



THREE-YEAR EVALUATION PLAN FOR THE AMEREN ELECTRIC & GAS RESIDENTIAL AND COMMERCIAL PORTFOLIOS

Final

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1. OVERVIEW OF THE AMEREN PORTFOLIO

This document is the three-year evaluation plan for the Ameren Illinois Company (AIC) portfolio of commercial, industrial, and residential energy efficiency resources. Opinion Dynamics Corporation, along with its subcontractors, The Cadmus Group, Navigant Consulting, and Michael's Engineering (the Opinion Dynamics team or the team), have been contracted by AIC to provide an independent evaluation of the 2011-2014 electric and natural gas energy efficiency programs. In this document, we provide a high-level overview of the planned evaluation activities for each program year and the reasons for the choices made. Each program year will also have a detailed evaluation plan provided in a separate document. We will return to the three-year plan each year and review it to inform a detailed annual plan. While we have a set objective to obtain impact values as required by legislation, priorities around specific evaluation tasks may change from year to year.

1.1 AMEREN'S PORTFOLIO OF ENERGY EFFICIENCY RESOURCES

In 2007, the Illinois legislature mandated that electric utilities must use energy efficiency and demand-response measures to reduce electric load.¹ In 2009, AIC voluntarily began a gas energy efficiency program as well. As such, June 2007 through May 2011 marked the first three-year cycle for energy efficiency resources in AIC service territory (Plan 1). (Note that all AIC programs begin on June 1 and end the following calendar year on May 31.) The current plan, Plan 2, consists of the next three program years (PY) which began on June 1, 2011 and will continue to May 31, 2014.

As stated in their filed plan, AIC's portfolio comprises measures bundled into 13 programs (and one pilot) that provide diversity of opportunities for customers of all rate classes (Table 1).

¹ Section 8-103(f) and 8-104(f) of the Public Utilities Act (Act), 220 ILCS 5/1-101 et seq.

Table 1. Description of Portfolio Programs

Program	Description
Residential - Lighting	Provides incentives to the manufacturing and retail partners to increase sales of qualified lighting whereby the end-user receives a discount on the price of ENERGY STAR® qualified or other high-efficiency lighting products.
Residential - HVAC	Provides HVAC diagnostics/tune-up, retrofit, and replacement upgrades for air conditioners, heat pumps, and heating and cooling systems, achieving both gas and electric energy savings.
Residential - Behavior Modification	Uses Home Energy Reports to provide customers with a profile of their energy use, energy efficiency tips, portfolio program information, and a comparison of their energy usage to their “neighbors,” encouraging reduced energy use, achieving both gas and electric energy savings.
Residential - Home Energy Performance (HEP)	Provides a home energy audit, direct install measures, and follow up sealing and insulation measures, achieving both gas and electric energy savings.
Electric Space Heat Pilot	Provides a home energy audit, direct install measures, blower door-assisted air sealing at no cost to targeted AIC customers living in older homes with electric space heat. Provides customized report for follow up sealing and insulation measures through HEP and HVAC program.
Residential - Appliance Recycling	Provides an incentive to a customer for removing an inefficient refrigerator whereby a turnkey appliance recycling company verifies customer eligibility, schedules pick-up appointments, picks up appliances, recycles and disposes of units, and performs incentive processing.
Residential - Multifamily	Provides installation of measures in tenant spaces and common area lighting, exit signs, in addition to walk-through audits and incentives for complex measures, achieving both gas and electric energy savings.
Residential - Moderate Income (Subset of HEP)	Provides increased incentives for energy efficiency improvements and retrofits in moderate income households, achieving both gas and electric energy savings. (This program is also called Warm Neighbors, Cool Friends)
Residential - Energy Efficient Products	Promotes measures such as ENERGY STAR high-efficiency water heaters, window ACs, smart strips, and pool pumps through the mid-stream and upstream levels, achieving both gas and electric energy savings.
Residential - ENERGY STAR New Homes	Targets builders with a package of training, technical, and marketing assistance, and incentives for construction of ENERGY STAR homes, achieving both gas and electric energy savings.
Business - Standard Incentive	Incentivizes customers to purchase energy efficient measures

Program	Description
	with predetermined savings values and fixed incentive levels, achieving both gas and electric energy savings.
Business - Custom Incentive	Applies to energy efficient measures that do not fall into the Standard Incentive program. These projects normally are complex and unique, requiring separate incentive applications and calculations of estimated energy savings, achieving both gas and electric energy savings.
Business - Retro-Commissioning	Provides options and incentives for businesses to improve operations and maintenance practices for buildings, systems, and processes, achieving both gas and electric energy savings.
Business - New Construction	Provides incentives to overcome cost barriers to incorporating energy efficient building design and construction, achieving both gas and electric energy savings.

Note: AIC also has a Residential and Business - Demand Response effort that the evaluation team will not assess.

The priorities in this plan are set by the following:

- AIC has stipulated that the evaluation team perform at least one process evaluation and one impact assessment for each program at some point in the Plan 2 period.²
- The Order also requires that the evaluation team obtain verified participation rates for all programs for each year.
- Additionally, AIC agreed with the ICC to use updated net-to-gross ratios (NTGRs) in its Plan 3 filing. As such, the evaluation team must set the priorities across all programs to enable new NTGRs prior to AIC filing its plan for all programs – with one exception the Residential New Construction program. The Residential New Construction Program is a new program with limited savings expected. Our evaluation will address the NTGR for Residential New Construction in PY6 after the program has had time to increase participation.
- Finally, the ICC has specified certain parameters for the evaluation effort (specifically around the use of NTG and per unit values). These are described in Section 1.2 of this plan.

It should be noted that the portfolio has PY4 energy goals of slightly over 270 GWh and 3.7 million therms with somewhat lower electrical savings and higher therm savings for the following program years (Table 2). AIC has goals for energy (i.e., MWh and therms), but no statutory required goals for demand.

Table 2 presents the values in order of magnitude within the residential or commercial portfolio based on a fuel neutral MMBTU energy savings. For example, the table lists Residential Energy Efficiency Products above Appliance Recycling due to the substantial therm savings expected.

² Note that additional process, impact or market research will be conducted as budget allows.

Table 2. Portfolio Planned Savings by Program Year

Program	TRC	Annual MWh Savings			Annual MW Savings			Annual Therm Savings		
		PY4	PY5	PY6	PY4	PY5	PY6	PY4	PY5	PY6
RES-Lighting	2.3	82,485	61,974	42,418	2.5	1.9	1.3	0	0	0
RES-Behavioral Modification	1.7	21,705	21,705	21,705	4.9	4.9	4.9	664,517	664,517	664,517
RES-HVAC	1.4	13,448	14,187	15,109	6.4	6.8	7.2	896,800	1,147,316	1,480,704
RES-Efficient Products	1.5	11,079	11,999	13,110	2.3	2.4	2.7	324,590	463,622	552,133
RES-Appliance Recycling	2	19,889	20,070	16,036	2.9	2.9	2.3	0	0	0
RES-Multi-family	1.9	4,874	5,217	5,285	0.9	1	1	247,116	290,831	313,078
RES- Home Energy Performance	1.4	2,593	2,665	2,728	0.7	0.7	0.7	100,890	103,916	107,034
RES-Moderate Income	1.4	1,732	1,774	1,800	0.5	0.5	0.5	64,850	66,795	68,799
RES-New Construction	1	273	304	329	0.1	0.1	0.1	12,831	14,268	15,449
RES-Voltage Optimization	1.1	0	0	0	4.5	4.5	4.5	0	0	0
RESIDENTIAL Portfolio Total	1.7	158,078	139,895	118,521	25.5	25.6	25.1	2,311,593	2,751,267	3,201,714
BUS-Standard	1.7	47,815	40,648	37,334	20.2	17.2	15.8	1,145,345	1,306,813	1,429,883
BUS-Custom	2	55,620	54,490	50,648	16.3	15.9	14.8	189,043	210,919	223,281
BUS-New Construction	1.3	8,194	7,123	6,454	2.9	2.5	2.2	51,483	50,035	47,131
BUS-RCx	3	3,309	3,196	3,019	0.8	0.8	0.7	5,654	5,002	4,651
BUSINESS Portfolio Total	1.8	114,938	105,458	97,456	40.1	36.3	33.5	1,391,525	1,572,768	1,704,945
AIC PORTFOLIO TOTAL	1.8	273,534	245,871	216,495	65.6	61.9	58.7	3,735,017	4,355,658	4,942,447

Source: AIC Filing Dated: January 20, 2011.

