Docket No. 14-0567
ICC Staff Exhibit 1.0

DIRECT TESTIMONY

of

SCOTT TOLSDORF

Accountant

Accounting Department
Financial Analysis Division
Illinois Commerce Commission

Reconciliation of revenues collected under Rider EDA with the actual costs associated with energy efficiency and demand response programs.

Commonwealth Edison Company

Docket No. 14-0567

July 9, 2015

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Witness Identification

Q. Please state your name and business address.

A. My name is Scott Tolsdorf. My business address is 527 East Capitol Avenue, Springfield, Illinois 62701.

Q. What is your current position with the Illinois Commerce Commission ("ICC" or "Commission")?

A. I am currently employed as an Accountant in the Accounting Department of the Financial Analysis Division.

Q. Please describe your qualifications and background.

A. I received a Bachelors of Science in Liberal Studies from Excelsior College in Albany, New York, and am nearing completion of a Master's degree in Accounting from the University of Illinois-Springfield. I am a Certified Public Accountant and joined the Staff of the Commission ("Staff") in February 2010. Prior to the Commission, I was employed for four years as a staff accountant for a public accounting firm, and nine years in the U.S. Navy as an operator and instructor in the Naval Nuclear Power Program.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to report the results of my review of Commonwealth Edison Company's ("ComEd" or the "Company") reconciliation of revenues collected under Rider EDA (Energy Efficiency and Demand Response Adjustment) with the actual costs associated with

energy efficiency and demand-response programs for the Program Year 6 ("PY6") reconciliation period June 1, 2013 through May 31, 2014 as presented by Company witness Mr. Michael Brandt, in ComEd Exhibit 2.0 CORR., and the underlying documents which support the calculations.

Schedule and Attachment Identification

Q. Are you sponsoring any schedules with your testimony?

A. Yes. I prepared the following schedules, which shows data as of, or for, the PY 6 reconciliation period:

Schedule 1.01	Rider EDA – Reconciliation
Schedule 1.02	Unverified Costs
Schedule 1.03	One Change PY7 Start Up Costs
Schedule 1.04	Great Energy Stewards

Q. Are you sponsoring any attachments with your testimony?

A. Yes. I am sponsoring the following attachments with my testimony:

Attachment A	One Change CFL Distribution Program PY6 Evaluation Report
Attachment B	Great Energy Stewards Program PY6 Evaluation Report

Q. Please explain Staff Exhibit 1.0, Schedule 1.01.

A. Schedule 1.01 presents the reconciliation statements proposed by the Company in its corrected testimony, Staff's adjustments, and Staff's resulting reconciliation displayed in a format consistent with past

Commission reconciliation orders. Page 1 represents a summary of Rider EDA, while pages 2 through 6 are the reconciliation statements for the applicable delivery classes EDA-R (Residential), EDA-NSN (Non-Residential-Small Load Noncompetitive), EDA-NSC (Non-Residential-Small Load Competitive), EDA-NLN (Non-Residential-Large Load Noncompetitive) and EDA-NLC (Non-Residential-Large Load Competitive). The reconciliation as presented in Schedule 1.01 allows for a transparent and consistent approach for reporting the operation of Rider EDA on an on-going basis.

Unverified Costs

Q. Please explain Schedule 1.02, Unverified Costs.

A. Schedule 1.02 presents my adjustment to disallow 27.5% of the costs associated with the One Change CFL Distribution program that could not be verified by the third party evaluator, Navigant.

Q. What is the One Change CFL Distribution program?

A. The One Change program is a third party energy efficiency program that distributed CFL light bulb packs free of charge to customers least likely to respond to typical lighting offers in the ComEd service territory. The One Change field representatives claimed to have delivered 158,898 lightbulbs to 26,730 ComEd customers.[1]

[1] Attachment A, Page 5.

Q. How were these distributed lightbulbs supposed to be tracked and accounted for?

A. One Change was to use an iPad device to record the latitude and longitude of every home that was to receive these lightbulbs.

Q. Was the third party evaluator, Navigant, able to confirm the delivery of bulbs to all 26,730 customers claimed by One Change?

A. No. Navigant found that 27.5% of the homes supposedly receiving the bulbs had no associated tracking data and therefore could not be verified. Navigant also performed a telephone survey focused on the entire participant population to verify whether customers received the CFLs. The survey results indicated that 102 out of 124 respondents noted that they had not received the bulbs. The Navigant report states that because of the lack of tracking data and the low recall in the telephone interviews, only 72.5% of the homes can be verified to have received the CFLs.[2]

Q. What is your recommendation?

A. I recommend that the 27.5% of costs associated with the One Change CFL Distribution program that could not be verified should be disallowed for recovery. ComEd's customers should not be held responsible for costs that cannot be verified. Unverified costs cannot be considered to be reasonable and prudent, and therefore should be disallowed.

[2] Attachment A, Page 1.

One Change PY7 Start Up Costs

Q. Please explain Schedule 1.03, One Change PY7 Start-Up Costs.

A. Schedule 1.03 presents my adjustment to disallow the start up costs of the One Change Small Commercial Power Strips program scheduled to occur during PY7. The disallowance is based on the fact that the contracted vendor, One Change, became financially insolvent within a few months of the beginning of PY7 and failed to meet the obligations of the contract.

Q. What is the One Change Small Commercial Power Strips program?

A. The One Change Small Commercial Power Strip program is a third party energy efficiency program designed to target 25,000 small commercial customers and provide each with two energy efficient power strips.

Q. What is the status of the One Change Small Commercial Power Strips program?

A. The One Change Small Commercial Power Strips program was not completed due to the financial insolvency of the third party vendor, One Change.

Q. What were the verification procedures ComEd employed to ensure the funds paid to One Change were spent on the products/services specified in the contract?

A. According to the Company's revised response to Staff Data Request ("DR") JHM-2.03(d), "The pay-for-performance structure of the contract provided a transparent means for ensuring that ComEd receives the performance for

which it contracted. Because the third party vendor became financially insolvent within a few months of the start of Plan Year 7, however, it was unable to satisfy its obligations under the contract." (ComEd Rev. Resp. to Staff DR JHM-2.03(d).)

Q. Does the Company agree that the PY7 start-up costs should be removed from the PY6 reconciliation?

A. No. In response to Staff DR ST 4.04, the Company stated, in part, "ComEd does not believe it is appropriate to remove the One Change PY7 start-up costs incurred during PY6 from the PY6 reconciliation because the start-up costs were paid in good faith pursuant to a contract that complies with and implements a Commission-approved energy efficiency program." (ComEd Resp. to Staff DR ST-4.04.) The Company further states, "At the time that the PY7 start-up costs were paid, ComEd had no knowledge of the vendor's financial distress." Id.

Q. Did ComEd's customers have any involvement in the selection of this third party vendor or any oversight authority related to this vendor?

A. No. As stated by ComEd, "ComEd is tasked with coordinating the IPA Third Party Efficiency Program request-for-proposals ("RFP") and overseeing the contracting for the programs as approved by the ICC." Id.

Q. ComEd's customers received no benefit from the One Change Power Strips program in PY6 or PY7. The contract is a "pay-for-performance"

contract. Is it reasonable to pass along the costs of a failed program to ComEd's customers?

A. No.

Q. What is your recommendation?

A. I recommend that the PY7 start-up costs associated with the One Change Power Strips program be disallowed for recovery.

Great Energy Stewards

Q. Please explain Schedule 1.04, Great Energy Stewards.

A. Schedule 1.04 presents my adjustment to remove the costs associated with the Great Energy Stewards program from the PY6 reconciliation due to no verified energy savings in PY6.

Q. What is the Great Energy Stewards program?

A. The Great Energy Stewards ("GES") program is a third-party behavioral energy efficiency program 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.

Q. Is the GES program a pay-for-performance contract?

A. Yes. In the Company's DR response JHM 1.02_Attach 040A (PUBLIC), the Scope/ Statement of Work for the GES program states, "This is a pay-for-performance program with net kWh savings being determined by the 3rd

Party Evaluator according to the protocol defined in the EM&V Plan." (ComEd Resp. JHM-1.02_Attach 040A (PUBLIC), 13.)

Q. What were the net kWh savings for the program as determined by the third party evaluator?

A. According to the third party evaluator, Navigant, the final verified net savings was zero.[3]

Q. Does ComEd agree that the payments it made to the third party vendor Shelton Solutions for the Great Energy Stewards program should be remitted to ComEd?

A. Yes. In it's response to Staff DR ST-4.01, the Company states, in part, "ComEd agrees that Shelton Solutions must remit to ComEd the entire $60,000 invoiced as a start-up payment for the Plan Year 6 ("PY6") Great Energy Stewards IPA Third Party Efficiency Program." (ComEd Resp. ST-4.01.)

Q. What is your recommendation?

A. I recommend the $60,000 paid to Shelton Solutions for the Great Energy Stewards program be disallowed for recovery.

DCEO Cost Recovery

Q. Did ComEd recover any costs on behalf of DCEO during the reconciliation period ended May 31, 2014?

[3] Attachment B, Pages 2-3.

A. Yes. As explained by Mr. Brandt (ComEd Ex. 2.0 CORR., 21-22), ComEd collected, through Rider EDA charges, all DCEO energy efficiency costs related to PY6 of ComEd's Energy Efficiency and Demand Response Plan ("Plan"). Accordingly, ComEd reimbursed DCEO for incremental costs incurred by DCEO in connection with DCEO's implementation of the Plan measures. For the PY6 reconciliation period ended May 31, 2014, ComEd reimbursed DCEO $31,563,417. That amount is included in the Summary of Incremental Costs Incurred for PY 6 shown in the Corrected Annual Report. (ComEd Ex. 1.0 CORR., 4.)

Original Cost Determination

Q. Why is it necessary for the Commission to make an original cost determination?

A. Requirements for preservation of records are associated with an original cost determination. Appendix A to 83 Ill. Adm. Code Part 510, and Appendix A to 83 Ill. Adm. Code Part 420, each of which are entitled "Schedule of Records and Periods of Retention**"** contain requirements for the preservation of specific records. For example, journal vouchers and journal entries which support plant accounts are to be maintained "7 years prior to date as of which original cost of plant has been unconditionally determined or approved by this Commission in" an original cost determination proceeding or a rate case.

Q. Why is it necessary for the Commission to make an original cost determination in this proceeding?

A. In ComEd's most recently completed formula rate case, Docket No. 14-0312, the Commission made an original cost determination which excluded the original cost of certain capital costs recovered through Rider EDA. The Commission determined that a separate original cost determination would be made for those excluded items. This reconciliation docket is the appropriate place for such a finding.

Q. What is your recommendation regarding an Original Cost Determination in this proceeding?

A. I recommend the Commission approve $3,269,423 as the original cost of the AC Cycling units recovered through Rider EDA as of May 31, 2014. The last capital outlay for these AC Cycling units was in June 2011 and thus the original cost has not changed since. The $3,269,423 was the amount excluded from ComEd's most recently completed formula rate case, Docket No. 14-0312, and is consistent with the amount proposed by ComEd for exclusion in its current formula rate case, Docket No. 15-0287. I further recommend that the Commission adopt the following language in the Findings and Ordering paragraphs of its Order in this proceeding:

> (#) The Commission, based on Staff's proposed original cost of AC Cycling units in service as of May 31, 2014, approves $3,269,423 as the original cost of AC Cycling units whose costs are recovered through Rider EDA as of May 31, 2014.

Recommendations

Q. Please summarize your recommendations.

A. I recommend that the Commission approve the following:

1) The Rider EDA reconciliation for PY6 as presented on ICC Staff Exhibit 1.0, Schedule 1.01;

2) Page 1 of Schedule 1.01 be attached to the order resulting from this proceeding;

3) The disallowance of the unverified costs associated with the One Change CFL Distribution program;

4) The disallowance of the PY7 start up costs associated with One Change Small Commercial Power Strip program;

5) The disallowance of the costs associated with the Great Energy Stewards program for PY6; and

6) The original cost determination of $3,269,423 for the AC Cycling units recovered through Rider EDA as of May 31, 2014.

