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Small Commercial and Industrial Behavioral (EnergyCheck/Pulse) Pilot Program PY7 Evaluation Report

FINAL

Energy Efficiency/Demand Response Plan: Plan Year 7 (2/1/2014-1/31/2015)

Presented to Commonwealth Edison Company

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E. Executive Summary

This report presents a summary of the findings and results from the impact evaluation of the PY7 Commonwealth Edison Company (ComEd) Small Commercial and Industrial Behavioral (EnergyCheck/Pulse) pilot program.

The EnergyCheck/Pulse program was a behavioral energy efficiency (EE) pilot program designed to generate energy savings by providing eligible ComEd commercial and industrial (C&I) customers[1] with information about their specific energy usage and related information, as well as conservation suggestions and tips. This information was provided in the form of paper reports, initially delivered monthly and later bimonthly. The reports gave participants three types of information:

- Assessment of how their recent energy use compared to their own energy use in the past;
- Assessment of how their recent energy use compared to that of other, similar ComEd customers in their industry; and
- Tips on how businesses can reduce energy consumption, some of which are tailored to their specific circumstances or business type.

Recipient customers were also encouraged to access a dedicated program website where they could establish accounts, track their energy usage, and learn more about energy conservation, including information about other ComEd energy-efficiency (EE) programs for which they may qualify.

The pilot program started in February 2014 and concluded in January 2015, with the first reports mailed in February 2014 to a target group of approximately 10,600 customers. Another 10,000 customers served as a control group. The target energy savings was 1.5 percent.

E.1. Program Savings

Table E-1 summarizes the energy savings from the EnergyCheck/Pulse pilot program. Verified savings prior to uplift adjustment was 579 MWh. After adjusting for uplift from other energy efficiency programs (see Section 3.3), final verified savings were 196 MWh. This estimate is not statistically significant at the 90 percent confidence level using either a two-sided test or a one-sided test.[2]

[1] To qualify, participants must be ComEd C&I customers with monthly peak demand levels no greater than 100 kW.
[2] However, Navigant verified savings for four of the 26 industry groups that were significant at the 90 percent confidence level. See Section 3.3.1 for details.

Table E-1. PY7 EnergyCheck/Pulse Program Energy Savings

Savings Category	Energy Savings (MWh)
Ex Ante Gross Savings*	6,900
Verified Savings, Prior to Uplift Adjustment†	579
Verified Gross Realization Rate‡	0.08
Uplift Savings	383
Verified Net Savings After Uplift Adjustment†	196

Source: Navigant analysis of ComEd program tracking and customer billing data.
* Equals product of target savings rate (1.5 percent), average daily pre-program energy usage, and total number of participant-days during the pilot period (pro-rated for participant move-outs/drop-outs).
† Verified savings were not statistically significant at 90 percent confidence level using two-tailed test (p-value = 0.18), but were significant at 90 percent confidence level using one-tailed test (p-value = 0.09).
‡ Equals ratio of verified savings (prior to uplift adjustment) to ex ante gross savings.

E.2. Program Participation

Table E-2 summarizes participation in the EnergyCheck/Pulse program participation during the pilot period.

Table E-2. PY7 EnergyCheck/Pulse Program Participation Detail

Participation	Program Total
Targeted Number of Report Recipients	10,600
Sample Size – Report Recipients	10,607
Targeted Number of Control Customers	10,000
Sample Size – Control Customers	10,014
Program Period Average Daily Use (kWh)	121.17
Average Daily Savings (kWh)	0.16
Standard Error	0.12
Percentage Savings	0.13%
Standard Error	*0.10%*
kWh Savings per Customer	54.61
Standard Error	*40.71*

Source: Navigant analysis of ComEd program tracking and customer billing data.

E.3. Findings and Recommendations

The following provides insight into key program findings and recommendations.

Verified Gross Savings and Realization Rate.

Finding 1. Overall, the EnergyCheck/Pulse pilot program yielded 579 MWh of energy savings prior to uplift adjustment. This represents an average savings of 0.16 kWh per program

report recipient per day, or an average savings rate of 0.13 percent. The EnergyCheck/Pulse program's internal planning goal had been 1.5 percent average savings.

Finding 2. Of the 579 MWh of energy savings, 383 MWh, or 66 percent, consisted of uplift due to participation by EnergyCheck/Pulse participants in the ComEd Small Business Energy Savings (SBES) program.

Recommendation 1. In future behavioral pilot programs targeting business customers, ComEd should include a process evaluation/customer satisfaction survey component. This would provide insights into why the program succeeded (or did not succeed) in stimulating significant energy savings among customers in different industry groups. Navigant's evaluation team has formulated a number of hypotheses as to why savings from the EnergyCheck/Pulse program was not more robust and widespread, but lacking an empirical foundation these hypotheses remain purely speculative.[3] Given the SBES' program size and prominence in the marketplace, uplift in SBES participation is likely to represent a sizable proportion of the savings from any behavioral programs targeting this customer segment.

[3] One possible explanation for why the EnergyCheck/Pulse program did not achieve the same level of savings that is commonly attained by similar programs targeting residential customers (1-3 percent) is that in the latter case the person receiving and reading the energy reports, the person paying the electric bills, and the person making decisions about investing in new energy-efficient fixtures, appliances or mechanicals are usually one and the same, whereas for business customers they are often different people. Thus, the messages conveyed by the reports may not be getting to the decision-maker.

1 Introduction

1.1 Program Description

This report presents a summary of the findings and results from the impact evaluation of the PY7 Commonwealth Edison Company (ComEd) Small Commercial and Industrial (C&I) Behavioral (EnergyCheck/Pulse) pilot program.

The EnergyCheck/Pulse program was a behavioral energy efficiency (EE) program designed to generate energy savings by providing eligible ComEd C&I customers[4] with information about their specific energy usage and related information, as well as conservation suggestions and tips. This information was provided in the form of paper reports, initially delivered monthly and later bimonthly. The reports gave participants three types of information:

- Assessment of how their recent energy use compared to their own energy use in the past;
- Assessment of how their recent energy use compared to that of other similar ComEd customers in their industry; and
- Tips on how businesses can reduce energy consumption, some of which are tailored to their specific circumstances or business type.

Recipient customers were also encouraged to access a dedicated program website where they could establish accounts, track their energy usage, and learn more about energy conservation, including information about other ComEd energy-efficiency (EE) programs for which they may qualify.

The program started in January 2014 and concluded in January 2015, with the first reports mailed in February 2014 to a target group of approximately 10,600 customers. Another 10,000 customers served as a control group. The target energy savings was 1.5 percent.[5]

An important design feature of the EnergyCheck/Pulse program was that it was designed as a randomized controlled trial (RCT). Customers in the target group were randomly assigned to either the recipient group or the control (non-recipient) group for the purpose of estimating changes in energy use due to the program. This approach makes the process of verifying energy savings much simpler and more robust than would be the case with an opt-in program: among other things it effectively eliminates free-ridership bias and thus the need for net-to-gross research. Customers may opt *out* of the program at any time, but they cannot opt *in* due to the RCT design.

Working with the implementation contractor, Pulse Energy (Pulse), ComEd rolled out the EnergyCheck/Pulse program to a targeted sample of approximately 10,600 small C&I customers. A control group of roughly 10,000 non-recipient C&I customers were also selected at that time. These are summarized in Table 1-1.

[4] To qualify, participants must be ComEd C&I customers with monthly peak demand levels no greater than 100 kW.
[5] Telephone call with ComEd and implementer program managers, July 3, 2014.

Table 1-1. Synopsis of ComEd EnergyCheck/Pulse Program

Sample Group	Month of First Report	Month of Last Report	Targeted Number of Customers*	Average Daily Usage in Post Period (kWh)
Recipients	February 2014	January 2015	10,600	121.17
Controls	N/A	N/A	10,000	121.80

Source: Navigant analysis of ComEd program tracking and customer billing data.

* These are the targeted numbers of customers in each group. Navigant's evaluation analysis used the actual numbers of recipients and control customers in the programs at the start of pilot period.

1.2 Evaluation Objectives

Navigant's primary objective was to determine the extent to which participants in the PY7 EnergyCheck/Pulse pilot program reduced their energy consumption.

2 Evaluation Approach

Navigant relied on statistical methods appropriate for evaluating the results of a randomized controlled trial (RCT) to produce the results presented in this report. Navigant estimated program impacts using two approaches: a simple post-program regression (PPR) analysis with lagged usage controls and a linear fixed-effects regression (LFER) analysis. Both approaches rely on the statistical analysis of customer energy usage data obtained from customers' monthly billing records.

2.1 *Overview of Data Collection Activities*

Navigant received tracking data and monthly billing data for all program participants and control customers from February 2013 through January 2015 from the program implementer. Table 2-1 provides those details.

Table 2-1. Primary Data Collection Activities

Collection Method	Subject Data	Quantity	Net Impact	Process
Billing Data	Program participants and controls	All	X	N/A
Tracking Data	Program participants and controls	All	X	N/A
Tracking Data for Other Programs	Participants in other programs	All	X	N/A

Source: Navigant analysis

These data reflect the pilot period (February 2014-January 2015) as well as the pre-program year (February 2013-January 2014).

2.2 *Sampling Plan*

The EnergyCheck/Pulse program was designed by the program implementer as a RCT in which customers in the target group were randomly assigned to either a treatment (participant) group or control (non-participant) group.[6] Data for all participants and controls were included in this impact evaluation.

2.2.1 Validation of Randomization

Navigant used multiple methods to validate the RCT design of the EnergyCheck/Pulse program. The reasoning underlying all of the methods used is that random allocation of the targeted customers to the treatment and control groups should result in energy usage that is identically distributed in the two groups during the pre-program period (i.e., before the treatment group began receiving reports).

The evaluation team conducted the following activities:

- Plotted the monthly mean energy usages for treatment and control groups in the pre-program year to visually examine differences between the two groups;

[6] In this design, treatment customers received energy reports, while control customers did not.

- Performed t tests on the monthly differences in mean energy use between the treatment and control groups in each of the 12 months; and
- Performed a regression analysis of customer energy usage in the pre-program period to identify any non-random differences in usage between treatment and control households in the pre-program period.

No evidence of inconsistency with the random assignment to treatment and control groups was found.

2.3 Data Used in Impact Analysis

In preparation for the impact analysis, Navigant combined and cleaned the program tracking data and the customer billing data provided by the implementer. The dataset included usage observations from the bill records of a total of 20,621 ComEd C&I customers: 10,607 program participants (report recipients) and 10,014 controls.

Navigant performed the following data cleaning steps:

- Excluded observations with dates after the move out date;
- Excluded observations with negative usage;
- Excluded observations with fewer than 20 or more than 40 days in the billing cycle;
- Excluded customers who did not move and had fewer than 12 post-program bills;
- Excluded customers who had fewer than nine pre-program bills; and,
- Excluded outliers, defined as observations with average daily usage more than one order of magnitude from the median.[7]

Detailed counts of the observations and customers removed are included in Section 6.1 of the Appendix. After data cleaning, the dataset consisted of 10,547 participants and 9,944 controls.

