



## Energy Efficiency / Demand Response Plan: Plan Year 4 (6/1/2011-5/31/2012)

### Evaluation Report: Smart Ideas for Your Business Comprehensive Compressed Air Study Program

**FINAL**

**Presented to  
Commonwealth Edison Company**

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Prepared by:  
Randy Gunn  
Managing Director  
Navigant Consulting  
30 S. Wacker Drive, Suite 3100  
Chicago, IL 60606

Phone 312.583.5700  
Fax 312.583.5701

[www.navigant.com](http://www.navigant.com)



**MichaelsEnergy**



**Submitted to:**

ComEd  
Three Lincoln Centre  
Oakbrook Terrace, IL 60181

**Submitted by:**

Navigant Consulting, Inc.  
30 S. Wacker Drive, Suite 3100  
Chicago, IL 60606  
Phone 312.583.5700  
Fax 312.583.5701

**Contact:**

Randy Gunn, Managing Director  
312.938.4242  
randy.gunn@navigant.com

Jeff Erickson, Director  
608.497.2322  
jeff.erickson@navigant.com

**Prepared by:**

Vishy Tirumalashetty  
Itron, Inc.  
510.844.2814  
vishy.tirumalashetty@itron.com

Sara Rosenbrock  
Itron, Inc.  
510.844.2890  
sara.rosenbrock@itron.com

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## E. Executive Summary

### E.1 Evaluation Objectives

ComEd's three-year (2011 – 2013) Energy Efficiency and Demand Response Plan,<sup>1</sup> anticipates that the Comprehensive Compressed Air Study (Compressed Air Study) program will provide 5% of the business portfolio nonresidential energy savings. The goal of this report is to present a summary of the findings and results from the evaluation of the PY4 Compressed Air Study program<sup>2</sup>. The primary objectives of this evaluation are to quantify gross and net impacts and to determine key process-related program strengths and weaknesses and identify ways in which the program can be improved.

### E.2 Evaluation Methods

For the PY4 impact evaluation, gross program impact results were developed based on detailed M&V for eight projects and a thorough desk review for one project. The net impact results were developed based on survey data collected for seven of the nine projects. Four research activities were conducted in support of the process evaluation: (1) interviews with program and implementation staff, (2) in-depth interviews with participating market actors, (3) in-depth interviews with ComEd Account Managers, and (4) a quantitative telephone survey with participating customers.

### E.3 Key Impact Findings and Recommendations

Program Year 4 represents the first full year of implementation for the Compressed Air Study program. As such this is the first opportunity to independently evaluate the savings generated by this program, and to gain an understanding of and report on the reasons that evaluation estimates of impacts differ from ex ante savings estimates.

Table E-1 below provides reported ex ante and Evaluation Research Findings (ex post) gross<sup>3</sup> and net savings impacts for the PY4 Compressed Air Study program. The PY4 Research Findings gross realization rate for energy savings is 0.75 and the gross realization rate for demand savings is 0.68 (realization rate = Research Findings gross / ex ante gross). The PY4 Research Findings net-to-gross ratio (NTGR) for energy savings 0.67 and the NTGR for demand savings is 0.72. The PY4 Compressed Air Study program did not meet the ComEd's targeted PY4 net savings goals<sup>4</sup> of 18,151 MWh mainly due to the project completion rate. The net savings goals were based on a target of 26 completed projects but there were only nine completed projects in PY4. Many on-going projects were deferred into PY5 based on their completion dates.

<sup>1</sup> Commonwealth Edison Company's 2011 – 2013 Energy Efficiency and Demand Response Plan, pg. 90

<sup>2</sup> The Program Year 4 (PY4) began June 1, 2011 and ended May 31, 2012.

<sup>3</sup> See the glossary at the beginning of the appendices for definitions.

<sup>4</sup>ComEd, Op. Cit., pg. 113

**Table E-1. PY4 Savings Estimates**

Savings Estimates	Energy Savings (kWh)	Peak Demand Savings (kW)
Ex ante Gross*	5,927,508	680
Ex ante Net**	4,742,006	544
Research Findings Gross	4,472,612	461
Research Findings Net	2,996,604	331

\* Source: Ex ante savings from ComEd tracking spreadsheet, September 25, 2012

\*\* Ex ante net savings include an assumed net-to-gross ratio of 0.80

The goal of the evaluation was to complete a census for both the gross impact analysis and the NTGR analysis. If all participating customers can be reached, there is no sampling error and the error bounds are zero; therefore, there is no need for estimating precision levels for the sampling effort.

For the gross impact analysis this approach was successful. All nine sites were evaluated and engineering impact estimates were generated. There is no sampling error for the gross impact estimates, and the reported realization rate has zero error bounds.

However, we were only able to complete telephone (NTGR) surveys with seven out of the nine participants in PY4. Since not all participating customers completed the NTGR interview, precision levels are relevant for the evaluation NTGR. The relative precision at a 90% confidence level, based on the seven completed surveys for the program NTG ratio, is  $\pm 10\%$  for kWh and  $\pm 12\%$  for kW.

Based on the nine projects evaluated in PY4, the gross impact results yielded an energy realization rate of 0.75, which is understandable for a first year program that involves challenging data collection activities and complex customized savings calculations. The program can further improve the gross impact results by using improved data collection methods and enhanced calculation models. Key evaluation findings and recommendations include the following:

- **Improvements to Ex Ante Savings Estimates<sup>5</sup>**

**Finding.** The program-verified compressed air system post retrofit operating conditions changed for several projects between the program M&V period and the evaluation M&V period. These changes in post retrofit operating conditions affected the project savings and generally resulted in a reduction to realized savings (e.g., #I-11-001, #I-11-012, #I-11-015, #I-11-026 and # S-10-001).

**Recommendation.** The program should probe more to verify if the facility has any firm plans to change operating conditions in the foreseeable future. The program might also be able to incorporate longer measurement periods and/or pre- and post-installation monitoring in order to ensure better model calibration based on more comprehensive observations of plant operation.

**Recommendation.** Additionally, the program should consider conducting the post-installation M&V after the compressed air system has operated for a reasonable period following measure

<sup>5</sup> Site-specific data and information reported in this section is limited in some instances in order to protect customer confidentiality.

installation, to ensure that the customer is satisfied with the new measures and does not subsequently change the compressed air system operating conditions.

**Finding.** For the air leaks repair measure, the program calculations did not use a consistent approach for estimating air flow (CFM) savings. Typically, these savings were reported to be estimated based on the experience of the technical reviewers. This estimation approach typically resulted in overestimation of air flow (CFM) reduction and savings (e.g., #S-10-006 and #I-11-012).

**Recommendation.** Since a significant amount of savings for the PY4 program are from the air leaks repair measure it is critical that the program calculations for this measure follow a consistent and thorough approach for all projects. The air leaks calculations should use industry standard sources for estimating CFM reduction based on the measured size of the air leaks. The program should consider using industry standard guidelines for converting measured air leaks using ultrasonic leak detector from decibel (dB) to CFMs.

**Finding.** The program baseline and post-installation calculations were not always normalized to account for changes in facility production levels or compressed air system airflow load profiles. Additionally, when the program calculations were normalized, it did not always represent typical annual operating conditions (e.g., # I-11-026, #I-11-001, # I-11-012 and # I-11-015). In some cases, the normalization was not performed when production data was not provided by the customer.

**Recommendation.** Determine whether pre or post measurement data will require normalization to properly adjust for weekly or seasonal variation, market fluctuations, or to ensure equivalent modeling of operating conditions for the baseline and post-installation estimates. Normalization would ensure that energy savings calculations represent typical annual operating conditions. We understand that normalization is a challenging task and is dependent on the availability of an annual compressed airflow profile and production data for these projects; however, the program should develop a consistent data collection approach and calculation methodology to perform normalization for projects.

**Recommendation.** The program could do a better job of verifying whether or not the energy usage, airflow and production data collected represents typical annual operating conditions for the project. The program calculations should verify correlation between energy usage, airflow (CFMs) and production where possible and methodically select the normalization parameter to improve the accuracy of estimated savings.

- **Baseline Review**

**Finding.** Overall, the program did a good job at selecting baseline for all other measures.

**Recommendation.** When selecting baselines for replace-on-burnout (ROB) measures, the program should select baselines based on standard industry practice or minimum efficiency equipment available in the market as a replacement option (e.g., Use AIRMaster+ for selecting minimum efficiency options for air compressors). The program should select minimum efficiency only if there is no clear industry standard practice. For example, when selecting a dryer, if the customer has installed a cycling refrigerated dryer, the program should select a non-cycling refrigerated dryer instead of a less efficient desiccant dryer.

- **Data Collection**

**Finding.** When the program collected measured data for pre- and post- implementation periods in support of ex ante savings calculations, and used that as a source for estimating savings or for

model calibration, the resulting ex ante savings estimates were found to be more accurate (e.g., #S-10-001 and #S-10-006). When the program did not perform post M&V activities, it typically resulted in overestimation of savings or reduced accuracy in the savings estimates. However, the program was not always successful in collecting production information from the facility which affected the accuracy of the savings calculations.

**Recommendation.** The program should continue to take measurements for pre retrofit and post retrofit conditions. Additionally, the program should notify customers that the program requires production data for the pre and post periods and also annual production data to accurately model the final savings estimates.

- **Net Impacts**

**Finding.** Free-ridership levels for PY4 compressed air program are 33% for kWh savings in the first year of the program. Program influence was low in some instances for a number of different reasons. In two cases, participants reported that program implementers arrived late in the decision making process and offered incentives for projects that had already been decided upon. In some cases, the customer reported a high likelihood that they would have implemented the same measures, especially the air leaks repair measure, at the same time in the absence of the program incentives. It is important to note that certain types of compressed air energy efficiency improvements may be particularly prone to free ridership, since they constitute a type of routine maintenance activity undertaken by some end users.

**Recommendation.** One approach to reducing free ridership is for program administrators to exclude projects from the program that they believe have a high probability of being free riders. Similarly, if there is evidence that the program did not contribute significantly to the decision to install a particular measure or equipment type then an incentive may not be warranted. For example, incentives might not be provided for measures that the customer already planned to implement. One example is compressed air energy efficiency measures that are frequently undertaken as a routine maintenance activity.

#### ***E.4 Key Process Findings and Recommendations***

- **Program Participation**

**Finding.** The program induces increased knowledge regarding energy efficiency for compressed air systems. Ultimately the program has been effective in stimulating awareness among those who make the financial decisions and need to see the benefits of improving compressed air efficiency. The audits are an effective educational vehicle for this purpose, providing cost-benefit analysis through embedded assessment of measure feasibility. Account managers might be a good vehicle for spreading awareness and knowledge to those who make the financial decisions.

**Recommendation.** Engage ComEd account managers more to promote the program. Typically, reaching the correct customer decision-maker is a major hurdle, therefore, the program could benefit from the account manager's help in developing a more targeted database of energy decision makers for facilities with compressed air systems. This should help increase decision-maker awareness of the program and encourage participation. Also, participants indicate that they prefer to receive information regarding programs through email (71%) or from their ComEd Account Manager (43%).



- **Program Processes Satisfaction**

**Finding.** A major theme across all of the telephone surveys was a lack of clarity and/or confusion with the program, and feedback that the program is too complicated. Participants and service providers reported confusion with the players involved, incentive amounts, who to report to, what are the roles and functions of each of the players, and perceived disorganization.

**Recommendation.** Make the program rules and requirements more clear as much as possible. Facilitate improving communication among all of the players involved. Provide clear direction to the team in terms of roles and expectations. Strong communication and clear expectations are crucial to the success of the program.

**Finding.** Participants are satisfied with most aspects of the program. Satisfaction across all program processes was high for PY4 with over 70% of the participants interviewed rating all program processes highly (a rating of 7 to 10). Reasons for satisfaction with the program ranged from satisfaction with energy savings achieved to praise for the program administrator's role in the project. When asked what could be done to improve the program, many participants offered no recommendations (43%). Participant recommendations for improvements included better communication (29%), greater publicity (14%), making the leak testing portion of the program recurring (14%) and providing additional information about the energy savings measures (14%).

**Recommendation.** Increase ongoing communications with customers. Consider increasing efforts to publicize the program, and developing additional technical briefs that provide information about each type of energy savings measure.

- **Service Provider Network**

**Finding.** All but one of the participant service providers had suggestions on ways they would like to see the Compressed Air Study program improved. The broad array of suggestions included expanding the range of incentives offered to target smaller customers, reducing the amount of required meetings and paperwork, increasing incentive amounts, easing requirements and procedures to push projects through, better defining some of the requirements, working closer with the service providers and customers to create a team approach, and reducing the amount of detail needed for project approval.

**Recommendation.** The program should use this feedback to improve program processes, and also independently gather information from Compressed Air Service Providers (CASP's) about project experiences to inform program improvements. Project success stories could also be shared among CASP's in order to encourage best practices, perhaps through case studies or periodic meetings. These efforts would serve to educate the service provider network and groom CASP actions to best serve the program.

**Finding.** Compressed Air Service Providers play a pivotal role in this program. In PY4, the CASPs are an important marketer of the program; they are also responsible for conducting the compressed air study and reporting the results to the customer and the program administrator. The program has a good screening process for selecting service providers which ensures that only reliable and knowledgeable service providers are included in the program.

**Recommendation.** CASPs will be an important factor for the success of the program since they play key roles in various program activities. The program administrators should increase the pool of qualified service providers under the program in order to increase program participation, and expand program reach and offerings.

**Recommendation.** The Smart Ideas program should also consider offering a bonus to service providers, similar to the PY4 trade ally bonuses. The program should strive to communicate the new bonus program early and clearly to both service providers and non- service providers, and provide sufficient lead time for service providers to increase their promotion and take advantage of the offering to the fullest extent.

## 1. Introduction to the Program

This evaluation report covers the Compressed Air Study program element of the ComEd Smart Ideas for Your Business program.

The Smart Ideas for Your Business program is a key part of ComEd’s overall portfolio of programs in support of 2011-2013 ComEd’s Energy Efficiency and Demand Response Plan. ComEd’s three-year (2011 – 2013) Energy Efficiency and Demand Response Plan,<sup>6</sup> anticipated that the Compressed Air Study program will provide 5% of the business portfolio nonresidential energy savings. The program is funded on an annual basis from June 1 to May 31 of each year.<sup>7</sup> Funding in any given program year is limited to that year’s budgeted amount and, therefore, incentives are paid on a first-come, first-served basis until the program year’s incentive funds are exhausted.

The net MWh savings goals and budgets for the 2011 (PY4) Compressed Air Study program are presented in Table 1-1.

**Table 1-1. Smart Ideas for Your Business PY4 Planned Savings Goals and Budgets**

Program Element	No. of Participants	Plan Target Net MWh	Plan Target Total Cost
Compressed Air Study	26	18,151	\$2,072,573

*Source: Commonwealth Edison Company’s 2011 – 2013 Energy Efficiency and Demand Response Plan*

### 1.1 Program Description

The Commonwealth Edison Company (ComEd) Smart Ideas for Your Business program provides incentives for business customers who upgrade their facilities with energy efficient equipment. This incentive program is available to all eligible, nonpublic, commercial and industrial customers in ComEd’s service territory.

ComEd’s Smart Ideas for Your Business suite of energy efficiency programs for business customers introduced a new Compressed Air Study program in PY4. The program offers a combination of technical assistance and financial incentives. Technical assistance includes a comprehensive compressed air system study which assesses the performance of the facility’s industrial compressed air system to ensure efficient, economical operation. This service examines the system’s operating pressure, controls sequencing, compressors and more to help identify energy saving measures, using a combination of capital investment and low or no cost measures.

#### 1.1.1 Implementation Strategy

ComEd selected Nexant, Inc. as its program administrator responsible for day-to-day operations. The Compressed Air Study program was launched in June 2011. Day-to-day administration of the

<sup>6</sup> Commonwealth Edison Company’s 2011 – 2013 Energy Efficiency and Demand Response Plan

<sup>7</sup> Program year 4 ran from June 1, 2011 through May 31, 2012.