Q. Does this end your prepared direct testimony?

A. Yes.

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA - Summary Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (3,557,105)	$ -	$ (3,557,105)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(19,923,829)	-	(19,923,829)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (23,480,934)	$ -	$ (23,480,934)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 185,128,615	$ (447,500)	$ 184,681,115
5	PY-6 EDA Revenue	170,795,723	-	170,795,723
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ 14,332,892	$ (447,500)	$ 13,885,392
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ (9,148,042)	$ (447,500)	$ (9,595,542)
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (3,557,105)	$ (447,500)	$ (4,004,605)
9	Total ARF to be (Refunded)/Recovered	$ (5,590,937)	-	(5,590,937)
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ (9,148,042)	$ (447,500)	$ (9,595,542)

Sources:
Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6
Column (C): Staff Ex. 1.0, Schedule 1.02 ($137,500), Schedule 1.03 ($250,000), and Schedule 1.04 ($60,000)
Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA-R - Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (1,325,316)	$ -	$ (1,325,316)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(3,040,951)	-	(3,040,951)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (4,366,267)	$ -	$ (4,366,267)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 54,356,573	$ (447,500)	$ 53,909,073
5	PY-6 EDA Revenue	50,251,779	-	50,251,779
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ 4,104,794	$ (447,500)	$ 3,657,294
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ (261,473)	$ (447,500)	$ (708,973)
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (1,325,316)	$ (447,500)	$ (1,772,816)
9	Total ARF to be (Refunded)/Recovered	1,063,843	-	1,063,843
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ (261,473)	$ (447,500)	$ (708,973)

Sources:
Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6
Column (C): Staff Ex. 1.0, Schedule 1.02 ($137,500), Schedule 1.03 ($250,000), and Schedule 1.04 ($60,000)
Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA-NSN - Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (503,641)	$ -	$ (503,641)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(16,846)	-	(16,846)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (520,487)	$ -	$ (520,487)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 53,879,611	$ -	$ 53,879,611
5	PY-6 EDA Revenue	34,001,399	-	34,001,399
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ 19,878,212	$ -	$ 19,878,212
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ 19,357,725	$ -	$ 19,357,725
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (503,641)	$ -	$ (503,641)
9	Total ARF to be (Refunded)/Recovered	19,861,366	-	19,861,366
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ 19,357,725	$ -	$ 19,357,725

Sources:

Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6

Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA-NSC - Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (764,975)	$ -	$ (764,975)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(25,587)	-	(25,587)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (790,562)	$ -	$ (790,562)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 32,830,846	$ -	$ 32,830,846
5	PY-6 EDA Revenue	51,644,442	-	51,644,442
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ (18,813,596)	$ -	$ (18,813,596)
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ (19,604,158)	$ -	$ (19,604,158)
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (764,975)	$ -	$ (764,975)
9	Total ARF to be (Refunded)/Recovered	(18,839,183)	-	(18,839,183)
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ (19,604,158)	$ -	$ (19,604,158)

Sources:

Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6

Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA-NLN - Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (6,742)	$ -	$ (6,742)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(117,883)	-	(117,883)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (124,625)	$ -	$ (124,625)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 308,431	$ -	$ 308,431
5	PY-6 EDA Revenue	244,287	-	244,287
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ 64,144	$ -	$ 64,144
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ (60,481)	$ -	$ (60,481)
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (6,742)	$ -	$ (6,742)
9	Total ARF to be (Refunded)/Recovered	(53,739)	-	(53,739)
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ (60,481)	$ -	$ (60,481)

Sources:

Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6

Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison
Rider EDA - Reconciliation
Rider EDA-NLC - Reconciliation
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Per Company	Staff Adjustments	Per Staff (B+C)
	(A)	(B)	(C)	(D)
	(Over)/Under Recovery from Prior Years			
1	Total Ordered Reconciliation Factor (ORF) [PY 1-5; Docket No. 13-0529]	$ (956,431)	$ -	$ (956,431)
2	Total Automatic Reconciliation Factor (ARF) [PY 1-5; Docket No. 13-0529]	(16,722,562)	-	(16,722,562)
3	(Over)/Under Recovery from Prior Periods (Line 1 + Line 2)	$ (17,678,993)	$ -	$ (17,678,993)
	Current Year (Over)/Under Recovery			
4	PY-6 Recoverable EDA Costs	$ 43,753,154	$ -	$ 43,753,154
5	PY-6 EDA Revenue	34,653,816	-	34,653,816
6	(Over) /Under Recovery for PY-6 (Line 4 - Line 5)	$ 9,099,338	$ -	$ 9,099,338
7	Cumulative (Over)/Under Recovery (Line 3 + Line 6)	$ (8,579,655)	$ -	$ (8,579,655)
	Disposition of Cumulative (Over)/Under Recovery			
8	Total ORF to be (Refunded)/Recovered	$ (956,431)	$ -	$ (956,431)
9	Total ARF to be (Refunded)/Recovered	(7,623,224)	-	(7,623,224)
10	Cumulative (Over)/Under Recovery (Lines 8 + Line 9)	$ (8,579,655)	$ -	$ (8,579,655)

Sources:

Column (B): ComEd Exhibit 1.0 CORR., Page 1 of 6

Column (D): Per Staff [Column (B) + Column (C)]

Commonwealth Edison

Rider EDA - Unverified Costs

For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Amount	Sources
	(A)	(B)	(C)
1	One Change (Project Porchlight) per Staff	$ 362,500	Sch. 1.02, P. 2, Line 9
2	One Change (Project Porchlight) per Company	500,000	Sch. 1.02, P. 2, Line 7
3	Staff Adjustment	$ (137,500)	Line 1 - Line 2

Commonwealth Edison
Rider EDA - Unverified Costs
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Amount	Sources
	(A)	(B)	(C)
	Payments to Project Porchlight		
1	One Change (Project Porchlight)	$ 205,500	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 13.
2	One Change (Project Porchlight)	104,886	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 14.
3	One Change (Project Porchlight)	60,315	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 15.
4	One Change (Project Porchlight)	54,215	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 16.
5	One Change (Project Porchlight)	54,214	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 17.
6	One Change (Project Porchlight)	20,870	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 18.
7	Total	$ 500,000	Sum of Lines 4 - 9
8	Percentage of Homes Verified to Have Received CFL Lightbulbs	72.50%	One Change CFL Distribution Program PY6 Evaluation Report, Page 1.
9	Allowable Costs per Staff	$ 362,500	Line 10 * Line 11

Docket No. 14-0567
ICC Exhibit 1.0
Schedule 1.03

Commonwealth Edison
Rider EDA - One Change PY7 Start Up Costs
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Amount	Sources
	(A)	(B)	(C)
1	One Change (Project Porchlight) per Staff	$ -	
2	One Change (Project Porchlight) per Company	250,000	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 16, Document # 3.
3	Staff Adjustment	$ (250,000)	Line 1 - Line 2

Docket No. 14-0567
ICC Exhibit 1.0
Schedule 1.04

Commonwealth Edison
Rider EDA - Great Energy Stewards
For the Period June 1, 2013 through May 31, 2014 (PY-6)

Line No.	Description	Amount	Sources
	(A)	(B)	(C)
1	Great Energy Stewards (Shelton Solutions) per Staff	$ -	
2	Great Energy Stewards (Shelton Solutions) per Company	60,000	ComEd DR Response ST 1.02-Attach, Vendor Tab, Sort 1: 14, Document # 19.
3	Staff Adjustment	$ (60,000)	Line 1 - Line 2

Docket No. 14-0567
ICC Staff Ex. 1.0
Attachment A

One Change CFL Distribution Program PY6 Evaluation Report

Final

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

Presented to Commonwealth Edison Company

December 29, 2014

Prepared by:

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Opinion Dynamics

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NAVIGANT

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Tables

NAVIGANT

E. Executive Summary

This report presents a summary of Navigant's findings and results from the Impact and Process Evaluation of Program Year 6 (PY6)[1] One Change CFL Distribution program (One Change). The 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 Commonwealth Edison (ComEd) service territory. This program was a response to the ComEd Third-Party Efficiency Program RFP and was implemented by One Change with support from Sageview Associates. One Change will not continue operating as a ComEd program in PY7.

E.1. Program Savings

Table E-1 summarizes the program results.

Table E-1. PY6 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

E.3. Program Volumetric Detail

The implementer tracked its savings in a tracking system referred to as iChange (referred to here as "iChange" or "Tracking System"). In an attempt to monitor the distribution of CFLs, One Change designed iChange to record the latitude and longitude of a participant's home when the field staff delivered CFLs – this entry was executed via an iPad device with the iChange application. In the course of the evaluation team's review of the tracking system data, we noted that many of the latitude and longitude entries were missing. Of the 26,730 entries in the Tracking System, 7,339 (or 27.5%) did not include the latitude and longitude data. In conducting the telephone interviews, Navigant found that the majority of respondents did not remember receiving the CFL light bulbs (e.g., 102 out of 124 respondents noted they had not received the bulbs). Based upon the low recall in the telephone interview and the lack of tracking data, only 72.5% of the homes can be verified to have received the CFLs. The evaluation team

[1] The PY6 program year began June 1, 2013 and ended May 31, 2014.

determined that the program distributed 115,329 (158,904 bulbs claimed) bulbs to 19,391 households (out of a total of 26,730 households claimed) as shown in the following table (Table E-3).

Table E-2. PY6 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.

E.4. Results Summary

The following table (Table E-3) summarizes the key metrics from PY6.

Table E-3. PY6 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.

E.5. Findings and Recommendations

The following provides insight into key program findings and recommendations.[2] Overall, the program achieved net savings of 2,335,716, falling short of the program net goal of 3,874,902 kWh. Participants we spoke to via the telephone survey were satisfied with the CFL bulbs.

[2] Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the evaluation report for ease of reference between each section.

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%. This is due to (1) the ex-ante savings were calculated at the generator since the implementer used savings values based upon ComEd at the generator savings (savings at the generator are slightly higher, as compared to at the meter savings, since line losses have to be subtracted from the meter savings), and (2) the Tracking System and phone survey did not provide 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 (or 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 when distributing the bulbs, (3) the field staff noted, for a number of homes, it was too cold to enter the geo-tracking information at each individual address (light bulbs were distributed during November 2013 – January 2014), or (4) non-delivery. The iChange tracking system failed in the field during delivery of the bulbs and much of the data was entered without any official geo-tracking stamp that could be verified by evaluation. Thus, the evaluation team could only verify 115,329 bulbs of the 158,904 claimed by the implementer.

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., parallel (simple) spreadsheet or paper form). Navigant also recommends distributing the CFLs during more clement weather, which may lead to improved data as well as additional customer engagement.

Program Delivery

Finding 4. Of the 124 customers contacted for the participant survey, 82% did not remember receiving the light bulb pack. This could be due to (1) we did not speak with the person who received the bulbs, or (2) some bulbs were left at the door rather than being handed to a resident. Those bulbs left at the door may not have made the same impression on the customer, or (3) amount of time that had lapsed from receiving bulbs to the follow-up survey (approximately 10 months).

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 was the central goal of the One Change program.

Recommendation 4. ComEd should implement quality control on 5% of the participants soon after delivery (e.g., 1 month) to verify receipt of the CFLs or any other energy product delivered via a third party.

1. Introduction

1.1 Program Description

The One Change CFL Distribution Program is a third-party, community-based, CFL distribution program. The program delivers CFLs free of charge to those residential customers who were determined to be the least likely to respond to typical retail lighting offers. The program used a systems-based approach and focused targeting methodology to identify traditionally unresponsive neighborhoods. The customers were targeted based on previous energy efficiency program participation, age, and socioeconomic status. Between November 2013 and January 2014, 11 locally-hired One Change field representatives delivered 158,898 lights bulbs to 26,730 ComEd customers. The One Change field representatives targeted specific neighborhoods which were of particular focus based upon prior limited involvement in ComEd energy efficiency programs. The bulbs were delivered in-person to those customers who answered the door. Those homes where no resident answered the door, CFLs were left at the residence's door step. Field representatives used an iPad with an application (iChange) that provided delivery lists, recorded the delivery address, and recorded answers to three questions (for those customers who were available in person) to assist in evaluation research. This mobile application was the One Change tracking system (iChange). There was ComEd marketing collateral included in the packet of CFL light bulbs.

1.2 Evaluation Objectives

The Evaluation Team identified the following key researchable questions for EPY6:

1.2.1 Impact Questions

1. What are the verified gross annual energy and demand savings induced by the program?
2. What are the verified net impacts from the program?
3. Did the program meet its energy and demand savings goals?

1.2.2 Process Questions

The evaluation team conducted a limited process evaluation for this program that mostly involved utility and implementer interviews, as well as several process questions asked as part of participant telephone surveys. Also, during the evaluation certain process-related issues became apparent and will be outlined below.

2. Evaluation Approach

The evaluation reflects the first program year of the One Change CFL Program (One Change) in the ComEd service territory. One Change will not continue operating as a ComEd program in PY7. For this impact evaluation the gross savings were evaluated by (1) reviewing the implementer submitted measure assumptions to assure that CFL savings are calculated in accordance with the Illinois TRM v2.0 (TRM) and (2) verifying light bulbs delivered based on review of the program Tracking System (iChange) and participant interviews. Navigant calculated net savings using the evaluator determined NTGR value of 0.60 based on a free-ridership rate of 40%. Navigant researched the NTGR value and that research is set forth in the appendix to this report. The evaluation team conducted a limited process review which included interviews with Program Implementer and ComEd staff. The evaluation also implemented a participant telephone survey to verify receipt and installation of the bulbs, which also asked several process questions.

2.1 Overview of Data Collection Activities

The core data collection activities included review of the program Tracking System, interviews with program staff, and a participant telephone survey. The full set of data collection activities and resources used in the course of the evaluation are outlined in Table 2-1 and Table 2-2.

