Evaluation of Illinois Energy Now Public Sector Custom, Standard, and New Construction Incentives Programs: June 2013 through May 2014

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Final Report: April 2015

Table of Contents

1 Executive Summary 1-1

2 Introduction 2-1

2.1 Description of Programs 2-1

2.2 Overview of Evaluation Approach 2-6

2.3 Organization of Report 2-7

3 Estimation of Gross Savings 3-1

3.1 Methodology for Estimating Gross Savings 3-1

3.2 Results of Gross Savings Estimation 3-14

4 Estimation of Net Savings 4-1

4.1 Methodology for Estimating Net Savings 4-1

4.2 Results of Net Savings Estimation 4-4

5 Process Evaluation 5-1

5.1. Evaluation Objectives 5-1

5.2. Summary of Primary Data Collection 5-1

5.3. Summary of Conclusions and Recommendations 5-2

5.4. Custom and Standard Incentives Program Activity 5-7

5.5. Public Sector Custom and Standard Incentives Programs Operation Perspective 5-14

5.6. Public Sector New Construction Program Participant Profile 5-16

5.7. Public Sector New Construction Incentive Program Operations Perspective 5-17

5.8. State Buildings Sector 5-20

5.9. Chicago Metropolitan Area Local Governments 5-24

5.10. Trade Ally Program 5-39

5.11. Trade Ally Perspectives 5-39

6 Conclusions and Recommendations 6-1

6.1 Key Conclusions 6-1

6.2 Program Recommendations 6-1

Appendix A: Site-Level Reports A-1

Appendix B: Survey Instrument for Custom Standard Survey B-1

Appendix C: Custom and Standard Survey Responses C-1

Appendix D: Survey Instrument for New Construction Survey D-1

Appendix E: New Construction Survey Responses E-1

Appendix F: Survey Instrument for Municipal Non Participant F-1

Appendix G: Municipal Survey Responses G-1

Appendix H: Trade Ally Survey Instrument H-1

Appendix I: Trade Ally Survey Responses I-1

List of Figures

Figure 2-1 Custom Incentives Program Cumulative Ex Post kWh Savings by Date of Application Submission 2-3

Figure 2-2 Standard Incentives Program Cumulative Ex Post kWh Savings by Date of Application Submission 2-3

Figure 2-3 Custom Incentives Program Cumulative Ex Post Therm Savings by Date of Application Submission 2-4

Figure 2-4 Standard Incentives Program Cumulative Ex Post Therm Savings by Date of Application Submission 2-4

Figure 3-1 Custom Incentives and New Construction Programs Sample Project Realization Rate versus Ex Ante kWh Savings 3-21

Figure 3-2 Custom Incentives and New Construction Programs Sample Project Ex Post kWh Savings versus Ex Ante kWh Savings 3-22

Figure 3-3 Standard Incentives Program Sample Project Realization Rate versus Ex Ante kWh Savings 3-22

Figure 3-4 Standard Incentives Program Sample Project Ex Post kWh Savings (ADM Calculated) versus Ex Ante kWh Savings 3-23

Figure 3-5 Custom Incentives and New Construction Programs Sample Project Realization Rate versus Ex Ante Therm Savings 3-24

Figure 3-6 Custom Incentives and New Construction Programs Sample Project Ex Post Therm Savings versus Ex Ante Therm Savings 3-24

Figure 3-7 Standard Incentives Program Sample Project Realization Rate versus Ex Ante Therm Savings 3-25

Figure 3-8 Standard Incentives Program Sample Project Ex Post Therm Savings (ADM Calculated) versus Ex Ante Therm Savings 3-25

Figure 5-1 Custom Electricity Savings by Final Application Date during EPY6/GPY3 5-7

Figure 5-2 Standard Electricity Savings by Final Application Date during EPY6/GPY3 5-8

Figure 5-3 Custom Natural Gas Savings by Final Application Date during EPY6/GPY3 5-8

Figure 5-4 Standard Natural Gas Savings by Final Application Date during EPY6/GPY3 5-9

Figure 5-5 Custom Electricity Savings by Applicant Type 5-9

Figure 5-6 Standard Electricity Savings by Applicant Type 5-10

Figure 5-7 Custom Natural Gas Savings by Applicant Type 5-11

Figure 5-8 Standard Natural Gas Savings by Applicant Type 5-12

Figure 5-9 Geographical Distribution of Gross Ex Post Electricity Savings 5-13

Figure 5-10 Geographical Distribution of Gross Ex Post Natural Gas Savings 5-13

Figure 5-11 New Construction Electricity Savings by Applicant Type 5-16

Figure 5-12 New Construction Natural Gas Savings by Applicant Type 5-17

Figure 5-13: SEDAC Website – Smart Energy Design Tips 5-19

Figure 5-14 Importance of Factors Related to Energy Efficiency Decision Making 5-34

Figure 5-15 Criticality of Potential Services to Completing Incentive Projects 5-36

Figure 5-16 Awareness of Incentives 5-49

Figure 5-17 Projects Qualified for DCEO Incentives 5-49

Figure 5-18 Client Agreement to Proposed Qualifying Equipment 5-50

Figure 5-19 Clients Applying for DCEO Incentives 5-51

List of Tables

Table 1-1 Precision of Sample Estimates for Custom and Standard Electric and Natural Gas Savings 1-2

Table 1-2 Sample Sizes for Custom and Standard Incentives Programs Data Collection Efforts 1-2

Table 1-3 Summary of kWh Savings for Custom Incentives Program 1-3

Table 1-4 Summary of kWh Savings for Standard Incentives Program 1-3

Table 1-5 Summary of kWh Savings for New Construction Program 1-3

Table 1-6 Summary of Therm Savings for Custom Incentives Program 1-4

Table 1-7 Summary of Therm Savings for Standard Incentives Program 1-4

Table 1-8 Summary of Therm Savings for New Construction Program 1-4

Table 1-9 Summary of Therm Savings for Custom Incentives Program 1-5

Table 1-10 Summary of Therm Savings for Standard Incentives Program 1-5

Table 1-11 Summary of Therm Savings for New Construction Program 1-5

Table 2-1 Ex Ante kWh Savings for Custom and Standard Incentives Programs 2-2

Table 2-2 Ex Ante Therm Savings for Custom and Standard Incentives Programs 2-2

Table 2-3 EPY5/GPY2 Bonus Incentive Rates 2-5

Table 2-4 Ex Ante kWh Savings for New Construction Program 2-6

Table 2-5 Ex Ante Therm Savings for New Construction Program 2-6

Table 3-1 Population Statistics Used for Sample Design for Custom Incentives and New Construction Programs kWh Savings 3-2

Table 3-2 Population Statistics Used for Sample Design for Standard Incentives Program kWh Savings 3-2

Table 3-3 Ex Ante kWh Savings for Custom Incentives and New Construction Sampled Projects by Stratum 3-3

Table 3-4 Ex Ante kWh Savings for Standard Incentives Sampled Projects by Stratum 3-3

Table 3-5 Population Statistics Used for Sample Design for Custom Incentives and New Construction Programs Therm Savings 3-4

Table 3-6 Population Statistics Used for Sample Design for Standard Incentives Program Therm Savings 3-4

Table 3-7 Ex Ante Therm Savings for Custom Incentives and New Construction Sampled Projects by Stratum 3-4

Table 3-8 Ex Ante Therm Savings for Standard Incentives Sampled Projects by Stratum 3-5

Table 3-9 Typical Methods to Determine Savings for Measures 3-6

Table 3-10 Ex Ante and Gross Ex Post kWh Savings for the Custom Incentives and New Construction Programs by Sample Stratum 3-14

Table 3-11 Ex Ante and Gross Ex Post kWh Savings for the Standard Incentives Program by Sample Stratum 3-15

Table 3-12 Ex Ante and Gross Ex Post kWh Savings for the Custom Incentives Program by Project 3-15

Table 3-13 Ex Ante and Gross Ex Post kWh Savings for Standard Incentives Program by Project 3-16

Table 3-14 Ex Ante and Gross Ex Post kWh Savings for New Construction Program by Project 3-17

Table 3-15 Ex Ante and Gross Ex Post Therm Savings for the Custom Incentives and New Construction Programs by Sample Stratum 3-17

Table 3-16 Ex Ante and Gross Ex Post Therm Savings for the Standard Incentives Program by Sample Stratum 3-18

Table 3-17 Ex Ante and Gross Ex Post Therm Savings for the Custom Incentives Program by Project 3-19

Table 3-18 Ex Ante and Gross Ex Post Therm Savings for the Standard Incentives Program by Project 3-20

Table 3-19 Ex Ante and Gross Ex Post Therm Savings for the New Construction Program by Project 3-20

Table 4-1 Free Ridership Scores for Combinations of Indicator Variable Responses 4-4

Table 4-2 Weighted Average Indicator Variable Values 4-5

Table 4-3 Estimated Free ridership for kWh Savings from Custom Incentives Program Projects 4-5

Table 4-4 Estimated Free ridership for kWh Savings from Standard Incentives Program Projects 4-5

Table 4-5 Estimated Free ridership for kWh Savings from New Construction Program Projects 4-6

Table 4-6 Estimated Free ridership for Therm Savings from the Custom Incentives Program .. 4-6

Table 4-7 Estimated Free ridership for Therm Savings from the Standard Incentives Program . 4-6

Table 4-8 Estimated Free ridership for Therm Savings from the New Construction Program ... 4-7

Table 4-9 Summary of kWh Savings for the Custom Incentives Program 4-7

Table 4-10 Summary of kWh Savings for the Standard Incentives Program 4-7

Table 4-11 Summary of kWh Savings for the New Construction Program 4-7

Table 4-12 Summary of Therm Savings for the Custom Incentives Program 4-8

Table 4-13 Summary of Therm Savings for the Standard Incentives Program 4-8

Table 4-14 Summary of Therm Savings for the New Construction Program 4-8

Table 4-15 Summary of Net Peak kW Savings for the Custom Incentives Program 4-9

Table 4-16 *Summary of Net Peak kW Savings for the Standard Incentives Program* 4-9

Table 4-17 Summary of Net Peak kW Savings for the New Construction Program 4-9

Table 5-1 Custom Electricity Savings by Applicant Type and Utility 5-10

Table 5-2 Standard Electricity Savings by Applicant Type and Utility 5-10

Table 5-3 Custom Natural Gas Savings by Applicant Type and Utility 5-11

Table 5-4 Standard Natural Gas Savings by Applicant Type and Utility 5-12

Table 5-5 New Construction Electricity Savings by Applicant Type and Utility 5-17

Table 5-6 New Construction Natural Gas Savings by Applicant Type and Utility 5-17

Table 5-7 Summary of New Construction Program Activity 5-19

Table 5-8 Survey Respondent Job Titles 5-31

Table 5-9 Natural Gas Service Franchise Agreements 5-31

Table 5-10 Electric Service Franchise Agreements 5-32

Table 5-11 Effect of Agreements on Energy Efficiency Projects 5-32

Table 5-12 Sources of Information on Saving Energy 5-33

Table 5-13 Whether or Not the Incentive Used would be Returned to the General Fund 5-34

Table 5-14 Previous Experience with Non-DCEO Funding 5-35

Table 5-15 Awareness of DCEO Incentives and Services 5-35

Table 5-16 Awareness of Metropolitan Mayors Caucus Services 5-35

Table 5-17 Awareness of Where to get More Information on DCEO Incentive Programs 5-36

Table 5-18 Types of Equipment Involved in Future Energy Efficiency Plans 5-37

Table 5-19 Likelihood of Applying for DCEO Incentives 5-37

Table 5-20 Reasons for potentially not Applying for DCEO Incentives 5-38

Table 5-21 Number of Employees at Trade Ally Firm 5-40

Table 5-22 Trade Ally Types of Business 5-41

Table 5-23 Benefits of the Trade Ally Program 5-42

Table 5-24 Topics Covered by Training Webinars 5-42

Table 5-25 Clarity of Information in Training Webinars 5-43

Table 5-26 Level of Detail Provided in Training Webinars 5-43

Table 5-27 Length of Training Webinars 5-43

Table 5-28 Training Topics Suggested by Trade Allies 5-44

Table 5-29 Reasons for Not Attending Trade Ally Rallies 5-45

Table 5-30 Usefulness of Trade Ally Rally for Incentive Program Updates 5-45

Table 5-31 Benefits of Trade Ally Rallies 5-45

Table 5-32 Programs Energy Efficiency Projects Completed Through 5-46

Table 5-33 Trade Ally Suggestions for Modifying Application Process 5-46

Table 5-34 Trade Ally Communication with Program Staff 5-48

Table 5-35 Reasons for Program Staff Communication 5-48

Table 5-36 Reasons for Not Installing Qualifying Equipment 5-50

Table 5-37 Coded Open-Ended Responses for Identified Challenges Unique to Completing Projects in State Facilities 5-52

Table 5-38 Suggestions for Improving Program to Increase Projects Completed 5-53

Table 5-39 Impacts of Incentive Program on Trade Ally Equipment/Service Options 5-54

Table 5-40 Levels of Satisfaction 5-54

1 Executive Summary

This report presents the results of the impact and process evaluations performed by ADM Associates Inc. (ADM) for three programs administered by the Illinois Department of Commerce and Economic Opportunity (DCEO) for public sector entities: Public Sector Custom Incentive Program, Public Sector Standard Incentives Program (grouped together as the Custom and Standard Incentives Programs), and the Public Sector New Construction Program (New Construction Program).This report presents results for electric program year six and natural gas program year three (EPY6/GPY3), the period from June 2013 through May 2014.The main features of the approach used for the evaluation of the Custom and Standard Incentives Programs and New Construction Program are as follows:

- Data for the study were collected through: review of program materials; on-site inspections; end-use metering; and interviews with DCEO staff members, program partner staff members, and participating public sector entities' staff and contractors.
- A sample design was developed for on-site data collection. Separate samples were drawn for electric and natural gas savings that provided savings estimates for programs within ±10% precision at the 90% confidence level. Table 1-1 shows the precision of the sample estimates. Table 1-2 shows the sample sizes for different types of data collection employed for the Custom and Standard Incentives Programs.
- On-site visits were used to collect data for savings impact calculations, to verify measure installation, and to determine measure operating parameters. Facility staff were interviewed to determine operating hours of installed measures, and to explain any additional benefits or shortcomings with the installed measure. For the majority of sites, lighting equipment, HVAC equipment, or motors/VFDs were monitored to obtain accurate information on hours of operation. For electric savings, the 23 projects sampled for the Custom Incentives Program accounted for 35% of the expected kWh savings and the 47 projects sampled for the Standard Incentives Program accounted for 11% of the expected kWh savings. For natural gas savings, the 33 projects sampled for the Custom Incentives Program accounted for 71% of the expected therm savings and the 24 projects sampled for the Standard Incentives Program accounted for 67% of the expected therm savings.
- Surveys of participant decision makers provided information necessary for net to gross analysis and process evaluation. For the Custom and Standard Incentives Programs, a total of 267 participant decision makers were surveyed about the influence of the program on their project decision-making. For the New Construction Program, seven of eight participant decision makers who completed EPY6/GPY3 projects were surveyed.
- Information for process evaluation was collected through interviews with program staff, state agency staff, local government staff, trade allies, and municipal government decision makers.

Table 1-1 Precision of Sample Estimates for Custom and Standard Electric and Natural Gas Savings

Program	*Precision for 90% Confidence Level*
Custom/Standard and NC, Electric	± 8.24%
Custom/Standard NC, Natural Gas	± 8.93%

Table 1-2 Sample Sizes for Custom and Standard Incentives Programs Data Collection Efforts

Type of Data Collected	*Sample Size*
Project On-Site Measurement and Verification	85
Participant Decision Maker Survey	267

The Illinois Statewide Technical Reference Manual (TRM) was used to estimate gross savings for TRM measures implemented through the Standard Incentives Program. Measures implemented through the New Construction Program, the Custom Incentives Program and non-TRM savings measures implemented through the Standard Incentives Program were estimated using industry standard engineering calculations and verification of computer simulations.

For standard measures, savings were calculated using one of three different TRM approaches. These approaches were as follows:

- TRM-Calculated: Savings calculated as per Illinois's Statewide TRM version 2.
- TRM-Calculated (Errata Corrected): Savings calculated as per an erratum in version 3 of the TRM.
- ADM-Calculated: Savings calculated using a non-TRM methodology. ADM-Calculated savings were performed when the Standard Incentives Program measure was not in the TRM or when the methodology in the TRM was not applicable because the assumptions provided were not appropriate for that measure.

The realized electric savings for the Custom and Standard Incentives Programs and New Construction Program during the period June 2013 through May 2014 are summarized in Table 1-3, Table 1-4, and Table 1-5.

During this period, gross ex post electric savings total 18,664,961 kWh for the Custom Incentives Program, 94,110,595 kWh for the Standard Incentives Program, and 1,402,411 kWh for the New Construction program. The gross realization rates for electric savings from the Custom and Standard Incentives Program are 78% and 119%, respectively. For the New Construction Program, the gross realization rate is 76%.

In order to estimate free ridership in the program, survey-based techniques were applied to the data collected through a survey of decision makers. During EPY6/GPY3, net ex post electric savings total 12,692,998 kWh for the Custom Incentives Program, 79,511,435 kWh for the Standard Incentives Program, and 1,073,636 kWh for the New Construction Program. The net to gross ratio for the Custom Incentives Program is 68% and the net to gross ratio for the Standard Incentives Program is 84%. For the New Construction Program, the net to gross ratio is 77%.

