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PC Power Management
PY5 Evaluation Report

Final

Energy Efficiency / Demand Response Plan:
Plan Year 5
(6/1/2012-5/31/2013)

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E. Executive Summary

The PC Power Management Program (also marketed as the "Desktop Power Management Rebate Program") was implemented by Resource Solutions Group (RSG) in EPY5.[1] The program provides rebates for installations of desktop power management software. For EPY5, there was only one program participant with 50 computers under control. Since the participation rate was so small, the evaluation was limited to a high level analysis of the impact calculations. If participation warrants it, the EPY6 evaluation will be more in-depth.

The program's tracking dataset reported total program annual energy savings based on average annual energy savings of 291 kWh/year for each qualifying desktop. Navigant reviewed the documentation of the completed project, examined the reasonableness of the impact calculation for the reported savings from the implementation contractor's work paper, and compared those savings to those found in a secondary literature review. The main source used for examining the energy savings estimates was the ENERGY STAR® website. Navigant determined that an average annual energy savings of 356 kWh/year was more reasonable to reflect the various PC power management schemes of desktops targeted by the program.

Demand savings were not recorded in the tracking dataset. Navigant's literature review indicated that the demand savings in Pennsylvania's TRM provided a reasonable estimate, with some adjustments to reflect the proper coincident peak demand period.

E.1. Program Savings

Table E-1 summarizes the electricity savings from the PC Power Management Program.

Table E-1. EPY5 Total Program Electric Savings

Savings Category †	Energy Savings (MWh)	Demand Savings (MW)	Coincident Peak Demand Savings (MW)
Ex Ante Gross Savings	14.55	NA	NA
Realization rate	1.22	NA	NA
Research Findings Gross Savings	17.79	0.0024	0.0012
Net to Gross Ratio ‡	1.00	1.00	1.00
Research Findings Net Savings	17.79	0.0024	0.0012

Source: Utility tracking data and Navigant analysis.
† See the Glossary in the Appendix for definitions
‡ No analysis of free ridership or spillover was undertaken this year.

[1] The EPY5 program year began June 1, 2012 and ended May 31, 2013.

E.2. Conclusions and Recommendations

The following provides insight into key program findings and recommendations:

Gross Realization Rates

Finding 1. The gross savings should be 356 kWh/year for each qualifying desktop (rather than the 291 claimed by the implementation contractor). .

Recommendation. If the program expects to see greater customer interest in EPY6 and beyond, the IC may consider incentives for different types of power management software equipment (e.g., laptops, other portable devices, etc.).

Demand Savings Estimates.

Finding 2. Gross and net ex post coincident demand savings were estimated to be 1.2 kW. The coincidence factors used to derive the program's peak coincident demand savings were determined from secondary literature review.

Recommendation. In EPY6, Navigant recommends that the IC calculate an ex ante value that can be used as a starting point for evaluation. Navigant suggests that the IC use demand savings estimate from the Pennsylvania TRM that can then be refined to reflect the program's peak coincident demand period definition.

1. Introduction

1.1 Program Description

The PC Power Management Program (a.k.a. the Desktop Power Management Rebate Program[2]) provides rebates for qualifying installations of desktop power management software, which at the network level controls the internal power settings of both desktop central processing units (CPU) and monitors. RSG started implementing this program in EPY5. Rebate amounts increased from $8 to $12 per eligible desktop computer on February 8th, 2013 to attempt to increase participation in the program.[3] Customers may receive rebates for workstations (both desktop CPU and monitor) not previously controlled by enterprise-managed power management software. In addition, the program requires a Program Participation Agreement (PPA) to be completed in full, signed by the participant, and submitted to the program prior to the date of purchase of software or installation.

1.2 Evaluation Objectives

The Evaluation Team identified the following key researchable questions for EPY5:

Impact Questions

1. What are the gross impacts from this program?
2. What are the net impacts from this program?

Process Questions

1. Are customers satisfied with the program?

[2] http://pcpower-rebates-il.com/

[3] The EPY5 participant received $8.50/unit, which was the software license cost they paid.

2. Evaluation Approach

The evaluation was based on a review of the program tracking data, project documentation, and a literature review.

2.1 Data Sources

The data used to evaluate this program consisted of the program tracking dataset, project documentation for the completed project (program participation agreement, application), a secondary literature review, and information from interviews with the ComEd and RSG program managers.