2.4 Statistical Models Used in the Impact Evaluation

Navigant estimated program impacts using two statistical approaches: a simple post-program regression (PPR) analysis with lagged controls and a linear fixed-effects regression (LFER) analysis, both applied to monthly customer usage data derived from billing records. Navigant used the PPR results for reporting total program savings for PY7 but ran both models as a robustness check. Both approaches should, in principle, produce unbiased estimates of program savings, but we prefer the PPR results for the following reason. We believe, based on our own past experience analyzing the impacts of other behavior-based programs similar to EnergyCheck/Pulse, as well as recent findings from the academic literature[8], that the savings estimates produced by the PPR model tend to be more precisely estimated than those from the LFER model.[9] Although the two models are structurally different, assuming the RCT is well balanced

[7] The median of average daily usage in the sample (pooling treatments and controls) was 79.55 kWh per day.
[8] Allcott, Hunt and Todd Rogers, 2014. "The Short-Run and Long-Run Effects of Behavioral Intervention: Experimental Evidence from Energy Conservation. *American Economic Review*, 104(10): 3003-37.
[9] One likely reason for this is that the PPR model embodies more flexibility than the LFER model, in that the former allows the individual customer control variable to vary seasonally while the latter does not. The LFER model treats all unobserved inter-household heterogeneity affecting customer energy usage as time-invariant, while the PPR model uses lagged customer usage for this purpose, which can vary over time. This is discussed in more detail in section 6.2.1 of the Appendix.

with respect to the drivers of energy use, in a single sample they should generate similar estimates of program savings.

The PPR model combines both cross-sectional and time-series data into a single panel dataset. The PPR model used only the post-program data for estimation but includes the customer's lagged energy use for the same calendar month of the pre-program period as a control for any small, systematic differences between the treatment and control customers. The underlying logic of this approach is that systematic differences between treatment and control customers will be reflected in differences in their past energy use, which in turn is highly correlated with their current energy use. Inclusion of the lagged usage effectively differences out the effects of any common factors affecting energy usage that are not explicitly accounted for in the model.

The LFER model also combines cross-sectional and time-series data into a single panel dataset. The LFER regression compares the pre-to-post-program usage differences of participants and controls to identify the effect of the program. The inclusion of customer-specific fixed effects is the key feature of the LFER approach. These are included to capture all customer-specific factors affecting electricity usage that do not change over time, including those that are unobservable to the evaluation team. Examples of the latter might include the construction and square footage of the premise; the number, sizes and vintages of the mechanicals and appliances present; the number of windows and their orientation; and number of types of lighting fixtures. The inclusion of fixed effects represents an alternative approach to controlling for any small, systematic differences between the treatment and control customers that might occur due to chance, similar to the inclusion of lagged usage in the PPR model.

Detailed discussions of the PPR and LFER models used in the analysis are presented in section 6.3.

2.5 *Accounting for Uplift in Other Energy Efficiency Programs*

2.5.1 Accounting for Uplift in PY7

The energy reports sent to participating businesses through the EnergyCheck/Pulse program included energy-saving tips, some of which encouraged participants to enroll in other ComEd energy efficiency (EE) programs.[10] If participation rates in other EE programs were the same for the participant and control groups, the savings estimates from the regression analyses would already be "net" of savings from the other programs, as this would indicate the program did not increase or decrease participation in the other EE programs. However, if the program affected participation rates in other EE programs, then savings across all programs were lower than what would be indicated by the simple summation of savings in the EnergyCheck/Pulse and other EE programs. If the EnergyCheck/Pulse program caused increased participation in one or more other EE programs, the resulting increase in savings may be allocated to either program but not both simultaneously.[11]

As data permitted, Navigant used a difference-in-difference (DID) statistic to estimate uplift in other EE programs attributable to the EnergyCheck/Pulse program. To calculate the DID statistic, Navigant

[10] Facsimiles of the reports sent to participants in the EnergyCheck/Pulse program are included as attachments in the Appendix.

[11] It is not possible to avoid double counting of savings generated by programs for which tracking data are not available, such as upstream compact fluorescent lamp (CFL) programs.

subtracted the change in the participation rate in other EE programs between PY7 and the pre-program year for the control group from the participation change for the treatment group. For instance, if the rate of participation in another EE program for which customers in the EnergyCheck/Pulse program might qualify during PY7 was five percent for the treatment group and three percent for the control group, and the rate of participation during the year before the start of the EnergyCheck/Pulse program was two percent for the treatment group and one percent for the control group, then the rate of uplift due to the EnergyCheck/Pulse program would be estimated to be one percent, as reflected in Equation 2-1.

Equation 2-1. DID Statistic Calculation

$$(\text{PY7 treatment group participation} - \text{prePY treatment group participation}) - (\text{PY7 control group participation} - \text{prePY control group participation}) = \text{DID statistic}$$

$$(5\% - 2\%) - (3\% - 1\%) = 1\%$$

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 vary due only to differences in time-invariant factors between the two groups.

Navigant examined the uplift associated with one other ComEd EE program: the Small Business Energy Savings (SBES) program. The SBES program achieves energy savings through incentives designed to encourage small C&I customers to upgrade the efficiency of their existing equipment and lighting.

Since the EnergyCheck/Pulse was a new program, Navigant did not need to account for legacy uplift for SBES savings that accrued from EE measures with multi-year measure lives that were installed in prior years.

2.6 Process Evaluation

Navigant's EnergyCheck/Pulse process evaluation was limited to interviews with the program implementation contractor and ComEd program managers.

3 Gross Impact Evaluation

3.1 Program Savings

Ex ante savings for the EnergyCheck/Pulse program was 6,900 MWh. Verified savings prior to uplift adjustment was 579 MWh, resulting in a verified realization rate of 0.08. Of the total verified savings, 383 MWh was due to uplift in other EE programs, resulting in a final verified savings after uplift adjustment of 196 MWh. These figures are shown in Table 3-1.

Table 3-1. PY7 Total EnergyCheck/Pulse Program Energy Savings

Savings Category	Energy Savings (MWh)
Ex Ante Gross Savings*	6,900
Verified Savings, Prior to Uplift Adjustment‡	579
Verified Gross Realization Rate†	0.08
Uplift Savings	383
Verified Net Savings After Uplift Adjustment‡	196

Source: Navigant analysis of ComEd program tracking and customer billing data.

* Equals product of target savings rate (1.5 percent), average daily pre-program energy usage, and total number of participant-days during the pilot period (pro-rated for participant move-outs/drop-outs).

† Equals ratio of verified savings prior to uplift adjustment to ex ante gross savings.

‡ Verified savings not statistically significant at 90 percent confidence level.

3.2 PPR and LFER Model Parameter Estimates

The PPR and LFER models generated results for EnergyCheck/Pulse program savings that are very similar – and not statistically different from each other. Navigant prefers the PPR results for reporting EnergyCheck/Pulse program savings for the pilot period, but the results from the LFER model are not materially different. The PPR model yielded an estimated impact of 0.16 kWh per day of savings per participant, with a 90 percent confidence interval of [-0.035 kWh/day, 0.349 kWh/day]. Expressed in percentage terms, this is a 0.13 percent savings rate, with a 90 percent confidence interval of [-0.03%, 0.29%]. For the LFER model the estimated impact was 0.17 kWh per day per participant, with a 90 percent confidence interval of [-0.261 kWh/day, 0.600 kWh/day], or in percentage terms, 0.14 percent savings with a 90 percent confidence interval of [-0.21%, 0.49%]. Neither of these energy savings estimates is statistically significant at the 90 percent confidence level using either the two-sided test or a one-sided test; nor, as mentioned above, are the savings estimates statistically different from one another: each estimate falls within the 90 percent confidence bounds for the other.

3.3 Uplift of Savings in Other EE Programs

Navigant's estimate of EnergyCheck/Pulse program savings was found to include savings that resulted from the uplift in participation of report recipients in another ComEd EE program, the Small Business Energy Savings Program (SBES). To be clear, this savings is attributable to the EnergyCheck/Pulse program, in the sense that it would not have occurred without the EnergyCheck/Pulse program. But since the SBES program's energy savings has been evaluated separately, the portion of its savings that overlaps

with the EnergyCheck/Pulse program should not be counted twice. It can be attributed to the EnergyCheck/Pulse program, or to the SBES program, but not to both. Navigant estimated total uplift savings and subtracted it from the EnergyCheck/Pulse program's savings to avoid double-counting.

Section 6.6 of the Appendix presents the details of the calculation of PY7 uplift for the SBES ComEd EE program. The estimate of double-counted savings is likely an *overestimate* because it presumes that participation in the SBES program occurred at the start of PY7. If we instead assume that the uplift in participation occurred at a uniform rate throughout the program year, the estimate of double-counted savings would be approximately 192 MWh, or half the estimated value of 383 MWh.

3.4 Verified Program Impact Results

The detailed savings results from the EnergyCheck/Pulse program are summarized in Table 3-2.

Table 3-2. Detailed EnergyCheck/Pulse Program Results

Type of Statistic	Program Total
Sample Size – Treatment Group	10,607
Sample Size – Control Group	10,014
Program Period Average Daily Use (kWh)	121.17
Average Daily Savings (kWh)	0.16
Standard Error	0.12
Percentage Savings	0.13%
Standard Error	*0.10%*
kWh Savings per Customer	54.61
Standard Error	*40.71*
Verified Gross Savings Prior to Uplift Adjustment, MWh*	579.30
Standard Error	*431.76*
Savings Uplift in Other EE Programs in PY7, MWh	383.02
Verified Net Savings after Uplift Adjustment, MWh†	191.51

Source: Navigant analysis of ComEd program tracking and customer billing data.
* Total savings are pro-rated for participant move-out/drop-out during the pilot period.
† Verified net savings after uplift adjustment equals verified gross savings prior to uplift adjustment less uplift savings in other EE programs.

3.4.1 Program Savings by Industry Group

In addition to evaluating the overall energy savings of the EnergyCheck/Pulse program, Navigant evaluated the savings achieved by individual industry groups. Since Pulse randomized the targeted customers to the recipient and control groups using the entire sample, rather than doing so separately for each industry group, we first reran the RCT validation checks for each industry group. Energy savings was only assessed for industries that passed the test, indicating that the energy usage patterns of the recipients and controls in the industry during the pre-program year were consistent with an RCT design. These results are shown in Table 3-3. The industries where statistically significant energy savings were found are highlighted.