Table 1-3 Summary of kWh Savings for Custom Incentives Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Gross Realization Rate*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	6,444,643	6,170,854	96%	4,196,453	68%
ComEd	17,494,785	12,494,107	71%	8,496,545	68%
Total	23,939,429	18,664,961	78%	12,692,998	68%

Table 1-4 Summary of kWh Savings for Standard Incentives Program

Utility	*Ex Ante kWh Savings*	*TRM-Calculated*		*TRM-Calculated (Errata Corrected)*		*ADM-Calculated*			
		Gross Ex Post kWh Savings	*Net Ex Post kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Gross Ex Post kWh Savings*	*Gross Realization Rate*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	18,657,883	20,868,163	17,678,843	20,736,789	17,560,381	21,383,441	115%	18,066,277	84%
ComEd	60,543,376	70,466,714	59,697,157	70,140,300	59,396,390	72,727,155	120%	61,445,159	84%
Total	79,201,259	91,334,877	77,376,000	90,877,089	76,956,771	94,110,595	119%	79,511,435	84%

Table 1-5 Summary of kWh Savings for New Construction Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Gross Realization Rate*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	708,736	554,018	78%	424,136	77%
ComEd	1,126,092	848,393	75%	649,500	77%
Total	1,834,828	1,402,411	76%	1,073,636	77%

The gross ex post natural gas savings for the Custom and Standard Incentives Programs and New Construction Program during the period June 2013 through May 2014 are summarized in Table 1-6, Table 1-7, and Table 1-8. For the period, gross ex post natural gas savings total 5,420,120 therms for the Custom Incentives Program, 144,686 therms for the Standard Incentives Program,

and 47,640 therms for the New Construction Program. The gross realization rates for the Custom and Standard Incentives Programs are 95% and 104%, respectively. The gross realization rate for the New Construction Program is 84%.

The total net ex post natural gas savings is 4,893,051 therms for the Custom Incentives Program, 115,136 therms for the Standard Incentives Program, and 43,757 therms for the New Construction Program. The net to gross ratio for the Custom Incentives Program is 90% while the net to gross ratio for the Standard Incentives Program is 80%. For the New Construction Program, the net to gross ratio is 92%.

Table 1-6 Summary of Therm Savings for Custom Incentives Program

Utility	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Gross Realization Rate*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	1,826,963	1,643,318	90%	1,483,516	90%
Nicor	1,066,541	1,064,189	100%	960,704	90%
North Shore	146,573	149,439	102%	134,907	90%
Peoples	2,645,671	2,563,175	97%	2,313,924	90%
Total	5,685,748	5,420,120	95%	4,893,051	90%

Table 1-7 Summary of Therm Savings for Standard Incentives Program

Utility	*Ex Ante Therm Savings*	*TRM-Calculated*		*TRM-Calculated (Errata Corrected)*		*ADM-Calculated*			
		Gross Ex Post Therm Savings	*Net Ex Post Therm Savings*	*Gross Ex Post Therm Savings*	*Net Ex Post Therm Savings*	*Gross Ex Post Therm Savings*	*Gross Realization Rate*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	25,577	34,780	27,671	32,959	26,228	32,959	129%	26,228	80%
Nicor	107,245	103,587	82,414	95,584	76,062	101,598	95%	80,848	80%
North Shore	3,189	4,788	3,809	4,581	3,645	4,581	144%	3,645	80%
Peoples	3,008	5,585	4,443	5,549	4,415	5,549	184%	4,415	80%
Total	139,019	148,740	118,337	138,672	110,350	144,686	104%	115,136	80%

Table 1-8 Summary of Therm Savings for New Construction Program

Utility	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Gross Realization Rate*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	10,091	10,685	106%	9,814	92%
Nicor	46,401	36,955	80%	33,942	92%
Total	56,492	47,640	84%	43,757	92%

The gross ex post peak demand reductions for the Custom and Standard Incentives Programs and New Construction Program during the period June 2013 through May 2014 are summarized in Table 1-9, Table 1-10, and Table 1-11. For the period, gross peak demand reductions total 3,947.16 kW for the Custom Incentives Program, 13,907.42 kW for the Standard Incentives Program, and 289.72 for the New Construction Program. The gross realization rate for the Standard Incentives Program is 119%.

The net peak demand reductions total 2,567.57 kW for the Custom Incentives Program, 10,170.64 kW for the Standard Incentives Program, and 230.17 kW for the New Construction Program. The net to gross ratio for the Standard Incentives Program is 73%.

Table 1-9 Summary of Peak kW Reductions for Custom Incentives Program

Utility	*Ex Ante kW Savings*	*Gross Ex Post kW Savings*	*Gross Realization Rate*	*Net Ex Post kW Savings*	*Net-to-Gross Ratio*
Ameren	-	1,002.88		652.35	65%
ComEd	-	2,944.29		1,915.21	65%
Total	-	3,947.16		2,567.57	65%

Table 1-10 Summary of Peak kW Reductions for Standard Incentives Program

Utility	*Ex Ante kW Savings*	*TRM-Calculated*		*TRM-Calculated (Errata Corrected)*		*ADM-Calculated*			
		Gross Ex Post kW Savings	*Net Ex Post kW Savings*	*Gross Ex Post kW Savings*	*Net Ex Post kW Savings*	*Gross Ex Post kW Savings*	*Gross Realization Rate*	*Net Ex Post kW Savings*	*Net-to-Gross Ratio*
Ameren	2,625.87	2,437.75	1,801.49	2,437.63	1,801.39	2,629.84	100%	1,923.23	73%
ComEd	9,031.78	10,289.03	7,603.55	10,288.57	7,603.20	11,277.59	125%	8,247.41	73%
Total	11,657.65	12,726.78	9,405.04	12,726.20	9,404.59	13,907.42	119%	10,170.64	73%

Table 1-11 Summary of Peak kW Reductions for New Construction Program

Utility	*Ex Ante kW Savings*	*Gross Ex Post kW Savings*	*Gross Realization Rate*	*Net Ex Post kW Savings*	*Net-to-Gross Ratio*
Ameren	-	108.27		86.01	79%
ComEd	-	181.45		144.15	79%
Total	-	289.72		230.17	79%

The following presents a selection of key findings from EPY6/GPY3:

- **Combined Gross Realized Savings Decreased from Prior Program Year**: In comparison to last year, the realized gross electric and natural gas savings for all three programs combined decreased. The lower activity was due to decreased Custom and New Construction Incentives Program savings. Realized gross savings for the Standard Incentives Program increased from EPY5/GPY2.
- **DCEO and Partners Working to Provide a Clear, More Consistent Brand:** DCEO's partners have adopted the Illinois Energy Now branding. The intent is to provide a clear message to the market and to communicate to public entities the partnership with the incentive programs. The Smart Energy Design Assistance Center (SEDAC) plans to host a support call center for program participants.
- **Multiple New Initiatives Launched:** DCEO launched several new initiatives during the program year including: The Clean Water Energy Efficiency Initiative directing participants to leverage funding provided by the Illinois EPA and the Illinois Clean Energy Community Foundation to implement high efficiency aeration systems, a pilot project for data centers, and a bonus incentive for large custom gas projects that exceeded 50,000 therms to increase natural gas savings.
- **Database Improvements are needed to Track New Construction Projects and Meet Accounting Requirements:** Improvements need to be made to the database because it was found to be insufficient for tracking the early phases of new construction projects, and does not accurately report annual program expenditures.

Key findings from interviews with staff in the state buildings sector and a review of state policy pertaining to energy efficiency in state government are summarized below.

- **There are State Policies in place to Encourage Energy Efficiency in State Buildings, but Budget Policy Limits Implementation Potential:** There are several state policies that encourage or require the state to adopt energy conservation measures in existing and new facilities. However, reductions in state agency appropriations and the under-funding of capital budgets present significant constraints on resources available for the implementation of energy saving measures.
- **Decision Making and Approval Processes are Complex:** The approval processes for energy efficiency projects is complicated and it may involve either staff from the agency that is primarily using the building or CMS staff, depending on which agency has primary responsibility for the building. In addition, larger capital improvement projects require additional approval by the Capital Development Board (CDP). The multiple decision makers and organizations involved in the process likely create challenges for program outreach and

for trade allies seeking to develop business opportunities by encouraging energy efficiency improvements in state buildings. Trade allies noted that there were many parties involved in making decisions about equipment purchasing for state buildings and approval processes were slow.

- **Agencies Lack Budget Line Item for Incentive Projects to Participation:** Some agencies do not have a line item in their budgets for incentive dollars from DCEO. Incentives for these agencies are funneled into the general fund rather than funding the agency directly. This likely reduces the efficacy of incentives for encouraging energy efficiency projects. One large agency has developed a solution that uses funds for managing cash flow to finance projects. Other agencies may be able to replicate this strategy.
- **Funding Constraints Create Multiple Barriers:** The lack of state funds for capital improvements and agency facilities disincentives the replacement of old equipment, or equipment that is not operating optimally. Because of the lack of capital funds, most capital improvements are approved only to make emergency repair. Energy saving options may not be fully considered in these cases because short time frames to identify energy efficient equipment options and to apply for grant opportunities. Complicating this, many state facilities have older equipment that is more expensive to replace than newer equipment more commonly found in private sector buildings.

  Some state government entities such as state universities and the Department of Military Affairs have access to non-state funds that are available to pay for energy efficiency improvements. The availability of these funds likely contributes to the higher level of participation by state universities.
- **New Construction Program Time Requirements and Lack of Incentives for Incorporating Design Features Limit Participation:** Allowing projects to span multiple grant years may improve new construction program activity. Additionally, either providing incentives to designers or more fully leveraging SEDAC design assistance to incorporate efficiency may encourage additional projects.
- **Support Services Provided by ERC and SEDAC are Valued:** Staff of several state agencies stated services provided by ERC and SEDAC are valued for developing energy saving projects.

Key findings from decision makers from local government agencies in the Chicago metropolitan area collected through interviews and surveys are summarized below.

- **Local Government Decision Making and Approval Processes are Complex:** Decision making about energy efficiency projects involves multiple decision makers, as is typical of public sector organizations. Interview respondents reported that facility management staff

typically initiates projects, but projects require review from other managers and approval by the governing board for the municipality, the city council, and/or the mayor. This can complicate program outreach efforts because it increases the complexity and timeline of the approval process. Most municipalities have specific contracting requirements, which may affect project implementation timelines.

- **Barriers to Natural Gas Projects:** Three barriers to natural gas projects were identified: natural gas incentives cover a smaller share of equipment cost than incentives for electricity efficiency projects; organizations have already planned electricity efficiency projects; and there is less awareness of natural gas incentives. These factors explain why meeting natural gas efficiency goals has been more challenging than meeting electricity efficiency goals, but do not explain why DCEO has had greater difficulty reaching its natural gas saving goals in the Nicor service territory.
- **Opportunities to Improve Awareness and Understanding of Programs:** DCEO may be able to improve outreach efforts by targeting associations such as the Northwest Municipal Conference and the Illinois Chapter of the American Public Works Association. The facility management staff who often initiate energy saving projects are members of these organizations. There may also be opportunities to develop a clear presentation of how to complete an incentive project that would better inform municipalities of the process.
- **Franchise Agreements may have Moderate Impact on Completion of Incentive Projects:** Program staff has noted that franchise agreements that cover all or a portion of municipality energy costs may limit program activity. Interview and survey responses suggest that these agreements may have a moderate impact on program participation. Most survey respondents report that they have franchise agreements that cover all or part of the cost of electricity (78%) and natural gas service (69%). However, none indicated that these arrangements made it much more difficult to get projects approved and only 22% indicated that it made it somewhat more difficult. One interview respondent indicated that not having utility costs made getting approval for energy efficiency projects more difficult. The effect of these agreements may be greater than respondents stated. Respondents may be reluctant to report that the agreements reduce their motivation to complete energy saving projects that could result in environmental benefits and reduce municipal energy costs being passed on to residents.
- **Incentive Dollars May Not be Returned to Budgets used to Finance Projects:** Nearly one-half of respondents (48%) reported that the incentive funds for energy efficiency projects would not be returned to the department or budget that financed the project. As such, some organizations may not implement energy efficient equipment because the incremental costs are not recouped.
- **DCEO Sponsored Audits and Project Reviews are Highly Valued:** Interview respondents valued audits and project reviews performed by SEDAC and the 360 Energy Group. These services provided a credible source of information on energy saving improvements, assisted

with the development of projects, and provided clear equipment specifications used to develop bid requests.

The following recommendations are offered for improving the DCEO public sector programs.

- **Consider Outreach to Additional Associations:** Outreach efforts to groups such as the Northwest Municipal Conference and the Illinois Chapter of the American Public Works Association may be effective at reaching municipal facility staff who often initiate energy efficiency projects.
- **Continue to Leverage Audits and Project Reviews as Gateway to Program Participation:** Energy assessments and project reviews appear to be an effective means of assisting public entities with developing energy saving projects. Program staff should continue to leverage these services and target non-participating organizations to encourage participation in the incentive programs. Moreover, specifically targeting utility service territories where the programs are underperforming may improve goal attainment.
- **Explore Financing Mechanisms for Government Agencies:** Incentive payments are often not returned to the state agency budget used to pay for the improvement. Program staff should explore models developed by other state agencies for funding energy efficiency improvements in the absence of a budget line for accepting incentives can be applied elsewhere. DCEO should leverage its position on the Energy Efficiency Committee to press for the implementation of budget line items for state agencies to receive incentives mandated by Executive Order 7 of 2009.

  Similar budget issues may limit the effectiveness of the incentives for local government agencies. Staff should also consider implementing a utility bill credit process to fund efficiency projects for other public sector entities.
- **Opportunity to Improve Consistency of Program Information and Relevance:** Program staff reported that their partners were adopting consistent use of the Energy Now Brand to communicate that the DCEO energy efficiency incentives and technical services are part of a single program. SEDAC will be hosting a call center that will be the main telephone contact for program participants. These developments are moving the DCEO programs to a more consolidated presence. However, additional improvements are possible. For example, program information can be found separately on the DCEO, SEDAC, and ERC websites. Creating a single site that is used by DCEO and its partners to present information that is organized effectively may encourage program participation and help establish the DCEO programs a resource for energy efficiency. For example, the information could be presented by target market (e.g., state agencies, municipalities, parks departments), by facility type

(e.g., waste water treatment facilities, correctional facilities, or public pools), by equipment type (e.g., lighting equipment, kitchen equipment), or by some combination of these options.

- **Monitor Effectiveness of Sweet Deal Bonus:** Although program activity spiked around the two deadlines for the sweet deal bonus (October 31st and February 14th), it is unclear if these bonus incentives influenced additional projects or shifted their timeline to earlier in the program year. It is important to note that for both the Standard and Custom Programs, the majority of savings occurred after the sweet deal timeline had passed.
- **Consider Specialized Training to Trade Allies to help them Navigate Public Sector Approval Processes:** Trade allies reported issues developing projects at state agencies involving complex decision-making processes and slow approval processes. These issues are also found in other public sector entities. Staff may be able to provide guidance to trade allies on navigating decision-making processes at public sector organizations to make the process more transparent and facilitate their ability to sell projects.

2 Introduction

This section presents a description of the three programs that Illinois Department of Commerce and Economic Opportunity (DCEO) offers to public sector entities: Public Sector Custom and Standard Incentives Programs (Custom and Standard Incentives Program), and the Public Sector New Construction Program (New Construction Program). This section also includes an overview of the evaluation approach and report contents for the evaluation of electric program year six and natural gas program year three (EPY6/GPY3), the period from June 2013 through May 2014.

2.1 Description of Programs

The Custom and Standard Incentives Programs and the New Construction Program offered by DCEO were designed to help the public sector identify and implement energy saving projects. The three programs evaluated in this report are described below.

2.1.1 Custom and Standard Incentives Programs

The Custom Incentives Program generates electric and natural gas savings by helping public sector entities identify and implement energy savings projects and provide incentives on a per kilowatt hour (kWh) or per therm basis. During EPY6/GPY3, the program provided incentives of $0.12 per kWh saved and $3.00 per therm saved. A payback period of one to seven years is required for custom incentive projects.

The Standard Incentives Program generates electric and natural gas savings by helping public sector entities identify and implement energy saving projects. The program offers incentives on a prescriptive basis for qualifying equipment purchased and installed by the participant.

Two bonus incentive opportunities were offered during the program year under both programs: The “Sweet Deal Bonus”, and the High Impact Natural Gas Efficiency bonus. The “Sweet Deal Bonus” offered a 10% bonus for projects completed by October 31st, 2013 and a 5% bonus for projects completed by February 14th, 2014. The High Impact Natural Gas Efficiency (HINGE) bonus offered incentives of $4.00 per therm saved for projects that saved between 50,000 and 100,000 therms, and $5.00 per therm saved for projects that saved more than 100,000 therms. Up to 90% of the project cost was eligible under either incentive. To receive the HINGE bonus, applications for pre-approvals were required by September 30th, 2013 and the project must have been completed by May 31st, 2014.