AIC's annual portfolio costs are close to \$60 million each year. Table 3 below orders the program costs by PY4 costs.

Table 3. Portfolio Planned Costs by Program Year

Program	Annual Program Costs (\$ millions)					
	PY4		PY5		PY6	
RES-Lighting	\$	7.00	\$	5.21	\$	3.74
RES-HVAC	\$	6.84	\$	8.07	\$	9.69
RES-Efficient Products	\$	3.31	\$	3.59	\$	3.99
RES-Appliance Recycling	\$	2.66	\$	2.77	\$	2.28
RES-Multi-family	\$	1.56	\$	1.79	\$	1.97
RES- Home Energy Performance	\$	1.35	\$	1.41	\$	1.48
RES-Voltage Optimization	\$	1.06	\$	1.19	\$	1.18
RES-Behavioral Modification	\$	0.96	\$	0.99	\$	1.02
RES-Moderate Income	\$	0.83	\$	0.87	\$	0.91
RES-New Construction	\$	0.18	\$	0.21	\$	0.23
RESIDENTIAL Portfolio Total	\$	25.76	\$	26.10	\$	26.50
BUS-Standard	\$	12.06	\$	12.50	\$	13.15
BUS-Custom	\$	11.17	\$	11.40	\$	10.91
BUS-New Construction	\$	2.20	\$	2.11	\$	2.06
BUS-RCx	\$	0.28	\$	0.28	\$	0.28
BUSINESS Portfolio Total	\$	25.71	\$	26.20	\$	26.39
AIC Portfolio Admin Costs	\$	2.57	\$	2.60	\$	2.64
AIC EM&V Costs	\$	1.54	\$	1.56	\$	1.59
AIC Education Costs	\$	1.29	\$	1.30	\$	1.32
AIC PORTFOLIO TOTAL	\$	58.35	\$	59.30	\$	59.96

Source: AIC Filing Dated: January 20, 2011.

1.2 COMMISSION-SPECIFIED EVALUATION EFFORTS

The Illinois Commerce Commission (ICC) Order for Docket 10-0568 dated December 21, 2010, provides significant information about how the evaluation team should use net-to-gross ratios (NTGRs), per-unit values, which ones specifically should be used, and when per-unit values will be updated. The ICC provided further clarification in the *Order on Rehearing*, dated May 24, 2011. The *Order on Rehearing* also directed AIC to participate in the development of a Statewide TRM.

We have spent considerable time on these documents to be sure we abide by the specifics indicated in the Order. Based on our reading of the Orders, there are several key points that inform our overall evaluation plan. Points directly taken from the ICC documents are:

- The Order has a set of fixed per-unit savings values that evaluators are to use in our PY4 evaluation for most measures. (Staff Cross Exhibits Part 1 and Part 2, see appendix) For measures without a fixed value, we plan to perform an engineering analysis.
- AIC must apply any updated per-unit values received by March 1 to the next program year (Lines 505-508 of AIC Exhibit 10.0 in the December Order). As evaluation results are generally available in the fall, the earliest application of any results from the evaluation of standard measures will skip a program year. For example, PY4 results are available for application in PY6, and PY5 results are available for application in PY7. Table 4 shows this timeline graphically.

Table 4. Timeline of Use for Evaluation Factors
(Per-unit values in Standard Measures)

Calendar Year		2012												2013												2013																
Program Year		PY4					PY5							PY6					PY7																							
Program Year	Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12					
PY4	New Per-Unit or NTGR Available											♦																														
PY4	New values applied																																									
PY5	New Per-Unit or NTGR Available																																									
PY5	New values applied																																									
PY6	New Per-Unit or NTGR Available																																									
PY6	New values applied																																									

- AIC must work with other utilities and the Stakeholder Advisory Group (SAG) “to develop a Statewide TRM for use in the upcoming energy efficiency three-year plan” (p.19 Order on Rehearing). Since this document is dated prior to the beginning of PY4, we assume this means PY4-PY6 (i.e., Plan 2).
 - The Statewide TRM consultant is currently working on high-impact measures and then will turn its attention to all the other measures in the portfolio. A draft of the some Statewide TRM with values may be available prior to March 1, 2012, but more likely, the final values will not be available until after March 1. Following the timeline from the Order, that would mean that per-unit values should be applied to

PY6. We will default to this assumption unless otherwise agreed to in writing with AIC or the ICC staff.³

- The *Order on Rehearing* also provided a framework on how and when to apply NTGRs as well as when any update to NTGRs should be applied. This framework is provided below, verbatim from the Order:
 1. Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has an estimated NTG ratio, that ratio can be used prospectively until a new evaluation estimates a new NTG ratio.
 2. In cases that fall under the paragraph above, once new evaluation results exist, these would be used going forward, to be applied in subsequent program years following their determination until the next evaluation, and so on.
 3. For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes - either in the program design or delivery, or changes in the market itself - NTG ratios established through evaluations would be used retroactively, but could also then be use prospectively if the program does not undergo continued significant changes, similar to the first paragraph above.
 4. For programs falling under the third paragraph above, deeming a NTG ratio prospectively may be appropriate if: the program design and market are understood well enough to estimate with reasonable accuracy an initial NTG (e.g., based on evaluated programs elsewhere); or it is determined that the savings and benefits of the program are not sufficient to devote the evaluation resources necessary to better estimate a NTG ratio.
 5. Recommendations of the SAG to the Commission regarding application of this framework shall be submitted in adequate time for Commission review. If the SAG is not in unanimous agreement in its recommendation, the Commission requests that any recommendation that has the support of more than a majority of SAG members be submitted to the Commission along with a discussion and enumeration of the dissenting opinions.

We have created a three-point set of rules to follow based on the above language that is somewhat simplified.

1. If the program design and delivery methods are stable over time and a previous Illinois evaluation has estimated a NTGR, that NTGR is used prospectively until a new value is calculated. When the new value is calculated, we will apply the value prospectively following a similar timeline as the per-unit values. For example, if a PY4 NTGR is calculated for a program that has had an evaluation and the program and market are stable, we will apply the new NTGR in PY6.
2. For existing programs that have been evaluated previously, but are undergoing significant changes in program design or in the market served by that program, or for existing and new programs that have not yet had an evaluation, a NTGR will be

³ We have heard in the ongoing Statewide TRM meetings that ComEd expects to implement some or all of the Statewide TRM measures in PY5. This choice does not follow the timeline in the Ameren Exhibit 10.0, although Ameren has chosen to follow the same timeline and use Statewide TRM values in PY5.

calculated and applied retroactively (i.e., for the year in which program participants are included in the research).

3. If a previous Illinois evaluation has not occurred, it is possible to deem a NTGR based on secondary research showing other NTGR values from similar programs. This approach is used in two cases:
 - a. If the program design and market is well understood
 - b. If the savings of the program are not sufficient to devote evaluation resources.