As shown in Table 3-3, savings are statistically positive at the 90 percent confidence level or better in four of the 26 industries (clothing stores, hotels, liquor stores, and nail salons), while in the remaining 22 industries they are not. The Navigant evaluation team can only speculate as to why the EnergyCheck/ Pulse program was successful in achieving significant energy savings in some industry groups but not others. To have been able to say more, we would have had to have conducted process research – in particular, participant surveys – to investigate how the reports were received, who viewed them, whether those viewing them were also the people responsible for paying the energy bills and/or making decisions about investing in new energy-efficient fixtures, appliances or mechanicals, and similar issues.

Table 3-3. PY7 EnergyCheck/Pulse Program Energy Savings by Industry

Industry	Sample Size	RCT Validated*	Average Energy Savings Rate	Average Daily Usage (kWh)†	P-Value (one-sided)‡
Accounting Office	292	✓	-0.28%	81	0.56
Bar	655	✓	0.23%	167	0.40
Barber Shop	149	✓	1.65%	49	0.25
Beauty Salon	1,266	No	N/A	62	--
Chiropractor	265	✓	1.33%	51	0.23
Clothing Store	388	✓	2.28%	88	0.10
Coffee Shop	232	✓	0.07%	187	0.48
Convenience Store	108	No	N/A	186	-
Dentist Office	1,198	No	N/A	66	-
Fast Food Restaurant	461	✓	0.27%	216	0.35
Grocery Store	549	✓	0.30%	208	0.39
Hotel	80	✓	3.17%	235	0.10
Insurance	690	✓	-1.80%	53	0.96
Law Office	550	✓	0.81%	69	0.27
Liquor Store	352	✓	1.84%	239	0.04
Motel	31	✓	2.74%	353	0.27
Nail Salon	107	✓	4.42%	59	0.03
Other Food	25	✓	-2.43%	141	0.66
Physician Office	1,091	✓	-0.93%	88	0.82
Realty	249	✓	0.46%	78	0.41
Religious Worship	2,561	✓	-0.28%	117	0.67
Restaurant	3,209	✓	0.08%	202	0.42
Trade Contractor	1,186	✓	1.05%	92	0.17
Used Car Dealership	140	✓	0.95%	94	0.41
Vehicle Dealership	92	✓	-5.92%	188	0.91
Vehicle Service	2,009	✓	-0.19%	95	0.61

Source: Navigant analysis of ComEd program tracking and customer billing data.

* Two-sided test of whether treatment effect in the pre-program year is non-zero at the 90 percent confidence level.

† Pooled average daily KWh usage of treatments and controls during the pre-program year.

‡ One-sided test of whether savings is greater than zero. A p-value of 0.10 or less indicates statistical significance at 90 percent confidence or better.

4 Net Impact Evaluation

A key design feature of the EnergyCheck/Pulse program is that it was an RCT, which means that the statistical analysis used to generate the energy savings estimated inherently yielded net savings. Since EnergyCheck/Pulse was an opt-out program, there was no possibility of any participants choosing to receive the individualized energy reports in the absence of the program. While it is possible that some customers receiving the reports might have undertaken the energy-conserving actions or purchased the high-efficiency equipment that they did during the pilot period even in the absence of the program, the random allocation of the targeted customers to treatment and control groups ensured that the participant and control groups of customers exhibited the same degree of energy-conserving behavior and purchases. Thus, there was no free ridership, and no "net-to-gross" (NTG) adjustment was necessary.

5 Findings and Recommendations

The following section includes program findings and recommendations.

Verified Gross Savings and Realization Rate.

Finding 1. Overall, the EnergyCheck/Pulse pilot program yielded 579 MWh of energy savings prior to uplift adjustment. This represents average savings of 0.16 kWh per program report recipient per day, or an average savings rate of 0.13 percent. The savings was not found to be statistically significant at the 90 percent confidence level. The EnergyCheck/Pulse program's internal planning goal had been 1.5 percent average savings.

Finding 2. Of the 579 MWh of energy savings, 383 MWh representing the majority of the claimed savings (66 percent), consisted of uplift due to participation by EnergyCheck/Pulse participants in the ComEd Small Business Energy Savings (SBES) program.

Recommendation 1. In future behavioral pilot programs targeting business customers, ComEd should include a process evaluation/customer satisfaction survey component. This would provide insights into why the program succeeded (or did not succeed) in stimulating significant energy savings among customers in different industry groups. Navigant's evaluation team has formulated a number of hypotheses as to why savings from the EnergyCheck/Pulse program was not more robust and widespread, but lacking an empirical foundation these hypotheses remain purely speculative.[12] Given the SBES' program size and prominence in the marketplace, uplift in SBES participation is likely to represent a sizable proportion of the savings from any behavioral programs targeting this customer segment.

[12] One possible explanation for why the EnergyCheck/Pulse program did not achieve the same level of savings that is commonly attained by similar programs targeting residential customers (1-3 percent) is that in the latter case the person receiving and reading the energy reports, the person paying the electric bills, and the person making decisions about investing in new energy-efficient fixtures, appliances or mechanicals are usually one and the same, whereas for business customers they are often different people. Thus, the messages conveyed by the reports may not be getting to the decision-maker.

6 Appendix

6.1 Data Cleaning Details

Before conducting the PPR and LFER analyses, Navigant removed the following customers and data points from the analysis:

- Observations after the move out date;
- Observations with negative bills;
- Observations with less than 20 or more than 40 days in the billing cycle;
- Customers who did not move and had less than 12 post-bills;
- Customers who had less than 9 pre-bills;
- Outliers, defined as observations with average daily usage more than one order of magnitude from the median usage.

Table 6-1 and Table 6-2 give tallies of observations and customers removed for each of these data cleaning steps.

Table 6-1. PY7 Data Cleaning Steps by Number of Observations Removed

Step	# of Control Observations	# of Participant Observations
Raw	262,689	278,893
Remove observations after the move out date	262,667	278,857
Remove observations with negative bills	262,667	278,857
Remove long/short bills (bill duration <20 or >40 days)	262,091	278,234
Remove customers who do not move and have less than 12 post-program bills	260,798	277,065
Remove customers who have less than 9 pre-program bills	260,798	277,065
Remove outliers (+/- one order of magnitude from median)	260,296	276,566

Source: Navigant analysis

Table 6-2. PY7 Data Cleaning Steps by Number of Customers Removed

Step	# of Controls	# of Participants
Raw	10,014	10,607
Remove billing observations after the move out date	10,000	10,600
Remove observations with negative bills	10,000	10,600
Remove long/short bills (bill duration <20 or >40 days)	10,000	10,600
Remove customers who did not move and had less than 12 post-program bills	9,944	10,547
Remove customers who have less than 9 pre-program bills	9,944	10,547
Remove outliers (+/- one order of magnitude from median)	9,944	10,547

Source: Navigant analysis

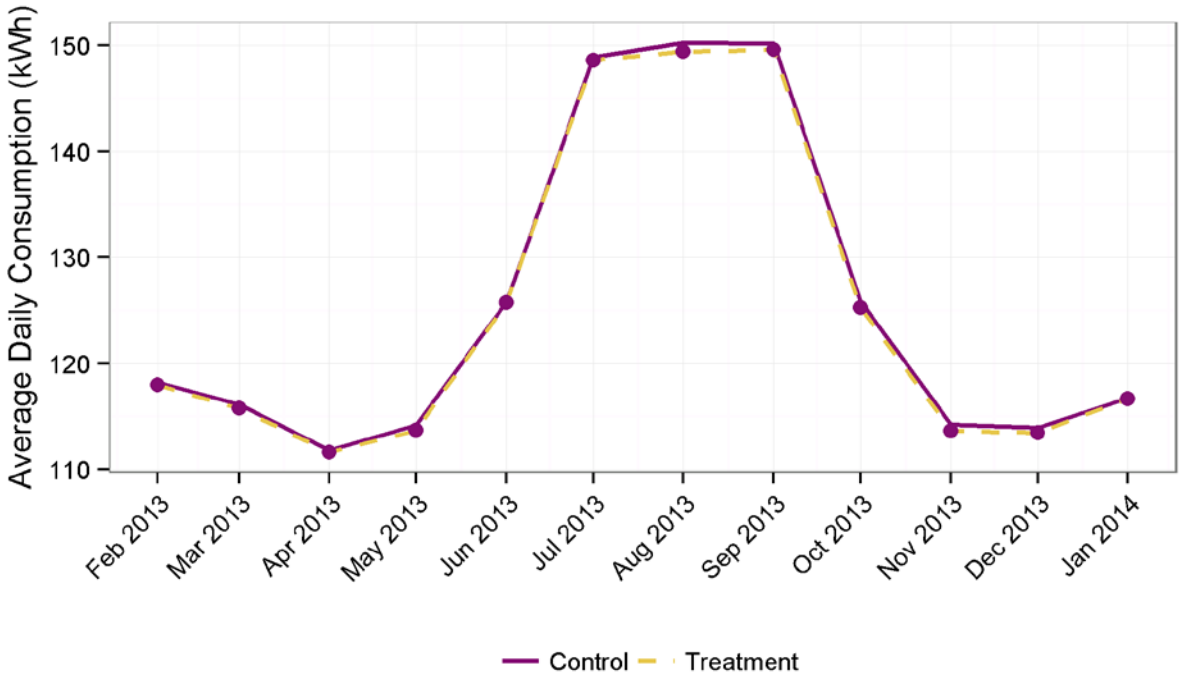
6.2 *Statistical Validation of the RCT Design*

Navigant used multiple methods to validate the RCT design of the EnergyCheck/Pulse program. The reasoning underlying all of the methods is that random allocation of the targeted customers to the treatment and control groups should result in energy usage that is identically distributed in the two groups during the pre-program period (i.e., before the treatment group began receiving reports). The evaluation team performed the following analyses using energy usage data from customer bills for the twelve months before the start of the program (February 2013 – January 2014) to validate the RCT design of the EnergyCheck/Pulse program:

- Plotted monthly mean energy usage for treatment and control groups in the pre-program year to visually examine differences between the two groups;
- Performed t tests on the monthly differences in mean energy use between the treatment and control groups in each of the 12 months;
- Performed a regression analysis in which customer average daily usage in each month in the pre-program period was regressed on a binary treatment variable and a set of monthly fixed effects to identify any evidence of non-random differences between the treatment and control groups.

Figure 6-1 shows the average energy use for treatment and control group for the twelve months prior to the start of the EnergyCheck/Pulse program's pilot period. As the figure shows, the means were virtually identical in each month, indicating little difference in average usage patterns for the treatment and control groups.

Figure 6-1. Pre-Period Treatment and Control Usage, in kWh



Source: Navigant analysis

Next, Navigant performed t tests of the differences in mean energy usage between the treatment and control groups in each of the twelve months of the pre-program period. As shown in Table 6-3, none of the monthly differences is significant at the 90 percent level of confidence.