The participant survey asked respondents to identify whether they remembered receiving the bulbs and if "yes", how many bulbs did they install. Of the 22 participants who answered that they received the CFLs, 11 confirmed that they installed the bulbs and 10 reported being satisfied with the CFL light bulbs Since only 22 respondents recalled getting the CFLs, we cannot make definitive statements on other questions from the participant survey. Navigant initially focused on the entire participant population (19,391 participants) and by the second evening of survey calls refined the telephone survey on the 2,398 participants that answered the four questions at the doorstep by field representatives.

Table 2-1. Primary Data Collection Activities

What	Who	Target Completes	Completes Achieved	When
Program Tracking Database review	Participants	Census	Census	October - November 2014
In Depth Interviews	Program Manager/	1	1	November 2014
In Depth Interviews	Implementer Staff	1	1	November 2014
Telephone Survey	Participants	68	124	Fall 2014

Table 2-2. Additional Resources

Reference Source	Author	Application	Gross Impacts	Process
Illinois Technical Reference Manual Version 2.0, dated June 7, 2013	Illinois Energy Efficiency Stakeholder Advisory Group (SAG)	CFL Measure Impact Analysis	X	
Program Summary Report for EMV – Third Party Residential Energy Efficiency Program 2013/14 for ComEd Prepared by One Change and Sageview	One Change and Sageview	Impact and Process Analysis	X	X

2.2 Verified Savings Parameters

Verified gross and net Savings (energy and coincident peak demand) resulting from the PY6 Program were calculated using the following algorithm as defined by the Illinois TRM version 2.0[3]

*Verified Gross Annual kWh Savings = Program Bulbs * ((WattsBase - WattsEE) / 1,000) * ISR * Hours * WHFe*

Where:

- WattsBase = Based on lumens of CFL bulb and program year installed:
- WattsEE = Actual wattage of CFL purchased / installed
- ISR = In Service Rate, the percentage of units rebated that are actually in service.
- Hours = Average hours of use per year
- WHFe = Waste heat factor for energy to account for cooling energy savings from efficient lighting

Verified Gross Annual kW Peak Coincident Demand Savings =
*Program Bulbs * ((WattsBase - WattsEE) / 1,000) * ISR * WHFd * CF*

With variables as described above and where:

- WHFd = Waste heat factor for demand to account for cooling energy savings from efficient lighting
- CF = Summer Peak Coincidence Factor for measure.

*Verified Gross Annual kW Savings = Program Bulbs * ((WattsBase - WattsEE) / 1,000) * ISR*

With variables as described above.

The following table presents the parameters that were used in the verified gross and net savings calculations and indicates which were examined through evaluation activities and which were deemed.

[3] Illinois TRM version 2.0 can be found at : http://www.icc.illinois.gov/docket/files.aspx?no=13-0437&docid=200492

Table 2-3. Verified Savings Parameter Data Sources

Gross Savings Input Parameters	Data Source	Value	Deemed or Evaluated?
WattsBase	Illinois TRM v2.0 - Section 5.5.1	60	Deemed
WattsEE	Implementer	14	Actual
ISR	Illinois TRM v2.0 - Section 5.5.1	0.695	Deemed
Hours	Illinois TRM v2.0 - Section 5.5.1	1000	Deemed
WHFe	Illinois TRM v2.0 - Section 5.5.1	1.06	Deemed
WHFd	Illinois TRM v2.0 - Section 5.5.1	1.11	Deemed
CF	Illinois TRM v2.0 - Section 5.5.1	0.095	Deemed
NTG	Implementer	0.6	Evaluated

2.2.1 Verified Gross Program Savings Analysis Approach

Navigant calculated verified gross program impacts for CFLs using the deemed savings values from the Illinois TRM v2.0 (TRM).

2.2.2 Verified Net Program Savings Analysis Approach

Verified net energy and demand (*coincident peak and overall*) savings were calculated by multiplying the Verified Gross Savings estimates by a net-to-gross ratio (NTGR). In PY6, the NTGR estimates were calculated using the following formula:

$$Free\ Ridership = \left(Past\ Behavior\ Score * \frac{2}{3}, No\ Program\ Score * \frac{1}{3}\right)$$
$$NTG = 1 + Spillover - Free\ Ridership$$

2.3 Process Evaluation

The process evaluation for EPY6 was based on the in-depth interviews as mentioned above.

2.3.1 Program Staff Interviews

In-depth interviews were conducted with the ComEd program managers as well as with the implementation staff in November of 2014. These interviews discussed the household targeting, the program processes, and success of implementation.

3. Gross Impact Evaluation

In PY6, the One Change program achieved verified gross electric savings of 3,908,292 kWh with a realization rate of 70%. The program achieved verified peak coincident demand savings of 389 kW.

3.1 Program Volumetric Findings

The evaluation team reviewed the Tracking System to verify number of bulbs distributed. The total bulbs were then multiplied by the CFL per unit savings, as deemed in the IL TRM v2.0, to determine the total verified gross savings. The evaluation team also conducted a telephone survey to verify delivery of the CFL light bulbs, the results of the survey are outlined in Table 3-1 and the overall disposition of the survey is outlined in Table 3-1. Results of Verification SurveyTable 3-2 .

Table 3-1. Results of Verification Survey

Survey	Participants
Participation to reach Survey Statistical Goal of 90/10	68
Total Survey Participants	124
Participants who confirmed receipt of the CFLs (1st Question)	22
Participants with no knowledge of receipt of the CFLs (1st Question)	102
Participants confirmed installation of the CFLs	11
Participants satisfied with the CFLs	10

Source: ComEd tracking data and Navigant team analysis.

Table 3-2. Survey Dispositions

Survey Disposition	Number of Records
Loaded but not dialed	37
No answer	342
Answering machine	245
Busy signal	9
Disconnected phone	121
Business phone	4
Computer tone	2
Not Available	14
Respondent scheduled callback	3
Non-specific callback	1
Complete	22
Language problems	14
Initial/soft refusal	80
Hard refusal - DO NOT CALL	17
Customer said wrong number	10
Did NOT receive free bulbs/CFLs	84
Mid-interview terminate	1
Total	*1000*

Source: Participant Survey

Key findings include:

1. The reported total number of entries in the Tracking System was the same as the One Change Annual Report provided to ComEd.
2. The evaluation team found that 115,329 bulbs had the associated longitude and latitude entries in the Tracking System database that allowed the evaluation team to verify delivery of the bulbs (see section 5.2 for additional information on the Tracking System review).

Table 3-3. PY6 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	26,730

Source: ComEd tracking data and Navigant team analysis.

3.2 Gross Program Impact Parameter Estimates

As described in Section 2, energy and demand savings are estimated using deemed per-bulb savings values as specified in the TRM:

The unit savings and other gross savings parameters are shown in Table 3-4 below.

Table 3-4. Verified Gross Savings Parameters

Gross Savings Input Parameters	Value	Deemed ‡ or Evaluated?
Quantity	115,329	Evaluated
Gross Savings per CFL(kWh)	33.9	Deemed
Gross Peak Demand Savings per CFL (kW)	0.003	Deemed
Gross Demand Savings per CFL (kW)	0.03	Evaluated
Verified Realization Rate on Ex-Ante Gross Savings (Lighting)	70%	Evaluated

‡ State of Illinois Technical Reference Manual version 2.0 from http://www.ilsag.info/technical-reference-manual.html.

3.3 Verified Gross Program Impact Results

The resulting total program verified gross savings is 3,908,292 kWh, gross peak demand savings of 389 kW, and total demand savings of 3,687 kW as shown in the following table (Table 3-5).

Table 3-5. PY6 Verified Gross Impact Savings Estimates by Measure Type

	Gross Energy Savings (kWh)	Gross Peak Demand Savings (kW)	Gross Demand Savings (kW)
Ex-Ante Gross Savings	5,546,070	NA	NA
Verified Gross Realization Rate	70%	NA	NA
Verified Gross Savings	3,908,292	389	3,687

Source: Evaluation Team analysis.

4. Net Impact Evaluation

The SAG consensus process determined that the NTG value should be calculated by the evaluation team and applied retrospectively to calculate verified net savings.[4] The evaluation team calculated a net to gross ratio based on collected survey questions outlined below. Additional information on how the net-to-gross ratio was calculated is available in the Appendix. Table 4-1 shows the NTG value and the PY6 verified net savings.

Table 4-1. PY6 Verified Net Impact Savings Estimates

	Energy Savings (kWh)	Coincident Peak Demand Savings (kW)	Demand Savings (kW)
Ex-Ante PY6 Gross Savings	5,546,070	NA	NA
Realization Rate	70%	NA	NA
Verified Gross Savings	3,908,292	389	3,687
Free Ridership	0.40	0.40	0.40
Spillover	0	0	0
NTG	0.60	0.60	0.60
Verified Net Savings	2,335,716	232	2,204

Source: Evaluation Team analysis.

One Change collected survey information from 2,398 customers during the light bulb distribution. The survey included the following questions around customer knowledge, CFL usage, and influence:

- Before I talked with you today, how familiar were you with CFLs? (0-10 scale)
  Average response: 6.72

- How many CFLs do you currently have installed in your home?
  Average response: 4.78[5]

- On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with the following statement "If I had not received the free CFLs from ComEd, I would have paid $3 per bulb, so $18 for the 6-pack of bulbs, to purchase the CFLs on my own."
  Average response: 5.64

[4] 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

[5] It is notable that nearly half of all respondents indicated that they had 4 or fewer bulbs which is far short of household saturation. Almost one-third reported 2 or fewer CFLs.

5. Process Evaluation

The section below includes information obtained from the in-depth program manager interviews as well as additional process findings related to the verification of results.

5.1 Program Verification

The evaluation team encountered difficulty in verifying the delivery of all the CFL light bulbs included in the Tracking System. Over one quarter (27.5%) of the records in the iChange Tracking System did not have latitude and longitude data entered – thus, there was no confirmation in iChange that the field staff had actually been to the participant's home. Also, One Change staff delivered all of the CFLs during the day and when residents did not answer the door, One Change representatives left the CFLs on the door step.

To support the installation verification, the evaluation team implemented a telephone survey with program participants. Of 124 participants surveyed, 102 did not recall getting the program bulbs.

5.2 Tracking System

One Change's Tracking System contains the following information:

- Customer ID: unique customer identifier as supplied by ComEd
- Customer Address
- Date Canvassed: date the bulbs were delivered
- Quantity: quantity of bulbs delivered (3 or 6)
- Response latitude and longitude: geo-tracking data which was entered at the door of participant by the field staff, using the GPS technology in the iPad
- Door latitude and longitude: the location of the applicable home based on mapping prior to the field staff arriving at the participant home
- Delta latitude and longitude: the difference between delivery location and door latitude and longitude (this verifies that the CFLs were delivered to the location)

The response latitude and longitude was to be used as verification that the bulbs were delivered to each participant. In the course of the evaluation team's review of the Tracking System data, we noted that many of the response latitude and longitude entries were missing. Of the 26,730 entries in the Tracking System, 7,339 (or 27.5%) did not include the response latitude and longitude. Thus, 72.5% of the homes can be verified to have received the CFLs. This could be due to (1) the application malfunctioning, (2) a lack of cellular reception when distributing the bulbs, (3) the field staff noted, for a number of homes, it was too cold to enter the geo-tracking information at each individual address (light bulbs were distributed during November 2013 – January 2014), or (4) non-delivery.

Navigant recommends in future years that ComEd ensure that this or similar tracking systems are functioning and recording all necessary fields for verification during the course of the program year. If a wireless tracking system is not working or reliable, there should be a back-up form of verification provided to the field staff (e.g., paper spreadsheet to record entries in duplicate as deliveries are

executed). Navigant also recommends distributing the CFLs during more clement weather, which may lead to improved data as well as additional customer engagement. Finally, we recommend not leaving CFLs at doorsteps when residents do not answer the door since there is some likelihood that the CFLs will be taken and used by another not associated with the intended delivery residence.

5.2.1 Program Delivery

During the in-depth implementer program manager interview, the implementer noted their field staff would leave the CFL bulb pack at the door for those residents who did not answer the door. The bulbs were distributed during the daytime and, thus, the majority of the CFL bulb packs were left at the door without verbal identification of ComEd or the One Change program. The majority (102 out of 124) of those participants contacted via the telephone survey did not recall receiving the light bulbs. This could be due to (1) we did not speak with the person who received the bulbs, (2) some bulbs were left at the door, rather than being handed to a resident (those bulbs left at the door may not have made the same impression on the customer, (3) amount of time that had lapsed from receiving bulbs to the follow-up survey (approximately 10 months), (4) or non-delivery of CFLs by the implementer may have led to participants' low recall receipt of the CFLs.

The implementing contractor should be required to implement quality control on 5% of the participants soon after delivery (e.g., 1 month) to verify receipt of the CFLs or any other energy product delivered via a third party. Also, Navigant recommends in future years that ComEd conduct follow-up verification over the course of the program year (quality control on the implementer's results); either through telephone survey or by ensuring all applicable data is being collected properly in the implementer's Tracking System so there is verification as the year progresses.