2.2 Gross Savings Analysis

Table 2-1 presents the parameters that were used in the verified gross and net savings calculations and indicates which were examined through evaluation activities and which were deemed.

Table 2-1. Research Findings Gross and Net Savings Parameter Data Sources

Input Parameters	Data Source	Deemed or Evaluated?
Program units	PY5 EM&V Program Tracking Data Analysis	Evaluated
NTG Ratio	Unexamined	Unexamined
Energy Savings per Unit	Secondary literature review	Evaluated
Peak Demand Savings per Unit	Secondary literature review	Evaluated

Since the program had only one participant, Navigant examined the reasonableness of the impact calculation but did not perform other analysis. Navigant reviewed ex ante saving savings estimates and conducting secondary literature review of other outside sources, as well as the sources described in RSG's 2011 work paper[4]. Navigant reviewed the analysis of savings derived from the ENERGY STAR calculator[5] for various PC power management schemes, which was Navigant's primary basis for quantifying per-unit energy savings.

2.3 Net Savings Analysis

Since there were too few participants to warrant a free ridership study, the evaluation applied a NTGR of 1.0 to calculate net savings.

2.4 Process Evaluation

Since there was limited program participation in EPY5, Navigant did not conduct any participant surveys. Instead, Navigant interviewed the ComEd and RSG program managers at various points

[4] *Work paper- Network Desktop Computer Power Management Software*; Resource Solutions Group; December 14, 2011 R0

[5] http://www.energystar.gov/ia/products/power_mgt/LowCarbonITSavingsCalc.xlsx

throughout the program year to obtain feedback on how the program was running and to learn more about customer satisfaction. Based on feedback from RSG's program manager, there was a procurement issue from the customer with its vendor that delayed completing the project. However, the program manager indicated that the program appears to be seeing significant interest in the university/educational sector with projects likely to be completed in the following program year.

3. Gross Impact Evaluation

This section describes the results from Navigant's gross impact evaluation for the EPY5 PC Power Management Program. A review of the program tracking system determined there was only one program participant with 50 units resulting in a total program ex ante gross energy savings of 14,550 kWh. Based on savings verification activities, the program achieved ex post gross energy savings of 17,793 kWh resulting in a realization rate of 1.22.

3.1 Tracking System Review and Program Volumetric Findings

Navigant's review of RSG's tracking system focused primarily on validating customer and participation fields with the customer rebate application, payment authorization form, and the program participation agreement. As shown in Table 3-1, Navigant verified that in EPY5 there was one program participant with 50 qualifying workstations controlled by PC power management software with an average ex ante savings of 291 kWh/year per qualifying desktop station. The tracking system review determined that the ex ante gross energy savings from this program was 14,550 kWh (14.55 MWh, as shown in Table 3-3). There was no ex ante gross peak demand savings reported in the tracking system.

Table 3-1. EPY5 Volumetric Findings Detail

Detail	Qualifying Desktop workstations
Participants	1
Total Measures	50

Source: EM&V analysis

Key findings include:

1. The program had one participant with 50 units incented
2. The average ex ante per unit gross energy savings was 291 kWh/unit

3.2 Gross Program Impact Parameter Estimates

Navigant's review of the program tracking system, completed project documentation, and of secondary literature determined that the ex post gross energy savings for this program should be 356 kWh/unit and 0.024 kW/unit (Table 3-2).

Table 3-2. Research Findings Gross Savings Parameters

Input Parameters	Value	Deemed or Evaluated?
Program units	50	Evaluated
NTG Ratio	1.0	Unexamined
Energy Savings per Unit (kWh/unit)	356	Evaluated
Peak Demand Savings per Unit (kW/unit)	0.024	Evaluated

Source: Evaluation Team analysis.

Navigant conducted a secondary literature review focused on an examination of outside sources, as well as the sources described in RSG's 2011 work paper[6]. In doing so, Navigant reviewed the analysis of savings derived from the ENERGY STAR calculator for various PC power management schemes, which was Navigant's primary basis for determining the annual energy savings per qualifying workstation. The savings, as shown in Figure 3-1vary by system configuration and the average of all the schemes is 356 kWh/year for desktops.

