Plan Year 6 Summary Evaluation Report

FINAL

Energy Efficiency / Demand Response Plan:
Plan Year 6 (PY6)
(6/1/2013-5/31/2014)

Presented to
Commonwealth Edison Company

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E. Executive Summary

This report presents summary findings and recommendations from the impact and process evaluation of the energy efficiency and demand response programs offered by Commonwealth Edison Company (ComEd) in Plan Year 6 (PY6), which ran from June 1, 2013 to May 31, 2014.

The PY6 ComEd Portfolio included fourteen programs targeted to residential customers and ten programs targeted to business customers. Section 1 includes a brief overview of the Portfolio and its energy impacts (which are referred to publicly as *"Smart Ideas for Your Home"* and *"Smart Ideas for Your Business*" for the Residential and Business sectors, respectively). Section 2 identifies program level evaluation activities. Section 3 provides program level results, findings and key recommendations. Full program evaluation reports are included in Appendix A.

The evaluation has estimated savings by 2 methods, verified savings using deemed evaluation parameters when specified by Illinois' statutory framework, and research savings based on evaluation parameters determined in the current year. Verified savings are used to determine compliance with portfolio goals and are provided in this section. Research savings present an alternate view based on traditional retrospective evaluation. An overview of the research savings is provided in Section 4.

E.1. ComEd PY6 Verified Portfolio Results

The estimated verified savings uses deemed evaluation values when available and research values and evaluators judgment for areas where deeming has not been specified. The deemed values are typically from the Illinois Technical Reference Manual v2.0[1] (TRM) that went into effect at the beginning of the program year. Verified savings are used to determine compliance with annual portfolio goals and are reported by ComEd in filings and responses for program achieved results. In PY6, ComEd's energy efficiency portfolio achieved 1,118,649 verified net MWh (Table E-1), with the EEPS portion of the total achieving 986,314 verified net MWh and the IPA portion of the total achieving 132,335 MWh verified net MWh savings. This included 1,005,865 net MWh from funded measures in PY6 and 112,784 MWh from previously funded CFL bulbs (funded in PY4 or PY5 through the Residential Energy Star Lighting Program [Res Lighting] and Business Instant Lighting Discounts Program [BILD] and expected to be installed in PY6). Carryover savings are calculated in order to account for light bulbs installed in years subsequent to when they are purchased, Savings from these bulbs are excluded from program results in the year they are purchased because they are assumed to be placed into storage and installed at a later time. It is estimated that there will be a total PY6 carryover of 63,144 MWh of net energy savings from the Res Lighting Program and 18,013 MWh of net energy savings from the BILD Program. This is a total estimated PY6 carryover of 81,157.

Based on these savings and total expenditures, the PY6 EEPS total cost effectiveness, based on the Illinois TRC test, is 1.88.

[1] State of Illinois Energy Efficiency Technical Reference Manual. Final, As of June 24, 2013. Effective: June 1st, 2013; http://www.icc.illinois.gov/downloads/public/edocket/353098.pdf

Verified energy savings are documented in Table E-1 and Table E-2 following this page, followed by Table E-3 summarizing first year and lifetime ex post savings and acquisition costs.

Table E-1. ComEd EEPS and IPA Year 6 Results – Planned and Net Energy Savings – Verified

	Ex-Ante	Ex-Post			
	Gross (MWh)	Realization Rate	Gross (MWh)	NTGR	Net (MWh)
Residential EEPS Programs					
Residential Energy Star Lighting	442,599	0.77	340,774	0.54	184,018
Residential Fridge and Freezer	38,274	0.93	35,478	0.71	25,331
Multifamily HES Joint	20,466	1.07	21,974	0.93	20,469
Home Energy Savings	1,220	1	1,221	0.8	973
Complete Systems Replacement	5,633	0.98	5,515	0.59	3,254
Home Energy Report	110,582	1.17	129,063	1	129,063
Residential New Construction	554	0.92	508	0.8	406
Elementary Energy Education	4,172	1	4,162	0.76	3,163
Home Energy Jumpstart	3,619	1.02	3,681	0.79	2,921
Total Residential EEPS Programs	*627,119*	*0.86*	*542,376*	*0.68*	*369,598*
Business EEPS Programs					
Business Standard	271,269	0.99	268,982	0.69	184,696
Business Instant Lighting Discount§	242,194	1.09	265,158	0.63	167,049
Small Business Energy Savings§	64,083	1	63,739	0.95	60,552
Business Custom	27,305	0.97	26,588	0.61	16,219
New Construction	27,208	1.01	27,518	0.52	14,310
Retro-Commissioning	26,459	0.96	25,302	1.04	26,314
Industrial Systems	25,393	0.95	24,121	0.74	17,902
Data Centers	21,905	0.97	21,333	0.61	12,939
Total Business EEPS Programs	*705,816*	*1.02*	*722,741*	*0.69*	*499,981*
Third Party EEPS Programs					
RLD Thermostats	99	1	99	1	99
Desktop Power Management	2,673	0.88	2,348	0.95	2,242
CUB†	N/A		1,610	1	1,610
Total Third Party EEPS Programs	2,772		4,057	0.97	3,951
EEPS Carryover					
Residential Energy Star Lighting	176,194	1	176,194	0.54	95,185
Business Instant Lighting Discount (BILD)	27,637	1.02	28,119	0.63	17,599
Total Carryover	*203,831*	*1*	*204,313*	*0.55*	*112,784*
EEPS Programs Total	1,539,538	0.96	1,473,487	0.67	986,314
IPA Programs					
Residential Energy Star Lighting IPA	94,956	0.85	80,258	0.51	40,931
Multifamily HES Joint IPA	18,819	1.26	23,776	0.80	19,021
Small Business Energy Savings IPA	71,524	1.00	71,564	0.95	67,986
Third Party IPA Programs					
Home Energy Savings IPA	99	1.04	103	0.80	82
Energy Stewards†‡	N/A		0		0
Sustainable Schools	2,272	0.92	2,083	0.95	1,979
One Change Residential	5,546	0.7	3,908	0.6	2,336
IPA Program Total	193,216	0.94	181,692	0.73	132,335
EEPS and IPA Total	1,732,754	0.96	1,655,179	0.68	1,118,649

† - No ex-ante gross savings estimates were provided for this program

‡ - Savings from the Energy Stewards program were evaluated using regression billing analysis. However, the savings results were not statistically different from 0.

§ - Double counted savings for Small Business Energy Savings and BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table E-2. ComEd EEPS and IPA Year 6 Results – Verified Net Peak Demand Savings (MW)

	Ex-Post		
	Gross (MW)	NTGR	Net (MW)
Residential EEPS Programs			
Residential Energy Star Lighting	40.00	0.54	21.60
Residential Fridge and Freezer	4.80	0.67	3.22
Multifamily HES Joint	2.59	0.92	2.39
Home Energy Savings	1.14	0.80	0.91
Complete Systems Replacement	4.05	0.59	2.39
Home Energy Report‡	N/A		N/A
Residential New Construction	0.13	0.80	0.11
Elementary Energy Education	0.48	0.76	0.37
Home Energy Jumpstart	0.37	0.78	0.29
Total Residential EEPS Programs	*53.56*	*0.58*	*31.28*
Business EEPS Programs			
Business Standard	46.89	0.68	31.97
Business Instant Lighting Discount§	54.00	0.63	34.00
Small Business Energy Savings§	11.47	0.95	10.90
Business Custom	1.75	0.64	1.12
New Construction	5.46	0.52	2.84
Retro-Commissioning	0.64	1.04	0.66
Industrial Systems	3.63	0.83	3.01
Data Centers	1.84	0.58	1.07
Total Business EEPS Programs	*125.68*	*0.71*	*85.57*
Third Party EEPS Programs			
RLD Thermostats	N/A		N/A
Desktop Power Management	0.18	0.96	0.17
CUB†	N/A		N/A
Total Third Party EEPS Programs	0.18	0.96	0.17
EEPS Carryover			
Residential Energy Star Lighting	146.50	0.54	79.10
Business Instant Lighting Discounts	5.50	0.71	3.90
Total Carryover	*152.00*	*0.55*	*83.00*
EEPS Program Total	331.42	0.60	200.02
IPA Programs			
Residential Energy Star Lighting IPA	10.2	0.51	5.2
Multifamily HES Joint IPA	3.62	0.8	2.9
Small Business Energy Savings IPA	13.48	0.95	12.8
Third Party IPA Programs			
Home Energy Savings IPA	N/A		N/A
Energy Stewards†‡	N/A		N/A
Sustainable Schools	0.14	0.93	0.13
One Change Residential	0.39	0.6	0.23
IPA Program Total	27.83	0.76	21.26
EEPS and IPA Total	359.25	0.62	221.28

Note: Many programs did not have ex-ante gross peak demand savings, which makes the calculation of realization rate at the sector or portfolio level impossible.
‡ - No ex-post gross or net demand savings were calculated or claimed for this program.
§ - Double counted savings for Small Business Energy Savings and BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table E-3. Ex Post Summary Table of First Year and Lifetime Savings and Acquisition Costs

	Realization Rate	Verified Ex Post Gross			Deemed/ Used	Verified Ex Post Net					Actual	Evaluation Estimate (Where Available)	Participation		Weighted Average Measure Life
ComEd PY6 Programs	Energy Savings (Ex Ante Gross/Ex Post Gross)	First Year Annual Energy Savings	First Year Peak Demand Savings	Lifetime Savings	Net-to-Gross Ratio	First Year Annual Savings	First Year Peak Demand Savings	Lifetime Savings	First Year Cost per First Year Annual Savings	First Year Cost per Lifetime Savings	Program Costs	Net-to-Gross Ratio	# Units	Units Definition	Years
	%	MWh	MW	MWh	%	MWh	MW	MWh	$/MWh	$/MWh	$	%			
Residential Programs															
Residential Energy Star Lighting	77%	340,774	40.00	1,476,075	54%	184,018	21.60	797,081	$ 75.05	$ 17.33	$ 13,810,316	59%	8,965,546	Bulbs	4.3
Residential Fridge and Freezer	93%	35,478	4.80	283,824	71%	25,331	3.22	202,648	$ 272.04	$ 34.00	$ 6,890,974	42%	42,313	Appliances	8.0
Multifamily HES Joint	107%	21,974	2.59	87,765	93%	20,469	2.39	81,754	$ 235.24	$ 58.90	$ 4,815,028	93%	301,703	Measures	4.0
Home Energy Savings & Jumpstart	101%	4,902	1.51	36,215	79%	3,894	1.20	28,768	$ 360.99	$ 48.86	$ 1,405,687	79%	101,857	Measures	7.4
Complete Systems Replacement	98%	5,515	4.05	99,270	59%	3,254	2.39	58,572	$ 1,497.68	$ 83.20	$ 4,873,460	59%	11,152	Measures	18.0
Home Energy Report	117%	129,063	-	129,063	100%	129,063	-	129,063	$ 13.86	$ 13.86	$ 1,788,260	100%	446,587	Participants	1.0
Residential New Construction	92%	508	0.13	9,362	80%	406	0.11	7,482	$ 94.06	$ 5.10	$ 38,188	80%	798	Homes	18.4
Elementary Energy Education	100%	4,162	0.48	26,822	76%	3,163	0.37	20,384	$ 257.17	$ 39.91	$ 813,434	76%	26,497	Kits	6.4
Total Residential	86%	542,376	53.56	1,945,508	68%	369,598	31.28	1,325,752	$ 93.17	$ 25.97	$ 34,435,347	70%	9,896,453		3.6
Business Programs															
Business Standard	99%	268,982	46.89	3,227,784	69%	184,696	31.97	2,216,352	$ 175.94	$ 14.66	$ 32,495,816	71%	7,126	Measures	12.0
Business Instant Lighting Discount	109%	265,158	54.00	1,063,533	63%	167,049	34.00	670,024	$ 72.49	$ 18.07	$ 12,109,711	68%	2,157,927	Bulbs	4.0
Small Business Energy Savings	100%	63,739	11.47	759,131	95%	60,552	10.90	721,174	$ 186.85	$ 15.69	$ 11,314,395	95%	553,955	Measures	11.9
Business Custom	97%	26,588	1.75	319,056	61%	16,219	1.12	194,628	$ 191.33	$ 15.94	$ 3,103,187	67%	93	Projects	12.0
New Construction	101%	27,518	5.46	330,216	52%	14,310	2.84	171,720	$ 346.95	$ 28.91	$ 4,964,818	80%	59	Projects	12.0
Retro-Commissioning	96%	25,302	0.64	126,510	104%	26,314	0.66	131,570	$ 175.71	$ 35.14	$ 4,623,510	104%	49	Projects	5.0
Industrial Systems	95%	24,121	3.63	361,815	74%	17,902	3.01	268,530	$ 248.22	$ 16.55	$ 4,443,571	74%	24	Projects	15.0
Data Centers	97%	21,333	1.84	255,996	61%	12,939	1.07	155,268	$ 182.94	$ 15.25	$ 2,367,091	61%	16	Projects	12.0
Total Business	102%	722,741	125.68	6,547,221	69%	499,981	85.57	4,529,266	$ 150.85	$ 16.65	$ 75,422,099	73%	2,719,249		9.1
EEPS Third Party Programs															
RLD Thermostats	100%	99	-	99	100%	99	-	99	$ -	$ -		100%	16	Participants	1.0
Desktop Power Management	88%	2,348	0.18	2,348	95%	2,242	0.17	2,242	$ -	$ -		95%	11,176	Computers	1.0
CUB		1,610	-	1,610	100%	1,610	-	1,610	$ -	$ -		100%	8,148	Participants	1.0
EEPS Third Party Total	95%	4,057	0.18	4,057	97%	3,951	0.17	3,951	$ 116.46	$ 116.46	$ 460,142	74%	19,340		1.0
EEPS Carryover															
Residential Energy Star Lighting	100%	176,194	146.50	763,191	54%	95,185	79.10	412,297	$ -	$ -	$ -	54%	3,266,736	Bulbs	4.3
Business Instant Lighting Discount	102%	28,119	5.50	112,784	63%	17,599	3.90	70,589	$ -	$ -	$ -	63%	229,136	Bulbs	4.0
EEPS Carryover	100%	204,313	152.00	874,768	55%	112,784	83.00	482,886	$ 144.91	$ 33.85	$ 16,344,088	55%	3,495,872		4.3
EEPS Total	105%	1,473,487	331.42	9,371,555	67%	986,314	200.02	6,341,855	$ 128.42	$ 19.97	$ 126,661,676	67%	16,130,914		6.4
ComEd IPA Programs															
Residential Energy Star Lighting IPA	85%	80,258	10.20	347,640	51%	40,931	5.20	177,294	$ 127.79	$ 29.50	$ 5,230,561	54%	2,125,179	Bulbs	4.3
Multifamily HES Joint IPA	126%	23,776	3.62	94,963	80%	19,021	2.90	75,971	$ 150.12	$ 37.59	$ 2,855,396	80%	90,181	Measures	4.0
Small Business Energy Savings IPA	100%	71,564	13.48	852,327	95%	67,986	12.80	809,713	$ 287.97	$ 24.18	$ 19,578,172	95%			11.9
ComEd IPA Total	95%	175,598	27.30	1,458,963	73%	127,938	20.90	1,062,978	$ 216.23	$ 26.03	$ 27,664,129	74%	2,215,360		8.3
Third Party IPA Programs															
Home Energy Savings IPA	104%	103	-	761	80%	82	-	606	$ 1,169.37	$ 158.28	$ 95,888	80%	240	Measures	7.4
Energy Stewards		-	-	-		-	-	-			$ 118,125		716	Participants	1.0
Sustainable Schools	92%	2,083	0.14	24,996	95%	1,979	0.13	23,748	$ 433.62	$ 36.13	$ 858,125	95%	10,777	Measures	12.0
One Change Residential	70%	3,908	0.39	20,322	60%	2,336	0.23	12,147	$ 238.92	$ 45.95	$ 558,125	60%	115,329	Bulbs	5.2
ComEd IPA Total	77%	6,094	0.53	50,588	72%	4,397	0.36	36,501	$ 370.77	$ 44.66	$ 1,630,263	74%	127,062		8.3
IPA Total	94%	181,692	27.83	1,509,552	73%	132,335	21.26	1,099,479	$ 221.37	$ 26.64	$ 29,294,392	73%	2,342,422		8.3
EEPS and IPA Total*	96%	1,655,179	359.25	10,881,107	68%	1,118,649	221.28	7,441,334	$ 139.41	$ 20.96	$ 155,956,068	70%	18,473,336		6.7

* The IPA cost information included in this table was requested by the Illinois Commerce Commission and inserted here after Navigant completed its PY6 evaluation. Navigant did not have the opportunity to evaluate or assess this detail in any significant manner - this detail is inserted here as costs that were provided by ComEd, but not verified or evaluated by Navigant.

Note: Program costs are not presently available for individual third party programs. The cost-benefit results included in these tables are reflective of only the Energy Efficiency Portfolio Standard (EEPS) portion of the ComEd energy efficiency and demand response programs, and are not inclusive of the Illinois Power Agency (IPA) portion.

The ComEd program tracking systems reported 1,732,754 MWh of gross savings for combined residential and business programs in PY6, including carryover. Evaluation verification review of these ex-ante gross savings estimates on a program-by-program basis concluded that 96% of the estimated gross savings had been realized (including lighting carryover from PY4 and PY5 from Residential ENERGY STAR Lighting Program and Business Instant Lighting Discount). Applying free ridership and spillover rates resulted in an overall verified net-to-gross ratio of 0.68.

In the course of estimating verified gross savings, the evaluation team used a variety of impact parameters in its calculations across programs. Many of these parameters (e.g., delta watts, hours-of-use, peak coincidence factors, full load cooling hours, demand coincidence factor, energy and demand interactive effects, realization rates, etc.) were deemed for PY6 based on the Illinois TRM. Custom measures are not included in the TRM since they are not standard. Evaluation research determined the split of quantities of bulbs sold and installed in residential vs. non-residential locations and various other parameters not included in the IL TRM. Net savings were based on the application of a net-to-gross ratio that was determined through a Statewide Advisory Group consensus process, which relied heavily on previous evaluation research findings.

The programs that calculated savings using the TRM in PY6 include:

Residential Programs: Residential Lighting, Fridge Freezer Recycle Rewards, Multifamily Home Energy Savings, Home Energy Savings, Home Energy Jumpstart, Residential New Construction, Complete System Replacement, Elementary Energy Education, Willdan Sustainable Schools, IPA Home Energy Savings and One Change CFL Distribution.

Business Programs: Standard, Business Instant Lighting Discounts (BILD), Business New Construction, Small Business Energy Services, RLD IP Thermostats and Desktop Power Management.

Programs that did not apply the TRM in PY6 include:

Residential Programs: Home Energy Report, CUB Energy Saver and Great Energy Stewards

Business Programs: Custom, Industrial Systems, Data Centers and Retrocommissioning.

Carryover Savings. The Residential ENERGY STAR Lighting Program had measures (CFLs) sold or incented in PY4 and PY5 that were not installed at that time but were installed in PY6 according to evaluation analysis. Those measures are credited to the PY6 savings as Late Installs or Carryover Savings. Similarly, BILD includes carryover savings.

E.2. ComEd PY6 Research Portfolio Results

Using its newest research findings (not limited to following the TRM and SAG consensus NTG values), the evaluation team estimated that ComEd's efficiency programs achieved 1,166,156 net MWh energy savings in the ComEd service territory for PY6. This included 1,053,372 net MWh from funded measures in PY6, plus the same CFL Carryover determined for verified savings. The result of all the individual program reviews based on research findings was a realization rate of 96%, a net-to-gross ratio of 0.70, and

an ex-post estimate of 1,166,156 MWh of net energy savings.[2] Researched savings reflect evaluation adjustments to any of the savings parameters using the best available research. This can occur even if a 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. Researched savings are also used to adjust deemed values during the annual Illinois TRM update process. Any such changes to deemed values are assessed and altered through the SAG Technical Advisory Committee's process updating the Illinois TRM, which occurs on an annual basis. Detailed research findings are presented in Section 4.

E.3. ComEd EEPS Portfolio Cost Effectiveness Results

This section provides a compilation of the program level cost and benefit components of the EEPS TRC and UCT test analysis as seen in Tables E-4 and E-5 below. The included savings numbers and cost-benefit results are reflective of the Energy Efficiency Portfolio Standard (EEPS) portion of the ComEd energy efficiency and demand response programs, and are not inclusive of the Illinois Power Agency (IPA) portion. Additionally, for programs that are jointly implemented by ComEd and one or more Illinois gas utilities (including Nicor Gas, Peoples Gas, and/or North Shore Gas), only the electric portion of the program savings and cost-benefit calculations are included here. Tables E-6 and E-7 present the program level cost and benefit components for the jointly implemented programs aggregated across both ComEd EEPS and the gas utilities associated with the implementation of each program. The results in Tables E-6 and E-7 are aggregated across the three years from EPY4 to EPY6 during which the programs were jointly implemented.