We have gone through each program and applied the three-point logic based on our understanding of the programs and markets. Appendix B shows the fixed NTGR from the Order and our planned NTGR for each year by program.

2. EVALUATION STUDIES BY YEAR

The AIC portfolio has 13 programs and 1 pilot in PY4.

Most programs have a set of standard measures. Standard measures have been specified through agreement between AIC and the ICC. The electric and gas savings are included in Appendix C as embedded Excel sheets. Anything not in this list is a non-standard measure. Standard measures have set per-unit values. If updated through our PY4 evaluation, the application of those values will occur in PY6. Table 5 provides planned evaluation activities by program and program year.

Table 5. Planned Evaluation Activities by Program and Program Year

Activity	Year	Residential										Commercial				
		Lighting	HVAC	Behavioral Modification	Home Energy Performance	Electric Space Heat Pilot	Appliance Recycling	Multifamily	Moderate Income	Efficient Products	ENERGY STAR New Homes	Standard	Custom	Retro-Cx	New Construction	
Program Material Review	PY4	Every Year and Every Program (except Commercial NC in PY4)														
	PY5															
	PY6															
Program Manager and Implementer Interviews	PY4	Every Year and Every Program (except Commercial NC in PY4)														
	PY5															
	PY6															
Energy Advisor or Key Account Executive Interviews	PY4												●	●		
	PY5												●	●		
	PY6												●	●		
Market Actor / Program Ally / Retailer Interviews	PY4				●	●	●		●			●	●	●		
	PY5	●													●	
	PY6		●		●	●	TBD		●		●	●	●	●		
Customer Intercepts	PY4															
	PY5	●														
	PY6	●														
Participant Survey	PY4		●		●	●	●		●	●		●	●			
	PY5		●					●				●	●	●		●
	PY6		●	●	●	●	●		●	●		●	●			
Non-participant Survey	PY4															

Activity	Year	Residential										Commercial			
		Lighting	HVAC	Behavioral Modification	Home Energy Performance	Electric Space Heat Pilot	Appliance Recycling	Multifamily	Moderate Income	Efficient Products	ENERGY STAR New Homes	Standard	Custom	Retro-Cx	New Construction
	PY5											●			
	PY6			●			●								
Site Visits	PY4	●	●									●	●		
	PY5	●	●		●DHW			●				●	●		
	PY6											●	●	●	●
●	Activity planned to be performed														

Table 6 provides an overview of data calculation approaches that are used to calculate gross and net impacts by program and program year.

Table 6. Data Calculation Approaches by Program and Program Year

Data for calculations on:	Year	Residential										Commercial			
		Lighting	HVAC	Behavioral Modification	Home Energy Performance	Electric Space Heat Pilot	Appliance Recycling	Multifamily	Moderate Income	Efficient Products	ENERGY STAR New Homes	Standard	Custom	Retro-Cx	New Construction
Per Unit Values (for Gross Impacts)	PY4	■	■	NA	■	■	■	■	■	■	■	■	⊙	⊙	None
	PY5	□	□	NA	⊙[SAE, DHW]	TBD	□	□	⊙[SAE]	□	■	□	⊙	⊙	⊙
	PY6	□	□	NA	PY5 Results	TBD	□	□	PY5 Results	□	■	□	⊙	⊙	⊙
NTGR (for Net Impacts)	PY4	■	■	⊙	⊙	■	⊙	■	■	⊙	■	■	■	⊙	None
	PY5	⊙	■	⊙	PY4 Results	TBD	PY4 Results	■	■	PY4 Results	■	■	■	PY4 Results	■
	PY6	⊙	■	⊙	PY4 Results	TBD	PY4 Results	■	■	PY4 Results	■	PY4 Results	■	PY4 Results	■

■	Values in Excel sheets in Appendix C or NTGR from prior evaluation per the NTG framework.
□	Statewide TRM Values
⊙	Value from that year's evaluation activities

3. RESIDENTIAL PROGRAM STUDIES

In this section, we present the overarching view of each residential program evaluation. We present the programs in order of savings (in MBTU) to the residential portfolio, from highest to lowest.

3.1 RESIDENTIAL LIGHTING PROGRAM

AIC has designed the Residential Lighting Program to increase awareness and sales of ENERGY STAR (ES) lighting among residential customers. The program provides discounts through a variety of retail channels to reduce the cost of compact fluorescent lamps (CFLs) and fixtures, High Intensity Discharge lamps, and occupancy sensors. The program is available throughout the entire AIC service territory through retail stores and an online store.

The program seeks to increase awareness of the energy efficient lighting and its benefits through marketing and outreach efforts at participating retailers, the AIC website, and the mass media. The program partners with retailers and lighting manufacturers to sell ES lighting at a discount to bring the cost closer to that of traditional incandescent lighting. The discounts encourage customers who are reluctant to pay full price for ES lighting to choose energy efficient over standard lighting.

Table 7. Lighting Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (EFI and APT)	X (n=3)	X (n=3)	X (n=3)
Retailer Interviews (Retailers: corporate buyers)		X (n=6)	
Customer Intercepts		X	X
In-Home Lighting Study	X		
Gross Impact Approach	Fixed per-unit Values from Excel File	Fixed per-unit values from Statewide TRM	Fixed per-unit values from Statewide TRM
	Participation based on database review, leakage and res/commercial split from intercepts, and storage rate from on-site audits	Participation based on database review and storage rates from on-site audits, leakage and res/commercial split from intercepts,	Participation based on database review and storage rates from on-site audits, leakage and res/commercial split from intercepts,
Net Impact Approach	Value from Prior Evaluation	Customer Intercepts	Customer Intercepts
Budget	\$136,000	\$200,000	\$90,000

➤ Studies by year

- PY4 – Different from all other programs, the evaluation of this upstream program must occur in the program year that AIC sells the bulbs. The ramifications for this occur when we go into the field for data collection for our gross impact analysis.
 - We will collect data from residential homes in PY4. We will use in-home lighting inventories to estimate the program’s impact on the lighting market, program spillover, and CFL installation rates (all things that cannot be collected in the store). This work will build on in-home visits conducted as part of the PY2 AIC residential lighting evaluation. We will complete approximately 225 total in-home lighting inventories, with one-half conducted towards the end of PY4 (April and May 2012) and one-half conducted at the beginning of PY5 (June and July 2012). Of these 225 inventories, 110 will be conducted in PY4.
 - We will use the PY2 NTGR for the program in PY4 per the NTG framework.

- PY5 – October has historically been “lighting season” in many parts of the country, Illinois included. There is a push by energy efficiency programs to get the word out about CFL programs with marketing and resultant increased sales.
 - In PY5 (i.e., the summer of 2012) we will conduct the second half of the in-home lighting study, which will include approximately 115 in-home lighting inventories.⁴
 - We also plan to perform customer intercepts in October of 2012 for two reasons: we will be able to obtain cost-effective information (as there are more customers in the store buying bulbs and our data collection activities garner more completions), and we believe the market for EISA compliant bulbs will have settled down for the 100 watt bulbs. (We note, however, that we expect the market will be in a similar state of flux for 75 watt bulbs which are anticipated to be regulated in early 2013.)
- PY6 – The PY6 evaluation will be more limited since the evaluation team will have put substantial effort into the evaluation of this program by PY6.
 - We have budgeted for another set of customer intercepts, but will assess the results from the previous two efforts to determine if it is worthwhile to again go into the field in the fall of 2013. If this does not occur, we will reduce the budget.