Higher incentives were offered for break-through equipment and devices that generate electric savings through both programs. For example, through the Custom Incentives Program some types of exterior LED and induction lighting projects were provided a higher custom incentive of $0.30 per kWh saved. Through the Standard Incentives Program additional incentives were provided for geothermal heat pumps.

Incentives provided by the program could not exceed 100% of the incremental measure cost or 75% of the total project cost. If incentives were provided from other public sources, those incentives in combination with the program incentives could not exceed 100% of the total project cost. Additionally, incentive awards could not exceed $300,000 unless multiple project locations were included.

Expected electric savings are shown in Table 2-1 by utility for the Custom and Standard Incentives Programs. There were 179 Custom Incentives Program projects during the period from June 2013 through May 2014 that were expected to provide savings of 23,939,429 kWh. Additionally, there were 923 Standard Incentives Program projects during the period June 2013 through May 2014 that were expected to provide savings of 79,201,259 kWh.

Table 2-1 Ex Ante kWh Savings for Custom and Standard Incentives Programs

Utility	*Ex Ante kWh Savings*	
	Custom Incentives Program	*Standard Incentives Program*
Ameren	6,444,643	18,657,883
ComEd	17,494,785	60,543,376
Total	23,939,429	79,201,259

Expected natural gas savings are shown in Table 2-2 by utility for the Custom and Standard Incentives Programs. There were 211 Custom Incentives Program projects during the period June 2013 through May 2014, which were expected to provide a total savings of 5,685,748 therms. The 106 Standard Incentives Program projects during the same period were expected to provide a total savings of 139,019 therms.

Table 2-2 Ex Ante Therm Savings for Custom and Standard Incentives Programs

Utility	*Ex Ante Therm Savings*	
	Custom Incentives Program	*Standard Incentives Program*
Ameren	1,826,963	25,577
Nicor	1,066,541	107,256
North Shore	146,573	3,189
Peoples	2,645,671	3,008
Total	5,685,748	139,019

Figure 2-1 shows the Custom Incentives Program's realized kWh savings by the date of application submission.

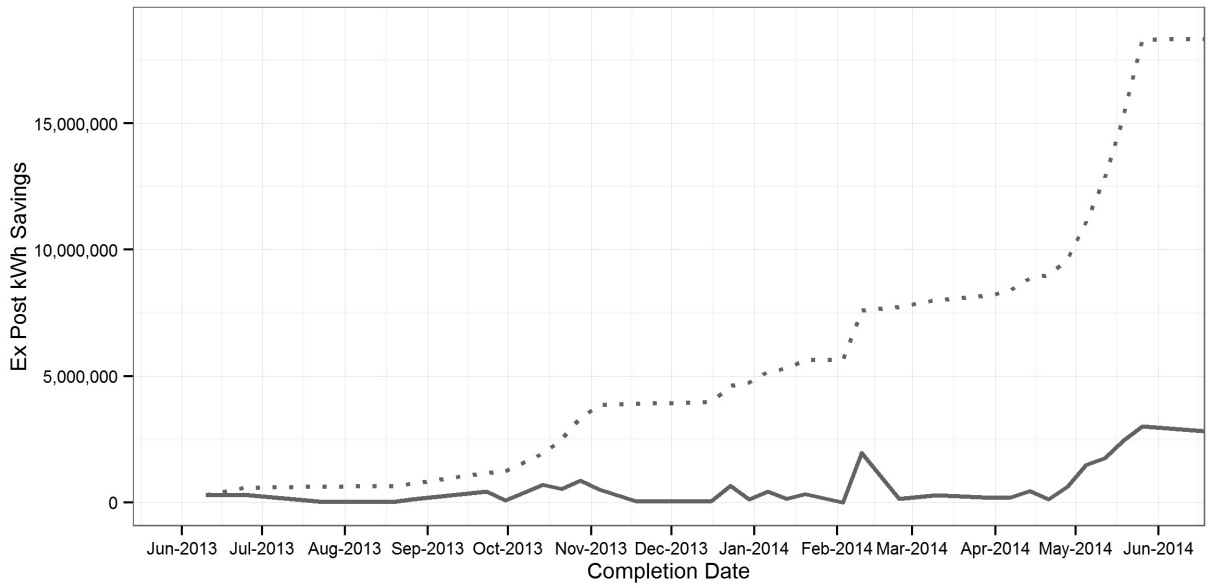

Figure 2-1 Custom Incentives Program Cumulative Ex Post kWh Savings by Date of Application Submission

Figure 2-2 shows the Standard Incentives Program's realized kWh savings by the date of application submission.

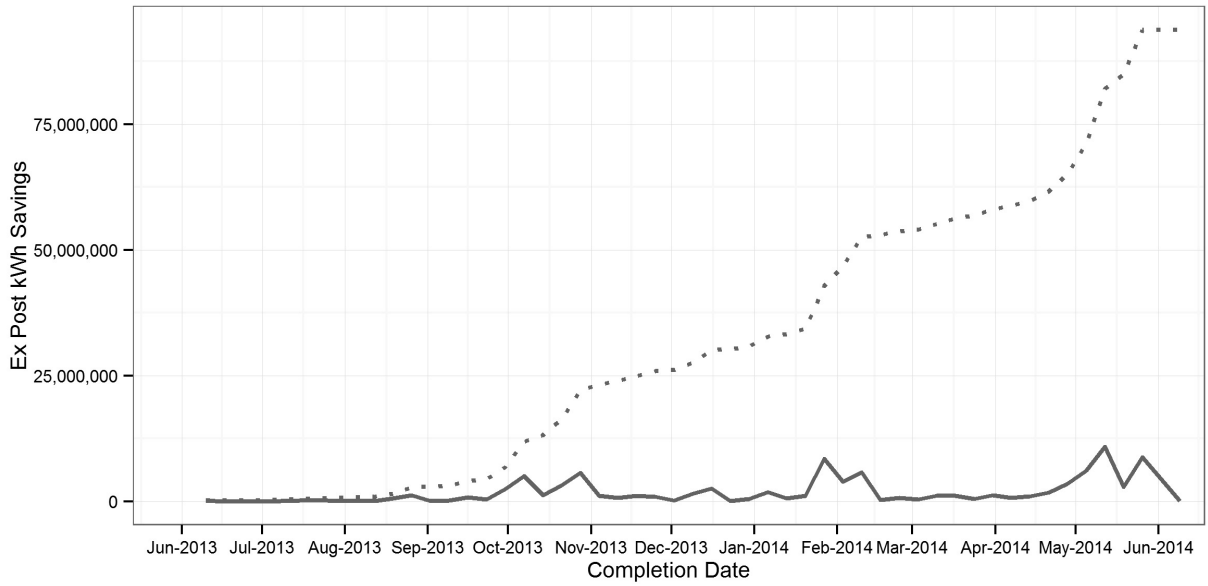

Figure 2-2 Standard Incentives Program Cumulative Ex Post kWh Savings by Date of Application Submission

Figure 2-3 shows the Custom Incentives Program's realized therm savings by the date of application submission.

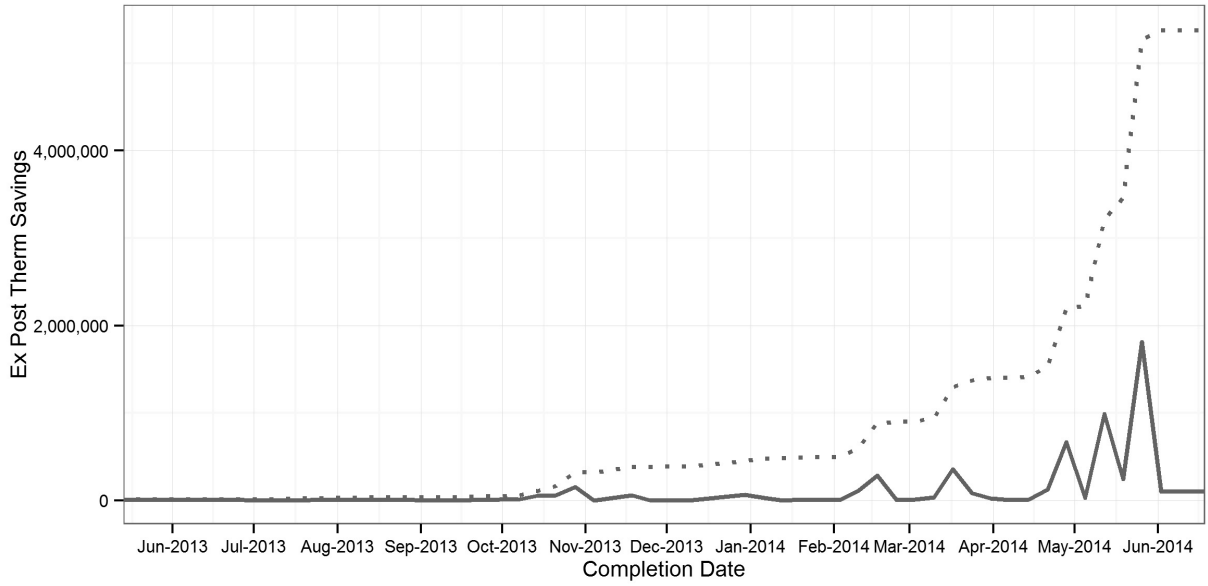

Figure 2-3 Custom Incentives Program Cumulative Ex Post Therm Savings by Date of Application Submission

Figure 2-4 shows the Standard Incentives Program's realized therm savings by the date of application submission.

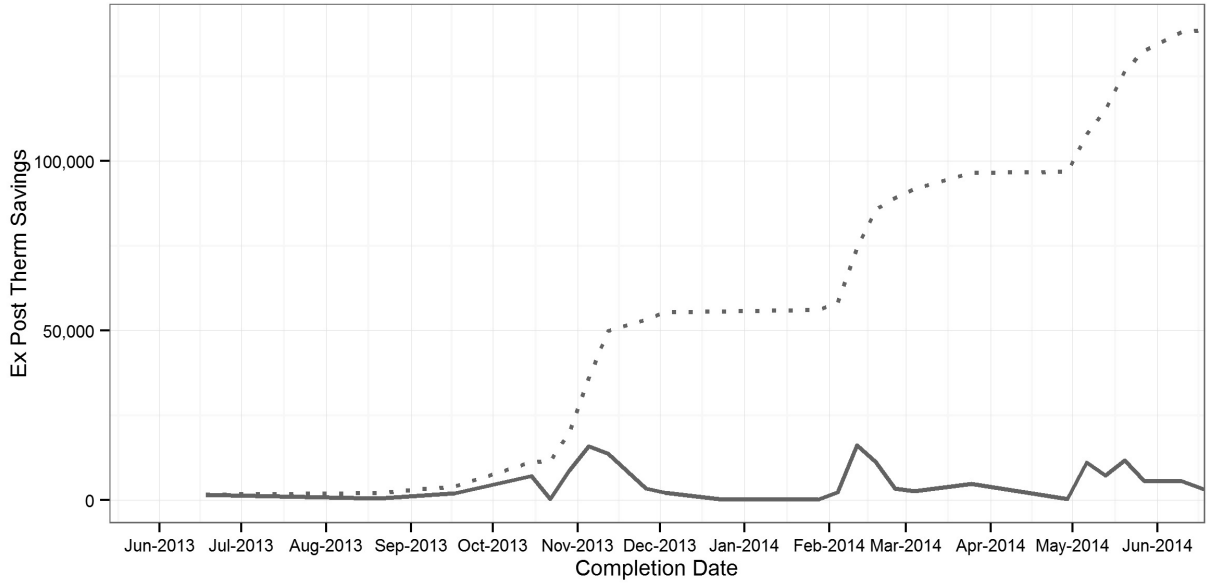

Figure 2-4 Standard Incentives Program Cumulative Ex Post Therm Savings by Date of Application Submission

2.1.2 New Construction Program

The New Construction Program generates electric and natural gas savings through new construction and major renovation of public sector buildings that exceed the requirements of the current Illinois Energy Conservation Code for Commercial Buildings. Applicants receive incentives for incorporating energy saving technologies and designing features that exceed the building code requirements that are in effect at the time of application.

To receive program incentives for electric savings, project sites must be serviced by the utilities Ameren Illinois or ComEd. Incentives are available for gas conservation measures for sites serviced by utilities Ameren Illinois, Nicor, Peoples, or North Shore.

The New Construction Program incentives encourage construction and major renovation projects to build or renovate buildings to use less energy than buildings constructed only to code requirements. Applicants can receive custom incentives for energy savings, or receive prescriptive incentives with fixed dollar amounts for equipment installed. There are two components of the custom incentives: a base incentive rate and a bonus rate for applicants seeking LEED Silver, Gold, or Platinum designation. The base rate incentives are $0.08 per kWh and $2.00 per therm saved by exceeding building energy code requirements. The bonus incentive rates for each applicable building code are shown in Table 2-3.

Table 2-3 EPY6/GPY3 Bonus Incentive Rates

IECC 2009/ ASHRAE 90.1 2007 required	*Incentive per square foot*	*IECC 2012/ ASHRAE 90.1 2010 required*	*Incentive per square foot*
5% beyond code	$0.00	5% beyond code	$0.40
10% beyond code	$0.20	10% beyond code	$0.60
15% beyond code	$0.40	15% beyond code	$0.80
20% beyond code	$0.60	20% beyond code	$1.00
25% beyond code	$0.80	25% beyond code	$1.20
30% beyond code	$1.00	30% beyond code	$1.40

Incentives for prescriptive measures are available for lighting equipment, envelope measures, mechanical measures, water heating measures, and kitchen measures. Lighting incentives are based on lighting density (i.e., watts per square foot); envelope measures are based or R-values per square foot; mechanical measures are based on equipment efficiency, type, and size; water heating measures are based on equipment type; and various kitchen measures are set on a per unit basis.

Total incentives cannot exceed 100% of the incremental measure cost or 75% of the project cost. If additional incentives are provided from other public sources, those incentives in combination with the program incentives cannot exceed 100% of the total project cost. The maximum bonus incentive is $100,000 and the total base and bonus incentive cannot exceed $2.50 per square foot or $300,000 (unless the project includes multiple project locations).

Preapproval of projects is strongly encouraged and incentives for certain measures may not be allowed if pre-retrofit equipment is not identifiable.

Expected kWh and therm savings by utility are shown in Table 2-4 and in Table 2-5. There were eight projects completed through the New Construction program that received incentives for reductions in electricity usage during the period June 2013 through May 2014. These projects were expected to provide savings of 1,834,828 kWh.

Table 2-4 Ex Ante kWh Savings for New Construction Program

Utility	*Ex Ante kWh Savings*
Ameren	708,736
ComEd	1,126,092
Total	1,834,828

There were seven projects completed through the New Construction program that received natural gas incentives during the period June 2013 through May 2014. These projects were expected to provide savings of 56,492 therms.

Table 2-5 Ex Ante Therm Savings for New Construction Program

Utility	*Ex Ante Therm Savings*
Ameren	10,091
Nicor	46,401
Total	56,492

2.2 Overview of Evaluation Approach

The objective of the impact evaluation performed for the Custom and Standard Incentives Programs, and the New Construction Program was to determine the gross and net electric and natural gas savings and peak demand (kW) reductions resulting from projects completed during the June 2013 through May 2014 period.

The evaluation approach had the following main features:

- Available documentation (e.g., audit reports, savings calculation work papers, etc.) was reviewed for a sample of projects, with particular attention to the calculation procedures and documentation for savings estimates.
- On-site data collection was conducted for a sample of projects to provide the information needed for estimating savings and demand reductions. Monitoring was also conducted at some sites to obtain more accurate information on the hours of operation for lighting, HVAC equipment, and motors/VFDs.

- The Illinois Statewide Technical Reference Manual (TRM) was used to estimate gross savings for TRM measures implemented through the Standard Incentives Program. Measures implemented through the New Construction Program, the Custom Incentives Program and non-TRM savings measures implemented through the Standard Incentives Program were estimated using proven techniques, including industry standard engineering calculations and verification of computer simulations developed by program contractors to determine energy savings.
    - Analysis of lighting savings was conducted using ADM's custom-designed lighting evaluation model with system parameters (fixture wattage, operating characteristics, etc.) based on operating parameter information collected on-site and, if appropriate, industry standards.
    - For HVAC measures, the original analyses used to calculate the expected savings were reviewed and the operating and structural parameters of the analysis were verified. For custom measures or relatively more complex measures, simulations with the DOE-2 energy analysis model were used to develop estimates of energy use and savings from the installed measures.
- A participant survey was conducted from a sample of program participants to gather information on participant decision-making, and factors that affected net to gross savings ratios for the program.
- Interviews and surveys of participating and non-participating local government decision makers in the Chicago metropolitan area were conducted to gather information on possible barriers to energy efficiency and participating in the program.
- Interviews were conducted with key state agency staff from the Department of Central Management Services (CMS), the Capital Development Board (CDB), and staff members from a large state agency active in the program. These interviews provided information on challenges the program faces in encouraging energy efficiency projects with the targeted market sector.
- Surveys of registered trade allies were conducted to provide insight on customer awareness of the incentive programs, the application process, and to provide suggestions for improving the programs.

