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Harry M. Barton
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April 26, 2016

By Hand Delivery
Ms. Lora W. Johnson, CMC
Clerk of Council
Council of the City of New Orleans
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

Re: **In Re: Resolution Regarding Proposed Rulemaking to Establish Integrated Resource Planning Components and Reporting Requirements for Entergy New Orleans, Inc. (Docket No. UD-08-02)**

Dear Ms. Johnson:

Entergy New Orleans, Inc. ("ENO") hereby submits for your further handling and filing an original and three copies of ENO's Application of Entergy New Orleans, Inc., For Approval of a Direct Load Control Pilot Program, and the exhibits thereto. Please file an original and two copies into the record in the above referenced matter, and return a date-stamped copy to our courier.

Should you have any questions regarding the above matter, please don't hesitate to contact me. Thank you for your assistance with this matter.

Sincerely,

Harry M. Barton

HMB/bkd
Enclosures

cc: Official Service List (*via email and U.S. Mail)*

BEFORE THE

COUNCIL OF THE CITY OF NEW ORLEANS

IN RE: RESOLUTION REGARDING PROPOSED RULEMAKING TO ESTABLISH INTEGRATED RESOURCE PLANNING COMPONENTS AND REPORTING REQUIREMENTS FOR ENTERGY NEW ORLEANS, INC.	)))))))	**DOCKET NO. UD-08-02**

APPLICATION OF ENTERGY NEW ORLEANS, INC.
FOR APPROVAL OF A DIRECT LOAD CONTROL PILOT PROGRAM

Entergy New Orleans, Inc. ("ENO" or the "Company"), pursuant to Council Resolution R-15-140, respectfully submits this Application for Approval of the Direct Load Control Pilot Program Plan (the "Application"), and, in support of this Application, ENO respectfully shows as follows:

I.

ENO is an electric and gas utility organized and operating under the laws of the State of Louisiana, with its general office and principal place of business at 1600 Perdido Street, Building 505, New Orleans, Louisiana 70112. The Company is engaged in the manufacture, production, transmission, distribution, and sale of electricity to residential, commercial, industrial, and governmental consumers throughout the City of New Orleans. ENO furnishes electric service to approximately 196,711 customers in Orleans Parish. The Company also provides natural gas service to approximately 105,501 retail gas customers in Orleans Parish.

II.

In July 2009, ENO submitted a filing in which it detailed the specifics of the design and funding levels for programs to be included in the Energy Smart Plan programs (*e.g.*, selection of

a third party administrator, verification of deemed savings calculations, proposed goals and targets). On September 17, 2009, Council Resolution R-09-483 approved the Energy Smart Plan programs as designed, including funding levels and allocations, and goals and targets recommended by ENO, and found ENO's programs to be just, reasonable, and in the public interest.

III.

In April 2011, ENO and the third party administrator, CLEAResult, implemented the Energy Smart Plan programs and began offering programs to ENO electric customers. ENO filed status reports as outlined and required by Council Resolution R-11-52. Representatives of ENO and CLEAResult made presentations on the first, second and third year results and on the progress of the Energy Smart programs to the Council's Utility, Cable, Telecommunications and Technology Committee (formerly known as the Council Utility Committee). Additionally, ENO submitted written reports summarizing the first, second, third, and fourth year results of the program.

IV.

Council Resolution R-15-599 approved the proposed budgets for Energy Smart Program Years 5 and 6. Program Year 6's budget for ENO's legacy territory ("ENO-Legacy") included an allotment of $440,000 for a Direct Load Control Pilot ("the Pilot") program.

V.

Subsection 2 of the ordering section of Council Resolution R-15-140 states the filing requirement for new pilot programs:

> Prior to the implementation of any new pilot program for the Energy Smart program, the Companies must file an application with the Council for review and approval that includes, at a minimum:
>
> a. Incentive costs, non-incentive costs and kWh savings (in some cases where the supporting calculations require, individual measures

should be shown within a program) for each individual pilot program proposed;

b. EM&V spending at 6.5%
c. LCFC including the adjusted gross margin ("AGM") calculation;
d. The composite of the pilot program costs and other proposed program costs, including NOLA Wise, should be shown to equal the annual total spending levels of $6.5 million for Program Year 5 and $7.8 million for Program Year 6 as approved in Resolution R-14-509; and
e. A program description that includes the objective of the pilot, including results, as appropriate, that will provide data to determine cost-effectiveness should a full implementation of the program be considered. [1]

VI.

The Council-approved budget for Program Year 6 is as follows:

ENO Residential, C&I Program Portfolio Budgets			
Year 6			
Residential Program	Incentives	Non-incentives	Total
HPwES	$ 346,032	$ 241,586	$ 587,618
Consumer Products	$ 249,353	$ 197,974	$ 447,327
Low Income Audit & Weatherization	$ 361,252	$ 400,467	$ 761,719
NOLA Wise Schoolkits and Education	$ 81,884	$ 384,903	$ 466,787
Residential Heating and Cooling	$ 230,735	$ 132,555	$ 363,290
Small C&I	$ 564,721	$ 534,105	$ 1,098,826
Large C&I	$ 941,341	$ 966,151	$ 1,907,492
Behavioral Pilot		$ 300,000	$ 300,000
Direct Load Control Pilot		$ 440,000	$ 440,000
EM&V			$ -
LCFC			$ 887,882
Utility Incentive at 100%			$ 530,000
Total Budget			$ 7,790,941
Council Approved Budget			$ 7,800,000

[1] More recently, in Resolution R-16-106 the Council recommended that proposals for pilot programs "should include, at a minimum, (1) the number of customers to be included in order to generate adequate data for evaluation, which customer classes should participate, whether participation is voluntary or mandatory; (2) what data is to be collected and how it will be collected; (3) the duration of the proposed pilot program; (4) draft tariff provisions to implement such a pilot program; and (5) the anticipated costs and rate impact of such a pilot program." The information set forth herein, and contained in the attached Implementation Plan, fulfills these requirements. ENO notes that the Council's prior approval of the budget for the Pilot largely eliminates the need for discussion of items (4) and (5) from R-16-106, as no tariff is necessary and no rate impact will result.

VII.

The proposed budget for the Pilot is as follows:

2016 - Direct Load Control Pilot Budget	
Task	**Budget**
Start Up, Contractor Training & Implementation	$136,610
Marketing & Outreach	$ 42,368
Load Control Equipment - Purchase & Set Up	$169,870
Installation (Trade Allies)	$ 47,987
EM&V	$ 28,600
Incentives – Customer Participation	$ 14,000
Total Budget	**$439,435**

Costs associated with the Pilot are on par with similar programs executed throughout the country.

VIII.

Spending for Program Year 5 was as follows:

Budget for Energy Smart ENO Legacy	$6,500,000
Total Spend as of April 26, 2016	$4,794,010[2]

IX.

The Company believes that the Pilot should cover the entire span of the hottest months of the year because this time period will show the greatest savings as a result of cycling air conditioners off during times of peak use. As such, the Company recommends a start date of June 1, 2016 and an end date of May 31, 2017. This proposed end date is later than the end date for Program Year 6, but it provides the opportunity to collect data in all of the hottest months of

[2] This amount has been paid as invoices from ENO.

the year. As with other Energy Smart programs, the Company plans to provide three quarterly updates and a year-end annual report on the Pilot to the Council.

X.

The Lost Contribution to Fixed Costs ("LCFC") and performance incentives have not been projected for this Pilot. The mechanisms for both calculations are based upon the kWh savings achieved. Direct load control programs generally shift the use of energy from one part of the day to another, so the kWh savings are typically small. In addition, ENO residential customers do not have a demand charge that contributes to the fixed portion of charges, so there is no LCFC related to demand charges. There generally are some small kWh savings which are determinable through the process of the Pilot. The EM&V contractor will attempt to assess the kWh savings retrospectively.

XI.

In further accordance with Council Resolution R-15-140, the Company has attached to this application the Implementation Plan, responses to comments from the Advisors, and a discussion of cost-effectiveness for the Pilot as Exhibits 1, 2, and 3, respectively.

XII.

In support of the request set forth herein, the Company submits this application for the approval of the Direct Load Control Pilot Program for ENO-Legacy customers for Program Year 6.

WHEREFORE, the Company respectfully requests that this Council issue a Resolution:

1. Approving the Company's proposal for the Direct Load Control Program;
2. Approving June 1, 2016 – May 31, 2017 as the time period for the Pilot; and
3. Granting all other general and equitable relief that the law and the nature of this proceeding may permit.

Respectfully Submitted:

By: _____

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Timothy S. Cragin, Bar No. 22313
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ATTORNEYS FOR ENTERGY NEW ORLEANS, INC.

CLEAResult

Implementation Plan - Entergy New Orleans – Direct Load Control Pilot

Pilot Objective

In New Orleans City Council Resolution R-15-140, the City Council requested Entergy New Orleans, Inc. ("Entergy New Orleans") to implement a Direct Load Control Pilot in Program Year 6 of the New Orleans EnergySmart Program. The Council approved a budget of $440,000 for the pilot program.

The Direct Load Control Pilot project is designed to recruit up to 350 residential customers with central air conditioning systems and to understand the peak load impact deliverable through a Direct Load Control (DLC) program. The preferred timing of the pilot is to start as quickly after the New Orleans City Council approves the pilot program. If the Council approves the project in April, CLEAResult believes that we can recruit the 350 customers during the remainder of April and in May and have the installations completed in time to collect meaningful data throughout the term of the pilot.

Implementation Process

Below, CLEAResult has summarized the implementation plan for the Demand Response Pilot. It includes the program's marketing/outreach, customer recruitment, trade ally recruitment/training, device installation process, data collection/management, Evaluation, Measurement &Verification ("EM&V") procedures and a budget for implementation. Because this pilot has a limited number of participants, CLEAResult will utilize a targeted outreach approach for recruiting participants for the program.

1. Marketing/Outreach

a. CLEAResult's marketing/communications department will utilized the EnergySmart Program branding to create acceptable, and impactful marketing materials for various marketing channels designed to encourage customers to participate in the DLC program.

b. CLEAResult will geographically target neighborhoods that have single-family homes utilizing central air conditioning systems. During the initial kick-off meeting, the program team can discuss the specific neighborhoods that need to be targeted.

c. CLEAResult will enroll a significant percentage of customers through targeted e-mails, door hangers and EnergySmart trade allies referring customers who are already participating in the EnergySmart Program.

d. CLEAResult marketing staff will handle all printing, receiving, sorting and enrollments associated with the program.

e. The local CLEAResult call center will answer customer's questions about the DLC program, reviews steps for participation and enroll the customer in the program.

2. Customer Enrollment

a. Customers will enroll through in-bound and outbound calls by the CLEAResult New Orleans call center.

b. The program will pay the customer a one-time $40 incentive for participation in the pilot program.

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3. Participation Guidelines

The DLC Pilot Program is designed to help Entergy New Orleans use less energy when the demand for electricity is at its highest. During the high usage period, Entergy New Orleans will schedule cycle session events through the pilot program to reduce the electric demand of central air conditioning system during these peak periods.

By participating in the DLC Pilot Program, the customer is agreeing to let Entergy New Orleans briefly cycle off the air conditioner condensing unit during June 1 through September 30 between the hours of 4pm through 6pm (2 hour per cycle session event), weekdays only. During the cycle session time period, the air conditioning condensing unit will cycle off 15 minutes every 30 minutes, during the cycle session period. This equates to 30 minutes of the entire hour. You can expect the utility to cycle off each participant's condensing unit approximately 12 times during the 4 month period. Cycle times will be varied in order to understand the optimal cycle time for the city of New Orleans.[1]

a. Only single family homes located in Orleans Parish that receive their electric service from Entergy New Orleans can participate in this Direct Load Control Pilot.

b. The home must utilize a central air conditioner or heat pump system that is in proper operating condition and that is currently being utilized for cooling. If the DLC program installer determines that there are maintenance issues, the homeowner must get the unit repaired before a DLC unit can be installed.

c. For homes that have multiple central air conditioning systems, the program will install DLC units on a maximum of two air conditioning systems.

d. Customers are eligible for a one-time $40 incentive for participating in the DLC Pilot Program.

e. For customers who plan to have a special event, during the cycle session time periods, they can call to be removed from the cycle session schedule for one day only.

f. Entergy New Orleans does not recommend participating in the pilot program if someone in the household is experiencing serious health problems.

4. Trade Ally Recruitment/Training

a. CLEAResult will recruit the appropriate number of local EnergySmart Program – HVAC contractors that are already enrolled in the Energy Smart Program as a trade ally.

b. CLEAResult will recruit, train, manage and provide quality control for the trade ally contractors performing installations for the DLC program.

c. Participating as a trade ally performing installations for this program will provide additional benefits:

   i. We are providing ready work orders for their staff, no marketing costs.
   ii. Each dealer will receive a level of "status" by virtue of being associated with ENO.
   iii. Enhancing the New Orleans dealer network to get them involved with future DLC/Demand Response programs to ensure dealer compliance with the program for years to come.

d. CLEAResult, Director of Demand Response Operations will train the EnergySmart HVAC contractors and technicians to properly install the DLC devices on the customers' outside air conditioner compressors.

[1] Please see the Responses to the Advisors' Comments (included with this filing) for a discussion on cycle times.

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i. Because the installation occurs outside the home, there is no need to gain access to the home and also little need for scheduled installation appointments.
ii. This installation process makes participation much easier for the homeowner as they do not need to be home during the installation.
iii. If customers prefer to be present during the installation or if the AC unit is enclosed within a locked gate, CLEAResult and the contractor will accommodate those requests and situations.
iv. A core team of CLEAResult technicians will provide installation training, supervision and quality control audits

5. Device Installations

a. CLEAResult will utilize the below Field Installation Procedures when installing a DLC unit on a customer's central air conditioning system.

b. Upon arrival at the customer's home, the technician will:

i. Perform a visual inspection of the A/C unit;
ii. Test the system to ensure that it is in proper working order;
iii. Disconnect power to the system;
iv. Mount and configure the new DR device and confirm connectivity;
v. Following installation and configuration the technician will test the HVAC system to ensure proper installation and operation;

c. In cases where installation is not possible due to a correctable problem (e.g., electrical code violations, physical access issues, equipment maintenance issues, etc.), the technician will inform the customer about the issue and instruct the customer to call the toll-free customer service number to request installation of the load control device after they have completed the necessary unit repairs.

d. If the customer has not rescheduled within two weeks, a CLEAResult representative will contact the customer to follow-up on the repair status. This process allows us to reach a resolution on all customers within one month of the initial installation attempt

6. Data Collection Requirements

a. CLEAResult will work with ENO and ADM (EM&V evaluator) to develop a set of data fields that are captured during each installation.

i. Customer name, address, phone and account numbers will be verified before installations begin
ii. AC compressor nameplate data, when available is captured on the work order
iii. The technician will capture the DLC unit serial # which is the unique identifier for the DLC unit.

7. Data Management & Reporting

a. CLEAResult will utilize the DLC manufacturer's load management software (LMS) system to administer the programs participation and for the execution of direct load control events.

b. Once the DLC units are installed and the contractor submits the work orders for processing, the DLC unit serial number and installation address will be entered into the load management software.

c. This process with be discussed further at the initial program kick-off meeting with Entergy New Orleans.

d. Routine and timely reporting of necessary program data is determined at kick off meeting

CLEAResult

8. Inventory Management

a. CLEAResult will take possession of necessary inventory of DR devices and secure in a proper warehouse location.

b. CLEAResult accepts responsibility for inventory management and shrinkage.

9. Evaluation, Measurement & Verification (EM&V)

The Residential Direct Load Control Pilot Program's evaluation will be conducted by Entergy New Orleans contracted evaluator ADM. The evaluation/verification of the expected peak demand kW savings for the New Orleans market. Below outlines the overall objectives for the program evaluation.

