



ComEd Elevate Multifamily All-Electric Heat Retrofit IPA Program Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Plan Year 9 (PY9)

Presented to
ComEd

DRAFT

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1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's Program Year 9 (PY9) Elevate Energy Multifamily Electric Heat Retrofit Program (MFEP). It presents a summary of the energy and demand impacts for the total program and broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology. PY9 covered June 1, 2016 through May 31, 2017. This program was not active during the bridge period from June 1 to December 31.

2. PROGRAM DESCRIPTION

The MFEP was an IPA program that implemented energy efficiency upgrades in the electrically-heated multi-family electric space heating market in the city of Chicago. This program provided energy audits and free energy efficiency products in residential dwelling units. In addition, the program offered free products to residential customers distributed through a series of initiatives and events the City undertook to engage its residents on issues of sustainability and energy efficiency.

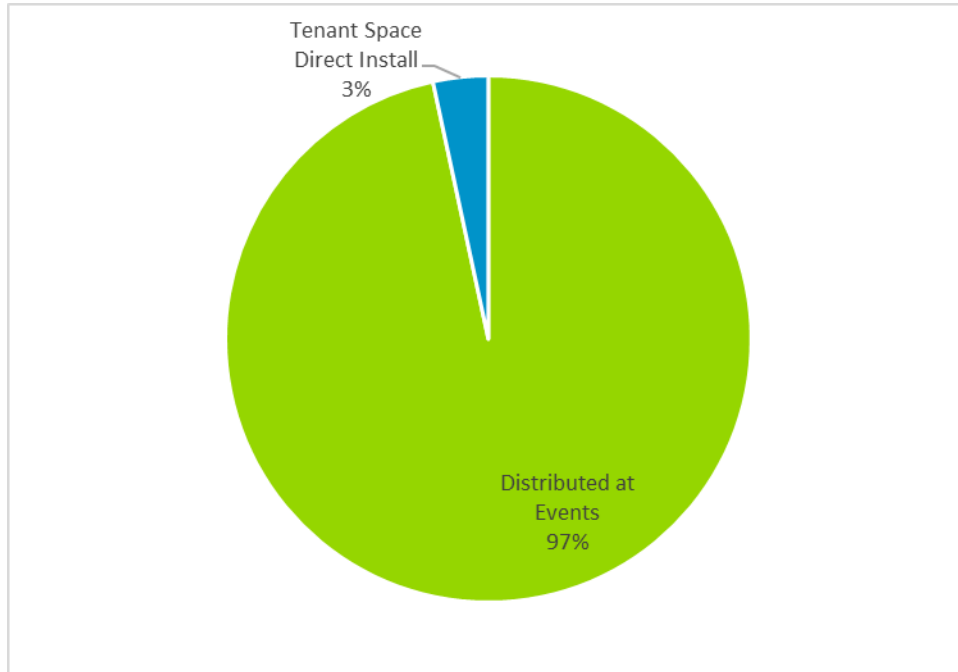
The program installed 60 programmable thermostats in tenant units and distributed 540 Advanced Power Strips (APS) to tenants in assessed buildings and a further 17,116 via 242 community events in Chicago. Table 2-1 shows the volumetric findings of the PY9 program year in more detail.

Table 2-1. PY9 Volumetric Findings Detail

Participation	Direct Install	Distributed Products	Total
Completed Building Assessment	-	-	3
Completed Events	-	242	242
Tenant Units in Assessed Buildings	60	479	539
Measures Installed in Tenant Units	60	540	600
Measures Distributed at Events	-	17,116	17,116
Total PY9 Measures	60	17,656	17,716

Source: ComEd tracking data and Navigant team analysis.

Figure 2-1. Percentage of Measures Installed by Channel



Source: Evaluation Analysis

3. PROGRAM SAVINGS

Table 3-1 summarizes the incremental energy and demand savings the MFEP achieved in PY9.

Table 3-1. PY9 Total Annual Incremental Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Peak Demand Savings (kW)
Ex Ante Gross Savings	1,868,792	NA*	NA
Program Gross Realization Rate	70%	NA	NA
Verified Gross Savings	1,305,036	176	141
Program Net-to-Gross Ratio (NTGR)†	Varies	Varies	Varies
Verified Net Savings	1,126,851	151	121

* Not reported in the tracking database

† Deemed values – 86% for Advanced Power Strip, 95% for Programmable Thermostat (Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>).

Source: ComEd tracking data and Navigant team analysis.

4. PROGRAM SAVINGS BY MEASURE

The program includes two measures as shown in Table 4-1.

Table 4-1. PY9 Energy Savings by Measure

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTGR *	Verified Net Savings (kWh)	Technical Measure Life	Persistence	Effective Useful Life (EUL)†
Advanced Power Strip	APS (7-plug, Tier 1)	1,818,568	69%	1,254,812	0.86	1,079,138	NA	NA	4
HVAC	Programmable Thermostat	50,224	100%	50,224	0.95	47,713	10	5	5
Total		1,868,792	70%	1,305,036		1,126,851			

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

† EUL is a combination of technical measure life and persistence.

Source: ComEd tracking data and Navigant team analysis.