[2] State of Illinois Energy Efficiency Technical Reference Manual, Version 2.0. Final, As of June7th, 2013. Effective: June 1st, 2013;
http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_2/Illinois_Statewide_TRM_Version_2.0.pdf

Table E-4. Summary of Program Level Benefits, Costs ($000), and TRC Test – *ComEd EEPS Specific w/o Natural Gas Data from Joint Programs*[3]

Program								Costs			IL Total Resource Cost (TRC) Test			
	Avoided Electric Production	Avoided Electric Capacity	Avoided T&D Electric	Avoided Ancillary	Avoided Gas Production	Other Benefits	Definition of Other Benefits	Non-Incentive Costs	Incentive Costs	Incremental Costs (Net)	IL TRC Benefits	IL TRC Costs	IL TRC Test Net Benefits	IL TRC Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l) = (b+c+d+e+f+g)	(m) = (i+k)	(n) = (l-m)	(o) = (l/m)
Residential Lighting	$ 24,637,472	$ 6,365,425	$ 3,744,356	$ 6,686,299	$ (16,220,346)	$ 42,598,899	Avoided GHGs / NPV of Avoided Replacments	$ 3,264,857	$ 10,545,459	$ 6,056,585	$ 67,812,105	$ 9,321,442	$ 58,490,662	7.27
Appliance Recycling	$ 5,161,061	$ 1,972,957	$ 1,198,350	$ 1,799,731	$ -	$ 2,491,033	Avoided GHGs	$ 1,620,176	$ 5,270,798	$ 3,763,350	$ 12,623,132	$ 5,383,526	$ 7,239,606	2.34
Complete System Replacement	$ 1,295,966	$ 2,812,140	$ 1,852,570	$ 431,200	$ -	$ 537,407	Avoided GHGs	$ 564,210	$ 4,309,250	$ 8,168,570	$ 6,929,283	$ 8,732,780	$ (1,803,497)	0.79
Elementary Education	$ 522,414	$ 197,589	$ 121,114	$ 182,355	$ -	$ 682,971	Avoided GHGs / NPV of Avoided Replacments	$ 689,125	$ 124,309	$ 108,743	$ 1,706,442	$ 797,868	$ 908,573	2.14
Home Energy Reports	$ 3,727,596	$ -	$ -	$ -	$ -	$ 1,991,682	Avoided GHGs	$ 1,788,260	$ -	$ -	$ 5,719,277	$ 1,788,260	$ 3,931,017	3.20
Joint Multi-Family	$ 2,681,633	$ 752,182	$ 452,720	$ 775,265	$ -	$ 3,958,568	Avoided GHGs / NPV of Avoided Replacments	$ 2,380,849	$ 2,434,179	$ 2,281,234	$ 8,620,368	$ 4,662,083	$ 3,958,285	1.85
Joint Single Family	$ 726,559	$ 1,439,567	$ 948,448	$ 250,188	$ -	$ 1,204,426	Avoided GHGs / NPV of Avoided Replacments	$ 833,920	$ 571,767	$ 1,383,862	$ 4,569,189	$ 2,217,782	$ 2,351,406	2.06
Res New Construction	$ 162,976	$ 135,407	$ 90,762	$ 53,998	$ -	$ 68,498	Avoided GHGs / NPV of Avoided Replacments	$ 28,763	$ 9,425	$ 56,350	$ 511,641	$ 85,113	$ 426,528	6.01
C&I Standard	$ 120,000,814	$ 28,674,151	$ 17,973,648	$ 13,664,840	$ (15,548,613)	$ 25,197,611	Avoided GHGs	$ 9,055,909	$ 23,439,907	$ 146,090,589	$ 189,962,452	$ 155,146,498	$ 34,815,953	1.22
C&I Custom	$ 10,090,008	$ 966,558	$ 605,862	$ 1,148,978	$ -	$ 2,118,686	Avoided GHGs	$ 1,186,565	$ 1,916,622	$ 11,898,322	$ 14,930,093	$ 13,084,887	$ 1,845,206	1.14
Data Centers	$ 7,757,174	$ 923,039	$ 578,583	$ 828,924	$ -	$ 1,523,672	Avoided GHGs	$ 1,012,562	$ 1,354,529	$ 2,937,827	$ 11,611,392	$ 3,950,389	$ 7,661,004	2.94
BILD	$ 39,214,519	$ 10,651,126	$ 6,340,016	$ 4,624,468	$ (6,683,051)	$ 36,428,751	Avoided GHGs / NPV of Avoided Replacments	$ 2,259,841	$ 9,849,870	$ 44,228,525	$ 90,575,830	$ 46,488,366	$ 44,087,464	1.95
Industrial Systems	$ 13,273,110	$ 3,097,131	$ 1,988,762	$ 1,501,245	$ -	$ 2,678,664	Avoided GHGs	$ 2,199,818	$ 2,243,753	$ 3,341,092	$ 22,538,912	$ 5,540,910	$ 16,998,002	4.07
C&I New Construction	$ 8,902,196	$ 2,450,762	$ 1,536,196	$ 1,013,719	$ -	$ 1,869,271	Avoided GHGs	$ 2,139,473	$ 2,825,345	$ 2,690,913	$ 15,772,144	$ 4,830,386	$ 10,941,758	3.27
Small Business	$ 15,712,057	$ 8,051,958	$ 5,043,705	$ 4,437,490	$ (8,183,707)	$ 6,925,527	Avoided GHGs / NPV of Avoided Replacments	$ 2,081,838	$ 9,232,557	$ 8,394,458	$ 31,987,029	$ 10,476,296	$ 21,510,733	3.05
Retro-Commissioning	$ 7,054,465	$ 252,704	$ 151,619	$ 782,838	$ -	$ 1,710,394	Avoided GHGs	$ 1,740,997	$ 2,882,513	$ 3,942,271	$ 9,952,020	$ 5,683,268	$ 4,268,752	1.75
3rd Party Program Results	$ 114,106	$ 18,936	$ 8,613	$ 41,177	$ -	$ 60,968	Avoided GHGs	$ 460,142	$ -	$ -	$ 243,799	$ 460,142	$ (216,343)	0.53
Sum of programs	$ 261,034,126	$ 68,761,631	$ 42,635,324	$ 38,222,715	$ (46,635,717)	$ 132,047,028		$ 33,307,305	$ 77,010,283	$ 245,342,692	$ 496,065,107	$ 278,649,997	$ 217,415,110	1.78
Portfolio-Level Costs & CFL Carryover Savings	$ 23,605,795	$ 4,786,329	$ 2,880,800	$ 4,338,869	$ -	$ 31,268,004	NPV of Avoided Replacments	$ 16,344,088	$ -	$ 4,363,140	$ 66,879,798	$ 20,707,228	$ 46,172,570	
Aggregate Portfolio	$ 284,639,922	$ 73,547,960	$ 45,516,125	$ 42,561,584	$ (46,635,717)	$ 163,315,032		$ 49,651,393	$ 77,010,283	$ 249,705,832	$ 562,944,905	$ 299,357,225	$ 263,587,680	1.88

Note: The cost-benefit results are reflective of only the EEPS portion of the ComEd portfolio, and are not inclusive of the Illinois Power Agency (IPA) portion. Within the ComEd DSMore runs, 3rd Party programs are only analyzed in aggregate, and, thus, are presented here as a single line item. In aggregate, 3rd Party programs represent such a small portion of savings that their impact on cost effectiveness is negligible.

Source: Navigant analysis

[3] Data for IPA programs that are part of ComEd's EEPS programs are not included in the presented statistics.

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Table E-5. Summary of Program Level Benefits, Costs ($000), and UCT Test – *ComEd EEPS Specific w/o Natural Gas Data from Joint Programs*[4]

Program								Costs			Utility Cost Test (UCT)			
	Avoided Electric Production	Avoided Electric Capacity	Avoided T&D Electric	Avoided Ancillary	Avoided Gas Production	Other Benefits	Definition of Other Benefits	Non-Incentive Costs	Incentive Costs	Incremental Costs (Net)	UCT Benefits	UCT Costs	UCT Test Net Benefits	UCT Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l) = (b+c+d+e)	(m) = (i+j)	(n) = (l-m)	(o) = (l/m)
Residential Lighting	$ 24,637,472	$ 6,365,425	$ 3,744,356	$ 6,686,299	$ (16,220,346)	$ 42,598,899	Avoided GHGs / NPV of Avoided Replacments	$ 3,264,857	$ 10,545,459	$ 6,056,585	$ 41,433,552	$ 13,810,316	$ 27,623,236	3.00
Appliance Recycling	$ 5,161,061	$ 1,972,957	$ 1,198,350	$ 1,799,731	$ -	$ 2,491,033	Avoided GHGs	$ 1,620,176	$ 5,270,798	$ 3,763,350	$ 10,132,099	$ 6,890,974	$ 3,241,125	1.47
Complete System Replacement	$ 1,295,966	$ 2,812,140	$ 1,852,570	$ 431,200	$ -	$ 537,407	Avoided GHGs	$ 564,210	$ 4,309,250	$ 8,168,570	$ 6,391,875	$ 4,873,460	$ 1,518,415	1.31
Elementary Education	$ 522,414	$ 197,589	$ 121,114	$ 182,355	$ -	$ 682,971	Avoided GHGs / NPV of Avoided Replacments	$ 689,125	$ 124,309	$ 108,743	$ 1,023,471	$ 813,434	$ 210,037	1.26
Home Energy Reports	$ 3,727,596	$ -	$ -	$ -	$ -	$ 1,991,682	Avoided GHGs	$ 1,788,260	$ -	$ -	$ 3,727,596	$ 1,788,260	$ 1,939,336	2.08
Joint Multi-Family	$ 2,681,633	$ 752,182	$ 452,720	$ 775,265	$ -	$ 3,958,568	Avoided GHGs / NPV of Avoided Replacments	$ 2,380,849	$ 2,434,179	$ 2,281,234	$ 4,661,800	$ 4,815,028	$ (153,228)	0.97
Joint Single Family	$ 726,559	$ 1,439,567	$ 948,448	$ 250,188	$ -	$ 1,204,426	Avoided GHGs / NPV of Avoided Replacments	$ 833,920	$ 571,767	$ 1,383,862	$ 3,364,762	$ 1,405,687	$ 1,959,075	2.39
Res New Construction	$ 162,976	$ 135,407	$ 90,762	$ 53,998	$ -	$ 68,498	Avoided GHGs / NPV of Avoided Replacments	$ 28,763	$ 9,425	$ 56,350	$ 443,143	$ 38,188	$ 404,955	11.60
C&I Standard	$ 120,000,814	$ 28,674,151	$ 17,973,648	$ 13,664,840	$ (15,548,613)	$ 25,197,611	Avoided GHGs	$ 9,055,909	$ 23,439,907	$ 146,090,589	$ 180,313,453	$ 32,495,816	$ 147,817,637	5.55
C&I Custom	$ 10,090,008	$ 966,558	$ 605,862	$ 1,148,978	$ -	$ 2,118,686	Avoided GHGs	$ 1,186,565	$ 1,916,622	$ 11,898,322	$ 12,811,407	$ 3,103,187	$ 9,708,220	4.13
Data Centers	$ 7,757,174	$ 923,039	$ 578,583	$ 828,924	$ -	$ 1,523,672	Avoided GHGs	$ 1,012,562	$ 1,354,529	$ 2,937,827	$ 10,087,720	$ 2,367,091	$ 7,720,629	4.26
BILD	$ 39,214,519	$ 10,651,126	$ 6,340,016	$ 4,624,468	$ (6,683,051)	$ 36,428,751	Avoided GHGs / NPV of Avoided Replacments	$ 2,259,841	$ 9,849,870	$ 44,228,525	$ 60,830,129	$ 12,109,711	$ 48,720,418	5.02
Industrial Systems	$ 13,273,110	$ 3,097,131	$ 1,988,762	$ 1,501,245	$ -	$ 2,678,664	Avoided GHGs	$ 2,199,818	$ 2,243,753	$ 3,341,092	$ 19,860,248	$ 4,443,571	$ 15,416,677	4.47
C&I New Construction	$ 8,902,196	$ 2,450,762	$ 1,536,196	$ 1,013,719	$ -	$ 1,869,271	Avoided GHGs	$ 2,139,473	$ 2,825,345	$ 2,690,913	$ 13,902,873	$ 4,964,818	$ 8,938,055	2.80
Small Business	$ 15,712,057	$ 8,051,958	$ 5,043,705	$ 4,437,490	$ (8,183,707)	$ 6,925,527	Avoided GHGs / NPV of Avoided Replacments	$ 2,081,838	$ 9,232,557	$ 8,394,458	$ 33,245,210	$ 11,314,395	$ 21,930,815	2.94
Retro-Commissioning	$ 7,054,465	$ 252,704	$ 151,619	$ 782,838	$ -	$ 1,710,394	Avoided GHGs	$ 1,740,997	$ 2,882,513	$ 3,942,271	$ 8,241,626	$ 4,623,510	$ 3,618,116	1.78
3rd Party Program Results	$ 114,106	$ 18,936	$ 8,613	$ 41,177	$ -	$ 60,968	Avoided GHGs	$ 460,142	$ -	$ -	$ 182,831	$ 460,142	$ (277,311)	0.40
Sum of programs	$ 261,034,126	$ 68,761,631	$ 42,635,324	$ 38,222,715	$ (46,635,717)	$ 132,047,028		$ 33,307,305	$ 77,010,283	$ 245,342,692	$ 410,653,796	$ 110,317,588	$ 300,336,208	3.72
Portfolio-Level Costs & CFL Carryover Savings	$ 23,605,795	$ 4,786,329	$ 2,880,800	$ 4,338,869	$ -	$ 31,268,004	NPV of Avoided Replacments	$ 16,344,088	$ -	$ 4,363,140	$ 35,611,794	$ 16,344,088	$ 19,267,706	
Aggregate Portfolio	$ 284,639,922	$ 73,547,960	$ 45,516,125	$ 42,561,584	$ (46,635,717)	$ 163,315,032		$ 49,651,393	$ 77,010,283	$ 249,705,832	$ 446,265,590	$ 126,661,676	$ 319,603,914	3.52

[4] Data for IPA programs that are part of ComEd's EEPS programs are not included in the presented statistics.

Note: The cost-benefit results are reflective of only the EEPS portion of the ComEd portfolio, and are not inclusive of the IPA portion of the. Within the ComEd DSMore runs, 3rd Party programs are only analyzed in aggregate, and, thus, are presented here as a single line item. In aggregate, 3rd Party programs represent such a small portion of savings that their impact on cost effectiveness is negligible.

Source: Navigant analysis

Table E-6. Summary of Program Level Benefits, Costs ($ in 000's) and IL TRC Test – Jointly Implemented Programs Aggregated Results for EPY4 to EPY6

Program									Costs						IL Total Resource Cost (TRC) Test			
	Avoided Electric Production	Avoided Electric Capacity	Avodied Electric T&D	Avoided Ancillary	Avoided Gas Production	Avoided Gas Capacity	Other Benefits	Other Benefits	Non-Incentive Costs (Electric)	Non-Incentive Costs (Gas)	Incentive Costs (Electric)	Incentive Costs (Gas)	Net Incremental Costs (Electric)	Net Incremental Costs (Gas)	IL TRC Benefits	IL TRC Costs	IL TRC Test Net Benefits	IL TRC Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	Description	(i)	(j)	(k)	(l)	(m)	(n)	(o) = (b+c+d+e+f+g+h)	(p) = (i+j+m+n)	(q) = (o-p)	(r) = (o/p)
Home Energy Savings / Single Family Retrofit	$ 1,064,833	$ 1,450,043	$ 952,332	$ 270,032	$ 7,333,180	$ 803,928	$ 1,222,287	GHG / Environmental Benefits	$ 1,565,878	$ 2,495,877	$ 996,856	$ 3,642,295	$ 1,815,297	$ 1,129,156	$ 13,096,635	$ 7,006,208	$ 6,090,427	**1.87**
Multifamily	$ 6,423,217	$ 1,035,848	$ 567,978	$ 926,694	$ 83,416,090	$ 8,983,137	$ 10,026,867	GHG / Environmental Benefits	$ 3,375,618	$ 8,233,785	$ 5,094,767	$ 19,759,360	$ 3,215,209	$ 20,881,315	$ 111,379,831	$ 35,705,927	$ 75,673,904	**3.12**
Elementary Energy Education	$ 1,120,925	$ 209,537	$ 124,784	$ 223,658	$ 3,488,639	$ 387,627	$ 1,143,773	GHG / Environmental Benefits	$ 1,050,991	$ 303,896	$ 211,617	$ 1,787,683	$ 171,775	$ 1,412,064	$ 6,698,942	$ 2,938,726	$ 3,760,216	**2.28**
Res New Construction	$ 252,007	$ 135,477	$ 91,225	$ 60,913	$ 3,780,487	$ 420,054	$ 848,028	GHG / Environmental Benefits	$ 93,840	$ 793,329	$ 46,699	$ 1,240,200	$ 85,548	$ 1,975,452	$ 5,588,191	$ 2,948,170	$ 2,640,021	**1.90**
C&I Retrocommissioning	$ 14,504,074	$ 414,186	$ 735,731	$ 794,319	$ 9,263,602	$ 1,002,355	$ 4,925,600	GHG / Environmental Benefits	$ 4,412,640	$ 1,082,433	$ 7,053,106	$ 3,188,949	$ 9,131,600	$ 3,507,586	$ 31,639,867	$ 18,134,259	$ 13,505,608	**1.74**
C&I New Construction	$ 24,778,780	$ 3,756,282	$ 6,558,377	$ 1,145,666	$ 2,625,391	$ 291,710	$ 6,428,585	GHG / Environmental Benefits	$ 4,728,092	$ 278,864	$ 6,950,253	$ 607,593	$ 4,771,801	$ 936,477	$ 45,584,792	$ 10,715,234	$ 34,869,558	**4.25**
Small Business Direct Install / Efficiency	$ 29,197,433	$ 8,665,482	$ 5,213,139	$ 7,346,248	$ 9,984,955	$ 1,965,045	$ 12,155,921	GHG / Environmental Benefits	$ 6,901,054	$ 2,319,112	$ 14,590,730	$ 3,312,580	$ 16,717,772	$ 2,852,589	$ 74,528,222	$ 28,790,526	$ 45,737,695	**2.59**

Note: In some instances, incremental costs for gas utilities have been altered from those utilized in the utility-specific cost-benefit calculations to prevent double counting of incremental costs when performing the joint calculations. Examples of this included thermostat measures and Elementary Energy Education kits. Additionally, for some programs including Single Family Retrofit, Multi-Family Retrofit, and Small Business Direct Install, Navigant did not have sufficient information from all utilities and all program years to ensure that costs associated with energy assessments, direct install labor and materials were treated consistently. In these cases, there is some uncertainty as to how these costs are distributed among cost categories within the joint TRC analysis.

Source: Navigant analysis

Table E-7. Summary of Program Level Benefits, Costs ($ in 000's) and Utility Cost Test – Jointly Implemented Programs Aggregated Results for EPY4 to EPY6

Program									Costs						Utility Cost Test (UCT), All Utilities Combined			
	Avoided Electric Production	Avoided Electric Capacity	Avodied Electric T&D	Avoided Ancillary	Avoided Gas Production	Avoided Gas Capacity	Other Benefits	Other Benefits	Non-Incentive Costs (Electric)	Non-Incentive Costs (Gas)	Incentive Costs (Electric)	Incentive Costs (Gas)	Net Incremental Costs (Electric)	Net Incremental Costs (Gas)	UCT Benefits	UCT Costs	UCT Test Net Benefits	UCT Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	Description	(i)	(j)	(k)	(l)	(m)	(n)	(o) = (b+c+d+e+f+g)	(p) = (i+j+k+l)	(q) = (o-p)	(r) = (o/p)
Home Energy Savings / Single Family Retrofit	$ 1,064,833	$ 1,450,043	$ 952,332	$ 270,032	$ 7,333,180	$ 803,928	$ 1,222,287	GHG / Environmental Benefits	$ 1,565,878	$ 2,495,877	$ 996,856	$ 3,642,295	$ 1,815,297	$ 1,129,156	$ 11,874,348	$ 8,700,905	$ 3,173,443	**1.36**
Multifamily	$ 6,423,217	$ 1,035,848	$ 567,978	$ 926,694	$ 83,416,090	$ 8,983,137	$ 10,026,867	GHG / Environmental Benefits	$ 3,375,618	$ 8,233,785	$ 5,094,767	$ 19,759,360	$ 3,215,209	$ 20,881,315	$ 101,352,964	$ 36,463,530	$ 64,889,434	**2.78**
Elementary Energy Education	$ 1,120,925	$ 209,537	$ 124,784	$ 223,658	$ 3,488,639	$ 387,627	$ 1,143,773	GHG / Environmental Benefits	$ 1,050,991	$ 303,896	$ 211,617	$ 1,787,683	$ 171,775	$ 1,412,064	$ 5,555,169	$ 3,354,187	$ 2,200,982	**1.66**
Res New Construction	$ 252,007	$ 135,477	$ 91,225	$ 60,913	$ 3,780,487	$ 420,054	$ 848,028	GHG / Environmental Benefits	$ 93,840	$ 793,329	$ 46,699	$ 1,240,200	$ 85,548	$ 1,975,452	$ 4,740,163	$ 2,174,068	$ 2,566,095	**2.18**
C&I Retrocommissioning	$ 14,504,074	$ 414,186	$ 735,731	$ 794,319	$ 9,263,602	$ 1,002,355	$ 4,925,600	GHG / Environmental Benefits	$ 4,412,640	$ 1,082,433	$ 7,053,106	$ 3,188,949	$ 9,131,600	$ 3,507,586	$ 26,714,267	$ 15,737,128	$ 10,977,139	**1.70**
C&I New Construction	$ 24,778,780	$ 3,756,282	$ 6,558,377	$ 1,145,666	$ 2,625,391	$ 291,710	$ 6,428,585	GHG / Environmental Benefits	$ 4,728,092	$ 278,864	$ 6,950,253	$ 607,593	$ 4,771,801	$ 936,477	$ 39,156,206	$ 12,564,802	$ 26,591,404	**3.12**
Small Business Direct Install / Efficiency	$ 29,197,433	$ 8,665,482	$ 5,213,139	$ 7,346,248	$ 9,984,955	$ 1,965,045	$ 12,155,921	GHG / Environmental Benefits	$ 6,901,054	$ 2,319,112	$ 14,590,730	$ 3,312,580	$ 16,717,772	$ 2,852,589	$ 62,372,301	$ 27,123,476	$ 35,248,825	**2.30**

Note: In some instances, incremental costs for gas utilities have been altered from those utilized in the utility-specific cost-benefit calculations to prevent double counting of incremental costs when performing the joint calculations. Examples of this included thermostat measures and Elementary Energy Education kits. Additionally, for some programs including Single Family Retrofit, Multi-Family Retrofit, and Small Business Direct Install, Navigant did not have sufficient information from all utilities and all program years to ensure that costs associated with energy assessments, direct install labor and materials were treated consistently. In these cases, there is some uncertainty as to how these costs are distributed among cost categories within the joint TRC analysis.

Source: Navigant analysis

E.4. ComEd Portfolio PY6 Summary and Conclusions

For ComEd's Program Year 6, the net verified savings was 1,118,649 MWh. Of this total verified savings, the EEPS portion of the total was 986,314 verified net MWh and the IPA portion of the total was 132,335 verified net MWh savings. Based on the Illinois TRC calculation, the EEPS TRC of 1.88 has met the statutory cost effectiveness test. ComEd's Energy Efficiency portfolio has exceeded its key compliance requirements.

1. Overview of ComEd Portfolio

1.1 Sector Level Results

1.1.1 Residential Sector Impacts — Smart Ideas

The residential sector includes fourteen programs designed to achieve cost-effective energy efficiency and demand savings in single family and multifamily residences. This sector includes programs that encourage and incent residential customers to improve the energy performance of their homes through retiring and recycling old appliances, purchasing energy efficient products, and behavior programs.

Participating customers may receive technical or financial resources, such as a home energy audit, instant or mail-in rebates for purchasing energy efficient products, or direct installation of energy efficiency measures, such as faucet aerators or water efficient showerheads at no cost to the participant. ComEd also ran behavioral programs where selected customers receive reports showing their energy consumption and that for typical households, along with energy saving suggestions.

