

NAVIGANT
CONSULTING

DCEO

Energy Efficiency and Demand Response Evaluation

Presentation to SAG

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Impact Results

	PY 1 Ex-Post Net Results	
Program	kW	MWh
EEAHC	1.0	1,599
Low Income Retrofit	0.7	5,925
Standard Incentive	2.8	17,468
Custom Incentive	1.1	13,143
Lights for Learning	0.1	1,339
Total	5.8	39,475

Section 1



Program-Specific Results

Evaluation Methods

- » review of verification and due diligence procedures
- » review of tracking systems and quality control
- » review of ex-ante impact assumptions
- » evaluation of program processes, implementation issues and concerns
- » documentation of program theory and logic

Energy Efficient Affordable Housing Construction Program

	Goals		PY1 Accomplishments	
Program Year	Installations	MWh Impact	Installations	Ex-Ante MWh Impact
PY1	652	0	759	0
PY2	1,087	1,095	-	451
PY3	1,957	2,921	-	1,227

Energy Efficient Affordable Housing Construction Program

Program Measures	Ex-Ante kWh/unit	Ex-Ante kW/unit	Revised kWh/unit	Revised kW/unit
6 interior fluorescent fixtures & 2 exterior fluorescent fixtures	782	0.089	788	0.090
Reduce required tonnage as a result of thermal envelope improvements	432	0.72	608	1.01
90% AFUE furnace with efficient air handler	400	0.046	400	0.046
SEER 14 central air conditioner w/ programmable thermostat	366	0.61	93.75	0.16
Energy Star rated bathroom exhaust fan	89	0.01	89	0.01
Energy Star refrigerator	79	0.009	95	0.01
Energy Star dishwasher	62	0.007	33	0.006
Total Unit Savings	2,210	1.491	2,107	1.33

Energy Efficient Affordable Housing Construction Program

Process Findings

- » Future challenges to the program including adequate staff to cover growing responsibilities from:
 - › additional funding sources added to the program
 - › the subsequent need to split and track two funding sources
 - › significant planned program growth
- » Inclusion of for-profit builders raises the need to create protocols to ensure that the for-profit builders use the funds to build homes for low-income dwellers.
- » Current program design requires grantees to apply for funding and complete building construction within 12 months, which is too short. The program should continue with its efforts to move toward an expanded 24 month timeline.

Low Income Residential Retrofit Energy Efficiency Program

Evaluation Methods

- » Algorithm review to verify reasonable assumptions and methods were used for assigning ex-ante gross kWh and kW savings per measure.
 - › verification of the mathematical soundness of the savings calculations for each measure
 - › The reasonableness of the calculation was assessed.
- » DCEO used the Energy Star calculator and furnace information from the Gas Appliance Manufacturers Association.
- » Additional sources examined by EM&V to verify reasonableness:
 - › The most current California Database for Energy Efficiency Resources (DEER) reports
 - › Efficiency Vermont's Technical Reference User Manual
 - › Summit Blue's own measure studies.

Low Income Residential Retrofit Energy Efficiency Program

	Measure	Ex Ante kWh per unit	Verified kWh per unit	Difference
1	Energy Star Refrigerator	554	550	-4
2a	CFL Installation	594	459	-135
2b	Energy Star Advanced Lighting Package	663	548	-115
3	Energy Star rated bathroom exhaust fan	89	89	0
4a	SEER 16 replacement central air conditioner w/ programmable thermostat	1,643	1,287	-356
4b	SEER 14 new central air conditioner w/ programmable thermostat	366	240	-126
5	Energy Star rated room air conditioner	176	176	0
6	90% AFUE furnace with efficient air handler	400	400	0
7	Energy Star Dishwasher	62	62	0
8	Reduce required AC tonnage as a result of thermal envelope improvements	216	216	0

Low Income Residential Retrofit Energy Efficiency Program

Weatherization Gross Savings

Measure	Ex Ante			Ex Post		
	kWh/ Unit	Units	Total MWH	kWh/ Unit	Units	Total MWh
Energy Star Refrigerator	554	1,275	706	550	1275	701
CFL Installation (12 bulbs)	594	9,449	5,612	459	9,449	4,338
Energy Star Bathroom Exhaust Fan	89	499	44	89	499	44