Table 6-3. Results of RCT T Test Checks

Program Month/Year	T Statistic	Degrees of Freedom	P-Value (2-Tailed Test)
February 2013	0.153	20,619	0.88
March 2013	0.213	20,574	0.83
April 2013	0.114	20,584	0.91
May 2013	0.338	20,598	0.74
June 2013	0.028	20,590	0.98
July 2013	0.127	20,588	0.90
August 2013	0.420	20,436	0.67
September 2013	0.316	20,582	0.75
October 2013	0.352	20,574	0.72
November 2013	0.400	20,561	0.69
December 2013	0.339	20,535	0.73
January 2014	0.036	20,453	0.97

Source: Navigant analysis of ComEd program tracking and customer billing data.

As a final check, the evaluation team estimated a regression model designed to test whether there was a statistically significant difference in energy usage of the customers in the treatment and control groups ("treatment effect") in the pre-program year. The regression model is shown in Equation 6-1.

Equation 6-1. RCT Validation Regression Model

$$ADU_{kt} = \beta_1 Treatment_k + \sum_j \beta_{2j} Month_{jt} + \varepsilon_{kt}$$

where:

ADU_{kt} = average daily energy (kWh) usage of customer k during billing cycle t

$Treatment_k$ = binary variable taking a value of 1 when customer k belongs to the treatment group and 0 otherwise

$Month_{jt}$ = binary variable taking a value of 1 when $j=t$ and 0 otherwise

ε_{kt} = cluster-robust error term for customer k during billing cycle t[13]

[13] Cluster-robust errors allow for heteroscedasticity and autocorrelation at the customer level. That is, the error variances can vary across customers, and the errors can be serially correlated for any given customer.

If the coefficient β_1 is found to be statistically significant when this regression is fitted to monthly energy usage data from the treatment and control groups from the pre-program period, it would indicate that there is a non-random difference in usage between treatment and control households, which would call into question the program's randomization. The results of this analysis confirm that there is no evidence of a treatment effect in the pre-program year, as shown in Table 6-4.

Table 6-4. RCT Validation Model Results

Point Estimate of Treatment Effect	P-Value (2-Tailed Test)
-0.39	0.81

Source: Navigant analysis of ComEd program tracking and customer billing data.

6.3 Detailed Impact Methodology

Navigant used two regression models to estimate program impacts on recipient customer energy usage, a PPR model and an LFER model. The following sections present each model.

6.3.1 Post Program Regression Model

The PPR model controls for non-treatment differences in energy use between treatment and control customers using the customer's own lagged energy consumption as an explanatory variable. Specifically, the model frames energy use in calendar month *t* of the post-program period as a function of both the treatment variable and energy use in the same calendar month of the pre-program period. The underlying logic is that any systematic differences among customers will be reflected in differences in their past energy use, which in turn should be highly correlated with their current energy use. Formally, the model is shown in Equation 6-2.

Equation 6-2. Post Program Regression Model

$$ADU_{kt} = b_1 Treatment_k + b_2 ADUlag_{kt} + \sum_J b_{3j} Month_{jt} + \sum_J b_{4j} Month_{jt} \times ADUlag_{kt} + e_{kt}$$

where:

ADU_{kt}	is average daily consumption of *kWh* by household *k* in bill period *t*;
$Treatment_k$	is a binary variable taking a value of 1 if customer *k* is assigned to the treatment group and 0 otherwise;
$ADUlag_{kt}$	is customer *k*'s energy use in the same billing period of the pre-program year as that of month *t*;
$Month_{jt}$	is a binary variable taking a value of 1 when $j = t$ and 0 otherwise; and
e_{kt}	is the cluster-robust error term for household *k* during billing cycle *t;* cluster-robust errors allow for heteroskedasticity and autocorrelation at the household level.[14]

The coefficient b_1 is the estimate of average daily kWh energy savings due to the program during the pilot period.

[14] Without cluster-robust errors, the ordinary least-squares (OLS) regression model assumes that the error terms are both homoscedastic (having constant variance) and non-serially correlated. In panel data models, the normal expectation is that the error variance will differ across individuals, and the error term in any one period will be correlated with the adjacent error terms for any given individual. Treating the errors as homoscedastic and non-autocorrelated in an individual-level panel data model would typically result in estimated standard errors that are biased downward.

6.3.2 Linear Fixed Effects Regression Model

The simplest version of an LFER model convenient for exposition is one in which average daily consumption of kWh by household *k* in bill period *t*, denoted by ADU_{kt}, is a function of the following three terms:

1. The binary variable $Treatment_k$
2. The binary variable $Post_t$, taking a value of 0 if month *t* is in the pre-treatment period, and 1 if in the post-treatment period
3. The interaction between these variables, $Treatment_k \cdot Post_t$

Formally, the LFER model is showing in as shown in Equation 6-3.

Equation 6-3. Linear Fixed Effects Regression Model

$$ADU_{kt} = a_{0k} + a_1 Post_t + a_2 Treatment_k \times Post_t + e_{kt}$$

In this model, the coefficient a_{0k} captures all customer-specific effects on energy usage that do not change over time, including those that are unobservable to the evaluation team. The coefficient a_1 captures the average effect *across all customers* of being in the post-program period. And the effect of being both in the treatment group and in the post period—the effect directly attributable to the program—is captured by the coefficient a_2. Put another way, whereas the coefficient a_1 captures the change in average daily usage between the pre- and post-treatment for the *control* group, the sum $a_1 + a_2$ captures this change for the treatment group, and therefore their difference, a_2, estimates the average daily therms savings due to the program in GPY4.PY7.

6.4 Detailed Impact Results: Parameter Estimates

Table 6-5 and Table 6-6 show the results of the PPR and LFER models for the program. Across the two models, the parameter estimates are not statistically different; that is, the estimates for each model are within the 90 percent confidence bounds for the other model.

Table 6-5. PPR Model Estimates

	Estimate	Std. Error	t value	Pr(>|t|)
pre.kwh	0.97	0.00	201.98	0.00
treatment	-0.16	0.26	-0.60	0.55
yrmo201403	3.83	0.46	8.33	0.00
yrmo201404	2.14	0.34	6.22	0.00
yrmo201405	1.82	0.31	5.91	0.00
yrmo201406	1.78	0.34	5.27	0.00
yrmo201407	2.00	0.35	5.70	0.00
yrmo201408	0.85	0.35	2.40	0.02
yrmo201409	0.45	0.38	1.17	0.24
yrmo201410	2.10	0.34	6.12	0.00
yrmo201411	1.51	0.33	4.56	0.00
yrmo201412	3.01	0.39	7.79	0.00
yrmo201501	1.50	0.35	4.30	0.00
yrmo201502	1.52	0.38	3.99	0.00
yrmo201503	3.01	0.42	7.10	0.00
pre.kwh:yrmo201404	0.00	0.00	-0.80	0.42
pre.kwh:yrmo201405	-0.02	0.00	-3.77	0.00
pre.kwh:yrmo201406	0.03	0.01	6.47	0.00
pre.kwh:yrmo201407	-0.02	0.01	-4.69	0.00
pre.kwh:yrmo201408	-0.02	0.01	-3.70	0.00
pre.kwh:yrmo201409	-0.02	0.01	-4.44	0.00
pre.kwh:yrmo201410	-0.07	0.01	-12.65	0.00
pre.kwh:yrmo201411	-0.01	0.01	-2.58	0.01
pre.kwh:yrmo201412	-0.02	0.01	-3.01	0.00
pre.kwh:yrmo201501	-0.01	0.01	-1.98	0.05
pre.kwh:yrmo201502	-0.02	0.01	-2.80	0.01
pre.kwh:yrmo201503	-0.02	0.00	-3.75	0.00
Multiple R-squared: 0.9698, Adjusted R-squared: 0.9698				

Source: Navigant analysis of ComEd program tracking and customer billing data.

Table 6-6. LFER Model Estimates

	Estimate	Std. Error	t value	Pr(>|t|)
post	-2.83	0.18	-15.42	0.00
post.treatment	-0.17	0.26	-0.65	0.52
R-Squared: 0.0020709 Adj. R-Squared: 0.0019919				

Source: Navigant analysis of ComEd program tracking and customer billing data.

6.5 One-Sided Versus Two-Sided Hypothesis Tests

As noted in Section E.1, the EnergyCheck/Pulse program's overall verified energy savings was found *not to be significant* at the 90 percent confidence level using either a two-sided or a one-sided test. That is, the estimated savings for the program as a whole was not large enough, relative to its estimated standard error, for Navigant to be able to confirm that it was not simply a statistical fluke resulting from sampling error. However, we were able to verify significant energy savings for four of the 26 industry groups included in the pilot: clothing stores, hotels, liquor stores, and nail salons. Of these, the first two are significant only using a 1-sided test. To clarify this distinction, the two-sided and one-sided versions of the test of statistical significance of program savings are presented formally in Equation 6-4 and Equation 6-5, respectively:

Equation 6-4. Two-Sided Test of Significance

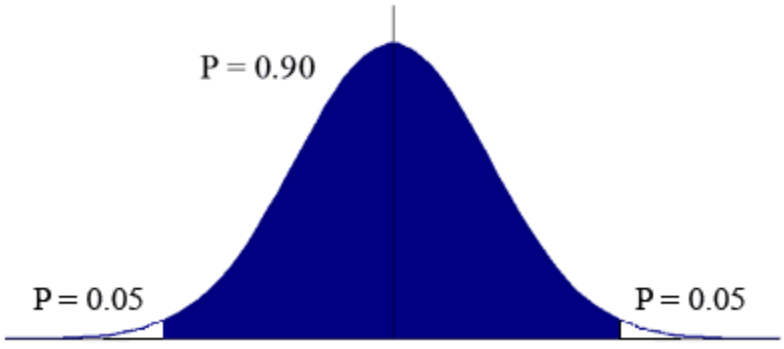
Null hypothesis: EnergyCheck/Pulse program savings = 0 MWh
Alternative hypothesis: EnergyCheck/Pulse program savings ≠ 0 MWh

Equation 6-5. One-Sided Test of Significance

Null hypothesis: EnergyCheck/Pulse program savings ≤ 0 MWh
Alternative hypothesis: EnergyCheck/Pulse program savings > 0 MWh

In the two-sided test, "significance" means "significantly different from zero." As shown in Figure 6-2, to be found significant in a two-sided test the value of energy savings must be sufficiently large *in absolute value* to exceed the margin of error associated with the 90 percent level of confidence (i.e., 1.645 x the estimated standard error). In other words, a two-sided test rejects the null hypothesis as long as savings exceeds the margin of error without regard to the sign: the "savings" that is deemed to be "significant" by the test can be either positive (i.e., actual energy savings) or negative (i.e., dissavings). As long as the estimate of savings is large enough to be pushed beyond the blue region in the figure in either direction, it is "significant."