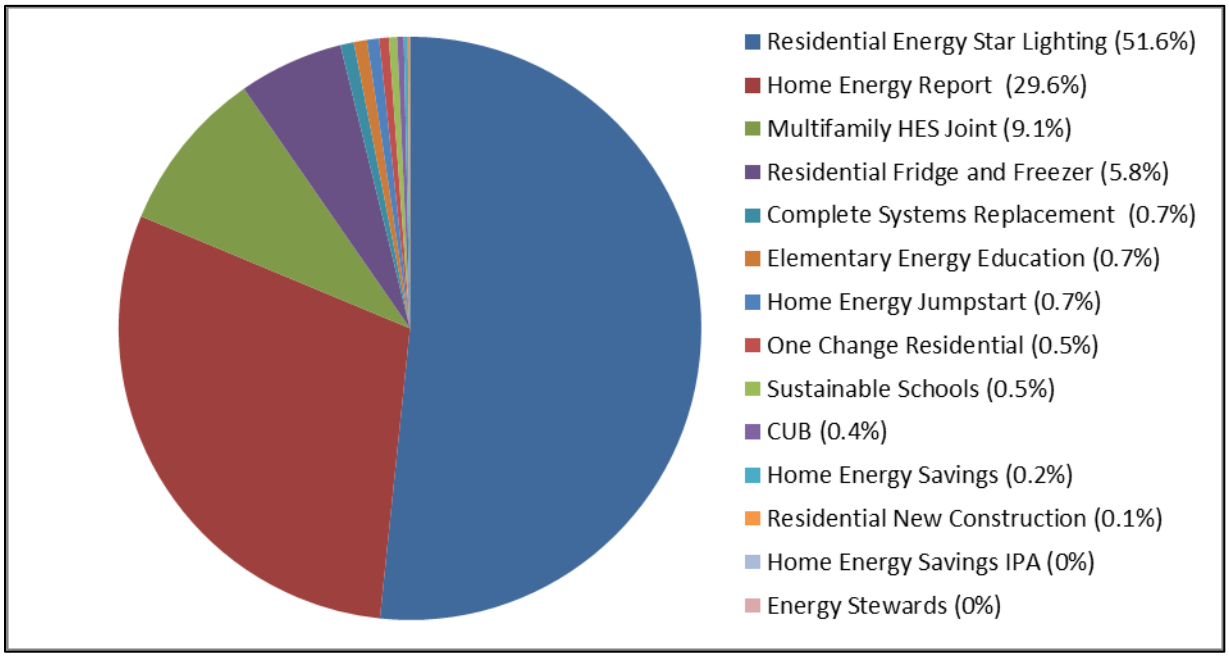
Marketing and outreach for these programs are conducted through a variety of channels under ComEd's Smart Ideas® brand. Outreach efforts include communication with trade allies, mass media, the internet and social media, direct mail, utility bill inserts, in-store displays, conventions, trade shows and public events. ComEd maintains a webpage for these programs under www.ComEd.com.[5]

Some residential programs were implemented jointly with gas companies sharing overlapping service territories, including Home Energy Savings, Home Energy Jumpstart, Elementary Energy Education, Complete Systems Replacement, Residential New Construction and Multifamily HES Joint.

The Residential Lighting program was the biggest program as measured by energy savings, representing approximately 52% of overall sector verified net savings. The Home Energy Report (HER) program is the second largest program by savings representing nearly 30% of the residential verified net savings. Figure 1-1 below depicts the relative impacts of individual programs within the residential sector.

[5] ComEd, Home Savings, www.comed.com/home-savings/Pages/default.aspx (accessed June 24, 2015)

Figure 1-1. Residential Ex-Post Net Energy Savings – Verified Values



Source: Evaluation research
Note, the Energy Stewards program had no verified savings in PY6

1.1.2 Commercial & Industrial Sector Impacts — Smart Ideas for Your Business

The Commercial & Industrial (C&I) Sector includes ten programs designed to achieve cost-effective energy efficiency and demand savings in commercial and industrial facilities. The programs encourage and incent customers to make energy efficiency improvements at their facilities by providing technical and financial resources.

Participating customers may receive technical resources such as expert design consultation for new construction projects or energy audits and recommendations for performance improvement at existing facilities from qualified contractors. Customers may qualify for financial incentives by implementing recommendations from program representatives. In addition, customers may receive rebates by purchasing and installing qualified energy efficient products at their facilities.

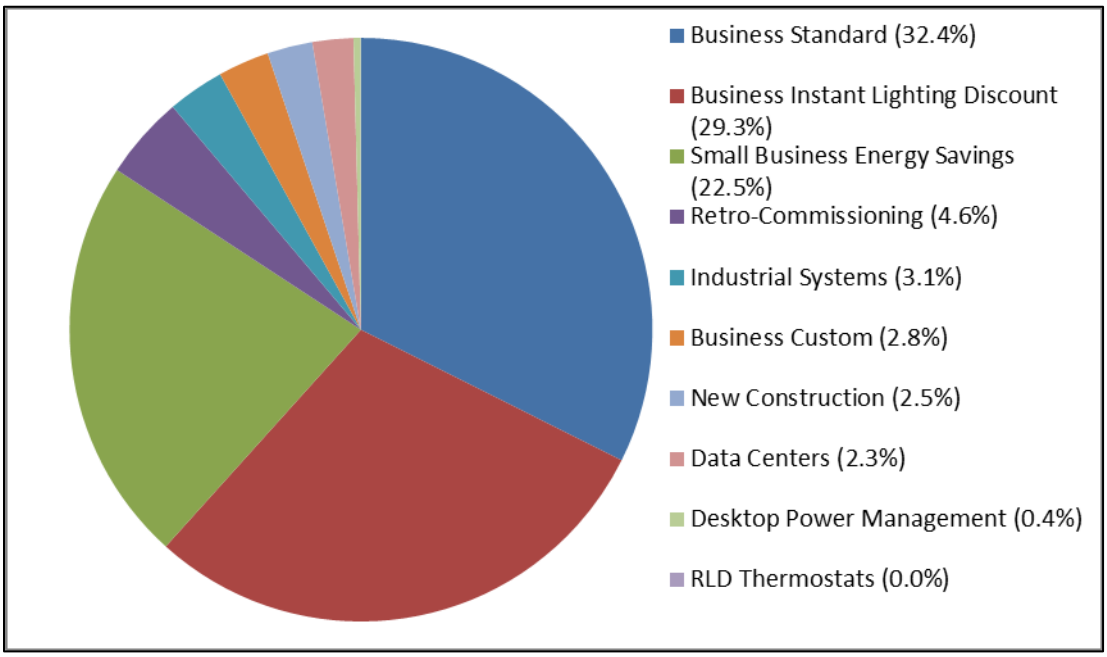
C&I programs are marketed under the Smart Ideas for Your Business® brand. Many C&I programs work closely with ComEd's account managers, energy efficiency program managers and trade allies to recruit qualified participants. These programs also conduct outreach through mass media, social media, direct mail, utility bill inserts, conventions, trade shows and public events. ComEd maintains a webpage for these programs on www.ComEd.com.[6]

Some business programs were implemented jointly with gas companies sharing overlapping service territories, including Retrocommissioning, Business New Construction and Small Business Energy Savings.

[6] ComEd, Business Savings, www.ComEd.com/business-savings/Pages/default.aspx (accessed June 24, 2015)

The Business Standard program was the largest C&I program as measured by energy savings, representing 32% of overall sector verified net savings. While the Business Instant Lighting Discount Program (BILD Midstream Program) represents 29% of the PY6 verified net savings. (Figure 1-2).

Figure 1-2. Business Programs Ex-Post Net Energy Savings – Verified



Source: Evaluation research

1.2 ComEd PY6 EEPS Portfolio Cost Effectiveness

The ComEd EEPS programs are cost effective at a TRC of 1.88. The included savings numbers and cost-benefit results are reflective of the Energy Efficiency Portfolio Standard (EEPS) portion of the ComEd energy efficiency and demand response programs, and are not inclusive of the Illinois Power Agency (IPA) portion. The cost effectiveness of the EEPS programs is dependent on a number of assumptions and these are described in the PY6 TRC Summary. Only the third party programs are not cost effective, with TRC values less than one (Table 1-1).

Cost effectiveness was determined for individual programs and for EEPS programs as a whole. It is assessed through the use of the Total Resource Cost (TRC) test. The TRC test is defined in the Illinois Power Agency Act (see 20 ILCS 3855/1-10) as follows:

> *'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, as well as other*

> *quantifiable societal benefits, including avoided natural gas utility costs, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.*[7]

ComEd uses DSMore™ software for the calculation of the TRC test.[8] The DSMore model accepts information on program parameters, such as number of participants, gross savings, free ridership and program costs, and calculates a TRC which fits the requirements of the Illinois legislation.

One important feature of the DSMore model is that it performs a probabilistic estimation of future avoided energy costs. It looks at the historical relationship between weather, electric use and prices in the PJM Northern Illinois region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact on electric prices that comes from extreme weather conditions. Extreme weather creates extreme peaks which create extreme prices. These extreme prices generally occur as price spikes and they create a skewed price distribution. High prices are going to be much higher than the average price while low prices are going to be only moderately lower than the average. DSMore is able to quantify the weighted benefits of avoiding energy use across years which have this skewed price distribution.

Additional costs are included in the determination of the TRC ratio at the EEPS portfolio level. These are costs related to the overall delivery of energy efficiency and demand response programs that cannot be assigned to any of the individual evaluated programs, like evaluation, measurement and verification costs, portfolio-level administration costs, research and development costs, educational outreach costs and Energy Insight Online (EIO) costs. In addition, the EEPS portfolio level TRC also includes benefits associated with Residential ENERGY STAR Lighting Program and Business Instant Lighting Discount savings from PY4 and PY5 that are considered deferred installations ("carryovers") and were not previously counted.

[7] See Section 1-10 Definitions of the Illinois Power Agency Act: http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=002038550K1-10

[8] Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

Table 1-1. Cost Effectiveness of the ComEd EEPS Portfolio

	Illinois Total Resource Cost Test	Utility Cost Test
Residential Energy Star Lighting	7.27	3.00
Residential Fridge and Freezer	2.34	1.47
Multifamily HES - Joint	1.85	0.97
Single Family HES Savings - Joint	2.06	2.39
Complete Systems Replacement - Joint	0.79	1.31
Home Energy Report	3.20	2.08
Residential New Construction - Joint	6.01	11.60
Elementary Energy Education - Joint	2.14	1.26
Business Standard	1.22	5.55
Business Instant Lighting Discount	1.95	5.02
Small Business Energy Savings - Joint	3.05	2.94
Business Custom	1.14	4.13
New Construction - Joint	3.27	2.80
Retro-Commissioning - Joint	1.75	1.78
Industrial Systems	4.07	4.47
Data Centers	2.94	4.26
Miscellaneous and Carryover	3.23	2.18
Third Party Program Results	0.53	0.40
ComEd EEPS Total	1.88	3.52

Source: ComEd DSMore analysis. Details on the assumptions used can be found in the ComEd TRC Summary Report.

Note: Jointly implemented programs with natural gas company's impacts (Nicor, Peoples Gas and North Shore gas) were not included in TRC calculations and only represents ComEd electric TRCs.

2. Evaluation Methods

The ComEd evaluation, measurement and verification (EM&V) team developed an evaluation work plan for each program in the portfolio. Within each program's evaluation plan, the level of rigor and evaluation methods were selected based on findings from each program's previous evaluation reports, including anticipated program impacts and planned changes to program design or implementation. For most programs, impact evaluation methods included reviewing program tracking databases and other program methodology for calculating reported savings, conducting primary and secondary research for verification and due diligence reviews, sampling projects for engineering reviews and/or on-site data collection, communicating with implementation contractors and/or trade allies about their participation, and contacting program participants and non-participants via telephone surveys. Frequent process evaluation methods included in-depth interviews with program staff, implementation contractors and trade allies, reviewing program materials and contacting program participants and non-participants via telephone surveys.

Table 2-1 and Table 2-2 summarize each program's main evaluation tasks conducted during PY6. Due to the nature of the program, the Behavioral Programs (Home Energy Report, CUB Energy Saver, and the C&I Behavioral pilot) were subject to a different evaluation method, a regression-based billing analysis.

Table 2-1. Evaluation Approaches – Residential Programs

Evaluation Tasks	Lighting	Home Energy Savings*	Multi-Family	HEER - CSR	Fridge /Freezer	New Construction	Element. Energy Ed.	HER	CUB	Energy Stewards	One Change	Sustainable Schools	Home Energy Jumpstart
Verification and Gross Realization Rate-	X	X	X	X	X	X	X	X	X	X	X	X	X
Measure-Level Deemed Savings Review	X	X	X	X	X	X	X				X	X	X
Net-to-gross Ratio	X	X	X	X	X		X				X	X	X
Process Analysis	X	X	X	X	X	X	X				X	X	X
Participant Surveys – Impact	X	X	X	X	X		X				X	X	X
• Participant Self-Report NTGR Analysis	X	X	X	X	X		X				X	X	X
• Installation Rate Analysis	X	X	X	X	X		X	X	X	X			X
• ANCOVA Modeled HOU/CF	X†												
In-store Intercept Surveys – Impact	X												
Billing & Tracking Data Analysis								X	X	X			
Shelf Surveys – Impact	X												
Metering Study for Lighting HOU/Peak	X												
Trade Ally Interviews – NTGR	X†	X	X	X	X							X	X
Program Manager and Implementation Contractor Interviews	X	X	X	X	X	X	X				X		X
General Population Surveys – Process	X						X					X	
In-store Intercept Surveys – Process	X												
Shelf Surveys – Process	X												
Stakeholder Interviews		X	X	X	X	X							
Participant Telephone Interviews	X	X	X	X	X	X						X	

Source: Navigant Evaluation

† Not used in the final NTGR calculations.

‡ This was a survey of the general population for the Residential Lighting Program.

* HES, above, also represents the HES IPA Program.

Table 2-2. Evaluation Approaches – Business Programs

Evaluation Tasks	Business Standard	Business Custom	Small Business	Retro-Commissioning	BILD	New Construction	Industrial Systems	Data Centers	RLD Thermostats	Desktop Power Management
Verification & Gross Realization Rate	X	X	X	X	X	X	X	X	X	X
Measure-Level Deemed Savings Review	X	X	X		X	X	X	X		
Net-to-gross Ratio	X	X	X	X	X	X	X	X		
Process Analysis	X	X	X	X	X	X	X	X	X	
Customer Self-Report NTGR Analysis	X	X	X		X	X	X			
Installation Rate Analysis	X	X	X	X	X	X	X	X	X	X
Trade Ally Interviews – NTGR	X		X				X		X	
Program Manager and Implementer Interviews	X	X	X	X	X	X	X	X	X	
Stakeholder Interviews	X	X	X	X	X	X	X	X		
Participant Telephone Interviews	X	X	X		X	X	X	X		
Billing and Tracking Data Analysis										X

Source: Navigant Evaluation

3. Program Level Findings and Recommendations

This section includes program-level detail for ComEd's PY6 portfolio of programs including a brief program description and key findings and recommendations.

3.1 Residential Energy Star® Lighting

The main goal of ComEd's PY6 Residential ENERGY STAR Lighting program (Residential ES Lighting) is to increase the market penetration of energy-efficient lighting within the Commonwealth Edison Company's (ComEd's) service territory by offering incentives for bulbs purchased through various retail channels. The program also seeks to increase customer awareness and acceptance of energy-efficient lighting technologies, as well as proper bulb disposal, through the distribution of educational materials. In PY6, the Residential ES Lighting program offered incentives for the purchase of standard and specialty compact fluorescent lamps (CFLs).[9]

Table 3-1. summarizes the gross and net electricity savings from the program, including carryover savings from PY4 and PY5 bulb sales installed in PY6. The total verified net energy savings includes carryover and bulbs attributable to both the Energy Efficiency Portfolio Standard (EEPS) and the Illinois Power Agency (IPA) portfolios. Table 3-2 and Table 3-3 show the savings attributable to the EEPS and IPA portfolios.

Table 3-1. PY6 Residential ES Lighting Program Electric Savings – Total PY6 Incentivized

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Program Savings[10]	537,555	n/a	n/a
Verified Gross Program Savings	421,032	351.9	50.2
Verified Net Program Savings	224,950	188.0	26.8
Verified Net Carryover Savings	95,185	79.1	10.4
Verified Total PY6 Net Savings	320,135	267.1	37.1

Source: ComEd tracking data and evaluation team analysis

[9] LEDs and CFL/LED fixtures were offered in PY5 but were not offered in PY6. LED bulbs have been reintroduced to the program in PY7.

[10] The ex-ante gross savings estimates shown in this table and the following EEPS and IPA tables have not been adjusted by the gross realization rate which applies the first year installation rate and interactive effect estimates.

Table 3-2. PY6 Residential ES Lighting Program Electric Savings - EEPS

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	442,599	n/a	n/a
Verified Gross Savings	340,774	282.8	40.0
Verified Net Savings	184,018	152.7	21.6

Source: ComEd tracking data and evaluation team analysis

Table 3-3. PY6 Residential ES Lighting Program Electric Savings - IPA

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	94,956	n/a	n/a
Verified Gross Savings	80,258	69.1	10.2
Verified Net Savings	40,931	35.2	5.2

Source: ComEd tracking data and evaluation team analysis

Table 3-4. PY6 Residential ES Lighting Program Electric Savings from Carryover (EEPS only, no IPA)

Savings Category	Energy Savings (MWh)	Demand Saving (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	176,194	n/a	n/a
Verified Gross Savings	176,194	146.5	19.2
Verified Net Savings	95,185	79.1	10.4

Source: ComEd tracking data and evaluation team analysis

Table 3-5. PY6 Residential ES Lighting Program Electric Savings from Carryover - EEPS

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	176,194	n/a	n/a
Verified Gross Savings	176,194	146.5	19.2
Verified Net Savings	95,185	79.1	10.4

Source: ComEd tracking data and evaluation team analysis

Table 3-6. PY6 Residential ES Lighting Program Electric Savings from Carryover - IPA[11]

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	n/a	n/a	n/a
Verified Gross Savings	n/a	n/a	n/a
Verified Net Savings	n/a	n/a	n/a

Source: ComEd tracking data and evaluation team analysis

Table 3-7 summarizes the electricity savings by program bulb type. Standard CFLs made up 82 percent of the total verified net savings, Specialty CFLs made up the remaining 18 percent, and light-emitting diodes (LEDs) were not incentivized through the program in PY6.

Table 3-7. PY6 Residential Lighting Program MWh Results by Measure[12]

Savings Category	Standard CFLs	Specialty CFLs	LEDs
Ex-ante Gross Savings (MWh)	442,599	94,956	n/a
Unadjusted Gross Savings (MWh)	451,199	94,740	n/a
Verified Gross Installed Savings Realization Rate[13]	76%	85%	n/a
Verified Gross Savings (MWh)	340,774	80,258	n/a
Net-to-Gross Ratio (NTGR)	0.54 *	0.51 **	n/a
Verified Net Savings (MWh)	184,018	40,931	n/a

* A deemed value from "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html

** Based on evaluation research findings.

Source: ComEd tracking data and evaluation team analysis

[11] PY6 carryover savings are all attributable to the EEPS portfolio. This table is included as a placeholder for future program years.

[12] These tables do not include PY6 carryover savings.

[13] The verified gross installed savings realization rate adjusts the unadjusted gross savings estimates to account for the first year installation rate and any interactive effects associated with the measure. It is different from them ex-ante realization rate which is the ratio of the ex-post verified savings estimate over the ex-ante savings estimate.

Table 3-8 summarizes the key metrics from PY6.

Table 3-8. PY6 Residential Lighting Program Verified Savings Results Summary

Key Metrics	Units	EEPS Portfolio	IPA Portfolio	EEPS Carryover	IPA Carryover
Unadjusted Gross Savings	MWh	451,199	94,740	n/a	n/a
Unadjusted Gross Demand Reduction	MW	406.9	87.4	n/a	n/a
Unadjusted Gross Peak Demand Reduction	MW	48.1	11.2	n/a	n/a
Installed Savings Realization Rate (MWh)[14]	%	76%	85%	n/a	n/a
Installed Savings Realization Rate (MW)	%	70%	79%	n/a	n/a
Installed Savings Realization Rate (Peak MW)	%	83%	91%	n/a	n/a
Verified Gross Savings	MWh	340,774	80,258	176,194	n/a
Verified Gross Demand Reduction	MW	282.8	69.1	146.5	n/a
Verified Gross Peak Demand Reduction	MW	40.0	10.2	19.2	n/a
NTGR	#	0.54 *	0.51 **	n/a	n/a
Verified Net Savings	MWh	184,018	40,931	95,185	n/a
Verified Net Demand Reduction	MW	152.7	35.2	79.1	n/a
Verified Net Peak Demand Reduction	MW	21.6	5.2	10.4	n/a
Standard CFLs incentivized	#	8,965,546	0	3,025,183[15]	n/a
Specialty CFLs incentivized	#	0	2,125,179	229,557	n/a
Other Bulbs incentivized[16]	#	n/a	n/a	11,996	n/a

* A deemed value from "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html

** Based on PY5 evaluation research, that recommended a weighted 3-year rolling average of Specialty CFL evaluation findings from PY3-PY5.

Source: ComEd tracking data and evaluation team analysis

The following provides insight into key program recommendations:

» **Program Tracking Data**

- **Finding.** In PY6 the Residential ES Lighting program tracking database and the goals tracker continue to not line up requiring additional manual effort to collect bulb information necessary to estimate ex-post program impacts (lumens, wattage, etc.).
- **Recommendation.** Model matching to the goals tracker was an imperfect process in PY6, as it has been in previous years, and thus we again recommend creating a bulb database with a clear match to the model numbers in the tracking data.

[14] The verified gross installed savings realization rate adjusts the unadjusted gross savings estimates to account for the first year installation rate and any interactive effects associated with the measure.

[15] Carryover bulbs were incentivized in PY4 and PY5.

[16] Includes LED bulbs, and CFL and LED fixtures.

» **PY5/PY6 Lighting Logger Study Findings**
As part of the PY5 and PY6 evaluations a lighting logger study was conducted in the ComEd service territory that included 85 single-family and multi-family homes. A total of 706 lighting loggers were installed on CFLs and LEDs to update the hours of use (HOU) and peak coincidence factor (CF) estimates that were calculated from the PY3 lighting logger study.

- **Finding.** A lighting inventory completed at all 85 homes found that CFL socket saturation increased from 20 percent in PY3 to 35 percent in PY5/PY6. This large increase was not unexpected as an average of 11.5 million CFLs were incentivized each year through the ComEd Residential ES Lighting program. That equates to an average of nearly four CFLs per Residential customer per year.
- **Finding.** The PY5/PY6 ex-post overall HOU estimate was 15 percent lower than the deemed estimate based on the PY3 logger study. The 90 percent confidence intervals around the HOU estimates from the two studies overlap indicating results are not statistically significantly different at the 90 percent confidence level.
- **Recommendation.** Update the HOU and peak CF estimates in the Illinois TRM with the recent PY5/PY6 logger study results.

3.2 Residential Fridge and Freezer Recycle Rewards

The Residential Fridge and Freezer Recycle Rewards (FFRR) program was designed to achieve energy savings through the retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners (ACs). The primary objectives of the program are to decrease the retention of high energy-use refrigerators and freezers and deliver long-term energy savings. A secondary objective is to dispose of these older units in an environmentally safe manner.