Low Income Residential Retrofit Energy Efficiency Program

Home Improvement Program Gross Savings

Total Measure	Ex Ante			Ex Post		
	kWh/Unit	Units	Total MWH	kWh/Unit	Units	Total MWH
Energy Star Refrigerator	554	1,089	603	550	1089	598
Energy Star Advanced Lighting Package	663	118	79	548	118	64
Energy Star Bathroom Exhaust Fan	89	86	7.4	89	86	7.4
Energy Star Dishwasher	62	19	1.3	62	19	1.3
SEER 14 Central AC with programmable thermostat (new installation)	366	60	22	240	60	14
Energy Star Room AC	176	29	5	176	29	5
Reduce required tonnage as a result of thermal envelope improvements	216	165	35	216	165	35
90% AFUE furnace with EE air handler	400	48	19.4	400	48	19.4
CFL Installation (12 bulbs)	594	209	124	459	209	96
TOTAL			897			842

Low Income Residential Retrofit Energy Efficiency Program

Key Impact Findings

- » Most of the measure-specific ex ante gross savings estimates were reasonable when compared to other authoritative sources.
- » The EM&V team recommends that adjustments be made to improve the energy savings estimates for the lighting and programmable thermostat measures.
 - › For the lighting measures, we recommend a reduction in savings based on the reduction of hours of operation from three to 2.33 hours per day.
 - › Savings for programmable thermostats should be adjusted from 16% to 6%.
- » In general, the evaluation found that verified gross savings were slightly lower than claimed gross savings.

Evaluation Methods

- » Review default energy savings assumptions for lighting products
- » Quantify gross savings impacts from a review of the program reporting data.
- » PY2 evaluation will address net impacts.
- » Impacts separated into sales occurring through
 - › DCEO public sector customers (e.g., public high schools) and
 - › Utility private sector customer organizations (e.g., private schools).
 - › products sales outside of the EEPS (includes organizations without an electric meter, for example “Campfire girls” and youth groups).
- » In-depth interviews with program staff, contract implementers and school fundraiser coordinators.
- » A review and evaluation of program materials
- » Review of tracking database.

Lights for Learning

Gross and Net Parameter and Savings Estimates	EEPS	Private	Total (public + private)	DCEO Non- EEPS
Units Purchased: There are no evaluation adjustments to units purchased				
CFL units purchased	21,077	8,847	29,924	6,252
LED night lights purchased	1,671	611	2,282	198
LED holiday lights purchased	770	599	1,369	232
Total All Units purchased	23,518	10,057	33,575	6,682
Annual Hours of Use:				
	DCEO	1,095 hours, average for all units purchased		
	Evaluation-Adjusted	854 (CFLs) / 2,920 (night lights) / 272 (holiday)		
Installation Rate:				
	DCEO	1		
	Evaluation-adjusted	0.9		
Coincidence Factor:				
	DCEO	Not addressed		
	Evaluation-adjusted	0.081 (CFLs) / 0.0 (LED night and holiday lights)		
First-Year Gross MWh and Coincident MW Savings				
DCEO reported Gross MWh Savings	1,202	514	1,716	342
Evaluation-Adjusted Gross MWh Savings	940	399	1,339	260
Realization Rate on MWh	78%	78%	78%	76%
Evaluation Gross Coincident MW savings	0.09	0.03	0.12	0.02
First-Year Net MWh and Coincident MW Savings from Evaluation-Adjusted Gross Savings				
Net-to-Gross Ratio (80% for PY1) (Planned)	80%	80%	80%	80%
Net MWh Savings	752	319	1071	208
Net Coincident MW Savings	0.07	0.03	0.1	0.02

Key Impact Findings

- » Impact adjustments
 - › Installation rate of 0.9 EM&V versus 1.0 DCEO
 - › 2.34 hours of use EM&V versus 3.0 DCEO
- » We recommend the program create a technical reference manual to document the default savings values for each lighting product offered through the program.

Key Process Findings

- » The design and implementation strategy of the Lights for Learning program is effective and allows the program to meet its goals with high participant satisfaction.
- » The program completed 161 fundraisers for 139 schools – slightly surpassing its goal of 160 fundraisers.
- » School fundraiser coordinators expressed very high satisfaction with the program.
- » The marketing materials that were evaluated show the messages to be clear and actionable.
- » The evaluation of the program tracking data shows inconsistent data being tracked between MEEA and APT.
- » The program employs multiple quality assurance and verification activities to help ensure the program meets its education mission and goals. Based on the program's size, target population, resources and goals, these activities are sufficient.

Evaluation Methods

- » Review default energy savings assumptions for measures eligible for the program
- » Quantify gross savings impacts from an engineering review of the program reporting data and project documentation.
- » Self-report survey with program participants yields process results, net impacts and spillover potential.
- » In-depth interview with the program manager and a participant phone survey.
- » Review and evaluation of program materials and the tracking database.