2.3 Organization of Report

This report on the impact and process evaluation of the Custom and Standard Incentives Programs and the New Construction Program for the period June 2013 through May 2014 is organized as follows:

- Chapter 3 presents the methods used for and the results obtained from estimating gross savings for measures installed under the Custom and Standard Incentives Programs and the New Construction Program.
- Chapter 4 presents the methods used for and results obtained from estimating net savings for the Custom and Standard Incentives Programs and the New Construction Program.
- Chapter 5 presents and discusses the methods used for and results obtained from the process evaluation of the Custom and Standard Incentives Programs and the New Construction Program.
- Chapter 6 presents evaluation conclusions and recommendations for the Custom and Standard Incentives Programs and the New Construction Program.
- Appendix A: Site-Level Reports presents the methods and results for the individual sample site analyses.
- Appendix B: Survey Instrument for Custom Standard Survey provides a copy of the questionnaire used for the survey of decision makers for participants in the Custom and Standard Incentives Programs.
- Appendix C: Custom and Standard Survey Responses presents the results from a survey of decision makers for participants that received incentives under the Custom and Standard Incentives Programs.
- Appendix D: Survey Instrument for New Construction Survey provides a copy of the questionnaire used for the survey of decision makers for participants in the New Construction Program.
- Appendix E: New Construction Survey Responses presents the results from a survey of decision makers for participants that received incentives under the New Construction Program.
- Appendix F: Survey Instrument for Municipal Non Participant provides a copy of the questionnaire used for municipal government decision makers.
- Appendix G: Municipal Survey Responses presents the results from a survey of municipal government decision makers.
- Appendix H: Trade Ally Survey Instrument provides a copy of the questionnaire used for the survey of members of the trade ally network.
- Appendix I: Trade Ally Survey Responses presents the results of the survey of trade allies.

3 Estimation of Gross Savings

This chapter addresses the estimation of gross kWh, gross therm savings, and peak kW reductions resulting from measures installed in facilities of participants that obtained incentives under the Custom and Standard Incentives Programs, and the New Construction Program during the period June 2013 through May 2014. Section 3.1 describes the methodology used for estimating gross savings. Section 3.2 presents the electric and natural gas gross savings results for the three programs.

3.1 Methodology for Estimating Gross Savings

This section describes the methodology used for estimating gross savings for the Custom and Standard Incentives Programs and the New Construction Program.

3.1.1 Sampling Plan

Data used to estimate the gross savings achieved through the Custom and Standard Incentives Programs were collected for samples of projects completed during the period June 2013 through May 2014. Samples were drawn for both electric and natural gas savings achieved through the programs.[1]

Data obtained from DCEO showed that during the period June 2013 through May 2014, there were 190 Custom Incentives Program projects that were expected to provide total electric savings of 25,774,257 kWh annually. During the same period there were 1,386 Standard Incentives Program projects, which were expected to provide total electric savings of 79,201,153 kWh annually.

Inspection of data on kWh savings for individual projects obtained from DCEO indicated that the distribution of electric savings was generally positively skewed, with a small number of projects accounting for a high percentage of the estimated energy savings for the Custom and Standard Incentives Programs. Estimation of electric savings for Custom and Standard Incentives Programs is based on a ratio estimation, which allows a smaller sample size to be used while still meeting requirements for precision. The actual precision of the Custom Incentives Program sample is ±14.1% at 90% confidence, while the actual precision of the Standard Incentives Program sample is ±9.92% at 90% confidence.

Table 3-1 shows the number of projects and expected kWh savings for the Custom Incentives Program sample by stratum.

[1] New construction projects were included in the custom project sample.

Table 3-2 shows the number of projects and expected kWh savings of the Standard Incentives Program sample by stratum.

Table 3-1 Population Statistics Used for Sample Design for Custom Incentives and New Construction Programs kWh Savings

	Stratum 1	*Stratum 2*	*Stratum 3*	*Stratum 4*	*Stratum 5*	*Totals*
Strata boundaries (kWh)	29,075 <	29,076 – 116,266	116,267 – 239,812	239,813 – 879,413	879,414 – 2,398,102	
Number of projects	114	30	16	27	3	190
Total kWh savings	762,082	1,925,018	2,639,653	14,435,326	6,012,178	25,774,257
Average kWh Savings	6,685	64,167	164,978	534,642	2,004,059	135,654
Standard deviation of kWh savings	7,513	27,857	32,340	172,049	488,460	309,681
Coefficient of variation	1.12	0.43	0.20	0.32	0.24	2.28
Final design sample	8	6	2	4	3	23

Table 3-2 Population Statistics Used for Sample Design for Standard Incentives Program kWh Savings

	Stratum 1	*Stratum 2*	*Stratum 3*	*Stratum 4*	*Stratum 5*	*Totals*
Strata boundaries (kWh)	29,960 <	29,961 – 119,628	119,629 – 278,438	278,439 – 869,500	869,501 – 3,111,382	
Number of projects	857	359	121	47	2	1,386
Total kWh savings	9,591,377	21,777,855	21,963,097	21,492,107	4,376,823	79,201,259
Average kWh Savings	11,192	60,663	181,513	457,279	2,188,412	57,144
Standard deviation of kWh savings	8,051	24,667	44,944	171,383	1,305,277	131,270
Coefficient of variation	0.72	0.41	0.25	0.37	0.60	2.30
Final design sample	19	11	8	8	1	47

As shown in Table 3-3, the sample projects account for approximately 35% of the Custom Incentives Program's expected kWh savings, and, as shown in Table 3-4, the Standard Incentives Program's sample projects account for approximately 11% of expected kWh savings.

Table 3-3 Ex Ante kWh Savings for Custom Incentives and New Construction Sampled Projects by Stratum

Stratum	*Sample Ex Ante kWh Savings*	*Total Ex Ante kWh Savings*	*Percent of Ex Ante kWh Savings in Sample*
5	6,012,178	6,012,178	100%
4	2,328,559	14,435,326	16%
3	347,274	2,639,653	13%
2	415,321	1,925,018	16%
1	119,015	762,082	16%
Total	9,222,347	25,774,257	35%

Table 3-4 Ex Ante kWh Savings for Standard Incentives Sampled Projects by Stratum

Stratum	*Sample Ex Ante kWh Savings*	*Total Ex Ante kWh Savings*	*Percent of Ex Ante kWh Savings in Sample*
5	3,111,382	4,376,823	71%
4	3,319,745	21,492,107	15%
3	1,479,684	21,963,097	7%
2	715,862	21,777,855	3%
1	141,030	9,591,377	1%
Total	8,767,703	79,201,259	11%

Data obtained from DCEO showed that during the period June 2013 through May 2014, there were 256 Custom Incentives Program projects that were expected to provide natural gas savings of 5,742,240 therms. During the same period, there were 97 Standard Incentives Program projects that were expected to provide natural gas savings of 139,019 therms.

Inspection of data on therm savings for individual projects obtained from DCEO indicated that the distribution of savings was generally positively skewed, with a relatively small number of projects accounting for a high percentage of the estimated savings. Estimation of natural gas savings for Custom and Standard Incentives Programs is based on a ratio estimation procedure, which allows a smaller sample size to be used while still meeting requirements for precision. The actual precision of the Custom Incentives Program sample is ±9.02% at 90% confidence, while the actual precision of the Standard Incentives Program sample is ±9.96% at 90% confidence.

Table 3-5 shows the number of projects and expected therm savings of the Custom Incentives Program sample by stratum.

Table 3-6 shows the number of projects and expected therm savings of the Standard Incentives Program sample by stratum.

Table 3-5 Population Statistics Used for Sample Design for Custom Incentives and New Construction Programs Therm Savings

	Stratum 1	*Stratum 2*	*Stratum 3*	*Totals*
Strata boundaries (Therm)	20,640 <	20,641 – 101,058	101,059 – 859,063	
Number of projects	216	32	8	256
Total therm savings	820,810	1,497,756	3,423,673	5,742,240
Average therm savings	3,800	46,805	427,959	22,431
Standard deviation of therm savings	4,864	21,945	292,207	89,164
Coefficient of variation	1.28	0.47	0.68	3.93
Final design sample	15	10	8	33

Table 3-6 Population Statistics Used for Sample Design for Standard Incentives Program Therm Savings

	Stratum 1	*Stratum 2*	*Stratum 3*	*Totals*
Strata boundaries (therm)	1,133 <	1,134 – 5,760	5,761 – 24,651	
Number of projects	75	17	5	97
Total therm savings	26,845	49,091	63,082	139,019
Average therm savings	358	2,888	12,616	1,433
Standard deviation of therm savings	304	1,274	6,859	3,177
Coefficient of variation	0.85	0.44	0.54	2.22
Final design sample	11	8	5	24

As shown in Table 3-7 the sample projects account for approximately 71% of the Custom Incentives Program's expected therm savings, and as shown in Table 3-8, the sample projects account for approximately 67% of the Standard Incentives Program's expected therm savings.

Table 3-7 Ex Ante Therm Savings for Custom Incentives and New Construction Sampled Projects by Stratum

Stratum	*Sample Ex Ante Savings*	*Total Ex Ante Savings*	*Percent of Ex Ante Therm Savings in Sample*
3	3,423,673	3,423,673	100%
2	524,953	1,497,756	35%
1	101,824	820,810	12%
Total	4,050,450	5,742,240	71%

Table 3-8 Ex Ante Therm Savings for Standard Incentives Sampled Projects by Stratum

Stratum	*Sample Ex Ante Savings*	*Total Ex Ante Savings*	*Percent of Ex Ante Therm Savings in Sample*
3	63,114	63,082	100%
2	27,875	49,091	57%
1	2,169	26,845	8%
Total	93,158	139,019	67%

3.1.2 Review of Documentation

For each project selected in the sample, ADM reviewed the available documentation for each incented measure including audit reports, savings calculation work papers, program forms, databases, billing data, and weather data, with particular attention given to documentation supporting calculation procedures and savings estimates.. Each application was reviewed to verify inclusion of the following information:

- Documentation of the equipment replaced, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information;
- Documentation of the newly-installed equipment, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information; and for custom measures
- Information about ex ante savings calculation methodology, and assumptions that were employed.

In the event of uncertainty regarding project characteristics, or apparently incomplete project documentation, ADM staff contacted DCEO to obtain further project information from program staff, participants, or contractors that facilitated the project implementation. This will facilitate the development of an appropriate project-specific M&V plan.

3.1.3 On-Site Data Collection Procedures

Data collected through on-site visits included information on the facilities participating in the program and data used in calculating savings impacts. Documentation ADM collected from DCEO about projects selected in the M&V sample included company names, project ID, site address, and contact information.

During an on-site visit, ADM field staff performed the following tasks:

- Verified the implementation of all measures the participants received incentives for, by confirming that energy efficiency measures were installed correctly, and were functional.
- Collected physical data needed to analyze realized energy savings from installed measures.

- Interviewed personnel at the facility to obtain additional information about installed measures.
- At sites requiring higher accuracy of savings calculations, staff monitored operating hours of the installed measures. . Monitoring was not conducted at sites where project documentation allowed for sufficiently detailed calculations.

3.1.4 Procedures for Estimating Savings from Measures Installed

This section presents procedures used to estimate savings for projects implemented through the Custom and Standard Incentives Programs and the New Construction Program.

3.1.4.1 Procedures for Estimating Savings from Custom Incentives Program Projects

The method ADM employed for measures implemented through the Custom Incentives Program was dependent on the measure type. Categories of measures may include the following:

- Lighting;
- HVAC;
- Motors;
- VFDs;
- Compressed-Air;
- Refrigeration; and
- Process Improvements.

ADM used specific methods to determine gross savings for projects, depending on the type of measure analyzed. These typical methods are summarized in Table 3-9.

Table 3-9 Typical Methods to Determine Savings for Measures

Type of Measure	*Method to Determine Savings*
Compressed Air Systems	Engineering analysis, with monitoring data on load factor and schedule of operation
Lighting	Analysis based on data regarding wattages before and after installation of measures and lighting hours-of-use data.
HVAC (including packaged units, chillers, cooling towers, controls/EMS)	eQUEST model using DOE-2 as its analytical engine for estimating HVAC loads and calibrated with site-level billing data to establish a benchmark.
Motors and VFDs	Measurements of power and run-time obtained through monitoring
Refrigeration	Simulations with eQUEST engineering analysis model, with monitoring data
Process Improvements	Engineering analysis, with monitoring data on load factor and schedule of operation

The activities specified in Table 3-9 generated calculations of project ex post gross energy savings. This allowed for calculation of a realization rate (the ratio of verified gross savings to expected gross savings) for each sampled project. ADM developed estimates of program level gross savings by applying the realization rates of sampled projects to non-sampled projects.

Sampled sites with relatively high or low realization rates were further analyzed to determine the reasons for the discrepancy between expected and realized energy savings.

The following discussion describes the basic procedures used for estimating savings from various measure types.

Plan for Analyzing Savings from Lighting Measures: Lighting measures examined include retrofits of existing fixtures, lamps and/or ballasts with energy efficient fixtures, lamps and/or ballasts. These measures reduce demand, while not affecting operating hours. Any proposed lighting control strategies that might include the addition of energy conserving control technologies such as motion sensors or daylighting controls are examined. These measures typically involve a reduction in hours of operation and/or lower current passing through the fixtures.

Analyzing the savings from such lighting measures requires data for retrofitted fixtures on (1) wattages before and after retrofit and (2) hours of operation before and after the retrofit. Fixture wattages are taken from a table of standard wattages, with corrections made for non-operating fixtures. Hours of operation are determined from metered data collected after measure installation for a sample of fixtures.

To determine baseline and post-retrofit demand values for the lighting efficiency measures, ADM uses in-house data on standard wattages of lighting fixtures and ballasts to determine demand values for lighting fixtures. These data provide information on wattages for common lamp and ballast combinations.

As noted, ADM collects data with which to determine average operating hours for retrofitted fixtures by using Time-of-Use (TOU) data loggers to monitor a sample of “last points of control” for unique usage areas in the sites where lighting efficiency measures have been installed. Usage areas are defined to be those areas within a facility that are expected to have comparable average operating hours. Typical usage areas are designated in the forms used for data collection.

ADM uses per-fixture baseline demand, retrofit demand, and appropriate post-retrofit operating hours to calculate peak capacity savings and annual energy savings for sampled fixtures of each usage type.

Peak kW reduction was calculated for projects that are part of the sample for measurement and verification. In order to calculate total achieved peak kW savings, the total realized peak kW savings for the sampled projects of a stratum were factored by the ratio of total expected kWh savings to sample expected kWh savings.

Peak Period Demand Savings are calculated as the difference between peak period baseline demand and post-installation peak period demand of the affected lighting equipment, per the following formula:

$$\text{Peak Capacity Savings} = kW_{before} - kW_{after}$$

The baseline and post-installation average demands are calculated by dividing the total kWh usage during the Peak Period by the number of hours in the Peak Period.

ADM calculates annual energy savings for each sampled fixture per the following formula:

$$\text{Annual Energy Savings} = kWh_{before} - kWh_{after}$$

The values for insertion in this formula are determined through the following steps:

- Results from the monitored sample are used to calculate the average operating hours of the metered lights in each costing period for every unique building type/usage area.
- These average operating hours are then applied to the baseline and post-installation average demand for each usage area to calculate the respective energy usage and peak period demand for each usage area.
- The annual baseline energy usage is the sum of the baseline kWh for each costing period for all of the usage areas. The post-retrofit energy usage is calculated similarly. The energy savings are calculated as the difference between baseline and post-installation energy usage.
- Savings from lighting measures in conditioned spaces are factored by the region-specific, building type-specific heating cooling interaction factors in order to calculate total savings attributable to lighting measures, inclusive of impacts on HVAC operation

Plan for Analyzing Savings from HVAC Measures: Savings estimates for HVAC measures installed at a facility are derived by using the energy use estimates developed through DOE-2 simulations and engineering calculations. The HVAC simulations also allow calculation of the primary and secondary effects of lighting measures on energy use. Each simulation produces estimates of HVAC energy and demand usage to be expected under different assumptions about equipment and/or construction conditions. There may be cases in which DOE-2 simulation is inappropriate because data are not available to properly calibrate a simulation model, and engineering analysis provides more accurate M&V results.

For the analysis of HVAC measures, the data collected through on-site visits and monitoring are utilized. Using these data, ADM prepares estimates of the energy savings for the energy efficient equipment and measures installed in each of the participant facilities. Engineering staff develop independent estimates of the savings through engineering calculations or through simulations with energy analysis models. By using energy simulations for the analysis, the energy use associated with the end use affected by the measure(s) being analyzed can be

quantified. With these quantities in hand, it is a simple matter to determine what the energy use would have been without the measure(s).

Before making the analytical runs for each site with sampled project HVAC measures, engineering staff prepare a model calibration run. This is a base case simulation to ensure that the energy use estimates from the simulations have been reconciled against actual data on the building's energy use. This run is based on the information collected in an on-site visit pertaining to types of equipment, their efficiencies and capacities, and their operating profiles. Current operating schedules are used for this simulation, as are local (TMY) weather data covering the study period. The model calibration run is made using actual weather data for a time period corresponding to the available billing data for the site.

The goal of the model calibration effort is to have the results of the DOE-2 simulation come within approximately 10% of the patterns and magnitude of the energy use observed in the billing data history. In some cases, it may not be possible to achieve this calibration goal because of idiosyncrasies of particular facilities (e.g., multiple buildings, discontinuous occupancy patterns, etc.).