Table 3-9 summarizes the key metrics from PY6.

Table 3-9. PY6 Residential Fridge and Freezer Recycle Rewards Program Verified Savings Results Summary

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-Ante Gross Savings	38,274	N/A	N/A
Verified Gross Savings – Excluding Part Use Factor	38,230	N/A	N/A
Verified Gross Savings – Including Part Use Factor	35,478	4.80	4.80
Verified Net Savings	25,331	3.22	3.22

* A deemed value from "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html
** Based on PY5 evaluation research, that recommended a weighted 3-year rolling average of Specialty CFL evaluation findings from PY3-PY5.
Source: ComEd tracking data and evaluation team analysis

There were 40,140 participants in PY6 contributing a total of 42,313 recycled measures to the program. The unit pick-up was verified by 100 percent of surveyed participants, resulting in a 100 percent verification rate.

The following table summarizes the key metrics from PY6.

Table 3-10. PY6 Residential Fridge and Freezer Recycle Rewards Program Results Summary

Participation	Units	PY6
Verified Net Savings	MWh	25,331
Verified Net Demand Reduction	MW	3.22
Verified Gross Savings	MWh	35,478
Verified Gross Demand Reduction	MW	4.80
Program Realization Rate (Gross)	%	0.93
Deemed Net to Gross Ratio (NTGR) †	#	Refrigerators 0.73 Freezers 0.82 Room A/C 0.72
Program Induced Replacement (PIR) ‡	#	Refrigerators (0.039) Freezers (0.013) Room A/C N/A
Final Net to Gross Ratio (NTGR and PIR) †	#	Total Program 0.71 Refrigerators 0.70 Freezers 0.81 Room A/C 0.72
Refrigerators picked-up - Non-retail	#	26,389
Refrigerators picked-up - Retail	#	10,014
Freezers picked-up - Non-retail	#	5,009
Freezers picked-up - Retail	#	386
AC Units picked-up	#	515
Customers touched	#	40,140

Source: ComEd tracking data and Navigant team analysis.
† A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

The FFRR program continues to recycle a high volume of units and provides a reliable source of savings for ComEd. Verified savings have decreased significantly from PY5 values due to a combination of factors (down 13 percent from PY5), although still significantly higher than the original program target of 40,000 units (which was later revised to 45,000 units).

The following provides insight into key program recommendations:

Program Savings Target Attainment

Finding 1. The starting PY6 net energy savings target for this program was 25,000 MWh, about 22 percent lower than the final PY5 target. The ex-ante net energy savings was about 33 percent higher than the target, at 33,253 MWh.

Finding 2. The PY6 verified gross energy savings is 35,478 MWh, while evaluation-verified net savings is 25,331 MWh, which is 71 percent of the verified gross savings.

Gross Realization Rates

Finding 3. The Program realization rate (Gross) is based on the Gross realization rate and the Verification rate. The Gross realization rate reflects the difference between ex-ante gross savings (kWh) and verified gross savings. Because the ex-ante gross savings did not include application of the part-use factor which is a Gross savings element, verified gross savings (including the part-use factor) were about 7 percent lower than ex-ante gross savings. Therefore, a verified gross realization rate of 0.93 (total program) was achieved.

Net-to-Gross Ratio

Finding 4. The NTG ratios used to calculate verified savings were based on the SAG approved values minus the Program Induced Replacement (PIR) factor as specified in the TRM v. 2.0. Specific values applied were: Refrigerators – 0.70, Freezers – 0.81 and Room A/C units – 0.72, for a total program value of 0.71.

Recommendation 4. The Evaluation team believes the PIR factor concept is implausible because an incentive ranging from $35 to $50 is unlikely to be sufficient motivation for purchasing an otherwise-unplanned replacement unit (which can cost $500 to $2,000). For this reason, it is recommended that the PIR be eliminated from the TRM calculation, starting in PY7.

Energy and Demand Savings Estimates

Finding 6. The PY6 verified gross energy savings is 35,478 MWh, while evaluation-verified net savings is 25,331 MWh. These are significantly down from the PY5 verified savings values of 44,674 gross kWh and 30,531 net kWh, and are reflective of the much lower per-unit savings values based on the regression formula in the TRM v. 2.0. Refrigerators gross energy savings per unit dropped from 1,026 kWh in PY5 to 912 kWh in PY6, or 11.1 percent. Freezers gross energy savings per unit have dropped from 1,243 kWh in PY5 to 913 kWh in PY6, or 26.5 percent.

Recommendation 6. Capture the missing prior location and primary/secondary fields. JACO indicated they are trying to reduce the frequency of such missing data by instituting callbacks to customers during its data reconciliation process.

3.3 Multi-Family Home Energy Savings

The Multi-Family Home Energy Savings (MFHES) program is in the second year of jointly implemented program delivery with Nicor Gas and Peoples Gas and North Shore Gas. The MFHES program is designed to secure energy savings through direct installation of low-cost efficiency measures, such as CFLs, water efficient showerheads and faucet aerators in residential dwelling units of eligible multifamily residences. The PY6 program year is the first full year for joint delivery. The MFHES realized verified net energy savings of 39,490 megawatt-hours (MWh), verified net demand reduction of 27.45 megawatts (MW) and verified net peak demand reduction of 5.29MW. Table 3-11 summarizes the breakdown of electricity savings from the ComEd PY6 MFHES by tenant space and common area installations.

Table 3-11. PY6 Multi-Family Program Electric Savings by Installation Area

Savings Category	Energy Savings (MWh)	Demand Reduction (MW)	Peak Demand Reduction (MW)
Residential (Tenant Space)			
Ex-ante Gross Savings	14,405	23.50	1.45
Verified Gross Savings	14,405	23.50	1.45
Verified Net Savings	13,875	22.36	1.40
Business (Common Areas)			
Ex-ante Gross Savings	24,880	6.24	4.76
Verified Gross Savings	31,345	6.24	4.76
Verified Net Savings	25,615	5.09	3.89
PY6 Program Total			
Ex-ante Gross Savings	39,285	29.74	6.21
Verified Gross Savings	45,750	29.74	6.21
Verified Net Savings	39,490	27.45	5.29

Source: Navigant analysis of ComEd tracking data (8-27-2014 data extract)

The following tables summarize the breakdown of the electricity savings from the EEPS and IPA subcategories of the ComEd PY6 MFHES. Navigant counted all direct install savings and large common area measures/projects as EEPS savings based on discussion with ComEd.[17] The IPA program savings included only common area measures.

As shown in Table 3-12, the EEPS category realized verified net energy savings of 20,469 MWh, verified net demand reduction of 23.64 MW and verified net peak demand reduction of 2.39 MW.

[17] From Navigant's correspondence with ComEd Program Manager on October 6, 2014, ComEd allocated 18,827 gross MWh to IPA based on the IPA budget, with the rest going to EEPS. Navigant identified verified gross savings of 18,819 MWh for IPA (based on findings from the tracking data, 8 MWh less than the ComEd allocation). EEPS verified gross savings was 20,469 MWh, 348 MWh less than ComEd's 20,817 gross MWh.

Table 3-12. PY6 Multi-Family Program EEPS Electric Savings

Savings Category †	Energy Savings (MWh)	Demand Reduction (MW)	Peak Demand Reduction (MW)
Residential (Tenant Space)			
Ex-ante Gross Savings	14,405	23.50	1.45
Verified Gross Savings	14,405	23.50	1.45
Verified Net Savings	13,874	22.36	1.40
Business (Common Areas)			
Ex-ante Gross Savings	6,061	1.47	1.14
Verified Gross Savings	7,569	1.47	1.14
Verified Net Savings	6,595	1.28	0.99
EEPS Program Total			
Ex-ante Gross Savings	20,466	24.97	2.59
Verified Gross Savings	21,974	24.97	2.59
Verified Net Savings	20,469	23.64	2.39

Source: Navigant analysis of ComEd tracking data (8-27-2014 data extract)

As shown in Table 3-13 the IPA category realized verified net energy savings of 19,021 MWh, verified net demand reduction of 3.81 MW and verified net peak demand reduction of 2.90 MW.

Table 3-13. PY6 Multi-Family Program IPA Electric Savings

Savings Category	Energy Savings (MWh)	Demand Reduction (MW)	Peak Demand Reduction (MW)
Business (Common Areas)			
Ex-ante Gross Savings	18,819	4.77	3.62
Verified Gross Savings	23,776	4.77	3.62
Verified Net Savings	19,021	3.81	2.90

Source: Navigant analysis of ComEd tracking data (8-27-2014 data extract)

Table 3-14 summarizes the key metrics from PY6.

Table 3-14. PY6 Multi-Family Program PY6 Results Summary

	Units	PY6
Net Savings	MWh	39,490
Net Demand Reduction	MW	27.45
Net Peak Demand Reduction	MW	5.29
Gross Savings	MWh	45,750
Gross Demand Reduction	MW	29.74
Gross Peak Demand Reduction	MW	6.21
Program Realization Rate	%	116%
Program NTGR (lighting direct install)*	#	0.98
Program NTGR (hot water measures)*	#	0.92
Program NTGR (common area measures)*	#	0.80
Program NTGR (thermostats)**	#	0.90

Source: Navigant analysis of ComEd tracking data (8-27-2014 data extract)
*A deemed value from the IL SAG consensus process "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html
**Based on evaluation research findings

The following provides insight into key program recommendations:

» **Verified Gross Impacts and Realization Rate**
  - **Finding 1.** The PY6 MCEEP achieved 45,750 MWh verified gross savings verified gross demand reduction of 29.73 MW and verified gross peak demand reduction of 6.21 MW with an overall verified gross realization rate of 116 percent for electricity savings.
  - **Recommendation 1.** Based on the Illinois TRM v. 2.0, the multi-family common area savings input for PY6 should have applied a 1.34 waste heat factor for cooling energy savings, compared to 1.04 that was used in the ex-ante savings calculation.

» **Peak Demand Reduction**
  - **Finding 2**. The MFHES data extract did not track demand savings, although the tracking system has a demand input field and the implementation contractor's measure default savings spreadsheet calculated the PY6 measure demand savings.
  - **Recommendation 2**. ComEd or the implementation contractor should transfer demand savings estimates to the tracking system.

» **Verified Net Impacts & NTGR**

- **Finding 3**. Navigant used deemed NTGR estimates from the SAG consensus process to calculate net verified savings for EEPS measures.[18] NTGR estimates were 0.98 for direct install lighting measures and 0.92 for direct install hot water efficiency measures.

3.4 Complete System Replacement

The Complete System Replacement (CSR) program provides cash incentives to encourage ComEd customers to purchase higher efficiency air conditioning systems. This program is offered in conjunction with high efficiency furnace rebates through the Home Energy Efficiency Rebates (Home EER) program offered by Nicor Gas and the Residential Prescriptive Rebate Program offered by Peoples Gas and North Shore Gas. Both rental and owner-occupied dwellings are eligible for rebates for furnaces and air conditioning systems.

Table 3-15 summarizes the electricity savings from the CSR program.

Table 3-15. PY6 CSR Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	5,633	N/A	N/A
Verified Gross Savings	5,515	7.95	4.05
Verified Net Savings	3,254	4.69	2.39

Source: Navigant analysis of ComEd tracking data

Table 3-16 below summarizes program electricity savings in PGL-NSG and Nicor Gas service areas.

Table 3-16. PY6 CSR Program Results by Channel

Savings Category	PGL-NSG	Nicor Gas
Ex-ante Gross Savings (MWh)	610	5,023
Ex-ante Gross Peak Demand Reduction (MW)	N/A	N/A
Verified Gross Savings (MWh)	845	4,669
Verified Gross Demand Reduction (MW)	1.12	6.83
Verified Gross PJM Peak Demand Reduction (MW)	0.57	3.48
Verified Gross Realization Rate**	139%	93%
Net to Gross Ratio (NTGR)*	0.59	0.59
Verified Net Savings (MWh)	499	2,755
Verified Net Demand Reduction (MW)	0.66	4.03
Verified Net PJM Peak Demand Reduction (MW)	0.34	2.05

Source: Navigant analysis of ComEd tracking data
* A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html
** Based on evaluation research findings.

[18] "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html

Table 3-17 summarizes the key metrics from PY6.

Table 3-17. PY6 CSR Program Results Summary

Participation	Units	PY6
Net Savings	MWh	3,254
Net Demand Reduction	MW	4.69
Gross Savings	MWh	5,515
Gross Demand Reduction	MW	7.95
Gross Peak Demand Reduction	MW	4.05
Program Realization Rate	%	98%
Program NTGR*	#	0.59
Early Replacement Units	#	7,601
Early Replacement Gross Savings	MWh	4,816
Replace on Burnout Units	#	3,551
Replace on Burnout Gross Savings	MWh	698
Participants	#	10,706

Source: Navigant analysis of ComEd tracking data

*A deemed value from "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html

The following are the key recommendations for PY6:

» **Tracking Database**
  - **Finding 1.** The database ComEd uses to track the CSR program obtains two sets of data from three gas utilities. The data is often incomplete or inconsistent.
  - **Recommendation 1.** Navigant recommends that the program continue to refine the tracking database to make it functional for all parties. This includes agreed upon savings assumptions, database fields, and common language for those fields.

» **Gross Savings Estimates**
  - **Finding 3.** For projects in the PGL-NSG area, some were missing information or appeared to include a placeholder value in the tracking system. Updating the placeholder value and including additional project information increased program savings and accounted for a verified gross realization rate of 139 percent.
  - **Recommendation 3.** The implementation contractor should review deemed savings assumptions for the Central Air Conditioning measure in the Illinois TRM to ensure that proper savings estimates are being recorded.

3.5 Home Energy Savings

3.5.1 Home Energy Savings EEPS Program

The Home Energy Savings (HES) program is a joint program of Nicor Gas and ComEd. The HES program provides single-family homeowners who are customers of Nicor Gas or ComEd in the Nicor Gas territory a home weatherization service package. The weatherization package includes a comprehensive home energy assessment with combustion safety testing, direct installation of selected energy efficiency and water-saving measures, and incentives for installing a recommended package of weatherization measures. In PY6, the program launched an air sealing and insulation prescriptive track, and some contractors were allowed to conduct assessments in place of the implementation contractor.

Table 3-18 summarizes the electric savings from the ComEd PY6 HES program.

Table 3-18. PY6 HES Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Reduction (MW)	Peak Demand Reduction (MW)
Ex-ante Gross Savings	1,220	0.00	0.00
Verified Gross Savings	1,221	1.75	1.14
NTGR*	0.80	0.80	0.80
Verified Net Savings	973	1.40	0.91

*A deemed value from ComEd PY5-PY6 Proposal Comparisons with SAG.xls, available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html.
Source: ComEd tracking data and Navigant analysis

Table 3-19 summarizes the key metrics from PY6. These savings and installation values include electric participants and measures installed in households with electric heating and/or electric hot water heaters. Gas measures and savings are not included.

Table 3-19. PY6 HES Program PY6 Results Summary

Participation	Units	PY6
Verified Net Savings	MWh	973
Verified Net Demand Reduction	MW	1.40
Verified Net Peak Demand Reduction	MW	0.91
Verified Gross Savings	MWh	1,221
Verified Gross Demand Reduction	MW	1.75
Verified Gross Peak Demand Reduction	MW	1.14
Program MWh Realization Rate	%	100%
Program NTGR*	#	0.80
CFLs installed	#	12,859
Showerheads installed	#	15
Aerators installed	#	23
Hot Water Temperature Setback	#	2
Pipe Insulation (Linear Feet)	#	20
Programmable Thermostats	#	86
Programmable Thermostat Education	#	337
Insulation installed	#	1,206
Air Sealing installed	#	1,207
Participating customers	#	2,540

* A deemed value from ComEd PY5-PY6 Proposal Comparisons with SAG.xls, available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html

Source: ComEd tracking data and Navigant analysis

The following provides insight into key program recommendations.

» **Gross Realization Rate**

- **Finding 2.** The verified gross realization rate was 100 percent for MWh. Several of the measure-specific realization rates are higher or lower than 100 percent while the overall realization rate is 100 percent. These relate to low-flow showerheads, aerators, pipe insulation, and programmable thermostats.
- **Recommendation 1.** The implementation contractor should track the total quantity of existing kitchen and bathroom faucets for each residence installing aerator measures.
- **Recommendation 2.** The implementation contractor should only claim programmable thermostat or programmable thermostat education savings for a maximum of one unit per household across the two measures, based on measure savings assumptions in the Illinois TRM.

- **Recommendation 3.** The implementation contractor should include parameters used to calculate savings for weatherization measures in the tracking database provided to the evaluation team.

» **Verified Net Savings**

- **Finding 3.** Verified net savings were 973 MWh, verified net demand reduction was 1.40 MW, and verified net peak demand reduction was 0.91 MW. The NTGR estimates used to calculate the net verified savings were based on past evaluation research and approved through a consensus process by the IL SAG.

3.5.2 Home Energy Savings IPA Program

The Home Energy Savings program also had an IPA portion. Given the program's small size, Navigant's evaluation objectives in PY6 were limited to (1) verifying tracking system data, (2) verifying gross savings impacts based on the TRM, and (3) quantifying net savings impacts from the program using a suitable Net-to-Gross Ratio (NTGR) based on past evaluation research for similar program(s) and consistent with the SAG consensus process for EEPS programs.

Table 3-20 summarizes the electric savings from the ComEd PY6 HES program.

Table 3-20. PY6 HES IPA Program Electric Savings

Savings Category	Energy Savings (kWh)	Demand Reduction (kW)†	Peak Demand Reduction (kW)†
Ex-ante Gross Savings	99,062	N/A	N/A
Verified Gross Savings	103,154	N/A	N/A
NTGR*	0.80	N/A	N/A
Verified Net Savings	82,261	N/A	N/A

†Demand savings were not calculated for Home Energy Savings IPA

Table 3-21 summarizes the key metrics from PY6. It shows the number of participants and the number of installed units for the HES IPA Program in PY6, including both direct install and weatherization measures.

Table 3-21. PY6 HES IPA Program PY6 Results Summary

	Participation	Total Participants	Installed Units
Direct Install Measures	9 Watt CFL	5	18
	14 Watt CFL	16	56
	19 Watt CFL	5	13
	23 Watt CFL	5	15
	9 Watt Globe CFL	11	64
	Shower Head	9	11
	Kitchen Aerator	2	2
	Bathroom Aerator	9	17
	Hot Water Temperature Setback	1	1
	Pipe Insulation	9	10*
	Programmable Thermostat Education	2	2
Weatherization Measures	Attic Insulation	14	0
	Floor Insulation (Other)	3	0
	Duct Insulation & Sealing	0	0
	Air Sealing	14	0

Source: Navigant analysis of PY6 tracking data.
*Installed units for pipe insulation is reported in 3 ft. segments

The following provides insight into key program recommendations.

» **Program Savings Achievement**
  - **Finding 1.** The PY6 HES IPA program set to achieve net savings of 45 MWh. Navigant reports verified gross savings of 103 MWh and verified net savings of 82 MWh. PY6 verified net electric savings targets meet and exceeded the planned net savings of 45 MWH.

» **Gross Realization Rates**
  - **Finding 2.** Navigant reports overall gross realization rates of 104%.
  - **Recommendation 1.** Navigant recommends updating ex-ante calculations for kitchen and bathroom faucet aerators using custom inputs for the number of kitchen and bathroom faucet aerators in the home, respectively. Navigant also recommends updating ex-ante savings calculations for low-flow showerheads based on the TRM v2.0. These changes will improve the gross realization rate.

» **Tracking System Review**
  - **Finding 3.** Navigant found that kitchen and bathroom faucet aerators are not defined in separate data fields in the tracking database. Navigant also found that pipe insulation

lengths are not defined in the tracking database, along with heating type for electric heating participants.

- **Recommendation 2.** Navigant recommends collecting the number of kitchen and bathroom faucets in the home for each participant. This data should be tracked separately in the tracking database. Navigant also recommends tracking the length of pipe insulation installed for each participant. Navigant recommends that the implementation team also record the heating type of the residence as either electric resistance or heat pump, instead of the broader category of electricity. These changes will make the savings estimates more accurate.

3.6 Home Energy Jumpstart

The Home Energy Jumpstart (HEJ) program was in its first year in PY6.[19] The HEJ program is a joint program of Peoples Gas and North Shore Gas and ComEd. The PY6 HEJ program planning targeted net savings of 2,000 MWh. The goal of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, programmable thermostats, and, beginning in PY6, CFLs and the other previously installed measures for customers with electric space heat or electric hot water heating at eligible single family residences.

Table 3-22 summarizes the electric savings from the ComEd PY6 HEJ program.

Table 3-22. PY6 Home Energy Jumpstart Program Electric Savings

Savings Category	Energy Savings (MWh)	Peak Demand Reduction (MW)	Total Demand Reduction (MW)
Ex-ante Gross Savings	3,619	Not tracked	Not tracked
Verified Gross Savings	3,681	0.37	3.80
Verified Net Savings	2,921	0.29	3.00

Source: Navigant analysis of program tracking data

Table 3-23 summarizes key metrics from PY6, informed by the Illinois TRM v2.0. These savings and installation values include electric participants and measures installed in households with electric heating and/or electric hot water heaters. Natural gas measures and savings are not included in this report.

[19] PY6 began June 1, 2013, and ended May 31, 2014.

Table 3-23. PY6 Home Energy Jumpstart Program Results Summary

Metrics	Units	PY6
Verified Net Savings	MWh	2,921
Verified Net Peak Demand Reduction	MW	0.29
Verified Net Total Demand Reduction	MW	3.00
Verified Gross Savings	MWh	3,631
Verified Gross Peak Demand Reduction	MW	0.37
Verified Gross Total Demand Reduction	MW	3.80
Verified Program MWh Realization Rate	%	102
Program-Level NTGR*	#	0.79
CFLs Installed	#	83,403
Showerheads Installed	#	9
Kitchen Aerators Installed	#	9
Bathroom Aerators Installed	#	18
Programmable Thermostats Installed (Gas Heating Fan Savings)	#	2,458**
Programmable Thermostats Installed (Heat Pump Heating Participant)	#	1
Programmable Thermostats Reprogrammed	#	132***
Participating Customers	#	7,035

*Navigant evaluation research applying "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," which is available on the IL SAG website: http://ilsag.info/net-to-gross-framework.html
**Of the 2, 459 total participants that had programmable thermostats directly installed, 67 had more than one installed; however, the savings from only one installation per household can be attributable to the program.
***Of the 132 total participants that had existing thermostats reprogrammed, 5 had more than one reprogrammed, however the savings from only one reprogramming per household can be attributable to the program.
Source: Navigant analysis of program tracking data

The following provides insight into key program recommendations.

» **Program Savings Achievement**
  - **Finding 1.** The verified gross realization rate is 102 percent for energy savings. The program achieved 146 percent of its 2,000 MWh net planning target.