Compressed Air Study program is performed by a third-party program administrator (PA), Nexant, Inc. The PA is responsible for all aspects of the program including participant coordination, technical resources, Compressed Air Service Provider (CASP) recruitment and training, logistical support, and technical review at each phase of the program.

### **1.1.2 Measures and Incentives for PY4**

ComEd's Smart Ideas for Your Business Compressed Air Study incentive program provides incentive payments for eligible energy efficiency projects. In order for a project to be eligible for incentives, the program requirements are as follows:

- A participating facility must have a minimum of 250 HP (combined) of compressors in operation on the facility's primary system.
- The compressed air system, including the control system, must not be scheduled for significant upgrades in the near future.
- The applicant must agree to repair at least 50% of the compressed air leak volume identified through the study at their own expense.
- The applicant must agree to use a pre-approved ComEd Smart Ideas for Your Business compressed air service provider.

Compressed air leak repairs are not eligible for incentives. Eligible annual kWh savings are determined through final PA measurement & verification activities. Note that the study service provider fees (costs) are also considered part of the program incentives budget. The final paid cash incentive is paid on a per kWh basis according to the verified savings as documented in the verification report approved by the Program Administrator. The incentive formula is as follows:

- For eligible projects, the program pays an incentive of \$0.05/kWh down to a minimum payback of one year and up to a maximum payback of 7 years.
- The incentive cannot exceed 100 percent of the project's incremental cost and 50 percent of the total project cost.

Furthermore, customers may receive up to \$1,000,000 per program year (June 1 through May 31, 2012), per facility.

## **1.2 Evaluation Objectives**

The following key researchable objectives were evaluated.

### **1.2.1 Impact Objectives**

- Estimate the program gross impacts
- Identify opportunities for improvement to program impact calculations and estimates
- Estimate the program net impacts
- Assess the degree to which the program influenced customers' decisions to improve the efficiency of their compressed air systems versus other non-program factors
- Assess whether or not the program met its impact goals. If not, why not?

### **1.2.2 Process Objectives**

- Examine the program design and implementation
- Evaluate the effectiveness of the program design and processes
- Examine the effectiveness of program implementation
- Assess participation among compressed air service providers
- Assess the effectiveness of program marketing and outreach
- Identify barriers to participation for both customers and compressed air service providers
- Evaluate participant satisfaction for both customers and compressed air service providers

## 2. Evaluation Methods

This section describes the analytic methods and data collection activities implemented as part of the PY4 process and impact evaluation of the Compressed Air Study program, including the data sources and sample designs used as a basis for the data collection activities.

### 2.1 Primary Data Collection

The data collected for the evaluation of the PY4 Compressed Air Study program was gathered via on-site audits and telephone surveys to support impact and process analysis. Table 2-1 below provides a summary of the data collection activities including the targeted population, the sample size, and the objectives of the efforts.

**Table 2-1. PY4 Data Collection Activities**

Collection Method	Targeted Population	Sample Size Targeted	Sample Size Achieved	Gross Impact	Net Impact	Process
On Site Audit	Program participants	Census Attempt (9 participants)	Census (8 On Sites and 1 desk review)	X		
Telephone Survey	Program participants	Census Attempt (9 participants)	7	X	X	X
In-Depth Interviews	Program administrators and implementation contractor staff	2	2			X
Telephone Survey	ComEd Account Managers	3	2			X
Telephone Survey	Compressed Air Service Providers	5 participants and 5 non-participants	5 participants and 3 non-participants			X

Source: EM&V analysis

### 2.2 Impact Evaluation Methods

This section describes the analytic methods and data collection activities implemented as part of the PY4 process and impact evaluation of the Compressed Air Study program, including the data sources and sample designs used as a basis for the data collection activities.

To support the gross impact evaluation objectives the PY4 evaluation activities performed on-site visits and detailed M&V for eight projects and a thorough desk review for one project. Furthermore, telephone surveys were completed for seven projects to address evaluation process and net-to-gross objectives.

### **2.2.1 Gross Program Savings**

A site specific M&V analysis was performed for all completed PY4 projects. Gross impact M&V plans are based on IPMVP protocols, options A through D. The M&V analysis methods varied from project to project, depending on the complexity of the measures installed, the size of the associated savings and the availability and reliability of existing data.

On-site audits were planned for all completed PY4 projects. On-site data collection includes verification of measure installation and that the systems are functioning and operating as planned, and if not then in what way(s) there is variance.

On-site audits also include collecting or obtaining customer-stored data to support downstream M&V calculations. Measurement includes spot measurements, run-time hour data logging, and post-installation interval metering. Customer-supplied data from dedicated facility meters for the compressed air system or supervisory control and data acquisition (SCADA) systems were often used when available.

Engineering calculations were performed to derive gross kWh and KW savings. These calculations started with an engineering review of the algorithms used by the program to calculate energy savings and the inputs that feed into those algorithms. Measurement data obtained from the sites are used to perform ex post calculations and also to model calculations using AIRMaster+, as measured parameters typically have the least uncertainty of any of the data elements collected. The focus of the data collection was to verify and/or update the assumptions that feed into engineering algorithms of measure level savings.

The peak kW savings calculation methodology was consistent with PJM requirements for each project. Additionally, we performed a thorough review of the pre and post operating conditions and selected an appropriate baseline condition for each measure based on the available information.

When the evaluators were not able to perform an on-site audit due to customer's refusal to participate in the evaluation, desk reviews were performed to complete ex post analysis. Desk reviews do not incorporate on-site data collection. Desk reviews instead involve review of project documentation provided by the program and an engineering review of the algorithms used by the program to calculate energy savings. The engineering review of program calculations determines if the inputs that feed the program calculations are reasonable and acceptable or need revision based on evaluation findings.

Out the nine completed projects, one of the participants refused to participate in the evaluation. Therefore, on-site audits were conducted for eight projects and a thorough desk review for one project.

A gross realization rate was calculated for each site, and the program gross realization rate is calculated as a ratio of the total Research Findings kWh savings to the total ex ante kWh savings claimed for the PY4 Compressed Air Study program.

## 2.2.2 Net Program Savings

This program has not been evaluated before and so according to the NTG Framework<sup>8</sup> the NTG is to be applied retroactively. The program falls under the following condition from the NTG Framework: *“For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes – either in the program design or delivery, or changes in the market itself – NTG ratios established through evaluations would be used retroactively.”*

The primary objective of the net savings analysis for the Compressed Air Study program was to determine the program's net effect on customers' electricity usage. After gross program impacts have been assessed, net program impacts are derived by estimating a Net-to-Gross (NTG) ratio that quantifies the percentage of the program's gross impact that can reliably be attributed to the program. A customer self-report method, based on data gathered during participant telephone surveys, was used to estimate the NTG ratio for this evaluation.

For PY4, the net program impacts were quantified solely on the estimated level of free-ridership. This requires estimating what would have happened in the absence of the program. The existence of participant spillover was examined in PY4 but no significant spillover activity was reported by participants, therefore, quantification was not warranted.

Once free-ridership has been estimated the NTG ratio is calculated as follows:

NTG Ratio = 1 – Free-ridership Rate

## 2.3 Process Evaluation Methods

Four research activities were conducted in support of the process evaluation: (1) interviews with program and implementation staff, (2) in-depth interviews with participating market actors, (3) in-depth interviews with ComEd Account Managers, and (4) a quantitative telephone survey with participating customers.

## 2.4 Sampling

### 2.4.1 Profile of Population

ComEd's final tracking spreadsheet dated 7/25/2012 contained data for all the completed projects in PY4. Table 2-2 presents the number of completed projects in PY4, along with ex ante gross kWh claimed, ex ante gross kW claimed, and the amount of incentive paid.

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<sup>8</sup> “Proposed Framework for Counting Net Savings in Illinois.” Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.



**Table 2-2. PY4 Compressed Air Study Program Participation**

No. of Projects	Ex ante kWh Impact Claimed	Ex ante kW Impact Claimed	Total Incentives
9	5,927,508	680	\$315,778

*Source: Ex ante savings from ComEd tracking spreadsheet, September 25, 2012*

#### **2.4.2 Gross Impact Sample**

The sampling approach for gross impact analysis was a census attempt consistent with the PY4 evaluation plan.

#### **2.4.3 Telephone Surveys**

##### **Sampling**

Per the evaluation plan, the sampling approach for the participant survey was a census attempt in support of the net impact evaluation and the process evaluation. In addition, the data sources for the process evaluation included the in-depth interviews with five participating service providers, three non-participating service providers (market actors) and two account managers.

##### **Survey Disposition**

Out of the nine participants in PY4, telephone surveys were conducted with seven participants. The primary decision makers for the two remaining participants had left their companies, and so it was not possible to complete interviews with those firms.

## 3. Evaluation Results

### 3.1 Impact Evaluation Results

This section presents Gross and Net impact results from the PY4 Compressed Air Study program evaluation.

#### 3.1.1 Tracking System Review

Compressed Air Study program participants are not tracked within the overall *Smart Ideas* commercial program tracking database. The PY4 tracking instrument provided by the program was in a standard spreadsheet format. This spreadsheet tracks project level data such as customer contacts, savings, costs, incentives, service providers, account managers and completion dates.

**Finding.** The simple tracking spreadsheet was adequate for the PY4 program with relatively low participation, but as the program expands, it will be useful to have a more comprehensive tracking system such as a relational database format or a more sophisticated spreadsheet. The tracking spreadsheet did not provide measure-level tracking information such as list of the recommended measures and the list of implemented measures. The tracking system did not allow the evaluators to confirm measures implemented as part of the project. For example in PY4, the evaluators learned that one measure in a project was being claimed in PY5 instead of PY4, but there was no way to differentiate that fact in the database itself.

**Recommendation.** ComEd should consider tracking this program within the overall *Smart Ideas* commercial program on-line tracking database (Frontier). The on-line system is easy to work with and provides viewing access to the project tracking data plus the ability to download project documentation in electronic format for each project. Adding these capabilities would greatly facilitate the evaluation. It would also remove a step that commonly impedes evaluation progress: the need to file a data request for the same type of information that ComEd makes available in the Frontier tracking database already for other Business programs. This documentation helps the evaluation team to verify the consistency of the data which typically is the most important issue in a program for the evaluation team. This level of access and documentation represents best practice in the area in project tracking for a program and ComEd should consider including the Compressed Air Study program in this database for PY5.

**Recommendation.** At a minimum, we recommend that the program should include the following data in the tracking spreadsheet or database.

- Project start date
- List of recommended measures
- Pre implementation savings estimates
- List of measures implemented

### 3.1.2 Gross Program Impact Parameter Estimates

Research Findings gross program impacts for this evaluation for the Compressed Air Study program were developed based on the on-site visits and detailed M&V analysis for eight projects and a thorough desk review for one project.

#### Realization Rates for the Compressed Air Study Program

The program gross realization rate is calculated as a ratio of the total Research Findings kWh savings to the total ex ante kWh savings claimed for the PY4 Compressed Air Study program.

The PY4 Research Findings gross realization rate for demand savings is 0.68, while the realization rate for energy is 0.75. The somewhat low realization rate is understandable for a first year for the program given the complexity of the savings calculations, challenging data collection activities and the varying operating conditions of the compressed air systems. At the project level, the PY4 energy savings realization rate results ranged from 0.26 to 1.18 which shows a large variation in realization rates across projects. The projects where the program administrator (PA) conducted post-installation M&V activities realized a greater proportion of the ex ante claims than the projects without post-installation M&V activities. Note that the two projects (#S-10-001 and # S-10-006) for which the PA did not conduct post M&V activities were part of the pilot program in PY3 that were deferred to PY4. The program M&V guidelines for the pilot in PY3 were not as rigorous as the program M&V guidelines in PY4. The energy savings realization rate for the two projects (#S-10-001 and # S-10-006) that followed the PY3 pilot program M&V guidelines is 0.49 and the energy savings realization rate for the remaining seven projects that followed the PY4 program M&V guidelines is 0.82. The project level results are summarized in Table 3-1.

In general the implementation team did a very good job of collecting site specific pre and post M&V data and calculating savings. They also did an excellent job of using the pre and post M&V data for revising the savings estimates provided by the service providers, which were typically overestimated. Since the evaluators do not have access to pre retrofit conditions, the pre M&V data collected by the implementation team greatly facilitated the evaluation savings calculations. Also, when the evaluators were not able to collect measured data for post conditions; the post M&V data collected by the implementation team benefitted the evaluation savings calculations.

Statistical confidence and precision is based on the sample size relative to the population. For the gross impact analysis, all participants were included in the sample, thus the sampling approach was a census attempt. Given that the evaluation completed a census for gross impact analysis, there is no sampling error and the error bounds are zero; therefore, there is no need for estimating precision levels for the sampling effort.

Note that out of the nine completed projects, one project (#S-10-006) had an ex ante kW impact claim of zero. However, the evaluation found that program calculations and documentation included an ex ante kW savings estimate that was not populated in the tracking spreadsheet.

**Table 3-1. Gross Impact Realization Rate Results for the Compressed Air Projects**

Project ID	Ex ante kWh Impact Claimed	Ex ante kW Impact Claimed	Research Findings Gross kWh Impact	Research Findings Gross kW Impact	Research Findings Gross kWh Realization Rate	Research Findings Gross kW Realization Rate
I-11-015	1,220,704	165.50	1,154,809	153.21	0.95	0.93
I-11-026	963,201	166.69	432,870	54.73	0.45	0.33
I-11-001	669,757	78.49	601,629	73.37	0.90	0.93
S-10-001	657,643	49.38	171,631	17.59	0.26	0.36
I-11-003	624,937	45.46	544,405	33.93	0.87	0.75
I-11-012	620,010	58.86	542,953	49.74	0.88	0.85
I-10-005*	549,847	59.96	488,017	55.71	0.89	0.93
S-10-006	496,898	0.00	389,893	8.80	0.78	N/A
I-11-006	124,511	56.03	146,405	14.10	1.18	0.25
TOTAL	5,927,508	680	4,472,612	461	0.75	0.68

Source: EM&V Analysis

\* Customer refused to participate in the evaluation; therefore, desk review was performed to calculate Research Findings gross impacts.

### 3.1.3 Gross Program Impact Results

Based on the gross impact parameter estimates described previously, gross program impacts were derived for the PY4 Compressed Air Study program. Table 3-2 provides the gross impact results for the PY4 program.

**Table 3-2. Gross Parameter and Savings Estimates**

	kWh, Ex Ante	Research Findings kWh	kWh RR	kW, Ex Ante	Research Findings kW	kW RR
Total	5,927,508	4,472,612	0.75	680	461	0.68

Source: EM&V analysis

The evaluation team has provided to ComEd site-specific M&V reports for each verified project. These site-specific impact evaluation reports summarize the ex ante savings in the Final Application submitted, the ex post M&V plan, the data collected at the site, and all of the calculations and parameters used to estimate savings.

Some general observations from the gross impact sample:

- In some cases, the ex ante reported operating conditions were found to be different than actual ex post verified conditions. For projects # I-11-012, #I-11-001 and #I-11-015, the ex ante verified

operating conditions were different from the ex post verified operating conditions which led to reduced realized savings. For project #I-11-006 the ex ante assumed operating conditions were different from the ex post verified operating conditions and resulted in an increase in the total realized savings.

- Not all program-reported measures for project #S-10-001 were fully implemented, resulting in significant reductions in realized savings.
- For several projects, we found that the air flow (CFM) demand reduction was not accurately modeled in the ex ante calculations which resulted in overestimation of savings (e.g. #I-11-012 and #S-10-006).
- For projects #I-11-026, the ex ante analysis did not have access to post retrofit production data and so there was no normalization conducted to establish standard operating conditions.
- For projects #I-11-001 and #I-11-012, we found that the ex ante utilization rate for the nozzles measure was significantly overestimated compared to the ex post verified operating conditions for the nozzles.
- For projects #S-10-001 and #S-10-006, the program did not conduct post verification M&V activities which resulted in overestimation of savings.