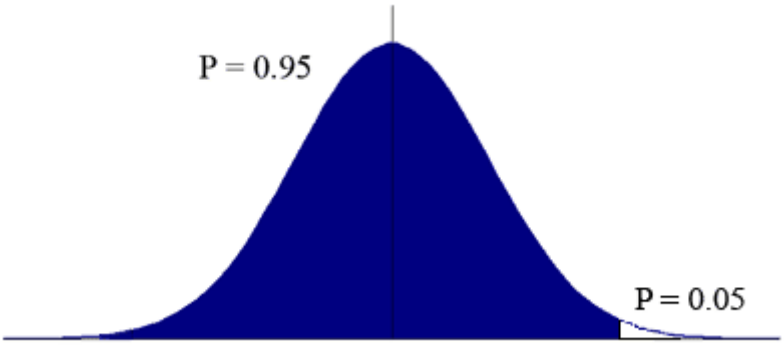
Figure 6-2. Illustration of Two-Sided Hypothesis Test



Source: "1- vs 2-Tailed Tests" (http://www.chem.utoronto.ca/coursenotes/analsci/stats/12tailed.html).

By contrast, the one-sided test takes account of the *sign* of the energy savings, implicitly assuming that energy savings only matters if it is positive (i.e., if the program causes the average energy usage of participants to *decline* relative to that of controls). This is shown in Figure 6-3.

Figure 6-3. Illustration of One-Sided Hypothesis Test



Source: "1- vs 2-Tailed Tests" (http://www.chem.utoronto.ca/coursenotes/analsci/stats/12tailed.html).

Navigant believes that in the case of energy efficiency programs, the one-sided test is the more relevant of the two since the goal of the program is to induce actual savings.

6.6 Savings Due to Participation Uplift in Other EE Programs in PY7

Table 6-7 presents program savings due to participation uplift in the Small Business Energy Savings program in PY7.

Table 6-7. Estimates of Double-Counted Savings

	Program SBES
Average program savings (annual kWh per participant)	11,559
# treatment households	9,011
Rate of participation, PY7 (%)	7.30%
Change in rate of participation from pre-program year (%)	4.67%
# control households	8,985
Rate of participation, PY7 (%)	7.18%
Change in rate of participation from pre-program year (%)	4.37%
DID/POD statistic	0.30%
Change in program participation due to energy report program	27
Statistically significant at the 90% confidence level?	No
Savings attributable to other programs (kWh)	310,506

Source: Navigant analysis.

6.7 Attachments: Facsimiles of EnergyCheck/Pulse Reports

Seven EnergyCheck/Pulse report facsimiles are reproduced below: the initial welcome report mailed out in February 2014 and six subsequent reports. Each report contained two pages printed back-to-back.

March 5, 2014

ComEd powering lives
An Exelon Company

P.O. Box 5228 Oak Brook, IL 60522-5228

energycheck

Reporting period: Jan 2013 - Dec 2013
Account #: 9999999999
Report for: ComEd Energy Efficiency Services -

For more detailed information: **ComEd.com/EnergyCheck**

You spend **$3,275 more** on electricity than average restaurants.

Your electricity use over the last 12 months is compared to the **average** of restaurants in Northern Illinois with similar characteristics.

Annual energy cost comparison

3 Lincoln Centre **$19,845**

Average restaurants **$16,570**

This comparison is based on the following details:

- ☐ You operate a **restaurant**
- ☐ You are normally open **86 hours per week**
- ☐ You occupy about **6,500 ft²**
- ☐ You are located in a **hot summer**, **cold winter** climate
- ☐ Default electricity price: **9.26 ¢/kWh**

To update your details, please visit **ComEd.com/EnergyCheck** or contact us at **EnergyCheck@ComEd.com** or **1-855-433-2700**.

About the costs and savings in this report

EnergyCheck uses a default electricity price of **9.26 ¢/kWh** to calculate cost and savings figures.

To use your exact electricity price, visit **ComEd.com/EnergyCheck**.

We want to help you lower your energy bills

In the coming months, you will receive a **series of reports** that focus on how your business uses energy and actions you can take to lower your bill.

Welcome	Refrigeration	Cooling	Closed Hours	Lighting	Cooking	...
Feb 2014	Mar 2014	Apr 2014	Jun 2014	Aug 2014	Oct 2014	

ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com smart ideas

FOCUS ON
Annual cost breakdown

Over the last 12 months, you spent **$19,845** on electricity based on the default price of 9.26 ¢/kWh.

We've estimated the breakdown of your energy costs based on the major energy consumption categories of a typical restaurant.

Energy use by category

39%	Refrigeration	$7,914
20%	Lighting	$3,878
12%	Ventilation	$2,292
11%	Cooking	$2,175
18%	Other	$3,586

"Other" includes cooling, misc. equipment, office equipment, space heating and water heating.

We've analyzed your restaurant's electricity use and recommend the following actions:

Upgrade interior lighting

One of the **best ways** to reduce energy waste and cut costs is to upgrade your interior lighting.

Newer, more efficient technologies can reduce your lighting energy use by **20% or more**.

For example, **LED bulbs** use about **80% less energy** than standard incandescent bulbs.

NEXT STEP:
Contact a lighting specialist.

Incentives available at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO **$1,700**/YEAR

ENERGY STAR refrigerators

When it's time to replace your older refrigerator, consider prioritizing **energy efficiency**.

A new ENERGY STAR® refrigerator is **15% more efficient** than a non-qualified model.

Generally, the larger the refrigerator, the greater the energy use, so choose the **smallest model** that meets your needs.

NEXT STEP:
Look for the ENERGY STAR label.

CUT ELECTRICITY COSTS BY UP TO **$1,200**/YEAR

Variable speed drives

Ventilation systems do not normally require that fans **operate at full speed** at all times.

Consider adding **variable speed drives** (VSDs) to fan motors.

VSDs match fan speed to **the actual requirements** at different times of the day. They can reduce your ventilation load by **up to 50%.**

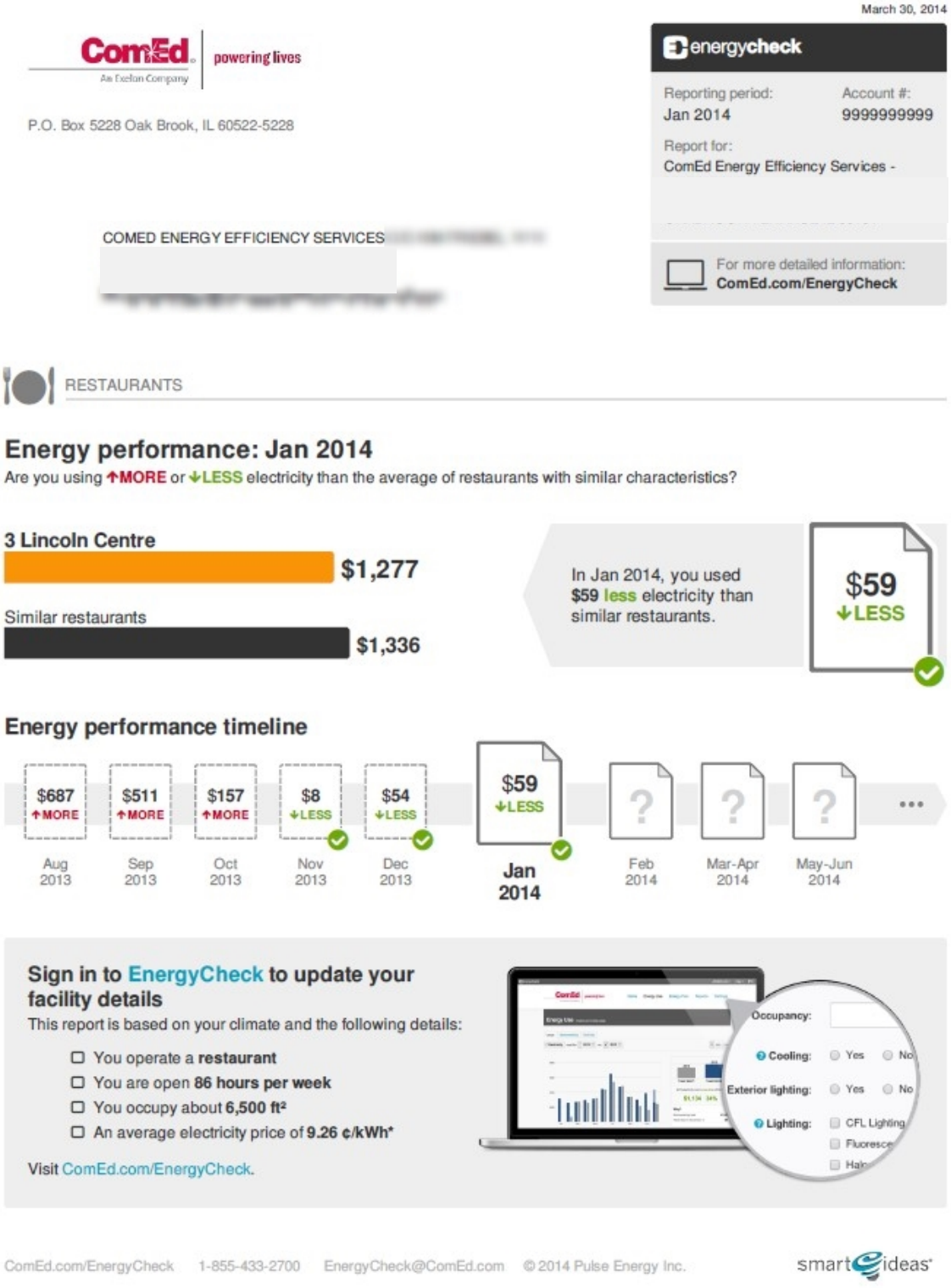
NEXT STEP:
Contact your equipment supplier.

Incentives available at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO **$1,100**/YEAR

NEXT REPORT
Refrigeration
Energy efficient refrigeration can cut refrigeration electricity use by up to 35%. **Learn more in your next report.**

In your mailbox: **Mar 2014**


March 30, 2014
ComEd
An Exelon Company
powering lives
P.O. Box 5228 Oak Brook, IL 60522-5228
energycheck
Reporting period:
Jan 2014
Account #:
9999999999
Report for:
ComEd Energy Efficiency Services -
COMED ENERGY EFFICIENCY SERVICES
For more detailed information:
ComEd.com/EnergyCheck
RESTAURANTS
Energy performance: Jan 2014
Are you using ↑MORE or ↓LESS electricity than the average of restaurants with similar characteristics?
3 Lincoln Centre
$1,277
Similar restaurants
$1,336
In Jan 2014, you used $59 less electricity than similar restaurants.
$59
↓LESS
Energy performance timeline
$687 ↑MORE
$511 ↑MORE
$157 ↑MORE
$8 ↓LESS
$54 ↓LESS
$59 ↓LESS
Aug 2013
Sep 2013
Oct 2013
Nov 2013
Dec 2013
Jan 2014
Feb 2014
Mar-Apr 2014
May-Jun 2014
Sign in to EnergyCheck to update your facility details
This report is based on your climate and the following details:
You operate a restaurant
You are open 86 hours per week
You occupy about 6,500 ft²
An average electricity price of 9.26 ¢/kWh*
Visit ComEd.com/EnergyCheck.
Occupancy:
Cooling: Yes No
Exterior lighting: Yes No
Lighting:
CFL Lighting
ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com © 2014 Pulse Energy Inc.
smart ideas

FOCUS ON
Refrigeration

Cost of refrigeration:

- About **40%** of your electricity bill is from electricity used for refrigeration.
- You currently spend about **$7,900**/year on electricity for refrigeration, assuming an average price of 9.26 ¢/kWh*.