» **Gross Realization Rates**
  - **Finding 2.** Several of the measure-specific realization rates are higher or lower than 100 percent while the overall realization rate is 102 percent. These relate to 9W candelabra CFLs, 14W flood CFLs, and 9W globe CFLs. Programmable thermostat measures had realization rates below 100 percent.
  - **Recommendation 1.** ComEd should update ex-ante calculation assumptions for specialty CFLs, including candelabra, flood, and globes. Additionally, the implementer should only apply programmable thermostat or programmable thermostat reprogramming savings to one unit per household.

» **Net-to-Gross Ratio**
  - **Finding 3.** This is the first year of ComEd participation, and PY6 HEJ program electric measures were not included in the SAG NTGR consensus process. For all electric measures except programmable thermostats, the evaluation determined that the PY4 ComEd/Nicor Gas HES program NTGRs are appropriate for use, including lighting (0.79) and electrically heated water measures (0.75). Navigant used 0.90 NTGR for programmable thermostats, based on findings from previous ComEd programmable thermostats and thermostat education research.

3.7 Residential New Construction

The Residential New Construction Program is jointly offered by ComEd and Nicor Gas. Nicor Gas is the lead utility. The program launched in early 2012 and did not claim savings in the first program year, but ex-ante gross savings estimates exceeded both gas and electric savings targets for PY5 and again in PY6. ComEd incentivizes several ENERGY STAR electric appliances and claims savings from these installations as well as whole-home electricity savings calculated with REM/Rate.

Table 3-24. PY6 Residential New Construction Program Impact Results

Category	Nicor Gas Energy Savings (therms)	ComEd Energy Savings (kWh)	ComEd Demand Savings (kW)
Ex-ante Gross Savings	256,445	554,001	NA
Ex-ante Net Savings	205,156	443,201	NA
Verified Gross Savings	232,557	507,943	133.24
Net to Gross Ratio (NTGR)		0.80	
Verified Net Savings	186,046	406,355	106.6

Source: Navigant analysis of ComEd program tracking data

Navigant found low penetration for the five prescriptive electric measures offered by ComEd. ENERGY STAR refrigerators were the most common measure installed in over 30 percent of homes.

Navigant analyzed homes by grouping them into four "model bins." Table 3-25 below shows the total number of homes completed by bin. Nineteen percent of PY6 homes were built under IECC 2009 code and 81 percent were built under IECC 2012 code.

Table 3-25. PY6 Residential New Construction Program Homes Completed

Model Bin	Joint Homes Completed	Nicor Gas Only Homes Completed	Total Homes Completed
Detached 1 Story	107	50	157
Detached 2 or More Story	355	23	378
Attached 1 Story	49	33	82
Attached 2 or More Story	287	26	313
Total	**798**	**132**	**930**

Source: Navigant analysis of ComEd program tracking data

For PY6, the jointly implemented RNC program achieved verified net savings of 406,355 kWh for ComEd. Evaluation research net demand reduction was 106.6 kW. The planning NTGR value of 0.80 used for this evaluation was approved through a consensus process by the Illinois SAG.

The following provides insight into key program recommendations.

Finding 1. The program exceeded participation and gas and electric savings targets again in PY6 despite operating with a more stringent residential energy code.

Finding 2. As in PY5, the program experienced low participation levels of prescriptive electric measures.

Recommendation 1. Provide additional marketing material or sales pitch ideas to help builders and raters to increase the prevalence of these measures.

Recommendation 2. Estimate savings for all electric measures through whole-home models in order to more accurately capture whole-home savings and interactive effects.

3.8 Home Energy Report

ComEd designed the Home Energy Report (HER) behavioral program to generate energy savings by providing residential customers with sets of information about customer energy use and energy conservation. Information can induce customers to reduce their energy use, creating average energy savings in the one to three percent range. Program participants receive home energy reports that include their recent energy usage patterns and tips on how to reduce energy consumption tailored to their circumstances.

The design of the program did not change in PY6, but the enrollment configuration did. First, as part of a persistence study, ComEd targeted approximately 10,000 customers each in program Waves 1 and 3 for termination of their reports in autumn 2012, but due to an implementer error their reports restarted in autumn 2013. Throughout this report these customer groups are referred to as lapsed report (LR) groups. Second, ComEd targeted approximately 10,000 customers each in program Waves 1, 3, and 5 non-advanced metering infrastructure (non-AMI) for termination of reports in autumn 2013, with the termination lasting throughout PY6. These customer groups are referred to as terminated report (TR)

groups. Third, ComEd added a new wave (Wave 6 in this report) with approximately 100,000 customers in June 2013.

Table 3-26 summarizes the estimated electricity savings from the HER program. The PY6 planning target for this program was 100,000 MWh.

Table 3-26. PY6 HER Program Electric Savings

Savings Category	Energy Savings (MWh)
Ex-ante Savings	110,582
Verified Savings, Prior to Uplift Adjustment	129,244
Verified Realization Rate	117%
Uplift Adjustment	181
Final Verified Savings	129,063

Source: Navigant analysis of ComEd billing data and implementation contractor data

The rollout of the six waves is summarized in Table 3-27. As shown in the rightmost column, daily electricity usage varies widely across the different waves.

Table 3-27. Synopsis of the HER program

Wave	Persistence Group Indicator	Month of First Report*	Month of Last Report	Month of Restarted Report	Targeted Number of Participants**	Targeted Number of Controls**	Average Daily Usage in PY6 (kWh)
1	CR	July 2009	-	-	50,000	50,000	41
1	LR	July 2009	August 2012	August 2013	10,000	50,000	40
1	TR	July 2009	September 2013	-	10,000	50,000	41
2	-	September 2010	-	-	3,000	3,000	38
3	CR	May 2011	-	-	200,000	50,000	52
3	LR	May 2011	August 2012	August 2013	10,000	50,000	52
3	TR	May 2011	September 2013	-	10,000	50,000	52
4	-	January 2012	-	-	20,000	20,000	34
5 AMI	-	July 2012	-	-	60,000	30,000	20
5 Non-AMI	CR	July 2012	-	-	20,000	20,000	61
5 Non-AMI	TR	July 2012	September 2013	-	10,000	20,000	62
6	-	June 2013	-	-	100,000	30,000	47

*This is the month of the "first generated date" in the Opower dataset when a wave is initiated. Participants likely received their first report approximately one month later than this date.

**These numbers are the targeted numbers for each wave. The actual number of participants and control customers at the start of PY6 is used in the evaluation.

Source: Navigant analysis

Table 3-28 summarizes estimated program savings by participant wave. The number of participants represents the number of customers assigned to each participant group, while the sample size indicates the number of customers with sufficient data for inclusion in the regression analysis. Navigant estimated separate savings for each wave and subgroup (for example, Wave 1 CR) using regression.

Table 3-28. PY6 HER Program Results, by Wave

Type of Statistic	Wave 1 CR	Wave 1 LR	Wave 1 TR	Wave 2	Wave 3 CR	Wave 3 LR	Wave 3 TR	Wave 4	Wave 5 AMI	Wave 5 Non-AMI CR	Wave 5 Non-AMI TR	Wave 6	Total
Number of Participants	28,806	8,781	8,722	2,973	176,826	9,694	9,682	20,378	60,389	9,116	9,043	102,177	446,587
Sample Size, Treatment	22,974	7,054	6,989	2,397	152,006	8,280	8,286	18,422	37,188	5,696	5,663	87,312	-
Sample Size, Control	34,759			2,403	41,719			18,509	18,307	7,181		26,467	-
Percentage Savings	2.57%	2.59%	2.52%	2.99%	2.46%	2.69%	2.36%	2.02%	0.95%	1.75%	1.43%	1.24%	1.94%
	0.23%	*0.36%*	*0.36%*	*0.78%*	*0.13%*	*0.28%*	*0.28%*	*0.21%*	*0.30%*	*0.42%*	*0.42%*	*0.13%*	-
kWh Savings per Customer	307.32	310.25	302.88	345.99	416.82	455.1	396.74	227.25	58.88	320.33	263.43	181.54	289.40
	26.93	41.75	44.32	88.21	21.65	46.11	45.64	23.41	18.35	84.34	70.91	18.3	-
Verified Gross Savings, Prior to Uplift Adjustment, MWh*	8,853	2,724	2,642	1,029	73,704	4,412	3,841	4,631	3,556	2,920	2,382	18,550	129,244
	775.69	366.58	372.51	262.25	3828.98	447.03	441.04	476.96	1108	768.85	641.28	1869.71	-
Savings Uplift in Other EE Programs, MWh**	-3	7	9	-9	-2	9	4	-10	78	20	-17	95	181
Verified Gross Savings, MWh***	8,856	2,717	2,633	1,038	73,706	4,403	3,837	4,641	3,478	2,900	2,399	18,455	129,063

Note: The table provides standard errors in gray italics.

Source: Navigant analysis

* Total savings are pro-rated for participants that closed their accounts during PY6.

** Negative double counted savings indicate that the participation rate in the EE program is higher for the control group than the treatment group. This lowers the baseline and underestimates HER program savings.

*** Gross savings adjusted for savings uplift are equal to gross savings less the uplift of savings in other EE programs.

Key findings include the following:

- **Verified Program Savings**
  - **Finding 1.** Overall, the program continues to generate savings at the level expected and exceeded the PY6 planning target of 100,000 MWh. Verified savings, prior to uplift, is 129,244 MWh resulting in a realization rate of 117 percent. Final verified savings is 129,063 MWh after uplift. The double counting of savings related to uplift with other ComEd EE programs *is not a significant issue* for the HER program.
  - **Finding 2.** The final verified savings of 129,063 MWh for PY6 correspond to a 1.94 percent weighted average usage reduction for program participants across the six waves. Of the four waves in PY6 that included at least a second full year of participation in the program (i.e. Waves 1-4), estimated energy savings were over 2 percent.
  - **Finding 3.** Compared to reported savings in PY5, estimated savings for all waves increased in PY6. However increases are only statistically significant for the CR group in Waves 3 and 4. This suggests that the savings for the two longest running waves (Waves 1 and 2) have levelled out. The largest increase in estimated savings occurred for Wave 4, where estimated savings increased by 0.58 percentage points; this increase was likely driven by ramp-up, as Wave 4 started in January 2012 and PY6 was their first full year of reported savings.

- **Persistence Findings**
  - **Finding 6.** The LR customers in Waves 1 and 3 whose reports were terminated in October 2012 and then restarted in August 2013 generated estimated savings in PY6 at least as high as their counterparts who continued to receive reports, although the differences are not statistically significant. It is unlikely that this result reflects that program effects increase when reports are stopped for 10 months.
  - **Finding 7.** The estimated savings for all three groups of TR customers were lower than their CR counterparts, but in all three cases the differences were not statistically significant. Estimated savings decreased 0.05 percentage points for Wave 1 customers who had been in the program four years before termination, 0.01 percentage points for Wave 3 customers who had been in the program two years, and 0.32 percentage points for Wave 5 Non-AMI customers who had been in the program one year.
  - **Recommendation 1.** Given the small decay in estimated savings after report termination, Navigant recommends that ComEd continue the persistence study with TR customers continuing not to receive reports.
  - **Recommendation 2.** Increase Waves 1, 3, and 5 Non-AMI sample sizes to find statistically significant decreases from termination.

3.9 Elementary Energy Education

The Elementary Energy Education (EEE) program's primary focus is to produce electricity and natural gas savings in the residential sector by motivating 5th grade students and their families to reduce energy consumption from water heating and lighting in their home. The EEE program aims to increase participation in other ComEd and Nicor Gas programs via cross-marketing and increased customer awareness of energy efficiency issues. Table 3-29 summarizes the electricity savings from the program.

Table 3-29. PY6 Elementary Energy Education Program Electric Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)
Ex-ante Gross Savings[20]	4,172,174	NA[21]
Verified Gross Savings	4,162,033	483
Verified Net Savings	3,163,145	367

Source: Navigant analysis of ComEd tracking data.

Table 3-30 summarizes the electricity program savings by measure type.

Table 3-30. PY6 Elementary Energy Education Program PY6Results by Measure

Research Category	Ex-ante Gross Savings (kWh)	Ex-Ante Gross Demand Reduction (kW)[22]	Verified Gross Savings (kWh)	Verified Gross Demand Reduction (kW)	Verified Gross Realization Rate	NTGR*	Verified Net Savings (kWh)	Verified Net Demand Reduction (kW)
Showerheads	1,100,436	NA	1,085,887	70	99%	0.76	825,267	53
Kitchen Aerators	381,255	NA	374,621	76	98%	0.76	284,712	58
Bathroom Aerators	97,931	NA	106,294	96	109%	0.76	80,783	73
CFLs	2,592,552	NA	2,595,232	241	100%	0.76	1,972,376	183
Total	4,172,174	NA	4,162,033	483	100%	0.76	3,163,145	367

Source: Navigant analysis of ComEd tracking data.
* A deemed value from the IL SAG consensus process "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html

[20] From the NEF 2013 Think! Energy with Nicor Gas and ComEd Savings Report, named Nicor ComEd Report 2013.pdf
[21] Ex-Ante gross kW were not included in the program tracking system.

The following table summarizes the key metrics from PY6.

Table 3-31. PY6 Elementary Energy Education Program PY6 Results Summary

Participation	Units	PY6
Verified Net Savings	kWh	3,163,145
Verified Net Demand Reduction	kW	367
Verified Gross Savings	kWh	4,162,033
Verified Gross Demand Reduction	kW	483
Program Realization Rate	%	100
Program NTG Ratio*	#	0.76
CFLs Distributed	#	79,491
Showerheads Distributed	#	26,497
Faucet Aerators Distributed	#	52,994
Kitchen Aerators Distributed	#	26,497
Total Kits Distributed	#	26,497

Source: Navigant analysis of ComEd tracking data.
*A deemed value from the IL SAG consensus process "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html.

The following provides insight into key program recommendations.

Verified Gross Program Savings and Realization Rate

Finding 1. The EEE program achieved verified gross electric savings of 4,162,033 kWh and a gross savings realization rate of 99.8 percent. The program achieved verified gross demand savings of 483 kW.

Tracking System Review

Finding 2. The implementation contractor provided algorithms and values for per unit savings for low-flow showerheads, CFLs, and kitchen and bathroom aerators in the final report, but the equations were not contained in the tracking system.

Finding 3. Navigant compared the tracking system values to what was reported in the final report and only found a small variation (2 kWh), which appeared to be due to rounding.

Recommendation 1. The program should calculate savings for CFLs, aerators, and showerheads for single family homes separately from multi-family homes.

Verified Net Savings.

Finding 5. The program achieved verified net savings of 3,163,145 kWh, exceeding the net planning target of 1,900,000 kWh. The program achieved verified net demand savings of 367 kW.

3.10 Great Energy Stewards

The Great Energy Stewards (GES) program is a third-party behavioral program. GES is designed to generate energy savings by providing ComEd residential customers with information on their energy usage and energy-saving tips through periodic postcards mailed to their homes, as well as small financial incentive payments for energy savings.[23] The program's design called for recruiting participants primarily at Chicago-area churches, but due to difficulties the majority of the program's PY6 participants were recruited at events sponsored by CEDA[24] for customers seeking LIHEAP[25] assistance. As a new program, GES began PY6 with no customers enrolled, and had 716 participants signed up by the end of the program year, short of the 3,000 to 4,000 participants that Shelton had expected to enroll during the program's first year.

The evaluation team calculated energy savings for the GES program using regression analysis of monthly billing data for participants. Table 3-32 summarizes the electricity savings. While the program appears to generate negative savings they are not statistically significant or distinguishable from zero. Hence, our primary finding is that the program achieved no verified energy savings in PY6.

Table 3-32. PY6 Great Energy Stewards Program Electric Savings

Savings Category	Energy Savings (MWh)
As Calculated Verified Net Savings Prior to Uplift Adjustment †	-18,592‡
As Calculated Verified Net Savings	-18,594‡
Final Verified Net Savings	0

Source: ComEd billing data, GES tracking data, and Navigant team analysis.
†The uplift adjustment reflects savings that are jointly produced by the program and other EE programs.
‡Not statistically significant

The following provides insight into key program recommendations.

Program Participation and Targeting

Finding 1a. The GES Program struggled with recruitment and did not meet its enrollment target of 3,000 to 4,000 customers, and only signed up 716 customers.

Finding 1b. The program experienced particular recruitment problems early on when its recruitment efforts were focused on local churches. Roughly 90 percent of participants signed up in the latter half of the program year.

Recommendation 1. ComEd should identify and address the barriers that prevented effective recruiting in area churches. Navigant identified the restrictions placed use of customer data

[23] "The Program will reward participants at a level 5 cents per kWh saved, up to $50." The 2013 Great Energy Stewards Program SCOPE OF WORK DOCUMENT final vers.pdf (June 3, 2013), p. 3.
[24] CEDA is the Community and Economic Development Association, the largest private, non-profit community action agency in Cook County (http://www.cedaorg.net/www2/index.htm).
[25] Low-Income Home Energy Assistance Program (http://www.cedaorg.net/www2/EnergyAssistance.html).

to be one such barrier, as detailed in Finding 2. However, we note that this restriction is a basic requirement of customer privacy protection that ComEd applies to all of its implementers.

Finding 2. The implementer failed to satisfy ComEd's information security requirements for third-party contractors wishing to host, process, or store customer personal identifying information (PII).

Recommendation 2b. ComEd should provide detail in their Request for Proposals (RFPs) for third-party EE programs describing all relevant customer data privacy/ security requirements. ComEd should also consider making satisfaction of its customer data security standards a prerequisite for responding to its RFPs, when appropriate.

3.11 One Change CFL Program

The One Change CFL Distribution (One Change) program is a third party, community-based energy efficiency program which distributed CFL light bulb packs to customers least likely to respond to typical lighting offers in the ComEd service territory. One Change will discontinue operating in PY7.

Table 3-33 summarizes the program results.

Table 3-33. PY6 Great Energy Stewards Program Results

Savings Category	
Ex-ante Gross Savings (kWh)	5,546,070
Ex-ante Gross Peak Demand Reduction (kW)	NA
Verified Gross Savings (kWh)	3,908,292
Verified Gross Peak Demand Reduction (kW)	389
Verified Gross Demand Reduction (kW)	3,687
Verified Gross Realization Rate, Savings	70%
Net to Gross Ratio (NTGR)	0.60†
Verified Net Savings (kWh)	2,335,716
Verified Net Peak Demand Reduction (kW)	232
Verified Net Demand Reduction (kW)	2,204

Source: ComEd tracking data and Navigant team analysis.
† An evaluated value

The implementer tracked its savings in a tracking system called iChange. iChange recorded the latitude and longitude of a participant's home when the field staff delivered CFLs. Navigant noted that many of the latitude and longitude entries were missing from the tracking data. In conducting the telephone interviews, Navigant found that the majority of respondents did not remember receiving the CFLs (e.g., 102 out of 124 respondents noted they had not received the bulbs). Based upon the low recall and the lack of tracking data, only 72.5 percent of the homes can be verified to have received the CFLs. Table 3-34 summarizes the program activities.

Table 3-34. PY6 Great Energy Stewards Program Volumetric Findings Detail

Participation	Quantity
Total Bulbs Delivered, Claimed	158,904
Total Bulbs Delivered, Evaluated	115,329
Number of CFL 6-Packs Delivered, Evaluated	19,052
Number of CFL 3-Packs Delivered, Evaluated	339
Total Households, Evaluated	19,391

Source: ComEd tracking data and Navigant team analysis.

Table 3-35 summarizes the key metrics from PY6.

Table 3-35. PY6 Great Energy Stewards Program Key Metrics Summary

Participation	Units	Value
Net Savings	kWh	2,335,716
Net Peak Demand Reduction	kW	232
Net Demand Reduction	kW	2,204
Gross Savings	kWh	3,908,292
Gross Peak Demand Reduction	kW	389
Gross Demand Reduction	kW	3,687
Program Realization Rate	%	70%
Program NTG Ratio †	#	0.60
CFLs Distributed	#	115,329
Customers Touched	#	19,391

Source: ComEd tracking data and Navigant team analysis.
† A researched value.

The following provides insight into key program recommendations.

Gross Impact Analysis

Finding 1. One Change achieved gross verified energy savings of 3,908,292 kWh, gross peak demand savings of 389 kW, and gross demand savings of 3,687 kW.

Realization Rate

Finding 2. There was a difference between ex-ante and verified energy savings of 30 percent. This is due to (1) the ex-ante savings being calculated at the generator instead of the meter, and (2) the tracking system and phone survey not providing adequate information to verify all bulbs delivered (the evaluation team verified 115,329 bulbs of the 158,904 claimed bulbs).

Program Tracking Data

Finding 3. Of the 26,730 entries in the tracking system, 7,339 (27.5%) entries did not have the latitude or longitude data (geo-tracking), which was part of the installation verification. This could be due to (1) the application malfunctioning, (2) a lack of cellular reception, (3) the field staff noting that it was too cold to enter the information (bulbs were distributed during November 2013 – January 2014), or (4) non-delivery.

Recommendation 1. Navigant recommends in future years that ComEd verify that this or similar tracking systems are functioning and recording all necessary fields for verification during the course of the program year. If a tracking system is wireless, there should be a back-up form of verification provided to the field staff (e.g., spreadsheet or paper form).

Program Delivery

Finding 4. Of the 124 customers contacted for the participant survey, 82 percent did not remember receiving the light bulb pack. This could be due to (1) Navigant not speaking with the person who received the bulbs, or (2) some bulbs being left at the door rather than being handed to a resident.

Recommendation 2. Navigant recommends that for similar programs, ComEd conduct some form of follow-up verification over the course of the program year to ensure that all applicable data for verification is being collected and that bulbs are reaching customers.

Recommendation 3. Future similar programs should focus more closely on those ComEd customers that have limited exposure to energy efficiency products since that is the central goal of the program.

3.12 Willdan Sustainable Schools

The Sustainable Schools program (SSP) was launched in June 2013 and implemented by Willdan Energy Solutions (Willdan). The targeted customers for the SSP are independent schools, ranging from daycare/pre-school facilities through high schools. The program offers a no-cost energy survey of the facilities conducted by a trained professional followed by a list of recommended improvements to the facility. After the school decision-maker approves the installations, the lighting measures are installed at the facility with no co-pay required. Because the program transitioned from a third-party program in PY6 to part of the Smart Ideas portfolio in PY7, the implementation contractor attempted to finish the program year as close to the target savings as possible. The target net savings was 2,000 MWh and our analysis verified 1,979 MWh.

Table 3-1. summarizes the electricity savings from the SSP.

Table 3-36. PY6 Willdan Sustainable Schools Program Electric Savings

Savings Category †	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-Ante Gross Savings	2,272	Not tracked	Not tracked
Verified Gross Savings	2,083	0.73	0.14
Verified Net Savings	1,979	0.69	0.13

Source: Willdan Energy Solutions tracking data and Navigant team analysis.

