

STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY	:	
	:	No. 12-0484
Petition for approval of tariffs implementing	:	
ComEd's proposed peak time rebate program	:	
	:	

# **Direct Load Control Pilot Design and Pre-enrollment Research Progress Report**

**Submitted by:  
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**August 21, 2013**

**Table of Contents**

- I. INTRODUCTION and overview ..... 2
- II. DLC Pilot Design Progress ..... 2
  - A. Internal DLC Pilot Development ..... 2
  - B. Stakeholder Workshops and SGAC Input on ComEd’s DLC Pilot Design..... 3
  - C. Current Status of ComEd’s DLC Pilot Design..... 3
    - 1. Proposed DLC Pilot Objectives ..... 4
    - 2. Initial Experimental Design of the DLC Pilot ..... 4
    - 3. Proposed DLC Pilot Enrollment Process ..... 6
  - D. Next Steps for Developing DLC Pilot Proposal ..... 7
    - 1. ComEd Partnerships with DLC Technology Vendors..... 7
    - 2. Finalizing Experimental Design ..... 7
- III. RESEARCH On USE of a pre-enrollment process ..... 7

## I. INTRODUCTION AND OVERVIEW

On February 21, 2013, the Illinois Commerce Commission (“Commission” or “ICC”) entered an Interim Order in ICC Docket 12-0484 (“Interim Order”) that approved Commonwealth Edison Company’s (“ComEd”) Rider PTR - Peak Time Rebate (“Rider PTR”) with certain modifications. Additionally, while there are a number of open issues within the docket, the Interim Order directed ComEd to file this progress report to update the Commission regarding its progress on two specific issues: (1) the design of a Direct Load Control (“DLC”) pilot and (2) the development of a customer research plan to evaluate a pre-enrollment process in the Rider PTR program. The Rider PTR program has been named Peak Time Savings (“PTS”), and PTS will be used to refer to the program in this report.

First, this report will describe ComEd’s progress on designing a DLC pilot, with input from the Smart Grid Advisory Council (“SGAC”). Interim Order at 31. A sample group of Rider PTR program participants will receive DLC technology under the planned pilot design. The pilot will evaluate whether the use of the DLC technology by PTS participants, at no direct cost to the participant, will result in overall net benefits for all customers through incremental demand reduction. Interim Order at 30.

ComEd is required to file its proposed DLC pilot program and supporting testimony by February 1, 2014. Interim Order at 31. If the Commission determines after that filing that a DLC pilot program is appropriate, it will be implemented in the summer of 2015 to coincide with the initial offering of ComEd’s PTS program. Interim Order at 31.

Second, this report will also describe ComEd’s progress in developing a customer research plan to assess the value of the pre-enrollment process. Interim Order at 6-7. The Commission stated that “ComEd should actively consult with and work with the SGAC to develop” this research plan. Interim Order at 6.

## II. DLC PILOT DESIGN PROGRESS

### A. Internal DLC Pilot Development

ComEd determined its first step in developing a DLC pilot design was to meet internally and consult with leading subject matter experts in order to define the objectives and structure of the DLC pilot. As a result, ComEd determined the DLC pilot should be designed in a manner that will allow ComEd to evaluate the following criteria:

- Whether the inclusion of DLC technology, at no direct participant cost, influences a customer to either become a DLC pilot participant, and/or participate in a PTS event<sup>1</sup>;

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<sup>1</sup> A PTS event is when ComEd gives notice to a PTS customer that if they reduce demand during a specified time period, known as a curtailment period, they will become eligible for PTS credit on their bill. There is no penalty if the PTS customer chooses not to participate.

- Whether emerging demand response enabled thermostats, such as Nest Laboratories’ “Rush Hour Rewards,” are effectively generating load response reduction and improving customer satisfaction;
- Whether DLC devices designed for window air conditioners are effective at increasing participation and customer satisfaction in the multi-family customer class; and
- Whether the use of a randomly controlled trial (“RCT”) to isolate the impacts of DLC technology usage will be the best experimental design in order to promote robust and actionable DLC pilot results.

