

To: ComEd, Peoples Gas, North Shore Gas and Nicor Gas

CC: Jennifer Morris, ICC Staff

From: Roger Hill, INCA Energy Efficiency
 Emily Cross, Navigant
 Navigant Evaluation Team

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Re: Coordinated Utility CY2018 Retro-Commissioning Program Interim Impact (Wave 1) Data Review and Analysis

INTRODUCTION

Navigant performed a preliminary verification of the Coordinated Utility Retro-Commissioning (RCx) Program tracking database of measures installed from January to July 2018 (Wave 1). The evaluation team reviewed the extracts from tracking databases to determine if adequate data were being collected to track savings for evaluation purposes. The data review included business and public sector RCx projects. After ascertaining the status of the data, the evaluation team reviewed completed projects that had been selected for our research sample to determine evaluated savings.

This memo includes the preliminary calculation of cumulative persisting annual savings (CPAS) for the sampled projects completed in Wave 1 of CY2018. This includes CPAS from electric (kWh) savings and CPAS from gas savings.

SUMMARY FINDINGS

Key findings from the Wave 1 preliminary evaluated savings review and on-sites include:

- Private and public sector project-level data are adequately tracked in the databases for evaluation purposes. Key milestone dates are recorded and savings at the project level appear to accurately reflect savings in customer deliverables.
- Measure-level database extracts were not delivered for public sector projects. Data for public sector projects should include measure names and savings at each key project milestone: planning, implementation and verification. These data facilitate analysis of measure savings from initial estimates through verification or abandonment.
- Tune-Up savings estimates made without operating data can lead to large under- and over-estimates of savings.

EVALUATION APPROACH AND SAMPLE DESIGN

Most RCx projects take several months to develop and complete. Consequently, retro-commissioning projects are often back-loaded in the program year with a majority of projects completing in the last quarter of the program year (e.g., October to December each year). While on-going efforts and program modifications have served to reduce this feature of the program, the long project cycles do affect evaluation planning.

In response, the evaluation team develops a preliminary impact evaluation sample based on mid-year data of completed projects and pipeline projects that are *projected to complete* by the end of the program year. The impact evaluation progresses through the end of the program year evaluating sampled projects as they complete. At the close of the program year, the sample is reviewed for participation shifts that might affect the sample. At this point projects can be added to the sample or sampled projects that did not complete are dropped from the sample or replaced.

The following tables map the impact evaluation from preliminary sample to Wave 1 evaluated impacts.

Details of the electricity and natural gas sampled savings for CY2018 projects are presented in the following tables.

Table 1. Preliminary Program Participation

Research Category	Count Elec / Gas	Ex Ante Gross kWh Savings	Ex Ante Gross Peak kW Savings	Ex Ante Gross Therm Savings
MBCx	30 / 4	7,113,623	66	65,776
RCx	9 / 2	9,318,487	64	94,581
RCxpress	18 / 11	7,054,906	136	149,487
Tune-Up	102 / 31	11,928,755	50	162,156
DCEO	48 / 45	17,814,949	NA	984,745
Total	207 / 93	53,230,720	316	1,456,745

Source: Navigant Analysis of ComEd RCx Ops Report – 080618.xls

Table 2. Preliminary Sample

Research Category	Count	Ex Ante Gross kWh Savings	Ex Ante Gross Therm Savings	% kWh sampled	% Therms sampled
MBCx	10	5,713,750	39,311	80%	60%
RCx	3	4,874,938	77,993	52%	82%
RCxpress	7	3,822,676	141,859	54%	95%
Tune-Up	11	2,128,942	47,779	18%	29%
DCEO	24	10,134,307	616,320	57%	63%
Total	55	26,674,613	923,262	50%	63%

Source: Navigant Analysis of ComEd RCx Ops Report – 080618.xls

Table 3. Wave 1 Preliminary Verified Savings

Research Category	Count	Verified Gross kWh Savings	Verified Gross Therm Savings	Progress Realization Rate kWh*	Progress Realization Rate Therms*
MBCx	0	0	0	NA	NA
RCx	0	0	0	NA	NA
RCxpress	4	1,958,459	53,314	0.82	0.78
Tune-Up	3	605,138	6,693	1.18	0.86
DCEO	4	460,732	87,972	0.92	0.92
Total	11	3,024,329	147,978	0.89	0.86

* The progress results shown are for the sample only, not weighted up to the program population level.
 Source: Navigant Analysis of Wave 1 projects

MEASURE LEVEL DETAIL

Overall, ex ante savings are well-estimated with evaluated savings within 10% of the ex ante estimates. The differences between the ex ante and evaluated gross savings estimates are discussed below and include file review, telephone discussions with the participants, and on-sites by the evaluation team. Errors with the estimates are more common but minor, while there are a few one-off problems identified via evaluation.

DCEO 30230

- The baseline for the optimal warm-up sequence measure should have been the implemented new schedule (ECM 1) rather than the as-found schedule to avoid double counting of savings.
- Engineering estimates did not model latent heat or fan power accurately. These errors are repeated in other DCEO projects with minor effects on the savings estimates.
- One measure recorded as “abandoned” was subsequently implemented properly by the participant.

16-038 RCxpress

- A recommendation to raise cooling setpoints and reduce subsequent reheat resulted in excess space humidity and condensate problems. The measure was modified to eliminate the humidity and condensate problems, and consequently achieved less savings.
- Recommended airflow reductions were not fully achievable due to minimum flow requirements for HVAC equipment. Partial measure savings were achieved.

17-005 RCxpress

- Savings from increased free cooling with economizers were observed achieving less than predicted savings, perhaps due to damper leakage.
- A recommendation for automated change from winter to summer operation is still partially manual and the participant has only achieved partial predicted savings.
- The estimated savings from a leaking valve mistakenly claims savings when the valve is allowing more flow than the leakage rate in order to meet actual loads.
- The chilled water temperature reset savings estimate contained multiple errors which ultimately reduce savings estimates.

17-519 Tune-Up

- The recommendation to reduce air compressor operation has been implemented more aggressively than previously proposed. Furthermore, the assumed afterhours compressor power

was far lower than actual power measured during the evaluation; therefore, the compressor shut-down saves more than predicted.