Once the analysis model has been calibrated for a particular facility, ADM performs three steps in calculating estimates of energy savings for HVAC measures installed or to be installed at the facility.

- First, an analysis of energy use at a facility under the assumption that the energy efficiency measures are not installed is performed.
- Second, energy use at the facility with all conditions the same but with the energy efficiency measures now installed is analyzed.
- Third, the results of the analyses from the preceding steps are compared to determine the energy savings attributable to the energy efficiency measure.

Plan for Analyzing Savings from Motors: Estimates of the energy savings from use of high efficiency motors on HVAC and non-HVAC applications are derived through an "after-only" analysis. With this method, energy use is measured only for the high efficiency motor and only after it has been installed. The data thus collected are then used in estimating what energy use would have been for the motor application *if the high efficiency motor had not been installed.* In effect, the after-only analysis is a reversal of the usual design calculation used to estimate the savings that would result from installing a high efficiency motor. That is, at the design stage, the question addressed is how would energy use change for an application if an high efficiency motor is installed, whereas the after-only analysis addresses what the level of energy use would have been had the high efficiency motor not been installed.

For the “after only” analysis, it is not possible to use a comparison of direct measurements to determine savings, since measured data are collected only for the high efficiency motor.

However, savings attributable to installation of the high efficiency motor can be estimated using information on the efficiencies of the high efficiency motor and on the motor it replaced. In particular, demand and energy savings can be calculated as follows:

$$\text{Demand Savings} = kW_{peak} \times (1/Eff_{old} - 1/Eff_{new})$$

where kWpeak = Volts x Ampspeak x Power Factor, and Ampspeak is the interval with the maximum recorded Amps during the monitoring period

$$\text{Energy Savings} = kW_{ave} \times (1/Eff_{old} - 1/Eff_{new}) \times \text{Hours of use}$$

where kWave = Volts x Ampsave x Power Factor and Ampsave is the average measured Amps for the duration of the monitored period.

$$\text{Annual Energy Savings} = kW_{ave} \times (1/Eff_{old} - 1/Eff_{new}) \times (\text{days of operation per year/ days metered}) \times \text{Annual Adjustment Factor}$$

where kW_{ave} = Volts x $Amps_{ave}$ x Power Factor for the monitoring period, $Amps_{ave}$ is the average measured Amps for the duration of the monitored period, and use factor is determined from interviews with site personnel. Annual Adjustment Factor is 1 if the monitoring period is typical for the yearly operation, less than 1 if the monitoring period is expected to be higher use than typical for the rest of the year, and more than 1 if the monitoring period is expected to be lower than typical for the rest of the year.[2]

The information on motor efficiencies needed for the calculation of savings is obtained from different sources. Data on the efficiencies of high efficiency motors installed under the program should be available from program records. In some cases, the efficiencies of the replaced motors may also be noted in DCEO's program records. Care must be taken using nameplate efficiency ratings of replaced motors, unless the company maintains good documentation of their equipment. If a motor has been rewound it may not operate as originally rated. However, if the efficiencies of the old motors are not directly available, the efficiency values can be imputed by using published data on average efficiency values for motors of given horsepower. If the motor replacement is for normal replacement, the baseline efficiency is established as the efficiency of new, standard efficiency motor. However, in cases of early replacement, the efficiency of the old motor is used for the length of the remaining life. [3]

Because most motors monitored run only under full load conditions, some adjustments must be made from the "industry averages" of full load efficiencies. Motor efficiency curves of typical

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[2] Current year weather data were compared with the *Typical Meteorological Year* from the National Oceanic & Atmospheric Administration (NOAA)

[3] Assumptions regarding measure expected useful life were taken from the most recent Database for Energy Efficiency Resources (DEER). See http://www.deeresources.com/.

real motors that have the same full load efficiencies are used for determining part load efficiencies.

Like motor efficiency, the power factor varies with motor loading. Motor power factor curves of typical real motors that have the same full load power factor are used for determining part load power factor.

Another factor to consider in demand and energy savings comparisons of motor change out programs is the rotor slip. Full load RPM ratings of motors vary. For centrifugal loads such as fans and pumps, the power supplied is dependent on the speed of the driven equipment. The power is theoretically proportional to the cube of the speed, but in practice more closely approximates the square of the speed. In general high efficiency motors have slightly higher full load RPM ratings (lower slip) than standard motors. Where nameplate ratings of full load RPM are available for replaced motors, a derating factor can be applied.[4]

The data needed to carry out these plans for determining savings are collected from several sources.

- The first source of data is the information from each project's documentation. This information is expected to include aggregate energy used at a site, disaggregated energy usage data for certain targeted processes (if available), before (actual) and after (projected) data on production, scrap, and other key performance indicators, and final reports (which include process improvement recommendations, analyses, conclusions, performance targets, etc.).
- The second source of data is energy use obtained from utilities.
- The third source is information collected through on-site inspections of the facilities. ADM staff collect the data during on-site visits using a form that is comprehensive in addressing a facility's characteristics, its modes and schedules of operation, and its electrical and mechanical systems. The form also addresses various energy efficiency measures, including high efficiency lighting (both lamps and ballasts), lighting occupancy sensors, lighting dimmers and controls, air conditioning, high efficiency motors, etc.
- As a fourth source of data, selected end-use equipment are monitored to develop information on operating schedules and power draws.

Plan for Analyzing Savings from VFDs: A variable-frequency drive (VFD) is an electronic device that controls the speed of a motor by varying the magnitude of the voltage, current, or

[4] As an example, take the case where a new motor has a full load RPM rating of 1770 and the old motor had a full load RPM rating of 1760. The derating factor would be:

Derating factor = $(RPM_{old})^2 / (RPM_{new})^2 = 1760^2 / 1770^2 = 0.989$

frequency of the electric power supplied to the motor. The factors that make a motor load a suitable application for a VFD are (1) variable speed requirements and (2) high annual operating hours. The interplay of these two factors can be summarized by information on the motor's duty cycle, which essentially shows the percentage of time during the year that the motor operates at different speeds. The duty cycle should show good variability in speed requirements, with the motor operating at reduced speed a high percentage of the time.

Potential energy savings from the use of VFDs are usually most significant with variable-torque loads, which have been estimated to account for 50% to 60% of total motor energy use in the non-residential sectors. Energy saving VFDs may be found on fans, centrifugal pumps, centrifugal blowers, and other centrifugal loads, most usually where the duty cycle of the process provided a wide range of speeds of operation.

ADM's approach to determining savings from installation of VFDs involves (1) making one-time measurements of voltage, current, and power factor of the VFD/motor and (2) conducting continuous measurements of amperage over a period of time in order to obtain the data needed to develop VFD load profiles and calculate demand and energy savings. VFDs are generally used in applications where motor loading changes when motor speed changes. Consequently the true power drawn by a VFD is recorded in order to develop VFD load shapes. One-time measurements of power are made for different percent speed settings. Power and percent speed or frequency (depending on VFD display options) are recorded for as wide a range of speeds as the participant allows the process to be controlled; field staff attempt to obtain readings from 40 to 100% speed in 10 to 15% increments.

Plan for Analyzing Savings from Compressed Air Measures: Measures to improve the efficiency of a compressed air system include the reduction of air leaks, resizing of compressors, installing more efficient compressors, improved controls, or a complete system redesign. Savings from such measures are evaluated through engineering analysis of compressor performance curves, supported by data collected through short-term metering.

ADM field staff obtain nameplate information for the pre-retrofit equipment either from the project file or during the on-site survey. Performance curve data are obtained from manufacturers. Engineering staff then conduct an engineering analysis of the performance characteristics of the pre-retrofit equipment. During the on-site survey, field staff inspect the as-built system equipment, take pressure and load readings, and interview the system operator to identify seasonal variations in load. Potential interactions with other compressors are assessed and it is verified that the rebated compressor is being operated as intended.

When appropriate, short-term measurements are performed to reduce the uncertainty in defining the load on the as-built system. These measurements may be taken either with a multi-channel logger, which can record true power for several compressors, with current loggers, which can provide average amperage values, or with motor loggers to record operating hours. The

appropriate metering equipment is selected by taking into account variability in load and the cost of conducting the monitoring.

ADM used AirMaster+ to calculate the savings due to the energy efficiency measures installed within each compressed air system. The AirMaster+ as-built and baseline compressor types were inputted into the model using data points collected during on-site verification. The as-built model was then calibrated to a typical daily schedule, derived from at least two weeks of trending data. Project energy savings were calculated by subtracting the as-built from the baseline energy consumption.

Plan for Analyzing Savings from Refrigeration and Process Improvements: Analysis of savings from refrigeration and process improvements is inherently project-specific. Because of the specificity of processes, analyzing the processes through simulations is generally not feasible. Rather, reliance is made on engineering analysis of the process affected by the improvements. Major factors in ADM's engineering analysis of process savings are operating schedules and load factors. Information on these factors is developed through short-term monitoring of the affected equipment, be it pumps, heaters, compressors, etc. The monitoring is done after the process change, and the data gathered on operating hours and load factors are used in the engineering analysis to define "before" conditions for the analysis of savings.

3.1.4.2 Procedures for Estimating Savings for the Standard Incentives Program

The Illinois Statewide Technical Reference Manual (TRM) was used to estimate gross savings for TRM measures implemented through the Standard Incentives Program. Project specific parameters for the gross savings analysis were taken from project documentation and information collected during site visits. Non-TRM savings measures implemented through the Standard Incentives Program were estimated using proven techniques, including industry standard engineering calculations and verification of computer simulations developed by program contractors to determine energy savings as outlined in Section 3.1.4.1.

Depending on the measure type, savings were calculated using up to three different TRM approaches. These approaches were as follows:

- TRM-Calculated: Savings calculated as per Illinois's Statewide TRM version 2.
- TRM-Calculated (Errata Corrected): Savings calculated as per an erratum in version 3 of the TRM.
- ADM-Calculated: Savings calculated using a non-TRM methodology. ADM-Calculated savings were performed when the measure was not in the TRM or when the methodology in the TRM was not applicable because the assumptions provided were not appropriate for that measure.

Appendix A contains project-level M&V reports providing information regarding the factors determining ex post energy savings and variances between ex post and ex ante energy savings.

Gross savings were developed for measures not covered by the Illinois TRM using the methods described in Section 3.1.4.1.

3.2 Results of Gross Savings Estimation

This section presents the results of the gross savings estimation analysis. To estimate gross kWh savings, peak kW reductions, and gross therm savings for the Custom and Standard Incentives Programs, data were collected and analyzed for samples of 56 Custom Incentives Program and New Construction Program projects and 71 Standard Incentives Program projects. The data were analyzed using the methods described in Section 2.1 to estimate project energy savings and peak kW reductions and to determine realization rates for the three programs.

3.2.1 Realized Gross kWh and Therm Savings

The gross kWh savings for the Custom Incentives Program during the period June 2013 through May 2014 are summarized by sampling stratum in Table 3-10. Overall, the gross ex post savings of 20,067,372 kWh were equal to 78% of the expected savings.

Table 3-10 Ex Ante and Gross Ex Post kWh Savings for the Custom Incentives and New Construction Programs by Sample Stratum

Stratum	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Gross Realization Rate*
5	6,012,178	3,636,445	60%
4	14,435,326	10,832,425	75%
3	2,639,653	2,913,078	110%
2	1,925,018	1,676,862	87%
1	762,082	1,008,561	132%
Total	25,774,257	20,067,372	78%

The gross ex post kWh savings for the Standard Incentives Program for the period June 2013 through May 2014 is summarized in Table 3-11. Overall, the gross ex post savings of 94,110,595 kWh were equal to 119% of the expected savings.

Table 3-11 Ex Ante and Gross Ex Post kWh Savings for the Standard Incentives Program by Sample Stratum

Stratum	Ex Ante kWh Savings	TRM-Calculated	TRM-Calculated (Errata Corrected)	ADM Calculated	Gross Realization Rate
		Gross Ex Post kWh Savings	Gross Ex Post kWh Savings	Gross Ex Post kWh Savings	
5	4,376,823	3,253,873	3,253,873	3,253,873	74%
4	21,492,107	27,796,950	27,796,950	28,500,159	133%
3	21,963,097	18,841,550	18,841,550	21,371,847	97%
2	21,777,855	24,038,285	23,580,497	23,580,497	108%
1	9,591,377	17,404,219	17,404,219	17,404,219	181%
Total	79,201,259	91,334,877	90,877,089	94,110,595	119%

Table 3-12 shows the expected and gross ex post kWh energy savings by sampled project for the Custom Incentives Program.

Table 3-12 Ex Ante and Gross Ex Post kWh Savings for the Custom Incentives Program by Project

Project ID	Ex Ante kWh Savings	Gross Ex Post kWh Savings	Gross Realization Rate
C-24	2,398,102	2,445,183	102%
C-8	2,156,525	233,196	11%
C-19	1,457,551	958,066	66%
C-2	790,412	295,508	37%
C-29	680,519	940,058	138%
C-26	545,800	327,291	60%
C-21	177,000	197,961	112%
C-13	170,274	185,285	109%
C-1	116,266	118,112	102%
C-4	59,698	15,732	26%
C-3	41,114	12,096	29%
C-5	36,375	69,472	191%
C-27	31,472	46,514	148%
C-4	30,324	12,684	42%
C-14	24,731	41,388	167%
C-4	20,956	16,470	79%
C-11	17,698	3,155	18%
C-20	14,296	12,643	88%
C-6	9,455	9,119	96%
C-15	2,800	3,173	113%
C-12	1,878	975	52%
All Non-Sample Projects	15,156,183	12,720,880	84%
Total	23,939,429	18,664,961	78%

Table 3-13 shows the expected and gross ex post kWh energy savings by sampled project for the Standard Incentives Program.

Table 3-13 Ex Ante and Gross Ex Post kWh Savings for Standard Incentives Program by Project

Project ID	*Ex Ante kWh Savings*	*TRM-Calculated*	*TRM-Calculated (Errata Corrected)*	*ADM Calculated*	*Gross Realization Rate*
		Gross Ex Post kWh Savings	*Gross Ex Post kWh Savings*	*Gross Ex Post kWh Savings*	
S-37	3,111,382	2,313,103	2,313,103	2,313,103	74%
S-44	863,788	2,093,642	2,093,642	2,093,642	242%
S-38	548,070	518,689	518,689	518,689	95%
S-33	397,967	398,239	398,239	398,239	100%
S-18	355,639	366,454	366,454	366,454	103%
S-34	303,212	296,847	296,847	296,847	98%
S-31	284,973	286,638	286,638	286,638	101%
S-30	283,952	285,610	285,610	285,610	101%
S-1	282,144	47,494	47,494	156,114	55%
S-26	275,326	139,850	139,850	304,310	111%
S-43	244,511	254,765	254,765	254,765	104%
S-5	205,826	232,646	232,646	232,646	113%
S-3	189,277	71,289	71,289	71,289	38%
S-18	158,810	166,859	166,859	166,859	105%
S-42	144,065	129,216	129,216	135,345	94%
S-13	138,329	103,266	103,266	103,266	75%
S-25	123,540	172,379	172,379	172,379	140%
S-32	117,855	92,614	92,614	92,614	79%
S-25	96,841	110,216	110,216	110,216	114%
S-20	79,001	94,683	94,683	94,683	120%
S-35	71,350	58,069	58,069	58,069	81%
S-17	68,959	86,744	71,696	71,696	104%
S-2	66,824	61,084	61,084	61,084	91%
S-15	50,523	49,981	49,981	49,981	99%
S-8	49,092	60,565	60,565	60,565	123%
S-39	48,309	67,199	67,199	67,199	139%
S-9	34,959	66,967	66,967	66,967	192%
S-12	32,149	42,043	42,043	42,043	131%
S-25	26,779	38,066	38,066	38,066	142%
S-27	13,218	14,702	14,702	14,702	111%
S-18	13,197	13,197	13,197	13,197	100%
S-41	11,232	52,673	52,673	52,673	469%
S-45	9,222	10,279	10,279	10,279	111%
S-7	9,066	15,424	15,424	15,424	170%
S-8	8,308	11,399	11,399	11,399	137%
S-12	7,962	8479	8479	8479	106%
S-15	6,848	6,838	6,838	6,838	100%
S-15	6,848	6,838	6,838	6,838	100%
S-23	6,455	7,973	7,973	7,973	124%
S-16	5,877	35,931	35,931	35,931	611%
S-11	4,756	8,800	8,800	8,800	185%

Project ID	*Ex Ante kWh Savings*	*TRM-Calculated*	*TRM-Calculated (Errata Corrected)*	*ADM Calculated*	*Gross Realization Rate*
		Gross Ex Post kWh Savings	*Gross Ex Post kWh Savings*	*Gross Ex Post kWh Savings*	
S-4	3,513	7,973	7,973	7,973	227%
S-40	2,411	6,982	6,982	6,982	290%
S-36	2,307	2,307	2,307	2,307	100%
S-24	1,222	5,462	5,462	5,462	447%
S-22	993	997	997	997	100%
S-6	816	1,441	1,441	1,441	177%
All Non-Sample Projects	70,433,556	82,411,965	81,969,225	84,923,522	121%
Total	79,201,259	91,334,877	90,877,089	94,110,595	119%

Table 3-14 shows the expected and gross ex post kWh energy savings by project for the New Construction Program.