The primary objectives for the residential DLC pilot EM&V are to:

a. Confirm that the savings claimed by the EnergySmart Program are defensible given field data and other documentation collected by the program implementation team;

b. Confirm the appropriateness of the savings methodologies used by the program implementation team to estimate energy savings;

c. Determine the available resource provided by a DLC system under critical peak conditions; and

d. Recommend strategies to respond to pilot program challenges experienced during implementation.

Once the program is implemented, Entergy New Orleans, ADM and CLEAResult can determine the appropriate date for delivery of the final EM&V Report that will be delivered. It's important to allow the Entergy New Orleans and the CLEAResult program team to review, cross-checking identified issues, and addressing any needed changes to reported program savings and supplemental data collection.

10. Pilot Budget

CLEAResult has created a Direct Load Control Pilot program budget that includes for the load management software set up cost, purchase of the DLC units, program design, marketing/outreach/enrollment, contractor recruitment/training and installation of the units. Because this is a new DLC program, the first year initial startup cost is much greater than subsequent years of the program. The below table provides the budget by task for installing DLC units for an estimated 350 customers. Because of there is a high upfront cost for purchasing the DLC load management software, set-up of the software and the DLC unit cost, it's important that the equipment cost be pre-funded to allow for immediate payment to the DLC vendor once the equipment is delivered.

CLEAResult

2016 - Direct Load Control Pilot Budget	
Task	**Budget**
Start Up, Contractor & Implementation	$136,610
Marketing & Outreach	$ 42,368
Load Management System (Includes Set Up, Testing) - Software & Communications - Direct Load Control Units & Materials	 $128,590 $ 41,280
Installation (Trade Allies)	$ 47,987
EM&V	$ 28,600
Incentives – Customer Participation	$ 14,000
Total Budget	**$439,435**

Entergy New Orleans Demand Response Pilot – Responses to Comments from the Advisors to the City Council of New Orleans

The purpose of this pilot is to understand the kW impact achievable through direct load control of central air conditioning systems in the average home in Orleans Parish. Entergy New Orleans has requested that CLEAResult Consulting provide the infrastructure, marketing and installation services to offer a demand response pilot to approximately 350 residential customers. The duration of the test period of this pilot is summer/early fall 2016, provided approval is given to begin the pilot with sufficient time and weather conditions to gather appropriate control day data.

The Advisors to the City Council of New Orleans ("Advisors") posed a series of questions and comments pertaining to the pilot. A pilot is, by nature a research project to gain information. Therefore, we do not have all the answers prior to conducting the pilot, but we do have information that pertains to similar projects from around North America.

Question/Comment A1:

Why fix on 50% cycling when 25% has often been used? Why not vary cycling time for different participants to better evaluate impact of percent off time?

CLEAResult response: A 50% control strategy is the most common level of control for programs across North America. Under the typical control conditions, ambient temperature in excess of 95°, a 50% control will provide peak demand reduction in the range of 0.9 to 1.1 kW per central air conditioning unit. Please see Figure 1 for a similar pilot study conducted in Houston, TX.

Figure 1:

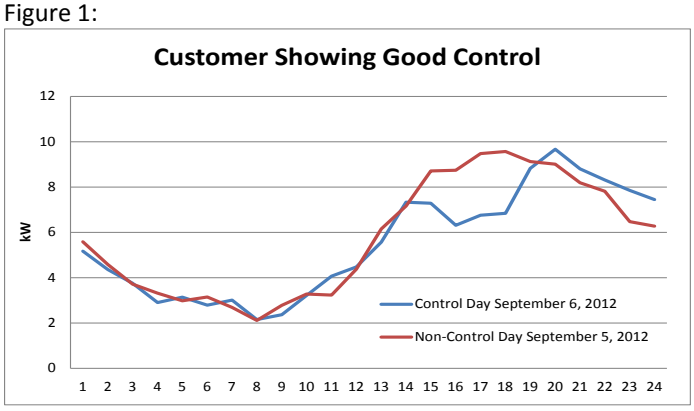
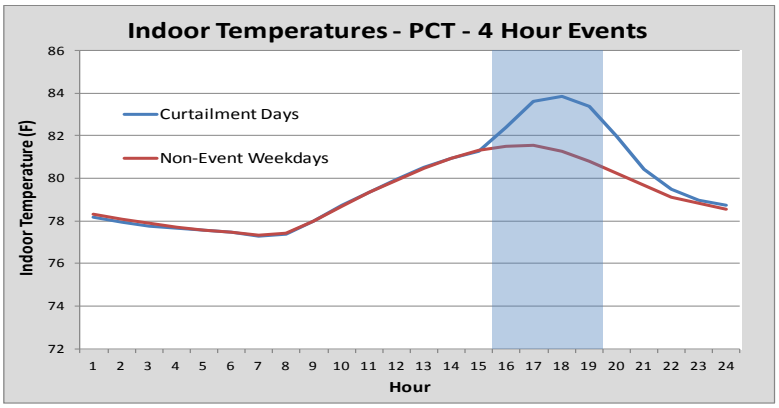


Figure 1 represents data gathered in a direct load control pilot conducted in Houston, TX in the summer of 2012. The DLC equipment used in the Houston pilot is the same type of equipment proposed for the Entergy New Orleans pilot. This pilot data indicates a whole house demand response impact of almost 2.0 kW. This particular test house was equipped with two central air conditioning units (3.0 and 2.5 tons respectively)

The resultant indoor temperature gain from the 2012 Houston, TX study is depicted below in Figure 2.

Figure 2: Indoor Temperature



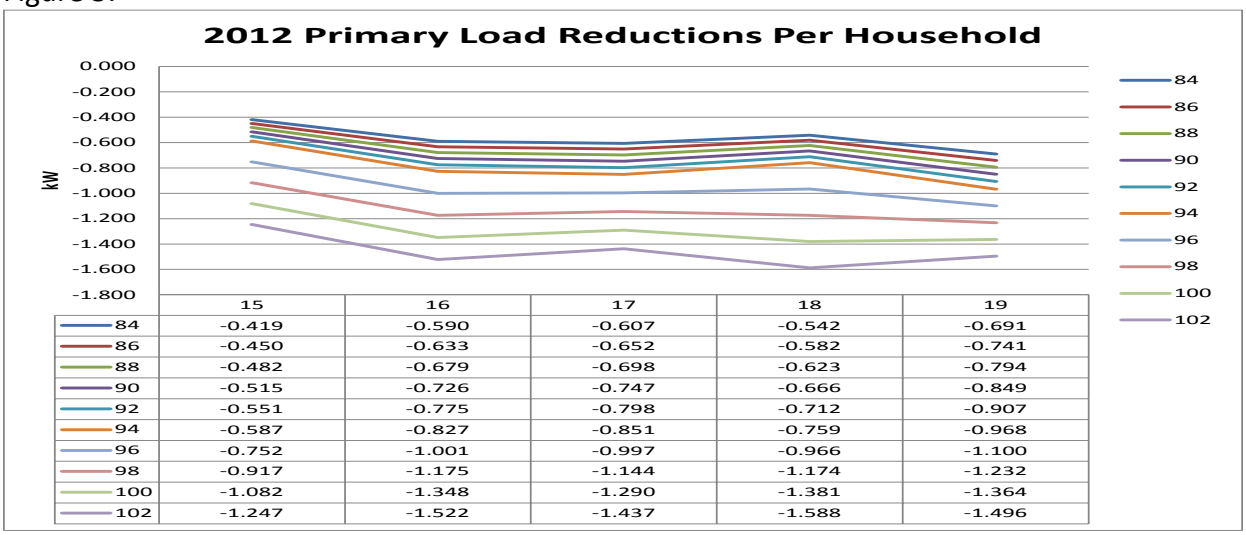
Average Increase in Indoor Temperature (F) During Curtailment		
Type of Event	Load Control Device	
	DLC Switch	PCT
2 Hour Events	0.6	0.8
4 Hour Events	1.1	2.6

36

The DLC indoor temperature gain is compared to an earlier study using programmable communicating thermostats (PCT). The average indoor temperature gain for the DLC program was 0.6° during a 2 hour cycling event and 1.1° during a 4 hour cycling event. The program using PCT remotely raised the thermostat settings and the resultant indoor temperature gains were 0.8° and 2.6° for the same time periods.

The Advisors raise a very good question regarding control strategy and we are happy to enact varying levels of control and duration throughout the pilot study. CLEAResult will coordinate with the EM&V contractor to gather information at different levels and length of control. Figure 3 illustrates the correlation between temperature and load impact:

Figure 3:



	15	16	17	18	19
84	-0.419	-0.590	-0.607	-0.542	-0.691
86	-0.450	-0.633	-0.652	-0.582	-0.741
88	-0.482	-0.679	-0.698	-0.623	-0.794
90	-0.515	-0.726	-0.747	-0.666	-0.849
92	-0.551	-0.775	-0.798	-0.712	-0.907
94	-0.587	-0.827	-0.851	-0.759	-0.968
96	-0.752	-1.001	-0.997	-0.966	-1.100
98	-0.917	-1.175	-1.144	-1.174	-1.232
100	-1.082	-1.348	-1.290	-1.381	-1.364
102	-1.247	-1.522	-1.437	-1.588	-1.496

Question/Comment A2:

How will these 12 [control events] times be selected over the four months – THI index? System peak load? Non-coincident peak load? Or other criteria?

CLEAResult response: The purpose of the pilot is to determine the amount of peak demand reduced with each control event. We are gathering data as it pertains to the amount of peak load reduced at various ambient temperature, control levels and durations. A pilot of 350 homes will have no noticeable impact on the overall grid or coincident system peak. An ongoing demand response program would incorporate each of the criteria noted by the Advisors to determine when and for how long to control. The primary driver for any demand response pilot is temperature.

Question/Comment A3:

How will the 350 participants be selected such that they statistically represent the population of ENO residential customers with central A/C? Will alternates be chosen to replace participants who move or drop from the DLC Pilot for any reason? Should duplex and other small multi-family housing with one central A/C be considered? Since the participants will be limited to the East Bank because this Pilot is funded by East Bank ratepayers, how will the participant selection and program structure provide that the results may also be applied to residential central A/C customers in the West Bank?

CLEAResult response: When demand response programs are offered to the general population, the responding customers may not represent a statistical sampling. Demand Response programs are voluntary and different customer segments participate for different reasons. Some customers will participate because of the incentive payment, others because they perceive a social responsibility to help strengthen the electric grid or reduce the need to build additional generation plants.

The group of customers that enroll in demand response pilots typically corresponds to the groups that will respond to a general demand response program. While this group may not be statistically representative of the overall population, it is likely representative of a future group that may participate in a demand response program.

Entergy New Orleans is operating this pilot on an extremely tight budget and there are no funds provided to develop a representative sampling of the general population. As previously stated, a representative sampling of the general population may not accurate approximate the future participants in a demand response program. One reason to select a pilot group of 350 homes is to allow the EM&V contractor a larger sample from which to select a smaller and more representative sample of Orleans Parish homes.

As customers enroll in the DR program, we will capture any willing participants that exceed the initial 350 available slots. We do not anticipate, and funds are not available, to recruit replacement candidates for move outs or drop outs. Most EM&V contractors will select roughly 100 participating homes to monitor and another 100 homes for the control group. With 350 participants, we should have adequate participation for the duration of the pilot period.

We can, of course, offer the DR program to homeowners who live in duplex or owner occupied multi-family homes. Many DR programs limit participation to single-family, owner occupied to maximize cost-benefit ratios and to avoid excessive move-outs, which are more common in rental and multi-family properties. Our purpose for this pilot is to gather the data that is desired by the City of New Orleans for purposes of determining if a larger DR program is warranted. We are happy to offer the program to any residential customer as directed by our client.

Across a broad cross-section of customers, the residential populations and housing stock are somewhat homogeneous and we do not see great variations from one neighborhood to another unless there is a significant variation in socio-economic status. Even if this variation exists from the East to West Bank communities, the EM&V contractor can gather representative sampling of central air conditioning size and housing stock to approximate any variations in impact that might be expected from one community to the other.

Question/Comment A4:

Is the individual who has been identified as CLEAResult's Director of Demand Response part of the existing CLEAResult staff in New Orleans and familiar with the Energy Smart Programs administered by CLEAResult?

CLEAResult response: The Director of Demand Response operations is Mr. Bob Addicks and he is not part of the CLEAResult New Orleans staff. The purpose of Mr. Addicks involvement is to train the local Energy Smart trade allies in the installation methods for demand response technologies and to provide ongoing quality control processes to ensure compliance with CLEAResult standards. The DR program, which is an extension of the Energy Smart program will continue to fall under the jurisdiction of Mr. Alex Scott who has managed the Energy Smart program since 2012.

Question/Comment A5:

Does the agreement with the customer participating in the DLC Pilot include any provision for potential customer claims that their central A/C was adversely affected by the participation in DLC Pilot?

CLEAResult response: Yes, Energy Smart trade allies are fully insured for liability of damage to the customer's property. Part of our training to the Trade Allies is how to inspect each HVAC system before installation of the DR device to ensure that the system is in proper working order. If the HVAC system does not pass the initial inspection we will notify the customer of the failure and request that they call their service contractor of choice and notify us upon the completion of repairs. There are, of course, those instances where systems pass inspection and still fail shortly after installation. CLEAResult will work closely with Entergy N O and the customer's service contractor to inspect and repair the systems. If it is determined the DR device, or its installation caused the failure the Energy Smart trade ally will cover the cost of repairs. Please note that the selected DR technology has been in the market for over 30 years and is designed to be benign in its operation.

Question/Comment A6:

The DLC Pilot is proposed for Program Year 6, which is a program start for June 1. CLEAResult should provide a timeline indicating Council Approval of the DLC Pilot in April, selection of participants, and implementation on all customer sites, including rescheduling to be completed prior to June 1, 2016.

CLEAResult response: Our understanding is that approval has been delayed until at least the May Council meeting. It is impossible to set up, recruit customers and accomplish all installations prior to June 1. The program operations will continue throughout the summer months. Data gathering, analysis and final report submission will occur in the latter part of the year. While the majority of expense will occur in the early part of the program there will be some expenses such as call center, service calls, etc. that will be ongoing throughout the program period. Please see Figure 4 for an updated timeline based on approval at the May 19 Council Meeting. Please note that this timeline is dependent upon the ordering and receipt of switches by June 13 and that any delay in the receipt of switches will push this timeline back.

Figure 4

05/23/16	Order switches
05/23/16	Begin Outreach and Enrollment
05/23/16	Schedule Contractor Installation Training
06/08/16	Conduct Contractor Installation Training
06/13/16	Begin Installation of Switches*
07/22/16	Anticipated Completion Date for Installation
07/25/16	Begin Control Events

*assuming switches are received by this date

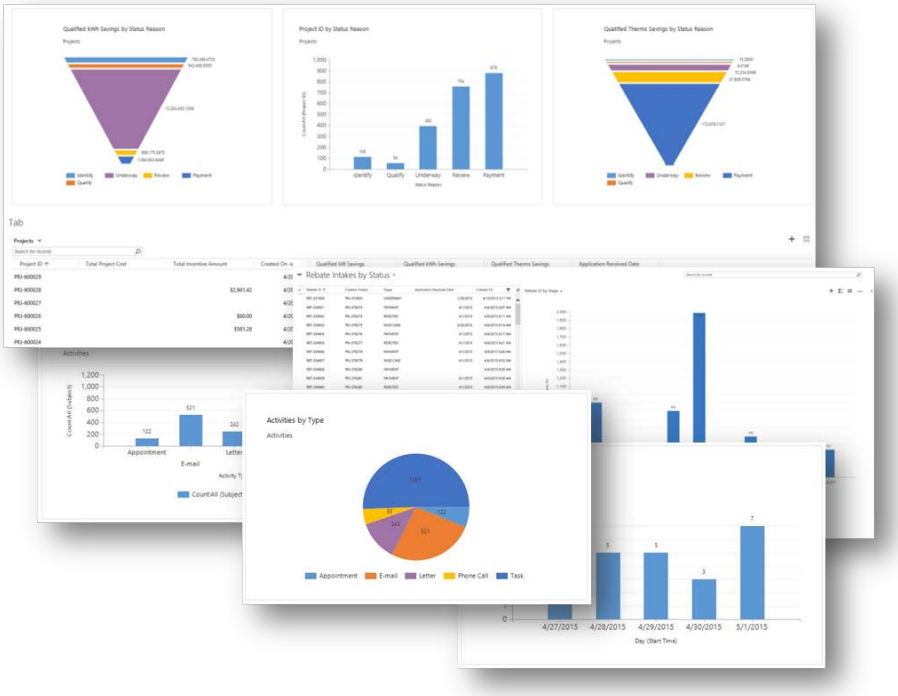
Question/Comment A7:

In what data base with the participants' set of data fields reside? CLEAResult should provide a description of the database and information that can be accessed, and how the data base will be used to produce and evaluate the results of the DLC Pilot. Has consideration been given to collecting continuous recorded data from the 350 participants during the 4 month period to better evaluate the impact on daily load shapes from the load cycling events?