More efficient refrigeration:

- Reduces food spoilage
- Is quieter
- Requires less maintenance
- Has a longer lifespan
- Limits ice build-up

Refrigeration

40%
of annual electricity cost

We've analyzed your restaurant's electricity use and recommend the following actions:

ENERGY STAR® refrigerators

When it's time to replace your older refrigerator, consider making **energy efficiency** a priority.

A new ENERGY STAR refrigerator is **15% more efficient** than a standard model.

Generally, the larger the refrigerator, the greater the energy use, so choose the **smallest model** that meets your needs.

NEXT STEP:
Look for the ENERGY STAR label.

CUT ELECTRICITY COSTS BY UP TO
$1,200/YEAR

Fan motors

Refrigeration systems require evaporator units to **circulate cool air**.

Most of these units come equipped with fans driven by **inefficient** shaded pole motors.

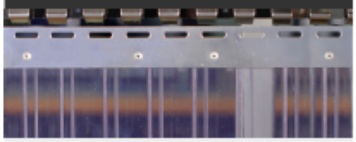
By upgrading to **electronically commutated motors** (ECMs), you can achieve significant energy savings at a relatively low cost.

NEXT STEP:
Contact a refrigeration specialist.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$1,000/YEAR

Cooler strip curtains



Strip curtains are **clear flexible strips** located at the openings of walk-in coolers.

They help **block the transfer of heat** from the surrounding air into the refrigerated space when the door is opened.

As a result, compressors don't have to work as hard, or for as long, which **saves energy**.

NEXT STEP:
Measure the size of your cooler door.

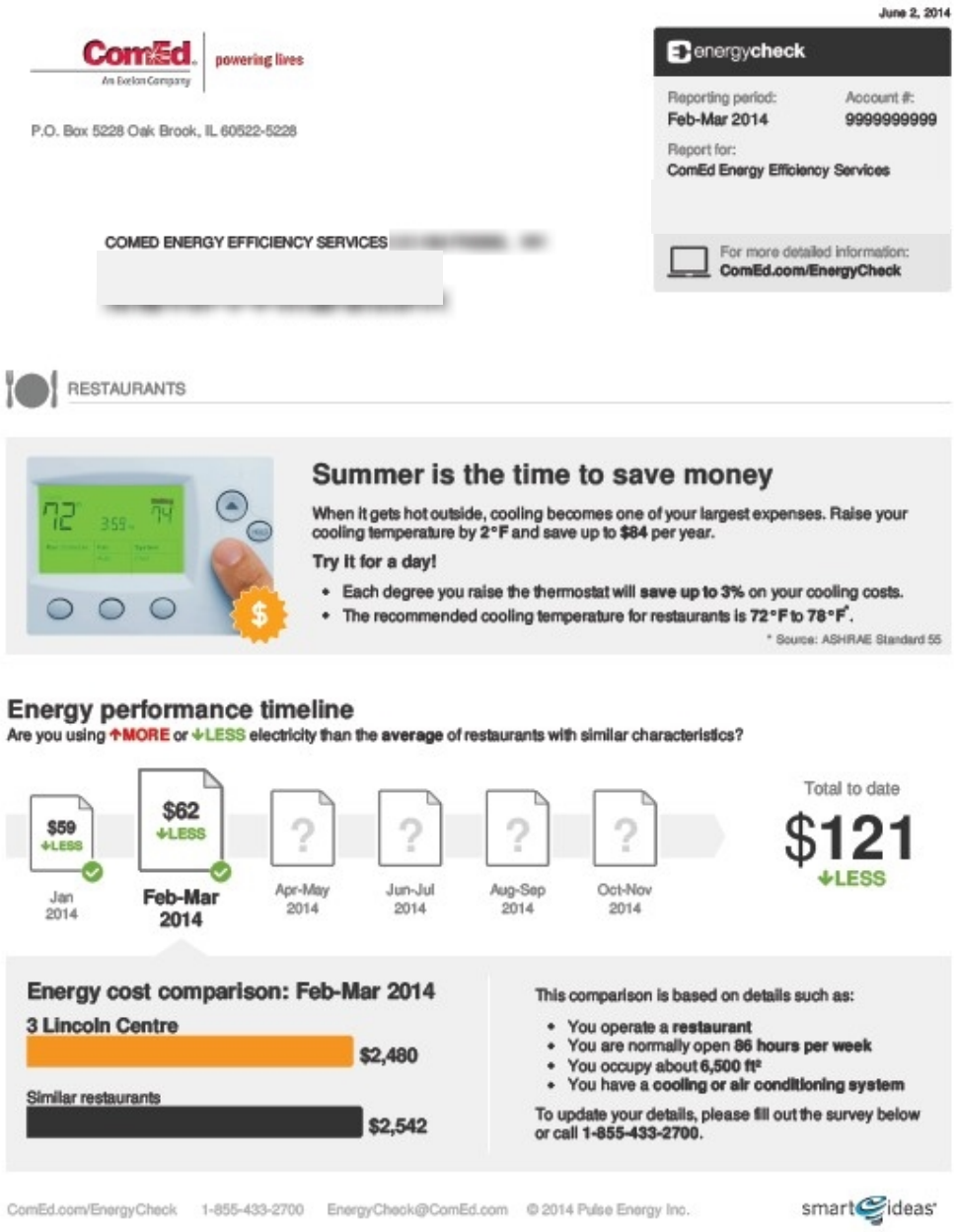
CUT ELECTRICITY COSTS BY UP TO
$330/YEAR

Learn more about your recommendations

Visit **ComEd.com/EnergyCheck** to personalize your energy savings estimates, update your facility profile and discover more ways to save.

Next report: May 2014

FOCUS ON
Cooling



June 2, 2014

ComEd. powering lives
An Exelon Company

P.O. Box 5228 Oak Brook, IL 60522-5228

COMED ENERGY EFFICIENCY SERVICES

energycheck

Reporting period: Feb-Mar 2014

Account #: 9999999999

Report for: ComEd Energy Efficiency Services

For more detailed information: ComEd.com/EnergyCheck

RESTAURANTS

Summer is the time to save money

When it gets hot outside, cooling becomes one of your largest expenses. Raise your cooling temperature by 2°F and save up to $84 per year.

Try it for a day!

- Each degree you raise the thermostat will **save up to 3%** on your cooling costs.
- The recommended cooling temperature for restaurants is **72°F to 78°F***.

* Source: ASHRAE Standard 55

Energy performance timeline

Are you using ↑MORE or ↓LESS electricity than the **average** of restaurants with similar characteristics?

Jan 2014	Feb-Mar 2014	Apr-May 2014	Jun-Jul 2014	Aug-Sep 2014	Oct-Nov 2014
$59 ↓LESS	$62 ↓LESS	?	?	?	?

Total to date
$121
↓LESS

Energy cost comparison: Feb-Mar 2014

3 Lincoln Centre $2,480

Similar restaurants $2,542

This comparison is based on details such as:

- You operate a **restaurant**
- You are normally open **86 hours per week**
- You occupy about **6,500 ft²**
- You have a **cooling or air conditioning system**

To update your details, please fill out the survey below or call **1-855-433-2700**.

ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com © 2014 Pulse Energy Inc. smartideas

Detach here

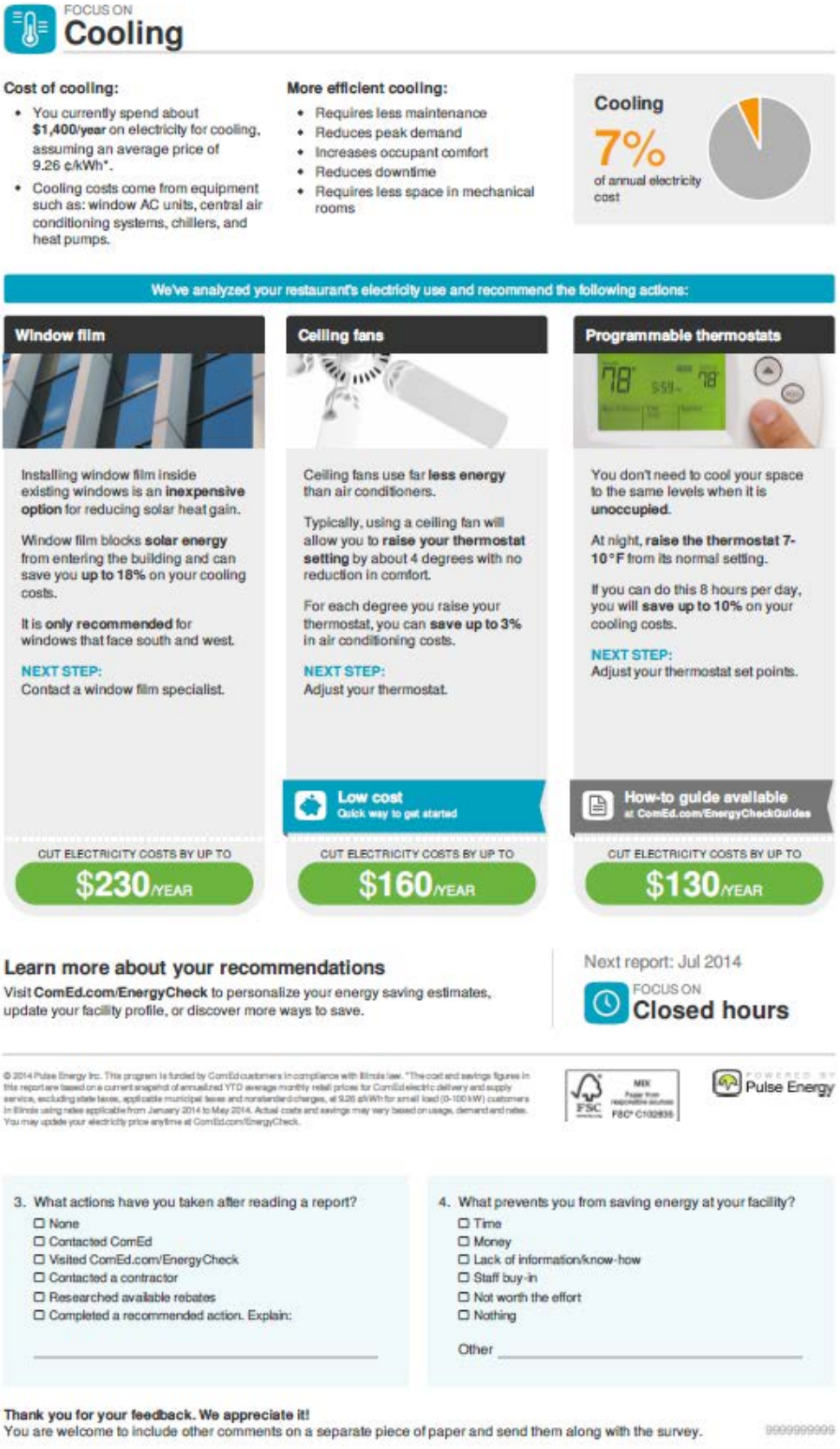
We want to hear from you

Please answer these four questions and mail back your responses in the enclosed prepaid envelope:

1. Please confirm or correct your business details:
   Type: restaurant
   Open: 86 hours/week Size: 6,500 ft²

2. How satisfied are you with the EnergyCheck reports mailed to your business?
   1 2 3 4 5
   Very dissatisfied Very satisfied

Please turn over »



FOCUS ON
Cooling

Cost of cooling:

- You currently spend about **$1,400/year** on electricity for cooling, assuming an average price of 9.26 ¢/kWh*.
- Cooling costs come from equipment such as: window AC units, central air conditioning systems, chillers, and heat pumps.