### **B. Stakeholder Workshops and SGAC Input on ComEd’s DLC Pilot Design and Pre-enrollment Customer Research**

In addition to the Commission directive to seek input from SGAC regarding ComEd’s DLC pilot design and pre-enrollment customer research, ComEd voluntarily sought input from stakeholders. On June 27, 2013, a workshop was held at the Commission’s offices in Chicago. Workshop participants included a variety of interested parties, including those from the retail supplier community and from consumer advocate groups. ComEd’s workshop objectives were threefold. The first objective was to inform participants of the Commission directive to design a DLC pilot program, and how ComEd planned to comply. The second objective was to describe the initial steps ComEd had taken, described above in Section IA, to initiate the design of the DLC pilot. The third objective was to obtain feedback and input on the DLC pilot’s design from stakeholders. In this workshop, ComEd also described its plan for performing pre-enrollment customer research and seeking input from stakeholders.

ComEd met with SGAC on August 16<sup>th</sup> to educate SGAC regarding ComEd’s planned DLC pilot design and pre-enrollment customer research. During the discussion of the DLC pilot, SGAC and ComEd exchanged thoughts on the type of treatment groups to include, the sample size, the timing, the cost, and the recovery of the cost of the DLC pilot. The SGAC did not propose any specific changes to the planned DLC pilot design following this discussion, but encouraged ComEd to track and report the cost of implementing the DLC pilot. In the pre-enrollment research discussion, the SGAC encouraged ComEd to test different messages and media to find effective ways of enrolling customers year around.

ComEd intends to hold stakeholder workshops and meet with the SGAC in the fall of 2013 to obtain additional feedback as the DLC pilot and pre-enrollment customer research are further developed. ComEd also intends to use this forum to discuss any additional PTS related topics with the SGAC and stakeholders.

### **C. Current Status of ComEd’s DLC Pilot Design**

ComEd has evaluated all the information described above, and has drafted the initial design of its DLC pilot program. As with any draft, the DLC pilot design is likely to be further refined and evolve as ComEd receives feedback from various outlets, including: industry experts, additional internal research, stakeholder workshops, the SGAC, and responses from DLC technology vendors to ComEd’s request for proposals (“RFP”).

## **1. Proposed DLC Pilot Objectives**

ComEd’s DLC pilot design objective will be to understand the impact of DLC technology on the areas listed below:

- Amount of energy curtailed during PTS events;
- The amount of revenue ComEd is able to receive from PJM;
- Customer satisfaction;
- Overall costs of the PTR program; and
- Opt-in enrollment levels

## **2. Initial Experimental Design of the DLC Pilot**

ComEd currently plans to develop a RCT to test the effect of DLC usage on the proposed outcomes. To do so, ComEd will randomly assign customers to different “treatments” and include “control” groups for measuring impacts. The “control” group would receive a standard PTS enrollment offer without technology, whereas the “treatment” groups would receive offers that include different DLC technologies. Such a design will enable ComEd to isolate the impacts of different DLC technologies and control strategies on PTS outcomes, and help the Commission make a determination on whether to include DLC as part of the PTS program and, if so, how to best implement such a determination.

To determine the exact experimental design, ComEd plans to gather additional information on DLC options from selected industry vendors. In particular, ComEd will seek to understand the impact of:

- Different DLC technologies designed for Air Conditioning (“AC”) control
- Different control strategies (such as cycling rates or thermostat set-point changes)

### **a. DLC Technology Options**

At this point, ComEd believes that focusing the DLC technologies that ComEd uses in this pilot on AC control technology is the best option because AC loads are the largest peak contributors for residential customers. Additionally, ComEd’s evaluation of DLC devices has found that AC control technologies are the most mature DLC devices because those devices have evolved more rapidly than non-AC DLC devices. Another benefit to using AC DLC technology is that there is more diversity within this category of DLC devices. This is also an optimum choice because ComEd has familiarity with AC control pilots through its AC cycling program.