CLEAResult response: The internal data collection and management platform we will use for the EnergySmart DLC Program is a Microsoft® Dynamics platform that CLEAResult customized for energy efficiency and demand response program data management and measures tracking. The platform, called Catalyst, allows us to monitor and track measures and devices installed through the program, customer contacts, appointments, call volume, and all other program activities. CLEAResult uses Catalyst to manage data for more than 200 utility clients and 700 programs. Through CLEAResult Catalyst, Entergy New Orleans will receive:

- A data management platform that is fully integrated and tailored to the specific needs of your program type, industry, customer segmentations, and program policies and regulatory framework
- Data tracking and insight into the program's entire lifecycle, from lead and customer generation to customer payment
- Standardized processes that support a quicker launch times

Catalyst is a flexible and configurable solution that allows us to align eligible products, incentives, program participants, and partners specific to Entergy New Orleans' program. We also have system integration solutions that allow the transfer of data into and out of Catalyst, such as between customer systems. We will also use data captured in Catalyst to report project and program information to Entergy New Orleans weekly, monthly, and annually. Example dashboards can be found below.



The purpose of the pilot is to record usage data on an ongoing basis in order to validate the peak demand impact during control events. The second part of the question is not applicable to this pilot because the plan is to continuously meter the pilot homes for the duration of the pilot.

Question/Comment A8:

CLEAResult should provide to the Council Advisors a full description and procedural guide of the load management software used to administer the programs participation.

CLEAResult response: Please see Appendix A for a detailed discussion of the Yukon Load Management System provided by Eaton-Cooper. Please note; only DR switch electronic addressing information will be housed in the Yukon load management system database.

Question/Comment A9:

What reporting will be made to Council Advisors?

CLEAResult response: The standard reporting package for a demand response pilot:

- Number and type of marketing activities by week
- Call center activity:
  - Number of calls received
  - Number of enrollments via call center
- Number of enrolled customers on a weekly basis
- Number of installations on a weekly basis
- Canceled or turned-down installations and reason code
- Customer complaints and resolution status
- Final report
- EM&V report:
  - Load impact measurement
  - Analysis and forecast of impact potential
  - Customer satisfaction report
  - Recommendations for program improvement
  - Cost-effectiveness testing

Question/Comment A10:

In what form and when will the evaluation of the DLC Pilot be provided to the Council. Results and conclusions applied to total ENO should be supported by workpapers.

ADM Response: The evaluation of the DLC Pilot would be provided prior to the end of the ENO program year. The load control season ends October 1st. It is anticipated that data would become available three weeks following this (October 24th). With this timeline in mind, ADM anticipates the following timelines for interim and final deliverables:

- Load analysis: completed by November 15th
- Draft report: completed by December 6th
- Results to be included in this pilot study are as follows:
- Verified load reduction during the pilot, in terms of total kW, kW per control device, and kW per ton controlled.
- Customer feedback on their experience in the pilot. This will in particular emphasize customer satisfaction, any noted discomfort during events, whether the program induces other Energy Smart program participation, and participant demographics.
- Pilot cost-effectiveness:
  - TRC of the pilot for the summer 2016 period;
  - TRC of the pilot population over a 5-year cycle;
  - TRC of an expanded program over a 5-year cycle.

Question/Comment A11:

Define the "program implementation team". The savings methodologies that will be used by the program implementation team should be provided to the Council Advisors prior to implementation of the DLC Pilot.

CLEAResult Response

The program implementation team will consist of several key CLEAResult staff.

- Roger Gray (Director)

  Mr. Gray will establish all setup with Eaton Cooper for the ordering of devices, paging system and software development for calling events.

- Bob Addicks (Director)

  Mr. Addicks will work with the New Orleans Sr. Program Consultant to establish the contractor network and train them on installation of the devices on compressors.

- Alex Scott (Sr. Program Manager)

  Mr. Scott will oversee all operations and manage the Sr. Program Consultant and Coordinator who will provide support for both contractors and customers.

- Sr. Program Consultant

  The Sr. Consultant will be hired to work day to day with contractors and customers on installation of devices and ensure any follow up work that may need to be completed will take place.

- Program Coordinator

  The program Coordinator will respond to e-mail and phone calls from customers and contractors, schedule installations and process incentive payments.

- Marketing Account Manager

  The Marketing Account Manager will oversee all collateral creation, website development and copywriting for communications.

ADM Response:

Savings methodologies used in this pilot will be as follows:

- **Comparison group analysis:** the primary mode of analysis will be comparison group matching. In this, the pilot group will be split randomly into equal groups, one of which will not be curtailed during a system event. This will provide a meaningful counterfactual as to what would have occurred absent the curtailment event.

- **Baseline day matching:** in the same events administered with a comparison group, ADM will analyze the reduction via baseline day matching. In this approach, the curtailment group is compared to itself, using three of five eligible baseline days. Eligible baseline days are defined as the prior five days that are non-weekend, non-holiday, non-event days without a major system outage. Three of five such days will be selected based on the first, second, and third highest average load during the hours of the day in which the event occurs on the event day.

The formula for this is as follows:

$$Baseline_t = Mean\left(BaseLoad_{a,t}, BaseLoad_{b,t}, BaseLoad_{c,t}\right) \times Offset\ Factor$$

Where,

$Baseline_t$ = Baseline load for hour *t*

$BaseLoad_{a,t}$ = Load on baseline day *a* for hour *t*

$BaseLoad_{b,t}$ = Load on baseline day b for hour *t*

$BaseLoad_{c,t}$ = Load on baseline day *c* for hour *t*

Offset Factor = Prior hour adjustment to normalize baseline load to event-day load. This is calculated as:

$$Offset\ Factor = \frac{Load_{a,t-1}}{BaseLoad_{a,t-1}}$$

$Load_{t-1}$ = Load on event day for the hour *prior* to the start of the event

$BaseLoad_{t-1}$ = Average load on baseline days for the hour *prior* to the start of the event

The Offset Factor is applied regardless of whether it scales the baseline higher or lower; though one would generally expect that this serves to increase kW load reduction results (through increasing the baseline to match event day load profiles) this is not guaranteed.

This analysis is redundant with the Comparison Group Analysis. However, it will have value in the pilot analysis in that it will be used to ascertain whether a comparison group is warranted after the pilot is brought to full-scale program implementation. If results differ by less than 5%, ADM will advise that the expense of maintaining a comparison group is not warranted.

Question/Comment A12:

Since the data collection is concluded by September 30, 2016, it is not unreasonable to establish a target date for an initial EM&V report to be provided to the Council.

ADM Response: please see ADM Response to Question/Comment A11 for a timeline for EM&V reporting.

Question/Comment A13:

On what basis was this statement made? Was the RFP for a TPA for the following program year considered? Was the EM&V contractor considered to be the same for future implementation?

CLEAResult response: Question A13 relates to the following comment in the pricing section of the pilot proposal: "*Because this is a new DLC program, the first year initial startup cost is much greater than subsequent years of the program.*" While startup costs are certainly a contributing factor to first year expense, most pilot programs only operate for one year. The greatest disparity between the per unit cost of a pilot and a fully operating DR program is the total number of participants. The infrastructure required to operate a pilot; database setup, call center training, load management software licenses and hosting costs and communication to the DR device expenses are almost equal to those same expenses for a DR program of 20-30,000 participants. The per unit cost of a pilot is much higher as the necessary infrastructure cannot be reduced beyond a certain level.

Question/Comment A14:

It is assumed that the software will be the property of ENO. If not, this should be clarified.

CLEAResult response: The software is not the property of ENO. Eaton-Cooper is providing a hosted software solution, which greatly reduces cost to ENO and the monthly fee for the load management software is only charged for the duration of the pilot.

Question/Comment A15:

CLEAResult and ENO should confirm that program funds are available for immediate payment to the DLC vendor.

CLEAResult response: CLEAResult is working closely with ENO to ensure funding is available for the load control equipment upon receipt.

Question/Comment A16:

For Transparency, how is CLEAResult compensated? The table does not provide any insights on that.

CLEAResult response: Upon contract addendum activation, CLEAResult will present ENO with an invoice for project startup costs. Startup payment will help to defray the cost of hiring new staff, expenses for training trade allies, call center CSRs on this specific program, marketing design and other expenses directly related to the activities which occur prior to active launch. CLEAResult will provide an invoice for DR equipment upon receipt and will subsequently pay Eaton-Cooper for those goods.

As the pilot progresses, CLEAResult will provide a monthly invoice for services rendered during the previous month. For example, if 100 DLC units were installed in the previous month those units are billed at the end of that month. Services provided on a monthly basis, such as project management, call center activities, paging services, etc. will also be billed on a monthly basis.

Appendix A

Cooper Power Systems
by EATON

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Smart Solutions ■ Smart Grid™

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Executive Summary

Introduction to Eaton's Cooper Power Systems

Eaton's Cooper Power Systems LLC is a business within the Electrical Sector of Eaton plc; a diversified power management company providing energy-efficient solutions that help customers effectively manage electrical, hydraulic and mechanical power. Eaton (NYSE: ETN) has approximately 103,000 employees worldwide and sells products to customers in more than 175 countries. Eaton's Electrical Sector is a global leader with expertise in power distribution and circuit protection; backup power protection; control and automation; lighting and security; structural solutions and wiring devices; solutions for harsh and hazardous environments; and engineering services. Eaton is positioned through its global solutions to answer today's most critical electrical power management challenges.

Eaton's Cooper Power Systems provides world-class electric power delivery apparatus and solutions for the utility, end-consumer and commercial & industrial markets. The company maintains a complete portfolio of products and services required to support the end-consumer and create a Smart Grid platform. Our technology allows our customers to transform, protect, connect, and build out an electric power system backbone. Smart apparatus such as voltage regulators, capacitors, reclosers, switchgear, smart sensors, and controls, integrated with enterprise level software and secure communications, enable customers to increase productivity, optimize asset efficiency, improve system reliability, and reduce costs.

The Energy Automation Solutions (EAS) group within Eaton's Cooper Power Systems provides Smart Grid Network Solutions such as demand response (DR) and advanced metering infrastructure (AMI), and reliability and grid-point solutions such as integrated volt/VAR control (IVVC) and feeder and substation automation systems. Through its CYME International business, EAS is also a leading provider of power system analysis tools.

Eaton's Cooper Power Systems is headquartered in Waukesha WI and has approximately 2,900 employees worldwide. The EAS group has more than 360 employees in North America, all engaged in supporting our products and services aimed at developing and maintaining the smart grid. We have a staff of over 50 individuals devoted to customer service and in excess of 280 engineers focused on software and hardware development.

Eaton's Cooper Power Systems Demand Response Solutions

With more than 20 years of specialized experience in DR programs, we are an industry leader committed to innovation and customer satisfaction. We offer reliable, industry-proven solutions that provide utilities and energy consumers with cost effective automation, energy savings and efficiency applications.

Eaton's Cooper Power Systems is one of the leading providers of utility solutions for demand response and energy efficiency in the United States and Canada. We are known for our:

- Industry leading technology
- Track record for quality

- Operational expertise
- Experienced DR support team
- Financial stability

Our DR solutions are the platform for many of the largest utilities in North America, such as Hydro One, Toronto Hydro, BGE, PSE&G, Duke Energy, First Energy and Xcel Energy. In all, our DR solutions:

- Serve more than 200 electric utilities
- Support nearly 890,000 smart thermostats and more than 5.3 million load control switches, totaling nearly 6.3 million load management devices
- Deliver approximately 6.5GW of utility-managed DR
- Enhance the end customer experience through our intuitive web portal utilized by an estimated 800,000 utility energy customers to remotely manage their energy use and their participation in demand response programs and events

We recognize the importance of the relationship between the utility and the end-user. A utility's customers need to be empowered to have control of their energy resources. At the same time, the utility needs to be able to ensure system stability and cost effective operation by reliably delivering the necessary amount of avoided or reduced load. We understand this balance and offer DR solutions that consistently and reliably deliver forecasted load reductions, while allowing individual customers the control and flexibility to determine their comfort and enrollment preferences through our advanced web portal. This secure and protected interface encourages greater participation and customer satisfaction in utility programs. Just as important are the security methods implemented to protect customer privacy with our secure technology.

A Demand Response Innovation and Technology Leader

Eaton's Cooper Power Systems commitment to innovation and cost-effective implementation of new technologies allows us to provide utilities and their customers with more choices, today and tomorrow. Through advancements in technology and improvements in our production process, we continue to reduce the total lifetime cost per kW of our DR solution, resulting in $/kW costs which are significantly less than building new generation or purchasing long-term power contracts.

We offer the most flexibility for communication solutions in the utility DR market, and a selection of packaging to fit a wide variety of applications. In addition to offering proprietary communications, we support open protocol standards and the ability to leverage customers' existing communication infrastructure.

Our DR solutions use advanced algorithms for precise comfort and targeted reductions in energy use.

Eaton's Cooper Power Systems is active in many of the key organizations that support and drive industry trends and future technologies such as:

- Peak Load Management Alliance (PLMA)
- Demand Response and Smart Grid Coalition (DRSG)
- Demand Response & Advanced Metering Coalition (DRAM)
- Association for Demand Response and Smart Grid (ADS)
- Association of Energy Services Professionals (AESP)
- ZigBee® Alliance
- OpenADR Alliance

Integrated *Yukon™ Advanced Energy Services* Software Platform

Eaton's Cooper Power Systems demand response solutions are driven by our **Yukon™** advanced energy services software platform, which offers complete support for intelligent control endpoints for both utility managers and energy consumers. Yukon is architected to provide the tools to effectively manage DR technologies with an emphasis on utility operational capabilities and ease of use for energy consumers.

We are proposing the Yukon platform operated as a hosted, cloud-based solution hosted at our Tier 3 hosting partner's facility. Yukon is modular in design and fully supports our array of DR, AMI and distribution automation (DA) applications. Acknowledging the diverse needs of utility operations and systems, Yukon is designed to allow ease of integration to other systems. The Yukon head-end system can work as a stand-alone system or in concert with AMI, SCADA, EMS, CIS, MDM, work order management, inventory control and outage management systems. Yukon allows utilities to build a comprehensive and fault-tolerant load management system.

Nearly 400 electric utilities use Yukon today to:

- Operate residential, commercial and industrial load management programs
- Control distributed generation
- Manage advanced metering infrastructure
- Manage power factor
- Monitor critical equipment
- Improve preventive maintenance practices

The Yukon software is designed to be both simple to use and scalable to a very large system. Eaton's Cooper Power Systems personnel have extensive load management implementation experience. We are able to offer consultative services for deployment, program and maintenance strategies, plus provide our clients with custom support services as needed.

