# Evaluation Plan – C&I Prescriptive Program

## Introduction

The objectives of the evaluation are to: (1) quantify net savings impacts from the program for each of the following program years: PY 2008, 2009 and 2010; and (2) to determine key process-related program strengths and weaknesses and identify ways in which the program can be improved. Key impact evaluation activities will take place as program participation levels allow representative samples for survey and field work. Process evaluation work will be concentrated in the second and third quarters of each calendar year.

The C&I Prescriptive program provides an expedited application approach for nonresidential customers interested in purchasing efficient technologies. The program targets discrete retrofit and replacement opportunities in lighting, HVAC, motor, and refrigeration systems. A streamlined incentive application and quality control process is intended to facilitate ease of participation. Relationships with trade allies (equipment vendors and installation contractors) are a key strategy for promoting prescriptive incentive availability to customers.

The three-year ComEd program plan anticipates that the C&I Prescriptive program will provide the largest component of business savings to the portfolio with 57% of the nonresidential energy savings. The program launched in June 2008 and quickly reached its funding target for the first program year and as a result, ComEd has closed the 2008 program to new applicants effective November 1, 2008. A substantial number of projects have been placed on the wait list for the second program year.

Given the significant role in the energy savings plan and the strong response, the C&I Prescriptive program warrants a high level of evaluation effort. The C&I Prescriptive evaluation budget for PY 2008 has been increased on a relative basis within the business programs portfolio because some programs have limited needs in the first year (e.g., C&I New Construction). The existence of participant spillover will be examined using survey self-report data in PY2008. If preliminary evidence of significant spillover is found in PY2008, a more extensive effort will be undertaken to quantify it in PY2009.

The evaluation will seek to answer the following key researchable questions:

Impact Questions:

1. What are the gross impacts from this program?
2. What are the net impacts from this program?
3. Did the program meet its energy and demand goals? If not, why not?

Process Questions:

1. Effectiveness of program implementation
   1. Is implementation on track and meeting goals? Has the program been implemented a manner consistent with program design?
   2. Has the program design changed from the plan filed on November 15, 2007? If so, how, why, and was this an advantageous change?
   3. What challenges have occurred in implementation, have they been overcome? If so, how? If not, why not? What is being done to address these challenges?
   4. What are the characteristics of the customers and program “partners” (which primarily encompass lighting, HVAC, refrigeration, and electrical contractors, equipment vendors and installers) participating in the programs and is this the expected group for participation? Who should be more involved but is not, and how can the program increase their involvement?
   5. Has program outreach, recruiting and training of trade allies occurred in a manner consistent with program design? If no, what changes have been made? Why were these changes made? Is trade ally enrollment occurring at the level anticipated? If not, why not? What is being done to expand enrollment?
   6. Is the program outreach to customers through the program and program partners effective in increasing awareness of the program opportunities? What is the format of the outreach? How often does the outreach occur? Are the messages within the outreach clear and actionable?
   7. What is the type of support that the program is giving the program partners and is it sufficient?
   8. What are the verification procedures for the program? Have they been implemented in a manner consistent with design? Do they present a barrier to participation or perceived undue burden on customers?
2. Effectiveness of program design and processes
   1. Have the participation process and program requirements been clearly explained to customers and program partners?
   2. Are the program processes effective for smoothly providing incentives to customers and motivating the program partners to participate? Do they create any barriers to partner or customer participation? If yes, what barriers?
   3. What is the timing from start to finish for projects that go through this program?
   4. How quickly do the comprehensive audits/studies occur and is the information useful to the customer?
   5. How quickly does the program answer customer and program partner questions?
   6. What are the expectations of the program for program partners and are they fulfilling that role? What suggestions do the program partners have about the current program elements and do they have any recommendations for improvement?
   7. Is the application process onerous? Does the process present any barriers to program participation?
   8. What type of follow up is provided to customers to assure that things are moving along and on-track?
   9. Do program implementers screen projects for likelihood of implementation and/or validation of the baseline to assure that the program obtains the expected net impacts?
3. Customer and program partner experience and satisfaction with the program
   1. Are customers and program partners satisfied with the aspects of program implementation in which they have been involved?
   2. Are customers satisfied with the process of participation and program measures?
4. Opportunities for program improvement
   1. What areas could the program improve to create a more effective program for customers and/or program partners and help increase the energy and demand impacts? (e.g., How is the program addressing the difficult economic conditions and how could it be modified to further assist customers in achieving energy savings?)
5. Program awareness and potential market effects (establish trend as marketing efforts and program participation expands over the three years)
   1. Change in partner and customer awareness of the program
   2. Change in partner and customer awareness of the benefits of energy efficient measures and practices
   3. Changes in market share of energy efficient measures