3.2 RESIDENTIAL HVAC

The ActOnEnergy Heating, Ventilation, and Air Conditioning Program (HVAC Program) offers incentives for the purchase of a high-efficiency furnace, boiler, air source heat pump (ASHP), ground source heat pump (GSHP) or central air conditioner (CAC) that is installed by an HVAC Registered Program Ally. Our earlier studies used engineering simulation modeling with some limited metering. Efforts across PY4 and PY5 will expand the sample size of all the metering to increase our confidence in the metered results.

The table below shows the tasks and budgets for this effort.

⁴ Note that the actual numbers are subject to change as we get closer to PY5.

Table 8. HVAC Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	2 interviews CSG (n=1) Ameren (n=1)	2 interviews CSG (n=1) Ameren (n=1)	2 interviews CSG (n=1) Ameren (n=1)
Contractor Interviews			70 participants per measure type (some have multiple – about 140), up to 70 non-participants
Participant Survey	Recruiting for metering, and telephone survey for verification only n=70	Telephone Survey n=150 Verification and NTG (30 per measure x 5 equipment types)	Telephone Survey for verification only n=150
Metering	48 meters installed; 24 CAC and 24 HP (May 2012)	CAC meters removed, heat pump data downloaded (Oct 2012) 48 meters installed in furnaces and boilers (Oct 2012)	Meter removals: <ul style="list-style-type: none"> • Boiler meters • Furnace meters • ASHP meters • GSHP meters
Gross Impact Approach	Fixed values from Order	Statewide TRM	Statewide TRM and/or PY4 metering results for cooling equipment
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
Budget	\$ 132,500	\$158,500	\$ 170, 000

➤ **Studies by year**

- **PY4** - We will focus on obtaining cooling equipment metering information for prospective use within the Statewide TRM.
 - We will base gross impacts on the fixed per-unit values in the Order and application with self-reported participant verification from our participant survey.
 - We will calculate PY4 Net impacts using the PY3 NTGR per the NTG framework.

- The majority of effort in PY4 will be recruiting and installation of meters on participating customers' HVAC equipment to update the effective full load hours (EFLH) and obtain a peak coincident factor for cooling for prospective use within the Statewide TRM (results available in PY5).
 - We will also include a participant survey (n=70) for customer verification and to measure program satisfaction.
 - PY5 – Our effort will focus on obtaining an updated NTGR and process findings as well as metering heating measures for prospective use within the Statewide TRM.
 - We will verify participation through our participant survey. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM.
 - We will use the PY3 NTGR per the NTG framework for PY5.
 - Our telephone survey of participants will enable the calculation of a self-report NTGR. This program is not new, has not changed design, has previously been evaluated to obtain a NTGR, and is a high level of savings across the portfolio. Based on these criteria, we will apply the NTGR calculated in PY5 prospectively to the PY7 program.
 - We will obtain process information from the participant survey to aid in understanding participants' motivations for purchasing the products, as well as how program marketing and incentives influenced their decision-making. We will also collect satisfaction information such as satisfaction with the program, rebate level, satisfaction with their contractor, information provided from the contractor, etc. in our participant survey.
 - Much of our PY5 impact evaluation effort will be meter retrieval and data analysis to update the effective full load hours (EFLH) for prospective use within the Statewide TRM.
 - PY6 – The PY6 evaluation is currently anticipated to be more limited since much of the needed data will have been collected in PY4 and PY5.
 - We will verify participation through our participant survey. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM. We are unsure if our PY4 metering results will have been updated in the Statewide TRM but recommend using the new information from the extensive metering for assessment of savings for cooling equipment in PY6. We will continue to use the Statewide TRM information for heating equipment.
 - We will use the PY3 NTGR per the NTG framework for PY6.
 - We will conduct contractor interviews in PY6, both with participating and non-participant contractors. These interviews will gather data for the process evaluation (satisfaction with the program design, incentive levels, etc.) as well as track the program's market effects in comparison to data gathered in PY3 (how easy is it for them to convince customers to purchase high-efficiency equipment, how often do they recommend high-efficiency units).
 - In PY6, we will perform analysis of the metered heating equipment to provide information to update the Statewide TRM.
- Potential for updating components of the algorithms within the Statewide TRM

- There are several measures incented within this program where we plan additional evaluation activity to support updates to the Statewide TRM. Central air conditioners, air source heat pumps, gas furnaces, and boilers are all included as high-impact measures. We have targeted these measures specifically in our evaluation to be sure that AIC specific values are available for the Statewide TRM.

3.3 RESIDENTIAL BEHAVIORAL MODIFICATION

The Behavioral Modification Home Energy Report (HER) program began mid-year in AIC's PY3 with a pilot group of approximately 50,000 customers. According to information from AIC, the program added several additional groups of customers in PY4, while the original customers remain in the program.

In early 2011, the Cadmus evaluation team completed a first-year analysis of the 50,000 member pilot group. Our evaluation will build on the first-year evaluation findings to provide additional insights regarding program effects, and the ability to leverage this program to improve overall savings from the portfolio.

The table below shows the tasks and budgets for this effort.

Table 9. Behavioral Modification Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	OPOWER and Ameren Interviews (n=3)	OPOWER and Ameren Interviews (n=2)	OPOWER and Ameren Interviews (n=2)
Comparison of Treatment and Control Groups	X	X	X
Treatment and Control Group Survey			Random Sample of 200 Treatment/200 Control participants
Database Crosscheck	X	X	X
Net Impact Approach	PY4 Billing Analysis (gas and electric)	PY5 Billing Analysis (gas and electric)	PY4, 5, and 6 Latent Growth Curve Analysis with Impact Estimates for each program cohort. This will include a persistence analysis.
			Billing analysis (gas/electric) for original Pilot participants in 3 rd year.
Additional Net Analysis	Database Crosscheck to understand program participation	Database Crosscheck to understand program participation	Database Crosscheck to understand program participation
Budget	\$80,000	\$60,000	\$135,000

The overarching goal of the evaluation efforts for PY4, 5, and 6 is to provide adjusted net impact assessments (including accounting for other AIC programs). Note that this program is different from other programs as per unit estimates and stipulated net-to-gross assumptions are less applicable (since the actions taken can vary both by household and over time). As such, the evaluation team will conduct two billing analyses each year (one gas and one electric) in conjunction with a crossing of program participation databases to remove any double counting

within the portfolio. Notably, gas savings are particularly important for this program and will be one of the focuses of our Behavioral Modification efforts.

➤ Studies by year

- In PY4, we will conduct gas and electric billing analyses as well as a crossing of participant databases (similar to PY3). These research efforts will focus on the time frame from June 2011 to May 2012.
- In PY5, our analysis will focus on net impacts through our standard method of conducting a billing analysis with a database cross-check.
- The PY6 assessment will allow us to understand impact, persistence, and process-related issues:
 - In PY6, we will conduct a quantitative survey of: (1) Pilot participants who have been in the program 2+ years, and (2) Pilot participants who stopped receiving Home Energy Reports (e.g., interrupted groups). We will couple this analysis with a billing analysis comparing these two populations to help understand both savings estimates over time, and persistence of savings.
 - In PY6, we will also conduct a Latent Growth Curve Analysis (LGCA) of all participants still receiving the HER. This analysis will allow us to understand savings estimates for the program over the three years. (See Appendix D for additional details.)
 - We will perform a treatment and control group quantitative survey effort in PY6. We will use this survey effort to provide additional process and impact insights regarding energy savings actions taken.

➤ Potential for updating components of the algorithms within the Statewide TRM

- This program does not lend itself to updating any information in the Statewide TRM.