5.3 Participant Feedback

Navigant fielded a simple telephone survey (*attached in the Appendix*) with the participants and completed the screening part of the survey with 124 participants. The participant survey asked respondents to identify whether they remembered receiving the bulbs and if "yes", how many bulbs did they install. Of the 22 participants who answered that they received the CFLs, 11 confirmed that they installed the bulbs and 10 reported being satisfied with the CFL light bulbs. The participants who did not report being satisfied noted the CFLs "could be a little bit brighter." Since only 22 respondents recalled getting the CFLs, we cannot make definitive statements on other questions from the participant survey. Navigant initially focused on the entire participant population and by the second evening of survey calls refined the telephone survey on the 2,398 participants that answered the four questions at the doorstep by field representatives.

The field staff asked three evaluation-provided questions when they spoke with customers at the door. We found answers from 2,398 participants in the data.

- Before I talked with you today, how familiar were you with CFLs? (0-10 scale)
  Average response: 6.72

- How many CFLs do you currently have installed in your home?
  Average response: 4.78

- On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with the following statement "If I had not received the free CFLs from ComEd, I would have paid $3 per bulb, so $18 for the 6-pack of bulbs, to purchase the CFLs on my own."
  Average response: 5.64

Using the field questions as a barometer of participants from the field, it is clear that residents had knowledge of CFLs, had nearly five CFLs installed in each home and were somewhat willing to pay $3 per bulb regardless of the program. A recommendation for the future is to continue to focus such programs on those ComEd customers that have limited exposure to energy efficiency products. However placing these results in historical context we see that the average number of bulbs reported in the One Change PY6 population was roughly half that reported in the 2013 ComEd Residential Baseline Report(*ComEd Residential Saturation/End-Use Market Penetration and Behavioral Study*, April 2013). Given the effects of six years of ComEd programming and EISA this is a credible result for 2014.[6]

[6] See e.g. Summit Blue et al, Commonwealth Edison Company Energy Efficiency/Demand Response Plan Year 1 (6/1/2008-5/31/2009) Evaluation Report: Residential Energy Star® Lighting December 10, 2009. Table 56, page 65 references the 2008 General Population Survey describing average bulb saturation in program participants of 9.7 and nonparticipants of 8.7. Available at: http://ilsagfiles.org/SAG_files/Evaluation_Documents/ComEd/ComEd%20EPY1%20Evaluation%20Reports/ComEd_Res_Lighting_PY1_Evaluation_Report_Final.pdf. Note too that nearly one-third reported 2 or fewer bulbs before receiving the bulb.

6. Findings and Recommendations

The following provides insight into key program findings and recommendations.[7] Overall, the program achieved net savings of 2,735,850, falling short of the program net goal of 3,874,902 kWh. A portion of the participants we spoke to via the telephone survey were satisfied with the CFL bulbs.

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%. This is due to (1) the ex-ante savings were calculated at the generator since the implementer used savings values based upon ComEd at the generator savings (savings at the generator are slightly higher, as compared to at the meter savings, since line losses have to be subtracted from the meter savings), and (2) the Tracking System and telephone survey did not provide 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 (iChange), 7,339 (or 27.5%) entries did not have the latitude or longitude data (geo-tracking), which was part of the installation verification. The iChange tracking system failed in the field during delivery of the bulbs and much of the data was entered without any official geo-tracking stamp that could be verified by evaluation. Thus, the evaluation team could only verify 115,329 bulbs of the 158,904 claimed by the implementer.

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., parallel (simple) spreadsheet or paper form). Navigant also recommends distributing the CFLs during more clement weather, which may lead to improved data as well as additional customer engagement.

Program Delivery

Finding 4. Of the 124 customers contacted for the participant survey, 82% did not remember receiving the light bulb pack. This could be due to (1) we did not speak with the person who received the bulbs,(2) some bulbs were left at the door rather than being handed to a resident, (those bulbs left at the door may not have made the same impression on the customer), (3) amount of time that had lapsed from receiving bulbs to the follow-up survey (approximately 10 months), or (4) non-delivery of CFLs by the implementer may have led to participants' low recall receipt of the CFLs.

[7] Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the evaluation report for ease of reference between each section.

Recommendation 2. Navigant recommends that for similar programs, ComEd conduct follow-up verification during each month of such a program 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 was the central goal of the One Change program.

Recommendation 4. The implementing contractor should be required to implement quality control on 5% of the participants soon after delivery (e.g., 1 month) to verify receipt of the CFLs or any other energy product delivered via a third party..

7. Appendix

7.1 Net to Gross Findings

Free Ridership was calculated using the survey responses collected by the One Change field representatives. The past behavior free ridership ratio is calculated using the number of CFLs participants currently have installed over a Bass Diffusion curve, with zero CFLs corresponding to a free ridership of 0%, an inflection point of 7 CFLs corresponding to free ridership of 50% and 9+ CFLs corresponding to a free ridership of 70%. This resulted in a total free ridership score of 32% (see Table 7-1).

Table 7-1. Past Behavior Free Ridership Score

Number of Bulbs Installed	Number of Participants	FR Percentage
0	354	0%
1-2	241	3%
2-4	360	15%
4-6	412	35%
6-8	192	55%
9+	506	70%

Source: Participant survey

In addition to number of CFLs already installed, to calculate free ridership the evaluation team also used a "no program" metric where the participants reported whether they would have purchased the CFLs had the program not been available. This resulted in a total free ridership score of 56% (see Table 7-2).

Table 7-2. No Program Free Ridership Score

No Program Score	Number of Participants	FR Percentage
0	242	0%
1	91	10%
2	140	20%
3	107	30%
4	104	40%
5	185	50%
6	61	60%
7	101	70%
8	156	80%
9	131	90%
10	436	100%
Don't know	272	50%

Source: Participant survey

The no program score was weighted at half of the past behavior score because past behavior is likely a better indicator of future behavior when compared to the no program score. ***This resulted in a total FR of 40%.***

The evaluation team did not find credible primary or secondary research for a spillover estimate, though given the program model and logic, spillover is likely very small or zero. Thus, the overall NTG for this program is 60%.

7.2 Participant Survey

ONE CHANGE RESIDENTIAL CFL PROGRAM – PARTICIPANT SURVEY

September 2014

Introduction
Hello, this is _____ from Opinion Dynamics calling on behalf of One Change CFL program. This is not a sales call. May I please speak with <PROGRAM CONTACT>?
Our records show that your home received <QTY> free light bulbs from the One Change energy efficiency light bulb program about 11 months ago <DATE> – the CFLs were hand-delivered to your home [confirm that they received]. This is a follow-up call to support evaluation efforts for this program. This survey should take about 2-5 minutes, is now a good time? [If no, schedule call back]

Q1. Did you receive CFL light bulbs delivered to your door sometime toward the end of last year (2013)?
1. Yes
2. No (THANK AND TERMINATE)
8. Don't know (THANK AND TERMINATE)
9. Refused (THANK AND TERMINATE)

Q2. Have you installed *any* of the <QTY> light bulbs?
1. Yes
2. No
8. Don't know
9. Refused

[ASK IF Q2=1]
Q2a. How many did you install?
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
8. Don't know
9. Refused

[ASK IF Q2A=1-6]
Q2b. [IF Q2A2-6: Are they ALL] [IF Q2A=1: Is it] still installed?
1. Yes
2. No
8. Don't know
9. Refused

[ASK IF Q2B=2]
Q2bb. Why did you remove these CFLs?
Open end
98. Don't know
99. Refused

[ASK IF Q2A=2-6 AND Q2B=2]
Q2c. How many of the CFLs are still currently installed?
0. None
1. 1
2. 2

3. 3
4. 4
5. 5
6. 6
8. Don't know
9. Refused

[CALCULATE QTY_ORIGINALLY_INSTALLED FROM Q2a]
[CALCULATE QTY_CURRENTLY_INSTALLED FROM Q2A AND Q2B=Yes OR Q2C IF Q2B=No]

[ASK IF QTY_ORIGINALLY_INSTALLED>0, ELSE TO Q5]
Thinking about the <QTY_ORIGINALLY_INSTALLED> CFLs you installed.
Q3a. What type of light bulb did the first CFL replace?
01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF QTY_ORIGINALLY_INSTALLED >1]
Q3a. What type of light bulb did the second CFL replace?
01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF QTY_ORIGINALLY_INSTALLED >2]
Q3a. What type of light bulb did the third CFL replace?
01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF QTY_ORIGINALLY_INSTALLED >3]
Q3a. What type of light bulb did the fourth CFL replace?
01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF QTY_ORIGINALLY_INSTALLED >4]
Q3a. What type of light bulb did the fifth CFL replace?

01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF QTY_ORIGINALLY_INSTALLED >5]
Q3a. What type of light bulb did the sixth CFL replace?
01. Incandescent
02. Halogen
03. CFL
04. No light bulb (burned out)
00. Other, please specify
98. Don't know
99. Refused

[ASK IF Q2A=1-6]
Q4. Were you satisfied with the quality of the CFL bulbs you installed?
1. Yes
2. No
8. Don't know
9. Refused

[ASK IF Q4=2]
Q4b. Why were you not satisfied with the quality of the CFL bulbs you installed?
Open end
98. Don't know
99. Refused

[ASK IF QTY> QTY_ORIGINALLY_INSTALLED]
Q5. Do you plan to install the light bulbs which you have not yet installed?
1. Yes
2. No
8. Don't know
9. Refused

Those are all the questions I have. Thank you very much for your time and help, have a good day!

Docket No. 14-0567
ICC Staff Ex. 1.0
Attachment B

Great Energy Stewards Program
PY6 Evaluation Report

Final

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

Presented to
Commonwealth Edison Company

April 1, 2015

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E. Executive Summary

This report presents a summary of the findings and results from the impact and limited process evaluation of the Great Energy Stewards program in Program Year 6 (PY6) [1]. The Great Energy Stewards (GES) program is a third-party behavioral energy efficiency (EE) program implemented by Shelton Solutions, Inc. (Shelton). GES is designed to generate energy savings by providing Commonwealth Edison (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.[2]

The program's design called for Shelton to recruit participants primarily at Chicago-area churches through announcements and presentations at church services and events, articles in church bulletins, and similar efforts, and have interested customers sign up on the program's website, in person, or via mail or fax. Shelton experienced difficulties implementing this plan, however, and instead recruited the majority of the program's PY6 participants at events sponsored by a local community action agency, CEDA[3], for customers seeking assistance paying their utility bills through LIHEAP.[4] This led to a number of unanticipated changes to the program's design that adversely affected its performance. Notably, the program ended up targeting mainly low-income customers, whose energy usage tends to be lower than average and who, therefore, generally have less capacity for usage reduction than higher-use customers. Also, the alternative recruitment process was not put in place until after the major sign-up period for LIHEAP assistance, which contributed to the lower-than-anticipated recruitment rate.

At the conclusion of the Program Year, Shelton disbursed reward checks to 104 participants for whom "raw savings"[5] was reported by ComEd to be greater than 250 kWh. Another 67 participants had raw savings greater than zero, but less than the reward threshold of 250 kWh.

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. Because GES is an opt-in program[6], inducing customers to voluntarily take the steps necessary to enroll is critical for program success. Any inconvenience or complication

[1] PY6 began June 1, 2013 and ended May 31, 2014.
[2] "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.
[3] 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).
[4] Low-Income Home Energy Assistance Program (http://www.cedaorg.net/www2/EnergyAssistance.html).
[5] "Raw savings" is defined as the year-over-year difference between a customer's energy usage in a given billing period in the program year and their usage in the same billing period in the previous year. Since it was not adjusted for differing numbers of days in the billing periods from year to year, nor for weather differences or other time-varying factors, "raw savings" does not represent actual program savings.
[6] By contrast, Home Energy Reports programs are typically opt-out, with customers randomly assigned to receive periodic reports providing energy-saving tips and information on their energy usage.

customers encounter during the recruitment process may discourage them from signing up. One of Shelton's difficulties with recruitment stemmed from their inability to satisfy the minimum information security measures required by ComEd of third-party contractors and other external entities before they are allowed to store, host or transmit electronic records containing customer personal identifying information (PII), including names, addresses, account numbers, and energy usage. This prevented Shelton from signing customers up for the program on their website, which, according to their plan document, was supposed to have been the primary method of acquiring participants.[7] Instead, customers were only able to sign up in person at recruitment events by providing their name, address, ComEd account number and other information, or by providing this information at a later time via phone, mail or fax. If customers did not know their ComEd account number or have a bill in their possession, which was typically the case[8], Shelton had to follow up with them later or rely on them to call back with the information before they could be enrolled. (One advantage of recruiting customers at LIHEAP-applicant events is customers typically bring a ComEd bill to the event since it is a requirement.)