Qualifications

As CLEAResult considers Eaton's Cooper Power Systems as a potential partner for its Direct Load Control Residential Electric Water Heater Pilot, we would also like to highlight the following unique set of qualifications.

Smart Grid Expertise

While there are DR vendors who have acquired communications technology or communications vendors that have integrated DR technology, Eaton's Cooper Power Systems is unique. We are a smart grid vendor with roots in automating the distribution network and providing easy-to-use software to empower field devices and integrate them to additional applications within the utility.

We are committed to the evolving requirements of demand response and energy management through new product development and annual updates to our Yukon head-end system. Flexible communications and device interoperability are the building blocks of our solution.

Eaton's Cooper Power Systems can also integrate information from a two-way DR system into other applications such as AMI and IVVC that will helps ensure a higher level of reliability and service to its customers.

Experience

Eaton's Cooper Power Systems is the leading supplier of DR solutions to the utility industry. We have been awarded many of the competitively bid major DR programs, including those at AEP Indiana &Michigan Power, Northern Indiana Public Service Company (NIPSCO), FirstEnergy, Pacific Gas & Electric (PG&E), Baltimore Gas & Electric (BGE), Duke Energy, Hydro One, Toronto Hydro and We Energies. As our references will attest, Eaton's Cooper Power Systems DR solutions not only meet but exceed their goals and expectations for their program requirements, and each organization has expressed enthusiastic approval of our services.

Scalability

Our technology supports programs from pilot to full-scale deployment, with systems ranging in size from a handful of employee homes to hundreds of thousands of load control points. We currently supply proven DR solutions to many electric utilities, with programs ranging from 10MW to 600MW of load under control. These are facts, not theory or future goals.

Flexibility

We offer the most flexibility of any supplier through our advanced control technologies, open protocols, communication options and our proven Yukon DR Management system. Our DR solutions include single- and multi-function switches, a thermostat platform, and a beat-the-peak in home indicator, and we offer connections through various communication options such as 900 MHz, VHF, power line carrier (PLC), RF mesh and ZigBee®.

We understand that as technologies evolve, open standards and protocols provide the utility with protection against technology obsolescence and allow the utility to leverage new innovations without leaving stranded investments. Our focus is to provide you with choices designed to ensure the success of the program.

Stability

Eaton's Cooper Power Systems is part of Eaton and is an established, financially strong company. In Eaton's Cooper Power Systems, CLEAResult has a stable and proven company as a partner and one who presents no risk to you in continuing as a viable supplier now and in the future. As you look to build your program, you can depend on our ability to meet your needs for the long term. As part of Eaton, we have the resources and financial

strength to reinvest substantially in innovation and the development of new technology in support of DR.

We are committed to delivering solutions today that are also designed with the future and next generation DR solutions in mind.

Supply Chain

Eaton's Cooper Power Systems follows a defined strategic sourcing process to optimize our supply chain activities by coordinating and leveraging the purchasing and procurement of commodities from a select group of preferred suppliers. Cooper Power Systems strategic sourcing provides a cohesive inbound supply chain that maximizes the value of all products and services procured by all of our worldwide locations, providing exceptional global operating efficiencies and innovation.

Least Risk

We believe the solution characteristics described above are unique in the industry. Having a customer-focused partner with industry leading technical strength and financial stability is essential for long-term success.

Technical Requirements

Client References

Hydro One

Hydro One selected Cooper Power Systems for their mass market DR program in 2006. The Hydro One program is unique in many respects. Cooper is hosting the DR solution and providing all program administration activities on the project. In addition, Hydro One has selected to provide the DR infrastructure to several of the other smaller utilities (Hydros) in the area, allowing them to provide a DR solution without the burden of administering a Demand Response Software System. Roughly 50,000 paging thermostats have been installed beginning in 2006 using public 900MHz communications.

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Director of Conservation and Demand Management

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Conservation Analyst

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Baltimore Gas & Electric

Eaton's Cooper Power Systems was awarded the BGE contract in early 2008 and the program became active in May of that year. In the time since, Eaton's Cooper Power Systems has worked with BGE to develop a DR system that is fully integrated in to BGE's internal business processes. The program is currently targeted to residential customers, with possible extension to commercial customers in the future. It offers customers a choice of three levels of Air Conditioning (A/C) control: 50%, 75% and 100% cycling and a choice of Load Control switch or thermostat. The program combines recruitment of new customers as well as conversion of customers participating in a legacy DR program. To date, BGE has 350,000 air conditioners and 13,000 water heaters under control. In 2008 BGE was awarded the Peak Load Management Alliance Outstanding Outreach Award for the Peak Rewards Program.

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Supervisor, Residential Demand Response

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Xcel Energy

Xcel Energy has been an Eaton's Cooper Power Systems customer since 2002. Xcel Energy's Saver's Switch program is offered to residential and small commercial customers in seven states and has over 550,000 participating customers. Xcel Energy operates an all-switch program that includes control events for both summer and winter peaking conditions, cycling central air conditioners, and heat pumps, and shedding water heaters, pool pumps, generators, and dual fuel. Maximum savings and customer satisfaction are achieved through our patented TrueCycle intelligent algorithms. Xcel Energy implemented a custom version of the

	TrueCycle technology developed by Xcel Energy working with Eaton's Cooper Power Systems (Cannon Technologies). The Advanced Run-Time Air Conditioning Cycling provides a single algorithm that utilizes both pre-event weighted run time and actual average run time to calculate and administer intelligent cycling. Participants are paid an annual incentive for participating and on average the switches are activated 15 times per year. The program also has a less than 1% attrition rate, impressive for a long-standing program that does not allow overrides. The residential portion of the program has reached a 49% penetration rate in Minnesota where the program began. Other states are at approximately 25% penetration. The commercial portion of the program is at an approximate 10% penetration rate. To date, approximately 450,000 Eaton's Cooper Power Systems devices have been installed with Xcel Energy. Contact Information: Patrik Ronnings Demand Response Program Manager Patrik.ronnings@xcelenergy.com 612.330.5787
	Financial Information Requirements
	Due to the large file size, we do not typically include this report as an attachment. All public financial information is made available in Eaton's Annual Report on our website: www.eaton.com/Eaton/OurCompany/InvestorRelations/FinancialReports/AnnualReport/index.htm

System Architecture

Overview

Eaton's Cooper Power Systems has been providing end to end solutions that include communications for over 25 years and understands the strengths and weaknesses of the technologies that have been deployed to date. The demand response communication system is integral to the performance of the complete solution and its value to a utility. Our solutions optimize programs' value against cost, to result in a best of breed solution to our customers.

The traditional value of load control to a utility has been for contingency, capacity, and as an energy price hedge in the market. However, Open Access and Open Market regulations that address best standards and practices are paving the path to use DR resources for more advanced functions including ancillary services. Whether a utility is part of an ISO with an open DR market or not, Eaton's Yukon DR Platform is field proven to provide Fast DR. For example,

utilities within WECC are using DR resources for non-spinning reserves, which add an additional value chain to the DR resource.

Eaton's Cooper Power Systems offers the widest range of communications options of any load control/ DR solution provider in the market. We know that with communications, one size does not fit all utilities or values.

RF Mesh Communications Option for Demand Response

Cooper Power Systems RF Mesh option provides a robust communications network able to support a utility's DR applications. The RF Mesh option also provides expanded network capabilities that allow for future AMI and other grid automation capabilities to be added. Highlights of the RF Mesh communications option include:

- Highly reliable and cost-effective
- A single network that is 100% self-forming, self-optimizing and self-healing
- 100% redundant two-way communication capability to DR endpoints, as well as electric and water meters a service territory
- Easily expandable system with the simple addition of gateways to support growth areas
- High-bandwidth (up to 300kbps) and low-latency to maximize data throughput
- Minimal annual operating costs without spectrum license costs or tower rental fees

Cooper Power Systems two-way RF Mesh Load Control Switches operate independent of an electric meter and provide appliance load profiles, run time, extensive M&V capabilities, and tamper detection. These same devices also have built-in grid stability features such as Line Under Frequency, Line Under Voltage, and Cold-Load Pickup protections to mitigate voltage collapse or cascading outages. These patented grid automation capabilities are not available from any other solution provider

RF Mesh Two-Way Communications

The following are the key benefits of Cooper Power systems RF Mesh:

- Two-Way Communication. The two-way communication network provides the ability to receive status and performance data from every field device.
- Security Compliance with NERC CIP and NIST. The Cooper Power systems RF Mesh communications architecture is built in compliance with the current system security standards that include both encryption and authentication.

- Strategic Metering and Verification. Optional Meter Nodes can be added to the RF Mesh network to provide valuable information to a load management system. The meter nodes can be placed at strategic points on the network to provide the following information:

  - M&V Data. Whole-house of sub-metering of usage and demand for live data presentation and analysis. The data can also provide the information to validate datalog information and calculate load management performance.
  - Voltage Data. All meter nodes collect line voltage interval data, maximum and minimum readings, and can alarm on voltage thresholds. Meter nodes can be placed on end-of-line locations, taps and segments to monitor and report voltage conditions. This information allows the customer to deploy DR resources to locations in support of voltage regulation.
- Smart Grid Applications. The establishment of an RF Mesh network allows for easy migration to additional automation and optimization of key utility processes. Deploy additional applications without affecting network performance and/or an existing drive-by meter system. Applications include:
  - Pre-Pay Metering - offer Pre-Pay solutions to customers on a case by case basis. The addition of the meter node with disconnect automatically registers with the network on installation.
  - Disconnect Devices - install disconnect meters at locations that warrant their use to reduce operational costs.
  - Move In/Move Out - install mesh meters at locations that have a high turnover rate to reduce operation costs.
- Polyphase Metering. Polyphase metering nodes can be added to the RF mesh network for commercial and industrial customers. This will reduce the third party communication costs for these customers.
- DA Applications. The RF Mesh includes a robust backhaul; this established backhaul network provides the utility with the ability to add additional Distribution Automation applications that require high speed communication with field devices including automatic feeder re-configuration, IVVC, and other DA applications.

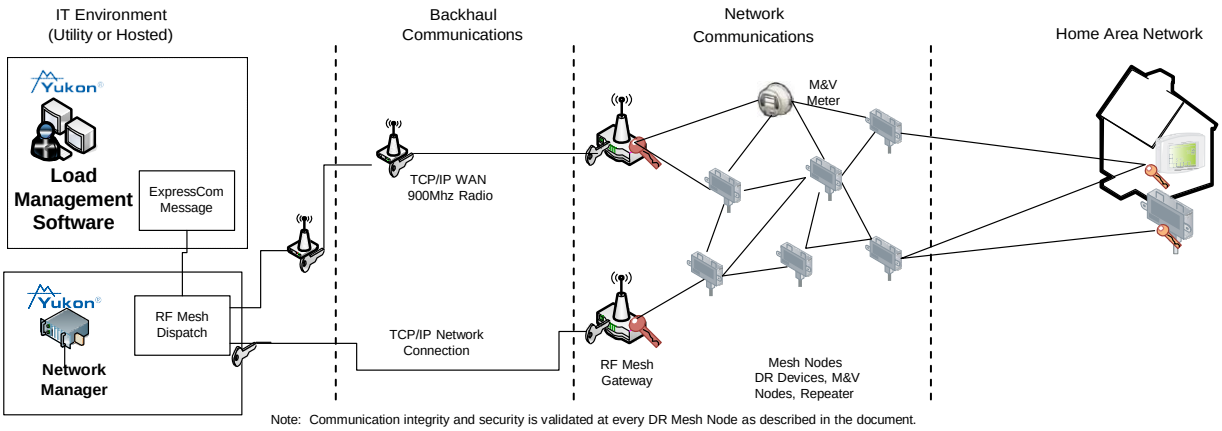
Event Messaging

Load Control messages are sent to the Mesh Network Manager for distribution to the communication system. The Cooper Power Systems ELPRO radio system provides the backhaul path from Yukon to the RF Mesh Gateways. The gateway devices then broadcast the DR messages to all devices in the network. Every device in the field receives the message. The message is then decoded using the encryption key and the switch determines if the message addressing is specific to it. If so, the command is processed and executed.

The Cooper Power Systems RF Mesh solution uses a superior performing mesh technology as a basis for the intelligent, secure network. Scalability and interoperability are at the foundation of the network. The RF Mesh network delivers highly reliable two-way communications across an unlicensed 900 MHz spread spectrum (902-928 MHz) utilizing radios with 50 channels for frequency hopping.

The Cooper Power Systems RF Mesh network is 100% self-forming, self-healing, and self-optimizing. No configuration of the nodes at the utility or in the field is required. The nodes automatically identify neighbors, form communication relationships, and they independently

Cooper RF Mesh with Native DR Node Communication



Note: Communication integrity and security is validated at every DR Mesh Node as described in the document.

determine the most efficient path to the gateway. If these primary communication relationships are interrupted, the nodes automatically migrate to alternative routes to the gateway without any single point of failure. This solution will require significantly less effort to deploy, maintain and operate than typical wireless solutions, providing a lower total cost of ownership.

Security

Cooper Power Systems provides industry-leading end-to-end security architecture and has employed a number of methodologies such as encryption to secure AMI data. Cooper Power Systems is constantly testing the security of its software and communications systems to mitigate security concerns. In addition to internal testing, Cooper Power Systems Yukon software platform undergoes outside third party vulnerability testing.

All Cooper Power Systems developers undergo routine cyber-security training to ensure product designs are robust, including training on the NERC-CIP requirements and how they apply to both the utility and the solutions offered to the utility. Employees are aware of the requirements and will comply with guidelines outlined by our utility customers to ensure compliance.

The Yukon software uses items such as login/permission protections, role-based security, user authentication (LDAP and Active-Directory), Secure Socket Layers, firewalls, Virtual Private Networks, etc. All users must be authenticated and all user and system activities are logged. Yukon is specifically designed to fit into existing utility IT environments.

Cooper Power Systems implements a security architecture that addresses the core security elements of Confidentiality, Integrity, and Availability (CIA) for all communications exchanges across the Cooper Power Systems AMI solution. All of our solutions are expected to meet current requirements and will continue to be evaluated to ensure that future requirements are met as they emerge.

Demand Response Hardware

Eaton's Cooper Power Systems is proud to offer the industry's most complete solution portfolio for demand response. Our offering includes a family of load control switches and the ecobee family of Smart Thermostats. We offer robust communications and a selection of packaging to fit a wide variety of applications.

The following sections provide details on the hardware and software solutions being proposed.

Load Control Switches

Our load control switches are an excellent option for demand reduction as well as energy management. They can be used to provide customers the ability to reduce energy use on major household loads within a home area network (HAN), can be connected directly to appliances, and can be used on commercial loads through an energy management system (EMS) for a variety of control applications including HVAC, pool pumps, lighting and motors.

Eaton's Cooper Power Systems load control switches provide appliance load profiles, run time, extensive M&V capabilities and tamper detection. These same devices also have built-in grid stability features such as Line Under Frequency, Line Under Voltage, protections to mitigate voltage collapse or cascading outages. ***These patented grid automation capabilities are not available from any other vendor.*** The devices also include Cold-Load Pickup and Short Cycle protection features for added safety and consumer equipment protection.

Large Enclosure	Small Enclosure

Load Control Switch Features

Eaton's Cooper Power Systems load control switches have several unique strengths:

Communications Protocols The ExpressCom protocol provides advanced addressing and feature options while minimizing communication bandwidth requirements and cost. ExpressCom is supported in most Eaton's Cooper Power Systems devices. The value to the utility is to provide flexible control and addressing features without having to re-program installed equipment.

Frequency Agile Receivers Eaton's Cooper Power Systems paging radio frequency (RF) devices have frequency agile receivers with Automatic Failover for VHF and Flex Paging, providing the option of supporting a "failover" air time provider. Eaton's Cooper Power Systems is the only vendor to offer this feature in all of our paging broadcast products and it can prove very valuable versus other solutions which are hard coded to a single frequency for life.