ComEd proposes to analyze two classes of DLC devices designed for AC control before finalizing the experimental design of the DLC pilot. First, ComEd wants to analyze load curtailment switches designed for AC units. ComEd has significant experience with such DLC devices from its AC Cycling program. However, ComEd’s advanced metering infrastructure (“AMI”) network provides new opportunities for such switches to communicate directly with that network. ComEd will analyze whether these AMI-enabled switches would be valuable to

the DLC pilot. Specifically, the AMI-enabled switches will potentially enable ComEd to directly integrate DLC switches into its existing systems and potentially lower costs. Also, there are new DLC devices that enable DLC for window AC units, which are prevalent in multi-family housing and which traditionally have been more difficult to include in DLC programs. ComEd plans to assess whether it would be valuable to pilot these window AC DLC devices.

A second class of DLC devices that ComEd wants to assess in relation to AC control are demand response enabled thermostat technologies. Many recently released thermostats include increasingly effective and precise DLC. These new devices claim to more effectively reduce load and measure impacts – all while doing so in ways that are less invasive to the customer and potentially increase customer satisfaction.

At this point, ComEd believes that any device tested in the pilot should allow the participating customer to override any automated load reduction, whether directly through the device itself or other means, to comport with the voluntary nature of the customer’s response to a PTS event.

### **b. Proposed Load Control Strategies**

In addition to evaluating different DLC technologies, ComEd also plans to evaluate whether to test different types of DLC strategies. Several strategies for load control are available, including:

- Compressor cycling (of 50%, 100%, for example)
- Advanced or emerging “smart” cycling techniques (cycling that takes advantage of existing cycling profiles built into certain air conditioner units)
- Emerging demand response techniques such as Nest Laboratories’ “Rush Hour Rewards” (advanced thermostat algorithms that respond to various signals that reduce energy consumption at certain times)
- Varying the Programmable Communicating Thermostats (“PCT”) Set Point Temperature

Currently, ComEd uses traditional compressor cycling as part of its AC Cycling program. ComEd will solicit more information on the new cycling techniques to see if these techniques are more effective at generating voluntary load reductions under the PTS program and increasing customer satisfaction.

### **c. Example of an Experimental Design**

Once ComEd has received responses to its RFP and further input from stakeholders and experts, it will develop a proposed experimental design of the DLC pilot to be filed with the Commission in February of 2014. Below is an example of a potential experimental design.

**Table 1: Example Experimental Design**

		Technology			
		Control: No DLC	Option 1: Central AC Switch	Option 2: Window AC Switch	Option 3: PCT
			Load Control Method	Option 1: 50% cycling	Control group receives the standard PTS opt- in offer
Option 2: 100% Cycling	Group D	Group E		Group F	
Option 3: Advanced cycling	Group G	Group H		Group I	
Option 4: Set point changes	Group J	Group K		Group L	

It is important to note that the final experimental design will likely differ significantly from what is shown in the example above. The final proposed experimental design could be considerably larger or smaller depending on the cost of piloting multiple technologies and the necessary sample sizes required to return statistically valid conclusions.

ComEd plans to include DLC technology and installation as part of participation in the pilot. If the pilot is approved, the Interim Order stated that the pilot costs should be recovered from all residential customers. Interim Order at 31. ComEd also plans to educate customers that participate in the DLC pilot about their participation in ComEd’s PTS program. Participants will be able to use the DLC technology to reduce their load during curtailment periods which will make them eligible for PTS credits. ComEd will also inform participants that they have the ability to override the DLC signal. In light of the Commission’s findings regarding socialization of the DLC costs (see Interim Order at 30), ComEd currently does not intend to test whether requests for payment of DLC technology impacts participation in the DLC pilot or the PTS program as part of its experimental design.