Table 3-14 Ex Ante and Gross Ex Post kWh Savings for New Construction Program by Project

Project ID	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Gross Realization Rate*
N-4	311,828	184,519	59%
N-1	27,201	70,585	259%
All Non-Sample Projects	1,495,799	1,147,307	77%
Total	1,834,828	1,402,411	76%

Table 3-15 summarizes the gross ex post therm savings for the Custom Incentives Program for the period June 2013 through May 2014. Overall, the gross ex post savings of 5,467,760 therms were equal to 95% of the expected savings.

Table 3-15 Ex Ante and Gross Ex Post Therm Savings for the Custom Incentives and New Construction Programs by Sample Stratum

Stratum	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Gross Realization Rate*
3	3,423,673	3,180,155	93%
2	1,497,756	1,418,439	95%
1	820,810	869,166	106%
Total	5,742,240	5,467,760	95%

Table 3-16 summarizes the gross ex post therm savings for the Standard Incentives Program for the period June 2013 through May 2014. Overall, the gross ex post savings of 139,355 therms were equal to 100% of the expected savings.

Table 3-16 Ex Ante and Gross Ex Post Therm Savings for the Standard Incentives Program by Sample Stratum

Stratum	*Ex Ante Therm Savings*	*TRM-Calculated*	*TRM-Calculated (Errata Corrected)*	*ADM Calculated*	*Gross Realization Rate*
		Gross Ex Post Therm Savings	*Gross Ex Post Therm Savings*	*Gross Ex Post Therm Savings*	
3	63,082	37,564	33,460	39,474	63%
2	49,091	66,999	61,382	61,382	125%
1	26,845	44,177	43,830	43,830	163%
Total	139,019	148,740	138,672	144,686	104%

Table 3-17 shows the expected and gross ex post therm savings by sampled project for the Custom Incentives Program.

Table 3-17 Ex Ante and Gross Ex Post Therm Savings for the Custom Incentives Program by Project

Project ID	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Gross Realization Rate*
C-17	859,063	1,030,286	120%
C-23	854,379	319,100	37%
C-17	531,035	136,802	26%
C-22	396,843	735,070	185%
C-16	233,175	294,512	126%
C-24	198,562	235,509	119%
C-28	185,013	285,381	154%
C-25	165,603	143,495	87%
C-32	100,698	96,644	96%
C-18	78,000	51,557	66%
C-19	70,547	89,884	127%
C-31	59,911	54,009	90%
C-27	56,588	54,694	97%
C-30	52,491	49,654	95%
C-17	31,059	32,958	106%
C-21	28,497	23,356	82%
C-26	25,855	23,722	92%
C-13	21,307	20,675	97%
C-17	17,131	11,153	65%
C-14	10,835	10,174	94%
C-9	10,416	1,703	16%
C-17	10,348	13,944	135%
C-1	6,754	21,420	317%
C-4	5,000	1,348	27%
C-3	3,966	1,008	25%
C-10	3,330	11,281	339%
C-11	894	3,098	346%
C-6	818	845	103%
C-20	652	647	99%
C-15	350	398	114%
C-12	235	10,058	4280%
All Non-Sample Projects	1,666,393	1,655,736	99%
Total	5,685,748	5,420,120	95%

Table 3-18 shows the expected and gross ex post therm savings by sampled project for the Standard Incentives Program.

Table 3-18 Ex Ante and Gross Ex Post Therm Savings for the Standard Incentives Program by Project

Project ID	Ex Ante Therm Savings	TRM-Calculated	TRM-Calculated (Errata Corrected)	ADM Calculated	Gross Realization Rate
		Gross Ex Post Therm Savings	Gross Ex Post Therm Savings	Gross Ex Post Therm Savings	
S-29	24,651	17,435	15,244	15,244	62%
S-46	11,200	0	0	3,906	35%
S-10	9,920	0	0	2,108	21%
S-1	9,850	10,298	9,122	9,122	93%
S-14	7,493	9,831	9,094	9,094	121%
S-35	4,449	7,149	6,817	6,817	153%
S-17	4,200	6,596	5,670	5,670	135%
S-27	4,200	3,500	3,228	3,228	77%
S-43	4,035	6,579	6,053	6,053	150%
S-45	3,360	4,541	4,200	4,200	125%
S-11	2,832	4,114	3,804	3,804	134%
S-19	2,781	2,800	2,520	2,520	91%
S-38	2,018	2,764	2,562	2,562	127%
S-12	472	541	541	541	115%
S-4	358	376	361	361	101%
S-25	305	306	306	306	100%
S-42	248	248	248	248	100%
S-6	239	531	514	514	215%
S-28	224	1,004	1,004	1,004	448%
S-3	178	251	251	251	141%
S-21	124	251	251	251	202%
S-5	12	52	52	52	433%
S-8	7	7	10	10	147%
S-8	2	2	3	3	170%
All Non-Sample Projects	45,861	69,563	66,817	66,817	146%
Total	139,019	148,740	138,672	144,686	104%

Table 3-19 displays the expected and gross ex post therm savings by project for the New Construction Program.

Table 3-19 Ex Ante and Gross Ex Post Therm Savings for the New Construction Program by Project

Project ID	Ex Ante Therm Savings	Gross Ex Post Therm Savings	Gross Realization Rate
N-4	15,575	14,323	92%
N-1	15,520	6,424	41%
All Non-Sample Projects	25,397	26,893	106%
Total	56,492	47,640	84%

3.2.2 Discussion of Gross Savings Analysis

The project realization rates were reviewed to assess whether there were factors that were causing systematic differences in the realization rates.

For the Custom Incentives and New Construction Programs projects, sample project realization rates and expected kWh savings are plotted in Figure 3-1. There is not a strong association between realization rates and expected kWh savings. Figure 3-2 plots the custom incentive project realized energy savings against the expected energy savings for each sample point.

Similarly, for the Standard Incentives Program projects, sample project realization rates and expected kWh savings are plotted in Figure 3-3. There is not a strong association between realization rates and expected kWh savings. Figure 3-4 plots the standard incentive project realized energy savings against the expected energy savings for each sample point.

Case-by-case examination showed that project-specific factors were more likely to cause realized kWh savings to differ from expected savings. Project-specific factors include type of measure implemented, building type, facility operating schedule, and other parameters that may affect energy efficiency measure savings.

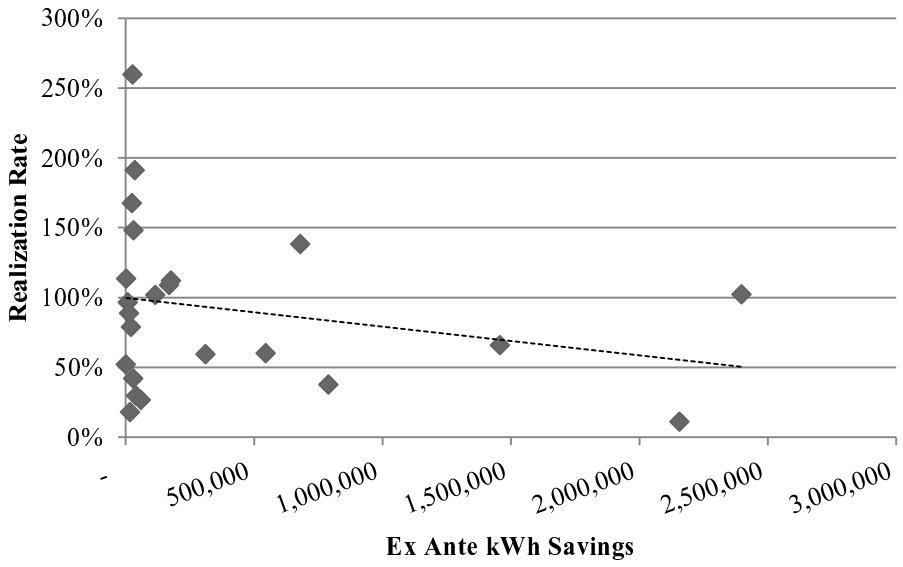

Figure 3-1 Custom Incentives and New Construction Programs Sample Project Realization Rate versus Ex Ante kWh Savings

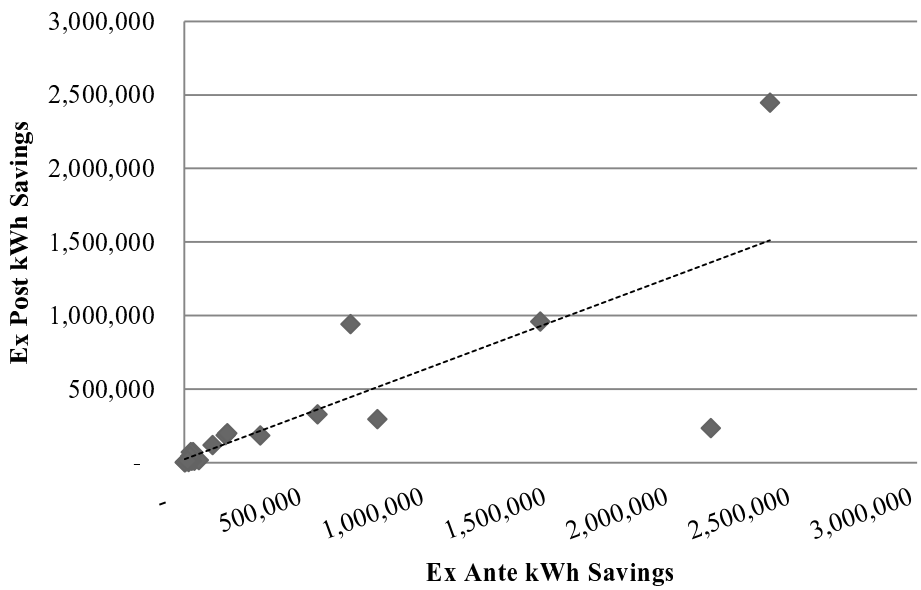

Figure 3-2 Custom Incentives and New Construction Programs Sample Project Ex Post kWh Savings versus Ex Ante kWh Savings

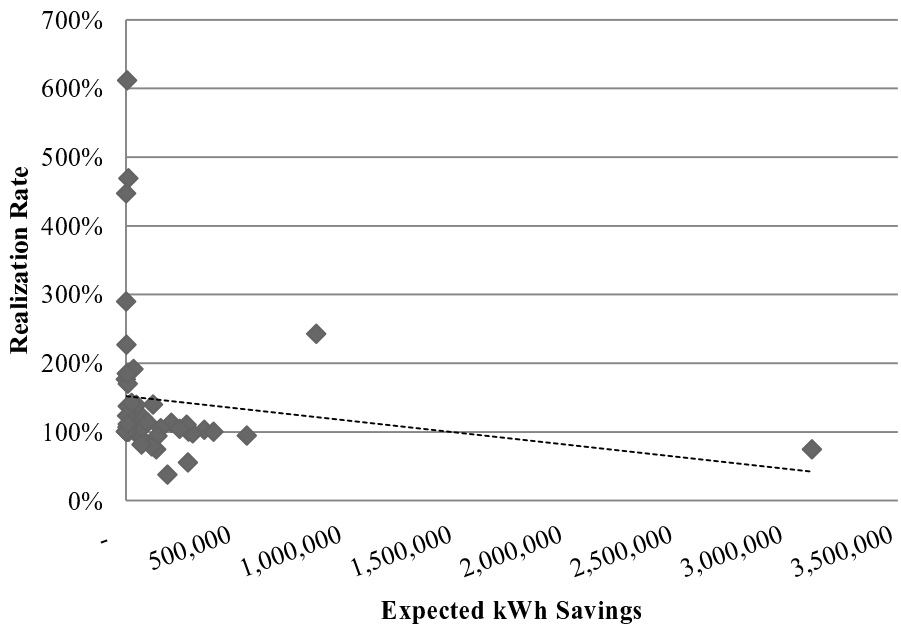

Figure 3-3 Standard Incentives Program Sample Project Realization Rate versus Ex Ante kWh Savings

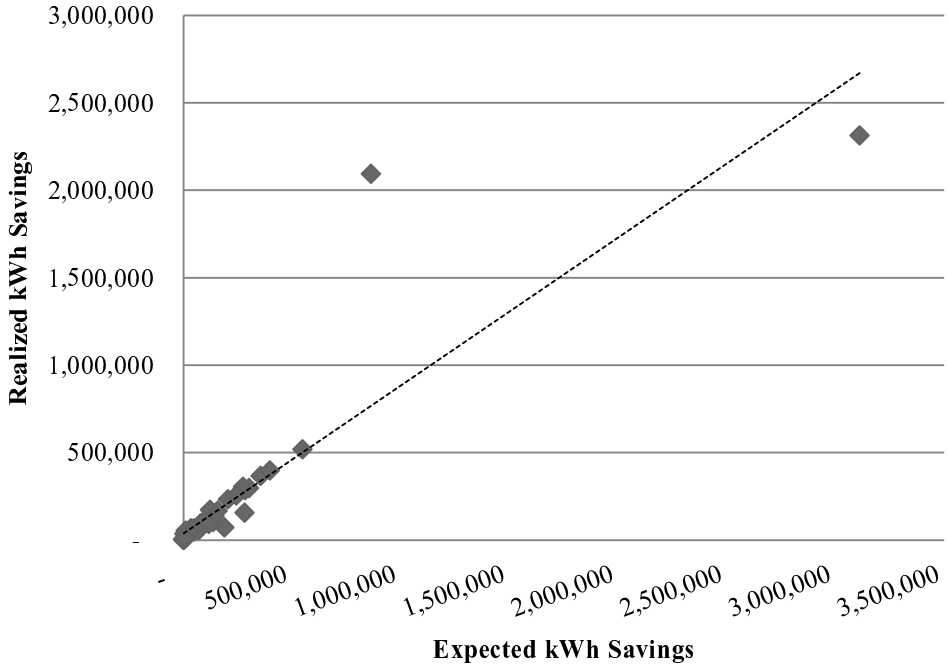

Figure 3-4 Standard Incentives Program Sample Project Ex Post kWh Savings (ADM Calculated) versus Ex Ante kWh Savings

Similarly, for the Custom Incentives and New Construction Programs projects, sample project realization rates and expected therm savings are plotted in Figure 3-5. There is not a strong association between realization rates and expected therm savings. Figure 3-6 plots the standard incentive project realized therm savings against the expected therm savings for each sample point. For the Standard Incentives Program projects, sample project realization rates and expected therm savings are plotted in Figure 3-7. There is not a strong association between realization rates and expected kWh savings. Figure 3-8 plots the standard incentive project realized energy savings against the expected energy savings for each sample point.

Case-by-case examination showed that project-specific factors were more likely to cause realized therm savings to differ from expected savings. Project-specific factors include type of measure implemented, building type, facility operating schedule, and other parameters that may affect energy efficiency measure savings.