#### **3.1.4 Net Program Impact Parameter Estimates**

The calculation of the program's NTG ratio is a multi-step process. The NTG ratio was assessed using a customer self-report approach using data collected during participant phone surveys. The survey covers a battery of questions used to assess the net-to-gross ratio for a specific project. Responses from the survey are used to calculate a Program Components score, a Program Influence score and a No-Program score for each project covered through the survey. These three scores can take values of 0 to 10 where a lower score indicates a higher level of free-ridership. The calculation then averages those three scores to come up with a project-level net-to-gross ratio. The project-specific NTG ratios are shown in Table 3-3. Out of the nine completed projects in PY4, telephone surveys were conducted with seven projects.

**Table 3-3. NTGR Results for the Compressed Air Projects**

Project ID*	kWh NTGR	kW NTGR
1	0.90	0.90
2	0.40	0.40
3	0.47	0.47
4	0.80	0.80
5	0.44	0.44
6	0.86	0.86
7	0.49	0.49
TOTAL	0.67	0.72

Source: EM&V analysis

\*Actual Project IDs are not provided to protect customer confidentiality

The separate ratio estimation technique was used to estimate NTG ratios for the program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework<sup>9</sup>. The standard error was used to estimate the error bound around the estimate of verified NTG ratio. The program level NTG ratios, along with precision estimates, are shown in Table 3-4 (kWh impacts) and in Table 3-5 (kW impacts).

A quantification of spillover was not included in the calculation of NTG ratio for PY4. However, spillover effects were examined in this evaluation and their magnitude was found to be quite small as discussed below.

**Table 3-4. kWh NTG Ratio and Relative Precision at 90% Confidence Level**

Relative Precision ± %	Low	Mean	High
10%	0.60	0.67	0.74

Source: EM&V analysis

**Table 3-5. kW NTG Ratio and Relative Precision at 90% Confidence Level**

Relative Precision ± %	Low	Mean	High
12%	0.63	0.72	0.80

Source: EM&V analysis

The measured PY4 NTG ratio was 0.67 for kWh and 0.72 for kW, with the project-specific scores ranging from 0.90 to 0.40. No projects completed in PY4 were found to be full-free riders (i.e., with NTG ratios

<sup>9</sup> Tec Market Works, "The California Evaluation Framework," Prepared for the California Energy Commission, June 2004. Available at <http://www.calmac.org>

ranging from 0.00 to 0.25). On the other hand, relatively high program influence (NTG ratio above 0.60) was found in three of the seven projects discussed.

**Spillover**

Spillover effects were addressed qualitatively in the PY4 evaluation, based on responses to a battery of spillover questions in the telephone survey. The evidence of spillover for the Compressed Air Study program is presented in Table 3-6 below.

**Table 3-6. Evidence of Spillover in PY4**

Spillover Question	Evidence of Spillover
Since your participation in the ComEd’s Comprehensive Compressed Air Study (Compressed Air) program, did you implement any additional energy efficiency measures at this facility that did NOT receive incentives through any utility or government program?	Of the 7 surveyed customers that responded to this question, 3 said “Yes” (43%). These 3 respondents implemented a total of 6 energy efficiency measures.
What type of energy efficiency measure was installed without an incentive?	<ul style="list-style-type: none"> <li>(1) Changed coalescing filters               <ul style="list-style-type: none"> <li>(1) Variable Speed fans on the compressed air system</li> </ul> </li> <li>(1) Forage pipe system increases in pipe size</li> <li>(1) Equipment with variable frequency drives</li> <li>(2) Lighting Measures (Additional lighting, Motion sensors for lighting)</li> </ul>
On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much influence did your participation in ComEd’s Compressed Air program have on your decision to install additional energy efficiency measures?	For the 6 implemented measures: <ul style="list-style-type: none"> <li>(2) Rating between 0 and 3</li> <li>(0) Rating between 4 and 6</li> <li>(4) Rating between 7 and 10</li> </ul>
How did ComEd’s Compressed Air program influence your decision to install additional energy efficiency measures?	For the 4 implemented measures that were greatly influenced by the program: <ul style="list-style-type: none"> <li>(1) Outside vendor reaffirming that we had a problem</li> <li>(1) It showed us that there was money to be saved by doing projects like that</li> </ul>

Source: EM&V analysis

These findings suggest that the program may be quite effective at leading to follow-on projects, but nonetheless, spillover effects for PY4 were found to be relatively small for the reasons outlined below. The four installed measures that were greatly influenced by the program were the coalescing filters, the variable speed fans on the compressed air system, increased forage pipe size, and additional lighting.

The filters were not installed on the main compressors so the savings are considered to be minimal. The variable speed fan was found to have no savings because the fan is running at 100%, which is the same speed as before the new fans were installed. The additional lighting measure has been going on for the last few years and is very minimal. The customer replaces 2 or 3 fixtures each time they move machines. The increased forage pipe system size measure had contradictory information on the survey regarding whether the pipes were changed out before or after their participation in the program. Therefore, the measure was not considered<sup>10</sup>.

### 3.1.5 Net Program Impact Results

Net program impacts were derived by multiplying Research Findings gross program savings by the calculated NTG ratio. Table 3-7 and Table 3-8 provide the program-level Research Findings net impact results for the PY4 Compressed Air Study program. The NTG ratio for energy savings is 0.67 and for demand savings is 0.72, and is based upon responses from each contributing participant in the sample (and other sources) and the use of kWh-based weights. The chained realization rate (gross kWh RR \* NTG ratio) is 0.51 for kWh and 0.49 for kW.

**Table 3-7. Program-Level Research Findings Net kWh Impacts for PY4**

	Ex Ante Gross kWh	Research Findings Gross kWh	Gross kWh RR	Research Findings Net kWh	NTGR
Total	5,927,508	4,472,612	0.75	2,996,604	0.67

Source: EM&V analysis

**Table 3-8. Program-Level Research Findings Net kW Impacts for PY4**

	Ex Ante Gross kW	Research Findings Gross kW	Gross kW RR	Research Findings Net kW	NTGR
Total	680	461	0.68	331	0.72

Source: EM&V analysis

## 3.2 Process Evaluation Results

The process component of the Compressed Air program evaluation focused on program participation, program design and implementation, the service provider network, marketing and outreach, barriers to participation, and participant satisfaction. The primary data sources for the process evaluation included the telephone surveys with seven program participants and the in-depth interviews with eight market actors and two Account Managers.

### 3.2.1 Participant Profile

The Compressed Air program targets industrial customers. The seven participants surveyed self-reported themselves as:

<sup>10</sup> Call backs were attempted but the customer did not respond.



- 71% manufacturing, 29% printing
- 71% large, 14% medium, 14% small
- 100% owners
- 100% have facilities at other locations

### 3.2.2 Program Design and Implementation

ComEd’s Compressed Air program was a pilot program in PY3 and was implemented as a full scale program in PY4. Program design and implementation were still in the process of being refined in PY4. In general, the program is designed to provide customers with a fully funded compressed air system study that recommends both no/low cost and capital measures to lower the energy use by improving the efficiency of their compressed air system. Customers that participate in the study are required to repair 50% of their compressed air leaks at their own expense and are also eligible for cash incentives towards the cost of implementing recommendations.

#### Application Process

In PY4, all of the projects were initiated by the Compressed Air Service Providers (CASPs). The program manual states, “If an application is solicited directly through a CASP, the CASP should screen both the facility and the facility staff to determine if a successful Compressed Air Study is likely. This screening should be completed before the application is submitted to the program.” However, the customer still has the responsibility for completing and submitting the application paperwork to the program administrator. While participating customers seem to be satisfied with the program in general, one participant reported that:

*“Paperwork is too burdensome. Program is too complicated. The biggest thing is that it’s too confusing. It’s a little bit hard to get in. And, I’m applying for other programs now and the paperwork is hard and the Nexant people are not technical. So, you can’t really discuss technical aspects with them. Because they are not experienced in the field.”*

The participating service providers also report being fairly satisfied with the program in general; however two did note the hassle of the application process:

*“We have not done any work through ComEd for the past 12 months at all. ... The amount of time, detail, review was well beyond what we could do economically based on the program framework. ... And we’ve been doing this for 20 years, working with utility programs. ...we were spending way too much time and way too much energy answering questions that either didn’t need to be answered at that point in time, or just the requirements put on us to meet the questions ... took too much time, too much effort. We just couldn’t make any money at that. ...the amount of questions and detail that came back from the [program administrator] on that almost took us to a detailed engineering study level before they would approve the project to go do the detailed engineering study.”*

*“Many of the procedures that are in place make it difficult for projects to go through, whether that be from an application standpoint or just the processing of an application. And, some of the incentives aren’t as clear as they could be.”*

### **Project Schedule**

The Compressed Air consists of five primary phases: Application, Planning, Investigation, Implementation, and Verification. The Application Phase is the initial phase. In this phase the application is filled out by customer and submitted to the program administrator and a service provider is assigned to the project. The next phase is the Planning Phase, which should take around six weeks. The major milestones in this phase are the kick off meeting, preliminary site assessment, preliminary study, and a formal program agreement. Following the Planning Phase is the Investigation Phase, which can take up to eight weeks. This is the phase where the service provider conducts a more detailed site assessment, finalizes the site study, reviews the findings with the customer, and the customer selects the measures they want to implement. The second to last phase is Implementation, which can take up to eight weeks. In this phase customers are responsible for implementing the measures agreed upon in investigation phase. The final phase is the Verification Phase. In this phase the program administrator or the service provider visits the site to make sure the measures have been properly installed and they prepare a verification report.

Program staff mentioned that service providers were having trouble adhering to the project deadlines that they agreed to in their contracts.

*“We have made improvements this year to hold them to their commitments, but they still did not necessarily achieve those deadlines which took the focus away from the customer timeline for implementation and overall extended the schedule of the project. On top of that, when it comes to deadlines, often times implementation deadlines were often extended in most cases, which also extended the entire deadline of the project.”*

Program staff also noted that the requirements for number of days to implement is usually 90 days, however they are considering adjusting the program rules to increase the maximum number of days for implementation to 180.

When the participating customers were asked about their satisfaction with their individual project schedules, all but one reported being satisfied with their schedules. Fifty-seven percent of participants noted that their project schedules were challenging, but still reported satisfaction with them. One participant even reported, *“They were pushing us and I’m glad.”*

### **Leak Repair Commitment**

Customers that participate in the Compressed Air program are required to repair 50% of the volume of their compressed air leaks by the date agreed upon in their contract in exchange for a free compressed air system study that provides recommendations on how to lower their energy use by improving the efficiency of their compressed air system. If the 50% threshold is not met within the agreed upon timeline the cost of the study is to be paid by the customer.

Program staff noted that every customer made an effort to meet and exceed the commitment, but one project didn’t quite make the 50% volume savings. However, ComEd was satisfied with that project being successful in meeting the minimum commitment and the customer was not required to pay back the cost of the study.

When participating customers were asked about their satisfaction with the level of leak repair commitment required by the program, 86% reported being satisfied and the remaining customer was neutral towards the level of commitment.

### **Account Managers**

When participants were asked “What are the best ways of reaching companies like yours to provide information about energy efficiency opportunities?” 43% of participants reported that their account manager is the best way to contact them.

Since PY2, program staff has been working to more actively engage ComEd account managers in the Smart Ideas Program. Given their pre-existing relationship with customers who are the largest users of energy, a goal has been to provide account managers with better tools to sell the program. Over the years the program has developed a toolkit for account managers and also began providing training opportunities and “Lunch and Learns.” The last program year marked the introduction of Smart Ideas goals for account managers. Goals included recruiting customers to attend the Energy Efficiency Expo and attending “Lunch and Learns.”<sup>11</sup>

Three account managers made themselves available for an interview. One was newly transferred to the participating customer and was unable to report on his interaction with the project. The other two talked with us about their experiences with the Compressed Air program. Both account managers agreed that the “Lunch and Learns” are useful in providing information about the program. One account manager specifically mentioned that the “Lunch and Learns” are the best way to learn about the program aside from having one of your customers participating in it. Interviewed account managers feel that, overall, they have enough knowledge of the program to effectively promote it and assist their customers through the participation process.

All but one of the PY4 Compressed Air projects was associated with customers who have an account manager. Twenty-nine percent of program participants reported a recommendation from their account managers was very important in their decision to participate in the Compressed Air program, and another 43% reported it was somewhat important to their decision. However, none of the participants surveyed reported first hearing about the program through an account manager.

In general, despite efforts to better engage Account Managers, program staff noted that there is still large variability in the efforts of account managers to promote the program and that they are still trying to strengthen their relationship with the account managers.

### **3.2.3 ComEd Service Provider Network**

CASPs play a pivotal role in this program. In PY4, they were a main driver for bringing customers into the program; they are also responsible for conducting the compressed air study and reporting the results to the customer and the program administrator. For these reasons it is important to have reliable, trustworthy service providers. The program administrator is responsible for selecting service providers through an RFP process. Those that are accepted become a part of the pool of qualified service providers that provide services under the program.

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<sup>11</sup> In early PY3, an additional savings goal for Account Managers was contemplated but ultimately not implemented.

As part of this evaluation, telephone interviews were conducted with both participating and non-participating service providers. Based on the Compressed Air program database, five unique service providers had a project completed in PY4. Telephone surveys were conducted with all five of the service providers that had projects completed in PY4. Additionally, telephone surveys were conducted with three service providers that have not yet participated in ComEd's Compressed Air program. These non-participant service provider names were gathered through interviews with program staff and service providers, internet searches, and the Retro-commissioning (RCx) program trade ally list.

Five of the eight service providers interviewed for this evaluation participated in ComEd's Compressed Air program in PY4. Four of the five participating service providers report making no change in their business practices or the types of compressed air equipment and related services they provide as a result of their participation in the program. However, they all indicated that participating in the program has resulted in an increase in business. When asked about the main benefits of becoming affiliated with the program, they cited helping customers reduce costs, gaining leads from customers looking to participate in ComEd's programs, increase in business, and being associated with ComEd.

Three of the eight service providers interviewed for this evaluation did not participate in ComEd's Compressed Air program in PY4. Reasons for not becoming a ComEd service provider range from a contractor who mostly installs additional new equipment (as opposed to retrofitting existing equipment) to the program's hassle factor.

*"Personally, it's a very cumbersome program. The multiple steps to get paid in. The fact that supplier, like me, is out the dollars to do the work and out the dollars once they submit the different stages. It's a very cumbersome process and it takes a long time to get through."*

Also as part of this evaluation, interviews were conducted with seven program participants. These interviews included questions about their interaction with their service provider. All participant survey respondents reported that the recommendation from their service provider was very important in their decision to conduct the study and commit the funding to make energy efficiency improvements to the compressed air system. On average, service providers were the third most important influence in their decision to conduct the study and commit the funding to make energy efficiency improvements to the compressed air system, only slightly behind the free comprehensive study and the payback on investment with the incentive.

Five of the seven participants surveyed reported first hearing about the program through a service provider. Of the two remaining participants, one reported being unsure of where they heard about the program and the other reported an energy consulting firm first telling them about the program. All of the participants surveyed were very satisfied with the information provided in the compressed air study given to them by their service provider. Most noted that the reports were very detailed and informative and were helpful in selling the project to upper management.

*"I wanted to get a new air compressor to replace this old, inefficient one and I think this [Compressed Air Study] was helpful in convincing people above me that it was a good idea with some of the studies and things that were happening."*

One of the features of the Compressed Air program management design is to score service providers throughout their participation process in order to assess the quality of services they are providing. Scores are based on the number of completed projects, the quality of deliverables, the value to the program, and customer satisfaction. Program staff noted that this exercise was completed for the service providers that participated in PY4. In general the service providers did a good job, but scored lower than expected. However, program staff noted that some of the low scores were due to PY4 being a launch year and categories like “number of projects” were lower than expected as the program was slow to get started.

*“It was a momentum building year, meaning that it took some time to engage service providers and help them develop their sales cycles, to bring projects into the program. That momentum builds and continues to remain fairly steady which is great.”*

Program staff noted that there is also room for improvement in timelines and deliverables.