Over-the-Air Programmability All devices are over-the-air programmable allowing remote update of any load control or communications parameter, including cold load pickup, short cycle protection, under frequency and voltage settings, etc. For paging solutions this includes the communication frequency and CAP codes. A utility benefits by having a flexible communication system that can evolve as business requirements change.

Choices of Cost-Effective Packaging Eaton's Cooper Power Systems offers switch technology in two load enclosures: Multiple Relay and Single Relay. The multiple relay enclosure supports the installation of up to three relays in the device chassis with integral wiring compartment housing separate high voltage wiring compartments. The relays can be a mixture of 5-amp and 30-amp. This feature allows the delivery of cost-effective controls to sites with loads in addition to air conditioning for residential, small commercial and industrial applications. Eaton's Cooper Power Systems also offers a single load, small footprint package for the quickest and most effective installation in single load, air conditioner control applications.

Eaton's Cooper Power Systems switches are designed in collaboration with national installation contractors to minimize hardware preparation and installation time, resulting in savings on both installation and operating costs as well as improved customer service capabilities.

Both enclosures offer support for industry-leading communications features.

Switch Control Commands Flexible control options are provided depending on the type of load and best strategy to meet operations or energy markets requirements:

- Discrete which controls load for a continuous time period.
- Cycling which controls load in repeated control/restore cycles implemented on a random distribution basis and includes our Patented Advanced Control Algorithms.

- SCRAM. Each control address, i.e., Class/Relay address, is individually configured to respond to an immediate command from zero to eight hours.
- Cold load pickup is also supported and configurable separately for each relay or controlled load.

Switch Maintenance and Configuration Functions Our switches contain several software functions to enhance the utility's ability to lower the cost of operating a load control program. These include the following command capabilities:

- Contractual In and Out-Of-Service. Places a device in "hibernation," no actions are implemented by a device in this status until a commanded restore is sent.
- Temporary In and Out-Of-Service. Performs the same function as contractual but restores the switch to normal operation after a specified time period.
- Configuration Commands. Allows the change of switch settings over the air.

Configurable Load Control Relays The large enclosure switch, with its surface-mounted configuration provides one, two or three individually addressable non-latching relay outputs. These additional relay ratings and combinations permit switch installations to be tailored to the location application.

Switch Status Indicators Each load control switch includes *Load Status* and *Switch Status* LED indicators which are viewable without opening the switch enclosure or interfering with switch operation. The switch's LED indication function is configurable as enabled or disabled (i.e., the Load Status and Switch Status LEDs are enabled or disabled as a group).

Protected RAM Carry Over The temporary data used by the switch (e.g., scratch pad for calculations) is stored in nonvolatile memory. The Protected RAM contents include:

- Last message received
- Current load control data for each load (e.g., remaining control time for a discrete command)
- History counter data

Switch Start-Up When power is applied, the switch performs either a warm start or a cold start. The switch selects warm start if the carry-over voltage has been maintained on the nonvolatile memory. If not, a cold start is performed. A warm start retains the previous history counter and load control data; a cold start resets all history counters to zero and clears all in-process load control commands. The cold load pickup configuration determines the load control action at power up.

Switch Error Detection and Response *Internal Error Detection* routines monitor operation of the switch's microprocessor. If an internal malfunction is detected, these detection routines restart the microprocessor and/or restore all loads immediately and activate a switch internal fault indication as applicable. For *Message Error Detection,* the switch performs three levels of error checking for each transmitted command:

- BCH Check: After an entire message is received, a CRC (cyclic redundancy check) is performed by the switch. If the calculated CRC does not match the command's CRC, the command is ignored.
- Address Check: Address must match the switch's address for the switch to act on the command.
- Protocol: Each command must match the ExpressCom protocol requirements for that command type. If any protocol error occurs in a command, the command is ignored.

Switch Power Requirements The switch operates on AC voltage. One of two operating voltage configurations must be selected:

Operating Voltage Types	Operating Voltage Configuration
Standard:	120/240 VAC (+10%, -20%)
Frequency:	50 or 60 Hz (+2%, -2%)
Power Consumption:	Without Relay Activation: <3.5 W With Relay Activation: <7.0 W (full multiple relay load)

Line Under Frequency/Line Under Voltage Brown Out Protection

Eaton's Cooper Power Systems switches are equipped with automatic, instant relay tripping in the event that the device experiences an under frequency and/or under voltage event. The trip points and trip time are remotely programmable and trigger cold load pickup upon close. Both of these features – *Low Voltage Load Shed* and *Under Frequency Load Shed* – can be remotely enabled/disabled for the entire system, by group or for an individual device or relay.

Data Logs & Reporting

Eaton's Cooper Power Systems load control **switches** offer robust data logging capability and storage for retrieval of important M&V data such as date/time, runtime, control time, communications channel in use (multiple channel devices), system addressing, signal strength, amp draw, and verification of event participation. Our devices include an advanced logging system that records the start and end time for every event on the system. In addition, the following information is also stored in non-volatile memory: RSSI, paging channel, time and a number of utility configurable counters.

All information stored in the device can be configured remotely, including log duration, data type, freeze logs, start logs, stop logs and reset logs. The devices also time-stamp events (restarts, time syncs, etc.) and have the ability to log received messages.

Several customers use the data logs paired with the premise AC equipment information as their primary M&V data for reporting to PUCs, Commissions and Directors. The data log information, together with nameplate data from the air conditioner or heat pump, allows a utility to construct an hourly load profile for each air conditioner having a switch. The use of the data log information as valid M&V has been documented by multiple independent consultants and has been presented at IEPEC conferences and published in the IEPEC journal.

Smart Thermostat Offering

Eaton is also proposing ecobee wireless thermostats that provide full HVAC thermostat control and deliver energy efficiency and usage controls to the consumer. The integration of PCT, IHD, and DR into a single device provides a solution that:

- delivers low long term cost of ownership;
- enhances the customer experience for energy conservation and price management;
- consolidates the collection of usage and performance data for analysis and reporting.

The ecobee thermostats are the best way to deliver demand response functionality; reduce customer energy consumption (for both heating and cooling); and collect energy use data. Eaton is proposing the delivery of two ecobee smart thermostat models to meet Orange and Rockland's future needs. The devices can be targeted to match different customer segments, rate structures, or conservation goals. The models include:

- Ecobee3. Providing automatic comfort and energy efficiency through remote comfort and occupancy sensing technology.
- Smart Si. A traditional PCT Providing customer control, energy usage display, and modern esthetic controls at a lower price point.

ecobee3. The ecobee3 thermostat provides unprecedented customer comfort where it matters with enhanced energy efficiency capabilities. The ecobee3 thermostat expands upon the occupancy and temperature sensors at the device by providing remote wireless sensors that can be placed by the consumer where their comfort matters most. Furthermore, every wireless remote sensor connected to the thermostat also includes an occupancy sensor, making it easy and inexpensive to provide monitoring at all the high traffic regions of the home. The ecobee 3 automatically adjusts to deliver comfort when residents are home and savings when they are away.

The ecobee3 is enclosed in a sleek, low profile metal enclosure; includes a highly-responsive capacitive touch interface familiar to smart phone users everywhere; and delivers an updated customer centric user interface. Sensors can be wall-mounted or freestanding. Each thermostat comes with one wireless remote sensor in the box. Additional sensors are available for purchase.

Easy to install and beautiful to look at and use, the ecobee3 is truly the next-generation of thermostat.

Smart Si. The ecobee Smart Si thermostat provides residential customers with a value option for a PCT/IHD. The Smart Si includes a bright display and intuitive

keypad controls. Customers benefit most from products that are easy to use. ecobee thermostats incorporate bright, high contrast, color screens that are easily viewable in any lighting conditions. The color screen allows ecobee to use graphics, plain language and modern user interface design concepts to significantly improve the customer experience.

User navigation through various thermostat screens is accomplished using a 7 button key pad (left, right, up, down, select, home and menu). The ecobee Smart Si thermostat comes pre-programmed with an energy saving comfort schedule for homeowners looking for an out of the box solution. Smart Si thermostat's advanced features such as a fully customizable 7-day schedule and vacation events can easily be setup using a built-in set up wizard.

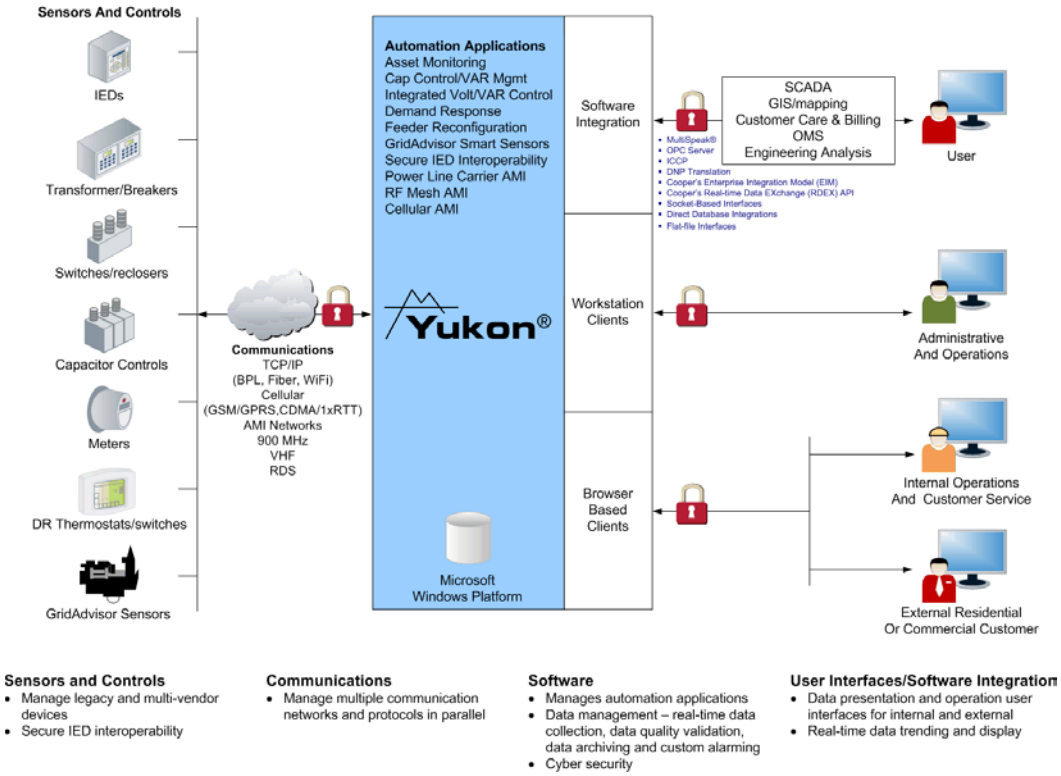
Demand Response Software

Yukon™ Software Platform

Eaton's Cooper Power Systems Yukon™ advanced energy services platform for demand response solutions runs in tandem with the software of various monitor and control servers. Yukon utilizes Java and Windows services technology, and is a modular platform that allows a utility to use it for one core business service and later add other operational or business functions.

The Yukon platform features include:

- Secure browser-based access to the system
- Microsoft SQL Server or Oracle databases
- Intuitive administrative options
- Advanced load management displays
- Meter data collection
- Feeder capacitor control
- Flexible integration suite



In the context of our demand response solutions, the Yukon software provides the tools to effectively manage your DR portfolio of programs. More specifically, it provides both direct and indirect control options.

- In direct control situations, Yukon initiates a signal designed to physically interrupt the load from cycling air conditioners, controlling pool pumps and water heaters, and turning on customer-owned generation.
- Indirect Control refers to the software initiating messages to provide the customer with information and notification messages detailing curtailment and real-time pricing information.

Yukon design emphasis has been placed on integration to other systems because of the diverse needs of today's utility operation center. The master station is built to work as a stand-alone system or in concert with AMI, SCADA, EMS, CIS, MDM, work order management, inventory control and outage management. These relationships can be thought of as "two-way" in that they gather and use data from real, pseudo or calculated points.

The Yukon DR module includes:

- Web-based front end, featuring:
  - Advanced Demand Response Programming and Control

  - Customer Service and Program Administration Portal
  - Consumer Portal
- Yukon Services containing the business logic for various processes to carry out specialized tasks and maintain interoperability of Yukon components. These include:
  - Message Dispatcher, responsible for receiving and passing on messages between the server and client applications
  - Port Control, responsible for channel management and field hardware communications
  - Load Management business logic engine which schedules and executes DR control strategies that have been defined by the user
  - Notification service responsible for coordinating and sending messages that notify utility personnel, end-customers and other program shareholders of control event activity
  - Yukon Web Server, the heart and brain of direct user browser-based interaction with Yukon
  - Enterprise Integration Module (optional), a toolkit of Web Services that provide specific Yukon DR functionality to other software applications across the Internet or a closed business network
  - Foreign Data Router (optional) that supports a large number of data point integrations with outside systems
- System Administration Clients
  - Java Clients, used by utility personnel to setup and manage the system within the corporate data network (can be used in tandem with Yukon's primary web portals to support and maintain the system)
  - Load Management Setup- the parameters for load control events

Yukon™ Demand Response Module

We work with many utilities that utilize Yukon to manage hundreds of load programs across multiple regions and/or states and services companies. Yukon is used by our customers to operate DR incentive; ToU and CPP rate; and pay for performance programs. The software supports Auto DR both triggered and manually activated; Fast DR for ancillary services including reserves and renewable integration; and full integration with the utility IT infrastructure and applications.

Eaton's Cooper Power Systems Yukon advanced energy services software platform empowers our innovative smart grid solutions, including the tools to effectively manage a demand response (DR) program. Yukon provides accessibility, automation, network and communications management, security, integration capabilities, redundancy and scalability to

support our customers' DR and future smart grid needs. The platform is specifically designed to be both ***simple to use*** and ***expandable*** to a very large system.

Yukon is a secure, browser-based software platform with an easy-to-use front-end interface, providing a rich and flexible solution appropriate for the many types of users that may interact with a demand response program. Through a robust set of user-based permissions and security controls, the Yukon master station can be set up to provide different functionality to program administrators, call center representatives, control room operators, IT system administrators, commercial load supervisors, and end-consumers.

Yukon supports a broad range of communication options, protocols and control methodologies which – combined with multiple event management options ranging from dynamic triggers for automated response to operator managed events to integration to third party systems – enable and support any DR program.

The Yukon DR module includes:

- Advanced Load Management Programming and Control for activating, monitoring, and reporting on DR resources and events.
- Operator Forecasting for estimating DR resource availability and impact of an event using live weather feeds or other predictive parameters.
- Customer Service and Program Administration Portal for managing customer accounts, program enrollments, and customer requests.
- Consumer Portal providing end-consumers with access to information about the utility program, contacts, enrollments, and programming of their connected thermostats.
- Inventory Management for managing device inventory, installation status and location, and device history.
- Enterprise Integration Module (EIM) providing real-time integration with other utility IT infrastructure including SCADA, Energy Markets, etc.

These features are described in more detail below.

Advanced Load Management Programming and Control

Yukon provides operators with web-based access to the Yukon load management hierarchy of levels for direct control of residential and commercial loads:

- Control Areas and Scenarios – Control Areas allow automated control, while Scenarios allow the operator to schedule multiple programs at once. This level provides the "when" and "why" of the control decision, and is frequently organized by time restrictions, geographic layout, area of control and program requirements.

- Programs – Programs provide the control strategy level. Control constraints and addressing groups can be assigned to specific control strategies at this level. This level provides the "how" portion of the control decision.
- Load Groups – The load group layer includes the information necessary for field communication with devices and subsets of devices. This level provides the "what" portion of the control decision.

Yukon's DR hierarchy provides a utility with AutoDR capabilities by using threshold and automatic triggers. An Operator can also manually deploy DR resources through the Yukon Web displays. The combination of these methods provides a utility with the flexibility to use the DR resources for FastDR applications (Contingency, Reserves, Frequency, etc.), Energy Price Mitigation, and Capacity Management.