3.4 RESIDENTIAL HOME ENERGY PERFORMANCE AND ELECTRIC SPACE HEAT PILOT PROGRAMS

The HEP program has completed its third year, while the Electric Space Heat (ESHP) program is currently a pilot. We have combined the evaluation of these programs given the similar nature in which AIC designed and delivers the program as well as cost savings associated with combining evaluation activities.

The HEP and ESHP evaluation efforts will build upon previous evaluation activities for the HEP program in PY1 through PY3. Evaluations in PY1-PY3 included an engineering analysis of gross measure savings and secondary research to estimate the NTG ratio. The process evaluation work consisted of a participant survey and review of the program documents and processes. The evaluation team will incorporate aspects of previous evaluations, including survey questions and analysis frameworks. The ESHP Pilot will begin in PY4.

As such, the evaluation team will conduct both process and impact evaluation efforts for the HEP and ESHP programs for PY4.

Table 10. HEP and ESHP Pilot Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	X (n=2 to 4)	X (n=2 to 4)	X (n=2 to 4)
Market Actor / Program Ally Interviews (CSG Auditors; HEP Program Allies and HVAC insulation contractors) ^a	X (n=10-15)		X (n=10-15)
Participant Survey ^b	HEP: Installation Verification, Process and NTG (n=TBD)		HEP: Installation Verification, Process and NTG (n=TBD)
	ESHP: Installation Verification and Process (n=TBD)		TBD
Site Visits		Possible DHW metering for application in the Statewide TRM ^c	
Gross Impact Evaluation Approach	HEP: Application of per unit savings from the Order/ Engineering Analysis	HEP: Statistically Adjusted Engineering Analysis	HEP: Application of PY5 SAE coefficients
	ESHP: Application of per unit savings from the Order/ Engineering Analysis	TBD	TBD
Net Impact Evaluation Approach	HEP: From participant survey	HEP: Results from PY4	HEP: Results from PY4
	ESHP: Default of 0.80	TBD	TBD
Budget	\$46,500	\$114,000	\$60,000
<p>^a Notably, we will combine our market actor interview efforts with our Moderate Income program evaluation activities.</p> <p>^b The participant survey will include participants from the Moderate Income program.</p> <p>^c DHW metering activities are budgeted within TRM activities.</p>			

➤ Studies by year

- PY4 – We will build the HEP and ESHP evaluation efforts upon previous evaluation activities for the HEP program in PY1 through PY3. Evaluations in PY1-PY3 included an engineering analysis of gross measure savings and secondary research to estimate the NTG ratio. The evaluation team will focus on program impacts for PY4, as the HEP evaluation conducted in PY3 assessed energy and demand savings through application of deemed savings values collected in PY1 and PY2 to the program database.
 - The evaluation team will conduct a participant verification effort for PY4 by assessing measure installation through survey self report results and will apply the per-unit savings from the Order to the installed measures to obtain gross savings. We will conduct an engineering review for any measures that do not have a fixed value from the Order. Notably, we will also conduct this analysis for the ESHP program.
 - The evaluation team will field a self-report net-to-gross battery within the participant survey to HEP program participants to determine a program-level net-to-gross ratio to retrospectively apply to PY4.
 - The Electric Space Heat Pilot program is a very small portion of the overall program and may not be continued. We will apply a deemed net-to-gross value of 0.80. We will work with AIC to understand if it will continue this pilot. If so, we will develop a prospective NTGR for PY6.
 - The evaluation team will field a quantitative participant survey to assess HEP and ESHP program processes, such as program awareness, audit satisfaction, preferred methods for receiving energy efficiency information, actions taken, key demographics, installation of ISMs, i.e., number of measures received and installed, and net-to-gross battery to assess program attribution. The evaluation team will work with program staff and implementers to ensure that survey design reflects current program implementation and design through a review of the instrument prior to fielding. The survey will have distinct modules for the HEP and ESHP program where program design and implementation varies. In addition, this survey instrument will also include a self-report net-to-gross battery of questions to determine a program-level net-to-gross ratio. . We plan to complete enough interviews with program participants to provide statistically valid findings regarding each program.
 - The evaluation team will also conduct approximately 10 to 15 in-depth interviews with a variety of market actors in PY4. These market actors include CSG auditors in the field (n=2) as well as HEP and HVAC Program Allies (n~=13). These interviews will review program implementation successes and challenges, in addition to understanding barriers to participation for both contractors and participants.
- PY5 – In this evaluation period, we will focus on conducting a statistically adjusted engineering (SAE) analysis to assess gross savings attributable to the program for both electric and gas savings. The evaluation team will also apply the NTGR from the evaluation activities occurring in PY4 to the PY5 gross savings value to obtain a net savings number.
 - The evaluation team will conduct an SAE analysis to determine gross savings for the HEP program for PY4 participants. An SAE model provides the percentage of the program ex ante estimate of measure savings observed in changes in energy usage. The model estimates realization rates for overall customer savings based on the

individual measure savings estimates. Notably, we will also conduct this analysis for the Moderate Income Program participants, given our understanding that there are similar participant databases as well as program designs. Because an SAE analysis requires a complete year of billing data before and a year of billing data after installation of measures, the evaluation team will conduct the analysis in PY5. We will apply the coefficients from this analysis to the measures installed in the PY5 program for gross impacts.

- For the ESHP program, if present, the gross impact effort will consist of the application of per unit TRM savings values to participation levels found in the program tracking database. The evaluation team will continue to apply the NTGR of 0.80 for PY5.
- The evaluation team will apply the NTGR from the evaluation activities occurring in PY4 for the HEP program
- The evaluation team may also conduct site visits to meter DHW measures, including High Efficiency Furnaces and Storage and Tankless Water Heaters. We will coordinate with ongoing TRM efforts to identify the correct measures to meter.
- PY6 - In this evaluation period, we will focus on participant verification and the application of previously calculated analytical coefficients for savings values to provide a PY6 value. We will also provide process-related feedback gleaned from our participant survey, possibly including measure persistence.
 - The gross impact effort will consist of the application of the coefficients from the analysis in PY5 to the measures installed in the PY6 program for per-unit gross impacts and installation rates determined through the participant survey.
 - The evaluation team will apply the PY4 participant survey net-to-gross results to determine net program savings for the HEP program. If the ESHP pilot continues, the evaluation team will field a self-report net-to-gross battery with the participant survey to identify PY6 NTGR for the program.
 - The evaluation team will again field a quantitative participant survey to assess program processes, such as customer satisfaction with program aspects and recommendations for improvement, as well as to verify installation of energy savings measures installed as part of the home energy audit and subsequent shell and HVAC measures. In addition, the evaluation team will also include a self-report net-to-gross battery to assess savings attributable to the program. We will apply the NTG ratio to PY8 savings values for both programs. We plan to complete enough interviews with program participants to provide statistically valid findings regarding each program.
 - The evaluation team will also conduct approximately 10 to 15 in-depth interviews with a variety of market actors in PY6. These market actors include CSG auditors in the field (n=2) as well as HEP and HVAC Program Allies (n=13). These interviews will review program implementation successes and challenges, in addition to understanding barriers to participation for both contractors and participants.
- Potential for updating components of the algorithms within the Statewide TRM
 - There are several measures incented within this program where we plan additional evaluation activity to support updates.
 - We anticipate updating components of algorithms for storage Water Heater / Tankless Water Heater. However, we will revisit this choice prior to writing our PY5 plan.

- Other measures such as insulation, showerheads, aerators, and bulbs are better suited to be metered for other program efforts.