*“...but there were other challenges that also came about, such as service providers adhering to their deadlines. As each service provider is a sub-contractor to the program, not just a Trade Ally, so they have a contract with Nexant as a sub and also as a flow down from ComEd. Rather than using a template as a projected schedule for a project we have customized project schedules for each customer given that we have capital measures engaged in this program not just low/no cost measures. Having service providers commit to that deadline upfront we have made improvements this year to hold them to their commitments, but they still did not necessarily achieve those deadlines which took the focus away from the customer timeline for implementation and overall extended the schedule of the project. On top of that, when it comes to deadlines, often times implementation deadlines were often extended in most cases, which also extended the entire deadline of the project.”*

When asked if the timelines are realistic, program staff noted:

*“I think if we were just using a template schedule the answer would be no, but because we are working with the service provider to customize that schedule I would say that they are perfectly capable of meeting those deadlines. There are cases where some customer issues come up, but I would say that that’s not the rule of thumb that comes up it’s just that the service provider is delinquent in their deliverable.”*

Service providers are responsible for coming up with savings estimates in the planning phase. In PY4, the difference between the planned and verified savings was around 50% on average. However, program staff noted that they use a 70% multiplier on service provider savings estimates to better estimate the actual savings expected.

Program staff noted that there were some additional challenges with the planned versus verified savings. One of the challenges noted is the interaction of measures in this program. If one measure is not implemented properly it can affect the savings of the other measures. Program staff also noted that the service providers had some room for improvement on the technical side, but are working with the service providers to identify ways to overcome savings estimation challenges.

### 3.2.4 Program Marketing and Outreach

In PY4, program staff indicated that the service providers are the main channel through which participation begins. This sentiment was also echoed by participants who ranked service providers as the greatest source of program awareness; 71% of participants indicate that they first heard about the program through a service provider.

Although service providers are the most common source of program awareness, participants generally do not believe that service providers are the best ways to provide them with information regarding energy efficiency opportunities. Instead participants indicate that they prefer to receive this information through email (71%) or their ComEd Account Manager (43%).

When asked about marketing and outreach materials, program staff noted that various materials were developed for this program, but were unsure of their effectiveness.

*“I think we have a fact sheet that was developed and specific to compressed air and I think it was co-shared between this program and the custom program in PY4. I’m not sure that that was a significant driver for this program. There was also a tri-fold that was developed for an overview for the program. And that was used by some SPs. It was also available via the web on ComEd’s website. There were some small marketing campaigns that were done to reach out, it was done in PY4 but I think the emphasis was for PY5 with a calendar campaign and I think there was a water bottle campaign and some significant follow-up activities.... But I would say, again, that we relied heavily on SPs to educate them about the program, provide them with maybe that one piece of collateral and trying to provide consistent messaging on what the program is offering, a fully funded study with a minimum commitment of the 50% of leak volume of the identified leaks, that was largely the bigger piece from a marketing perspective”*

Four of the five interviewed participating service providers indicate that they received and utilized promotional materials from the program. The other service provider noted *“we have an arrangement with ComEd where they work with us in a different manner.”* Of those that currently utilize ComEd’s program materials, two said the materials are very useful and two said they are somewhat useful.

Even though program staff and service providers mentioned having and utilizing marketing material, none of the participants surveyed remembered receiving any marketing materials or other information about the Compressed Air program.

Interviewed service providers were asked to gauge their customer’s awareness of the Compressed Air portion of the Smart Ideas for Your Business Program. Four of the five participating service providers say their customers are somewhat aware of the program and one reported their customers are not very aware of the program. They all reported that they promote the program frequently and customers are generally interested once they become aware of the program.

Program staff noted that an attempt was made to engage the account managers in the program activities. In general, program staff noted that there is still large variability in the efforts of account managers and that they are still trying to strengthen their relationship with the account managers.

*“Some were more engaged than others. Depends on the account rep.”*



It was also noted that ComEd had a pretty significant reorganization of the Account Managers assignments to customers. This was documented in the tracking data also. As part of this evaluation, telephone surveys were conducted with account managers. When we tried to contact the account managers for interviews we were informed that two of the account managers were different than the ones listed in the tracking data. Program staff noted:

*“We are continuing to work with that team to help find a way to work with them [Account Managers] most efficiently given their roles and responsibilities. If they had more roles and responsibility with regards to energy efficiency metrics it would have a pretty significant impact in involvement activities for energy efficiency in general. And I think that there is some of that happening in the next program year, but I think from an energy efficiency perspective it’s still not at the desired level that it could be.”*

Three account managers made themselves available for an interview. One was newly transferred to the participating customer and was unable to report on his interaction with the project. The other two talked with us about the compressed air projects that were completed with their customers. One account manager noted:

*“It’s my experience, and I have fewer industrial customers now than I had in my previous portfolio, my experience has been that customers who are interested in compressed air projects, they’ve already been looking at their compressed air issues and they know there is something that they need to fix and they are trying to figure out what they mainly need to do to with what we offer. So, I haven’t had any experience of going and saying, you know, we have this compressed air program and having somebody say, you know, I really haven’t thought about that.”*

Both of the account managers interviewed found the program’s marketing materials to be easily accessible on the ComEd Smart Ideas for Your Business website. One of those interviewed noted that they most often utilize the general outline they have in their handouts. The account manager was asked if there is anything that the program could do to help you be more effective in promoting the Compressed Air program. The account manager noted:

*“Probably knowing where the customer is and if they are receiving assistance from one of our vendors in the whole process, I’d like some updates. If somebody associated with ComEd is working with them I would like to know what is going on. ... I really don’t know just where we are, typically. I don’t know if they are ordering equipment or if they are on-site installing things. I don’t necessarily know where the process is, if it is somebody outside. I think I’ve had quite enough training. But, when it’s beyond just replacing equipment, if it’s handed over to a vendor or a contractor. The best thing for me would be to just know who is working with the customer directly and know where they are at in the process of the program.”*

### **3.2.5 Barriers to Participation**

#### **Customer barriers**

Service providers were asked to give feedback on customer barriers to improving the energy efficiency of their compressed air systems. They noted costs, knowledge about energy efficiency, time-frame, and lack of understanding as barriers to customer participation.

*“The **time-frame**, going May to May, where projects can’t leech over into the next year. That’s a barrier because some companies can’t fit that schedule, where things have to be done within a year or a particular time-frame. What that does is that it messes up our marketing capabilities. Because if you are marketing to a customer in December and things have to be completed in May, a lot of times they can’t get it done in that period of time. So, you have to wait until the following June before we can start the project. Allow projects to roll from year to year and go on the schedule that they naturally flow from a company. So, if it takes, you know, six months for a project to go on the ground, it doesn’t matter when it starts, it just gets submitted when it gets submitted.”*

*“Another issue that came up with that is because of the error checking and so forth, or the detailed analysis and everything that needs to be done, it demotivated the customer because it took months for these analyses and these approvals to happen at each step of the process.”*

*“**Lack of understanding.** The program’s not explained very well. Again, a lot of it comes down to a lack of understanding of the manufacturing environment, not on our part, but on the part of those marketing the program. They just don’t seem to have a firm understanding of how work goes on in a manufacturing environment and the dynamics of it all. The best thing to do is just get out there in the field with somebody that does know what they are looking at and learn.”*

Program staff was also asked to give feedback on customer barriers. Trust is a major hurdle both in encouraging participation and building satisfaction. Program staff noted that some customers don’t really have trust that ComEd will fully fund the study. It was also noted that some customers are averse to transactions with larger compressed air service providers because they suspect they may just be trying to sell equipment and not have the customer’s best interests in mind. Other barriers noted by program staff include required project timelines, lack of awareness, and the economic environment.

*“**Slow Economic Recovery** – reluctance to spend money. Some customers mention having a financing option would increase willingness to spend.”*

Program staff mentioned that they are implementing a direct mail campaign for the Compressed Air program to address the barrier of lack of awareness.

Account managers were asked to give feedback on customer’s barriers. They noted as barriers - budgets, time needed to devote to improving their system, and making the sale to upper management.

### **Service Provider Barriers**

Telephone surveys were conducted with three service providers that have not yet participated in ComEd’s Compressed Air program. These non-participant service provider names were gathered through interviews with program staff and service providers, internet searches, and the Retro-Commissioning trade ally list. We asked these non-participant service providers to discuss the barriers that are keeping them from participating in the program and they cited the lack of opportunity to participate and the hassle factor.



*“Customers. We are developing this program. And, our program actually started out of Wisconsin. So, we are kind of rolling north to south. So, we’ve been working mostly with Focus on Energy and those kinds of folks. But, as soon as we have an opportunity, we would like to work with the ComEd program.”*

*“We don’t have that many retrofits. We mostly do new [installations]. I don’t think it has much advantage to us when we do a new one. ... If we got into an existing one where we were replacing it, we certainly would go. We just had one of the guys in here for the HVAC energy retrofit program. I forget what that’s called. Anyway, we are active in that and if we had an opportunity to be active on the compressed air side we would be. We just haven’t had any opportunity to be.”*

*“Personally, it’s a very cumbersome program. The multiple steps to get paid in. The fact that supplier, like me, is out the dollars to do the work and out the dollars once they submit the different stages. It’s a very cumbersome process and it takes a long time to get through.”*

### **3.2.6 Participant Satisfaction**

Participants are satisfied with most aspects of the program. Customers were asked to rate – on a scale of 0 to 10, where 0 means “very dissatisfied” and 10 means “very satisfied” – several aspects of the program. Satisfaction across all program processes was high for PY4, with an average greater than 7.5 for all program processes discussed. The highest average satisfaction was with the information provided in the compressed air study followed by the program overall, with average satisfaction ratings of 9.1 and 8.7 respectively.

We asked participants to rate the following aspects of the program: the leak repair commitment, the compressed air study information, Nexant, program staff, savings achieved, the project timeline, the report quality, project meetings, the program overall, and ComEd. Over 70% of the participants interviewed rated all of these program processes highly (a rating of 7 to 10). Reasons for satisfaction with the program ranged from satisfaction with energy savings realized to praise for the program administrator’s role in the project.

*“Because we’ve seen the savings in costs in energy. Plus, we’ve had less downtime just from the things they told us. They also gave very good hints and things on how to keep the machines longer and everything. So, very good feedback”*

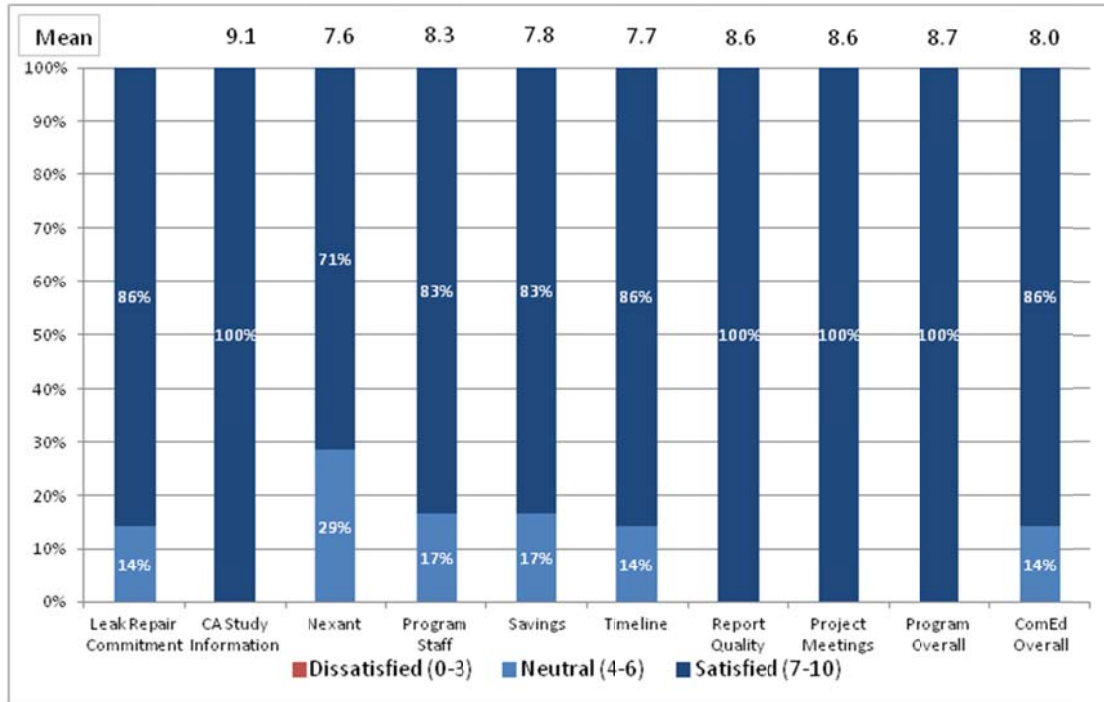
*“I think it helped open our eyes that there was savings there. Then they helped us go down the path, helped us get there. And then, the incentive at the end was very good for getting the work done.”*

The remaining 29% gave neutral ratings (a rating of 4 to 6) to a few of the program processes, specifically: the leak repair commitment, Nexant, savings achieved, the project timeline, and ComEd. One participant reported a lower satisfaction rating because their achieved savings was only 40% of what the initial report presented and also lower satisfaction in regards to the lack of supporting information in the report.

*“I think the full program recommendations that we received from [our service provider] was great. But, the lack of supporting information, whether it be through Nexant or Smart Ideas or wherever, there’s a lot*

*of players that come in and out and it's not clear who we were reporting to or who we were waiting on for reports. It seems disorganized and no one seems to know the answer."*

**Figure 3-1. Program Satisfaction**



Source: EM&V analysis

Note: This graph presents valid percentages, i.e., don't know, refused, and not applicable responses are excluded.

Source: PY4 CATI Participant Survey.

Given the high satisfaction scores, it is not surprising that all of the participants surveyed would recommend this program to others. When asked what could be done to improve the program, many participants offered no recommendations (43%). While others thought that the program could improve with better communication (29%), greater publicity (14%), making the leak testing portion of the program recurring (14%), and more information (14%).

*"I think the improvements made need to be at an expectation level and a communication level between who ComEd hires as their engineering consulting firm and the actual compressed air service firms that are on the front line helping to implement it."*

*"I've wondered if the program could be recurring. Because, obviously, in any manufacturing facility, I could get all those air leaks fixed and within 6 months I could probably have just as many air leaks and maybe some of them would even be the same air leaks all over again. It's good to go through it. But, I think it would be good, incentive-wise, to have a recurring program to continue to be involved in."*

*"We could use a little more information on some other electrical savings. Maybe they could steer towards where to find other incentive programs, maybe."*

### **Service Provider Satisfaction**

Participating service providers were asked about their satisfaction with four program components -- measures offered, incentive amounts, communication, and the program overall. In general, participating service providers were satisfied with the program overall, with 60% very satisfied and 40% somewhat satisfied. All were satisfied with the measures offered, with 40% reporting very satisfied and 60% somewhat satisfied. All were also satisfied with the incentive amounts, but slightly less than the other factors, with 20% being very satisfied and 80% being somewhat satisfied. Communication was the only factor that resulted in a dissatisfied rating. Forty percent said they were very satisfied with the communication, 40% were somewhat satisfied, and 20% were not very satisfied, noting:

*"I wasn't very satisfied with the amount of time the third party took to get back to me."*

All but one of the participant service providers had suggestions on ways they would like to see the Compressed Air program improved. Suggestions included: having more incentives tailored for smaller customers, reducing the amount of required meetings and paperwork, increasing incentive amounts, making it easier to push projects through, better defining some of the requirements, working closer with the service providers and customers to create a team approach, and reducing the amount of detail needed for project approval.