Table 4-2. PY9 Demand Savings by Measure

End Use Type	Research Category	Ex-Ante Gross Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Demand Reduction (kW)	NTGR*	Verified Net Demand Reduction (kW)
Advanced Power Strip	APS (7-plug, Tier 1)	NA	NA	176	0.86	151
HVAC	Programmable Thermostat	NA	NA	NA	0.95	NA
Total		NA	NA	176		151

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

Source: ComEd tracking data and Navigant team analysis.

Table 4-3. PY9 Peak Demand Savings by Measure

End Use Type	Research Category	Ex-Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTGR*	Verified Peak Net Demand Reduction (kW)
Advanced Power Strip	APS (7-plug, Tier 1)	NA	NA	141	0.86	121
HVAC	Programmable Thermostat	NA	NA	NA	0.95	NA
Total		NA	NA	141		121

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

Source: ComEd tracking data and Navigant team analysis.

5. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

5.1 Impact Parameter Estimates

Navigant estimated verified unit savings for each program measure using the impact algorithms and inputs found in the Illinois Technical Reference Manual (TRM) version 5.0. Table 5-1 presents the key parameters and the references used in the verified gross and net savings calculations.

Table 5-1. Verified Gross Savings Parameters

Measure	Ex Ante Gross Value (kWh/unit)	Verified Gross Value (kWh/unit)	Deemed or Evaluated?	Source (TRM V5.0 & 6.0)
Advanced Power Strip (7-plug, Tier 1)	103	71.01	Evaluated	5.2.1*
Programmable Thermostat	837.1	837.1	Deemed	5.3.11†

*State of Illinois Technical Reference Manual version 6.0 from <http://www.ilsag.info/technical-reference-manual.html>.

†State of Illinois Technical Reference Manual version 5.0 from <http://www.ilsag.info/technical-reference-manual.html>.

5.2 Other Impact Findings and Recommendations

The following describes the key program findings and recommendations:

Finding 1: When calculating the savings, the implementer did not use an in-service rate (ISR) for advanced power strips. Section 5.2.1 of the IL TRM v5.0 (Advanced Power Strip – Tier 1) states that the measure was developed to be applicable to time of sale, new construction, and direct install programs. When applied to other types of programs, the TRM states the measure savings should be verified. Because a distributed product is not one of the applicable program types, Navigant verified the savings using version 6.0¹ of the Illinois Technical Reference Manual (TRM v6.0). TRM v6.0 is applicable to kit programs and includes an ISR of 69 percent. This resulted in a realization rate for this measure of 69 percent.

Recommendation 1: The implementer should ensure that the protocols used to calculate reported savings apply to the measures under consideration. In the case of advanced power strips, an ISR of 69 percent should be included when calculating energy and demand savings.

6. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

6.1 Verified Gross Program Savings Analysis Approach

Navigant determined verified gross savings for each program measure by:

1. Reviewing the savings algorithm inputs in the measure workbook for agreement with the IL TRM v5 or secondary research.
2. Validating that the savings algorithm was applied correctly.
3. Cross-checking per-unit savings values in the scorecard with the verified values in the measure workbook or in Navigant’s calculations if the workbook did not agree with the TRM.
4. Multiplying the verified per-unit savings value by the quantity reported in the scorecard.
5. Verifying the reported quantities with the monthly invoices and accruals.

6.2 Verified Net Program Savings Analysis Approach

Navigant calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTGR). In PY9, the NTGR estimates used to

¹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0, available at: <http://www.ilsag.info/technical-reference-manual.html>.

calculate the net verified savings were based on past evaluation research and defined by a consensus process through SAG.²

7. APPENDIX 2. IMPACT ANALYSIS DETAIL

Navigant downloaded the final scorecard for the Elevate Energy Multifamily Electric Heat Retrofit PY9 impact evaluation from the ComEd Evaluation Share file site. The evaluation team relied on the following documents to verify the per-unit savings for each program measure.

- Final PY9 scorecard file: “05.31.17 TPEP Final Elevate Scorecard”
- Illinois Technical Reference Manual (TRM v5.0) for deemed input parameters or TRM (v6.0) for the APS ISR value.

Navigant compared the quantities in the scorecard with the ComEd Monthly Accruals, monthly invoices and corresponding documentation.

The following table provides quantity of units delivered, and ex ante and verified savings per unit. The realization rate for the APS reflects a 69 percent ISR adjustment to the gross per unit savings.

Table 7-1. Measures Impact Detail

Measure	Unit Basis	Quantity Installed	Ex Ante kWh Savings per unit	Gross kWh Realization Rate	Verified Unit kWh Savings per unit
APS (7-plug, Tier 1)	Each	17,656	103.00	69%	71.07
Programmable Thermostats	Each	60	837.10	100%	837.10

Source: ComEd tracking data and Navigant team analysis.

8. APPENDIX 3. TOTAL RESOURCE COST DETAIL

Table 8-1 includes variables for the Total Resource Cost (TRC) test. It only includes analysis inputs available at the time of finalizing the PY9 MFEP impact evaluation report. Additional required data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team at a later date. EULs are not final and are subject to change.

Table 8-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	Effective Useful Life (years)	Ex Ante Gross Savings (kWh)	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Savings (kWh)	Verified Gross Peak Demand Reduction (kW)
Advanced Power Strip	APS (7-plug, Tier 1) - Distributed	Each	60	4	1,818,568	141	1,254,812	141
HVAC	Programmable Thermostat - Direct Install	Each	17,656	5	50,224	0	50,224	0

Source: ComEd tracking data and Navigant team analysis.

² Source ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>