3.5 RESIDENTIAL APPLIANCE RECYCLING

The Appliance Recycling Program (ARP) promotes the retirement and recycling of primary and secondary inefficient refrigerators and freezers from AIC’s electric households by offering a turn-in incentive and free pickup of working equipment, as well as information and education on the cost of keeping an inefficient unit in operation. The target market for this program is residential electric customers with working refrigerators and freezers that are between 10 and 27 cubic feet in size. This program has been in place for three years.

Table 11. Appliance Recycling Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	Review program from a process standpoint	Review sample of receipts for participants for verification	Review program from a process standpoint
Program Manager and Implementer Interviews (CSG)	2 interviews CSG (n=1) Ameren (n=1)	2 interviews CSG (n=1) Ameren (n=1)	2 interviews CSG (n=1) Ameren (n=1)
Market Actor Interviews	In-depth interview with ARCA (n=2)		In-depth interview with ARCA (n=2)
Participant Survey for Process, verification, and NTGR	Telephone survey (n=140)		Telephone survey (n=140)
Non-Participant Survey for NTGR			Telephone survey (n=140)
Gross Impact Approach	Fixed per-unit values from Order	Statewide TRM values	Statewide TRM values
Net Impact Approach	PY4 Results	PY4 Results	PY4 Results
Budget	\$ 58,000	\$ 16,500	\$ 63,000

➤ Studies by year

- PY4 - We will focus on calculation of an updated NTGR and participant verification.

- We will base gross impacts on the fixed per-unit values in the Order and application with self-reported participant verification from our participant survey.
 - Our telephone survey of participants will enable the calculation of a new NTGR. We will apply the PY4 NTGR retrospectively.
 - We will obtain process information such as satisfaction with the program from our participant survey.
 - **PY5 – We expect little change to this program in PY5 and will perform a limited evaluation.**
 - We will verify participation through a review of the program tracking database. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM. The Statewide TRM team has not yet decided if the appliance recycling measure in Statewide TRM will have a fixed value or use coefficients for savings based on the configuration of refrigerators and freezers. We will apply the chosen method.
 - We will use the PY4 NTGR for PY5.
 - **PY6 – Because the vintage of recycled models tends to change over time, we will perform a similar evaluation in PY6 as we did for PY4.**
 - We will verify participation through our participant survey. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM. The Statewide TRM team has not yet decided if the appliance recycling measure in Statewide TRM will have a fixed value or use coefficients for savings based on the configuration of refrigerators and freezers. We will apply the chosen method.
 - We will calculate PY6 net impacts using the NTGR calculated in PY4.
 - Our telephone survey of participants and non-participants will enable the calculation of an updated NTGR. This program is not new and has not changed in design. In addition, the program has previously been evaluated to obtain an NTGR, and provides a moderate level of savings across the portfolio. As a result, evaluators should apply the NTGR calculated in PY6 prospectively to PY8.
 - We will obtain process information such as satisfaction with the program from our participant survey.
- **Potential for updating components of the algorithms within the Statewide TRM**
- We know that ComEd evaluators are currently conducting a metering study of refrigerator and freezer usage in units prior to recycling. We expect the results of that study to be included in the Statewide TRM.
 - We plan to use the PY4/PY5 on-site lighting study to collect information from AIC homes about secondary refrigerators and freezers to determine if there is a difference in units (either in terms of configuration or age) that would indicate use of coefficients from the ComEd service territory would not be valid. Additionally, we will mine the past participation databases to determine if previously recycled units are different from what was metered in ComEd. Results of that analysis may point towards the need for an AIC-specific metering study for appliance recycling. If so, we may perform such a study in PY6.

3.6 RESIDENTIAL MULTIFAMILY PROGRAM

The Multifamily Program encompasses three program components: common area lighting, tenant unit installations, and major measures. The common area lighting component primarily focuses on replacement of standard efficiency common area lighting with high-efficiency fluorescent lighting, and incandescent and fluorescent exit signs with LED exit signs. The tenant unit installation focuses on the installation of measures in tenant units related to a limited number of incandescent lighting replacements and water conservation measures. The major measure portion of the program will address more expensive complex measures, such as replacing central heating units, adding insulation, and performing air sealing.

Based on previous evaluation results, it appears that this program has the potential to garner larger energy savings through potentially increasing participation and/or adding more eligible measures. However, due to the relatively low savings compared to other programs in the portfolio, we are focusing our efforts on PY5 with limited evaluation in PY4 and PY6.

Table 12. Multifamily Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	X (n=2)	X (n=2)	X (n=2)
Secondary Research/Other Multifamily Program Manager Interviews		X	
Property Manager Survey		Process, verify installation, includes NTG for common area lighting, measure persistence (n=~40)	
Onsite Audits		X (n=100)	
Gross Impact Approach	Fixed Values / Engineering Analysis	Fixed Values / Engineering Analysis	Fixed Values / Engineering Analysis
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
Budget	\$20,000	\$80,000	\$25,000

➤ Studies by year

- PY4 - We will perform a limited evaluation in PY4 that will allow us to develop a well-grounded understanding of the program’s implementation strategy.

- We will verify participation through a review of the program tracking database. We will calculate gross impacts from this verification multiplied by the fixed values for this program in the Order. We do not expect to have any measures not covered as a fixed value, but if that occurs, we will perform engineering analysis for those measures.
- When considering the structure from the NTGR framework, this program is not new; there was a previous NTGR calculated for common area lighting (while in-unit items used a value of 1.0 as they were direct install measures), and it brings in a relatively small level of savings for the overall portfolio. As a result, we will use the PY2 NTGR for PY4.
- **PY5** – In this evaluation period, we focus our budget on surveys with property managers to calculate a NTGR for common areas. Additionally we have scheduled on-site audits to perform verification of direct install and common area lighting measures. We understand that previous on-site audits were difficult due to lack of contact information. We expect to work with the implementation team to improve program tracking that will facilitate this effort.
 - Measures persistence is a significant input to determining gross impacts associated with Multifamily Programs. Our experience evaluating similar programs indicates that measures installed in tenant-occupied spaces are often removed, particularly when the installations occur in building “sweeps,” at times when tenants may not be in the unit. In PY5, we will include field verification of measure persistence through site visits to a sample of participating buildings.
 - The gross impact effort will consist of application of fixed values for measures in the Statewide TRM multiplied by installation verification values from our on-site audits and surveys with property managers.
 - We will collect self-report data for a common area lighting NTGR from PY5 participating property managers for use prospectively in PY7. We will continue to apply the PY2 NTGR for PY5.
 - Because we plan to talk directly with customers in PY5, we will also include a short, targeted process assessment of the program. We will inquire about satisfaction with implementation aspects of the program such as interactions with the implementation team agents and quality of the direct install measures (through asking the property manager about any known complaints). We expect to work with AIC to determine if there are other areas for inclusion.
 - We will also conduct secondary research of similar multifamily programs across the country to compare and contrast program design and implementation strategies. This secondary research may include a look at the market size and opportunity size for the Multifamily Program in AIC territory to see how much further growth AIC can expect. We will focus this research on developing recommendations for further program improvements that may increase the program’s savings potential in future years.
- **PY6** – This year’s analysis will mimic the PY4 evaluation.
 - As with the PY4 effort, the gross impacts will be determined from a review of the program tracking database for verification and application of per-unit savings from the Statewide TRM.

- Although we will have calculated a new common area lighting NTGR in PY5, the value will not be available until partway into PY6. As such, we will continue to apply the PY2 NTGR for PY6.
- Potential for updating components of the algorithms within the Statewide TRM
 - This program provides direct installation of CFL bulbs, low-flow showerheads, and faucet aerators, all of which are high-impact measures. However, given the overall budgets, our data collection effort for this program is not able to leverage the on-site audits in PY5 to support updated values for the Statewide TRM.
 - We plan evaluation activity in PY5 for low-flow showerheads and faucet aerators within the Home Energy Performance program. We can apply values from that effort to the multifamily population for these measures.
 - Additionally, we plan to conduct a residential light logger study to gather primary data on hours of use and coincidence as part of the Residential Lighting program evaluation.