*"We have not done any work through ComEd for the past 12 months at all. ... The amount of time, detail, review was well beyond what we could do economically based on the program framework. ... And we've been doing this for 20 years, working with utility programs. ...we were spending way too much time and way too much energy answering questions that either didn't need to be answered at that point in time, or just the requirements put on us to meet the questions ... took too much time, too much effort. We just couldn't make any money at that. ...the amount of questions and detail that came back from the [program administrator] on that almost took us to a detailed engineering study level before they would approve the project to go do the detailed engineering study."*

*"We had a particular project that had about 40,000 HP of compressor energy, literally, 40,000 HP. These guys used 150 million kWh per year. That project never was approved by the contractor because they, I don't know if they were scared by the size of the thing or whatever. But, they could just never get their head around where the energy savings are going to come from. And, to me that's absolutely backwards. ... You should be questioning the small projects more than the big ones. Because a 1% savings on a huge facility is far more than a 30% savings on a very small facility. So, the amount of improvement that needs to be made on a very large system is very small to make the payback for ComEd. Versus a very small system, the improvement needs to be very large to pay off ComEd."*

*"We got, in many cases, situations where we were 6, 7, 8 revisions on our engineering study which, they were minute changes in approach that really didn't matter anyway because in the end you are going to verify the savings with a metered or an M&V protocol. . So, in the end it doesn't matter what the engineering study says, whether it's plus or minus 1% or 5% doesn't matter. In the end, the economics are going to come or the rebate and the benefit to ComEd is going to be based on actual, measured, real values."*

## 4. Findings and Recommendations

This section highlights the conclusions and recommendations from the PY4 evaluation of ComEd's Smart Ideas for your Business Compressed Air Study program. Below are the key findings and recommendations.

### 4.1 Key Impact Findings and Recommendations

#### 4.1.1 Gross Impacts

Based on the nine projects evaluated in PY4, the gross impact results yielded an energy realization rate of 0.75 and a demand realization rate of 0.68. This is understandable for a first year program that involves complex customized savings calculations, challenging data collection activities and the varying operating conditions of the compressed air system. The program can further improve the gross impact results by using improved data collection methods and enhanced calculation models. Key evaluation findings and recommendations include the following:

#### 4.1.2 Improvements to Ex Ante Savings Estimates<sup>12</sup>

**Finding.** The program-verified compressed air system post retrofit operating conditions changed for several projects between the program M&V period and the evaluation M&V period. These changes in post retrofit operating conditions affected the project savings and generally resulted in a reduction to realized savings (e.g., # I-11-001, #I-11-012, #I-11-015, #I-11-026 and # S-10-001).

**Recommendation.** The program should probe more to verify if the facility has any firm plans to change operating conditions in the foreseeable future. The program might also be able to incorporate longer measurement periods and/or pre- and post-installation monitoring in order to ensure better model calibration based on more comprehensive observations of plant operation.

**Recommendation.** Additionally, the program should consider conducting the post-installation M&V after the compressed air system has operated for a reasonable period following measure installation, to ensure that the customer is satisfied with the new measures and does not subsequently change the compressed air system operating conditions.

**Finding.** For the air leaks repair measure, the program calculations did not use a consistent approach for estimating air flow (CFM) savings. Typically, these savings were reported to be estimated based on the experience of the technical reviewers. This estimation approach typically resulted in overestimation of air flow (CFM) reduction and savings (e.g., #S-10-006 and #I-11-012).

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<sup>12</sup> Site-specific data and information reported in this section is limited in some instances in order to protect customer confidentiality

- **Recommendation.** Since a significant amount of savings for the PY4 program are from the air leaks repair measure it is critical that the program calculations for this measure follow a consistent and thorough approach for all projects. The air leaks calculations should use industry standard sources for estimating CFM reduction based on the measured size of the air leaks. The program should consider using industry standard guidelines for converting measured air leaks using ultrasonic leak detector from decibel (dB) to CFMs.

**Finding.** The program baseline and post-installation calculations were not always normalized to account for changes in facility production levels or compressed air system airflow load profiles. Additionally, when the program calculations were normalized, it did not always represent typical annual operating conditions (e.g., # I-11-026, #I-11-001, # I-11-012 and # I-11-015). In some cases, the normalization was not performed when production data was not provided by the customer.

- **Recommendation.** Determine whether pre or post measurement data will require normalization to properly adjust for weekly or seasonal variation, market fluctuations, or to ensure equivalent modeling of operating conditions for the baseline and post-installation estimates. Normalization would ensure that energy savings calculations represent typical annual operating conditions. We understand that normalization is a challenging task and is dependent on the availability of an annual compressed airflow profile and production data for these projects; however, the program should develop a consistent data collection approach and calculation methodology to perform normalization for projects.
- **Recommendation.** The program could do a better job of verifying whether or not the energy usage, airflow and production data collected represents typical annual operating conditions for the project. The program calculations should verify correlation between energy usage, airflow (CFMs) and production where possible and methodically select the normalization parameter to improve the accuracy of estimated savings.

#### 4.1.3 Data Collection

**Finding.** When the program collected measured data for pre- and post- implementation periods in support of ex ante savings calculations, and used that as a source for estimating savings or for model calibration, the resulting ex ante savings estimates were found to be more accurate (e.g., #S-10-001 and #S-10-006). When the program did not perform post M&V activities, it typically resulted in overestimation of savings or reduced accuracy in the savings estimates. However, the program was not always successful in collecting production information from the facility which affected the accuracy of the savings calculations.

- **Recommendation.** The program should continue to take measurements for pre retrofit and post retrofit conditions. Evaluators do not have access to pre retrofit conditions and therefore, ex ante measured data for pre retrofit conditions can greatly increase the accuracy of evaluation savings calculations. Also, when the evaluators were not able to collect measured data for post conditions; the availability of ex ante post M&V data benefitted the evaluation savings calculations.

- Projects with measured program data (obtained from logging or from a customer's meter) resulted in accurate ex ante savings calculations and high realizations rates. When the program is unable to perform post M&V measurements the program should consider using an industry standard calculation tool such as AIRMaster+ to accurately model calculations. Note the use of AIRMaster+ can also be used as a sanity check when using regression models or assumptions for inputs to calculate savings.
- The program should notify customers that the program requires production information for all projects. In addition to collecting the production data for the pre and post periods, the program should also collect the data that represents annual production to better calibrate the final savings estimates.

#### 4.1.4 Baseline Review

**Finding.** Overall, the program did a good job at selecting baseline for all other measures.

**Recommendation.** When selecting baselines for replace-on-burnout (ROB) measures, the program should select baselines based on standard industry practice or minimum efficiency equipment available in the market as a replacement option (e.g., Use AIRMaster+ for selecting minimum efficiency options for air compressors). The program should select minimum efficiency only if there is no clear industry standard practice. For example, when selecting a dryer, if the customer has installed a cycling refrigerated dryer, the program should select a non-cycling refrigerated dryer instead of a less efficient desiccant dryer.

#### 4.1.5 Strengthen Evaluation Participation

**Finding.** In the course of conducting the evaluation, one participant (# I-10-005) refused to participate in the evaluation and a few participants mentioned that they wanted us to limit evaluation data collection activities since they had already spent considerable resources to meet the program requirements. Examples include projects #I-11-012 and # I-11-026.

**Recommendation.** Evaluation participation requirements need to be clearly explained to participants, both at the time of final project application submission and when they are paid incentives. In some cases, the evaluation may require additional data (not previously collected by the program) to verify the savings.

#### 4.1.6 Project Documentation

**Finding.** Project documentation provided by the program was comprehensive and included all the information required to understand all the details about the measures implemented. Project documentation included verification reports, calculation spreadsheets, final application and pre implementation documentation. This documentation was complete and greatly facilitated the evaluation.

#### 4.1.7 Net Impacts

**Finding.** Free-ridership levels for PY4 Compressed Air program are 33% for kWh savings in the first year of the program. Program influence was low in some instances for a number of different reasons. In two cases, participants reported that program implementers arrived late in the decision making process and offered incentives for projects that had already been



decided upon. In some cases, the customer reported a high likelihood that they would have implemented the same measures, especially the air leaks repair measure at the same time in the absence of the program incentives. It is important to note that certain types of compressed air energy efficiency improvements may be particularly prone to free ridership, since they constitute a type of routine maintenance activity undertaken by some end users.

**Recommendation.** One approach to reducing free ridership is for program administrators to exclude projects from the program that they believe have a high probability of being free riders. Similarly, if there is evidence that the program did not contribute significantly to the decision to install a particular measure or equipment type then an incentive may not be warranted. For example, incentives should not be provided to measures that the customer already planned to implement. One example is compressed air energy efficiency measures that are frequently undertaken as a routine maintenance activity.

## 4.2 *Key Process Findings and Recommendations*

### 4.2.1 **Program Participation**

**Finding.** The program induces increased knowledge regarding energy efficiency for compressed air systems. Ultimately the program has been effective in stimulating awareness among those who make the financial decisions and need to see the benefits of improving compressed air efficiency. The audits are an effective educational vehicle for this purpose, providing cost-benefit analysis through embedded assessment of measure feasibility. Account managers might be a good vehicle for spreading awareness and knowledge to those who make the financial decisions.

**Recommendation.** Engage ComEd account managers more to promote the program. Typically, reaching the correct customer decision-maker is a major hurdle, therefore, the program could benefit from the account manager's help in developing a more targeted database of energy decision makers for facilities with compressed air systems. This should help increase decision-makers' awareness of the program and encourage participation. Also, participants indicate that they prefer to receive information regarding programs through email (71%) or from their ComEd Account Manager (43%).

### 4.2.2 **Program Satisfaction**

**Finding.** A major theme across all of the telephone surveys was a lack of clarity and/or confusion with the program, and feedback that the program is too complicated. Participants and service providers reported confusion with the players involved, incentive amounts, who to report to, what are the roles and functions of each of the players, and perceived disorganization.

**Recommendation.** Make the program rules and requirements more clear as much as possible. Facilitate improving communication among all of the players involved. Provide clear direction to the team in terms of roles and expectations. Strong communication and clear expectations are crucial to the success of the program.

**Finding.** Participants are satisfied with most aspects of the program. Satisfaction across all program processes was high for PY4 with over 70% of the participants interviewed rating all program processes highly (a rating of 7 to 10). Reasons for satisfaction with the program ranged from satisfaction with energy savings achieved to praise for the program

administrator's role in the project. When asked what could be done to improve the program, many participants offered no recommendations (43%). Participant recommendations for improvements included better communication (29%), greater publicity (14%), making the leak testing portion of the program recurring (14%) and providing additional information about the energy savings measures (14%).

**Recommendation.** Increase ongoing communications with customers. Consider increasing efforts to publicize the program, and developing additional technical briefs that provide information about each type of energy savings measure.

#### 4.2.3 Service Provider Network

**Finding.** All but one of the participant service providers had suggestions on ways they would like to see the Compressed Air Study program improved. The broad array of suggestions included expanding the range of incentives offered to target smaller customers, reducing the amount of required meetings and paperwork, increasing incentive amounts, easing requirements and procedures to push projects through, better defining some of the requirements, working closer with the service providers and customers to create a team approach, and reducing the amount of detail needed for project approval.

**Recommendation.** The program should use this feedback to improve program processes, and also independently gather information from Compressed Air Service Providers (CASP's) about project experiences to inform program improvements. Project success stories could also be shared among CASP's in order to encourage best practices, perhaps through case studies or periodic meetings. These efforts would serve to educate the service provider network and groom CASP actions to best serve the program.

**Finding.** Compressed Air Service Providers play a pivotal role in this program. In PY4, the CASPs are an important marketer of the program; they are also responsible for conducting the compressed air study and reporting the results to the customer and the program administrator. The program has a good screening process for selecting service providers which ensures that only reliable and knowledgeable service providers are included in the program.

**Recommendation.** CASPs will be an important factor for the success of the program since they play key roles in various program activities. The program administrators should increase the pool of qualified service providers under the program in order to increase program participation, and expand program reach and offerings.

**Recommendation.** The Smart Ideas program should also consider offering a bonus to service providers, similar to the PY4 trade ally bonuses. The program should strive to communicate the new bonus program early and clearly to both service providers and non-service providers, and provide sufficient lead time for service providers to increase their promotion and take advantage of the offering to the fullest extent.



## 5. Appendix

### 5.1 Glossary

#### High Level Concepts

##### Program Year

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

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

##### Verified Savings composed of

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

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In EPY4/GPY1 ComEd's deemed parameters were defined in its filing with the ICC. The Gas utilities agreed to use the parameters defined in the TRM, which came into official force for EPY5/GPY2.

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

##### Impact Evaluation Research Findings composed of

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

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

**Application:** When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be labeled Impact Evaluation Research Findings and designated as "ER" for short. When a program does not have deemed parameters (e.g., Business Custom, Retrocommissioning), the Research Findings are to

be in the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

### Program-Level Savings Estimates Terms

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

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

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

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

## Individual Values and Subscript Nomenclature

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

**Deemed Value** – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a deemed measure shall use the superscript “D” (e.g., delta watts<sup>D</sup>, HOU-Residential<sup>D</sup>).

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

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

**Adjusted Value** – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript “AV” as in X<sup>AV</sup>

## Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012<sup>13</sup>.

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

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

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<sup>13</sup> IL-TRM\_Policy\_Document\_10-31-12\_Final.docx

**Measure Level Research:** An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.

**Program Level Research:** An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

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

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

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

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

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

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

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

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



## 5.2 Data Collection Instruments

### 5.2.1 Phone Survey for Participating Customers

**COMED SMART IDEAS FOR YOUR BUSINESS PROGRAM  
PARTICIPANT SURVEY – COMPRESSED AIR PROJECTS  
PY4 FINAL 07/31/12**

Contact Name:  
Business Name:  
Address:  
Phone:  
Email:

#### Introduction

Hello, this is \_\_\_\_\_ from Itron calling on behalf of ComEd regarding your company’s participation in the Compressed Air program. May I please speak with [**&CONTACTNAME**]?

Our records show that [**&COMPANY**] participated in ComEd’s Smart Ideas for Your Business Compressed Air Program, and we are calling to conduct a follow-up study about your firm’s participation in this program. I was told you’re the person most knowledgeable and the most involved with the decision to participate in the program. Is this correct? [IF NOT, ASK TO BE TRANSFERRED TO THE DECISION MAKER OR SOMEONE FAMILIAR WITH THE BASIS FOR THE DECISION TO PARTICIPATE OR RECORD NAME & NUMBER.]

[IF NEITHER DECISION MAKER OR SOMEONE FAMILIAR WITH THE BASIS FOR THE DECISION TO PARTICIPATE, IS AVAILABLE TERMINATE AND CALL REFERRAL]

This survey will take about 20 minutes. Is now a good time? [If no, schedule call-back]

(IF NEEDED: Is it possible that someone else dealt with the Compressed Air project?)

#### Participation Verification

A1 First, according to our records, you participated in ComEd’s Smart Ideas for Your Business Compressed Air Program between **<MONTH/YEAR >**. [IF NEEDED: *the ComEd Smart Ideas for Your Business Compressed Air Program promotes energy efficiency improvements to compressed air systems with a primary focus on industrial facilities. The program offers technical assessments to help identify applicable measures and analyze the energy and cost savings of the recommended measures. The program also offers cash incentives to help cover a portion of the cost of making the recommended energy efficient improvements to the compressed air system.*]

Do you recall participating in the ComEd Smart Ideas for Your Business Compressed Air Program between **<MONTH/YEAR >?**

- 1. Yes
- 2. No Thank & terminate
- 88. Refused Thank & terminate
- 99. Don’t know Thank & terminate

A2 Next, I'd like to confirm the following information regarding your participation in the Compressed Air Program. I understand that you participated at <ADDRESS>. The Compressed Air study was completed in <MONTH/YEAR> by <SERVICEPROVIDER> and you implemented <NO OF MEASURES> measure(s), including <MEASURE1>, <MEASURE2>, <MEASURE3>. ) Does that sound right?