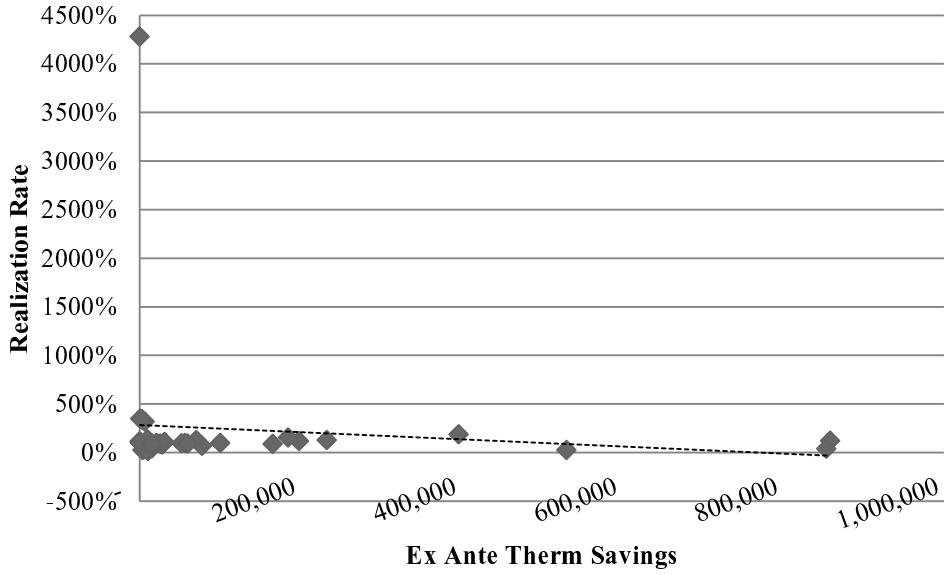

Figure 3-5 Custom Incentives and New Construction Programs Sample Project Realization Rate versus Ex Ante Therm Savings

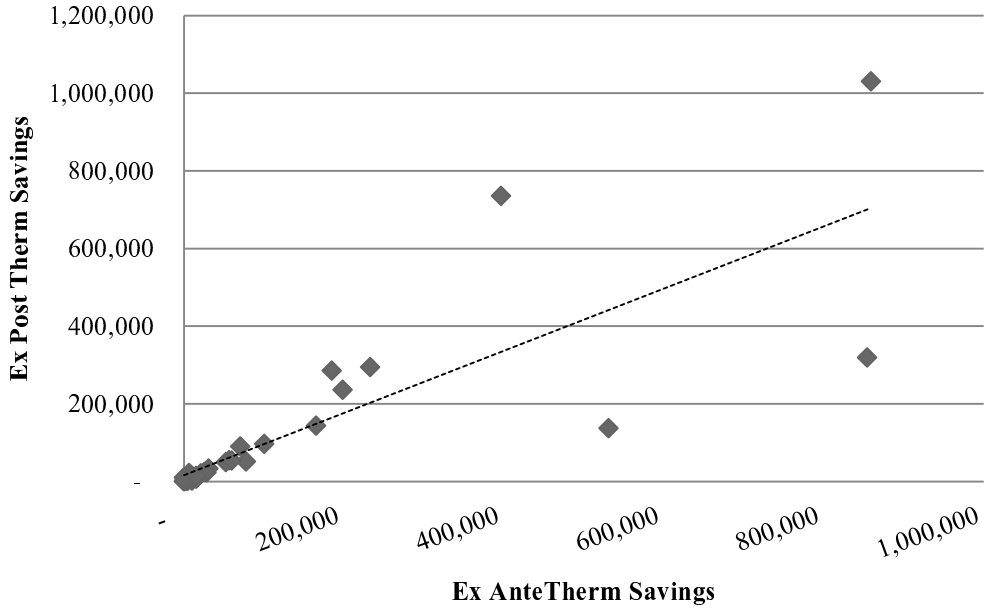

Figure 3-6 Custom Incentives and New Construction Programs Sample Project Ex Post Therm Savings versus Ex Ante Therm Savings

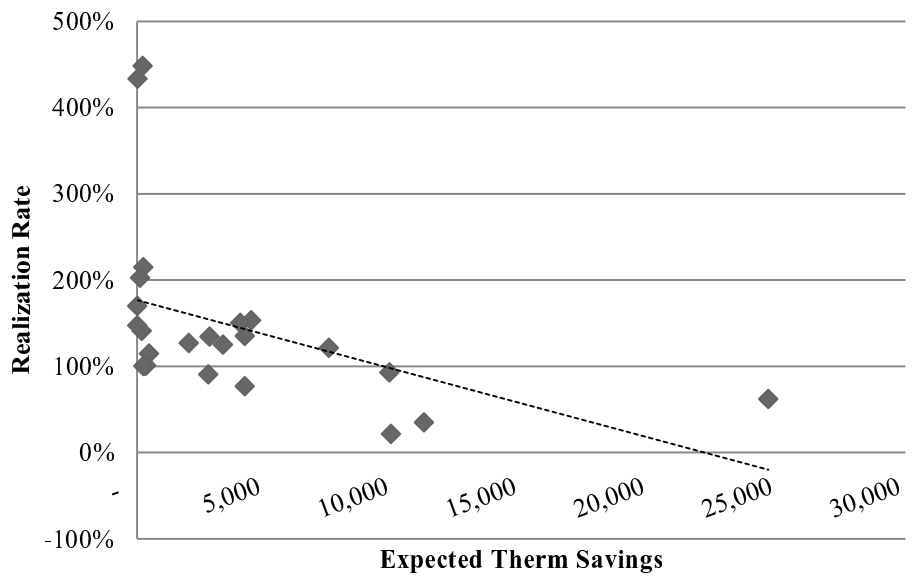

Figure 3-7 Standard Incentives Program Sample Project Realization Rate versus Ex Ante Therm Savings

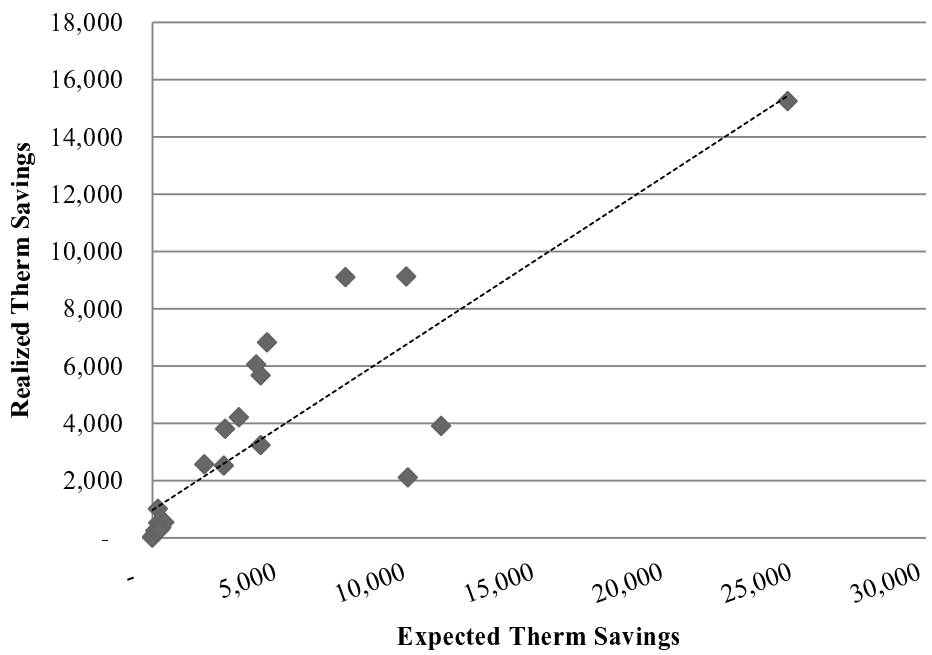

Figure 3-8 Standard Incentives Program Sample Project Ex Post Therm Savings (ADM Calculated) versus Ex Ante Therm Savings

As noted, for the Custom and Standard Incentives Programs, project specific factors accounted for most of the differences between expected and realized savings. These differences were generally due to the use of prescriptive per unit savings that did not incorporate site-specific

factors, as well as inaccurate assumptions about how the equipment was operated. In a few cases the estimated annual project savings exceeded the total annual energy consumption for the projects. It is recommended that the program collect utility bills including energy consumption data in the future and use this information as a check on estimated project savings.

4 Estimation of Net Savings

This chapter presents the results of estimated net impacts of the Custom and Standard Incentives Programs and the New Construction Program during the period June 2013 through May 2014.

4.1 Methodology for Estimating Net Savings

Net savings are defined as the portion of gross savings that can be attributed to the effects of the program. Net savings may be less than gross savings as a result of free ridership. Free riders are defined as those program participants that would have implemented the same energy efficiency measures and achieved the observed energy changes at the same time, even in the absence of the program.

In general, net savings are equal to gross savings less the impact of free ridership. Because energy savings realized by free riders are not induced by the program, these savings should not be included in the estimates of the program's actual (net) impacts. Without an adjustment for free ridership, some savings that would have occurred naturally would be incorrectly attributed to the program, skewing the results.

ADM performed a net savings analysis to estimate the impacts of the energy efficiency measures attributable to the Custom Incentives, Standard Incentives, and the New Construction Programs that were net of free ridership. Information collected from a sample of program participants through a decision maker survey was used to estimate the extent of free ridership. Appendix B provides a copy of the survey instrument for Custom and Standard Incentives Program Participants, and Appendix C presents tabulated responses for each survey question. Appendix D provides a copy of the survey instrument for New Construction Program Participants, and Appendix E presents tabulated responses for each survey question.

Based on a review of this information, the preponderance of evidence regarding free ridership inclinations was used to assess the likelihood of participant free ridership and estimate net savings.

Several criteria were used for determining what portion, if any, of a participant's savings for a particular project should be attributed to free ridership. The criteria used to attribute free ridership correspond to three factors. The three factors are:

- Plans and intentions of firm to install a measure even without support from the program;
- Influence that the program had on the decision to install a measure; and
- A firm's previous experience with a measure installed under the program.

For each of these factors, rules were applied to develop binary variables indicating whether or not a participant's behavior showed free ridership. These rules made use of answers to questions on the decision maker survey questionnaire.

The first factor required determining if a participant stated that his or her intention was to install an energy efficiency measure even without the program. Two binary variables were constructed to account for participant plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria indicating participant plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the programs?"
- The respondent answered "definitely would have installed" to the following question: "If the financial incentive from the programs had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?"
- The respondent answered "did not affect timing of purchase and installation" to the following question: "How did the availability of information and financial incentives through the programs affect the timing of your purchase and installation of [Equipment/Measure]?"
- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the programs affect the level of energy efficiency you chose for [Equipment/Measure]?

The second, less restrictive criteria indicating participant plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have gone ahead with this planned installation of the measure even if you had not participated in the programs?"
- Either the respondent answered "definitely would have installed" or "probably would have installed" to the following question: "If the financial incentive from the programs had not been available, how likely is it that you would have installed [Equipment/Measure] anyway?"
- Either the respondent answered "did not affect timing of purchase and installation" to the following question: "How did the availability of information and financial incentives through the programs affect the timing of your purchase and installation of [Equipment/Measure]?" or the respondent indicated that that while program information and financial incentives did

affect the timing of equipment purchase and installation, in the absence of the program they would have purchased and installed the equipment within the next two years.

- The respondent answered "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "How did the availability of information and financial incentives through the programs affect the level of energy efficiency you chose for [Equipment/Measure]?

The second factor required determining if a participant reported that a recommendation from a program representative was influential in the decision to install a particular piece of equipment or measure.

The criterion indicating that program influence may signify a lower likelihood of free ridership is that the following conditions are true:

- The respondent answered "yes" to the following question: "Did a representative of the programs recommend that you install [Equipment/Measure]?" and "probably would not have" or "definitely would not have" to the question: "If the Public Sector Energy Efficiency Program representative had not recommended installing the equipment, how likely is it that you would have installed it anyway?"

The third factor required determining if a participant in the program indicated that he or she had previously installed an energy efficiency measure similar to one that they installed under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had installed a similar measure is considered to have a likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answered "yes" to the following question: "Before participating in the programs, had you installed any equipment or measure similar to [Rebated Equipment/Measure] at your facility?"
- The respondent answered "yes, purchased energy efficient equipment but did not apply for financial incentive." to the following question: "Has your organization purchased any energy efficient equipment in the last three years for which you did not apply for a financial incentive through an energy efficiency program?"

The four sets of rules just described were used to construct four different indicator variables that address free ridership behavior. For each participant, a free ridership value was assigned based on the combination of variables. With the four indicator variables, there were 11 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 4-1 shows these values.

Table 4-1 Free Ridership Scores for Combinations of Indicator Variable Responses

Indicator Variables				*Free Ridership Score*
Had Plans and Intentions to Install Measure without the Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the Program? (Definition 2)*	*Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	
Y	N/A	Y	Y	100%
Y	N/A	N	N	100%
Y	N/A	N	Y	100%
Y	N/A	Y	N	67%
N	Y	N	Y	67%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	Y	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

4.2 Results of Net Savings Estimation

The procedures described in the preceding section were used to estimate free ridership rates and net to gross ratios for the Custom and Standard Incentives Programs and the New Construction Program for the period June 2013 through May 2014.

4.2.1 Net Ex Post kWh Savings

For the Custom and Standard Incentives Program, the data used to assign free ridership scores were collected through a survey of participant decision makers for projects completed during the period June 2013through May 2014. In total, 267 of 540 decision makers contacted completed the survey. For the New Construction Program, seven participant decision makers completed the survey out of eight participant decision makers contacted for projects completed during the period June 2013 through May 2014.

Individual free ridership rates were estimated for the Standard and Custom Incentives Programs and the New Construction Program.

Table 4-2 shows the percentage of survey respondents who relayed the following: They had plans and intentions to install the measures without any program incentive (under two alternative definitions as described in the preceding section), that the program influenced their decision to install the measure, or that they previously installed a similar energy efficiency measure without an energy efficiency program incentive during the last three years. Percentages reported are averages weighted by project gross ex post savings.

Table 4-2 Weighted Average Indicator Variable Values

Program	*Had Plans and Intentions to Install Measure without Program (Definition 1)*	*Had Plans and Intentions to Install Measure without Program (Definition 2)*	*Program had influence on Decision to Install Measure*	*Had Previous Experience with Measure*
Custom kWh	21%	43%	4%	19%
Custom Therm	7%	0%	31%	7%
Standard kWh	2%	18%	11%	25%
Standard Therm	0%	5%	1%	56%
New Construction kWh	0%	55%	12%	15%
New Construction Therm	0%	24%	23%	0%

Table 4-3 shows percentages of total gross ex post Custom Incentives Program kWh savings that are associated with different combinations of free ridership indicator variable values.

Table 4-3 Estimated Free ridership for kWh Savings from Custom Incentives Program Projects

Had Plans and Intentions to Install Measure without the C&S Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the C&S Program? (Definition 2)*	*C&S Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross kWh Savings*	*Free Ridership Score*
N	N	N	N	50%	0%
Y	N/A	N	N	14%	100%
N	Y	N	N	13%	33%
N	Y	N	Y	9%	67%
Y	N/A	N	Y	7%	100%
N	N	Y	N	4%	0%
N	N	N	Y	3%	33%
Total				100%	32%

Table 4-4 shows percentages of total gross ex post Standard Incentives Program kWh savings that are associated with different combinations of free ridership indicator variable values.

Table 4-4 Estimated Free ridership for kWh Savings from Standard Incentives Program Projects

Had Plans and Intentions to Install Measure without the C&S Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the C&S Program? (Definition 2)*	*C&S Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross kWh Savings*	*Free Ridership Score*
N	N	N	N	56%	0%
N	N	N	Y	16%	33%
N	N	Y	N	10%	0%
N	Y	N	Y	9%	67%
N	Y	N	N	7%	33%
Y	N/A	N	N	1%	100%
Y	N/A	N	Y	1%	100%
Total				100%	15%

Table 4-5 shows percentages of total gross ex post New Construction Program kWh savings that are associated with different combinations of free ridership indicator variable values.

Table 4-5 Estimated Free ridership for kWh Savings from New Construction Program Projects

Had Plans and Intentions to Install Measure without the NC Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the NC Program? (Definition 2)*	*NC Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross kWh Savings*	*Free Ridership Score*
N	Y	N	N	40%	33%
N	N	N	N	33%	0%
N	Y	N	Y	15%	67%
N	N	Y	N	12%	0%
Total				100%	23%

Table 4-6 shows percentages of total gross ex post Custom Incentives Program therm savings that are associated with different combinations of free ridership indicator variable values.

Table 4-6 Estimated Free ridership for Therm Savings from the Custom Incentives Program

Had Plans and Intentions to Install Measure without the C&S Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the C&S Program? (Definition 2)*	*C&S Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross Therm Savings*	*Free Ridership Score*
N	N	N	N	54%	0%
N	N	Y	N	31%	0%
Y	N/A	N	N	5%	100%
N	N	N	Y	5%	33%
N	Y	N	N	3%	33%
Y	N/A	N	Y	2%	100%
Total				100%	10%

Table 4-7 shows percentages of total gross ex post Standard Incentives Program therm savings that are associated with different combinations of free ridership indicator variable values.

Table 4-7 Estimated Free ridership for Therm Savings from the Standard Incentives Program

Had Plans and Intentions to Install Measure without the C&S Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the C&S Program? (Definition 2)*	*C&S Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross Therm Savings*	*Free Ridership Score*
N	N	N	Y	56%	33%
N	N	N	N	38%	0%
N	Y	N	N	5%	33%
N	N	Y	N	1%	0%
Total				100%	20%

Table 4-8 shows percentages of total gross ex post New Construction Program therm savings that are associated with different combinations of free ridership indicator variable values.

Table 4-8 Estimated Free ridership for Therm Savings from the New Construction Program

Had Plans and Intentions to Install Measure without the NC Program? (Definition 1)	*Had Plans and Intentions to Install Measure without the NC Program? (Definition 2)*	*NC Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross Therm Savings*	*Free Ridership Score*
N	N	N	N	52%	0%
N	Y	N	N	24%	33%
N	N	Y	N	23%	0%
Total				100%	8%

The net ex post electric savings of the Custom and Standard Incentives and New Construction Programs during the period June 2013 through May 2014 are summarized by utility in Table 4-9, Table 4-10, and Table 4-11. For the period, net ex post electric savings for the Custom Incentives Program total 12,692,998 kWh and net ex post electric savings for the Standard Incentives Program total 79,511,435 kWh. For the New Construction Program, net ex post electric savings total 1,073,636 kWh. The net to gross ratio for the Custom Incentives Program is 68%, while the net to gross ratio for the Standard Incentives Program is 84%; for the New Construction Program, the net to gross ratio is 77%.

Table 4-9 Summary of kWh Savings for the Custom Incentives Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	6,444,643	6,170,854	4,196,453	68%
ComEd	17,494,785	12,494,107	8,496,545	68%
Total	23,939,429	18,664,961	12,692,998	68%

Table 4-10 Summary of kWh Savings for the Standard Incentives Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	18,657,883	21,383,441	18,066,277	84%
ComEd	60,543,376	72,727,155	61,445,159	84%
Total	79,201,259	94,110,595	79,511,435	84%

Table 4-11 Summary of kWh Savings for the New Construction Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	708,736	554,018	424,136	77%
ComEd	1,126,092	848,393	649,500	77%
Total	1,834,828	1,402,411	1,073,636	77%

The net ex post natural gas savings of the Custom and Standard Incentives, and New Construction Programs during the period June 2013 through May 2014 are summarized by utility in Table 4-12, Table 4-13, and Table 4-14. For the period, net ex post natural gas savings for the

Custom Incentives Program total 4,893,051 therms and net ex post natural gas savings for the Standard Incentives Program total 115,136 therms. Net ex post natural gas savings total 43,757 therms for the New Construction Program. The net to gross ratio for the Custom Incentives Program is 90%, and the net to gross ratio for the Standard Incentives Program is 80%. For the New Construction Program, the net to gross ratio is 92%.