Load Management Setup

Load Control, whether AutoDR, Tariff Driven or Manually Dispatched, needs inputs to drive it and outputs to target. The generalized design of the Yukon database is ideally suited to the broad ranging needs of involved curtailment programs. Inputs can be directly polled meters, database links, file inputs, or direct computer-to-computer links with EMS/SCADA, forecasting, etc. Outputs can directly control load control switches (switches and thermostats) or, on larger installations, control points on devices such as RTU/Gateways at generator sets or on high function meters in customer facilities.

The following "loosely coupled" database objects are used to build flexible load management systems:

- Control/Status Points (on devices). Yukon supports accumulator, analog, control, and status points. Yukon can map all of the available points for a device, or selectively acquire just the desired points (within the limits of the device and protocol).
- Load Groups – Load Groups are a collection of a set of similar field devices that can be managed through a common strategy. A utility might build several sets of groups, some which target load by geographic or electrical location for use in T&D relief, and some which target load for economic dispatch.
- Load Programs – Load Programs contain one of more Load Groups and provide the method, duration, and strategy for managing the resource. Parameters include holidays; time of day and day/month/season control limits; and ramp in / ramp out strategy. They also include the control algorithms to be used which include: cycling or temperature setback; price-triggered; goal driven; or on/off.
- Control Areas – Control Areas are a collection of Load Programs that allow a utility to manage the resources by: responsibility and authority; tariff and rate class; resource ownership; or other operating criteria.

Control programs can be grouped in priority levels and each has multiple time, day and threshold parameters for its control. Tables can be mixed and matched for special applications including:

- Discrete Shed (100% off)
- Standard "burst" cycling
- Automatic percentage shedding where the user enters time period, control percentage and diversity, and then the system calculates the appropriate command mix to achieve the desired percentage.
- Timed control

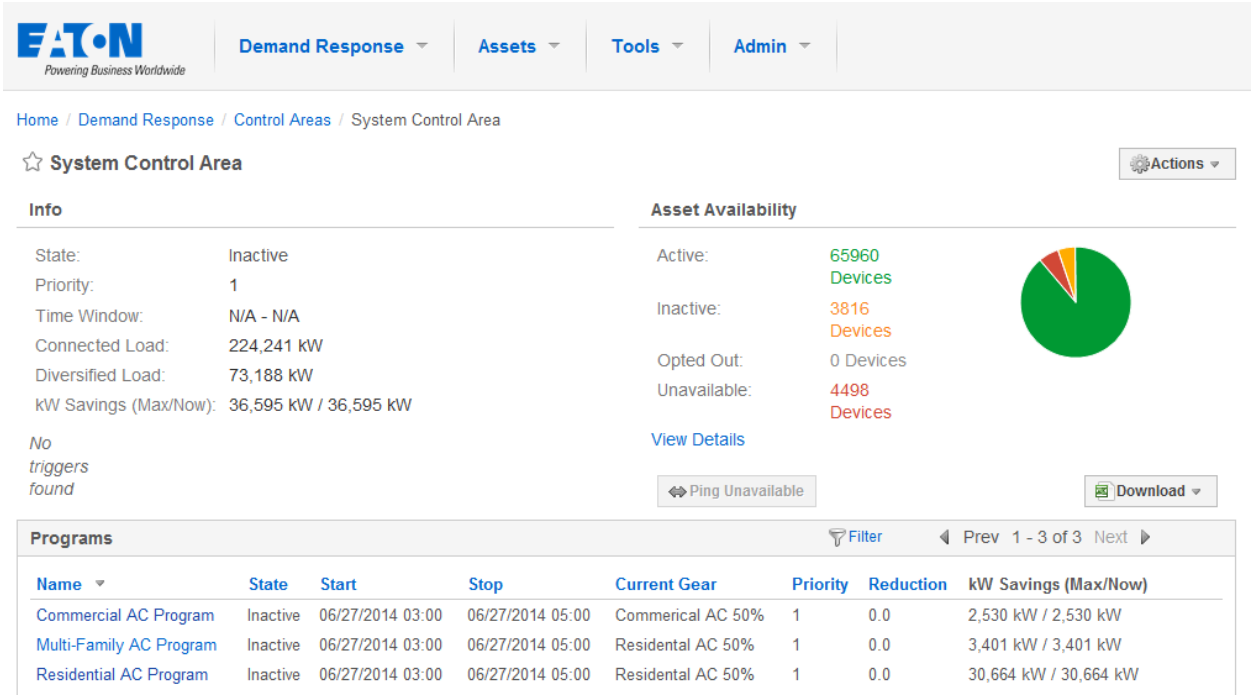
Yukon Two-Way DR Module

The Yukon Two-Way DR Module operator displays have been upgraded to provide live information about the status of the DR Resources. They include Control Area Overview, Control Area Detail and Load Program displays. All of the display are formatted similarly and provide the following information.

- Asset Availability. The asset availability section provides a summary of the status of the devices in the control area or load program. The device status information includes:
  - Active. The device is available, and the connected unit has shown runtime in the last few days.
  - Inactive. The device is available, but the connected unit does not have any runtime time data (all zero), so it might not provide any load relief.
  - Opted Out. The customer has opted out of the DR program and will not be included in an event.
  - Unavailable. Yukon has not gotten a communication message from the device recently.

- Programs. The programs section provides the operator with the status of the load programs assigned to the control area. It includes the following information:
  - Program Name. Assigned name of the asset class or group
  - State. The state variable indicates if the program is Active, Scheduled or Inactive.
  - Start/Stop. These variables indicate when a program had/will start for an Active or Scheduled program and when the event will end.
  - Gear. This section describes the type and level of control for the event.

Additionally, the navigation system has been enhanced to allow the operator to easily define favorite views and to move quickly to a specific area of interest. For specific device details, the operator can activate a ping command to refresh the status of devices and/or drill down into the device information details to diagnose connection issues.



Yukon™ Operator Load Forecast

This module calculates the expected load reduction of control areas, load programs, and scenarios using live weather data coupled with the offline analysis of equipment performance data. The Operator User can view the forecast results and determine which load program to execute at which gear setting to achieve the system or energy market goals. The results of the forecast module appear on the Operator Demand Response screens.

The module calculates the following values for each load program that is configured with forecast settings. The load program values are then aggregated for control areas and scenarios. The kW Savings values are shown on all screens and the Connected Load and Diversified Load are shown on the detail screens.

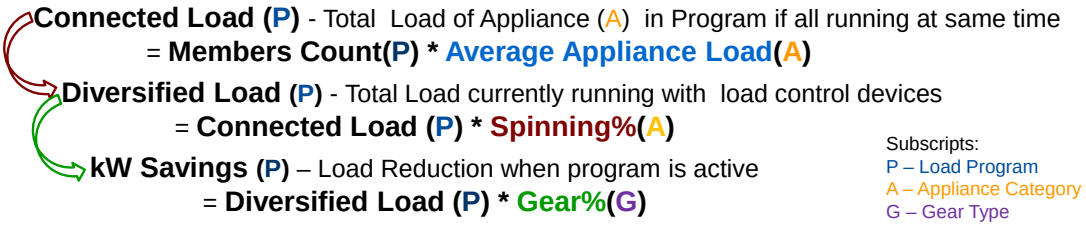
- **Connected Load**. Total load of the controllable resource if all are in the run state. This is the maximum load that could occur from the field equipment.

- **Diversified Load**. Amount of the controllable resource load in a run state based on the estimation parameters (weather data, time, etc.).

- **KW Savings**. Amount of the controllable resource load that can be removed from the system by executing an event. The load reduction is based on the default gear for inactive programs and the selected gear for scheduled programs.

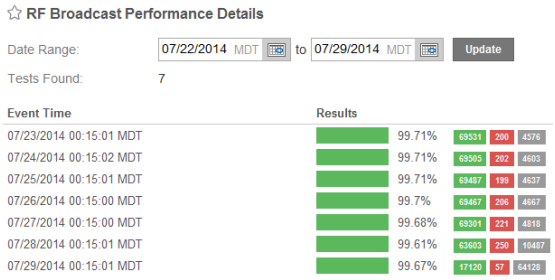
When an operator navigates to a control area screen, the Connected Load, Diversified Load, and kW Savings for the control area are shown in the summary section of the screen. The table section of the display shows the kW Savings for each of the programs in the control area.

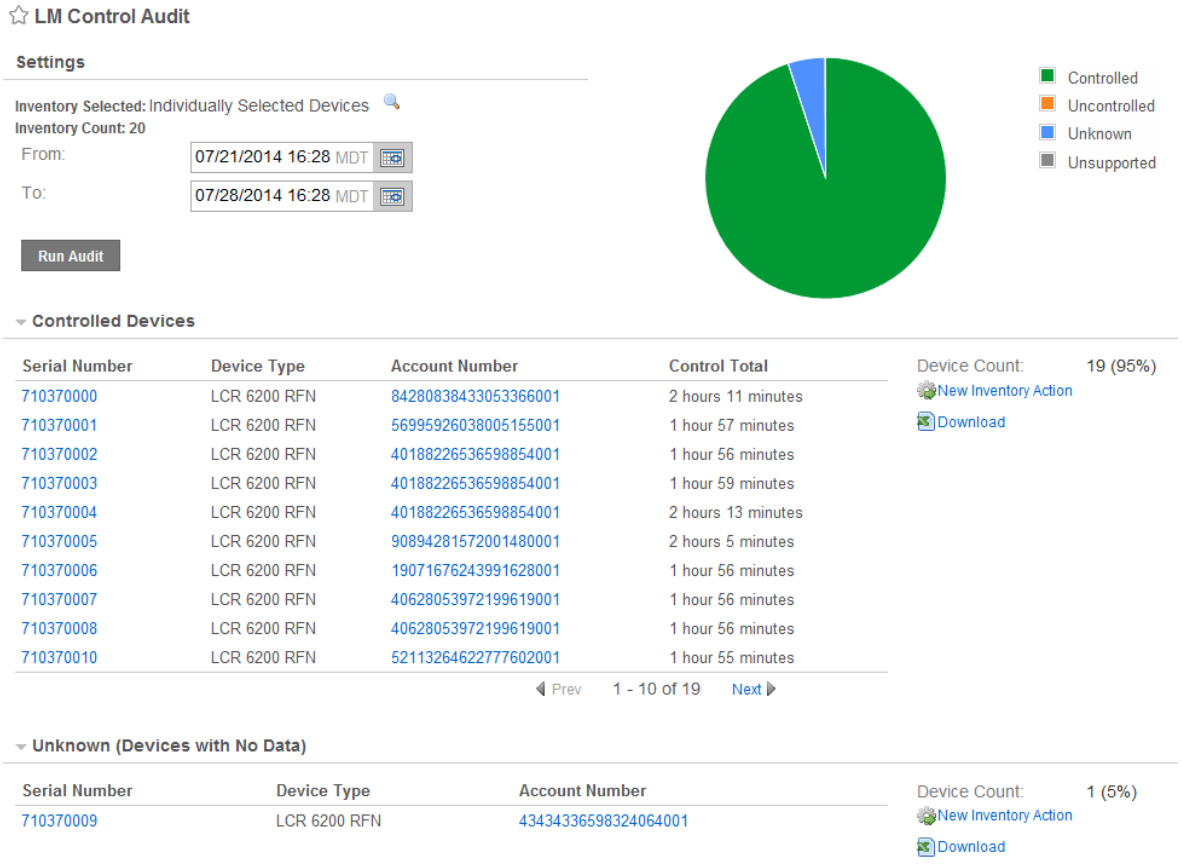
The Load Forecast values are calculated using a three step approach and are updated whenever input variables change. As can be seen in the figure, each successive step requires the results from the previous step. The subscripts in the equations reference the basic Yukon structures of Program, Appliance Category, and Gear.



Demand Response Dashboard

The Two-Way DR module includes communication performance, audit displays, and reports that may be used to easily verify control for an individual, group, subset or population of two-way devices. The reports and analysis can be schedule to run in the background, so that the current information is always available for display. Yukon allows the operator to configure the audit and review analysis with a powerful searching filter; by inventory number/class; and through a file upload of serial numbers. An asset availability report allows users to verify the number of devices on-line and available for control at any time. The data from these reports can be exported in CSV format for further analysis.