3.7 RESIDENTIAL MODERATE INCOME PROGRAM

The Moderate Income program was implemented as a pilot program in the Decatur area during PY3, and has not yet been evaluated. As such, the evaluation team will conduct both process and impact evaluation efforts for the Moderate Income Program for PY4.

Table 13. Moderate Income Program Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=2)	X (n=2)	X (n=2)
Market Actor Interviews (Energy Assistance Foundation, HEP Energy Auditors, Program Allies (HVAC and HEP) ^a	X (n=5-7)		X (n=5-7)
Participant Survey	Process and Installation Verification (n=TBD)		Process and Installation Verification (n=TBD)
Gross Impact Evaluation Approach	Application of per unit savings, Fixed from Order	Statistically Adjusted Engineering Analysis	Application of PY5 SAE coefficients
Net Impact Evaluation Approach ^b	Default Value	Default Value	Default Value
Budget	\$34,500	\$35,000	\$50,000
^a Notably, we will combine our market actor interview efforts with our Home Energy Performance evaluation activities. ^b Per discussions among the evaluation team, AIC and ICC staff, we will apply a NTGR of 1 for this program.			

Activity	PY4	PY5	PY6

➤ Studies by year

- **PY4** – There was no previous evaluation effort for the Moderate Income Program as it was a pilot program during PY3. As such, the evaluation team will focus on assessing program impacts and processes for PY4.
 - The gross impact effort for PY4 will involve the application of per-unit savings to PY4 participants and the verified participation rates from the participant survey. The evaluation team will conduct an engineering review for any measures that do not have a fixed value or will not be determined through the TRM effort.
 - The evaluation team will not perform a net-to-gross analysis for this program; rather we will apply an agreed upon net-to-gross ratio of 1.0 given our understanding of program design and targeted customers from discussions with Ameren, ICC staff and the evaluation team.
 - The evaluation team will field a quantitative participant survey to assess program processes, awareness of the program; audit satisfaction; preferred methods for receiving energy efficiency information; actions taken; key demographics; installation of measures, i.e., number of measures received and installed. We plan to complete enough interviews with program participants to provide statistically valid findings regarding the program.
 - We will also conduct in-depth interviews with the program coordinator at the Energy Assistance Foundation, as well as HEP and HVAC Program Allies and CSG auditors.
- **PY5** – In this evaluation period, we will focus on conducting a statistically adjusted engineering analysis to assess gross savings attributable to the program for both electric and gas savings. The evaluation team will also apply the net-to-gross value of 1.0 to the PY5 gross savings value to obtain a net savings number.
 - The evaluation team will conduct an SAE analysis to determine gross savings for the program for PY4 participants. An SAE model provides the percentage of the program ex ante estimate of measure savings observed in changes in energy usage. The model estimates realization rates for overall customer savings based on the individual measure savings estimates. Notably, we will also conduct this analysis for the HEP program participants, given our understanding that there are similar participant databases. Because an SAE analysis requires a complete year of billing data before and a year of billing data after installation of measures, the evaluation team will conduct the analysis in PY5. The evaluation team will apply the coefficients from this analysis to the measures installed in the PY5 program for gross impacts.
- **PY6** – In this evaluation period, we focus on participant verification and the application of deemed savings values to provide a PY6 value. We will also provide process-related feedback gleaned from our participant survey.
 - The gross impact effort will consist of the application of the coefficients from the analysis in PY5 to the measures installed in the PY6 program for per-unit gross impacts and installation rates determined through the participant survey.
 - The evaluation team will field a quantitative participant survey to assess program processes, awareness of the program; audit satisfaction; preferred methods for

receiving energy efficiency information; actions taken; key demographics; installation of measures, i.e., number of measures received and installed. We plan to complete enough interviews with program participants to provide statistically valid findings regarding the program.

- We will also conduct in-depth interviews with the program coordinator at the Energy Assistance Foundation, as well as HEP and HVAC Program Allies and auditors.
- Potential for updating components of the algorithms for high-impact measures associated with the Moderate Income Program
 - We see no measures in this program where additional data collection will be a cost-effective use of the evaluation budget.

3.8 RESIDENTIAL ENERGY EFFICIENCY PRODUCTS

The Residential Efficient Products Program (REEP) provides rebates and in-store advertising for energy-efficient products sold at retail outlets in AIC’s territory. AIC works with its implementers in coordination with industry retailers and manufacturers, while also educating customers on the benefits of efficient products. The goal of REEP is to reduce market barriers and create sustained demand and market for these products over time.

Table 14. Efficient Products Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	3 interviews CSG (n=1) Ameren (n=1) and APT (n=1)	3 interviews CSG (n=1) Ameren (n=1) and APT (n=1)	3 interviews CSG (n=1) Ameren (n=1) and APT (n=1)
Retailer Interviews		Participation retailers (n=10)	
Participant Survey	Telephone survey n=210 (30 per product)		Telephone survey n=210 (30 per product)
Gross Impact Approach	Fixed per-unit values from Order	Statewide TRM values	Statewide TRM values
Net Impact Approach	Participant Survey	PY4 Results	PY4 Results
Budget	\$ 74,500	\$ 55,000	\$ 78,000

➤ Studies by year

- PY4 - We will focus on obtaining a NTGR for prospective application and process findings.
 - We will base gross impacts on the fixed per-unit values in the Order and application with self-reported participant verification from our participant survey.
 - We will calculate PY4 Net impacts using the results from the participant survey.
 - We will obtain process information from the participant survey to aid in understanding participants' motivations for purchasing the products, as well as how program marketing and incentives influenced their decision-making. We will also collect satisfaction information such as satisfaction with the program, rebate level, speed of rebate delivery, influence of sales personnel, etc. in our participant survey.
- PY5 - We expect little change to this program in PY5 and will perform a limited evaluation.
 - We will verify participation through a review of the program tracking database. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM.
 - We will use the PY4 NTGR for PY5.
 - We will use a retailer survey in PY5 as the program gains momentum to obtain process findings and market effects information such as satisfaction with the program implementation, stocking levels and changes in stocking, program impacts on sales, and ease of finding qualified equipment.
- PY6 - We will focus on how this program is performing over time, as well as collecting another NTGR.
 - We will verify participation through our participant survey. We will calculate gross impacts from this verification multiplied by the values for this program in the Statewide TRM.
 - We will calculate PY6 net impacts using the NTGR calculated in PY4.
 - Our telephone survey of participants will enable the calculation of a self-report NTGR. Since we will have found an NTGR in PY4 and have an understanding of the variation in responses, we will use our experience to determine the appropriate sample size to obtain 90/10 precision and may increase the sample from what we present if needed. Evaluators should use the results from PY6 in PY8.
 - We will obtain process information such as satisfaction with the program from our participant survey.

➤ Potential for updating components of the algorithms within the Statewide TRM

- There are several measures incented within this program where additional evaluation activity would help to update components within the Statewide TRM. Heat pump water heaters, thermostats, and gas water heaters are all included as high-impact measures.
- There are no plans to use budget within this program to obtain primary data collection that could support the Statewide TRM values. However, we may consider gathering age data on gas water heaters during our PY4/PY5 lighting on-site audits to inform baseline usage for this measure.