## Gross Savings Impact and M&V

### Data Collection Methods

1. Engineering review of the algorithms used by the program to calculate energy savings for all measures and the assumptions that feed those algorithms.
2. Engineering review at the measure-level for a sample of project files.
3. On-site verification audits of a subset of project sites selected from the engineering review sample.
4. On-site performance measurement including spot measurements, run-time hour data logging, and post-installation interval metering. Pre-metering may be considered in select cases for measures that require pre-approval or have been placed on a wait list.

### Content

The engineering review of the algorithms used by the program to calculate energy savings and the assumptions that feed those algorithms will seek to place the assumptions in one of two categories, 1) reasonable and acceptable, or 2) needs revision based on program experience and evaluation. The review will also make a preliminary judgment to identify those assumptions with higher uncertainty or potential to influence the program savings estimate.

The measure-level engineering review of sampled projects will verify documentation, tracking system entries, installed measure characteristics, hours of operation, and characteristics of replaced equipment. On-site verification will include a detailed inventory of measures, and may also include measurement of important assumptions, determined on a case by case basis, and summarized in a site plan prior to the visit.

### Sample

For each program year, a statistically significant sample based on 90/10 confidence/precision level (or better) for program-level savings will be drawn for the engineering review. The specific customer projects receiving the engineering reviews will be selected using a stratified ratio estimator technique to ensure that the largest kWh projects are most likely to be included in the sample. We expect program savings to be dominated by a minority of measure (e.g., high performance four foot T8s, etc.) and business types. After the initial sample selection, we will review to verify that there is a good representation by measure technology and business type within the overall sample. This sampling will be primarily for measure and business types with the greatest contribution to program savings, and we will distribute the remaining sample across the other measure and business types. For PY 2009 and PY 2010, representative samples will be drawn quarterly as participation allows.

To improve the accuracy of the verified gross savings estimates, a subset of customers who receive an engineering review will also receive an on-site visit. Projects chosen for on-site measurement and verification will be drawn from the engineering review sample and will be selected to address measures with the greatest magnitude of electricity savings and those with assumptions that have the greatest potential impact on program savings as identified by the engineering reviews (for example, office lighting hours of use).

This sampling strategy is designed to provide a solid estimate of program level savings. It will not provide statistically significant results by measure type, building type, or measure end-use category, nor will the field work identify changes to all assumptions feeding the program’s engineering algorithms. Evidence from the engineering review and field work that addresses the appropriateness of the savings algorithms and the accuracy of the assumptions feeding those algorithms will be presented with the evaluation results along with an assessment of the statistical validity of that evidence but it is anticipated that the results will **not** typically be statistically significant at the 90/10 level.

The sampling plans for each program year will be revised to reflect participant response to program offerings, available resources, and changes in the program aspects that have the most impact on savings. In the first program year, the program is assumed to have approximately 400 project applications, some comprised of multiple measures, with representation in each measure category, but with program savings dominated by a minority of measure types. The November 15, 2007 program plan called for the program budget to double in year 2, and nearly double again in year 3. We anticipate ComEd will add and remove measure types and adjust rebate levels in year 2 and year 3. We have allowed for additional engineering reviews in the second and third program years to address additional information needs. The following sample has been used for budgeting purposes.