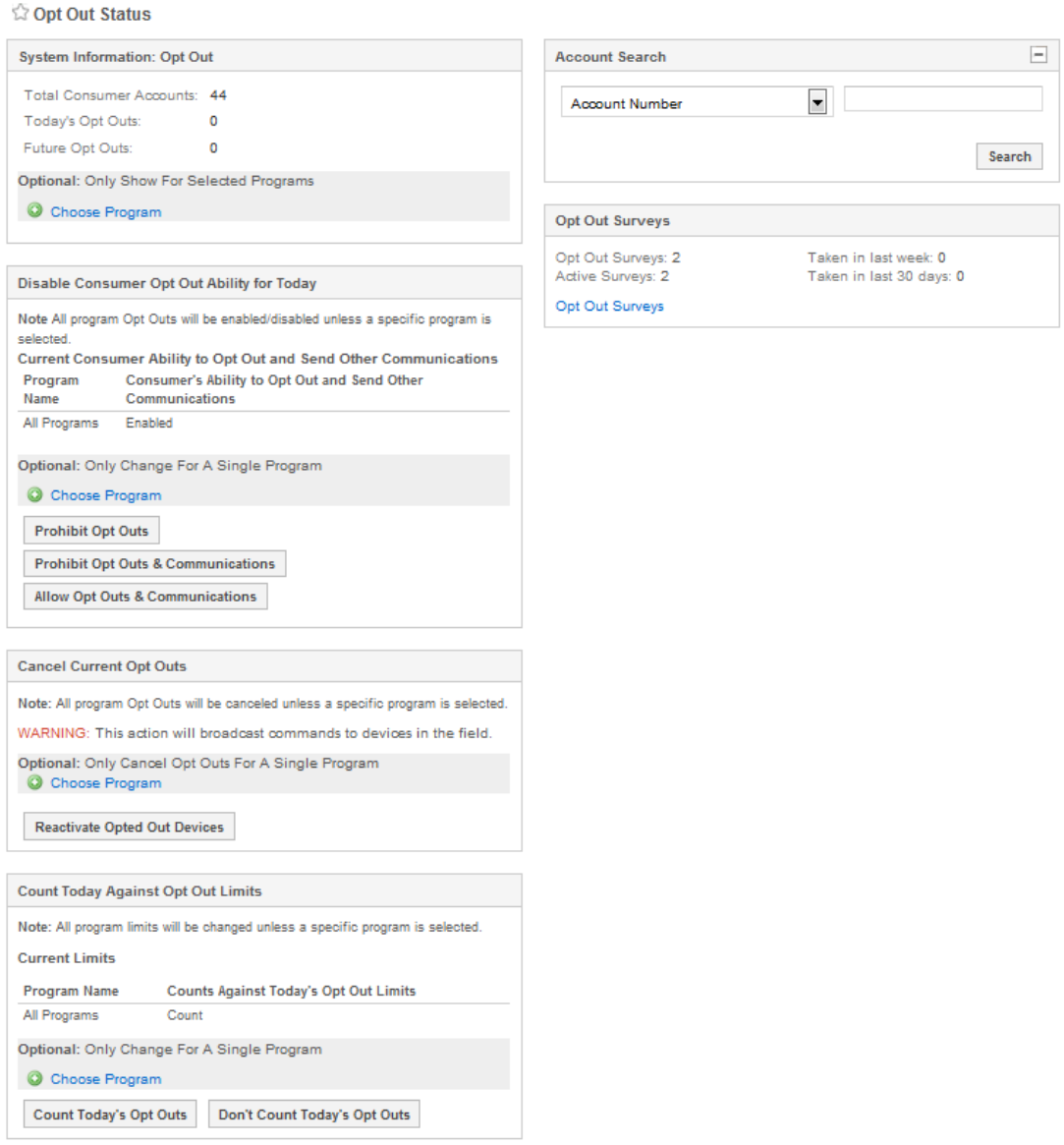




Opt-Out Management & Reporting

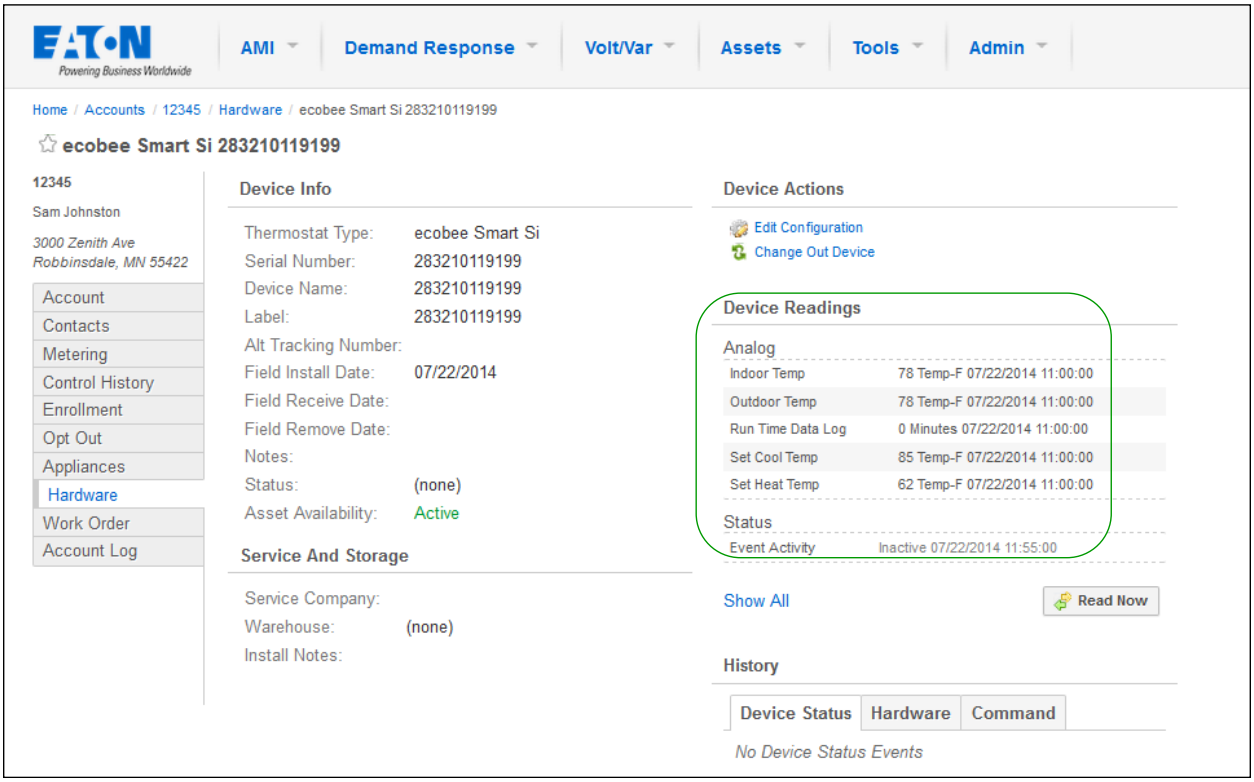
The Demand Response UI includes a revised operator interface for the review and management of Customer Opt-Outs. The DR Administer now has an easy to use portal for the configuration

of Event Messages, review of opt-out status and management of rules. The administrator can get reports for the current opt out list or query about and individual account.



Account/ Inventory Tracking

The Account management system has been also improved to support Two-Way DR devices. In addition to the standard information included on devices, the module now includes real time status and the most recent information collected for the device. Utility users can view the current readings from the device, Ping the device to get current readings and look at the stored history of information on the device. This interface also provides the utility with a method to extract stored information including runtime, setpoint temperature, actual temperature, local weather and other data for M&V analysis.



Reports

Yukon allows an administrator or other authorized operator to generate various reports that return data from different components of the application. Depending on the report, contents may consist of raw values pulled directly from the database, calculated values, or both. Commonly used reports include information on control history, portal activity, and program enrollment numbers. Yukon's Reporting Module generates PDF or spreadsheet output directly from the browser.

Technical Documentation

The following documents comprise the operating manuals for the software and hardware and are provided as PDF files to our customers:

- Yukon Installation, User and Administrator Manuals – These documents describe the setup, operation and maintenance of the software. All optional software modules are covered in

the document. Database structure, communications configuration and troubleshooting are discussed. On-line help is also provided with the software.

- Eaton's Cooper Power Systems System Field Equipment Guide – This detailed technical manual describes setup, operation and maintenance of the hardware. All optional hardware devices are covered in the document. Communications and installation are discussed in detail.
- Product-Specific Instructions Leaflets or Manuals – In addition, individual products such as Thermostats, Switches and Receiver Service Units (RSU), each have instructional leaflets and technical manuals.

Project Management

Eaton's Cooper Power Systems brings over 20 years of technology and program management expertise gained from working with utilities on more than 200 demand response programs.

Project Approach

Upon completion of the contract, we assign an experienced Project Management Team to work with CLEAResult, for the duration of the contract and/or programs. Our dedicated team of professionals is committed to support and assist CLEAResult to ensure success from project initiation through program maintenance. Each project is defined and documented through a detailed statement of work, project plan and key milestones. We coordinate our work plans, deliverables, and schedules across the utility, installation and technology teams. This process helps to ensure transparency across cross-functional teams and an efficient deployment.

Eaton's Cooper Power Systems has more than 50 qualified and experienced project engineering professionals. CLEAResult can be confident that your project management team will have extensive knowledge of the solution and best practices when it comes to deployment of and training for your system.

The Eaton's Cooper Power Systems team prides itself on comprehensive system implementation working hand in hand with your implementation team.

The team members and their roles are as described below.

- Program Manager: Program Design, Project Timeline, Issue Management, Implementation, Regulatory, Marketing Resource
- Primary Project Manager: Demand Response system set up: hardware, software, and configuration

- Technical Services Domain Expert. Technical Domain Experts are assigned to the project as required to perform specific tasks including installation training, field site evaluations, and other duties as assigned. They also are assigned to resolve specific field equipment issues, develop designs, consult on integration, or implement firmware.
- Internal Sales Representative: Orders, Quotes, Delivery Schedules
- Executive Sponsor: Business Relationship, Contracts and Pricing

The project management teams are from the same service group that will provide post-installation technical support and service so that all individuals are very familiar with system operation and installation details. This team will work with you through the life of the program.

Staff Bios and Contact Information

Provided below are biographical details for some of the Eaton's Cooper Power Systems current project management team for direct load control/demand response solutions.

Charles Plunkett, Senior Program Manager

Charles' role as a Senior Program Manager is to ensure that Eaton's Cooper Power Systems DR projects meet customers' needs and expectations, and to serve as a primary point of contact for these customers. In this role, he also provides guidance and feedback within Eaton's Cooper Power Systems on customer needs and practices, monitors program delivery, and ensures that programs are successfully delivered to the customer.

Charles has managed DR implementation programs for American Electric Power (Indiana & Michigan Power), Baltimore Gas and Electric (BG&E), FirstEnergy, Public Service Electric and Gas (PSE&G), Westar Energy, and several other investor-owned and municipal utilities. He has also worked closely supporting the DR programs of Duke Power and Pacific Gas and Electric (PG&E). In addition, he has conducted supplemental measurement and evaluation analysis for Pacific Gas and Electric and Westar Energy.

Prior to joining Eaton's Cooper Power Systems in 2009, Charles had a 23-year career in the Southern Company electric system, and 7 years at a major DR implementation company. Charles has a Bachelor of Arts degree in Geography, with minor in Economics from Georgia State University, and a Master's degree in Decision Sciences from Georgia State University.

Danielle Thompson, Program Manager

Since joining Eaton's Cooper Power Systems, Danielle has worked with some of the largest utilities in North America including Baltimore Gas & Electric (BG&E) and Pacific Gas and Electric (PG&E), being involved in setting up, configuring and maintaining their DR systems. She has also worked with investor-owned utilities, cooperatives and municipalities such as Missouri River Energy Services, Iowa Association of Municipal Utilities, and NV Energy.

Danielle has a Bachelor's degree in Electrical Engineering from North Dakota State University. She has been with Eaton's Cooper Power Systems for over four years.

When not serving in her role as Program Manager at Eaton's Cooper Power Systems, Danielle plays for the *Minnesota Machine* women's professional football team, and was voted 2011 Team MVP.

Security

Cooper Power Systems realizes security of user access, data transportation, and archiving is an ongoing development effort and fully expects to work with each of our customers to meet the evolving security standards. The system currently uses the following to meet existing cyber security requirements.

System Software

Yukon uses items such as login/permission protections, role-based security, user authentication via lightweight directory access protocol (LDAP) and Active-Directory, Secure Socket Layers, TLS, firewalls, Virtual Private Networks, etc. Use of Antivirus protections and installation of operating system (OS) security patches are encouraged and we test our software in conjunction with these tools. Yukon is specifically designed to fit into existing utility information technology (IT) environments.

All users must be authenticated and all user activities are logged within Yukon. All data is time stamped and audit trails are maintained for all system and user activities.

All head-end system code undergoes peer review, substantial QA screenings, and external vulnerability testing.

System Components

The proposed system meets cyber security requirements through the application of security across all of the IT component subsystems. Security within the supported subsystems is established in conformance with the applicable NIST standards. Cooper Power Systems implements a security architecture that addresses the core security elements of Confidentiality, Integrity, and Availability (CIA) for all communications exchanges across the Cooper Power Systems AMI network. The AMI node access to meter tables is controlled and pass code protected in conformance with American National Standards Institute (ANSI) specifications. The RF system security implementations have been developed with adherence to a number of applicable security guidelines and standards including: NISTIR 7628, AMI-SEC Security Requirements, NIST Special Publication (SP) 800-53, and NIST SP 800-82. NIST SP 800-14 "Generally Accepted Principles and Practices for Securing Information Technology" and NIST SP 800-26 "Security Self-Assessment Guide for Information Technology Systems", have also been base references in the development and assessment of the AMI RF system security

architecture. The AES-128 based cipher security encryption modes used for all wireless communications have been developed and tested in accordance with the NIST FIPS Publication 197. While in device development/selection, hardware and software were used for providing encryption algorithms (AES-128) and random number generators in accordance with the NIST FIPS Publication 140-2 "Security Requirements for Cryptographic Modules." Applied security key sizes across the system are all in conformance with (Draft) NIST SP 800-131, "Recommendation for the Transitioning of Cryptographic Algorithms and Key Sizes."

AES-256 and TLS encryption methodologies are utilized to secure WAN backhaul connections to the RF Gateways.

Our firmware ensures security through RSA signed images, which may be vulnerability in other systems.

Security Expertise

Cooper Power Systems employs a full time security expert who is in charge of monitoring changes to industry standards, acts as security consultant for development projects, etc. This individual also provides training classes for EAS personnel, responds to security inquiries from utilities and vendors, etc.

Employee Practices and Polices

Cooper Power Systems is constantly testing the security of its software and communications systems to mitigate security concerns. In addition to internal testing, the Cooper Power Systems Yukon software platform undergoes outside third party vulnerability testing.

All developers undergo routine cyber-security training to ensure product designs are robust, including training on the NERC-CIP requirements and how they apply to both the utility and the solutions offered to the utility. Employees are aware of the requirements and will comply with guidelines outlined by our utility customers to ensure compliance.

Cooper Power Systems employee conduct policy includes provisions for the security of remote access to our users' systems and is also subject to additional requests from our utility users.

All Cooper Power Systems solutions are expected to meet current requirements and will continue to be evaluated to ensure that future requirements are met as they emerge. As new AMI security requirements and assessments emerge within the utility domain, as driven by FERC, NERC and developed within forums such as the AMI-SEC Task Force and NIST, we will continue to participate in and review these requirements to ensure that the implemented security architecture continues to address any newly identified threats or vulnerabilities.

Sales Terms and Conditions

Cooper Power Systems by EATON

1. Applicable Terms and Conditions
(a) These terms and conditions of sale establish the rights, obligations, and remedies of Buyer and Seller that apply to any order issued by Buyer for the purchase of Seller's products and/or services ("Products"). No additional or different terms or conditions, whether contained in Buyer's purchase order form or in any other document or communication pertaining to Buyer's order, will be binding on Seller unless accepted in writing by an authorized representative of Seller. Seller expressly objects to and rejects any additional or different terms and conditions, which shall be ineffective.
(b) If Seller's order acknowledgement, invoice, other document, or electronic transmittal including or attaching these terms and conditions is found to be an acceptance of an offer, acceptance is expressly made conditional upon Buyer's assent solely to these terms and conditions, and acceptance of any part of Products delivered by Seller shall be deemed to constitute such assent by Buyer. If the order acknowledgement, invoice, other document, or electronic transmittal including or attaching these terms and conditions constitutes an offer, Buyer's acceptance of the offer is hereby limited to the terms of the offer.

2. Price, Payment Terms, and Title
(a) All prices represent those in effect at the time of quotation and are subject to change without notice. Unless prices are bid or quoted as "firm," Seller reserves the right to invoice at prices in effect at the date of shipment, regardless of any prior bid and whether notice was received by Buyer. Unless otherwise indicated, prices are stated in United States dollars and are exclusive of shipping, handling, shipping insurance, duties, and sales, use, excise or similar taxes. Export packaging or any other special handling requested by Buyer will be at Buyer's expense. A service charge of $25 will be assessed for any order less than $250. Seller requires a minimum $100 emergency handling charge for all orders that require shipment the same day or next day.
(b) Buyer acknowledges that the pricing of the Products has been set based on the agreed allocation of risks contained in these terms and conditions. If, notwithstanding the provisions of these terms and conditions, a court of competent jurisdiction determines that Buyer's terms and conditions apply to an order, then Seller shall have the right to either (i) modify the prices (including retroactively) according to the additional level of risk and responsibility that Buyer's terms and conditions require Seller to undertake; or (ii) cancel the order any time after such a determination without liability for the termination other than for the Products already delivered on these terms and conditions.
(c) Unless different credit terms have been extended to Buyer in writing by Seller, payment terms are net 30 days after delivery or date of invoice, whichever first occurs, in the currency invoiced. Seller reserves the right to modify or withdraw credit terms at any time without notice. If Buyer fails to fulfill the terms of payment, Seller may defer further shipments to Buyer or, at its option, cancel the unshipped portions of Buyer's orders. Buyer agrees to pay interest on all past due invoices at the lesser of 18% per annum, compounded monthly, or the highest contractual rate allowable under the law.
(d) Until full payment of all obligations of the Buyer for an order, Seller reserves the title (but not the risk of loss) to all Products furnished under that order. If the Buyer defaults in payment or performance or becomes subject to insolvency, receivership or bankruptcy proceedings or makes an assignment for the benefit of creditors, or without the consent of Seller voluntarily or involuntarily sells, transfers, leases or permits any lien or attachment on the Products, Seller may treat all amounts then or thereafter owing by Buyer to be immediately due and payable and Seller at its election may repossess Products for which Buyer has not paid in full. In the event of repossession of Products under this section or under the section entitled "Security Interest," Buyer agrees that Seller may enter the premises where the Products may be located and remove them without notice and without being liable to Buyer for such repossession. Buyer will not set off invoiced amounts or any portion thereof against sums that are due or may become due from Seller, its parents, affiliates, or subsidiaries. Buyer grants Seller a security interest in Products for which title has passed to Buyer, products in which Products are incorporated, and Products that Seller sells (including all Products acquired hereafter from Seller, and all accessions, substitutions, replacements, and additions, and any proceeds from sale or disposition of Products), as security for performance by Buyer of all of its payment obligations under these terms and conditions (including obligations regarding future advances). Buyer consents to Seller's execution of any documents to evidence and perfect this security interest, and agrees to execute the same if requested by Seller.