The restrictions on use of participants' PII also prevented Shelton from monitoring participants' energy usage which was a key features of the program's strategy for tracking energy savings through behavior change.[9] As a partial solution, ComEd was able to provide Shelton with monthly reports showing the unadjusted change in each participant's monthly kWh consumption relative to the same bill period in the previous year ("raw savings"). However, Shelton's inability to view customers' monthly usage levels prevented them from gaining insights into their energy consumption patterns – for example, knowing which participants were using electric space heat in the winter or air conditioning in the summer – which inhibited their ability to tailor their energy-saving tips to individual customers.

The program is administered through the Illinois Power Agency (IPA), so any reported savings for the program would accrue to the IPA portfolio designated by Illinois law rather than the Energy Efficiency portfolio.

E.1 Program Savings

The evaluation team calculated energy savings for the GES program using regression analysis of monthly billing data for participants. Table E-1. summarizes the electricity savings from the GES program. While the program appears to have generated negative savings, they are not statistically significant and, thus, are not distinguishable from zero. Hence, our primary finding is that the program achieved no verified energy savings in PY6.

[7] The 2013 Great Energy Stewards Program SCOPE OF WORK DOCUMENT, loc. cit. It should be noted that while Shelton Solutions, Inc. does have a website (http://www.shelton-solutions.com/), it does not appear to contain any links specific to the Great Energy Stewards program.
[8] Kelly Shelton, personal communication, January 15, 2014.
[9] 2013 Great Energy Stewards SCOPE OF WORK DOCUMENT, loc. cit.

Table E-1. PY6 Total Program IPA 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

E.2 Key Findings and Recommendations

The GES Program operated in PY6 using monthly updates on participants' year-over-year changes in energy consumption. This was based upon the assumption that these values represented program savings. On that basis, Shelton's analysis showed that 171 participants saved a total of 105,240 kWh. However, Navigant's evaluation, which considered the energy usage patterns of all participants and adjusted for weather and other time-varying factors, found that the GES Program generated no verified energy savings in PY6. We identified several probable reasons for this result, including difficulties with recruitment and targeting, and a limited response to the messaging and marketing provided by the implementer.

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, only managing to sign up 716 customers by the end of PY6.

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.

Finding 1c. The GES Program envisioned recruiting its participants by targeting local church congregations in the greater Chicago area. However, this proved less fruitful than anticipated, and most participants were recruited in other venues, mainly events targeting low-income or financially stressed households while they were seeking assistance paying their utility bills.

Recommendation 1. ComEd should identify and address the barriers that prevented Shelton from recruiting participants effectively in targeted area churches. Navigant identified the restrictions placed on Shelton's use of customer data to be one such barrier, as detailed in Finding 2 below. However, we note that this restriction is a basic requirement of customer privacy protection that ComEd applies to all of its implementers. It is also a common best practice of utilities and most large companies. To understand the extent to which other factors contributed to the program's difficulties with recruiting, ComEd should consider conducting process research, including a review of the program's marketing materials, interviews with program managers, implementer staff, and leaders at targeted churches, as well as surveys of participant and non-participant members at targeted churches.

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). To comply with ComEd's PII security standards, Shelton would have had to implement significant computer hardware and software upgrades as well as purchase supplementary liability insurance[10]. Thus, Shelton could not store customer names, addresses, account numbers and monthly energy usage values electronically, which prevented them from implementing one of its key intended recruitment strategies: enrolling customers on a dedicated program website.

Recommendation 2a. It appears Shelton assumed that it would have access to customer data[11] and did not foresee the difficulties in accessing customer data at a large public utility. Shelton should consider making the necessary investments if they plan to continue serving as a third-party implementer of customer-facing energy efficiency programs in the future.

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 (if this is not done today). ComEd should also consider making satisfaction of its customer data security standards a prerequisite for responding to its RFPs, when appropriate.

Program Response

Finding 3a. The GES Program failed to achieve significant energy savings among participants.

Finding 3b. No statistically significant difference in savings was detected between participants who were recruited through local churches and those who were recruited in other venues.

Finding 3c. Shelton's failure to satisfy ComEd's data security requirements prevented them from monitoring participants' post-enrollment energy usage. While Shelton did have access to participants' "raw savings" information provided by ComEd, the lack of participants' monthly energy usage levels prevented Shelton from using this information to gain insights into participants' basic usage patterns. Shelton could have used this detail to tailor their energy-savings tips more closely to participants' particular situations.

[10] We understand that Shelton did purchase the required insurance in August 2013, the third month of PY6. However, ComEd did not allow them to host customer PII because Shelton's servers were determined to represent an unreasonable risk to customer data privacy. Shelton chose not to invest in the necessary IT upgrades at that time, opting instead to wait for the results of the PY6 evaluation. They were concerned that the increased security might cost them more than the contract was worth, and hoped that the verified savings would correlate closely enough with their "raw savings" results to allow them to avoid having to expend the additional resources. Personal communications, ComEd program managers, November 20, 2014 and March 27, 2015.

[11] ComEd notified all RFP bidders that any data requests would have to comply with ComEd's data protection policies.

1. Introduction

1.1 Program Description

The Great Energy Stewards (GES) program is a third-party behavioral energy efficiency (EE) program implemented by Shelton Solutions, Inc. (Shelton) that is based on the hypothesis that local church congregations comprise a receptive audience for behavioral EE programs.[12] The program planned to enroll 3,000 to 4,000 participants in PY6, to whom they would provide information on their energy consumption, energy-saving tips, and small monetary incentives to reward energy savings. Participants were asked to agree to save at least 250 kWh per year. The GES plan document indicates that they hoped to save a total of 1,860,465 kWh, or an average of 465 to 620 kWh per participant. This anticipated savings is 2 to 3 times greater than the 1-3 percent savings rate that is commonly reported for other behavioral EE programs.[13]

The program's plan document indicates that Shelton intended to recruit participants primarily at Chicago-area churches "through church announcements, bulletins, and direct contact with church and community leaders."[14] Shelton was unable to effectively implement this plan to meet GES stated goals. Instead, GES recruited the majority of the program's PY6 participants at Community and Economic Development Association (CEDA-sponsored events for low-income or financially distressed customers seeking assistance paying their utility bills. CEDA is not a church-affiliated organization.

1.2 Evaluation Objective

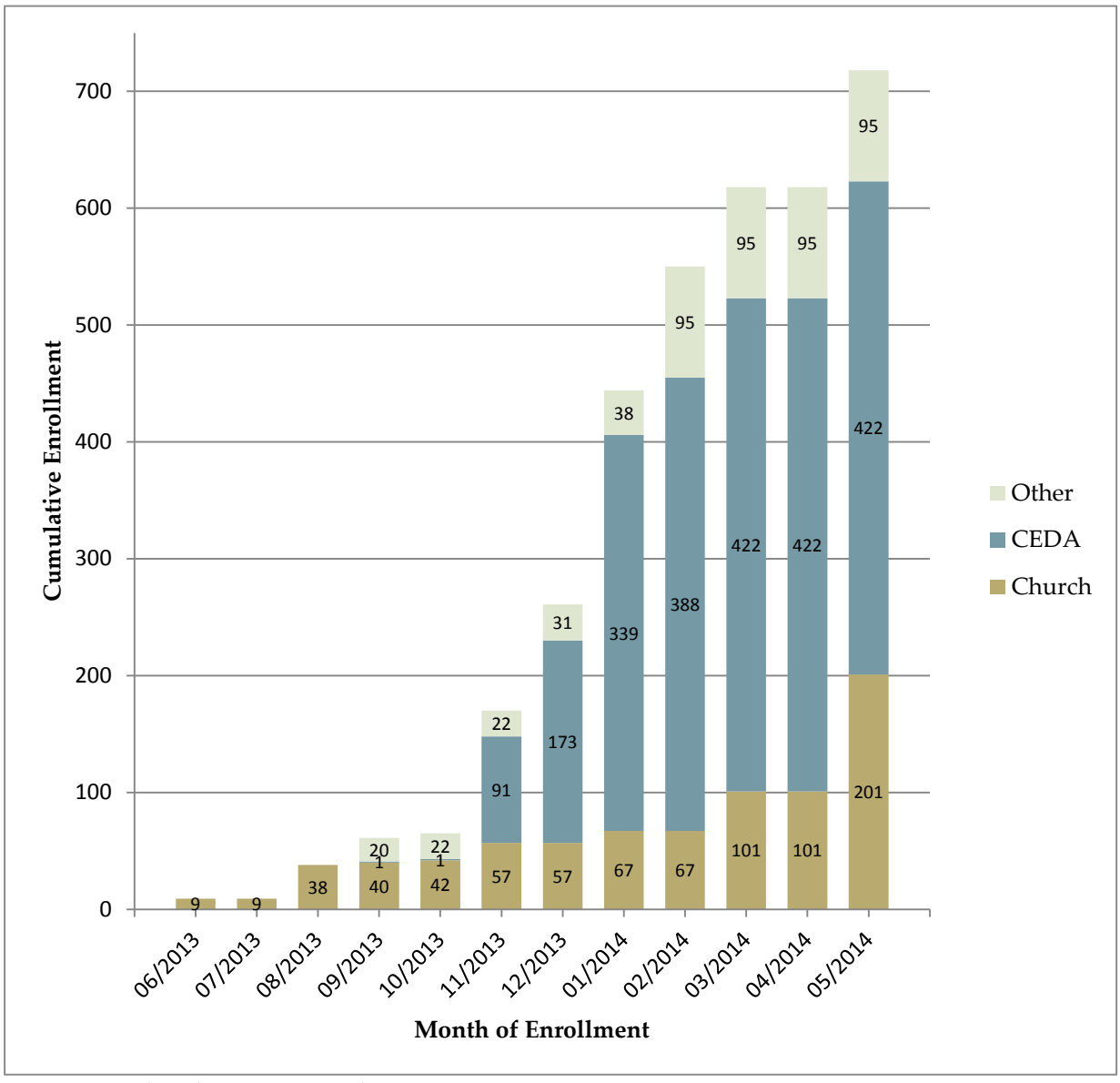
The sole objective of the analysis in this report is to determine the PY6 energy savings generated by the GES program. Due to the difficulties the implementer experienced with recruiting participants, we also undertook limited process evaluation related to that issue.

Figure 1-1 presents monthly cumulative enrollment since the program's inception, showing the type of venue where customers were recruited. During the first 5 months of the program year (June 2013 – October 2013), GES experienced very slow enrollment. It was not until November 2013, when the program began actively recruiting at CEDA-sponsored LIHEAP events, that enrollment began to

[12] "This program hinges on the fact that information disseminated via faith-based avenues is typically well-received and acted upon." The 2013 Great Energy Stewards Program SCOPE OF WORK DOCUMENT, loc. cit.
[13] Opower reports "consistent and sustained savings of 1.5% to 2.5% across all geographies" on their website (http://www.opower.com/results). They reported a 1.5 percent average savings rate for a home energy reports program in Massachusetts in a 2012 report ("Successful Behavioral EE Programs," Opower White Paper No. 3 https://opower.com/uploads/files/BEE_Whitepaper.pdf, downloaded 10/29/2014). Tendril cited savings of 1-3 percent for similar programs in a 2014 article ("Tendril Is Back: Could Nest and SolarCity Benefit from its Microtargeting Model?" http://www.greentechmedia.com/articles/read/tendril-models-and-micro-targets-the-home-energy-consumer, downloaded 12/11/2014). Based on Navigant's analysis of participant billing records, the average GES participant used roughly 8,160 kWh per year. An average of 465-620 kWh of savings would thus represent 5.7 to 7.6 percent of annual usage.
[14] The 2013 Great Energy Stewards Program SCOPE OF WORK DOCUMENT, loc. cit.

accelerate. Approximately 90 percent of program enrollment occurred between November 2013 and May 2014.

Figure 1-1. GES PY6 Cumulative Enrollment by Month and Venue



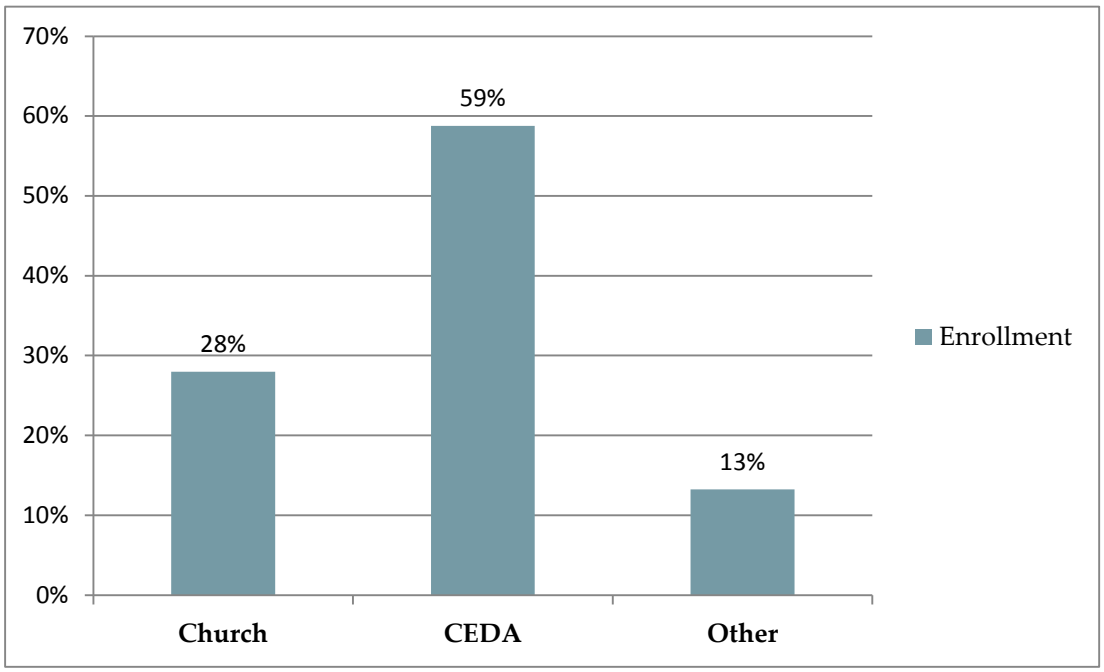
Source: GES tracking data, Navigant analysis.