Public Sector Standard Incentive Program

Public Sector	Tracking System Savings Ex Ante Gross kWh	Evaluation Adjusted Savings Ex Post Gross kWh	Realization Rate	Net kWh	NTGR (net kWh / ex post gross kWh)
K-12 School	4,249,610	5,492,737	1.29	3,605,794	0.66
Community college	1,135,202	1,157,834	1.02	594,662	0.51
University	2,888,512	3,277,450	1.13	2,082,939	0.64
Municipal	5,746,076	6,403,426	1.11	4,050,481	0.63
Federal	889,676	1,137,623	1.28	565,720	0.50
Statewide	14,909,076	17,469,070	1.17	10,899,596	0.62

Key Impact Findings

- » In developing default savings for measures, DCEO relied upon ComEd's and Ameren's documentation because of the matching measure lists. An evaluation team review of the utilities' assumptions found most of them to be conservative and reasonable, but both ComEd and Ameren had default measure savings values that we judged to be inaccurate. Some DCEO measure default savings did not match the utility defaults, and the DCEO discrepancies were both higher and lower than the utility-derived assumptions we judged to be reasonable. As a result, DCEO is introducing inaccuracies into their program tracking savings. DCEO should collaborate with ComEd, Ameren, and other parties in Illinois to develop a consistent set of default savings values and provide a brief description of how their default savings derive from the statewide values. It is recommended DCEO should then update their tracking system.

Key Impact Findings

- » Hard copy project documentation files are well maintained.
- » A more complete tracking system with better functionality would be a significant benefit to the program manager and staff, as well as improve our ability to evaluate the program.
- » Verified gross impacts were higher than recorded savings
 - › Errors in default assumptions
 - › Documentation on some large projects did not allow us to confirm all installed quantities or that all equipment met the qualifying criteria without follow-up verification from the site or site contact, resulting in some reductions to tracked savings.

Key Impact Findings

- » Net-to-Verified Gross ratio of 0.62 for energy savings.
 - › Some respondents learned about the program after they decided to implement the measure
 - › Some respondents claimed they would have installed exactly the same equipment at the same time (or within 6 months) in the absence of the program.
 - › DCEO should seek involvement in the planning processes for public sector entities and document involvement and influence (dates, contacts, documents delivered, and discussions).
 - › NTG score raised by the strong influence of various program components (rebates, recommendations, and program materials) on customer decisions.

Key Process Findings

- » **Satisfaction.** Customer satisfaction with various processes and components of the program was high, and few participants reported encountering problems during their participation.
- » **Database.** Program tracking database should handle multiple-measure projects and multiple-project grants in a more consistent and transparent fashion.
- » **Implementation.** Program staff targeted their efforts at core activities related to processing applications, participant implementation assistance, marketing, and inspections. Future growth of the program and attainment of program goals will require additional resources (staff and dollars) to expand the depth and breadth of program activities undertaken.
- » **Marketing and Outreach.** Overall, the program heavily leveraged activities by SEDAC, ComEd, and Ameren, with DCEO-specific activities somewhat limited by staff and resource availability. This became a problem when the ComEd program became oversubscribed and market actors mistakenly thought that incentive money had also run out for public sector projects as well.

Evaluation Methods

- » Project-specific On-site visits and M&V was completed for a sample of projects to assess the gross impacts
- » Self-report survey with program participants yields process results, net impacts and spillover potential.
- » In-depth interview with the program manager and a participant phone survey.
- » Review and evaluation of program materials and the tracking database.

Public Sector Custom Incentive Program

	Ex Ante Gross	Ex Post Gross	RR	Ex Post Net	NTGR (ex post gross)
kWh	16,881,910	13,143,568	0.78	9,434,996	0.72
kW	-	1,071	NA	761	0.71

Key Impact Findings

- » Consider additional analysis of the underlying assumptions of savings in projects entering the program.
- » Documentation generally presents a reasonably clear description of how a given project saves energy
- » However, some project input assumptions were found to result in higher ex ante impact claims than the ex post impact result.
- » The program should estimate and track summer peak demand savings.
- » Free-ridership levels measured are better than expected for a Custom program at roughly 30%.

Public Sector Custom Incentive Program

Key Process Findings

- » **Program Participation.** The program met its savings goals for PY1, while building a good foundation for future program years.
- » DCEO should take steps to reduce barriers to participation presented by the public sector budgeting process by creating confidence among public sector customers that the program will be active in future years.
- » **Implementation.** Program staff targeted their efforts at core activities related to processing applications, participant implementation assistance, marketing, and inspections. Future growth of the program and attainment of program goals will require additional resources (staff and dollars) to expand the depth and breadth of program activities undertaken.
- » **Marketing and Outreach.** Overall, the program heavily leveraged activities by SEDAC, ComEd, and Ameren, with DCEO-specific activities somewhat limited by staff and resource availability. The marketing that was conducted was recalled and well received by program participants. The most successful efforts were promotion via market actors and customer events.

QUESTIONS?

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