Navigant reviewed secondary literature and applied PJM's definition of peak period as stated in PJM Manual for PJM Capacity Market (M-18)[7] where appropriate to determine the gross peak demand savings. A review of the June 2012 Pennsylvania Technical Reference Manual (PA-TRM)[8] found that the ratio of gross peak kW savings per unit to gross energy savings per unit for this measure type in Pennsylvania was determined to be 0.00014 (= 0.020 kW/ 148 kWh). Since the defined peak period in Pennsylvania doesn't exactly match the peak period in Illinois, Navigant conservatively applied half of the estimated per-unit demand savings to the measures installed in EPY5. Therefore, the ex post gross peak demand savings per unit in the PC Power Management Program was determined to be 0.024 kW (= 356 kWh x 0.00014 kW/ kWh x 0.5). The overall ex post gross peak demand savings of 1.20 kW was derived by multiplying this per unit savings value (0.024 kW) by the overall number of units in EPY5 (50).

3.3 Research Findings Gross Program Impact Results

Multiplying the per-unit savings by the number of units (50) produces the total program verified gross savings of 17.79 MWh and 0.0012 MW (Table 3-3). Due to limited program participation in EPY5, the evaluation team completed verification activities for a census of program participants.

[6] *Workpaper: Network Desktop Computer Power Management Software*; Resource Solutions Group; December 14, 2011 R0

[7] http://www.pjm.com/~/media/documents/manuals/m18.ashx

[8] http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx. The PA-TRM is a well-documented and vetted source for many different deemed measures.

Figure 3-1. Annual Savings per Workstation as Projected by ENERGY STAR Calculator[9]

System Configuration	Desktop Savings	Laptop Savings
ENERGY STAR Computer	191 kWh/yr	44 kWh/yr
ENERGY STAR Computer + Standby	417 kWh/yr	76 kWh/yr
ENERGY STAR + Monitor Shut Down	322 kWh/yr	78 kWh/yr
ENERGY STAR + Standby + Monitor Shut Down	547 kWh/yr	109 kWh/yr
Baseline Computer + Standby	338 kWh/yr	49 kWh/yr
Baseline Computer + Monitor Shut Down	169 kWh/yr	52 kWh/yr
Baseline Computer + Standby + Monitor Shut Down	507 kWh/yr	100 kWh/yr
Notes: Baseline Computer is a unit that is not qualified for ENERGY STAR. These calculations use the basic assumptions included in the ENERGY STAR calculator model (as downloaded o 3/18/2010) with one exception: Machine turned off 36% of the time (not 0%). Source: ENERGY STAR Computer Power Management Savings Calculator. Available: http://www.energystar.gov/ia/products/power_mgt/LowCarbonITSavingsCalc_v26_with_5_0v2.xls		

Table 3-3. PY5 Research Findings Gross Impact Savings Estimates

	Energy Savings (MWh)	Demand Savings (MW)	Coincident Peak Demand Savings (MW)
Ex-Ante PY5 Gross Savings	14.55	NA	NA
Realization Rate	1.22	NA	NA
Research Findings Gross Savings	17.79	0.0024	0.0012

Source: Evaluation Team analysis.

[9] Reprinted from *Long-Term Monitoring and Tracking Report on 2009 Activities: FINAL REPORT*; presented to Northwest Energy Efficiency Alliance; Navigant Consulting, Inc; October 20, 2010

4. Net Impact Evaluation

Due to the limited participation during this program year, a free ridership study was not conducted and therefore the evaluation team applied a NTGR of 1.0 to calculate net savings. Thus research findings net savings are the same as research findings gross savings at 17.79 MWh and 0.0012 MW as shown in Table 4-1.

Table 4-1. PY5 Research Findings Net Impact Savings Estimates

	Energy Savings (MWh)	Demand Savings (MW)	Coincident Peak Demand Savings (MW)
Ex-Ante PY5 Gross Savings	14.55	NA	NA
Realization Rate	1.22	NA	NA
Research Findings Gross Savings	17.79	0.0024	0.0012
Research Findings Net Savings	17.79	0.0024	0.0012

Source: Evaluation Team analysis.

5. Process Evaluation

Since there was limited program participation in EPY5, Navigant did not conduct any participant surveys. Instead, Navigant interviewed ComEd's program manager and RSG's program manager at various points throughout the program year to obtain feedback on how the program was running and to learn more about customer satisfaction. In doing so, the program managers relayed that the late program start date of October 17th, 2012 may have limited program activity, but that there were three customers that received pre-approval and were expected to participate in EPY5. Only one of those customers participated in EPY5; one of the customers decided to drop out of the program after deciding the limited number of computers eligible for participation would have resulted in a very small incentive. Towards the end of EPY5, the other customer was still in a procurement hold-up with its vendor and thus unable to complete the installation in PY5. The RSG program manager indicated that the program was seeing more interest in the university/educational sector and that there were a few projects in the pipeline for the next program year.