Table . Sample Design for Gross Savings Impact and M&V

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **PY2008** | **PY2009** | **PY2010** | **Total** |
| **Applications Paid (assumed)** | **400** | **800** | **1,600** | **2,800** |
| Total Sample for Engineering Review | 80 | 86 | 100 | 266 |
| Subset of Engineering Review sample that will receive on-site verification audits | 16 | 8 | 48 | 72 |

### Analysis

The impact analysis will be based on an engineering estimate of gross kWh and kW savings, with analysis of on-site collected verification data for a subset of projects. The engineering analysis methods and degree of monitoring will vary from project to project, depending on the complexity of the measures installed, the size of the associated savings, the potential to revise input assumptions, and the availability and reliability of existing data. On-site performance measurement methodologies, when employed, will be based on IPMVP protocols, primarily option A, with option B and calibrated simulation modeling conducted for analyzing HVAC measures and HVAC interaction factors if warranted.

The project-level realization rates will then be extrapolated to the program population using a ratio estimation method to yield ex post evaluation-adjusted gross energy savings. Gross realization rates will also be developed for each energy metric (kW and kWh).

## Process Evaluation and Net-to-Gross Ratio Assessment

### Data Collection Methods

1. Phone surveys with participant decision makers (process, net impact) and non-participating customers (process questions only).
2. Trade ally in-depth interviews – with participating and non-participating equipment vendors (suppliers and/or installers).
3. ComEd staff and program contractor interviews
4. For enhanced net-to-gross cases – interviews with industry experts.
5. Secondary sources including program outreach materials, internal manuals, program tracking database, and technology information.

### Content

The major research tasks to be completed in support of the process evaluation effort include:

* Comprehensive review of program databases, documentation (including contractor Operations Manual, marketing plans, etc.), the website, and all promotional materials
* In-depth interviews with program administrators and implementation contractor
* In-depth interviews with participating and non-participating trade allies. Coverage for all four measure categories (lighting, HVAC, refrigeration, motors).
* In-depth interviews with equipment vendors/distributors and manufacturers
* Review of available secondary data on market share of energy efficiency measures (combine with qualitative statements from interviews with equipment vendors and manufacturers)
* Annual survey of participating customers on process questions and net-to-gross assessment. Quota groups for measure category and project size.
* Survey of non-participating customers on process questions (awareness, barriers to participation, etc.). Quotas for those specifically targeted and reached by program marketing efforts and those that have not.

The data collection will capture all the information needed to answer the net impact and process research questions noted earlier. For the net-to-gross analysis, we will use the self report method in three levels of rigor:

* Basic – all sized projects PY 2008, small or medium sized projects in PY 2009 and PY 2010.
* Standard – larger projects and smaller projects representing those measure categories that comprise the highest percentage of program savings impacts, added in PY 2009 and PY 2010.
* Enhanced – very largest projects.

The basic self report method asks questions only of the participant to determine what may have occurred in the absence of the program and the presence of any spillover installations. The standard self-report method captures the same information across many sources and arrives at a single net value by analyzing and justifying data from these sources. It typically includes the information from the customer and any relevant trade allies or contractors. Enhanced includes input from industry experts.

### Sample

Customer participant and non-participant surveys: Random sample of program participants based on 90/10 confidence/precision level (or better), overlapping with the gross savings impact sample with some differences to be expected due to non-response. Participant surveys: 80 surveys for PY2008, 86 for PY2009, and 100 for PY2010. Non-Participant Surveys: 70 surveys per year for PY2008, PY2009, and PY2010. Participating trade ally surveys: 20 surveys per year for PY2009 and PY2010. Non-participating trade ally surveys: 20 surveys per year for PY2009 and PY2010.

There will be 3 waves of data collection occurring each year during the second quarter of the calendar year (approximately from mid-April through mid-June of each year).