More efficient cooling:

- Requires less maintenance
- Reduces peak demand
- Increases occupant comfort
- Reduces downtime
- Requires less space in mechanical rooms

Cooling

7%

of annual electricity cost

We've analyzed your restaurant's electricity use and recommend the following actions:

Window film

Installing window film inside existing windows is an **inexpensive option** for reducing solar heat gain.

Window film blocks **solar energy** from entering the building and can save you **up to 18%** on your cooling costs.

It is **only recommended** for windows that face south and west.

NEXT STEP:
Contact a window film specialist.

CUT ELECTRICITY COSTS BY UP TO
$230/YEAR

Ceiling fans

Ceiling fans use far **less energy** than air conditioners.

Typically, using a ceiling fan will allow you to **raise your thermostat setting** by about 4 degrees with no reduction in comfort.

For each degree you raise your thermostat, you can **save up to 3%** in air conditioning costs.

NEXT STEP:
Adjust your thermostat.

Low cost
Quick way to get started

CUT ELECTRICITY COSTS BY UP TO
$160/YEAR

Programmable thermostats

You don't need to cool your space to the same levels when it is **unoccupied**.

At night, **raise the thermostat 7-10°F** from its normal setting.

If you can do this 8 hours per day, you **will save up to 10%** on your cooling costs.

NEXT STEP:
Adjust your thermostat set points.

How-to guide available
at ComEd.com/EnergyCheckGuides

CUT ELECTRICITY COSTS BY UP TO
$130/YEAR

Learn more about your recommendations

Visit **ComEd.com/EnergyCheck** to personalize your energy saving estimates, update your facility profile, or discover more ways to save.

Next report: Jul 2014

FOCUS ON
Closed hours

FSC MIX Paper from responsible sources FSC® C102935

POWERED BY Pulse Energy

3. What actions have you taken after reading a report?
   - ☐ None
   - ☐ Contacted ComEd
   - ☐ Visited ComEd.com/EnergyCheck
   - ☐ Contacted a contractor
   - ☐ Researched available rebates
   - ☐ Completed a recommended action. Explain: _____

4. What prevents you from saving energy at your facility?
   - ☐ Time
   - ☐ Money
   - ☐ Lack of information/know-how
   - ☐ Staff buy-in
   - ☐ Not worth the effort
   - ☐ Nothing

   Other _____

Thank you for your feedback. We appreciate it!
You are welcome to include other comments on a separate piece of paper and send them along with the survey.

999999999

July 31, 2014

ComEd. powering lives
An Exelon Company

P.O. Box 5228 Oak Brook, IL 60522-5228

energycheck

Reporting period: Apr-May 2014

Account #: 9999999999

Report for:

COMED ENERGY EFFICIENCY SERVICES C/O

For more detailed information:
ComEd.com/EnergyCheck
1-855-433-2700

RESTAURANTS

Energy performance timeline

Are you using ↑MORE or ↓LESS electricity than the average of restaurants with similar characteristics?

It appears your business is maintaining **consistent energy efficiency**. See the next page for ways to save.

Create an online EnergyCheck account and be entered to win!

Visit ComEd.com/EnergyCheck for a chance to win your choice of a $300 Staples® or The Home Depot® gift card.

No purchase necessary. Open to all ComEd customers who receive an EnergyCheck report and are online EnergyCheck portal users or sign up to become users. Rules apply. See ComEd.com/ECContest to view the rules. Contest ends August 31, 2014.

ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com smartideas

FOCUS ON
Electricity use during closed hours

Closed hours

24%

of annual electricity cost

Costs during closed hours:

- Your business is closed about **4264** hours per year.
- We estimate you spend about **$4,500/year** on electricity used during closed hours, assuming an average price of 9.26 ¢/kWh*.

x 190

The amount of electricity you use during closed hours each day is equivalent to leaving on **190 standard 60 Watt desk lamps** during these times.

We've analyzed your restaurant's electricity use and recommend the following actions:

Smart power strips

When you turn off some electronics, such as computers and monitors, they go into standby mode and **continue to draw power**.

This standby power can account for **about 5%** of your electricity bill.

Reduce this waste by plugging these devices into smart power strips that **automatically cut power** to items not actually being used.

NEXT STEP:
Purchase smart power strips.

CUT ELECTRICITY COSTS BY UP TO
$340/YEAR

Lighting time clocks

Installing a programmable time clock is a good way to ensure that lighting is **turned off automatically** at night.

They are **especially useful** for locations that have regular operating hours.

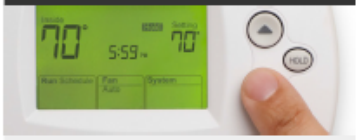
Time clocks **cost relatively little** to install and can control a **large amount** of lighting with a single device.

NEXT STEP:
Contact an electrician for a quote.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$300/YEAR

Programmable thermostats



You don't need to heat or cool your building to the same levels **when it is unoccupied**.

At night, set **the thermostat back 7-10°F** from its normal setting.

If you can do this 8 hours per day, you will save **up to 10%** on the electricity used for heating and cooling.

NEXT STEP:
Adjust your thermostat set points.

How-to guide available
at ComEd.com/EnergyCheckGuides

CUT ELECTRICITY COSTS BY UP TO
$120/YEAR

Learn more about your recommendations

Visit **ComEd.com/EnergyCheck** to personalize your energy saving estimates, update your facility profile, or discover more ways to save.

Next report: Sep 2014

FOCUS ON
Customer feedback

September 29, 2014

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P.O. Box 5228 Oak Brook, IL 60522-5228

COMED ENERGY EFFICIENCY SERVICES C/O [redacted]

energycheck

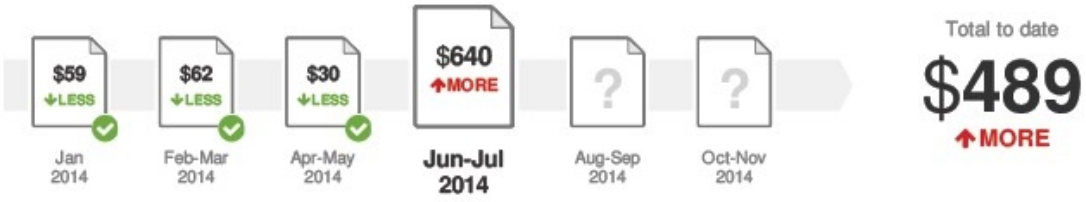
Reporting period: Jun-Jul 2014
Account #: 9999999999
Report for: ComEd Energy Efficiency Services

For more detailed information:
ComEd.com/EnergyCheck
1-855-433-2700

RESTAURANTS

Energy performance timeline

Are you using ↑MORE or ↓LESS electricity than the average of restaurants with similar characteristics?



Jun-Jul 2014

Practices used by restaurants with average energy-efficiency include:

- Turning off lights during closed hours
- Cutting idle time on cooking equipment
- Performing regular maintenance on refrigeration

Have questions?
Give us a call.
1-855-433-2700

Want to save money for your business?

The *SmartIdeas*® program includes a free assessment of the energy-efficiency opportunities in your facility. Upon completion of this free assessment, you will receive a written report with recommendations for energy-efficiency improvements.

To find out what ComEd has to offer your business, call today at 1-855-433-2700 or visit ComEd.com/smallbiz

ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com smartideas

FOCUS ON
Customer feedback

The survey results are in!

34% **Took action**

For example, customers researched rebates and completed recommended actions after reading a report.

Top recommended actions completed by customers

Programmable thermostats	27%
Upgrade interior lighting	27%
Ceiling fans	15%
Turn off equipment	8%
Other	23%

"Other" includes: Maintain HVAC systems, Close the blinds, Reflective window film, and Lighting time clocks.

Based on the recent survey, these are some of the most popular actions completed by other businesses:

Upgrade interior lighting

One of the **best ways** to reduce energy waste and cut costs is to upgrade your interior lighting.

LED bulbs use up to **80% less** electricity than standard incandescent bulbs and up to **20% less** electricity than CFL bulbs.

T8 fluorescent systems use up to **48% less** electricity than obsolete T12 lighting.

NEXT STEP:
Contact a lighting specialist.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$1,600/YEAR

Lighting time clocks

Installing a programmable time clock is a good way to ensure that lighting is **turned off automatically** at night.

They are **especially useful** for locations that have regular operating hours.

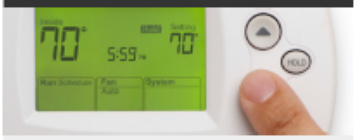
Time clocks **cost relatively little** to install and can control a **large amount** of lighting with a single device.

NEXT STEP:
Contact an electrician for a quote.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$330/YEAR

Programmable thermostats



You don't need to heat or cool your building to the same levels **when it is unoccupied**.

At night, set **the thermostat back 7-10°F** from its normal setting.

If you can do this 8 hours per day, you will save **up to 10%** on the electricity used for heating and cooling.

NEXT STEP:
Adjust your thermostat set points.