6. Conclusions and Recommendations

This section summarizes the key impact and process findings and recommendations.

Gross Realization Rates

Finding 1. The gross realization rate for this program in EPY5 was determined to be 1.22. The ex post gross savings per unit was determined through secondary literature review.

Recommendation. If the program expects to see greater customer interest in EPY6 and beyond, the IC may consider incentives for different types of power management software equipment (e.g., laptops, other portable devices, etc.).

Demand Savings Estimates.

Finding 2. Gross and net ex post peak coincident demand savings were estimated to be 1.2 kW. The coincidence factors used to derive the program's peak coincident demand savings were determined from secondary literature review.

Recommendation. In EPY6, Navigant recommends that the IC calculate an ex ante value that can be used as a starting point for evaluation purposes. Navigant suggests that one example the IC can use for a demand savings estimate is from Pennsylvania's TRM which can be refined to reflect the program's peak coincident demand period definition.

Program Participation

Finding 3. Only one customer participated in this program in EPY5.

Recommendation. Increasing the type of devices will help increase participation.

7. Appendix

7.1 Glossary

High Level Concepts

Program Year

- EPY1, EPY2, etc. Electric Program Year where EPY1 is June 1, 2008 through May 31, 2009, EPY2 is June 1, 2009 through May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 through May 31, 2012, GPY2 is June 1, 2012 through May 31, 2013.

There are two main tracks for reporting impact evaluation results, called Verified Savings and Impact Evaluation Research Findings.

Verified Savings composed of

- Verified Gross Energy Savings
- Verified Gross Demand Savings
- Verified Net Energy Savings
- Verified Net Demand Savings

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In EPY5/GPY2 the Illinois TRM was in effect and was the source of most deemed parameters. Some of ComEd's deemed parameters were defined in its filing with the ICC but the TRM takes precedence when parameters were in both documents.

Application: When a program has deemed parameters then the Verified Savings are to be placed in the body of the report. When it does not (e.g., Business Custom, Retrocommissioning), the evaluated impact results will be the Impact Evaluation Research Findings.

Impact Evaluation Research Findings composed of

- Research Findings Gross Energy Savings
- Research Findings Gross Demand Savings
- Research Findings Net Energy Savings
- Research Findings Net Demand Savings

These are savings reflecting evaluation adjustments to any of the savings parameters (when supported by research) regardless of whether the parameter is deemed for the verified savings analysis. Parameters that are adjusted will vary by program and depend on the specifics of the research that was performed during the evaluation effort.

Application: When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be labeled Impact Evaluation Research Findings and designated as "ER" for short. When a program does not have deemed parameters (e.g., Business Custom, Retrocommissioning), the Research Findings are to be in the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

Program-Level Savings Estimates Terms

N	Term Category	Term to Be Used in Reports‡	Application†	Definition	Otherwise Known As (terms formerly used for this concept)§
1	Gross Savings	Ex-ante gross savings	Verification and Research	Savings as recorded by the program tracking system, unadjusted by realization rates, free ridership, or spillover.	Tracking system gross
2	Gross Savings	Verified gross savings	Verification	Gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis	Ex post gross, Evaluation adjusted gross
3	Gross Savings	Verified gross realization rate	Verification	Verified gross / tracking system gross	Realization rate
4	Gross Savings	Research Findings gross savings	Research	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
5	Gross Savings	Research Findings gross realization rate	Research	Research findings gross / ex-ante gross	Realization rate
6	Gross Savings	Evaluation-Adjusted gross savings	Non-Deemed	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
7	Gross Savings	Gross realization rate	Non-Deemed	Evaluation-Adjusted gross / ex-ante gross	Realization rate
1	Net Savings	Net-to-Gross Ratio (NTGR)	Verification and Research	1 – Free Ridership + Spillover	NTG, Attribution
2	Net Savings	Verified net savings	Verification	Verified gross savings times NTGR	Ex post net
3	Net Savings	Research Findings net savings	Research	Research findings gross savings times research NTGR	Ex post net
4	Net Savings	Evaluation Net Savings	Non-Deemed	Evaluation-Adjusted gross savings times NTGR	Ex post net
5	Net Savings	Ex-ante net savings	Verification and Research	Savings as recorded by the program tracking system, after adjusting for realization rates, free ridership, or spillover and any other factors the program may choose to use.	Program-reported net savings

‡ "Energy" and "Demand" may be inserted in the phrase to differentiate between energy (kWh, Therms) and demand (kW) savings.