### 3. Proposed DLC Pilot Enrollment Process

ComEd plans to recruit PTS customers for its DLC pilot using an opt-in approach. Prior to recruitment into the DLC pilot, ComEd will randomly assign eligible PTS customers into either the control group or one of the treatment groups. Then ComEd will send the corresponding

customer marketing materials to the treatment groups to recruit the required sample size of customers into the DLC pilot in order to ensure that statistically valid conclusions can be drawn.

The opt-in nature of the DLC pilot will require ComEd to solicit a large number of customers for the DLC pilot and the PTS program from the pool of customers that either currently have AMI meters, or will receive AMI meters as part of the 2013-2014 AMI deployment. Based on information from subject matter experts, ComEd estimates that a sample size of at least 300 customers is required to participate in each treatment group in order to draw statistically valid conclusions at a 95% confidence interval. As a result, ComEd may be constrained in the number of technologies and/or control strategies that it can pilot. ComEd will indicate the number of customers it needs to draw statistically significant results in the experimental design it proposes to the Commission in the February 2014 filing.

#### **D. Next Steps for Developing DLC Pilot Proposal**

##### **1. ComEd Partnerships with DLC Technology Vendors**

ComEd plans to distribute an RFP for this pilot to a wide range of technology vendors. The responses to this RFP will educate ComEd on the impact of the cost for different DLC technologies and load control strategies. After analyzing the responses to this RFP, ComEd will be better able to estimate the cost of answering the key questions explained above, and to propose a recommended experimental design.

The information ComEd hopes to gain from this RFP includes:

- the cost of DLC hardware, IT systems, and device installation;
- the compatibility of devices with ComEd's communication networks;
- novel control strategies enabled by the technology; and
- estimated load reductions for each technology.

After receiving responses from interested vendors, ComEd will determine which AC DLC technologies would be most beneficial to pilot.

##### **2. Finalizing Experimental Design**

As discussed above, ComEd will work with experts with input from stakeholders and the SGAC to determine how large a sample size of each treatment group must be in order to ensure statistically valid results. The size of the treatment groups and the number of customers that will have AMI meters (and thus be eligible for this pilot) may constrain the number of DLC technologies and control strategies that ComEd can assess.

### **III. RESEARCH ON USE OF A PRE-ENROLLMENT PROCESS**

In Section II B of this report, ComEd already described its effort to seek input from SGAC and stakeholders regarding ComEd's pre-enrollment customer research. ComEd plans to conduct customer research on pre-enrollment in conjunction with the message testing planned for standard PTS enrollment. This research will be designed and executed in the fall of 2013 through the spring of 2014.

While the details of the pre-enrollment research design are still in the development process, the objective of ComEd's research design will be to ascertain the clearest way to communicate that pre-enrolled customers will not be eligible for events until the following event season and test the understanding of that message. This research will potentially include surveys and/or focus groups. ComEd plans to work with SGAC and stakeholders to develop a more detailed plan, including the content and structure of this research. This plan will be included in a progress report to be filed with the Commission in February 2014.

ComEd will offer year-round enrollment for the program – only the enrollment marketing will change based on when a customer becomes eligible for PTS. ComEd plans to launch the PTS program in October of 2014 once all IT infrastructure and marketing materials have been completed, so the first available pre-enrollment period will occur in the summer of 2015. Once the window for eligibility to participate in summer 2015 PJM events closes in May, ComEd will stop sending eligible PTS customers standard enrollment marketing materials and begin sending pre-enrollment marketing materials instead. After the event season of 2015 ends, ComEd will resume sending eligible customers standard enrollment offers for the upcoming event season.

During the initial pre-enrollment period in 2015, ComEd will gain critical experience pre-enrolling customers. As part of the pre-enrollment research, ComEd will track complaints and calls to the service center with PTS related questions. Tracking will be done through internal call center / complaint tracking systems, and potentially will be validated by outside surveys or other customer research. ComEd will then compare these outcomes to customers that enrolled in the regular window.

After the initial pre-enrollment concludes in the fall of 2015 and all analysis has been completed, ComEd will evaluate the data gained from the research and such analysis to determine whether to propose modifications to the enrollment process in Rider PTR.