Table 4-12 Summary of Therm Savings for the Custom Incentives Program

Utility	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	1,826,963	1,643,318	1,483,516	90%
Nicor	1,066,541	1,064,189	960,704	90%
North Shore	146,573	149,439	134,907	90%
Peoples	2,645,671	2,563,175	2,313,924	90%
Total	5,685,748	5,420,120	4,893,051	90%

Table 4-13 Summary of Therm Savings for the Standard Incentives Program

Utility	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	25,577	32,959	26,228	80%
Nicor	107,245	101,598	80,848	80%
North Shore	3,189	4,581	3,645	80%
Peoples	3,008	5,549	4,415	80%
Total	139,019	144,686	115,136	80%

Table 4-14 Summary of Therm Savings for the New Construction Program

Utility	*Ex Ante Therm Savings*	*Gross Ex Post Therm Savings*	*Net Ex Post Therm Savings*	*Net-to-Gross Ratio*
Ameren	10,091	10,685	9,814	92%
Nicor	46,401	36,955	33,942	92%
Total	56,492	47,640	43,757	92%

4.2.2 Net Ex Post Peak kW Reductions

The net ex post peak kW reductions for the Custom and Standard Incentives, and New Construction Programs during the period June 2013 through May 2014 are summarized by utility in Table 4-15, Table 4-16, and Table 4-17.

The net ex post peak demand savings for the Custom Incentives Program total 2,567.57 kW and the net ex post peak demand savings for the Standard Incentives Program total 10,170.64 kW. For the New Construction Program, the net ex post peak demand savings total 188.46 kW.

Table 4-15 Summary of Net Peak kW Reductions for the Custom Incentives Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	-	1,002.88	652.35	65%
ComEd	-	2,944.29	1,915.21	65%
Total	-	3,947.16	2,567.57	65%

Table 4-16 *Summary of Net Peak kW Reductions for the Standard Incentives Program*

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	2,625.87	2,629.84	1,923.23	73%
ComEd	9,031.78	11,277.59	8,247.41	73%
Total	11,657.65	13,907.42	10,170.64	73%

Table 4-17 Summary of Net Peak kW Reductions for the New Construction Program

Utility	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Net Ex Post kWh Savings*	*Net-to-Gross Ratio*
Ameren	-	108.27	86.01	79%
ComEd	-	181.45	144.15	79%
Total	-	289.72	230.17	79%

5 Process Evaluation

This chapter presents the results of the process evaluation of the Public Sector Custom and Standard Incentives Programs (Custom and Standard Incentives Programs) and the Public Sector New Construction Program (New Construction Program) during electric program year six and natural gas program year three (EPY6/GPY3). The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The evaluation had a particular focus on identifying barriers to participation in the state buildings and municipal governments in the Chicago region where the program has had less success in meeting its goals. Additionally, a survey of participating trade allies was completed to identify opportunities where the trade ally program could potentially be improved.

5.1. **Evaluation Objectives**

A key purpose of the process evaluation is to examine barriers to public sector efficiency projects, particularly in the municipal and state buildings markets. The process evaluation also documents program activity during the year in terms of timing of projects, types of organizations participating, location of completed projects.

Key research questions to be addressed by this evaluation of EPY6/GPY3 activity include:

- What program changes were implemented and what were the key successes and challenges during the program year?
- What factors may limit participation by state agencies? What program activities are effective in encouraging projects in state agencies?
- What factors may limit participation by municipalities? What program activities are effective in encouraging projects in municipal buildings?
- What are trade ally perspectives on reaching public sector clients? What aspects of the trade ally program work well and which may be in need of improvement?

5.2. **Summary of Primary Data Collection**

Multiple sources of information informed the process evaluation of the Standard, Custom, and New Construction Programs.

- **In-Depth Interviews and Surveys of Participant and Non-Participant Municipality and Local Government Decision Makers in the Chicago Metropolitan Area**: Data collected through surveys and interviews of participating and non-participating municipalities provide insight into the key challenges these agencies face in implementing energy efficiency projects.

- **Interviews with Key Staff at State Agencies**: Interviews were completed with staff from the Department of Central Management Services (CMS) and the Capital Development Board (CDB). These agencies play important roles in the adoption of energy saving measures in state buildings. CMS has management authority over several state facilities and CDB is responsible for funding capital improvement projects on behalf of state agencies. In addition to interviews with these agencies, staff members from a large state agency active in the program were also interviewed. These interviews provided insight on challenges in encouraging energy efficiency projects with the state building sector.
- **Surveys of Registered Trade Allies**: DCEO's implementation partner, the Energy Resources Center manages a trade ally program for contractors, vendors, and other professionals who provide services to incentive program participants. Surveys of registered trade allies provided insight into how aware their customers are of incentive programs, the application process, and suggestions for improving the programs.
- **Interviews with Program Staff**: Interviews with DCEO and program implementation partner staff members provided information about program progress and observations of service providers and participants. Staff members reported on recent program changes and future plans to improve program operational efficiency.

5.3. Summary of Conclusions and Recommendations

The following presents a selection of key findings from EPY6/GPY3:

- **Combined Gross Realized Savings Decreased from Prior Program Year: In** comparison to last year, the realized gross electric and natural gas savings for all three programs combined decreased. The lower activity was due to decreased Custom and New Construction Incentives Program savings. Realized gross savings for the Standard Incentives Program increased from EPY5/GPY2.
- **DCEO and Partners Working to Provide a Clear, More Consistent Brand:** DCEO's partners have adopted the Illinois Energy Now branding. The intent is to provide a clear message to the market and to communicate to public entities the partnership with the incentive programs. The Smart Energy Design Assistance Center (SEDAC) plans to host a support call center for program participants.
- **Multiple New Initiatives Launched:** DCEO launched several new initiatives during the program year including: The Clean Water Energy Efficiency Initiative directing participants to leverage funding provided by the Illinois EPA and the Illinois Clean Energy Community Foundation to implement high efficiency aeration systems, a pilot project for data centers, and a bonus incentive for large custom gas projects that exceeded 50,000 therms to increase natural gas savings.
- **Database Improvements are needed to Track New Construction Projects and Meet Accounting Requirements:** Improvements need to be made to the database because it was

found to be insufficient for tracking the early phases of new construction projects, and does not accurately report annual program expenditures.

Key findings from interviews with staff in the state buildings sector and a review of state policy pertaining to energy efficiency in state government are summarized below.

- **There are State Policies in place to Encourage Energy Efficiency in State Buildings, but Budget Policy Limits Implementation Potential:** There are several state policies that encourage or require the state to adopt energy conservation measures in existing and new facilities. However, reductions in state agency appropriations and the under-funding of capital budgets present significant constraints on resources available for the implementation of energy saving measures.
- **Decision Making and Approval Processes are Complex:** The approval processes for energy efficiency projects is complicated and it may involve either staff from the agency that is primarily using the building or CMS staff, depending on which agency has primary responsibility for the building. In addition, larger capital improvement projects require additional approval by the Capital Development Board (CDP). The multiple decision makers and organizations involved in the process likely create challenges for program outreach and for trade allies seeking to develop business opportunities by encouraging energy efficiency improvements in state buildings. Trade allies noted that there were many parties involved in making decisions about equipment purchasing for state buildings and approval processes were slow.
- **Agencies Lack Budget Line Item for Incentive Projects to Participation:** Some agencies do not have a line item in their budgets for incentive dollars from DCEO. Incentives for these agencies are funneled into the general fund rather than funding the agency directly. This likely reduces the efficacy of incentives for encouraging energy efficiency projects. One large agency has developed a solution that uses funds for managing cash flow to finance projects. Other agencies may be able to replicate this strategy.
- **Funding Constraints Create Multiple Barriers:** The lack of state funds for capital improvements and agency facilities disincentives the replacement of old equipment, or equipment that is not operating optimally. Because of the lack of capital funds, most capital improvements are approved only to make emergency repair. Energy saving options may not be fully considered in these cases because short time frames to identify energy efficient equipment options and to apply for grant opportunities. Complicating this, many state facilities have older equipment that is more expensive to replace than newer equipment more commonly found in private sector buildings.

Some state government entities such as state universities and the Department of Military Affairs have access to non-state funds that are available to pay for energy efficiency improvements. The availability of these funds likely contributes to the higher level of participation by state universities.

- **New Construction Program Time Requirements and Lack of Incentives for Incorporating Design Features Limit Participation:** Allowing projects to span multiple grant years may improve new construction program activity. Additionally, either providing incentives to designers or more fully leveraging SEDAC design assistance to incorporate efficiency may encourage additional projects.
- **Support Services Provided by ERC and SEDAC are Valued:** Staff of several state agencies stated services provided by ERC and SEDAC are valued for developing energy saving projects.

Key findings from decision makers from local government agencies in the Chicago metropolitan area collected through interviews and surveys are summarized below.

- **Local Government Decision Making and Approval Processes are Complex:** Decision making about energy efficiency projects involves multiple decision makers, as is typical of public sector organizations. Interview respondents reported that facility management staff typically initiates projects, but projects require review from other managers and approval by the governing board for the municipality, the city council, and/or the mayor. This can complicate program outreach efforts because it increases the complexity and timeline of the approval process. Most municipalities have specific contracting requirements, which may affect project implementation timelines.
- **Barriers to Natural Gas Projects:** Three barriers to natural gas projects were identified: natural gas incentives cover a smaller share of equipment cost than incentives for electricity efficiency projects; organizations have already planned electricity efficiency projects; and there is less awareness of natural gas incentives. These factors explain why meeting natural gas efficiency goals has been more challenging than meeting electricity efficiency goals, but do not explain why DCEO has had greater difficulty reaching its natural gas saving goals in the Nicor service territory.
- **Opportunities to Improve Awareness and Understanding of Programs:** DCEO may be able to improve outreach efforts by targeting associations such as the Northwest Municipal Conference and the Illinois Chapter of the American Public Works Association. The facility management staff who often initiate energy saving projects are members of these organizations. There may also be opportunities to develop a clear presentation of how to complete an incentive project that would better inform municipalities of the process.

- **Franchise Agreements may have Moderate Impact on Completion of Incentive Projects:** Program staff has noted that franchise agreements that cover all or a portion of municipality energy costs may limit program activity. Interview and survey responses suggest that these agreements may have a moderate impact on program participation. Most survey respondents report that they have franchise agreements that cover all or part of the cost of electricity (78%) and natural gas service (69%). However, none indicated that these arrangements made it much more difficult to get projects approved and only 22% indicated that it made it somewhat more difficult. One interview respondent indicated that not having utility costs made getting approval for energy efficiency projects more difficult. The effect of these agreements may be greater than respondents stated. Respondents may be reluctant to report that the agreements reduce their motivation to complete energy saving projects that could result in environmental benefits and reduce municipal energy costs being passed on to residents.
- **Incentive Dollars May Not be Returned to Budgets used to Finance Projects:** Nearly one-half of respondents (48%) reported that the incentive funds for energy efficiency projects would not be returned to the department or budget that financed the project. As such, some organizations may not implement energy efficient equipment because the incremental costs are not recouped.
- **DCEO Sponsored Audits and Project Reviews are Highly Valued:** Interview respondents valued audits and project reviews performed by SEDAC and the 360 Energy Group. These services provided a credible source of information on energy saving improvements, assisted with the development of projects, and provided clear equipment specifications used to develop bid requests.

The following recommendations are offered for improving the DCEO public sector programs.

- **Consider Outreach to Additional Associations:** Outreach efforts to groups such as the Northwest Municipal Conference and the Illinois Chapter of the American Public Works Association may be effective at reaching municipal facility staff who often initiate energy efficiency projects.
- **Continue to Leverage Audits and Project Reviews as Gateway to Program Participation:** Energy assessments and project reviews appear to be an effective means of assisting public entities with developing energy saving projects. Program staff should continue to leverage these services and target non-participating organizations to encourage participation in the incentive programs. Moreover, specifically targeting utility service territories where the programs are underperforming may improve goal attainment.

- **Explore Financing Mechanisms for Government Agencies:** Incentive payments are often not returned to the state agency budget used to pay for the improvement. Program staff should explore models developed by other state agencies for funding energy efficiency improvements in the absence of a budget line for accepting incentives can be applied elsewhere. DCEO should leverage its position on the Energy Efficiency Committee to press for the implementation of budget line items for state agencies to receive incentives mandated by Executive Order 7 of 2009.

  Similar budget issues may limit the effectiveness of the incentives for local government agencies. Staff should also consider implementing a utility bill credit process to fund efficiency projects for other public sector entities.

- **Opportunity to Improve Consistency of Program Information and Relevance:** Program staff reported that their partners were adopting consistent use of the Energy Now Brand to communicate that the DCEO energy efficiency incentives and technical services are part of a single program. SEDAC will be hosting a call center that will be the main telephone contact for program participants. These developments are moving the DCEO programs to a more consolidated presence. However, additional improvements are possible. For example, program information can be found separately on the DCEO, SEDAC, and ERC websites. Creating a single site that is used by DCEO and its partners to present information that is organized effectively may encourage program participation and help establish the DCEO programs a resource for energy efficiency. For example, the information could be presented by target market (e.g., state agencies, municipalities, parks departments), by facility type (e.g., waste water treatment facilities, correctional facilities, or public pools), by equipment type (e.g., lighting equipment, kitchen equipment), or by some combination of these options.

- **Monitor Effectiveness of Sweet Deal Bonus:** Although program activity spiked around the two deadlines for the sweet deal bonus (October 31st and February 14th), it is unclear if these bonus incentives influenced additional projects or shifted their timeline to earlier in the program year. It is important to note that for both the Standard and Custom Programs, the majority of savings occurred after the sweet deal timeline had passed.

- **Consider Specialized Training to Trade Allies to help them Navigate Public Sector Approval Processes:** Trade allies reported issues developing projects at state agencies involving complex decision-making processes and slow approval processes. These issues are also found in other public sector entities. Staff may be able to provide guidance to trade allies on navigating decision-making processes at public sector organizations to make the process more transparent and facilitate their ability to sell projects.

5.4. Custom and Standard Incentives Program Activity

The following sections summarize EPY6/GPY3 program activity.

5.4.1. Activity during the Program Year

Figure 5-1 and Figure 5-2 display the monthly and cumulative electricity savings for the Custom Incentives and Standard Incentives Programs, respectively. The shaded areas correspond to the periods during which Sweet Deal bonuses were offered for completed projects. As shown, there were increases in project savings shortly before the cutoff dates for the bonus periods. However, approximately one-half of the custom and standard electricity savings occurred after the bonus period.

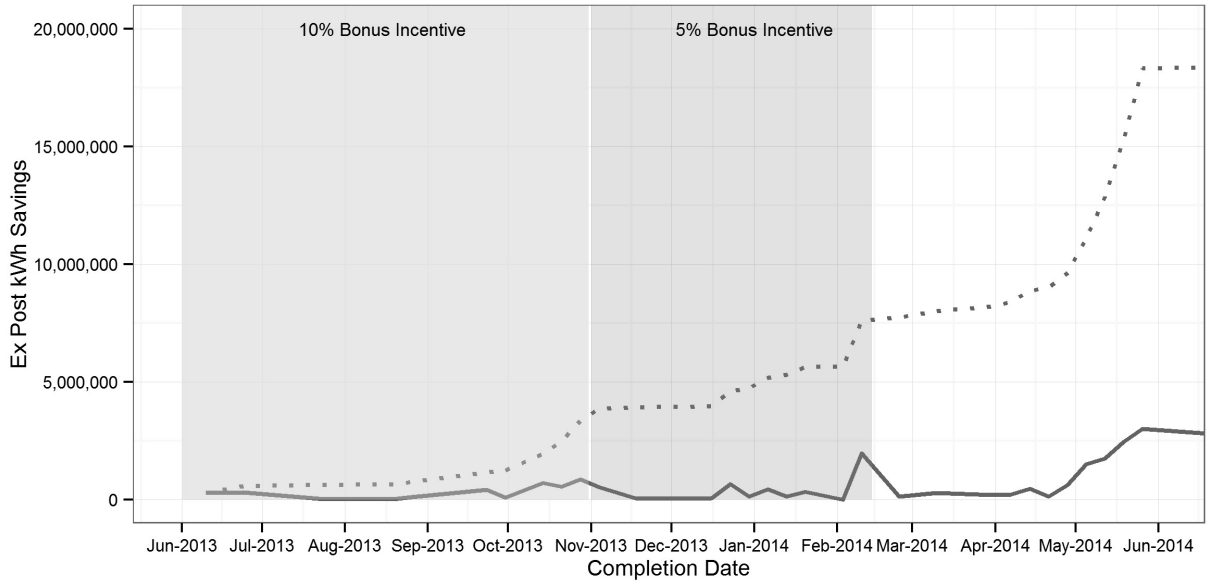

Figure 5-1 Custom Electricity Savings by Final Application Date during EPY6/GPY3