† **Verification** = Verified Savings; **Research** = Impact Evaluation Research Findings; **Non-Deemed** = impact findings for programs without deemed parameters. We anticipate that any one report will either have the first two terms or the third term, but never all three.

§ Terms in this column are not mutually exclusive and thus can cause confusion. As a result, they should not be used in the reports (unless they appear in the "Terms to be Used in Reports" column).

Individual Values and Subscript Nomenclature

The calculations that compose the larger categories defined above are typically composed of individual parameter values and savings calculation results. Definitions for use in those components, particularly within tables, are as follows:

Deemed Value – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or ComEd's approved deemed values. Values that are based upon a deemed measure shall use the superscript "D" (e.g., delta watts^{D}, HOU-Residential^{D}).

Non-Deemed Value – a value that has not been assumed to be representative of the average condition of an input parameter and has not been documented in the Illinois TRM or ComEd's approved deemed values. Values that are based upon a non-deemed, researched measure or value shall use the superscript "E" for "evaluated" (e.g., delta watts^{E}, HOU-Residential^{E}).

Default Value – when an input to a prescriptive saving algorithm may take on a range of values, an average value may be provided as well. This value is considered the default input to the algorithm, and should be used when the other alternatives listed for the measure are not applicable. This is designated with the superscript "DV" as in X^{DV} (meaning "Default Value").

Adjusted Value – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript "AV" as in X^{AV}

Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012[10].

Evaluation: Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, accomplishments, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Impact evaluation in the energy efficiency arena is an investigation process to determine energy or demand impacts achieved through the program activities, encompassing, but not limited to: *savings verification*, *measure level research*, and *program level research*. Additionally, evaluation may occur outside of the bounds of this TRM structure to assess the design and implementation of the program.

Synonym: **Evaluation, Measurement and Verification (EM&V)**

> **Measure Level Research**: An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.
>
> **Program Level Research**: An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be

[10] IL-TRM_Policy_Document_10-31-12_Final.docx

specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

Savings Verification: An evaluation process that independently verifies program savings achieved through prescriptive measures. This process verifies that the TRM was applied correctly and consistently by the program being investigated, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operating. The results of savings verification may be expressed as a program savings realization rate (verified ex post savings / ex ante savings). Savings verification may also result in recommendations for further evaluation research and/or field (metering) studies to increase the accuracy of the TRM savings estimate going forward.

Measure Type: Measures are categorized into two subcategories: custom and prescriptive.

Custom: Custom measures are not covered by the TRM and a Program Administrator's savings estimates are subject to retrospective evaluation risk (retroactive adjustments to savings based on evaluation findings). Custom measures refer to undefined measures that are site specific and not offered through energy efficiency programs in a prescriptive way with standardized rebates. Custom measures are often processed through a Program Administrator's business custom energy efficiency program. Because any efficiency technology can apply, savings calculations are generally dependent on site-specific conditions.

Prescriptive: The TRM is intended to define all prescriptive measures. Prescriptive measures refer to measures offered through a standard offering within programs. The TRM establishes energy savings algorithm and inputs that are defined within the TRM and may not be changed by the Program Administrator, except as indicated within the TRM. Two main subcategories of prescriptive measures included in the TRM:

Fully Deemed: Measures whose savings are expressed on a per unit basis in the TRM and are not subject to change or choice by the Program Administrator.

Partially Deemed: Measures whose energy savings algorithms are deemed in the TRM, with input values that may be selected to some degree by the Program Administrator, typically based on a customer-specific input.

In addition, a third category is allowed as a deviation from the prescriptive TRM in certain circumstances, as indicated in Section 3.2:

Customized basis: Measures where a prescriptive algorithm exists in the TRM but a Program Administrator chooses to use a customized basis in lieu of the partially or fully deemed inputs. These measures reflect more customized, site-specific calculations (e.g., through a simulation model) to estimate savings, consistent with Section 3.2.