Note: Customers were assigned to the "Church" category if they enrolled at venues whose names included one or more of the following terms: "AME," "Baptist," "Methodist," Bethel," or "Temple;" to the "CEDA" category if they enrolled at venues whose names include either "CEDA" or "DHS;" and to "Other" in all other cases.

Figure 1-2 summarizes the degree to which Shelton was able to implement its strategy of recruiting GES participants through local churches. It shows that only 28 percent of PY6 participants signed up at

church-related venues. The majority (72 percent) were recruited in non-church venues, mostly LIHEAP-related events.

Figure 1-2. GES PY6 Enrollment by Recruitment Venue



Source: GES tracking data, Navigant analysis

2. Evaluation Approach

Navigant used two evaluation approaches to quantify the energy savings induced by the GES program. The first is the variation-in-adoption (VIA) regression method used by Harding and Hsiaw.[15] The second is a matching method that compares energy usage of program enrollees to that of a set of closely-matched non-program customers. This method is known as regression with pre-program matching (RPPM) as described in Ho, Imai, King, and Stuart.[16] We present results for both methods in the appendix, but in reporting total savings we use results from the matching approach.

2.1 Overview of Data Collection Activities

Navigant received tracking data and monthly billing data for all program participants and control customers for the period of January 2012 to May 2014 from ComEd. Details are provided in Table 2-1.

Table 2-1. Primary Data Collection Activities

Data Source	Subject of Data	Quantity	Net Impact	Net Impact less Joint Impact with other EE Programs	Process
Interviews	ComEd and implementer program managers	2			X
Billing Data	Program participants and matches	All	X		NA
Tracking Data	Program participants and matches	All	X		NA
Tracking Data for Other Programs	Participants in Other Programs	All		X	NA

2.2 Sampling Plan

The VIA approach used data for 687 GES customers who were active at some time during the program year. The matching method used 582 program enrollees, and 574 unique matched customers, with the reduction in the number of program enrollees due to conditions necessary for proper matching.[17]

2.3 Matching Algorithm

The matching method relies on usage data from the bills of program participants, as well as from those of a set of matched comparison households, to estimate program savings. The pool of non-participant households available for matching consisted of 287,078 ComEd residential customers whose billing data were already accessible to Navigant.

[15] Harding, M. and A. Hsiaw, "Goal Setting and Energy Conservation," July 2013. Available at: http://www.stanford.edu/~mch/resources/Harding_Goals.pdf.

[16] Ho, Daniel E., Kosuke Imai, Gary King, and Elizabeth Stuart, 2007, "Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference." *Political Analysis* 15(3): 199-236.

[17] There are fewer matches than participants because matching was done with replacement.

For each program participant with monthly billing data available extending back at least 14 months before program enrollment, Navigant compared average daily energy consumption in each month in the period spanning 3-14 months before enrollment (a twelve-month period) to that of all of the customers in the available pool of potential matches over the same 12 months. For the sake of expositional clarity below, we denote by t_k=0 the month t in which customer k enrolled in the program, with t_k -1 denoting the month immediately before enrollment, t_k +1 the month immediately after enrollment, and so on. Customers with missing bills during the designated matching period [t_k -14, t_k -3], but whose billing data extended past 14 months before program enrollment, were matched based on their most recent 12 bills before t_k -2 (that is, starting three months before enrollment and working backwards in time).

For each comparison, Navigant calculated the difference in average daily energy use in the given month between a participant and a potential match, D_{PM} (**D**ifference between **P**articipant and potential **M**atch). The quality of a match is denoted by the Euclidean distance between the match and the participant over the 12 values of monthly D_{PM} used for matching; that is, denoting by SSD the sum of squared D_{PM} over the matching period, it is defined by $\sqrt{SSD}$.[18] The non-participant customer with the shortest Euclidean distance to a participant was chosen as the matched comparison for that participant. Matching was done with replacement. After excluding observations based on screening criteria explained in the next section, there were 582 participants and 574 unique comparison customers.

It is not possible to statistically test for selection bias, but Imbens and Wooldridge present a test that is suggestive (hereafter called the "IW test").[19] In the current context the logic of the test is that in the absence of selection bias there should be no difference between participants and matches in average energy use outside of the matching period prior to the start of the program period. A simple implementation of the test is to determine whether, given matching based on months t_k -3 to t_k -14, average D_{PM} in the two months before program enrollment, months t_k -1 and t_k -2, is practically or statistically different than zero.

The results of the matching exercise are presented in the first section of the gross impact results section.

2.4 Data Used in the Impact Analysis

In preparation for the impact analysis, Navigant combined and cleaned the data provided by ComEd. Billing data used in the analysis extended from January 2012 (17 months before the start of the program) to May 2014.

Both the VIA approach and the matching method involved the removal of the following customers:

- 23 customers who lacked billing data
- 1 customer with a signup date in 2017
- 1 customer with duplicate records
- 1 customer who signed up twice

[18] See Chiang, Alpha C., *Fundamental Methods of Mathematical Economics* Third Edition (McGraw-Hill 1984), pp. 73-74.
[19] Imbens, Guido W., and Jeffrey M. Wooldridge, 2009, "Recent Developments in the Econometrics of Program Evaluation." *Journal of Economic Literature*, 47(1): 5-86.

The VIA approach also involved the removal of the following billing data:

- 95 bills with less than 20 or more than 40 days in the billing cycle
- 305 outliers, defined as individual observations with average daily usage more than one order of magnitude from the median usage in the targeted sample for the analysis[20]

The matching method involved the removal of the following additional billing data:

- All billing data for 106 customers with fewer than 8 bills in the matching period
- 30 matched pair observations with an outlier, defined as individual observations with average daily usage more than one order of magnitude from the median usage in the targeted sample for the analysis[21]
- 147 matched pair observations with less than 20 or more than 40 days in the billing cycle

2.5 Statistical Approaches used in the Impact Evaluation

Navigant used two methods – the VIA and RPPM methods briefly described above – to estimate program savings. Final estimates of program savings are based on the RPPM approach because the VIA results indicated that the program data were inconsistent with the VIA model assumptions.

Details of the VIA approach are presented in the appendix in Section 6.1.1. The method uses only program participants to estimate savings, with late enrollees essentially serving as controls for early enrollees. It relies on the assumption that, controlling for both customer- and month-specific fixed effects, neither energy use in month t, nor energy savings s months into the program, is correlated with the timing of program entry.

Details of the RPPM approaches are presented in the appendix in Section 6.1.2. It treats matching as a "pre-processing" stage of the analysis and assumes that monthly energy use in the post-program period can be modeled as a linear regression function of month-specific fixed effects, a customer's usage from the same billing period of the prior year, and a participant indicator.

[20] The median usage was 18.03 kWh per day; observations with usage values greater than 180.3 kWh per day or less than 1.80 kWh per day were excluded from the analysis. Mean usage was 22.47 kWh per day, with a standard deviation of 18.57.

[21] The median usage for participants was 18.35 kWh per day; observations with usage values greater than 183.5 kWh per day or less than 1.84 kWh per day were excluded from the analysis. The mean usage for participants was 23.44 kWh per day, with standard deviation of 23.18. The median usage for matched controls was 18.62 kWh per day; observations with usage values greater than 186.2 kWh per day or less than 1.86 kWh per day were excluded from the analysis. The mean usage for matches was 22.95 kWh per day, with standard deviation 18.33.

2.6 Accounting for Uplift in other Energy Efficiency Programs

If participation rates in other energy efficiency programs are the same on average for GES participants compared to similar non-participants, the savings estimates from the statistical analyses presented here are already "net" of savings from the other programs, as this indicates the GES program had no effect on participation in the other energy efficiency (EE) programs.[22] However, if the GES program affects participation rates in other energy efficiency programs, then savings across all programs are lower than indicated by the simple summation of savings in the GES and EE programs. For instance, if the GES program increases participation in another EE program, the increase in savings may be allocated to either the GES program or the other EE program, but cannot be allocated to both programs simultaneously.[23]

As data permitted, Navigant used a difference-in-difference (DID) statistic to estimate uplift in other EE programs, in which the change in the participation rate in another EE program between PY6 and a pre-program period for enrollees was subtracted from the same change for a similar group of nonparticipants. The group of nonparticipants used in the analysis is the customers matched to the participants for the RPPM method. The designated pre-program period is June 2012-May 2013, which is the 12 month period before *any* customer enrolled in the GES program.

As an example, if the rate of participation in an EE program during PY6 is 5% for the treatment group and 3% for the matched comparison group, and the rate of participation during the 12 months before enrollment in the GES program is 2% for the treatment group and 1% for the matched comparison group, then the rate of uplift due to the GES program is 1%, which is reflected in the calculation (5%-2%)-(3%-1%)=1%. The DID statistic generates an unbiased estimate of uplift when the baseline average rate of participation is the same for the treatment and control groups, or when they are different due only to differences between the two groups in time-invariant factors, such as the square footage of the residence.

Navigant examined the uplift associated with four energy efficiency programs:

- The Residential Fridge and Freezer Recycle Rewards (FFRR) program, in which energy is saved by retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners.
- The Complete System Replacement (CSR) program, in which education and cash incentives are offered to ComEd's, Nicor Gas', North Shore Gas', and Peoples Gas' residential customers to encourage customer purchases of higher efficiency equipment.
- The Single Family Home Energy Savings (SFHES) program, in which customers in single family homes are offered a discounted home energy assessment and free or incentivized direct install and weatherization measure recommendations and installations.
- The Multi-Family Home Energy Savings (MFHES) program, which offers direct installation of low-cost efficiency measures, such as water efficiency measures and CFLs, at eligible multifamily residences.

[22] Here we assume that upon entry in the energy efficiency program the average program savings are the same for GES participants and non-participants.

[23] It is not possible to avoid double counting of savings generated by programs for which tracking data is not available, such as upstream CFL programs.

2.7 Process Evaluation

The evaluation of the GES program involved only a limited process evaluation that consisted of interviews with the program implementer and ComEd staff.