Table 3-37. PY6 Willdan Sustainable Schools Program Results by School Type

Research Category	Ex-Ante Gross Savings (MWh)	Verified Gross Savings (MWh)	Verified Gross Peak Demand Reduction (MW)	Verified Gross Energy Realization Rate	NTGR‡	Verified Net Savings (MWh)	Verified Net Peak Demand Reduction (MW)
Child Care/Preschool	678	581	0.038	86%	0.95	552	0.036
Preschool/Kindergarten	128	113	0.008	88%	0.95	107	0.008
Elementary School	653	502	0.048	77%	0.95	477	0.046
Elementary/Middle School	558	567	0.033	102%	0.95	539	0.031
Middle School/High School	254	320	0.010	126%	0.95	304	0.010
Total	2,272	2,083	0.14	92%	0.95	1,979	0.13

Source: Willdan Energy Solutions tracking data and Navigant team analysis. Note: Totals do not sum exactly due to rounding differences.
‡ Based on evaluation research findings.

The following table summarizes the key metrics from PY6.

Table 3-38. PY6 Willdan Sustainable Schools Program Results Summary

Participation	Units	PY6
Net Savings	MWh	1,979
Net Peak Demand Reduction	MW	0.13
Gross Savings	MWh	2,083
Gross Peak Demand Reduction	MW	0.14
Program Realization Rate‡	%	92
Program NTG Ratio ‡	#	0.95
Assessments Completed	#	86*
Direct Installed Measures	#	10,777
Completed Projects	#	74
Customers touched	#	86*

Source: Willdan Energy Solutions tracking data and Navigant team analysis.
‡ Based on Navigant analysis
*Willdan contacted 1,422 schools via email, phone, flyer, brochure, and/or personal visit and completed a total of 86 assessments.

Overall, the SSP achieved 99 percent of its net savings target by installing lighting measures in 74 schools. The marketing and outreach effort contacted 1,422 schools resulting in 86 assessments completed, and a high conversation rate of 86 percent for schools who agreed to have energy efficient lighting measures installed. The program overall realization rate is 92 percent after adjustments for hours, waste heat factors, and certain lamp wattages.

The following provides insight into key program recommendations.

Program Volumetric Review.

Finding 1. Much of the program information is collected via hand-written notes and the program data in the tracking system contains some irregularities regarding installations and savings since most of the program data is manually inputted.

Recommendation 1. To improve accuracy, consider switching to a tablet-based data input system used in the field to decrease the number of errors introduced when someone tries to interpret handwritten information.

Marketing and Outreach

Finding 2. School decision makers reported initial "skepticism" upon learning about the program and the top three preferred communication methods about program opportunities reported by school participants were (1) in person advisor, (2) e-mail and (3) telephone call.

Recommendation 2. Since school decision-makers report having skepticism toward energy efficiency programs and similar opportunities, continuing a "high touch" approach like an in-person visit or telephone call or personalized email will likely continue to be effective.

Verified Gross Impacts and Realization Rate

Finding 4. The tracking system did not include demand reduction savings.

Recommendation 4. Include ex-ante demand reduction savings calculations in the tracking system.

3.13 CUB Energy Saver

The CUB Energy Saver (CUB) program is a web-based, opt-in, behavioral energy efficiency program, introduced in June 2010, designed to generate energy savings by providing participants with information about their energy usage, recommendations about how participants may reduce energy consumption, and reward points for saving energy that can be redeemed at local retailers. In PY6, there were a total of 8,148 participants enrolled at the start of the program year and 8,793 participants enrolled at the end of the program year, the lowest annual increase in enrollment since the program's inception. Table 3-39 summarizes the electricity savings from the program. The evaluation team calculated savings using regression analysis of monthly billing data comparing participants to a matched set of non-participants.

Table 3-39. PY6 CUB Energy Saver Program Electric Savings

Savings Category	Energy Savings (MWh)
Verified Net Savings Prior to Uplift Adjustment*	1,572
Verified Net Savings	1,610

Source: Navigant analysis of ComEd billing data, C3 implementation data.

*The uplift adjustment reflects savings that are jointly produced by the CUB program and other EE programs.

This section summarizes key impact findings and recommendations.

Finding 1. In PY6, the average percent savings per enrolled customer is 2.04 percent. This is an average savings of 187 kWh per customer. Verified net program savings in PY6 is 1,572 MWh prior to uplift adjustment. Verified net savings is 1,610 MWh.

Finding 2. The program is performing adequately in terms of savings per customer, but as anticipated in the PY5 report, savings have dropped and enrollment is decreasing compared to previous years. Overall, program energy impact savings have fallen by almost 50 percent over the past year.

Recommendation 1. Given that savings per participant are similar to those of other opt-out behavioral programs, and the presumably low cost of running the program, attempts to increase enrollment should be considered, though Navigant strongly recommends that continuation of the program is contingent on the recommendations concerning self-selection bias presented below.

Recommendation 2 (*preferred*). Ideally, the program should implement a recruit-and-deny enrollment strategy to randomize program enrollment. Customers are provided a link to the web portal but told that the program is experimental and that some customers will not be allowed access to the program. Customers denied access serve as a control group.

3.14 Business Standard

ComEd offered prescriptive incentives for common energy efficiency measures under the Smart Ideas for Your Business Standard Incentives Program (Standard program) in PY6. The Standard program facilitates the implementation of cost-effective energy efficiency improvements for non-residential (commercial and industrial) customers. Eligible measures include energy-efficient indoor and outdoor lighting, HVAC equipment, refrigeration, commercial kitchen equipment, variable speed drives, compressed air equipment and other qualifying products. Additional program measures will continue to be researched and recommendations will be made for amendments to the TRM as appropriate.

Table 3-40 summarizes the electric savings from the Standard program.

Table 3-40. PY6 Business Standard Program Electric Savings

Savings Category	Energy Savings (MWh)	Total Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	271,269	NA	43.84
Verified Gross Savings	268,982	79.57	46.89
Verified Net Savings	184,696	53.75	31.97

Source: ComEd tracking data (September 28, 2014) and Navigant analysis.

Table 3-41 summarizes program savings by end-use category assigned by Navigant to each project, based on the predominant energy savings measure types. If project energy savings were more than half lighting or entirely lighting, it was defined as a "Lighting" project. All other projects were defined as "Non-lighting" in the evaluation.

Table 3-41. PY6 Business Standard Program Savings Results by End-Use Category

Savings Category	Lighting End-use	Non-Lighting End-use	Overall Program
Energy Savings (MWh)			
Ex-ante Gross Savings	212,649	58,620	271,269
Ex-ante Gross Savings (%)	78%	22%	100%
Verified Gross Realization Rate	1.02‡	0.88‡	0.99‡
Verified Gross Savings	217,668	51,314	268,982
Net to Gross Ratio (NTGR)	0.70†	0.63†	NA
Verified Net Savings	152,368	32,328	184,696
Verified Net Savings (%)	82%	18%	100%
Confidence Level/Rel Precision (± %)	90/4	90/13	90/4
Coincident Peak Demand Savings (MW)			
Ex-ante Gross Savings	32.63	11.21	43.84
Ex-ante Gross Savings (%)	74%	26%	100%
Verified Gross Realization Rate	1.06‡	1.10‡	1.07‡
Verified Gross Savings	34.61	12.28	46.89
Net to Gross Ratio (NTGR)	0.70†	0.63†	NA
Verified Net Savings	24.23	7.74	31.97
Verified Net Savings (%)	76%	24%	100%
Confidence Level/Rel Precision (± %)	90/6	90/16	90/8

Source: ComEd tracking data (September 28, 2014) and Navigant analysis.

† NTGR is a deemed value. ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

‡ Realization rate is based on PY6 evaluation research findings. Reported program gross savings results have been rounded.

The following table summarizes the key metrics from PY6.

Table 3-42. PY6 Business Standard Program Results Summary

Participation	Units	PY6
Net Energy Savings	MWh	184,696
Net Peak Demand Reduction	MW	31.97
Net Demand Reduction	MW	53.75
Gross Energy Savings	MWh	268,982
Gross Peak Demand Reduction	MW	46.89
Gross Demand Reduction	MW	79.57
Program Energy Realization Rate (Lighting)‡	%	102%
Program Energy Realization Rate (Non-Lighting)‡	%	88%
Program NTG Ratio (Lighting)†	%	70%
Program NTG Ratio (Non-Lighting)†	%	63%
Total Measures Installed	#'s	7,126
Ex-ante Lighting Savings	%	78%
Ex-ante VSD Savings	%	14%
Ex-ante Refrigeration Savings	%	3%
Ex-ante Other Savings	%	5%
Projects Completed	#'s	3,736
Customer Participants	#'s	2,263

Source: ComEd tracking data (September 28, 2014) and Navigant analysis.
†A deemed value from the IL SAG consensus process, "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html
‡Based on evaluation research findings

The following provides insight into key program findings and recommendations.

Impact Evaluation

Finding 1. Although the energy and peak demand savings verification realization rates were, respectively, 0.99 and 1.07 for the overall program, there were upward gross adjustments on lighting that balanced out downward savings adjustments on non-lighting measures. For energy savings, a gross realization rate of 1.02 for lighting balanced out the 0.88 gross realization rate for non-lighting. For demand, both lighting (1.06) and non-lighting (1.10) had gross realization rates above 1.00.

Recommendation 1. Navigant recommends that ComEd review the assumptions for occupancy sensors. Specifically, the energy savings factor used should be weighted towards fixture mounted occupancy sensors; approximately 87 percent of ex-ante occupancy sensor savings in the sample were fixture mounted.

Finding 2. The largest decrease in non-lighting savings was identified through on-site visits where it was found that a measure was redundant or did not have a qualifying control

strategy. The VSD installations which did not result in partial loading account for much of the lower realization rate for non-lighting measures.

Recommendation 2. ComEd should consider working with evaluators to review current pre-qualification requirements and post-installation verification approaches for large chiller and VSD projects to identify enhancements to the procedures that might reduce the likelihood of paying incentives on ineligible redundant units and non-qualifying control strategies.

Process Evaluation.

Finding 3. Awareness among bonus incentive recipients that their incentive included a bonus was high, and participants were satisfied with the application process. However, the bonus incentive did not appear to be a major driver of *additional* energy efficiency measure installations within a project.

Recommendation 3. If bonus incentives are going to be offered in the future, conduct further research to understand their effectiveness in expanding project scopes and to inform a redesign of effective bonus options.

3.15 Business Custom

ComEd's Smart Ideas for Your Business suite of energy efficiency programs for business customers includes the Custom incentive program. This program provides a Custom incentive for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom incentives are available based on the project's kWh savings ($0.07/kWh with caps), provided the project meets all program eligibility requirements.

Table 3-1. summarizes the electricity savings from the Custom program.

Table 3-43. PY6 Business Standard Program Electric Savings

Savings Category	Energy Savings (kWh)	Peak Demand Savings (kW)
Ex-Ante Gross Savings	27,305,336	1,825
Verified Gross Savings	26,587,755	1,750
Verified Net Savings	16,218,531	1,120

Source: ComEd tracking data and Evaluation Team analysis.

Evaluation results are based on the gross impact sample size of 20 projects in PY6, the evaluation results yielded an energy gross realization rate of 0.97 and a peak demand gross realization rate of 0.96. The relative precision for the gross impact results at one-tailed 90% confidence level is ± 5% for the kWh realization rate and ± 3% for the kW realization rate.

Table 3-44 summarizes the key metrics from PY6.

Table 3-44. PY6 Business Standard Program Results Summary

Participation	Units	PY6
Net Savings	kWh	16,218,531
Net Demand Reduction	kW	1,120
Gross Savings	kWh	26,587,755
Gross Demand Reduction	kW	1,750
Program kWh Realization Rate	%	97%
Program kW Realization Rate	%	96%
Program kWh NTG Ratio †	#	61%
Participants	#s	89
Projects completed	#'s	93

Source: ComEd tracking data and Evaluation Team analysis.

† A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

The following provides insight into key program recommendations:

Utilization of M&V Data for Savings Calculations

Finding 1. Data collected for the ex-ante analysis was not always fully utilized to calculate the saving estimates. However, data was sometimes disregarded and the customer self-report hours of operation were used in the ex-ante analysis.

Recommendation 1. Ensure calculated savings use all data collected, rather than using information from customer interviews or other less-reliable data sets.

Demand Savings Estimates

Finding 2. Program peak demand savings estimates were set to zero for 11 sampled projects for which the evaluation team found non-zero savings.

Recommendation 2. Calculate peak demand savings consistent with PJM requirements for all eligible projects and also ensure that the demand savings are populated consistently in the tracking system.

Estimation of Power Factor

Finding 3. For projects #16726 and #11062, the program M&V activities did not accurately determine power factor values. The program used power factor values of 95 percent or greater for motors which is not typical and resulted in overestimation of motor power (kW) usage.

Recommendation 3. The program should ensure that power factors used to determine power (kW) usage are reasonable when compared to typical power factor levels for similar type of equipment.

Net-to-Gross Ratio Research

Finding 5. The Evaluation Research Findings NTGR is 0.67 for both kWh and kW. These values are improved from those in PY5. Nevertheless, there is still free ridership occurring, particularly among the small and medium-sized, stratum 2 and 3 projects.

Recommendation 5. ComEd should consider adopting procedures to limit or exclude known free riders by conducting screening for high free ridership on a project-by-project basis. In addition, ComEd should consider making certain changes to the incentive structure.

3.16 Business Retro-Commissioning

The Northern Illinois Joint Utility Retro-Commissioning (Retro-Commissioning or RCx) program is offered in partnership between ComEd, Nicor Gas, Peoples Gas, and North Shore Gas. The Retro-Commissioning program helps commercial and industrial customers improve the performance and reduce energy consumption of their facilities through the systematic evaluation of *existing* building systems. Low- and no-cost measures are targeted and implemented to improve system operations, reduce energy use and demand and, in many cases, improve occupant comfort.

Table 3-45 and Table 3-46 summarize the electric and natural gas savings from the Retro-Commissioning program. Table 3-47 details key factors and breaks out savings by utility.

Table 3-45. PY6 RCx Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex-ante Gross Savings	26,459	NA	0.832
Verified Gross Savings	25,302	0.779	0.636
Verified Net Savings[26]	26,314	0.811	0.662

Source: ComEd tracking data and Navigant team analysis.

Table 3-46. PY6 RCx Program PY6Gas Savings

Savings Category	Nicor Gas (therms)	Peoples Gas (therms)	North Shore Gas (therms)
Ex-ante Gross Savings	739,312	260,508	23,123
Verified Gross Savings	706,362	264,763	23,123
Verified Net Savings[3]	720,490	270,058	23,585

Source: ComEd tracking data and Navigant team analysis.

Table 3-47 presents the savings by utility.[27] ComEd electric savings are summed across all utilities.

[26] Net savings is based on consensus evaluation framework research performed in EPY4/GPY1 which found net-to-Gross ratios equal to 1.04 and 1.02 for electricity and gas, respectively.

Table 3-47. PY6 RCx Program PY6Results by Utility

Savings Category	ComEd	Nicor Gas	Peoples Gas	North Shore Gas
Ex-ante Gross Savings (therms)	NA	739,312	260,508	23,123
Ex-ante Gross Savings (MWh) *	13,735	7,741	4,325	658
Ex-ante Gross Peak Demand Reduction (MW)	0.473	0.041	0.209	0.108
Verified Gross Savings (therms) ‡	NA	706,362	264,763	23,123
Verified Gross Savings (MWh) ‡*	13,135	7,403	4,136	629
Verified Gross Peak Demand Reduction (MW) ‡*	0.362	0.031	0.160	0.083
Verified Gross Realization Rate (therms) ‡	NA	96%	102%	100%
Verified Gross Realization Rate (MWh) ‡*	96%			
Verified Gross Realization Rate (MW) ‡*	76%			
Net to Gross Ratio (NTGR)	Electricity 1.04 †	Gas 1.02 †	†	†
Verified Net Savings (therms)	NA	720,490	270,058	23,585
Verified Net Savings (MWh)*	13,660	7,699	4,301	654
Verified Net Demand Reduction (MW)*	0.376	0.033	0.166	0.086

Source: ComEd tracking data and Navigant team analysis.
† A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html
‡ Based on evaluation research findings.
*All electrics savings, electric only and joint projects, are attributed to ComEd.

The following table summarizes the key metrics from PY6.

Table 3-48. PY6 RCx Program PY6 Results Summary

Participation	Units	ComEd	Nicor Gas	Peoples Gas	North Shore Gas
Net Savings	MWh or Therms	26,315	720,490	270,058	23,585
Net Demand Reduction	MW	0.661	NA	NA	NA
Gross Savings	MWh or Therms	25,303	706,362	264,763	23,123
Gross Demand Reduction	MW	0.654	NA	NA	NA
Program Energy Realization Rate	%	96%	96%	102%	100%
Program Demand Realization Rate	%	76%	NA	NA	NA
Program NTG Ratio †	#	1.04	1.02	1.02	1.02
Customers Touched	#	49	12	9	2

Source: ComEd tracking data and Navigant team analysis.
† A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

[27] The ComEd data include electric-only projects across ComEd's service territory. The gas utility data include gas savings for respective service territories and ComEd electricity savings for the projects with *both* gas and electric service in respective service territories. Total electricity savings would be a sum across all columns.

In general, the PY6 evaluation finds a mature program that has adjusted to the market over the years to include customers[28] that would benefit from the program, when they might otherwise not participate. Program participation and savings are stable. Participants and service providers are extremely satisfied with the program.

The following provides key program recommendations:

Program Energy Impacts

Finding 1. Energy realization rates continue to be relatively high. There are no patterns for verification adjustment except that some implemented measures are changed after the operators have run the building with the measures for a while.

Recommendation 1. Finalize implementation earlier so that operators can fine-tune measures prior to verification.

Finding 2. A minor, but widespread, error is incorrectly applied weather data. The metro-Chicago area has two well-researched TMY3 weather sets to draw on for energy calculation – O'Hare AP and Midway AP. The sets are comparable, but the Midway AP set has fewer extreme hot and cold hours due to moderation by Lake Michigan. An economizer measure using Midway AP data will show more savings than using O'Hare AP data. Most calculations use the O'Hare weather set, but most projects are downtown Chicago where the Midway weather is more representative.

Recommendation 2. Standardize the weather sets used for locales in the northern Illinois service territories. In order to distinguish projects that experience "lake effect" climate more accurately, Navigant recommends using Midway AP TMY3 files for all projects within 3 miles of Lake Michigan.

Finding 3. Demand savings estimates continue to be a challenge. Peak demand savings are estimated when none is warranted. Inappropriate peak conditions are used in estimates. ComEd's interest in "total demand savings" will confuse the issue further.

Recommendation 3. Standardize and enforce estimation methods for total and peak demand savings. Proscribe peak demand saving for certain measures *(e.g., economizers)*. Track and report total demand savings in verification reports and in the tracking database.

Process Evaluation.

Finding 4. Projects take a long time from application to final verification – more than a year in many cases. This leads to fatigue and potential loss of key project personnel.

Recommendation 4. Look for ways to speed the projects along[29]:

- Engage controls contractors earlier to implement measures.

[28] Examples of program adjustments include "campus aggregation" of smaller buildings and guidelines for allowing consumers of district energy to participate.

[29] Many of these recommendations are in process for EPY7/GPY4.

- Require completion of measure implementation earlier (March) so there is time to verify and perhaps revise measures before the program year-end.

3.17 Business New Construction Service

The New Construction Service program aims to capture immediate and long-term energy efficiency opportunities that are available during the design and construction of new buildings, additions, and renovations in the non-residential market. The program is jointly offered by ComEd and Nicor Gas. The ComEd program has been operating since June 1, 2009 (PY2). Nicor Gas joined the program to offer natural gas rebates in June 2011.

Table 3 -3-49 summarizes the gross and net electricity and gas savings from the program by utility.

Table 3 -3-49. PY6 Business New Construction Program Electric Savings

Utility	Metric	Ex-ante Gross Savings	Gross Realization Rate†	Evaluation-Adjusted Gross Savings	NTGR‡	Verified Net Savings
ComEd	MWh	27,208	101%	27,518	0.52	14,310
	Total MW	6.18	114%	7.05	0.52	3.57
	Peak MW	6.18	88%	5.46	0.52	2.84
Nicor Gas	Therms with interactive effects	259,183	95%	246,850	0.52	128,362
	Therms without interactive effects	304,131	99%	300,266	0.52	156,138

Source: Utility tracking data and Navigant analysis.

† Based on evaluation research findings and deemed values

‡ A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which can be found on the IL SAG web site: http://ilsag.info/net-to-gross-framework.html

The following table summarizes the key metrics from PY6.

Table 3-50. PY6 Business New Construction Program PY6 Results Summary

Participation	MWh	MW (total)	MW (peak)	Therms (without interactive effects)
Net Savings	14,310	3.57	2.84	156,138
Gross Savings	27,518	7.05	5.46	300,266
Program Realization Rate	101%	114%	88%	99%
Program NTG Ratio †	0.52	0.52	0.52	0.52
Building Area Served (Sq. ft.)	8,842,843			
Customers Touched ‡				
Training participants	994			
Leads transferred to other programs	84			
Projects completed	59			
Applications Received in PY6	100			
Projects in the Pipeline	152			

Source: ComEd tracking data and Navigant team analysis.
† A deemed value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which can be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html
‡ Customers touched includes training participants, leads transferred to other programs, and PY6 participants. The overall number of customers touched is not the total of these three groups, as certain customers may be present in multiple groups.

The following provides insight into key program recommendations:

Verified Gross Impacts and Realization Rate

Finding 1. The evaluation team found some errors in baseline parameters used in the building performance modeling. In general, few modifications to ex-ante savings were required; however, in some instances our team found that the baseline used to calculate savings included specifications that were inconsistent with the corresponding building codes.

Recommendation 1. We recommend the implementation team verify baseline parameters or describe any deviations from baseline assumptions in supporting documentation.

Finding 2. In some instances, projects had under-claimed savings due to as-built conditions differing from plans submitted by participants. In most cases, these changes were incorporated into the building models; however, for some projects, the evaluation team found minor discrepancies—particularly when projects added efficient equipment later in the project's timeline.

Recommendation 2. Program and implementation staff should track and review projects' most recent building plans and include these in the project models to ensure the program claims the most accurate level of savings.

3.18 Data Centers

ComEd's Data Centers Efficiency program provides incentives to both new and existing data centers for implementing program-eligible energy efficiency measures. The program pays an incentive of $0.07/kWh saved for eligible projects with caps on the total amount.

Table 3-51 summarizes the electricity savings from the Data Centers Efficiency Program.

Table 3-51. PY6 Data Centers Program Electric Savings

Savings Category	Energy Savings (MWh)	Peak Demand Savings (MW)
Ex-ante Gross Savings	21,905	1.996
Verified Gross Savings	21,333	1.842
Verified Net Savings	12,939	1.069

Source: ComEd tracking data and Evaluation Team analysis.