How-to guide available
at ComEd.com/EnergyCheckGuides

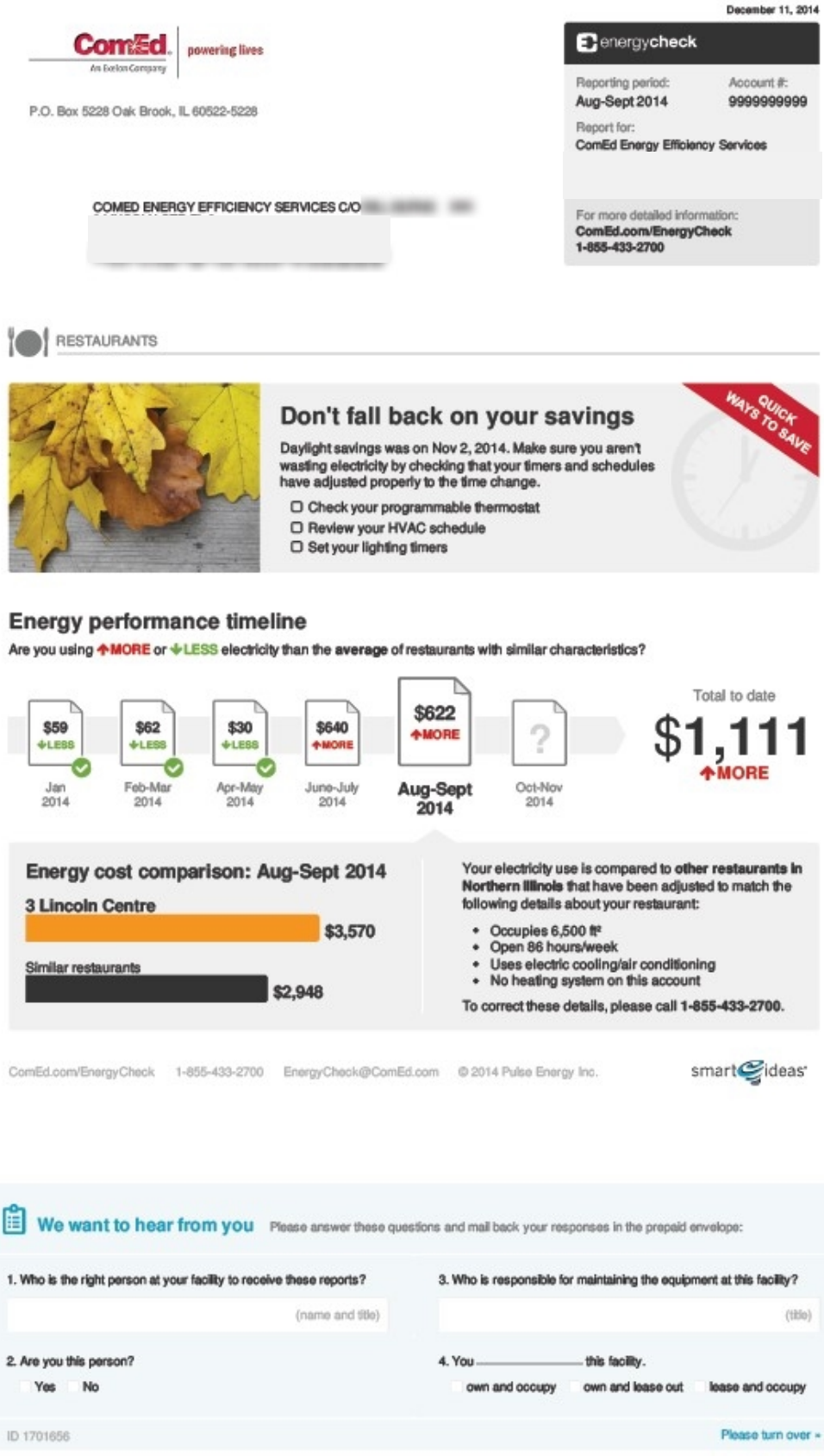
CUT ELECTRICITY COSTS BY UP TO
$130/YEAR

Learn more about your recommendations

Visit **ComEd.com/EnergyCheck** to personalize your energy saving estimates, update your facility profile, or discover more ways to save.

Next report: Nov 2014

FOCUS ON
Lighting



December 11, 2014

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P.O. Box 5228 Oak Brook, IL 60522-5228

COMED ENERGY EFFICIENCY SERVICES C/O [redacted]

energycheck

Reporting period: Aug-Sept 2014
Account #: 9999999999
Report for: ComEd Energy Efficiency Services

For more detailed information:
ComEd.com/EnergyCheck
1-855-433-2700

RESTAURANTS

Don't fall back on your savings

QUICK WAYS TO SAVE

Daylight savings was on Nov 2, 2014. Make sure you aren't wasting electricity by checking that your timers and schedules have adjusted properly to the time change.

- ☐ Check your programmable thermostat
- ☐ Review your HVAC schedule
- ☐ Set your lighting timers

Energy performance timeline

Are you using ↑MORE or ↓LESS electricity than the **average** of restaurants with similar characteristics?

Jan 2014	Feb-Mar 2014	Apr-May 2014	June-July 2014	Aug-Sept 2014	Oct-Nov 2014
$59 ↓LESS	$62 ↓LESS	$30 ↓LESS	$640 ↑MORE	$622 ↑MORE	?

Total to date
$1,111
↑MORE

Energy cost comparison: Aug-Sept 2014

3 Lincoln Centre — $3,570

Similar restaurants — $2,948

Your electricity use is compared to **other restaurants in Northern Illinois** that have been adjusted to match the following details about your restaurant:

- Occupies 6,500 ft²
- Open 86 hours/week
- Uses electric cooling/air conditioning
- No heating system on this account

To correct these details, please call **1-855-433-2700.**

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We want to hear from you

Please answer these questions and mail back your responses in the prepaid envelope:

1. Who is the right person at your facility to receive these reports?
(name and title)

2. Are you this person?
Yes No

3. Who is responsible for maintaining the equipment at this facility?
(title)

4. You _____ this facility.
own and occupy own and lease out lease and occupy

ID 1701656

Please turn over »

FOCUS ON
Lighting

Cost of lighting:

- About **20%** of your electricity bill is from electricity used for lighting.
- You currently spend about **$3,500/year** on electricity for lighting, assuming an average price of 9.26 ¢/kWh*.

More efficient lighting:

- Creates a more pleasant work environment
- Has a longer lifespan
- Requires less maintenance
- Improves aesthetics
- Produces less heat

Lighting

20%

of annual electricity costs

We've analyzed your restaurant's electricity use and recommend the following actions:

Upgrade fluorescent lamps

Lighting is often the **largest consumer** of electricity in a building and most buildings have **outdated** lighting technology.

For example, a building with T12 fluorescent lamps can be upgraded to **T8 lamps and ballast** technology for a savings of **up to 48%** on the electricity used for lighting.

NEXT STEP:
Contact a lighting specialist.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$910/YEAR

Occupancy sensors

Occupancy sensors reduce energy waste by **turning off lights automatically** when an area is unoccupied.

They are ideal for any room that is frequently unoccupied for more than **15 minutes** at a time: for example, restrooms and storage rooms.

Occupancy sensors can **save up to 45%** on your lighting costs in the areas they are used.

NEXT STEP:
Contact an electrician.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$510/YEAR

Excess lighting

Excess lighting **wastes energy** and causes **eyestrain, headaches,** and **fatigue.**

The solution is inexpensive and easy: **remove bulbs** in areas that are over-lit or receive adequate natural light.

For example, if there is a fixture with four fluorescent bulbs (wired in parallel) in a well-lit area, **try removing** two of them.

NEXT STEP:
Consult a lighting specialist.

How-to guide available
at ComEd.com/EnergyCheckGuides

CUT ELECTRICITY COSTS BY UP TO
$320/YEAR

Learn more about your recommendations

Visit **ComEd.com/EnergyCheck** to personalize your energy saving estimates, update your facility profile, or discover more ways to save.

Next report: Jan 2015

FOCUS ON
Ventilation

Detach here

5. Please tell us what you find most and least useful in these reports.

6. How useful do you find this report?

1 2 3 4 5

not useful very useful

Thank you for your feedback. We appreciate it!

You are welcome to include other comments on a separate piece of paper and send them along with the survey.

February 5, 2015

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P.O. BOX 5228 OAK BROOK IL 60522-5228

COMED ENERGY EFFICIENCY SERVICES C/O [redacted]

energycheck

Reporting period: Oct-Nov 2014
Account #: 9999999999
Report for: ComEd Energy Efficiency Services

For more detailed information:
ComEd.com/EnergyCheck
1-855-433-2700

RESTAURANTS

Energy performance timeline

Are you using ↑MORE or ↓LESS electricity than the **average** of restaurants with similar characteristics?

It appears your restaurant is maintaining **consistent energy efficiency**. See the next page for ways to save.

Energy cost comparison: Oct-Nov 2014

The comparison is tailored specifically to match your business's **floor area**, **operating hours**, **utility rate**, and **climate**.

This is the last report of the EnergyCheck 12 month pilot program

ComEd's *Smart Ideas*® Energy Efficiency program offers tools, tips and rebates that help you save money and energy.

Visit **ComEd.com/BizIncentives** or call **1-855-433-2700** today to learn about the offerings for which your business may qualify.

ComEd.com/EnergyCheck 1-855-433-2700 EnergyCheck@ComEd.com smart ideas

FOCUS ON
Ventilation

Cost of ventilation:

- You currently spend about **$2,100/year** on electricity for ventilation, assuming an average price of 9.26 ¢/kWh*.
- Ventilation costs come from equipment such as: air-handling units fans, exhaust fans, and make-up fans.

More efficient ventilation:

- Requires less maintenance
- Improves air quality
- Increases occupant comfort
- Reduces downtime
- Controls heating and cooling costs

Ventilation

12%

of your annual electricity costs

We've analyzed your restaurant's electricity use and recommend the following actions:

Kitchen ventilation

Demand control ventilation systems **adjust fan speed** according to the actual need.

Sensors in the kitchen hood **continually monitor** temperature, steam, and CO_2 so that ventilation matches the current conditions.

This type of control can reduce ventilation electricity use by **up to 50%**.

NEXT STEP:
Contact electrical and HVAC contractors for quotes.

How-to guide available
at ComEd.com/EnergyCheckGuides

CUT ELECTRICITY COSTS BY UP TO
$1,000/YEAR

Variable speed drives

Ventilation systems do not normally require that fans **operate at full speed** at all times.

Consider adding **variable speed drives** (VSDs) to fan motors.

VSDs match fan speed to the **actual airflow requirements** at different times of the day. They can reduce your fan motor's energy use by **up to 50%.**

NEXT STEP:
Contact your equipment supplier.

Incentives available
at ComEd.com/BizIncentives

CUT ELECTRICITY COSTS BY UP TO
$1,000/YEAR

Maintain HVAC

Your HVAC (Heating, Ventilation, & Air Conditioning) system requires regular **cleaning and maintenance** to run efficiently.

A well-maintained system can help reduce your HVAC electricity costs by **up to 10%**.

Regular maintenance also improves **equipment life**, **indoor air quality**, and **occupant comfort**.

NEXT STEP:
Schedule maintenance.

Low cost
Quick way to get started

CUT ELECTRICITY COSTS BY UP TO
$310/YEAR

Thank you for participating in the EnergyCheck program.

This program is one way that ComEd is helping businesses like yours save energy.