- 1. Yes
- 2. No Thank & terminate
- 88. Refused Thank & terminate
- 99. Don't know Thank & terminate

**Project Background**

B1. Before I ask you specific questions about your decision, please tell me in your own words why you decided to make changes to improve the energy efficiency of your compressed air system at this facility? Were there any other reasons? **[DO NOT READ]**

- 1 To replace old or outdated equipment
- 2 As part of a planned remodeling, build-out, or expansion
- 3 The maintenance downtime and expenses for the old equipment were too high
- 4 Had process problems and were seeking a solution
- 5 To improve equipment performance
- 6 To comply with company policies regarding regular maintenance/replacement policy
- 7 To get a cash incentive from the program
- 8 To protect the environment
- 9 To reduce energy costs
- 10 To reduce energy use/power outages
- 77. Other (RECORD VERBATIM)
- 88. Refused
- 99. Don't know

B1a. Do you test your compressed air system for leaks on a regular basis?

- 1. Yes
- 2. No [skip the next question, go to B2a – top of page 3]
- 88. Refused [skip the next question, go to B2a – top of page 3]
- 99. Don't know [skip the next question, go to B2a – top of page 3]

[ASK IF B1a=1]

B1b. How often do you test your compressed air system for leaks?

- 77. RECORD VERBATIM
- 88. Refused
- 99. Don't know

B2a. Before learning about the ComEd Compressed Air Program, had you ever made any other changes to improve the energy efficiency of your compressed air system at this facility or any of your other facilities?

- 1. Yes, at this facility
- 2. Yes, at another facility [skip the next two questions, go to B5 – mid page 3]
- 3. No [skip the next two questions, go to B5 – mid page 3]
- 88. Refused [skip the next two questions, go to B5 – mid page 3]
- 99. Don't know [skip the next two questions, go to B5 – mid page 3]



[ASK IF B2a=1]

B2aa. Specifically, what did you have done at this facility?

- 77. RECORD VERBATIM
- 88. Refused
- 99. Don't know

[ASK IF B2a=1]

B2b. Did you receive an incentive or another form of financial support for this previous compressed air project?

- 1. Yes
- 2. No
- 88. Refused
- 99. Don't know

B5. My next questions are about your awareness of the energy saving opportunities identified through your Compressed Air study PRIOR to conducting it. Would you say you were aware of all, some, or none of the opportunities before the study? [if needed read: <MEASURE1 through MEASUREx>]

- 1. All [skip the next question, go to B2bb – top of page 4]
- 2. Some
- 3. None [skip the next three questions, go to B6b – bottom of page 4]
- 88. Refused [skip the next three questions – bottom of page 4]
- 99. Don't know [skip the next three questions – bottom of page 4]

[ASK IF B5=2]

B6. Which of the following energy saving opportunities were you previously aware of? Were you aware of the opportunities with your... (1=Yes, 2=No, 88=Refused, 99=Don't know)

- a. MEASURE1
- b. MEASURE2 [ASK IF MEASURE2=1]
- c. MEASURE3 [ASK IF MEASURE3=1]
- d. MEASURE4 [ASK IF MEASURE4=1]
- e. MEASURE5 [ASK IF MEASURE5=1]
- f. MEASURE6 [ASK IF MEASURE6=1]
- g. MEASURE7 [ASK IF MEASURE7=1]
- h. Leaks in the compressed air system

[ASK IF B5=1,2]

B2bb. What were the main factors that kept you from making the specific changes identified through the Compressed Air Program Study PRIOR to your participation in the program? [DO NOT READ]

- 1. Was not aware of the procedure and availability
- 2. Did not understand the procedures and benefits
- 3. The cost of having a study done was too high
- 4. Had insufficient in-house staffing to carry out recommendations made in the study
- 5. Had inadequate in-house expertise to carry out recommendations made in the study
- 6. Not aware of qualified providers
- 7. Management was against making investments in the compressed air system
- 77. Other (RECORD VERBATIM)
- 88. Refused
- 99. Don't know

[ASK IF B5=1,2]

B6a. Before participating in ComEd's Compressed Air program, did you undertake specific activities or studies in order to identify the energy saving opportunities you just mentioned you were aware of prior to participation?

1. Yes
2. No [skip the next question, go to B6b – bottom of page 4]
88. Refused [skip the next question, go to B6b – bottom of page 4]
99. Don't know [skip the next question, go to B6b – bottom of page 4]

[ASK IF B6a=1]

B6aa. What specific activities or studies did you do?

1. Hired a third party to perform an energy audit/data trending [skip the next question]
77. Other [RECORD VERBATIM]
88. Refused
99. Don't know

B6b. In the past, have you hired any third parties to conduct a comprehensive energy assessment of the compressed air system in your facility?

1. Yes
2. No [skip the next three questions, go to B8c – mid page 5]
88. Refused [skip the next three questions, go to B8c – mid page 5]
99. Don't know [skip the next three questions, go to B8c – mid page 5]

[ASK IF B6b=1 OR B6aa=1]

B6bb. Please describe the scope of this compressed air assessment conducted by the third party and the approximate timing of the study.

77. RECORD VERBATIM
88. Refused
99. Don't know

[ASK IF B6b=1 OR B6aa=1]

B6c. Were any changes made to the facility as a result of this assessment?

1. Yes
2. No [skip the next question, go to B8c – mid page 5]
88. Refused [skip the next question, go to B8c – mid page 5]
99. Don't know [skip the next question, go to B8c – mid page 5]

[ASK IF B6c=1]

B6cc. What changes were made?

77. RECORD VERBATIM
88. Refused
99. Don't know

[ASK IF MEASURES\_NOT\_INSTALLED not blank]

B8c. Our records show that your company did not install all of the measures recommended in the Compressed Air study. What were the reasons why your company didn't implement

[<MEASURES\_NOT\_INSTALLED>]?

77. RECORD VERBATIM
88. Refused
99. Don't know

[ASK IF #PROJECTS>1]

B7. Our records indicate that your company completed <#PROJECTS> projects through the program. Was your decision to participate in the program the same for each project?

1. Yes
2. No
77. Some decisions were the same (RECORD VERBATIM)
88. Refused
99. Don't know

**Decision Influences**

N0 When were you first contacted by a Compressed Air service provider regarding ComEd's Program? (if needed: regarding the availability of technical assistance and incentives for energy efficiency improvements?)

77. RECORD VERBATIM
88. Refused
99. Don't know

N1 When did you first learn about ComEd's Compressed Air Program, was it BEFORE or AFTER you first began to THINK about making energy efficiency improvements to the compressed air system at your facility?

1. Before [skip the next question, go to N3 – mid page 6]
2. After
88. Refused
99. Don't know

[ASK IF N1=2, 88, 99]

N2 Did you learn about ComEd's Program and the availability of technical assistance and incentives for energy efficiency improvements BEFORE or AFTER you DECIDED to make energy efficiency improvements to the compressed air system at your facility?

1. Before
2. After
88. Refused
99. Don't know

N3. Now I'm going to ask you to rate the importance of several factors that might have influenced your decision to conduct the study and commit the funding to make energy efficiency improvements to the compressed air system at your facility. On a scale from 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how important were the following in your decision to conduct the study and commit the funding to make energy efficiency improvements to the compressed air system. [FOR N3a-m, RECORD 0 to 10; 96=Not Applicable; 88=Refused; 99=Don't know][If needed: How important in your DECISION to conduct the study and commit the funding to make energy efficiency improvements to the compressed air system was...]

[ROTATE N3a-N3m]

- N3a. The age or condition of all or part of the compressed air system
- N3b. The availability of cash incentives for energy efficiency improvements
- N3c. The free compressed air comprehensive study
- N3d. The recommendation from the compressed air service provider
- N3e. Previous experience with this type of project
- N3f. The recommendation from your ComEd Account Manager
- N3h. The information from the Compressed Air Program Representative (Service Provider)
- N3i. Recommendation from a compressed air expert not affiliated with the program

- N3j. Standard practice in your business/industry
- N3l. Corporate policy or guidelines
- N3m. Payback on the investment with the incentives

N3n. Were there any other factors that we haven't discussed that were influential in your decision to make changes to improve the energy efficiency of the compressed air system? If so, what were they?

- 77. Yes [RECORD VERBATIM]
- 96. Nothing else influential [skip the next question, go to N3p – top of page 7]
- 88. Refused [skip the next question, go to N3p – top of page 7]
- 99. Don't know [skip the next question, go to N3p – top of page 7]

[ASK IF N3n=77]

N3nn. Using the same 0 to 10 scale, how would you rate the influence of this factor?

- #. RECORD 0 to 10
- 96. Not Applicable
- 88. Refused
- 99. Don't Know

[READ IF (N3a, N3b, N3c, N3d, N3e, N3f, N3h, N3i, N3j, N3l, N3m, OR N3n)=8,9,10]

You just told me that the following other factors were important:

[READ IN ONLY ITEMS WHERE THEY GAVE A RATING OF 8 or higher]

- N3a. The age or condition of all or part of the compressed air system
- N3b. The availability of cash incentives for energy efficiency improvements
- N3c. The free compressed air comprehensive study
- N3d. The recommendation from the compressed air service provider
- N3e. Previous experience with this type of project
- N3f. The recommendation from your ComEd Account Manager
- N3h. The information from the Compressed Air Program Representative
- N3i. Recommendation from a compressed air expert not affiliated with the program
- N3j. Standard practice in your business/industry
- N3l. Corporate policy or guidelines
- N3m. Payback on the investment with the incentives
- N3n. Other factor

N3p If you were given a TOTAL of 100 points that reflect the importance in your decision to make changes to improve the energy efficiency of the compressed air system, and you had to divide those 100 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM? Points given to program:

- #. RECORD 0 to 100
- 888. Refused
- 999. Don't Know

[CALCULATE VARIABLE "OTHERPTS" AS: 100 MINUS N3p RESPONSE; IF N3p=888, 999, SET OTHERPTS=BLANK]

N3o And how many points would you give to other factors? [The response should be <OTHERPTS> because both numbers should equal 100. If response is not <OTHERPTS> ask INC1]

- #. RECORD 0 to 100
- 888. Refused
- 999. Don't Know

**CONSISTENCY CHECK ON PROGRAM IMPORTANCE SCORE**

[ASK IF (N3p>69 AND ALL OF (N3b, N3c, N3f, AND N3h)=0,1,2,3), ELSE SKIP TO N4a]

N4 You just gave <N3p RESPONSE> points to the importance of the program, I would interpret that to mean that the program was quite important to your decision to install this equipment. Earlier, when I asked about the importance of individual elements of the program I recorded some answers that would imply that they were not that important to you. Just to make sure I have recorded this properly, I have a couple questions to ask you.

[ASK IF N3b=0,1,2,3]

N4a When asked about THE AVAILABILITY OF THE CASH INCENTIVE, you gave a rating of ...<N3B RESPONSE> ... out of ten, indicating that the cash incentive was not that important to you. Can you tell me why the cash incentive was not that important?

- 77. Record VERBATIM
- 88. Refused
- 99. Don't know

[ASK IF N3c=0,1,2,3]

N4b When I asked you about THE COMPREHENSIVE COMPRESSED AIR STUDY, you gave a rating of ...<N3C RESPONSE> ... out of ten, indicating that the study was not that important to you. Can you tell me why the study was not that important?

- 77. Record VERBATIM
- 88. Refused
- 99. Don't know

[ASK IF N3f=0,1,2,3]

N4c When I asked you about THE RECOMMENDATION FROM YOUR COMED ACCOUNT MANAGER, you gave a rating of ...<N3F RESPONSE> ... out of ten, indicating that the recommendation was not that important to you. Can you tell me why the recommendation was not that important?

- 77. Record VERBATIM
- 88. Refused
- 99. Don't know

[ASK IF N3h=0,1,2,3]

N4d When asked about THE INFORMATION from the COMPRESSED AIR PROGRAM REP, you gave a rating of ...<N3H RESPONSE> ... out of ten, indicating that this information from the program rep was not that important to you. Can you tell me why this information was not that important?

- 77. Record VERBATIM
- 88. Refused
- 99. Don't know

[ASK IF N3p<31 AND ANY ONE OF (N3b, N3c, N3f, OR N3h =8,9,10) ELSE SKIP TO N5]

N4e You just gave <N3p RESPONSE> points to the importance of the program. I would interpret that to mean that the program was not very important to your decision to make energy efficiency improvements to the compressed air system. Earlier, when I asked about the importance of individual elements of the program I recorded some answers that would imply that they were very important to you. Just to make sure I understand, would you explain why the program was not very important in your decision to make energy efficiency improvements to the compressed air system?

- N5 Now I would like you to think about the action you would have taken if the Compressed Air Program had not been available. Using a likelihood scale from 0 to 10, where 0 is “Not at all likely” and 10 is “Extremely likely”, if the Compressed Air Program had not been available, what is the likelihood that you would have made exactly the same energy efficiency improvements?
- #. RECORD 0 to 10
  - 88. Refused
  - 99. Don't know

[ASK IF N3j>7]

- N6 In an earlier question, you rated the importance of STANDARD PRACTICE in your industry very highly in your decision making. Could you please rate the importance of the PROGRAM, relative to this standard industry practice, in influencing your decision to install this measure? Would you say the program was much more important, somewhat more important, equally important, somewhat less important, or much less important than the standard practice or policy?
- 1. Much more important
  - 2. Somewhat more important
  - 3. Equally important
  - 4. Somewhat less important
  - 5. Much less important
  - 88. Refused
  - 99. Don't know

**Actions Without the Program**

- N9a. Now we would like you to think about the action you would have taken with regard to the actions you would have taken if the Program had not been available. If you had not received the ComEd comprehensive compressed air study, would you have undertaken a study on your own?
- 1. Yes
  - 2. No [skip the next two questions, go to N12 – mid page 11]
  - 88. Refused [skip the next two questions, go to N12 – mid page 11]
  - 99. Don't know [skip the next two questions, go to N12 – mid page 11]

[ASK IF N9a=1]

- N9aa. Without the program, when do you think you would have conducted the compressed air study on your own?
- 1. At the same time [skip the next question, go to N12 – mid page 11]
  - 2. Later
  - 77. Other (RECORD VERBATIM) [skip the next question, go to N12 – mid page 11]
  - 88. Refused [skip the next question, go to N12 – mid page 11]
  - 99. Don't know [skip the next question, go to N12 – mid page 11]

[ASK IF N9aa=2]

N9ab. Would you say...

1. 1 to 3 months later
2. 4 to 6 months later
3. 7 to 12 months later
4. 13 to 24 months later
5. More than 2 years later
88. Refused
99. Don't know

N12. Now thinking about the leaks in the compressed air system and using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the ComEd Compressed Air Program had NOT been available, what is the likelihood that you would have repaired the leaks in the compressed air system?

- #. RECORD 0 to 10
88. Refused [skip the next three questions, go to N12\_1 – top of page 12]
99. Don't know [skip the next three questions, go to N12\_1 – top of page 12]

[ASK IF N12 not 0,88,99]

N13. Without the program, when do you think you would have repaired these leaks? Would you say...

1. At the same time [skip the next two questions, go to N12\_1 – top of page 12]
2. Earlier [skip the next two questions, go to N12\_1 – top of page 12]
3. Later
4. Never [skip the next two questions, go to N12\_1 – top of page 12]
88. Refused [skip the next two questions, go to N12\_1 – top of page 12]
99. Don't know [skip the next two questions, go to N12\_1 – top of page 12]

[ASK IF N13=3]

N13a. How much later would you have repaired these leaks? Would you say...

1. 1 to 3 months later [skip the next question, go to N12\_1 – top of page 12]
2. 4 to 6 months later [skip the next question, go to N12\_1 – top of page 12]
3. 7 to 12 months later [skip the next question, go to N12\_1 – top of page 12]
4. 13 to 24 months later [skip the next question, go to N12\_1 – top of page 12]
5. More than 2 years later
88. Refused [skip the next question, go to N12\_1 – top of page 12]
99. Don't know [skip the next question, go to N12\_1 – top of page 12]

[ASK IF N13a=5]

N13b. Why do you think it would have been 2 or more years later?

77. RECORD VERBATIM
88. Refused
99. Don't know

### **MEASURE1**

N12\_1. Now thinking about <MEASURE1> and using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the ComEd Compressed Air program had NOT been available, what is the likelihood that you would have performed <MEASURE1>?