Evaluation results are based on the gross impact sample of 10 projects. In PY6, the evaluation results yielded an energy gross realization rate of 0.97 and a peak demand gross realization rate of 0.92. The relative precision for the gross impact results at one-tailed 90% confidence level is ± 2% for the energy realization rate and ±3% for the peak demand realization rate. The evaluation verified net-to-gross ratio (NTGR) of 0.61 for energy savings is based on a NTG analysis of a census of the 16 projects completed by the program during PY6.

The following table summarizes the key metrics from PY6.

Table 3-52. PY6 Data Centers Program Results Summary

Participation	Units	PY6
Net Savings	MWh	12,939
Net Demand Reduction	MW	1.07
Gross Savings	MWh	21,333
Gross Demand Reduction	MW	1.84
Program Realization Rate	MWh	0.97
Program Demand Realization Rate	MW	0.92
Program NTG Ratio	MWh	0.61
Program Demand NTG Ratio	MW	0.58
Projects Completed	#	16

Source: ComEd tracking data and Evaluation team analysis.

The PY6 Data Centers program gross energy impact and demand realization rates are above average for a program that involves custom calculation methods based on site specific M&V, and analysis of complex and/or emerging technologies. These PY6 evaluation results reflect a program that is well run and technically competent in addressing an array of impact estimation and program design challenges.

The following provides insight into key program recommendations:

Measurement and Estimation of Power Factor

Finding 1. For several projects, the program M&V activities did not accurately determine power factor values. The program-reported power factor was found to be significantly higher than the typical values for data center cooling equipment (e.g., CRACs, fans and pumps). The program generally calculates cooling equipment power usage using power factor which results in overestimation of savings.

Recommendation 1. The program should ensure that measurements taken are within the typical range for the cooling equipment. For power factor measurements that exceed the typical or nameplate value, multiple spot measurements should be taken to confirm the accuracy of the measurements.

Normalizing Savings to account for IT load changes.

Finding 2. The program normalized savings to account for changes in IT load without verifying if the changes in energy usage of the cooling equipment are technically feasible (i.e., consistent with the equipment operating strategies, usage profiles and characteristics).).

Recommendation 2. The program should examine if the changes to energy usage of the cooling equipment due to changes in IT load are technically feasible (i.e., consistent with equipment operations). The equipment affected by the installed measure should be analyzed based on observed or typical operating conditions.

Net-to-Gross Ratio Research

Finding 6. The Evaluation Research Findings NTG ratio is 0.61 for kWh and 0.58 for kW. Although improved from the values in PY5, these values still indicate significant free ridership, particularly among the small and medium-sized stratum, 2 and 3 projects.

Recommendation 6. ComEd should consider adopting procedures to limit or exclude known free riders by conducting screening for high free ridership on a project-by-project basis.

3.19 Industrial Systems Study Program

The Industrial Systems Study program, started in PY4 with compressed air systems, and has expanded over the past three years to include process cooling and industrial refrigeration systems. The Industrial Systems program offers a combination of technical assistance and financial incentives. Technical assistance includes an industrial systems study which assesses the performance of the facility's industrial compressed air, process cooling, and refrigeration systems to ensure efficient, economical operation. The study identifies cost-effective energy saving measures, using a combination of capital investment and low or no cost measures.

Table 3-53 summarizes the electricity savings from the Industrial Systems program.

Table 3-53. PY6 Industrial Systems Program Electric Savings

Savings Category	Energy Savings (MWh)	Peak Demand Savings (MW)
Ex-ante Gross Savings	25,393	3.30
Verified Gross Savings	24,121	3.63
Verified Net Savings	17,902	3.01

Source: ComEd tracking data and Navigant team analysis.

Evaluation results are based on the gross impact sample size of 9 projects. In PY6, the evaluation results yielded an energy gross realization rate of 0.95 and a peak demand gross realization rate of 1.10. The relative precision for the gross impact results at a one-tailed 90% confidence level is ± 2% for the energy realization rate and ±12% for the peak demand realization rate.

The following table summarizes the key metrics from PY6.

Table 3-54. PY6 Industrial Systems Program Results Summary

Participation	Units	PY6
Net Savings	MWh	17,902
Net Demand Reduction	MW	3.01
Gross Savings	MWh	24,121
Gross Demand Reduction	MW	3.63
Program Realization Rate	#	0.95
Program Demand Realization Rate	#	1.10
Program NTG Ratio †	#	0.74
Program Demand NTG Ratio †	#	0.83
Compressed Air Projects Completed	#	16
Refrigeration Projects Completed	#	2
Process Cooling Projects Completed	#	5
Process Heating Projects Completes	#	1
Total Projects Completed	#	24

Source: ComEd tracking data and Navigant team analysis.
† A retrospective value. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

The PY6 gross energy realization rate of 95 percent is greater than the PY5 88 percent realization rate.

The following provides insight into key program recommendations:

Improvements to Demand Savings Calculations

Finding 1. Out of the nine projects sampled by the evaluation team, five projects reported average demand savings in the tracking data instead of PJM peak demand savings.[30] For four out of the five projects, peak demand savings were included in the calculations but not reported.

Recommendation 1. The program should ensure that they are both calculating and reporting savings for the PJM peak demand period and non-coincident demand in the tracking data.

Measurement and Estimation of Power Factor

Finding 2. There were some instances where the reported power factor was found to be significantly higher than the typical values for compressors and pump motors.

Recommendation 2. Power factor values used in savings calculations should be confirmed to fall within the typical range for industrial system equipment (compressor and pump motors). For power factor measurements that exceed typical or nameplate values, multiple spot measurements should be taken to confirm accuracy of the measurements.

Data Collection Activities

Finding 3. Three of the seven compressed air system audits used ultrasonic leak detectors to identify leaks and estimate their leak rates. Using a leak detector to estimate leak rates may not be totally accurate because dB readings depend on several factors, including leak geometry that may not be captured. However, the dB readings do provide a level of objectivity that judging by feel doesn't.

Recommendation 3. Ultrasonic leak detectors should be used to identify and classify leaks for compressed air projects that involve leak repair. All pertinent factors associated with the leak should be reported to verify accurate savings estimates.

3.20 Business Instant Lighting Discounts Program

The primary component of PY6 Midstream Incentives program covers lighting products and is branded as the Business Instant Lighting Discounts (BILD) program. The BILD program provides incentives to increase the market share of energy efficient CFLs, LEDs, Linear Fluorescents (LF), and High Intensity Discharge (HID) lamps sold to business customers. Additionally, linear fluorescent ballasts were added to the program offerings in PY6.

Table 3-55 summarizes the total electricity savings from the PY6 Retail and Distributor channels. Table 3-56 and Table 3-57 separate the overall PY6 savings into the portions attributable to the Retail and Distributor portfolios. Table 3-58 includes PY6 net carryover savings.

[30] PJM defines the coincident summer peak period as the months of June through August, 1PM to 5PM Central Time on non-holiday weekdays.

Table 3-55. PY6 BILD Program Total Electric Savings

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Program Savings[31]	242,194	NR[32]	NR
Verified Gross Program Savings	265,158	62	54
Verified Net Program Savings	167,049	39	34
Verified Net Carryover Savings	17,599	3.9	3.5
Verified Total PY6 Net Savings	184,648	42.9	37.5

Source: ComEd tracking data and Navigant team analysis.
§ - Double counted savings for BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-56. PY6 BILD Program Retail Electric Savings

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Program Savings	51,874	NR	NR
Verified Gross Program Savings	60,064	14.0	12.4
Verified Net Program Savings	37,840	8.8	7.8

Source: ComEd tracking data and Navigant team analysis.
§ - Double counted savings for BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-57. PY6 BILD Program Distributor Electric Savings

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Program Savings	190,319	NR	NR
Verified Gross Program Savings	205,094	48.0	41.6
Verified Net Program Savings	129,209	30.2	26.2

Source: ComEd tracking data and Navigant team analysis.
§ - Double counted savings for BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

[31] The Ex-ante Gross Savings estimates shown in this table and the following Retail and Distributor tables have not been adjusted by the gross realization rate which applies the first year installation rate and interactive effect estimates.
[32] Not Reported by ComEd

Table 3-58. PY6 BILD Program Electric Savings from Carryover

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Carryover Savings	27,637	NR	NR
Verified Gross Carryover Savings	28,119	6.2	5.5
Verified Net Carryover Savings	17,599	3.9	3.5

Source: ComEd tracking data and Navigant team analysis.

§ - Double counted savings for BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-59, Table 3-60, Table 3-61, Table 3-62, Table 3-63, and Table 3-64 summarize the electricity savings by program bulb type and distribution channel. CFLs made up more than 30 percent of the total program verified net and peak savings, while LEDs accounted for 60 percent and linear fluorescent lamps made up approximately 5 percent.

Table 3-59. PY6 BILD Retail Program MWh Results by Measure[33]

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (MWh)	20,512	9	23,645	7,685	24	0	0
Unadjusted Gross Savings (MWh)	21,110	9	24,253	9,561	12	0	0
Verified Gross Savings (MWh)	18,175	8	29,994	11,877	10	0	0
Verified Net Savings (MWh) †	11,450	5	18,896	7,482	6	0	0

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

Table 3-60. PY6 BILD Distributor Program MWh Results by Measure[34]

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (MWh)	29,352	49,419	91,216	0	18,156	799	1,378
Unadjusted Gross Savings (MWh)	29,906	50,341	81,856	13,267	18,072	759	1,371
Verified Gross Savings (MWh)	25,748	43,889	101,235	16,480	15,630	924	1,187
Verified Net Savings (MWh) †	16,221	27,650	63,778	10,382	9,847	582	748

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

[33] These tables do not include Carryover savings. Similar Carryover tables are included in Section 3 of this report.

[34] These tables do not include Carryover savings. Similar Carryover tables are included in Section 3 of this report.

Table 3-61. PY6 BILD Retail Program MW Results by Measure

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (MW)	NR	NR	NR	NR	NR	NR	NR
Unadjusted Gross Savings (MW)	6.5	0.0	7.4	2.1	0.0	0.0	0.0
Verified Gross Savings (MW)	4.5	0.0	7.4	2.1	0.0	0.0	0.0
Verified Net Savings (MW) †	2.9	0.0	4.6	1.3	0.0	0.0	0.0

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

Table 3-62. PY6 BILD Distributor Program MW Results by Measure

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (MW)	NR	NR	NR	NR	NR	NR	NR
Unadjusted Gross Savings (MW)	9.2	15.2	25.0	2.9	4.0	0.2	0.3
Verified Gross Savings (MW)	6.4	10.6	24.9	2.9	2.8	0.2	0.2
Verified Net Savings (MW) †	4.0	6.7	15.7	1.8	1.7	0.1	0.1

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

Table 3-63. PY6 BILD Retail Program Peak MW Results by Measure

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (Peak MW)	NR	NR	NR	NR	NR	NR	NR
Unadjusted Gross Savings (Peak MW)	4.1	0.0	4.4	1.4	0.0	0.0	0.0
Verified Gross Savings (Peak MW)	4.1	0.0	6.3	1.9	0.0	0.0	0.0
Verified Net Savings (Peak MW) †	2.6	0.0	4.0	1.2	0.0	0.0	0.0

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

Table 3-64. PY6 BILD Distributor Program Peak MW Results by Measure

Savings Category	Standard CFLs	Specialty CFLs	LED Bulbs	LED Fixtures	Linear FL	HID	LF Ballasts
Ex-ante Gross Savings (Peak MW)	NR	NR	NR	NR	NR	NR	NR
Unadjusted Gross Savings (Peak MW)	5.8	8.8	14.9	1.9	2.7	0.1	0.2
Verified Gross Savings (Peak MW)	5.8	8.7	21.4	2.7	2.6	0.2	0.2
Verified Net Savings (Peak MW) †	3.6	5.5	13.5	1.7	1.6	0.1	0.1

Source: ComEd tracking data and Evaluation team analysis.

† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

Table 3-65 shows that counts of BILD program incentivized 333,248 lamps and fixtures through the retail channel and 2,087,861 lamps, fixtures, and ballasts through the distributor channel for a total of 2,421,109 units, which was nearly 30 percent greater than PY3, PY4, and PY5 program sales combined. Table 3-66 shows the deemed installation rates from PY6 results in a total of 1,928,802 PY6 program bulbs installed this program year.

Table 3-65. PY6 BILD Program Incentivized Volumetric Findings Detail

Program Year	Standard CFLs	Specialty CFLs[35]	LEDs[36]	Linear FLs	HIDs	LF Ballasts	Total
PY6 Retail	139,320	58	193,000	870	n/a	n/a	333,248
PY6 Distributor	204,257	362,274	611,299	840,033	2,607	67,391	2,087,861
PY6 Total	343,577	362,332	804,299	840,903	2,607	67,391	2,421,109
PY5 Total	249,799	347,639	211,955	503,627	2,799	n/a	1,315,819
PY4 Total	194,180	381,072	n/a	n/a	n/a	n/a	575,252
PY3 Total	4,173	929	n/a	n/a	n/a	n/a	5,102

Source: ComEd tracking data and Navigant team analysis.

[35] Cold Cathode FL and High Wattage CFLs (>=40 Watts) are included in the Specialty CFL category.

[36] Includes 44,486 LED Fixtures in the Retail Program and 57,097 LED Fixtures in the Distributor Program.

Table 3-66. PY6 BILD Program Installed Volumetric Findings Detail

Program Year	Standard CFLs	Specialty CFLs	LEDs	Linear FLs	HIDs	LF Ballasts	Total
PY6 Incentivized Bulbs	343,577	362,332	804,299	840,903	2,607	67,391	2,421,109
PY6 1st Year Installed Bulbs	238,786	254,357	801,484	840,483	1,812	67,357	1,928,802
PY4 Carryover Bulbs – installed in PY6	26,445	51,898	n/a	n/a	n/a	n/a	78,344
PY5 Carryover Bulbs – installed in PY6	38,469	34,764	0	77,559	0	n/a	150,792
Total Installed Bulbs in PY6	303,700	341,019	801,789	661,986	2,606	46,837	2,157,937

Source: ComEd tracking data and Navigant team analysis.

The following table summarizes the key metrics from PY6.

Table 3-67. PY6 BILD Program Results Summary

Key Metrics	Units	Retail Channel	Distributor Channel	PY6 Carryover	PY6 Total
Unadjusted Gross Savings	MWh	54,944	195,571	n/a	250,516
Unadjusted Gross Demand Savings	MW	16.0	56.7	n/a	72.8
Unadjusted Gross Peak Demand Reduction	MW	9.9	34.4	n/a	44
Verified Gross Savings	MWh	60,064	205,094	28,119	293,277
Verified Gross Demand Reduction	MW	14.0	48.0	6.2	68.2
Verified Gross Peak Demand Reduction	MW	12.4	41.6	5.5	59
Verified Net Savings†,§	MWh	37,840	129,209	17,599	184,649
Verified Net Demand Reduction†,§	MW	8.8	30.2	3.9	42.9
Verified Net Peak Demand Reduction†,§	MW	7.8	26.2	3.5	37

Source: ComEd tracking data and Navigant team analysis
† Net savings reflective of a net to gross ratio of 0.63. Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html
§ - Double counted savings for BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

The PY6 savings target of the BILD Distributor Program was to achieve 100 GWh of gross energy savings and the PY6 gross verified energy savings were estimated to be more than twice that target (205,094 MWh). Thirty-three percent of these savings were from CFLs, 60 percent from LEDs, 6 percent from linear fluorescents, and 1 percent from linear fluorescent ballasts and HID lamps.

The following points are key recommendations from the PY6 BILD evaluation:

Midstream Program Evaluation

Finding 1. In order to achieve a statistically representative sample, the evaluation team estimated that 500 end-user survey completes would be necessary. Given the approximate 10 percent end-user survey completion rate experienced by the evaluation team, it would have been necessary to obtain contact information for every program participant to meet the 500 survey goal, which is difficult given the midstream delivery mechanism.

Recommendation 1. This finding has been stated in the prior three evaluation reports and, as such, the evaluation team recommends a meeting between the ComEd BILD Program Managers, the BILD Program Implementers, and select BILD Program Distributors in advance of PY8 to discuss data collection options.

Program Tracking Data

Finding 3. The bulb information database contained exact matches for all model numbers in the tracking data. However, for a number of products, there were multiple entries for the same bulb model number that had conflicting information. This led to incorrect baseline or measure wattages being assigned initially. It was determined that these multiple records were due to outdated entries in the database (i.e., from prior program years).

Recommendation 3a. A field should be added to the EFI_BIZ_LTG_LKUP table that specifies the program year. This would ensure the most up-to-date bulb information is appended to the tracking data. This recommendation was conveyed to ComEd and the program implementer early in the evaluation process, and the database is in the process of being verified and updated.

Verified Gross Impacts and Installed Savings Realization Rate[37]

Finding 4. The PY6 Gross Verified Energy Savings were estimated to 265,158 MWh of which 23 percent is attributable to the Retail Program and 77 percent is attributable to the Distributor Program. The Installed Savings Realization Rate on this savings estimate is 106 percent.

Evaluation Research Gross Impacts and Realization Rate

Finding 6. The Evaluation Research Gross Realization Rate[38] is 94 percent. As compared to Verified Savings, Evaluation Research savings are lower primarily due to a 3 percent reduction in the installation rate for LEDs (from 100% to 97%). Also contributing is a 13 percent reduction in average delta watts for LEDs that results from switching from the currently one-size-fits-all lumen mapping for directional LEDs in IL TRM v2.0 to the bulb shape specific mapping used to estimate the Evaluation Research results.

Recommendation 6. The large decrease in delta watts for LEDs is worth exploring through further research given their expanding influence in the program. Although the Evaluation Research lumen equivalencies are grounded in the Federal standards for incandescent lamps,

[37] The Verified Gross Installed Savings Realization Rate adjusts the Unadjusted Gross savings estimates to account for the 1st year installation rate and any interactive effects associated with the measure. It is different from them Ex-ante realization rate which is the ratio of the ex-post verified savings estimate over the ex-ante savings estimate.

[38] The Evaluation Research Gross Realization Rates are equal to the Evaluation Research Gross Savings estimate / Verified Savings Gross savings estimate.

initial review of LED manufacturer product specifications indicates that the reported incandescent equivalencies do not always align with the Federal lumen requirements of a similar incandescent lamp.

3.21 Small Business Energy Services

Small Business Energy Savings (SBES) program is ComEd's primary energy efficiency program for small business customers. PY6 represents the program's third full year of operation. The SBES program is designed to assist qualified ComEd non-residential customers to achieve electric energy savings by educating them about energy efficiency opportunities through on-site assessments conducted by trade allies and installation of no-cost direct-install measures.[39] Further savings were available to participating customers through incentives of 30 to 75 percent offered for select contractor-installed (CI) measures.

Table **3-68** summarizes the electricity savings for the program.

Table 3-68. PY6 SBES Program Electric Savings for EEPS and IPA

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Savings[40]	135,607	49.51	25.66
Verified Gross Savings	135,303	35.61	24.95
Verified Net Savings	128,538	33.83	23.70

Source: Navigant analysis of ComEd tracking data (8-31-2014 data extract)

§ - Double counted savings for SBES were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-69 and Table 3-70 summarize the allocation of PY6 SBES electricity savings between EEPS and IPA.[41]

[39] No-cost direct-install measures include low-flow showerheads, faucet aerators, pre-rinse spray valves, vending machine controls, and compact fluorescent lamps (CFLs).

[40] Includes 1,879 MWh from 70 projects that were installed in PY6 but whose invoicing and paperwork were not completed until June-July 2014, as well as 204 MWh from 25 projects that were begun during PY5 were not completed until the first month of PY6.

[41] ComEd allocated 71,521 gross MWh to IPA based on the IPA budget, with the rest going to EEPS (ComEd PY6 Ex-ante Savings.xlsx, 8-05-2014, and correspondence from ComEd program manager). Navigant identified 71,524 gross MWh for IPA and 64,083 gross MWh for EEPS in the tracking data.

Table 3-69. PY6 SBES Program EEPS Electric Savings

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Savings	64,083	29.47	11.87
Verified Gross Savings	63,739	16.99	11.47
Verified Net Savings	60,552	16.15	10.90

Source: Navigant analysis of ComEd tracking data (8-31-2014 data extract)
§ - Double counted savings for SBES were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-70. PY6 SBES Program IPA Electric Savings

Savings Category	Energy Savings (MWh) §	Demand Savings (MW) §	Peak Demand Savings (MW) §
Ex-ante Gross Savings	71,524	20.04	13.79
Verified Gross Savings	71,564	18.62	13.48
Verified Net Savings	67,986	17.68	12.80

Source: Navigant analysis of ComEd tracking data (8-31-2014 data extract)
§ - Double counted savings for SBES were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

Table 3-71 summarizes PY6 SBES program savings by measure end-use category. Lighting measures continue to comprise the majority of program savings, 99.5 percent of verified net energy savings.

Table 3-71. PY6 SBES Program Results by End-use

Parameter	Unit	Lighting	Water Efficiency Device	HVAC	Refrigeration	Total
Energy Savings						
Ex-ante Gross Savings§	(MWh)	134,980	93	9	525	135,607
Verified Gross Savings§	(MWh)	134,628	122	9	544	135,303
Verified Net Savings§	(MWh)	127,896	116	8	516	128,538
Peak Demand Reduction						
Ex-ante Gross Peak Demand Reduction§	(MW)	25.48	0.17	0.01	<0.00	25.66
Verified Gross Peak Demand Reduction§	(MW)	24.92	0.02	0.01	<0.00	24.95
Verified Net Peak Demand Reduction§	(MW)	23.67	0.02	0.01	<0.00	23.7

Source: Navigant analysis of ComEd tracking data (8-31-2014 data extract)
** A deemed value from the IL Stakeholder Advisory Group (SAG) consensus process "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html*
§ - Double counted savings for SBES were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

The key metrics from the SBES program are summarized in Table 3-72.

Table 3-72. PY6 SBES Program Results Summary

Participation	Units	PY6 Total
Net MWh Savings§	MWh	128,538
Net Peak Demand Reduction§	MW	23.77
Verified Gross MWh Savings§	MWh	135,303
Gross Peak Demand Reduction§	MW	24.95
Program Realization Rate	%	100%
Program NTGR*	#	0.95
Projects	#	7,515
Measures Installed	#	553,955
Customers Touched	#	5,975

Source: ComEd tracking data and Navigant team analysis.

* A deemed value from the IL SAG consensus process "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html

§ - Double counted savings for SBES were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

This following are key program recommendations.

» **Verified Gross Impacts and Realization Rate**
  - **Finding 1.** The PY6 SBES program achieved an overall verified gross realization rate of 100 percent for electricity savings. The program is accurately tracking gross savings for most measures with the exceptions noted below.
  - **Recommendation 1.** ComEd and the implementation contractor should update the tracking system default measure savings with adjustments to hours of use for religious worship locations and others, and delta watts input assumptions. ComEd should include in the lighting measure description the delta-watts value used to derive the tracking savings, as well as total watts controlled for occupancy sensors.