3. Gross Impact Evaluation

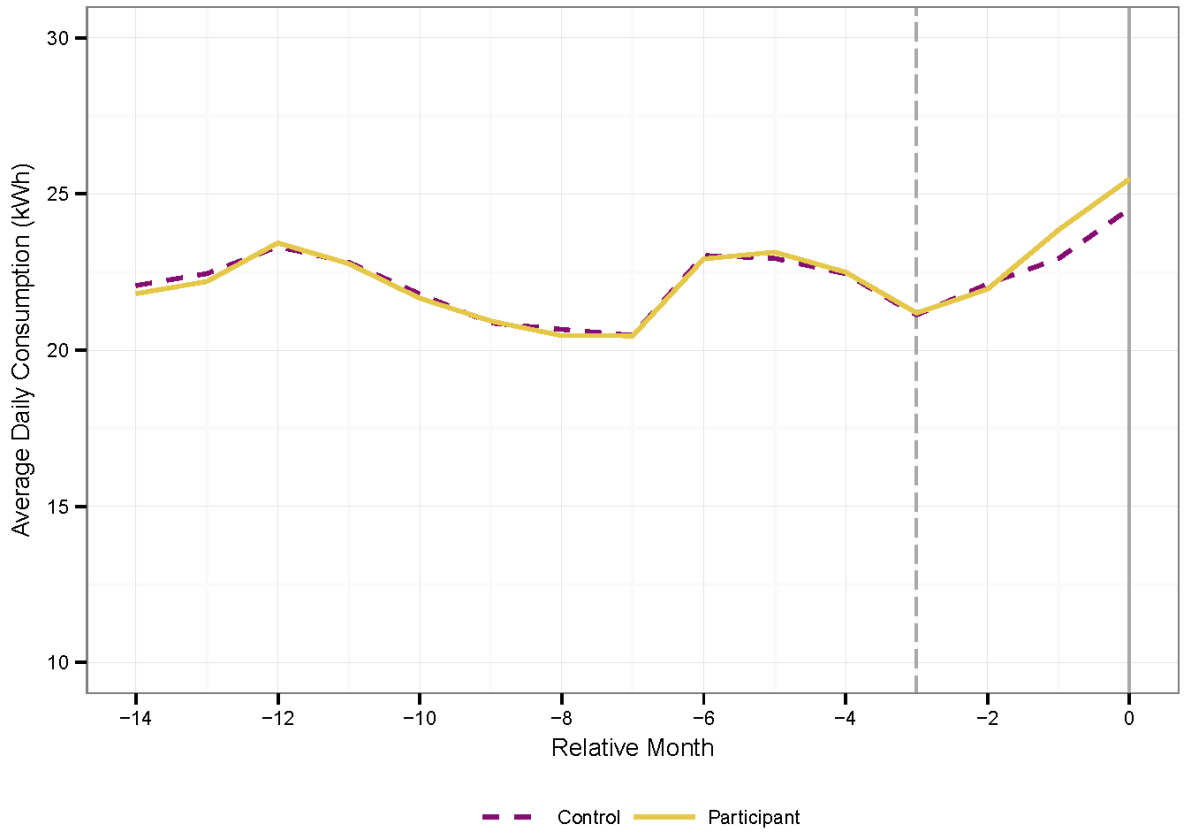
3.1 Matching Results

The matching method relies on a set of matched comparison households to estimate program savings. Figure 3-1 presents the mean of average daily energy use by participants and their matches over the period *t*-14 to *t*-1, and Figure 3-2 amplifies differences between the two groups by presenting the average *difference* in energy use between participants and their matches in percentage terms, with 90% confidence intervals superimposed. The figures illustrate two points:

- On average, the energy use by matches is very similar to that of program participants (Figure 3-1). Mean differences in energy use are neither statistically nor practically different than zero during the 12-month matching period.

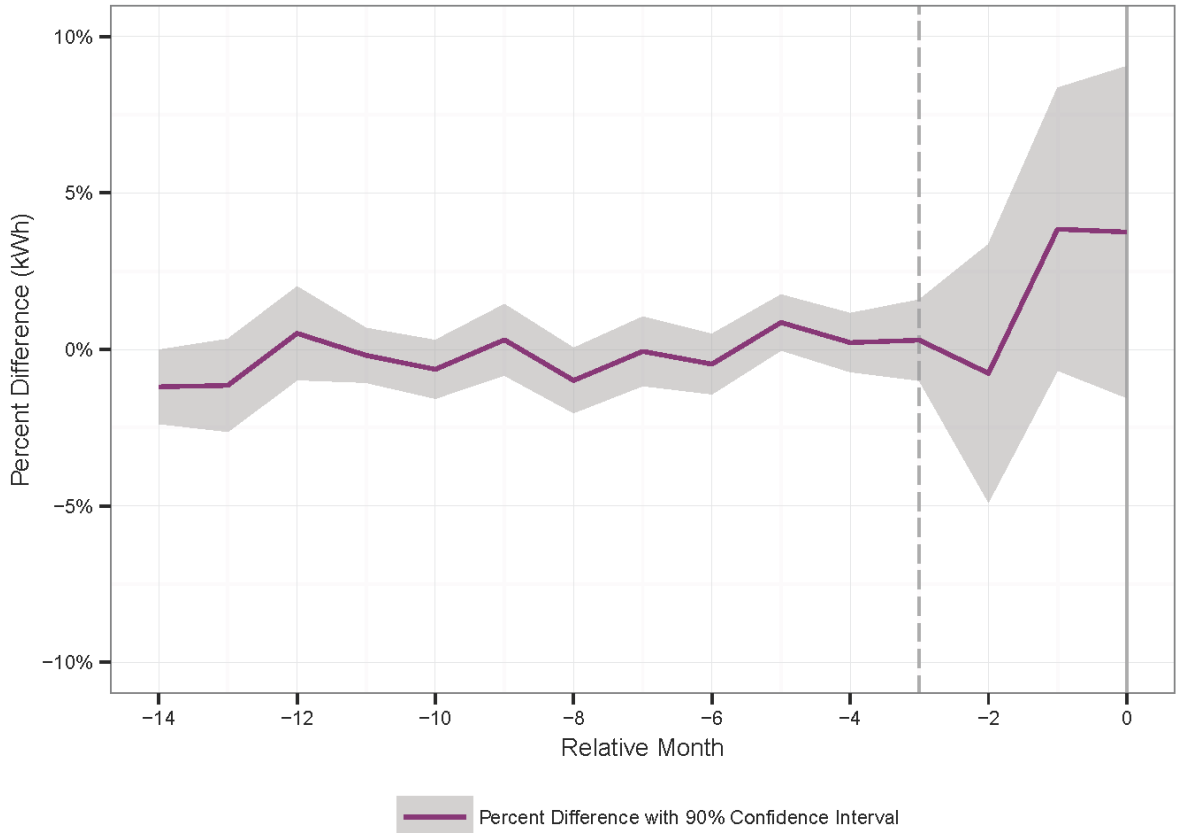
- The mean *difference* in energy use is not statistically different than zero in either test period *t*-2 or test period *t*-1 at the 90% confidence level (Figure 3-2). There is some divergence detected in period *t*-1, albeit not statistically significant. This leaves at least somewhat ambiguous the issue of selection bias in the sample. In other words, in period *t*-1 there is weak evidence that participants used more energy than their matches on average, which raises the possibility that the estimate of program savings could be biased downward.

Figure 3-1. Average Monthly Energy Use Before Program Enrollment, GES Participants and Matched Controls



Source: Navigant analysis

Figure 3-2. Average Difference in Monthly Energy Use Before Program Enrollment, GES Participants Less Matched Controls, with 90% Confidence Intervals



Source: Navigant analysis

3.2 Model Parameter Estimates

Navigant used two evaluation approaches to estimate energy savings. Our final results were based on the pre-program matching (RPPM) approach, as presented in this section. Regression parameter estimates for the RPPM approach are found in Table 6-2 in the appendix.

The results from the variation-in-adoption (VIA) regression method are in Table 6-1 in the appendix in Section 6.1.1.

Table 3-1 presents the estimated savings for the RPPM method. For the approach the estimated savings are derived directly from the estimate of α_2 in Model 2 in the appendix, and the standard error is based on the standard error of α_2. We estimated robust standard errors with clustering of errors by customer.

Table 3-1. GES Program Gross (and Net) Program Savings, PY6

Type of Statistic	RPPM Method (*standard errors in parentheses*)
Number of Participants used in analysis	582
Average Percent Savings	-0.82%
	(2.92%)
Average kWh savings per customer per day	-0.19
	(0.67)
Average kWh savings per customer, PY6	-26
Gross Verified MWh Savings†	-18,592
	(66,119)

Source: ComEd billing data, GES implementation data, and Navigant analysis.
†Total savings are pro-rated for participants that close their accounts during PY6.

Since the gross verified savings estimate is much smaller than its standard error (which is more than 3.5 times its size), the estimate is not statistically different from zero.[24]

3.3 Gross Savings

The evaluation team calculated energy savings for the GES program using regression analysis of monthly billing data for participants. Table 3-2 summarizes the gross electricity savings from the GES program. While the program appears to have generated negative savings, they are not statistically significant and, thus, are not distinguishable from zero. Hence, our primary finding is that the program achieved no verified gross energy savings in PY6.

Table 3-2. PY6 Total Program IPA Electric Savings

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

[24] The t statistic is -0.28, which indicates that the difference is not significantly different from zero at the 90 percent (or any other reasonable) level of confidence.

4. Net Impact Evaluation

Program savings calculated by the regression analysis are by nature net savings except for the uplift in participation in other energy efficiency programs caused by the GES program. To avoid double-counting of savings, program savings due to this uplift must be counted towards either the GES program or the other EE programs, but not both programs. The uplift of savings in other EE programs was very small: 1.65 MWh. Given that the program did not achieve any verified savings, the savings will automatically be counted towards the other EE programs.

Table 4-1 presents a summary of the PY6 double-counted savings due to uplift in other EE. Table 6-5 in the appendix presents the details of the calculation of the double-counted savings for each for the four ComEd energy efficiency programs considered in the analysis.

The estimate of double-counted savings is likely an *overestimate* because it presumes participation in the other EE programs occurs at the very start of PY6. Under the more reasonable assumption that participation occurs at a uniform rate throughout the year, the estimate of double-counted savings would be approximately .83 MWh, half the estimated value of 1.65 MWh. The main point is that double counting of savings with other ComEd energy efficiency programs is not a significant issue for the GES program.

Table 4-1. PY6 Uplift of Savings in Other EE programs

	FFRR	CSR	SFHES	MF
Participation uplift in other EE programs (# participants)	*2*	*-2*	*1*	*-1*
Savings Uplift in other EE programs (MWh)	*1.8*	*NA*	*NA*	*-.15*

Source: Navigant analysis

Table 4-2 summarizes the verified net electricity savings from the GES program. While the program appears to have generated negative savings, they are not statistically significant and are not distinguishable from zero. Hence, our primary finding is that the program achieved no verified net energy savings in PY6.

Table 4-2. PY6 Total Program IPA Electric Savings

Savings Category	Energy Savings (MWh)
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

5. Findings and Recommendations

This section summarizes the key impact findings and recommendations.

Program Participation and Targeting

Finding 1a. The GES Program struggled with recruitment and did not meet its target enrollment of 3,000 to 4,000 participants, only managing to sign up just 716 customers by the end of PY6.

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.

Finding 1c. The GES Program planned on recruiting participants "using a grass roots, faith-based campaign" aimed at local church congregations (African Methodist Episcopal and other denominations) in the greater Chicago area.[25] However, this proved less fruitful than anticipated, and most participants were recruited in other venues, mainly events targeting low-income or financially stressed households while they were seeking assistance paying their utility bills. When GES encountered difficulties in recruiting through local churches the program did not appear to have a "Plan B" and took time developing alternative approaches.

Recommendation 1. ComEd should identify and address the barriers that prevented Shelton from recruiting participants effectively in targeted area churches. Navigant identified the restrictions placed on Shelton's use of customer data to be one such barrier, as detailed in Finding 2 below. However, we note that this restriction is a basic requirement of customer privacy protection that ComEd applies to all of its implementers. It is also a common best practice of utilities and most large companies. To understand the extent to which other factors contributed to the program's difficulties with recruiting, ComEd should consider conducting process research, including a review of the program's marketing materials, interviews with program managers, implementer staff, and leaders at targeted churches, as well as surveys of participant and non-participant members at targeted churches.

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). To comply with ComEd's PII security standards, Shelton would have had to implement significant computer hardware and software upgrades as well as purchase supplementary liability insurance[26], which Shelton did not do in PY6. Thus, Shelton could not store customer names, addresses, account numbers and monthly energy usage values

[25] The 2013 Great Energy Stewards Program SCOPE OF WORK DOCUMENT final vers.pdf (June 3, 2013), p. 3.

[26] We understand that Shelton did purchase the required insurance in August 2013, the third month of PY6. However, ComEd did not allow them to host customer PII because Shelton's servers were determined to represent an unreasonable risk to customer data privacy. Shelton chose not to invest in the necessary IT upgrades at that time, opting instead to wait for the results of the PY6 evaluation. They were concerned that the increased security might cost them more than the contract was worth, and hoped that the verified savings would correlate closely enough with their "raw savings" results to allow them to avoid having to expend the additional resources. Personal communications, ComEd program managers, November 20, 2014 and March 27, 2015.

electronically, which prevented them from implementing one of its key intended recruitment strategies: enrolling customers on a dedicated program website.

Recommendation 2a. It appears Shelton assumed that it would have access to customer data[27] and did not foresee the difficulties in accessing customer data at a large public utility. Shelton should consider making the necessary investments if they plan to continue serving as a third-party implementer of customer-facing energy efficiency programs in the future.

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 (if this is not done today). ComEd should also consider making satisfaction of its customer data security standards a prerequisite for responding to its RFPs, when appropriate.

Program Response

Finding 3a. The GES Program failed to achieve significant energy savings among participants.

Finding 3b. No statistically significant difference in savings was detected between participants who were recruited through the mechanism envisioned in the program's plan, namely at local churches, and those who were recruited in other venues.

Finding 3c. Shelton's failure to satisfy ComEd's data security requirements prevented them from monitoring participants' post-enrollment energy usage. While Shelton did have access to participants' "raw savings" information provided by ComEd, its lack of participants' monthly energy usage levels prevented Shelton from using this information to gain insights into participants' basic usage patterns. Shelton could have used this detail to tailor their energy-savings tips more closely to participants' particular situations.

[27] ComEd notified all RFP bidders that any data requests would have to comply with ComEd's data protection policies.