3. Delivery and Risk of Loss
(a) Unless otherwise agreed in writing, all deliveries of Products will be EXW (Incoterms 2000) Seller's facility. Products will be packed in Seller's standard commercial shipping packages. Charges for shipping may not reflect net transportation costs paid by Seller. Buyer shall reimburse Seller for all costs of storage and handling incurred by Seller after the date that Seller is prepared to make shipment.
(b) Delivery and shipping dates are approximate and represent Seller's best estimate of the time required to make delivery or shipment. Time is not of the essence with respect to the transactions covered by these terms and conditions, except with respect to Buyer's obligation to make all related payments. Seller's obligations under these terms and conditions will be dependent upon Seller's ability to obtain necessary raw materials and components. Seller shall have the right to make partial deliveries and to ship up to forty (40) days in advance of shipping date.

4. Acceptance

Acceptance shall occur, if not before, when Buyer fails to reject within ten (10) days after delivery of the Products. Buyer may rightfully reject only when a reasonable inspection shows that the Products fail to conform substantially to the specifications for the Products. Buyer waives any right to revoke acceptance. Buyer's remedies for any nonconformity detected after acceptance are limited to those expressly provided in these terms and conditions for breach of warranty.

5. Limited Warranty

(a) Seller warrants to each original Buyer of Products that Products are, at the time of delivery to the Buyer, in good working order and conform to Seller's official published specifications, provided that no warranty is made with respect to any Products, component parts, or accessories manufactured by others but supplied by Seller.

(b) Seller's obligation under this warranty for any Product proved not to be as warranted within the applicable warranty period is limited to, at its option, replacing the Product, refunding the purchase price of the Product, or using reasonable efforts to repair the Product during normal business hours at any authorized service facility of Seller. All costs of transportation of any Product claimed not to be as warranted and of any repaired or replacement Product to or from such service facility shall be borne by Buyer.

(c) Seller may require the return of any Product claimed not to be as warranted to one of its facilities as designated by Seller, transportation prepaid by Buyer, to establish a claim under this warranty. The cost of labor for removing a Product and for installing a repaired or replacement Product shall be borne by Buyer. Replacement parts provided under the terms of this warranty are warranted for the remainder of the warranty period of the Products in which they are installed to the same extent as if such parts were original components. Warranty services provided under these terms and conditions do not assure uninterrupted operations of Products; Seller shall not be liable for damages caused by any delays involving warranty service.

(d) The warranty period for Products is the shorter of twelve (12) months from the date of installation or eighteen (18) months from the date of shipment unless otherwise agreed by Seller in writing.

(e) **EXCEPT FOR THE EXPRESS WARRANTY SET FORTH ABOVE, SELLER PROVIDES PRODUCTS AS-IS AND MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, REGARDING THE PRODUCTS, THEIR FITNESS FOR ANY PARTICULAR PURPOSE, THEIR MERCHANTIBILITY, THEIR QUALITY, THEIR NONINFRINGEMENT, OR OTHERWISE. IN NO EVENT SHALL SELLER BE LIABLE FOR THE COST OF PROCUREMENT OR INSTALLATION OF SUBSTITUTE GOODS.**

6. LIMITATION OF LIABILITY

IN NO EVENT WILL SELLER BE LIABLE FOR ANY SPECIAL DAMAGES, CONSEQUENTIAL DAMAGES, INDIRECT DAMAGES, INCIDENTAL DAMAGES, STATUTORY DAMAGES, EXEMPLARY OR PUNITIVE DAMAGES, LOSS OF PROFITS, LOSS OF REVENUE, LIQUIDATED DAMAGES, OR LOSS OF USE, EVEN IF INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. SELLER'S LIABILITY FOR DAMAGES ARISING OUT OF OR RELATED TO A PRODUCT SHALL IN NO CASE EXCEED THE PURCHASE PRICE OF THE PRODUCT FROM WHICH THE CLAIM ARISES. TO THE EXTENT PERMITTED BY APPLICABLE LAW, THESE LIMITATIONS AND EXCLUSIONS WILL APPLY WHETHER SELLER'S LIABILITY ARISES OR RESULTS FROM BREACH OF CONTRACT, BREACH OF WARRANTY, TORT (INCLUDING BUT NOT LIMITED TO NEGLIGENCE, GROSS NEGLIGENCE, MALICE, OR INTENTIONAL CONDUCT), STRICT LIABILITY, BY OPERATION OF LAW, OR OTHERWISE.

7. Cancellation and Return of Products

Orders shall not be subject to cancellation or modification either in whole or in part without Seller's written consent and then only with terms that will reimburse Seller for all applicable costs incurred by virtue of the sale, including costs of purchased materials, engineering costs and a reasonable allowance for profit. Seller's written consent must be given in advance of Buyer's return of Products for credit. Seller reserves the right to cancel any sale of Products without liability to Buyer (except for refund of monies already paid), if the manufacture or sale of the goods is or becomes technically or economically impractical.

8. Force Majeure

Seller shall not be liable for any failure to perform or delay in performing its obligations resulting directly or indirectly from or contributed to by any acts of God, acts of Buyer or those under Buyer's control, acts of government or other civil or military authorities, priorities, strikes, or other labor disputes, fires, accidents, floods, epidemics, war, riot, embargoes, delays in transportation, lack of or inability to obtain raw materials, components, labor, fuel or supplies, or other circumstances beyond Seller's reasonable control ("Force Majeure Event"). If Seller elects, the time for performance shall be extended by a period of time equal to the time lost because of any delays caused by reasons of a Force Majeure Event. Should Seller be prevented from completing Buyer's order or any part thereof because of any Force Majeure Event, then Buyer agrees promptly upon request and upon receipt of invoice therefore, to pay Seller for any Product or Products then completed.

9. Work Product

"Work Product" shall include, without limitation, all designs, discoveries, creations, works, devices, masks, models, work in progress, service deliverables, inventions, products, special tooling, computer programs, procedures, improvements, developments, drawings, notes, documents, business processes, information and materials made, conceived or developed by Seller alone or with others that result from or relate to the Products. All Work Product shall at all times be and remain the sole and exclusive property of Seller. Buyer hereby agrees to irrevocably assign and transfer to Seller and does hereby assign and transfer to Seller all of its worldwide right, title and interest in and to the Work Product including all associated intellectual property rights. Buyer hereby waives any and all moral and other rights in any Work Product or any other intellectual property created, developed or acquired in respect of the Products. Seller will have the sole right to determine the treatment of any Work Product, including the right to keep it as trade secret, execute and file patent applications on it, to use and disclose it without prior patent application, to file registrations for copyright or trademark in its own name or to follow any other procedure that Seller deems appropriate. All tools and equipment supplied by Buyer to Seller shall remain the sole property of Seller.

10. Confidentiality

(a) Buyer may acquire knowledge of Seller Confidential Information (as defined below) in connection with Products and/or its performance hereunder and agrees to keep Seller Confidential Information in confidence during and following termination or

expiration of this Agreement. "Seller Confidential Information" includes but is not limited to all information, whether written or oral, in any form, including, without limitation, information relating to the research, development, products, methods of manufacture, trade secrets, business plans, customers, vendors, finances, personnel data, Work Product, and other material or information considered proprietary by Seller relating to the current or anticipated business or affairs of Seller that is disclosed directly or indirectly to Buyer. In addition, Seller Confidential Information means any third party's proprietary or confidential information disclosed to Buyer in the course of providing Products to Buyer.
(b) Buyer agrees not to copy, alter or directly or indirectly disclose any Seller Confidential Information. Additionally, Buyer agrees to limit its internal distribution of Seller Confidential Information to Buyer's employees who have a need to know, and to take steps to ensure that the dissemination is so limited. In no event will Buyer use less than the degree of care and means that it uses to protect its own information of like kind, but in any event not less than reasonable care to prevent the unauthorized use of Seller Confidential Information. Buyer may disclose Seller Confidential Information that is required to be disclosed pursuant to a requirement of a government agency or law but only after Buyer provides prompt notice to Seller of such requirement and gives Seller the opportunity to challenge or limit the scope of the disclosure.
(c) Buyer further agrees not to use Seller Confidential Information except in the course of performing hereunder and will not use such Seller Confidential Information for its own benefit or for the benefit of any third party. All Seller Confidential Information is and shall remain the property of Seller. Upon Seller's written request, Buyer shall return, transfer or assign to Seller all Seller Confidential Information, including all Work Product, and all copies containing Seller Confidential Information.

11. Patent Indemnity
In the event any Product is made in accordance with drawings, samples or manufacturing specifications designated by Buyer, Buyer agrees to indemnify, defend, and hold Seller harmless from any and all damages, costs and expenses (including attorney's fees) relating to any claim arising from or relating to the design, distribution, manufacture, marketing, sale, or use of the Product or arising from or relating to a claim that such Product furnished to Buyer by Seller, or the use thereof, infringes any claim of any patent, foreign or domestic, and Buyer agrees at its own expense to undertake the defense of any suit against Seller brought upon such claim or claims.

12. Changes in Product Design or Manufacture
Seller shall have the right to change, discontinue or modify the design and construction of any of its products and to substitute material equal to or superior to that originally specified.

13. Software License
Software, if included with a Product, is hereby licensed and not sold. The license is nonexclusive, and is limited to use with the Product with which it is included. No other use is permitted and Seller retains for itself (or, if applicable, its suppliers) all title and ownership to any software delivered hereunder, all of which contains confidential and proprietary information and which ownership includes without limitation all rights in patents, copyrights, trademarks and trade secrets. Buyer shall not attempt any sale, transfer, sublicense, reverse compilation or disassembly (save to the extent expressly permitted by law) or redistribution of the software. Buyer shall not copy, disclose or display any such software, or otherwise make it available to others.

14. Compliance with Laws
Buyer shall comply with all laws and regulations applicable to Products, including but not limited to all applicable import and export laws and regulations. Buyer and Buyer's Agent shall provide all information requested by Seller relating to Seller's voluntary or mandatory compliance with any law or regulation, and Buyer shall indemnify Seller for any losses incurred by Seller arising from Buyer's or Buyer's Agent's failure to provide the information requested by Seller.

15. Waiver
No waiver of any provision of these terms and conditions (or any right or default hereunder) shall be effective unless in writing and signed by an authorized representative Seller. Any such waiver shall be effective only for the instance given, and shall not operate as a waiver with respect to any other rights or obligations under these terms and conditions or applicable law in connection with any other instances or circumstances.

16. Language
The parties have expressly required that these terms and conditions be prepared in the English language. Les parties aux présentes ont expressément exigé que les présents termes et les bons de commandes émis aux termes des présentes soient rédigés en langue Anglaise.

17. Choice of Law and Dispute Resolution
Except as set forth below, these terms and conditions shall be governed by and construed in accordance with the laws of the State of Texas, without reference to its choice of law rules. If both Seller and Buyer are incorporated under the laws of Canada or a province of Canada, these terms and conditions shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada. If Buyer is incorporated in the United States, any claim or litigation arising out of or relating to Products shall be brought exclusively in a court of competent jurisdiction in Harris County, Texas. If Buyer is incorporated outside of the United States, any dispute will be resolved by arbitration in Houston, Texas, by three arbitrators and under the International Chamber of Commerce Rules of Arbitration. The language of the arbitration will be English. In all cases, Buyer and Seller expressly exclude from application the United Nations Convention on Contracts for the International Sale of Goods.

18. Assignment
Buyer may not assign, transfer or subcontract the performance of its services, or any of its rights and/or obligations hereunder, without Seller's prior written consent.

19. Severability
If any provision of these terms and conditions is determined to be illegal, invalid, or unenforceable, the validity and enforceability of the remaining provisions of these terms and conditions will not be affected and, in lieu of such illegal, invalid, or unenforceable provision, there will

be added, as part of these terms and conditions, one or more provisions as similar in terms as may be legal, valid and enforceable under applicable law.

Confidentiality & Disclaimer

Confidentiality

The material contained in this document represents proprietary, confidential information pertaining to Eaton's Cooper Power Systems processes and methods. By accepting this document, CLEAResult hereby agrees that the information in this document shall not be disclosed outside except for disclosure to a utility for a proposed program. It will not be duplicated, used, or disclosed by CLEAResult employees for any purpose other than to evaluate Eaton's Cooper Power Systems fit for the specified project. Cooper Power Systems shall be notified immediately by CLEAResult if any party requests this document or any information contained within it.

Disclaimer

This document represents Eaton's Cooper Power Systems best efforts for a solution based on information gathered to date. Costs and time estimates quoted are for CLEAResult and are valid for 90 days.

Cooper Power Systems
by EATON

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Cost-Effectiveness

When extrapolating the cost-effectiveness of the Pilot to full implementation, the following additional parameters must be taken into account:

a. **Drop-off of fixed costs:** The cost of recruitment for homes that remain in the program is fixed and does not occur in subsequent program years.
b. **Annual attrition:** Recent data suggest an annual attrition rate of 9.6%[1]. Thus, to maintain a population of 350 residences, the program will need to recruit an estimated 34 new homes annually.
c. **Participant total for full program implementation.** With this target in mind, extrapolation of pilot findings to full program implementation will account for increased benefits and economies of scale when expanding the program. For illustrative purposes, we assume full-scale size of 5,000 customers.
d. **Anticipated program length:** A life-cycle for the program needs to be established. For illustrative purposes we assume a five-year cycle for the program.

With these parameters in mind, cost-effectiveness testing of full-scale implementation of a DLC program will reflect the totality of benefits and costs accrued over a specified life cycle of the demand response system. This can be completed in the following ways:

e. **TRC of the Pilot in Year 1:** This places the full upfront-costs of recruitment in Year 1, as demonstrated in the TRC and UCT values.
f. **TRC of the Pilot in Years 2-5, if kept at pilot scale:** This accounts for the drop-off in program costs associated with the initial recruitment of 350 residences and adds in costs from replenishment of attrition (34 residences annually).
g. **TRC of a 5-year cycle:** This calculation provides the cost-effectiveness of administering the program at pilot-scale for five years, and would essentially amortize the upfront costs of establishing the DLC system. These values would be discounted by ENO's Weighted Average Cost of Capital.

Item (g) detailed above will provide a more accurate representation of cost-effectiveness findings after expansion to full-scale implementation and reflects the value of a DLC system maintained over a multi-year cycle. With this in mind, full-program cost-effectiveness would be estimated using:

h. Marginal upfront costs associated with recruitment of 4,684 residential accounts[2] to scale the program from Pilot to full-program scale in Year 2;
i. Annual customer replenishment costs for 480 residential accounts[3] occurring in each of Year 3-5; and

[1] Opinion Dynamics Corporation. "PY2013 Statewide AC Cycling Programs Process Evaluation – Integrated Report." CALMAC Study ID PGE0368. Accessed April 5, 2016. The value reflects a program that includes renters and home owners, and may be lower if the pilot or program is limited to home owners.
[2] Reflecting an assumed 5,000 accounts in the program at full-scale minus 350 already in place from the pilot, and a 34-home replenishment for attrition of the initial 350 pilot homes.

j. Extrapolation of Year-1 Pilot findings for per-customer kW reduction during demand response events to a program comprised of 5,000 accounts.

[3] This assumes 9.6% attrition of a program of 5,000 accounts.

CERTIFICATE OF SERVICE
Docket No. UD-08-02

I hereby certify that I have this 26th day of April 2016, served the required number of copies of the foregoing report upon all other known parties of this proceeding, by the following: electronic mail, facsimile, overnight mail, hand delivery, and/or United States Postal Service, postage prepaid.

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New Orleans, Louisiana, this 26th day of April, 2016.

Harry M. Barton