- #. RECORD 0 to 10
88. Refused
99. Don't know



N13\_1. Without the program, when do you think you would have implemented these energy efficiency improvements? Would you say...

1. At the same time [skip the next two questions, go to next measure – N12\_2]
2. Earlier [skip the next two questions, go to next measure – N12\_2]
3. Later
4. Never [skip the next two questions, go to next measure – N12\_2]
88. Refused [skip the next two questions, go to next measure – N12\_2]
99. Don't know [skip the next two questions, go to next measure – N12\_2]

[ASK IF N13\_1=3]

N13a\_1. How much later would you have implemented these energy efficiency improvements? Would you say...

1. 1 to 3 months later [skip the next question, go to next measure – N12\_2]
2. 4 to 6 months later [skip the next question, go to next measure – N12\_2]
3. 7 to 12 months later [skip the next question, go to next measure – N12\_2]
4. 13 to 24 months later [skip the next question, go to next measure – N12\_2]
5. More than 2 years later
88. Refused [skip the next question, go to next measure – N12\_2]
99. Don't know [skip the next question, go to next measure – N12\_2]

[ASK IF N13a\_1=5]

N13b\_1. Why do you think it would have been 2 or more years later?

77. RECORD VERBATIM
88. Refused
99. Don't know

## **MEASURE2**

N12\_2. Now thinking about <MEASURE2> and using a likelihood scale from 0 to 10, where 0 is “Not at all likely” and 10 is “Extremely likely”, if the ComEd Compressed Air program had NOT been available, what is the likelihood that you would have performed <MEASURE2>?

- #. RECORD 0 to 10
88. Refused
99. Don't know

N13\_2. Without the program, when do you think you would have implemented these energy efficiency improvements? Would you say...

1. At the same time [skip the next two questions, go to next measure – N12\_3]
2. Earlier [skip the next two questions, go to next measure – N12\_3]
3. Later
4. Never [skip the next two questions, go to next measure – N12\_3]
88. Refused [skip the next two questions, go to next measure – N12\_3]
99. Don't know [skip the next two questions, go to next measure – N12\_3]

[ASK IF N13\_2=3]

N13a\_2. How much later would you have implemented these energy efficiency improvements? Would you say...

1. 1 to 3 months later [skip the next question, go to next measure – N12\_3]
2. 4 to 6 months later [skip the next question, go to next measure – N12\_3]
3. 7 to 12 months later [skip the next question, go to next measure – N12\_3]
4. 13 to 24 months later [skip the next question, go to next measure – N12\_3]
5. More than 2 years later
88. Refused [skip the next question, go to next measure – N12\_3]
99. Don't know [skip the next question, go to next measure – N12\_3]

[ASK IF N13a\_2=5]

N13b\_2. Why do you think it would have been 2 or more years later?

77. RECORD VERBATIM
88. Refused
99. Don't know

**MEASURE3**

N12\_3. Now thinking about <MEASURE3> and using a likelihood scale from 0 to 10, where 0 is “Not at all likely” and 10 is “Extremely likely”, if the ComEd Compressed Air program had NOT been available, what is the likelihood that you would have performed <MEASURE3>?

- #. RECORD 0 to 10
88. Refused
99. Don't know

N13\_3. Without the program, when do you think you would have implemented these energy efficiency improvements? Would you say...

1. At the same time [skip the next two questions, go to N8 – mid page 14]
2. Earlier [skip the next two questions, go to N8 – mid page 14]
3. Later
4. Never [skip the next two questions, go to N8 – mid page 14]
88. Refused [skip the next two questions, go to N8 – mid page 14]
99. Don't know [skip the next two questions, go to N8 – mid page 14]

[ASK IF N13\_3=3]

N13a\_3. How much later would you have implemented these energy efficiency improvements? Would you say...

1. 1 to 3 months later [skip the next question, go to N8 – mid page 14]
2. 4 to 6 months later [skip the next question, go to N8 – mid page 14]
3. 7 to 12 months later [skip the next question, go to N8 – mid page 14]
4. 13 to 24 months later [skip the next question, go to N8 – mid page 14]
5. More than 2 years later
88. Refused [skip the next question, go to N8 – mid page 14]
99. Don't know [skip the next question, go to N8 – mid page 14]

[ASK IF N13a\_3=5]

N13b\_3. Why do you think it would have been 2 or more years later?

77. RECORD VERBATIM
88. Refused
99. Don't know

**PAYBACK BATTERY**

[ASK N8-N10a IF N3m=6,7,8,9,10]

N8. I'd like to find out more about the financial criteria your company uses for its investments. What financial calculations does your company make before spending money on improvements?

- 1. None
- 77. RECORD VERBATIM
- 88. Refused
- 99. Don't know

N9. What is the payback cut-off point that your company uses (in months) before deciding to proceed with an investment? Would you say...

- 1. 0 to 6 months
- 2. 7 months to 1 year
- 3. more than 1 year up to 2 years
- 4. more than 2 years up to 3 years
- 5. more than 3 years up to 5 years
- 6. Over 5 years
- 66. Not Applicable, do not have a payback cut-off point [skip the next two questions, go to N10a – bottom of page 15]
- 88. Refused [skip the next two questions, go to N10a – bottom of page 15]
- 99. Don't know [skip the next two questions, go to N10a – bottom of page 15]

[ASK IF N9 =1,2,3,4,5,or 6]

N10. Does your company generally implement projects that meet the required financial cut-off point?

- 1. Yes [skip the next question, go to N10a – bottom of page 15]
- 2. No
- 88. Refused [skip the next question, go to N10a – bottom of page 15]
- 99. Don't know [skip the next question, go to N10a – bottom of page 15]

[ASK IF N10=2]

N10aa. What would be some reasons why your company wouldn't implement projects that meet the required financial cut-off point?

- 77. RECORD VERBATIM
- 88. Refused
- 99. Don't know

N10a. Did the cash incentive move your project within the acceptable payback cutoff point?

- 1. Yes
- 2. No
- 88. Refused
- 99. Don't know

**Spillover and Channeling**

CH1. Since your participation in the Compressed Air program, have you done any of the following? [1=Yes, 2=No, 88=Refused, 99=Don't know]

- CH1a. Installed any additional energy efficient equipment at this facility that received incentives from ComEd (non-compressed air measures)?
- CH1c. Implemented any additional Compressed Air measures at this facility that did not receive incentives through any utility or government program?

CH1b. Installed any OTHER energy efficient equipment at this facility that did NOT receive incentives through any utility or government program?

**#1 (A)**

[ASK IF CH1a=1(yes), ELSE SKIP TO CH8 – mid page 16]

CH2. What type of energy efficient equipment did you install that received incentives from ComEd?

77. RECORD VERBATIM

88. Refused [skip the next two questions, go to CH8 – mid page 16]

99. Don't know [skip the next two questions, go to CH8 – mid page 16]

CH3. On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much influence did your participation in the Compressed Air Program have on your decision to install additional energy efficiency measures?

#. SCALE 0-10

88. Refused

99. Don't know

[ASK IF CH3=8,9 or 10; ELSE SKIP TO CH8]

CH4. How did the Compressed Air Program influence your decision to install additional energy efficiency measures?

77. RECORD VERBATIM

88. Refused

99. Don't Know

**#2 (C)**

[ASK IF CH1c=1(yes), ELSE SKIP TO CH5 – top of page 17]

CH8. What additional Compressed Air measures did you implement?

77. RECORD VERBATIM

88. Refused [skip the next two questions, go to CH5 – top of page 17]

99. Don't know [skip the next two questions, go to CH5 – top of page 17]

[SKIP TO CH5 IF CH8=88, 99]

CH9. On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much influence did your participation in the Compressed Air Program have on your decision to implement the additional compressed air measures without an incentive?

77. RECORD VERBATIM

88. Refused

99. Don't know

[ASK IF CH9=8,9 or 10; ELSE SKIP TO CH5]

CH10. How did the Compressed Air Program influence your decision to implement the additional compressed air measures without an incentive?

77. RECORD VERBATIM

88. Refused

99. Don't Know

**#3 (B)**

[ASK IF CH1b=1(yes), ELSE SKIP TO S1 – mid page 17]

- CH5. What type of energy efficient equipment did you install that did NOT receive any incentives from utilities or government programs?
- 77. RECORD VERBATIM
  - 88. Refused [skip the next two questions, go to S1 – mid page 17]
  - 99. Don't know [skip the next two questions, go to S1 – mid page 17]

[SKIP TO S1 IF CH5=88, 99]

- CH6. On a scale of 0 to 10, where 0 means “no influence” and 10 means “greatly influenced,” how much influence did your participation in the Compressed Air Program have on your decision to install additional energy efficiency measures without an incentive?
- #. SCALE 0-10
  - 88. Refused
  - 99. Don't know

[ASK IF CH6=8,9 or 10; ELSE SKIP TO S1]

- CH7. How did the Compressed Air Program influence your decision to install additional energy efficiency measures without an incentive?
- 77. RECORD VERBATIM
  - 88. Refused
  - 99. Don't Know

**Process Module**

- S1. How did you first hear about the Compressed Air Program? **[DO NOT READ]**
- 1. Compressed Air service provider
  - 2. ComEd program representative
  - 3. ComEd Account manager
  - 4. ComEd Website
  - 5. Friend/colleague/word of mouth
  - 6. Contractor
  - 77. Other [RECORD VERBATIM]
  - 88. Refused
  - 99. Don't know

**Marketing and Outreach**

- MK1. Do you recall seeing or receiving any marketing materials or other information for the Compressed Air Program?
- 1. Yes
  - 2. No [skip the next three questions, go to MK4 – bottom of page 18]
  - 88. Refused [skip the next three questions, go to MK4 – bottom of page 18]
  - 99. Don't know [skip the next three questions, go to MK4 – bottom of page 18]

[ASK IF MK1=1, ELSE SKIP TO MK4]

- MK1A. What types of materials do you remember? **[DO NOT READ]**
- 1. Presentation/workshop
  - 2. Brochure
  - 3. Case Study

- 4. ComEd website
- 77. Other [RECORD VERBATIM]
- 88. Refused
- 99. Don't know

MK2. How useful were these materials in providing information about the program? Would you say they were...?

- 1. Very useful [skip the next question, go to MK4 – bottom of page 18]
- 2. Somewhat useful [skip the next question, go to MK4 – bottom of page 18]
- 3. Not very useful
- 4. Not at all useful
- 88. Refused [skip the next question, go to MK4 – bottom of page 18]
- 99. Don't know [skip the next question, go to MK4 – bottom of page 18]

[ASK IF MK2=3, 4]

MK3. What would have made the materials more useful to you? **[DO NOT READ]**

- 1. More detailed information
- 2. Where to get additional information
- 77. Other [RECORD VERBATIM]
- 88. Refused
- 99. Don't know

MK4. What are the best ways of reaching companies like yours to provide information about energy efficiency opportunities? **[DO NOT READ]**

- 1. Bill inserts
- 2. Flyers/ads/mailings
- 3. E-mail
- 4. Telephone
- 5. Key Account Executive
- 6. Service Providers
- 7. Trade Allies
- 8. Service Contractors
- 9. Vendors
- 77. Other [RECORD VERBATIM]
- 88. Refused
- 99. Don't know

## **Program Satisfaction (Process)**

PS3. On a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied, how would you rate your satisfaction with...? [SCALE 0-10; 96=N/A; 88=Refused; 99=Don't know]

- a. the level of commitment required by you to receive the free compressed air study
- b. the information provided in the Compressed Air study
- c. Nexant (the program administrator)
- d. the Smart Ideas for Your Business Program (ComEd) staff
- e. the amount of savings that was achieved compared to the savings estimated in the study
- f. the timeline for the project
- g. the quality of the reports
- h. the project meetings you were involved in

- i. the Compressed Air program overall
- j. ComEd overall

[ASK IF PS3a, b, c, d, e, f, g, h, i, j < 4 or PS3a, b, c, d, e, f, g, h, i, j > 7]

- PS4. Why did you rate [PS3a-j] this way? [77=OPEN END; 88=REFUSED; 99=Don't Know]
- a. the level of commitment required by you to receive the free compressed air study
  - b. the information provided in the Compressed Air study
  - c. Nexant (the program administrator)
  - d. the Smart Ideas for Your Business Program (ComEd) staff
  - e. the amount of savings that was achieved compared to the savings estimated in the study
  - f. the timeline for the project
  - g. the quality of the reports
  - h. the project meetings you were involved in
  - i. the Compressed Air program overall
  - j. ComEd overall

**Benefits and Barriers (Process)**

- B1. What do you see as the main benefits of the Compressed Air Program? **[DO NOT READ]**
- 1. Helps reduce the company's energy bills/save energy
  - 2. Free study
  - 3. Improves the performance of equipment
  - 4. Helps reduce implementation costs
  - 5. Improved awareness of system performance
  - 6. Educates staff about our compressed air system
  - 77. Other [RECORD VERBATIM]
  - 88. Refused
  - 99. Don't know
- B2. What concerns do you have about the program? **[DO NOT READ]**
- 1. Paperwork too burdensome
  - 2. Cash incentives/study not worth the effort or required commitment to implement
  - 3. Program is too complicated
  - 77. Other [RECORD VERBATIM]
  - 96. No drawbacks
  - 88. Refused
  - 99. Don't know

**Feedback and Recommendations (Process)**

- R1. Based on your experience, would you recommend the Compressed Air program to your peers inside or outside of your organization? **[DO NOT READ]**
- 1. Yes
  - 2. No
  - 3. Maybe
  - 77. Other [RECORD VERBATIM]
  - 88. Refused
  - 99. Don't know



- R2. Do you have any suggestions for ways to improve the program, and if so, what are they? **[DO NOT READ]**
1. Higher incentives
  2. More measures
  3. Greater publicity
  4. Advance payment
  5. Longer engagement with Service Provider to implement more measures
  6. Key Account Executives provide more information
  96. No recommendations
  77. Other [RECORD VERBATIM]
  88. Refused
  99. Don't know

**Firmographics**

- F1 I only have a few general questions left. What is the business type of this facility?
77. RECORD VERBATIM
  88. Refused
  99. Don't know
- F2 Does your company own or rent this facility?
1. Own
  2. Rent
  77. Other [RECORD VERBATIM]
  88. Refused
  99. Don't know
- F3. How old is this facility? (INTERVIEWER: IN YEARS)
- #. NUMERIC OPEN END, 0 TO 150
  888. Refused
  999. Don't know
- F4. How many employees, full plus part-time, are employed at this facility?
- #. NUMERIC OPEN END, 0 TO 2000
  888. Refused
  999. Don't know
- F5. Which of the following best describes your facility? This facility is...
1. my company's only location
  2. one of several locations owned by my company
  3. the headquarters location of a company with several locations
  88. Refused
  99. Don't know
- F6. In comparison to other companies in your industry, would you describe your company as...
1. A small company
  2. A medium-sized company
  3. A large company
  96. Not applicable
  88. Refused
  99. Don't know

*Those are all of the questions I have. Thank you very much for your participation!*

## 5.2.2 Interview Guide for ComEd Account Managers

### ComEd Smart Ideas for Your Business Compressed Air Program Account Manager Interviews Final

Hello, this is \_\_\_\_\_ from Itron. We are the independent contractor hired by ComEd to conduct the evaluation of the Compressed Air portion of the Smart Ideas for Your Business Program. We are doing a brief survey with ComEd Account Managers. We are interested in your experience with the Compressed Air Program and any feedback you may have received about the program from your customers.

Is now still a good time or is there a more convenient time when I could call back?

*Alert interviewee that the call will be recorded.*

*Note that responses will remain confidential and only be reported in aggregate with other responses.*

#### **Background**

1. How long have you been an Account Manager at ComEd?
2. What kind of customers do you serve? *[Probe for business sector, size, chains]* Approximately how many customers do you serve?
3. How frequently do you interact with your customers? What is the primary mode of communication? *[Probe for if they visit location, call, send out emails, letters]* Does this vary by customer type or size?