6. Appendix

6.1 Detailed Impact Methodology

Navigant used two methods to estimate impacts: the variation in adoption (VIA) approach and regression with pre-program matching (RPPM). Each is presented below.

6.1.1 VIA Approach

The method takes advantage of the differential timing of program enrollment by customers to identify program savings. It essentially takes the perspective that the best comparison group for customers enrolled at time *t* is those that enroll later in the program period.

The method uses a fairly simple, but flexible, linear fixed effects regression model of energy consumption by households. The base model casts monthly electricity consumption as a function of a household-specific fixed effect, month/year fixed effects, and the time-distance from enrollment (both pre- and post-enrollment). This is a two-way fixed effects model that accounts for all time-invariant customer characteristics, and all month/year-specific factors affecting all customers. Formally we have,

Model 1

$$ADU_{kt} = \alpha_k + \beta_t + \sum_{j=-\bar{m}}^{\bar{m}} \gamma_j D_{kt}^j + \varepsilon_{kt}$$

where,

ADU_{kt}	=	Average daily energy use by household *k* in month *t*;
α_k	=	Household-specific constant (fixed effect);
β_t	=	Month/year specific constant (fixed effect);
D_{kt}^j	=	A set of 0/1 indicators of month relative to month of program enrollment, taking a value of 1 if month *t* is the j^{th} month before/after household *k* enrolls in the program, where month $\bar{m} = 0$ is the month of enrollment.
γ_j	=	Coefficient on the indicator variable D_{kt}^j;
ε_{kt}	=	Model error term.

An underlying assumption of the VIA approach is that, after controlling for time-invariant customer characteristics (e.g., premise construction and square footage, number of sockets and appliances) and time-varying factors common to all customers (e.g., weather conditions), customer usage is completely determined up to a white-noise error term prior to program enrollment, and is also a function of program enrollment once they've signed up. An important feature of the model is that it embodies a test of its suitability for the particular data set to be analyzed. If the assumptions of the model are met, the program should have no apparent effect on participant usage prior to the time of enrollment, implying that the

values of the γ_j should all be zero for $j<0$. Thus, a test of the suitability of the VIA model is that $\gamma_j=0$ for all $j<0$.

6.1.2 Overview of the Matching Method

The basic logic of matching is to balance the participant and non-participant samples by matching on the exogenous covariates known to have a high correlation with the outcome variable. Doing so increases the efficiency of the estimate and reduces the potential for model specification bias. Formally, if the outcome variable Y (in this case, customer energy usage) is independently distributed conditional on X and D, where X is a set of exogenous variables and D indicates program participation, then the analyst can gain some power in the estimate of savings and reduce potential model specification bias by assuring that the distribution of X is the same for treatment and control observations.

In this evaluation, the outcome variable is the customer's average daily (post-program) energy use in a given bill period, and the available exogenous covariate with by far the greatest correlation with this outcome variable is the customer's average energy use in the same month of the pre-program period, $PREkWh_{kt}$, where k indexes the customer and t indexes the month; this is why the matching takes the form described in section 2.3. The RRPM approach can be interpreted as using regression analysis to further control for any remaining imbalance in the matching on this variable. If, for instance, after matching the participants use slightly more energy on average in the pre-program period than their matches –they are higher baseline energy users, in other words—then including $PREkWh_{kt}$ as an explanatory variable in a regression model predicting monthly energy use during the post-program period prevents this remaining slight difference in baseline energy use from being attributed to the program.

6.1.3 The RPPM Approach

In the RPPM approach the development of a matched comparison group is viewed as a useful "pre-processing" step in a regression analysis to assure that the distributions of the covariates (i.e., the explanatory variables on which the output variable depends) for the treatment group are the same as those for the comparison group that provides the baseline measure of the output variable. This minimizes the possibility of model specification bias. The regression model is applied only to the post-treatment period, and the matching focuses on those variables expected to have the greatest impact on the output variable.

As described in section 2.3, we matched participant and comparison customers on energy use during the pre-treatment period, and then estimated the following model for all post-program observations:

Model 2

$$ADU_{kt} = \alpha_{0t} + \alpha_1 PREkWh_{kt} + \alpha_2 Treatment_k + \varepsilon_{kt}$$

where:

ADU_{kt}	=	Average daily energy use by household *k* in month *t*;
α_{0t}	=	Month/year specific constant (fixed effect);
$Treatment_k$	=	A 0/1 indicator variable, taking a value of 1 if customer *k* is a GES participant, and 0 otherwise.
$PREkWh_{kt}$	=	The average daily electricity use by household *k* during the same month in the prior year.
ε_{kt}	=	Model error term.

In this model α_2 indicates average daily savings generated by the program. We include a monthly fixed effect to account for unobserved time-related factors, such as weather, that affect all customers.

We also estimated a form of the model that included a test of whether energy usage by customers who were recruited at a church-sponsored event differed from that of other customers:

Model 2a

$$ADU_{kt} = \alpha_{0t} + \alpha_1 PREkWh_{kt} + \alpha_2 Treatment_k + \alpha_3 Treatment_k \cdot Church_k + \varepsilon_{kt}$$

where:

$Church_k$	=	A 0/1 indicator variable, taking a value of 1 if customer *k* was recruited into the GES program at a church-sponsored event, and 0 otherwise.

In this model, α_2 indicates average daily savings for non-church recruits, while $(\alpha_2 + \alpha_3)$ is average daily savings for church recruits.

6.2 Detailed Impact Results: Parameter Estimates

6.2.1 Parameter Estimates for VIA Approach

The variables of interest for the VIA approach are the indicators of the months before and after program enrollment. Coefficient estimates for these variables are presented in Table 6-1. Variable names *D+k* correspond to indicator variable D^k in Model 1; so, for instance, *D-1* corresponds to variable D^{-1} in Model 1, indicating the month just before program enrollment. The results in Table 6-1 indicate that in eight of the 12 months before enrollment in the program, the program effect is statistically different than zero at a

90% confidence level or better.[28] It is logically inconsistent that the program should have an effect prior to enrollment, therefore this model was deemed unsuited for this application and was not used to estimate program savings.

Table 6-1. Parameter Estimates for VIA Model (Model 1)

Variable	Coefficient	Standard Error	t-statistic
D-12	-2.9712	1.6272	-1.8260
D-11	-1.4668	1.3438	-1.0916
D-10	-1.9262	1.1803	-1.6319
D-9	-2.3687	1.0774	-2.1985
D-8	-2.4440	1.0019	-2.4394
D-7	-2.5004	0.9494	-2.6336
D-6	-2.4853	0.8989	-2.7649
D-5	-1.1532	0.8436	-1.3670
D-4	-1.0463	0.8445	-1.2389
D-3	-1.3733	0.7479	-1.8363
D-2	-1.8518	0.6797	-2.7244
D-1	-1.0770	0.4853	-2.2190
D=0			
D+1	0.5521	0.4747	1.1631
D+2	1.4127	0.8728	1.6185
D+3	-0.3636	0.9463	-0.3842
D+4	-0.9544	1.0479	-0.9108
D+5	-1.1072	1.2411	-0.8921
D+6	-0.9093	1.6294	-0.5581
D+7	-1.1802	2.7439	-0.4301
D+8	-0.7956	2.0280	-0.3923
D+9	-1.5677	1.7183	-0.9124
D+10	-7.7512	3.9638	-1.9555
D+11	-5.6994	4.0787	-1.3974

Source: Navigant analysis

6.2.2 Parameter Estimates for RPPM Approach

Parameter estimates for the two variables of interest in Model 2, $PREkWh_{kt}$ and $Treatment_k$, are presented in Table 6-2 along with their estimated standard errors and t statistics.

[28] A t-statistic greater in absolute value than 1.65 indicates statistical significance at the 90% confidence level. A t-statistic greater in absolute value than 1.96 indicates statistical significance at the 95% confidence level.

Table 6-2. Parameter Estimates for RPPM Model (Model 2)

Parameter	Coefficient	Standard Error	t statistic
PREkWh	0.5972	0.0863	6.92
Treatment	0.1875	0.6667	0.28

Source: Navigant analysis

Since the treatment effect is not statistically significant, we conclude that there is no measurable savings evident for the program.

Two questions arose in the context of evaluating the matching-model results. The first was whether any difference was evident in the savings behavior of participants who had been recruited at church-sponsored events as opposed to other venues. Table 6-3 shows the parameter estimates of interest for the version of model 2 testing for a differential result between customers who enrolled at a church-sponsored event versus some other venue:

Table 6-3. Parameter Estimates for RPPM Model with Recruitment Venue (Model 2a)

Parameter	Coefficient	Standard Error	t statistic
PREkWh	0.5974	0.0858	6.96
Treatment	0.1298	0.7360	0.18
Treatment x Church	0.2251	0.9023	0.25

Source: Navigant analysis

Since the coefficient on the Treatment x Church interaction is not statistically significant, we conclude that there is no differential effect of being recruited into the program in a church as opposed to some other venue. And while the point estimates of the treatment coefficient changes, it also remains both positive, indicating negative savings, and statistically indistinguishable from zero.

The second question has to do with whether the fact that a large proportion of GES participants were enrolled in LIHEAP through CEDA events biased our results. Specifically, to the extent that LIHEAP assistance spurred increased energy usage by recipients, did this effect offset the effect of the program, which is designed to reduce energy consumption? First, it is important to note that while a higher fraction of GES participants than potential matches received LIHEAP assistance at some point during the analysis period – which is hardly surprising in view of the fact that the implementer effectively targeted them – LIHEAP recipients were also represented in the pool of potential matches, and indeed some matched non-participants did receive LIHEAP assistance.

Second, it should be noted that the potential difficulty that LIHEAP assistance poses to our model results is not related to whether or not a given customer received it or not. After all, what LIHEAP assistance does, in effect, is relax a recipient's budget constraint for the period during which they receive it. There is no reason to assume that the full value of the assistance was spent on extra energy consumption: each dollar of LIHEAP assistance received frees up a dollar of the recipient's income that would otherwise have been spent on their utility bill. Whether the recipient chooses to spend some or all of this added

purchasing power on additional energy consumption, or on some combination of other goods and services (or, indeed, saves it instead) depends on their individual tastes and preferences. Thus, we can have no a priori expectation as to the size, or even the direction, of the effect LIHEAP assistance might have on a recipient's energy consumption.

The key issue, for our purposes, is whether a customer changes LIHEAP status between the pre-enrollment period and the post-enrollment period. If a customer in our sample – either a GES participant or a potential match – received LIHEAP assistance during the pre-enrollment period, on the basis of which they were matched to a comparison customer, and also received LIHEAP assistance during the post-enrollment period, there would be no net effect on our analysis: their net income should not have changed as a result of LIHEAP. The same is true for customers who did not receive LIHEAP assistance in either period. The concern arises for cases where a customer – either a participant or a potential match – changed state between the two periods, either from recipient of LIHEAP assistance to non-recipient or vice versa. In that case, the matching might have been inappropriate to the extent that the changed purchasing power from receiving LIHEAP assistance was not accounted for.

To test for evidence of this effect, we constructed two dummy variables, LIHEAP_PreNotPost and LIHEAP_PostNotPre. The first took on the value of one if a customer received LIHEAP assistance in the pre-enrollment (i.e., matching) period but not the post-enrollment period, and zero otherwise. The second equaled one if the customer received it in the post-enrollment period but not the pre-enrollment period. We then included these variables in the RPPM model and reran it. The results are shown in Table 6-4.

Table 6-4. Parameter Estimates for RPPM Model with LIHEAP Status Change (Model 2b)

Parameter	Coefficient	Standard Error	t statistic
PREkWh	0.9937	0.7041	1.41
Treatment	1.2335	1.0997	1.24
LIHEAP_PreNotPost	0.3381	1.3117	0.26
LIHEAP_PostNotPre	0.3239	0.7575	0.43

Source: Navigant analysis

What is notable in these results is, first of all, that the coefficients on the LIHEAP status-change variables are not statistically different from zero, on the basis of which we conclude that there is no strong evidence of bias from this effect in our model. And secondly, the treatment effect also remains both positive, indicating negative savings, and statistically indistinguishable from zero.

6.3 Savings Due to Participation Uplift in Other EE Programs

Table 6-5 presents program savings due to participation uplift in other EE programs.

Table 6-5. Estimates of Double Counted Savings in PY6

	Program			
	FFRR	CSR	SFHES	MF
Average program savings (annual kWh per participant)	1,041	769	451	234
# GES Treatment Customers	559	559	559	559
Program participation, PY6	11	0	0	3
Change in participation from pre-program Year	2	-1	0	-1
# Comparison Customers	559	559	559	559
Program participation, PY6	5	2	0	0
Change in participation from pre-program	0	1	-1	0
DID statistic	0.35%	-0.35%	0.18%	-0.18%
Participation uplift	2	-2	1	-1
Statistically Significant at the 90% Confidence Level?	No	No	No	No
Savings attributable to other programs (kWh)	1,800	NA	NA	-155

Source: Navigant analysis