The complete sample for this evaluation is as follows:

Table 2. Sample

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| What | Who | How Many | When | Comments |
| *Impact Assessment* | | | | |
| Engineering Review | Participating Project | 80  86  100 | PY2008  PY2009, quarterly  PY2010, quarterly | Gross impacts. Quarterly samples depend on program response |
| Onsite Audit | Building | 16  8  48 | PY2008  PY2009, quarterly  PY2010, quarterly | Gross impacts |
| Telephone Survey | Participating Customer | 80  86  100 | PY2008  PY2009  PY2010 | Net impacts |
| Depth Interview | Participating trade allies and equipment vendors | 0  20  20 | PY2008  PY2009  PY2010 | Net impacts |
| *Process Assessment* | | | | |
| Telephone Survey | Participating Customer | 80  86  100 | PY2008  PY2009  PY2010 | Overlaps with impact sample |
| Telephone Survey | Non-Participating Customer | 70  70  70 | PY2008  PY2009  PY2010 |  |
| Depth Interview | Program Staff | 4  4  4 | PY2008  PY2009  PY2010 |  |
| Depth Interview | Participating trade allies and equipment vendors | 0  20  20 | PY2008  PY2009  PY2010 |  |
| Depth Interview | Non-participating trade allies and equipment vendors | 0  20  20 | PY2008  PY2009  PY2010 |  |

### Analysis

Data analysis will be conducted following completion of each year’s primary data collection via phone surveys and in-person interviews.

Free ridership will be calculated using an algorithm approach based on survey self report data. The analysis will triangulate between participant surveys and interviews with trade allies and equipment vendors. Analysis of enhanced cases will include input from industry experts and any relevant findings from secondary research.

The existence of participant spillover will be examined using survey self-report data in PY2008. If preliminary evidence of significant spillover is found in PY2008, a more extensive effort will be undertaken to quantify it in PY2009.

Process data will be analyzed to triangulate between trade ally surveys, participant surveys, and manager interviews to identify the most defensible conclusions and recommendations.

## Activity and Reporting Schedule Summary

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Action | | Deliverables | |
| Task | Deliverable Description | Start Date | End Date | Draft | Final |
| 2 | Draft and Final Evaluation Plans |  |  | 03/02/2009 | 03/25/2009 |
| 3 | Review and comment on program verification and due diligence procedures |  |  | 04/30/2009 | 05/31/2009 |
|  | Review and comment on program tracking system structure, data and content |  |  | 04/30/2009 | 05/31/2009 |
| 4 | Review program theory and logic model (if available) | 03/02/2009 | 05/31/2009 |  |  |
| 5A & 5B | Impact and Process Evaluation activities |  |  |  |  |
| Conduct program manager interviews | 03/02/2009 | 04/30/2009 |  |  |
|  | Savings algorithm and assumptions engineering review | 02/16/2009 | 05/31/2009 |  |  |
|  | Develop impact and NTG/process samples | Every quarter starting 03/31/2009 |  |  |  |
|  | Design NTG/process surveys | 03/17/2009 | 04/30/2009 |  |  |
|  | Conduct NTG/process phone surveys | 04/30/2009  04/30/2010  04/30/2011 | 06/30/2009  06/30/2010  06/30/2011 |  |  |
|  | Conduct engineering reviews and field data collection/on-site audits | On or before  04/15/2009  04/15/2010  04/15/2011 | 07/15/2009  07/15/2010  07/15/2011 |  |  |
|  | Analyze data | 07/15/2009  07/15/2010  07/15/2011 | 09/15/2009  09/15/2010  09/15/2011 |  |  |
|  | Develop gross and net realization rates |  |  | 08/15/2009, annually thereafter | 09/15/2009, annually thereafter |
|  | Summarize process findings |  |  | 08/15/2009, annually thereafter | 09/15/2009, annually thereafter |
| 6 | Develop draft and final annual report findings and recommendations |  |  | 09/15/2009, annually thereafter | 10/15/2009, annually thereafter |

## Budget

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **PY2008** | **PY2009** | **PY2010** | **Total** |
| Task 2 Develop Evaluation Plan | $17,979 | $3,694 | $2,983 | $ |
| Task 3 Verification and Due Diligence | 5,084 | 1,335 | 1,401 |  |
| Task 4 Tracking Systems, Program Theories, Communications | 17,794 | 12,818 | 13,209 |  |
| Task 5A Impact Evaluation | 143,483 | 124,199 | 221,923 |  |
| Task 5B Process Evaluation | 36,409 | 47,452 | 43,451 |  |
| Task 6 Reporting | 44,343 | 46,531 | 53,698 |  |
| Total | $ | $ | $ | $ |