» **Peak Demand Reduction**
  - **Finding 2**. The SBES tracking system did not track demand savings, although the tracking system has an input field for demand and the implementation contractor's measure default savings spreadsheet calculated demand savings.
  - **Recommendation 2**. ComEd and the implementation contractor should transfer demand savings estimates into the tracking system.

» **Verified Net Impacts & NTGR**

- **Finding 3**. Navigant used deemed NTGR estimates from the Illinois SAG consensus process to calculate net verified savings for both EEPS and IPA measures.[42] PY6 IPA measures were not covered by the SAG NTG consensus decision. The evaluation determined that NTGR estimates for PY6 EEPS measures were appropriate to use for comparable PY6 IPA measures.

3.22 Commercial and Retail Internet Protocol Thermostat and Controller Program

The RLD Resources LLC Commercial and Retail IP Thermostat and Controller (IP Thermostat) program targets small- to mid-size office buildings and retail stores (100 – 400 kW). The IP Thermostat program offers low-cost automation with monitoring and proactive control of HVAC systems. The benefits for the building owners (as well as property managers or tenants) include cost-savings and more scientific (data-driven) HVAC maintenance. The program provided outreach and technical support, including marketing support to help business partners reach new customers and build on existing relationships with clients. The program also identifies inefficient buildings that can benefit most from the program.

Table 3-73 summarizes the electric savings for the program. The IP net energy savings represent less than 2 percent of the savings target for PY6.

Table 3-73. PY6 IP Thermostat Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Reduction (MW)
Ex-ante Gross Savings	98.9	Not provided
Verified Gross Savings	98.9	0
Verified Net Savings	98.9	0

Source: Navigant analysis of program tracking data

Table 3-74 summarizes PY6 gross and net savings by building category.

[42] "ComEd PY5-PY6 Proposal Comparisons with SAG.xls," available on the IL SAG website here: http://ilsag.info/net-to-gross-framework.html

Table 3-74. PY6 IP Thermostat Program Results by Facility Type

Facility Category	Ex-ante Gross Savings (MWh)	Ex-ante Gross Demand Reduction (MW)	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Realization Rate	NTGR	Verified Net Savings (MWh)	Verified Net Demand Reduction (MW)
Laundromat	46.4	-	46.4	0	100%	1.0	46.4	0
Church	23.8	-	23.8	0	100%	1.0	23.8	0
Storage Facility	14.2	-	14.2	0	100%	1.0	14.2	0
Fitness Center	8.9	-	8.9	0	100%	1.0	8.9	0
Hospitality	4.1	-	4.1	0	100%	1.0	4.1	0
Radio Station	1.6	-	1.6	0	100%	1.0	1.6	0
Total	98.9	-	98.9	0	100%	1.0	98.9	0

Source: Navigant analysis of program tracking data

Table 3-75 summarizes the key metrics from PY6 that reflect the allowable savings using the implementation contractor's approach.

Table 3-75. PY6 IP Thermostat Program Results Summary

Metrics	Units	PY6
Net Savings	MWh	98.9
Net Savings Target	MWh	6,125
Percentage of Target Met	%	<2
Net Demand Reduction	MW	0
Verified Gross Savings	MWh	98.9
Gross Demand Reduction	MW	0
Program Realization Rate	%	100
Program-Level NTGR	#	1.0
Participating Customers with Attributable Savings	#	16

Source: Navigant analysis of program tracking data

The following provides insight into key program recommendations:

Program Savings Achievement

Finding 1. The gross energy savings realization rate is 100 percent. The program met less than 2 percent of its targeted savings of 6,125 MWh. Several facilities did not have attributable savings due to insufficient data history, accounts being closed, accounts being blocked, and account numbers being invalid.

Recommendation 1. Implementation contractors should include ability to determine facility usage history as a criterion for participation as well as determining that facility usage data is available and accounts are not blocked and are valid.

Program Participation

Finding 2. The majority of participants in PY6 were laundromats.

Recommendation 2. Since one of the PY6 marketing and outreach strategies was to target coin-operated laundromats, if this program were to be re-launched, consider additional marketing strategies specifically targeting other commercial market segments i.e. churches, storage facilities, fitness centers, etc.

3.23 Desktop Power Management

The Desktop Power Management program was offered by ComEd for the first time in PY5 and will not be offered beyond PY6. The program provides rebates for installations of computer power management software. This program was offered to both private and 3 public sector entities for part of PY6 through the public sector partnership with DCEO. ComEd provided incentives for all projects and the resulting savings will count towards ComEd's portfolio savings goals.

For PY6, the program had 10 participants and distributed incentives for software to 8,619 desktops and 2,557 laptops. Table 3-76 summarizes the electricity savings for the program. The program had one additional project underway in PY6, but it was not completed within PY6. That project may be considered in PY7 in another ComEd program or as a part of spillover research. Based on future deemed savings numbers recommended by Navigant, this project could result in additional savings of 1,229,750 kWh.

Table 3-76. PY6 Desktop Power Program Electric Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Peak Demand Savings (kW)
Ex-ante Gross Savings	2,673,463	NA	N/A
Verified Gross Savings	2,347,781	873	180
Verified Net Savings	2,241,834	834	172

Source: ComEd tracking data and Navigant team analysis.

The following table outlines program savings by measure.

Table 3-77. PY6 Desktop Power Program Results by Measure

Research Category	Ex-ante Gross Savings (kWh)	Ex-Ante Gross Peak Demand Reduction (kW)	Verified Gross Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	NTGR‡	Verified Net Savings (kWh)	Verified Net Peak Demand Reduction (kW)
Savings, Desktops	2,514,162	NA	2,203,614	169	88%	0.95	2,104,172	161
Savings, Laptops	159,301	NA	144,168	11	91%	0.95	137,662	10
Total	2,673,463	NA	2,347,781	180	88%	0.95	2,241,834	172

Source: ComEd tracking data and Navigant team analysis.
‡ Based on evaluation research findings.

The following table summarizes the key metrics from PY6.

Table 3-78. PY6 Desktop Power Program Results Summary

Participation Metric	Units	PY6
Net Savings	kWh	2,241,834
Net Peak Demand Reduction	kW	172
Gross Savings	kWh	2,347,781
Gross Peak Demand Reduction	kW	180
Program Realization Rate	%	88%
Program NTG Ratio †	#	0.95
Desktops Installations	#	8619
Laptop Installations	#	2557
Participating Customers	#	10

Source: ComEd tracking data and Navigant team analysis.
† Based on evaluation research

The following provides insight into key program recommendations:

Verified Gross Savings and Realization Rate

Finding 2. The program achieved verified gross savings of 2,347,781 kWh (*which is 15% of the planned gross savings of 15,852,885 kWh*) and verified gross peak demand savings of 180 kW.

Net to Gross Ratio

Finding 3. The NTGR submitted by the implementer of 0.8 for desktops and 0.6 for laptops is likely too conservative. Through evaluation research, the NTGR was calculated at 0.95.

Recommendation 1. Navigant recommends deeming the NTGR at 0.95 for future similar programs based on the participant self-report data gathered this year.

Ex-Ante Savings and Project File Review

Finding 4. Based on additional research into actual savings from this type of software, as well as claimed savings in other states, the evaluation found that the implementer work paper energy savings estimates of 291.7 kWh for desktops and 62.3 kWh for laptops are likely too high. This is mainly due the assumptions from ENERGY STAR (the main source of the calculation) which calculates savings (1) using aggressive power management settings and (2) assuming computers with power management software are not ENERGY STAR qualified.

Recommendation 2a. Navigant recommends a more conservative savings value, specifically 200 kWh per desktop and 50 kWh per laptops, to be used in the future.

Recommendation 2b. Navigant recommends ComEd and future implementers provide recommendations and guidelines to participants on the most efficient power management settings.

Verified Net Savings.

Finding 5. The program achieved verified net savings of 2,241,834 kWh and verified net demand savings of 172 kW.

4. Evaluation Research Results

Evaluation research results are included in this section. Researched savings reflect evaluation adjustments to savings parameters based upon an evaluator's best available research – this was done in parallel to deemed verification savings analysis. Parameters that were adjusted vary by program and depend on the specifics of the research that was performed during the evaluation effort. Researched savings were also used to adjust future deemed values (as noted below). Any changes to deemed values were assessed and possibly altered/updated through the SAG Technical Advisory Committee's process to update the Illinois TRM on an annual basis. The following is the Illinois Statewide TRM Policy Manual's description of how evaluators are to develop research, in addition to verifying savings with the TRM[43]:

> **Evaluators** (Evaluation Teams, Independent Consultants) – The Evaluators have primary responsibility pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8) to provide independent evaluations of the performance of the Utilities' and DCEO's energy efficiency portfolios. To support this responsibility in the context of the TRM, Evaluators will use TRM values to perform savings verification for prescriptive measures covered by the TRM, and, where budget allows, conduct measure and program level research to inform future TRM updates. The Evaluators shall collaborate with the Utilities, the SAG TAC, and DCEO to determine appropriate data collection and analysis that supports TRM savings verification updates, where available budget exists, while considering the administrative cost and participant burden associated with such data collection.

Using its newest research findings (not limited to following the TRM and SAG consensus NTG values), the evaluation team estimated that ComEd's efficiency programs achieved 1,166,156 net MWh energy savings in the ComEd service territory for PY6 (Table 4-1). This included 1,053,372 net MWh from funded measures in PY6, plus the verified CFL Carryover savings presented in Section 3.1.[44]

The result of all the individual program reviews based on research findings was a realization rate of 96% and a net-to-gross ratio of 0.70, and an ex-post estimate of 1,166,156 MWh of net energy savings.[45] Research evaluated savings are documented in Table 4-1 and Table 4-2 following this page.

[43] Illinois Statewide TRM Policy Manual at page 6.
[44] The ICC addressed deeming lighting values temporarily in its Final Order in ComEd's energy efficiency Plan 1 docket. See, ICC Docket No. 07-0540, Final Order at 42, February 6, 2008.
[45] Ibid.

Table 4-1. ComEd Portfolio Year 6 Results – Planned and Net Energy Savings – Research

	Ex-Ante		Ex-Post		
	Gross (MWh)	Realization Rate	Gross (MWh)	NTGR	Net (MWh)
Residential EEPS Programs					
Residential Energy Star Lighting	442,599	0.71	315,733	0.59	186,282
Residential Fridge and Freezer	38,274	0.79	30,238	0.42	12,714
Multifamily HES Joint	20,466	1.07	21,974	0.93	20,469
Home Energy Savings	1,220	1.00	1,221	0.80	973
Complete Systems Replacement	5,633	0.98	5,515	0.59	3,254
Home Energy Report	110,582	1.17	129,063	1.00	129,063
Residential New Construction	554	0.92	508	0.80	406
Elementary Energy Education	4,172	1.00	4,162	0.76	3,163
Home Energy Jumpstart	3,619	1.02	3,681	0.79	2,921
Total Residential EEPS Programs	*627,119*	*0.82*	*512,095*	*0.70*	*359,245*
Business EEPS Programs					
Business Standard	271,269	1.10	299,750	0.71	212,544
Business Instant Lighting Discount§	242,194	1.09	265,158	0.68	181,047
Small Business Energy Savings§	64,083	0.99	63,739	0.95	60,552
Business Custom	27,305	0.97	26,588	0.67	17,814
New Construction	27,208	1.01	27,518	0.80	22,014
Retro-Commissioning	26,459	0.96	25,302	1.04	26,314
Industrial Systems	25,393	0.95	24,121	0.74	17,902
Data Centers	21,905	0.97	21,333	0.61	12,939
Total Business EEPS Programs	*705,816*	*1.07*	*753,509*	*0.73*	*551,126*
Third Party EEPS Programs					
RLD Thermostats	99	1	99	1	99
Desktop Power Management	2,673	0.88	2,348	0.95	2,242
CUB†	N/A		1,610	1	1,610
Total Third Party EEPS Programs	2,772		4,057	0.97	3,951
Carryover					
Residential Energy Star Lighting	176,194	1.00	176,194	0.54	95,185
Business Instant Lighting Discount (BILD)	27,637	1.02	28,119	0.63	17,599
Total Carryover	*203,831*	*1.00*	*204,313*	*0.55*	*112,784*
EEPS Programs Total	1,539,538	0.96	1,473,487	0.70	1,027,106
IPA Programs					
Residential Energy Star Lighting IPA	94,956	0.93	88,233	0.54	47,646
Multifamily HES Joint IPA	18,819	1.26	23,776	0.80	19,021
Small Business Energy Savings IPA	71,524	1.00	71,564	0.95	67,986
Third Party IPA Programs					
Home Energy Savings IPA	99	1.04	103	0.80	82
Energy Stewards†‡	N/A		0		0
Sustainable Schools	2,272	0.92	2,083	0.95	1,979
One Change Residential	5,546	0.70	3,908	0.60	2,336
IPA Program Total	193,216	0.98	189,667	0.73	139,050
EEPS and IPA Total	1,732,754	0.96	1,663,641	0.70	1,166,156

† - No ex-ante gross savings estimates were provided for this program

‡ - Savings from the Energy Stewards program were evaluated using regression billing analysis. However, the savings results were not statistically different from 0.

§ - Double counted savings for Small Business Energy Savings and BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

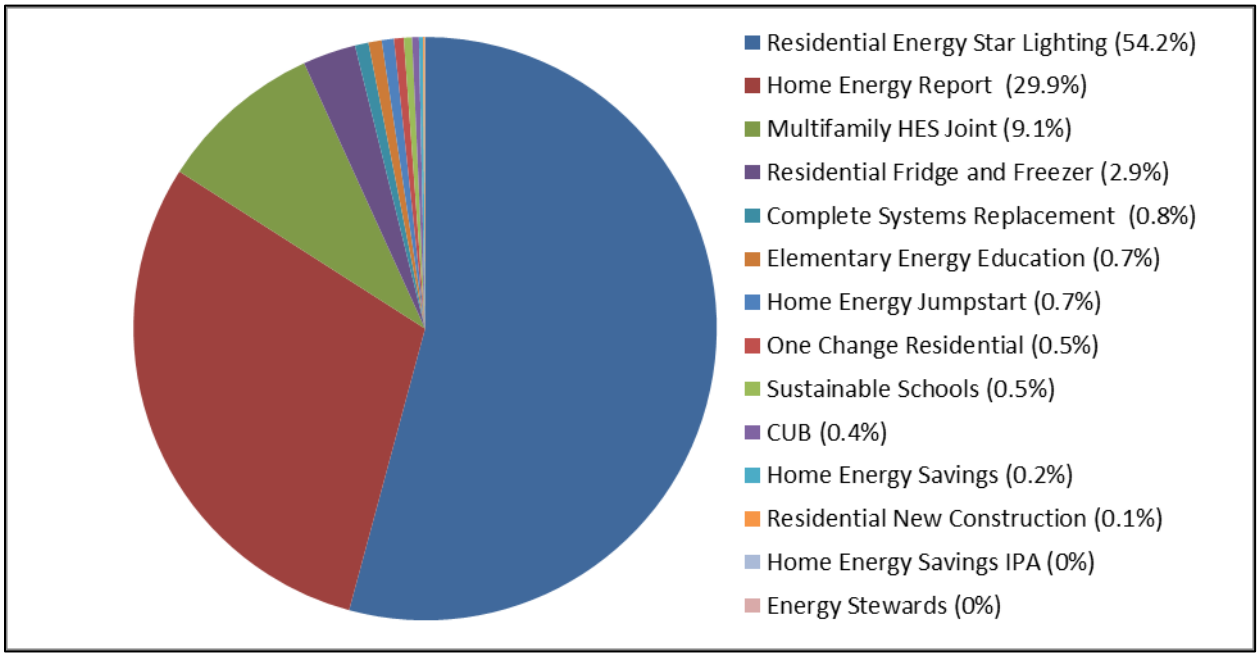
Table 4-2. ComEd Portfolio Year 6 Results – Researched Net Peak Demand Savings (MW)

	Ex-Post		
	Gross (MW)	NTGR	Net (MW)
Residential EEPS Programs			
Residential Energy Star Lighting	38.50	0.59	22.70
Residential Fridge and Freezer	4.81	0.42	2.03
Multifamily HES Joint	6.21	0.85	5.29
Home Energy Savings	1.14	0.80	0.91
Complete Systems Replacement	4.05	0.59	2.39
Home Energy Report ‡	N/A		N/A
Residential New Construction	0.13	0.80	0.11
Elementary Energy Education	0.48	0.76	0.37
Home Energy Jumpstart	0.37	0.78	0.29
Total Residential EEPS Programs	*55.69*	*0.61*	*34.09*
Business EEPS Programs			
Business Standard	48.59	0.70	33.94
Business Instant Lighting Discount§	54.00	0.68	36.72
Small Business Energy Savings§	11.47	0.95	10.90
Business Custom	1.75	0.67	1.17
New Construction	5.46	0.52	2.84
Retro-Commissioning	0.64	1.04	0.66
Industrial Systems	3.63	0.83	3.01
Data Centers	1.84	0.58	1.07
Total Business EEPS Programs	*127.38*	*0.71*	*90.31*
Third Party EEPS Programs			
RLD Thermostats‡	N/A		N/A
Desktop Power Management	0.18	0.96	0.17
CUB‡	N/A		N/A
Total Third Party EEPS Programs	*0.18*	*0.96*	0.17
Carryover			
Residential Energy Star Lighting	19.20	0.54	10.40
Business Instant Lighting Discounts	5.50	0.71	3.90
Total Carryover	*24.70*	*0.58*	*14.30*
EEPS Program Total	207.95	0.67	138.87
IPA Programs			
Residential Energy Star Lighting IPA	11.40	0.54	6.10
Multifamily HES Joint IPA	3.62	0.80	2.90
Small Business Energy Savings IPA	13.48	0.95	12.80
Third Party IPA Programs			
Home Energy Savings IPA‡	N/A		N/A
Energy Stewards‡	N/A		N/A
Sustainable Schools	0.14	0.93	0.13
One Change Residential	0.39	0.60	0.23
IPA Program Total	29.03	0.76	22.16
EEPS and IPA Total	236,98	0.68	161.03

Note: Many programs did not have ex-ante gross peak demand savings.
‡ - No ex-post gross or net demand savings were calculated or claimed for this program.
§ - Double counted savings for Small Business Energy Savings and BILD were not calculated during the PY6 evaluation due to the timing of the issue being raised. An adjustment for this will begin to be incorporated in the PY7 analysis.

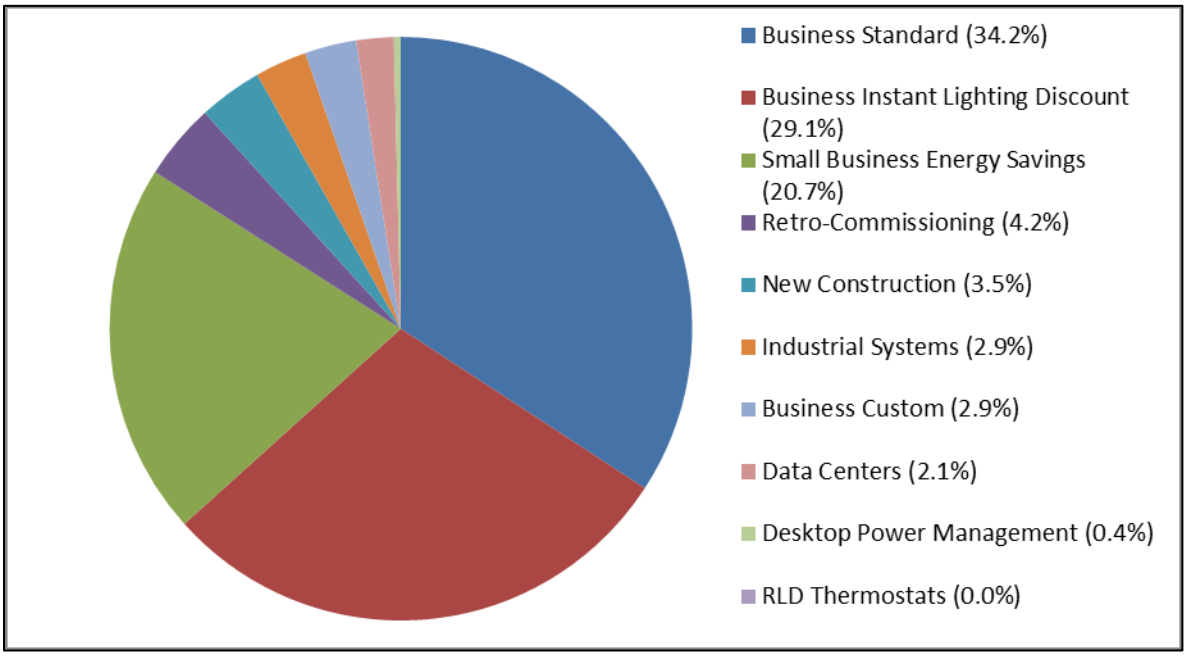
There was little difference between verified and research-based program-level savings as a percent of the total. The Residential Lighting program accounted for a slightly higher 54.2% of residential sector savings (as compared to evaluation verified findings at 51.6%) (Figure 4-1). Home Energy Report is still the second largest program by savings. Figure 4-2 shows that the Business Standard Program comprised a slightly greater percentage of the overall Business sector ex-post net energy savings when using research findings (34.2%) versus when using the deemed values (32.4%). The savings from the second largest C&I program, the Business Instant Lighting Discount program, were relatively similar (29.1% versus 29.3%).

Figure 4-1. Residential Ex-Post Net Energy Savings – Evaluation Research Findings



Source: Evaluation research

Figure 4-2. Business Programs Ex-Post Net Energy Savings – Evaluation Research Findings



Source: Evaluation research

Note, the Energy Stewards program had no verified savings in PY6

Appendix A. ComEd PY6 Evaluation Reports and TRC Assumptions Report

The program-specific reports and the TRC Assumptions Report will be attached as separate appendices.

1. Review of EPY6 Total Resource Cost Test Assumptions

2. Residential ENERGY STAR Lighting
3. Residential Fridge and Freezer Recycle Rewards
4. Multi-Family Home Energy Savings (Multi-Family or MFHES)
5. Complete Systems Replacement (CSR)
6. Home Energy Savings (HES)
7. Residential New Construction
8. Home Energy Report (HER)
9. Home Energy Jumpstart
10. Elementary Energy Education
11. One Change CFL Residential
12. Sustainable Schools
13. CUB Energy Saver Program
14. Energy Stewards
15. Business Standard
16. Business Custom
17. Data Centers
18. Business Retro-Commissioning
19. Business New Construction Service
20. Industrial Systems Study Program
21. Business Instant Lighting Discounts Program (BILD)
22. Small Business Energy Services (SBES)
23. Commercial and Retail Internet Protocol Thermostat and Controller Program
24. Desktop Power Management

Appendix B. Embedded Excel Files

The embedded Excel file here underpins the data presented in Table E-3.

ComEd_PY6_Savings_Tables - 2016-5-19.xls