#### **NTG Battery**

4. According to our records <COMPANY> is a customer of yours who implemented a project through the Compressed Air Program at <BUSINESS ADDRESS>. Were you aware of their participation? *[IF NO then T&T]*
5. In general, what role did you play in their compressed air project?
6. Please describe the project history, and when you first became involved.
7. From your perspective, what were the main factors in <COMPANY> decision to make improvements to their compressed air system and participate in the program?

#### **Program Awareness**

8. How familiar would you say you are with the Compressed Air Program? *[Probe: very, somewhat, not very, not at all familiar]*

9. Have you attended any lunch-and-learn presentations? How many? How useful did you find these presentations? How did you use the information from the lunch-and-learns? Please explain.
10. How often do you discuss energy efficiency with your customers? How often do you promote the Compressed Air Program? Does this vary by customer type or size?  
If not often: why not?
11. What do you find to be the best way to reach your customers about energy efficiency opportunities? Does this vary by customer type or size?
12. What information about the Compressed Air Program do you typically provide to customers?  
*[probe for fact sheets, case studies]*  
If provide materials: How useful have you found these marketing materials to be? What could make them more useful?
13. Do you use the website as a resource for compressed air program information? Do you find that the materials on the website are easily accessible? Do you have any suggestions on how to make Compressed Air Program materials more accessible?
14. Do you feel you have enough information about the Compressed Air Program to effectively promote it and assist customers in getting started with their participation?
15. Is there anything that the program could do to help you be more effective in promoting the Compressed Air Program? *(probe for better marketing materials, more training, ...)*
16. Did you attend last year's (2011) EE Expo? Did you promote the Expo to your customers? Did any of your customers attend the Expo?
  - a. Did you find this EE Expo useful in providing information to your customers or promoting the program? Are there any changes that would make it better in the future?
  - b. How about this year's (2012) Expo? [Will you attend?
17. Is there a formal process for tracking leads? Do you keep track of your communications with your customers with respect to the Compressed Air Program? Is this information passed along to Program staff?
  - a. Do you find this process is working? Why/Why not?

*Customer Awareness/Interest/Participation*

18. What percentage of your customers, do you think, are aware of the Compressed Air Program? What percentage of your customers do you think are good candidates for the Compressed Air Program? How many customers does this represent? What percentage of them are interested in making upgrades to improve the energy efficiency of their compressed air systems? If customers who are good candidates are not interested, why is that? Does this disinterest vary by customer type or size?
19. How do you stay informed of your customers' participation and status in the Compressed Air Program? Do you find that the weekly updates are useful? Why or why not? Do you prefer to get updates in any other way?
20. Approximately what percentage of your customers, who are good candidates, have participated in the Compressed Air Program? Does this vary by customer type or size?
21. Have you gotten any feedback from customers about the Compressed Air Program? What have you heard? Does this vary by customer type or size?
22. What are the major barriers, to your customers, in making improvements to their compressed air systems? What factors keep them from participating in the Compressed Air Program?
23. My understanding is that this was the second year that the program initiated goals for account executives. Is that correct?*(To bring customers to EE expo, bring in \$15 million in paid/reserved projects by Nov, and to attend a certain amount of lunch-and-learns)*. Did you achieve these goals? What are your views on these goals?

*Those are all the questions I had. Thank you very much for your time today!*

### 5.2.3 Interview Guide for Participating Service Providers

#### Compressed Air Service Provider Survey for the ComEd Compressed Air Program Participating Service Providers

##### Final

Hello, this is \_\_\_\_ from Itron calling on behalf of ComEd. THIS IS NOT A SALES CALL.

We are surveying firms who have been involved in projects supported by the Compressed Air portion of the Smart Ideas for Your Business Program. We are interested in your experience with the program and any feedback you may have received from your customers about the program. ComEd plans to use the information to improve the Compressed Air program. Who is the best person to speak with about ComEd's Compressed Air Program?

Would you be willing to speak with me for about 20 minutes? Is now a good time or is there a more convenient time when I could call back?

*Alert interviewee that the call will be recorded.*

*Note that responses will remain confidential and only be reported in aggregate with other responses.*

### Firmographics

First, I have a few general questions about your company.

- F1 What is your business category? (Probe for: contractor, engineer, ESCO, equipment vendor, architect)
- F2 What type(s) of equipment, does your company specialize in? (Probe, if necessary: compressed air, lighting, HVAC, refrigeration, motors, food service, etc)
  - a. **If multiple areas:** What is the MAIN area?
  - b. What percentage of your total industrial projects include compressed air systems?
  - c. Approximately how many total industrial compressed air projects does your company implement in a typical year?
- F3 Approximately, how many employees does your company have?
- F4 What are the key business sectors your company serves? (Probe for light/heavy industry, retail, office, restaurant, etc.)

## Freeridership Module

Now, I have a few specific questions about your firm's recent involvement in <CUSTOMER>'s compressed air project that was completed through the Compressed Air Program at <ADDRESS> in <MONTH/YEAR>.

FR1 According to our records your firm was involved in the implementation of this project. Is this correct? Are you the person that is most knowledgeable about your firm's involvement in this project?

[IF NO, PROBE TO SEE IF THERE IS SOMEONE ELSE IN FIRM WHO MAY HAVE KNOWLEDGE OF THIS PROJECT, ELSE SKIP TO FR4]

FR2 Can you please describe your firm's role in the decision to make improvements to the compressed air system at <CUSTOMER>'s facility?

[IF NO ROLE IN SELECTING EQUIPMENT, SKIP TO FR4]

FR3b And using a 0 to 10 likelihood scale where 0 is NOT AT ALL LIKELY and 10 is EXTREMELY LIKELY, if the Compressed Air Program, including the free study, cash incentives and other program services and information, had not been available, what is the likelihood that you would have recommended <CUSTOMER> make improvements to their compressed air system?  
[SCALE 0-10]

FR4 Do you know of any other vendors that worked with <CUSTOMER> while they were making improvements to their compressed air system, for example engineers or designers? If so, do you have their name and phone number?

## Market Trends & Effect of Program on Business

Now, I have a few questions about the market for industrial compressed air services and equipment.

- M1 Over the last 12 months, approximately what percentage of your compressed air business in ComEd's service territory involved upgrades to improve the energy efficiency of your customers' compressed air systems?
- Of these energy efficiency improvements, approximately what percentage would qualify for incentives from the program?
  - And of the installations that would qualify for incentives, approximately what percentage did NOT receive an incentive? Why do you think they did not receive an incentive? (*Probe for other reasons, if only one is mentioned.*)
- M2 Has the percentage of your business that involves upgrades to improve the energy efficiency of your customers' compressed air systems *changed* in the past three years? How? In other words, does more of your business involve energy efficiency improvements to compressed air systems?

- If increase:
- a. How important was ComEd's Compressed Air Program in bringing about this change?  
*(Probe for specific program components: incentives, training, program website, other program components.)*
  - b. How important were other factors not related to the program? What are these other factors?  
*(Probe for tax credits/gov't rebates, general EE awareness, change in codes or standards.)*
- M3 When a compressed air system is present, in what percent of sales situations do you recommend energy efficiency improvements to compressed air systems?
- a. [If not 100%] When you don't recommend energy efficiency improvements to compressed air systems, what are the reasons?
- M4 Has the frequency with which you recommend energy efficiency improvements for compressed air systems changed in the past three years? How?
- If change noted:
- a. How important was ComEd's Compressed Air Program in this change? *(Examples of program components: incentives, training, program website, other program components.)*
  - b. How important are other factors not related to the program? What other factors are important? *(Examples of non-program components: tax credits/gov't rebates, general EE awareness, change in codes or standards.)*
- M5 As a result of the Compressed Air Program...
- a. have you changed the types of compressed air equipment and related services you provide?
  - b. have you changed any other business practices as a result of the program? *(Probe for: hired more staff, opened up new offices, changed marketing.)*
  - c. Has the program caused an increase in business?
- M6 How aware, would you say, are your customers of energy efficiency and options available to make their compressed air systems more energy efficient? How interested would you say are they? *(Probe for very, somewhat, not very, not at all aware/interested)*
- M6a Has this (awareness/interest) changed over time?
- M7 What do you view as the main barriers to the installation of energy efficient compressed air equipment for your customers? Does this vary by customer type or size? Anything else? What could be done to overcome these barriers?



## Market Characterization

- MC1. Who are the key players in the Chicago-area compressed air market? (Probe for manufacturers, distributors, dealer network, consultants)
- MC2. Where is the industry in the Chicago-area with respect to adopting the systems-based approach to compressed air efficiency?
- MC2a. Is there an active market for compressed air efficiency services in the Chicago-area?
- MC2b. How is the market in the Chicago-area similar to or different from the national market?
- MC2c. Which suppliers, if any, are active in promoting compressed air system efficiency in the Chicago-area?
- MC2d. To what extent does this market exist apart from ComEd, or Compressed Air Challenge (CAC) sponsorship?
- MC3. Do Chicago-area compressed air distributors/dealers emphasize the systems approach in their sales and service contracts with end users?
- MC4. How often do you think Chicago-area suppliers offer:
- Measurement of compressed air system performance
  - Leak detection and reduction services
  - More efficient controls/operation strategies
  - Analysis of end-use energy reduction opportunities (e.g. replacing compressed air functions with motors, blowers, etc.)
- MC5. What percentage of compressed air systems are covered by service contracts?
- MC5a. What are the key features of compressed air service contracts; i.e., do they employ a systems approach rather than simply replace old equipment?
- MC6. Are there non-distributors that offer compressed air efficiency services such as compressed air audits in the Chicago-area?
- MC6a. Do these firms offer efficiency services exclusively, or do they also offer "standard" compressed air system design, installation, or maintenance services?

## Process Module

- P1 How aware, would you say, are your customers of the ComEd Smart Ideas for Your Business program (*Ask very, somewhat, not very, not at all aware*)? How aware are they about the Compressed Air portion of the program (*Ask very, somewhat, not very, not at all aware*)? How interested are they in the Compressed Air Program (*Ask very, somewhat, not very, not at all aware*)? Does this vary by customer type or size?

- P2 How frequently do you promote the ComEd Compressed Air Program to your customers? (Always, most of the time, sometimes, rarely, never?) If sometimes/rarely/never: Why? Does this vary by customer type or size?
- P3 Have you received any marketing materials from the ComEd Compressed Air program? If so, what did you receive? (*Probe for fact sheets, case studies, The Wire newsletter, "toolkit" from training session*) Do you provide these materials to your customers?
- If yes: How useful do you think are these materials in providing information about the program and encouraging customers to participate? If not useful, what would make them more useful?
  - If no: why not?
  - Are there any specific promotional materials that you would like ComEd to provide? If yes, what are they (e.g., case studies, point-of-sale technical handouts, website tools/enhancements)?
- P4 Our records show that you are a registered Trade Ally, is that correct?
- Has the designation of "Trade Ally" changed any of your business practices? How?
  - What do you see as the main benefits of being a registered Trade Ally? (*Probe: marketing materials, listing on ComEd website, group training, application status, sales coaching, discount on technical training, eligibility for trade ally bonus*)
- P7 What do you view as the main barriers to customer participation in the Compressed Air Program? What could be done to overcome these barriers?
- P8 How satisfied are you with your participation in the Compressed Air Program? (*Ask very, somewhat, not very, not at all satisfied.*) If not very satisfied or not at all satisfied: why?
- Are you satisfied with the measures offered
  - Are you satisfied with the incentive amounts
  - Are you satisfied with the communication with Compressed Air Program staff
  - Are you satisfied with the program overall
- P10 Do you have any recommendations of how the Compressed Air Program could be improved?

*This concludes our survey. On behalf of ComEd, thank you very much for your time today!*

## 5.2.4 Interview Guide for Non-Participating Service Providers

### Compressed Air Service Provider Survey for the ComEd Compressed Air Program Non-participating Service Providers

#### Final

Hello, this is \_\_\_\_\_ from Itron calling on behalf of ComEd. THIS IS NOT A SALES CALL.

We are surveying businesses who perform work on industrial customers' compressed air equipment. We are interested in your experience with compressed air projects. Who might be the best person to speak with about this?

Would you be willing to speak with me for about 20 minutes? Is now a good time or is there a more convenient time when I could call back?

*Alert interviewee that the call will be recorded.*

*Note that responses will remain confidential and only be reported in aggregate with other responses.*

#### Process Module

- P5 Our records show that you have not participated in ComEd's Compressed Air Program, is that correct? **[IF PART then T&T]**
- Are you aware that ComEd offers a Compressed Air Program? **[IF NO, SKIP to Firmographics]**
  - Have you completed any projects that COULD HAVE gone through ComEd's Compressed Air Program, but didn't?
  - What, if any, do you see as the main barriers that are keeping you from participating in the Compressed Air Program?
  - What benefits could the Compressed Air Program add that may convince you to participate in it?

#### Firmographics

First, I have a few general questions about your company.

- F1 What is your business category? (Probe for: contractor, engineer, ESCO, equipment vendor, architect)
- F2 What type(s) of equipment, does your company specialize in? (Probe, if necessary: compressed air, lighting, HVAC, refrigeration, motors, food service)
- If multiple areas:** What is the MAIN area?
  - What percentage of your total industrial projects include compressed air systems?

- f. Approximately how many total industrial compressed air projects does your company implement in a typical year?
- F3 Approximately, how many employees does your company have?
- F4 What are the key business sectors your company serves? (Probe for light/heavy industry, retail, office, restaurant, etc.)

### Market Trends & Effect of Program on Business

Now, I have a few questions about the market for industrial compressed air services and equipment.

- M1 Over the last 12 months, approximately what percentage of your compressed air business in ComEd's service territory involved upgrades to improve the energy efficiency of your customers' compressed air systems?
- M2 Has the percentage of your business that involves upgrades to improve the energy efficiency of your customers' compressed air systems *changed* in the past three years? How? In other words, does more of your business involve energy efficiency improvements to compressed air systems?
- M3 When a compressed air system is present, in what percent of sales situations do you recommend energy efficiency improvements to compressed air systems?
  - b. [If not 100%] When you don't recommend energy efficiency improvements to compressed air systems, what are the reasons?
- M4 Has the frequency with which you recommend energy efficiency improvements for compressed air systems changed in the past three years? How?
- M6 How aware, would you say, are your customers of energy efficiency and options available to make their compressed air systems more energy efficient? How interested would you say are they? (*Probe for very, somewhat, not very, not at all aware/interested*)
- M6a Has this (awareness/interest) changed over time?
- M7 What do you view as the main barriers to the installation of energy efficient compressed air equipment for your customers? Does this vary by customer type or size? Anything else? What could be done to overcome these barriers?

### Market Characterization

- MC1. Who are the key players in the Chicago-area compressed air market? (Probe for manufacturers, distributors, dealer network, consultants)
- MC2. Where is the industry in the Chicago-area with respect to adopting the systems-based approach to compressed air efficiency?
- MC2a. Is there an active market for compressed air efficiency services in the Chicago-area?

- MC2b. How is the market in the Chicago-area similar to or different from the national market?
- MC2c. Which suppliers, if any, are active in promoting compressed air system efficiency in the Chicago-area?
- MC2d. To what extent does this market exist apart from ComEd, or Compressed Air Challenge (CAC) sponsorship?
- MC3. Do Chicago-area compressed air distributors/dealers emphasize the systems approach in their sales and service contracts with end users?
- MC4. How often do you think Chicago-area suppliers offer:
  - a. Measurement of compressed air system performance
  - b. Leak detection and reduction services
  - c. More efficient controls/operation strategies
  - d. Analysis of end-use energy reduction opportunities (e.g. replacing compressed air functions with motors, blowers, etc.)
- MC5. What percentage of compressed air systems are covered by service contracts?
- MC5a. What are the key features of compressed air service contracts; i.e., do they employ a systems approach rather than simply replace old equipment?
- MC6. Are there non-distributors that offer compressed air efficiency services such as compressed air audits in the Chicago-area?
- MC6a. Do these firms offer efficiency services exclusively, or do they also offer "standard" compressed air system design, installation, or maintenance services?

*This concludes our survey. On behalf of ComEd, thank you very much for your time today!*