3.9 RESIDENTIAL ENERGY STAR NEW HOMES

The ENERGY STAR New Homes program targets builders with a package of services, including training, technical information, and marketing assistance and incentives for construction of ENERGY STAR new homes (homes with a HERS Index of 85 or lower). The incentive is designed to defray the cost of the required home energy rating. In addition, the program provides cooperative marketing support for builders.

Implemented by CSG, the program targets builders of new single- and multi-family homes heated with a fuel (natural gas or electricity) provided by AIC.

Table 15. Residential ENERGY STAR New Homes Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	X (n=2)	X (n=2)	X (n=2)
Market Actor Interviews			Contractor / Builders (n=15)
Gross Impact Approach	Review program records for participating homes and confirm ex ante savings are calculated properly	Review program records for participating homes and confirm ex ante savings are calculated properly	Review program records for participating homes and confirm ex ante savings are calculated properly
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
Budget	\$10,000	\$10,000	\$20,000

➤ Studies by year

- PY4 – Our approach is driven by the very low budgets and low expected participation for the program.
 - Gross impact evaluation will focus on review of program records and confirmation of ex ante savings through a limited engineering review. This will involve review of the REMRate files for some (or all depending on how low participation is) of the program homes.
 - We will calculate net impacts per the NTG framework. For this program, the value is based on the PY2 Ameren Docket.
- PY5 – Even for PY5, though, probable low participation and low overall level of savings for the portfolio drives our approach.

- The gross and net impact approaches will be identical to PY4. We will calculate net impacts using the fixed NTGR for PY5 from the Order.
- PY6 – We have evaluation budget to expand this program’s evaluation somewhat in PY6 and plan to talk with contractors for assessment of an NTGR.
 - As we did for PY4 and PY5, we will determine gross impacts through a review of program records and confirmation of ex ante savings through a limited engineering review.
 - We will calculate net impacts using the fixed NTGR for PY6 from the Order.
 - In general, this is a new program in Plan 2 (PY4-PY6), which would suggest research is needed to develop an updated NTGR. However, because of the low level of savings expected from this program, we have not made NTG research in advance of Plan 3 planning efforts a priority for this program. Given that our evaluation budget loosens up in PY6, we plan to obtain information from contractors to obtain a NTGR during that time. We are willing to discuss this deviation from the agreement between AIC and ICC staff that specifies all programs will have an updated NTGR prior to the Plan 3 filing.
- Potential for updating components of the algorithms within the Statewide TRM
 - Residential ENERGY STAR New Homes programs look holistically at building practices in the homes. These are not high-impact measures and are not part of the current Statewide TRM, nor do we recommend that any new construction measure become a deemed measure.
 - There are no measures within this program where additional evaluation activity would help to update components within the Statewide TRM.

4. COMMERCIAL & INDUSTRIAL PROGRAM STUDIES

The commercial & industrial (C&I) portfolio is consists of four programs: standard, custom, retro-commissioning, and new construction. We present them here in order of magnitude of overall savings.

4.1 C&I COMMERCIAL STANDARD

The C&I Prescriptive Incentive program offers AIC business customers fixed incentives for the installation of specific energy efficiency measures. The program covers lighting, variable frequency drives (VFDs), HVAC, refrigeration equipment, and motors. In addition, the program includes an online store available to all business customers that offers a variety of energy saving products, including Compact Fluorescent Lamps (CFLs), exit signs, and vending misers in a convenient and easy to use delivery mechanism.

The C&I Prescriptive Incentive program is the largest contributor to C&I portfolio savings and has received both impact and process evaluations since PY1. During that time, we have performed impact evaluation through TRM review, as well as through telephone verification of measure installation and operation. In PY4, the evaluation team will begin to perform on-site verification activities for large lighting projects given the scope of these projects and the challenge of recalling project details of this magnitude over the phone.

In addition, the evaluation team will implement installation verification approaches for the Standard Program's smaller components such as the Online Store and Direct Install efforts. The following table provides an overview of the evaluation activities planned by year.

Table 16. Commercial Standard Program Evaluation Activities by Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=4)	X (n=4)	X (n=4)
Energy Advisor or Key Account Executive Interviews	X (n=5)		X (n=5)
Program Ally Internet Survey	X (n=70)		X (n=70)
Participant Survey: Standard	Installation Verification and NTG (n=180)	Installation Verification (n=180)	Installation Verification (n=180)
Participant Survey: Green Nozzles	Installation Verification (n=100)	Installation Verification (n=100)	Installation Verification (n=100)
Participant Survey: Online Store	Installation Verification and NTG (n=90)	Process and Installation Verification (n=90)	Installation Verification (n=90)
Non-Participant Survey		X (n=200)	
Site Visits	X (n=40)	X (n=40)	X (n=40)
Gross Impact Approach	Fixed Values & Site Verification	Fixed Values & Site M&V	Fixed Values & Site M&V
NTG Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	PY4 Results
Budget	\$220,000	\$250,000	\$210,000

Below we describe the rationale for our planned activities.

➤ **Studies by year**

- **PY4** – Given the extensive process evaluation performed between PY1 and PY3, the PY4 evaluation effort will focus on installation verification.
 - We will perform site visits to support the determination of gross impacts for large lighting projects. The team will also use telephone surveys to verify installation for smaller lighting and other project types.
 - Because we have only one year of data for customers in the Online store, we will gather free ridership and spillover information via telephone surveys with participating customers in the Online Store for use prospectively in PY6.

- For all other standard participants, we will continue to apply the PY3 NTGR per the NTG framework in PY4.
 - The team will assess the performance of newly added Energy Advisor staff in recruiting eligible customers, as well as the growth of the Program Ally Network.
 - PY5 – Similar to PY4, the PY5 evaluation will focus on impact assessment through telephone and on-site verification. The new EISA standards take effect at the beginning of PY5. These standards require manufacturers to increase efficiency for linear fluorescent bulbs. While T12 bulbs may continue to be manufactured after June 2012 (as there are T12 bulbs meeting the efficiency level already), we expect that companies will have fewer opportunities to purchase T12 replacement bulbs. This may lead to entities retrofitting their linear fluorescent fixtures at a different rate than seen earlier for reasons outside of the program, and a somewhat different NTGR for these lighting retrofits.
 - As in PY4, the team will estimate gross savings based on a combination of on-site Measurement and Verification (M&V) for large lighting projects and telephone-based installation verification.
 - We will gather free ridership and spillover information via telephone surveys with participating customers in the core program for use retrospectively for the lighting and will use the PY3 NTGR per the NTG framework in PY5 for non-lighting end uses.
 - We will conduct non-participant research to explore barriers to participation and program awareness among key sectors targeted by the ActOnEnergy program (e.g., lodging, agriculture, and commercial kitchens). We have prioritized this research for PY5 to see whether participation in these sectors increases in PY4.
 - In addition, we will conduct process evaluation work with Online Store participants to assess the online experience and the impact of any special initiatives on participation.
 - PY6 – In the final year of evaluation, the emphasis on impact analysis continues. However, we will also implement specific process evaluation tasks aimed at the Program Ally Network and Energy Advisor staff integral to customer recruitment and relationship building.
 - The team will estimate gross impacts based on on-site and telephone-based verification.
 - We will consider performing additional research on free ridership and spillover for lighting in PY6. However, we expect to apply the NTGR developed in PY5 for lighting and will use the PY3 NTGR per the NTG framework for non-lighting end uses to determine net savings attributable to the program.
- Potential for updating components of the algorithms within the Statewide TRM
- As part of the PY3 evaluation of the Standard Program, the team conducted a lighting hours of use (HOU) study to provide AIC with annual hours of operation and coincidence factor information specific to its territory. AIC and ICC staff are currently exploring the potential use of this data in the Statewide TRM.

4.2 C&I CUSTOM

The C&I Custom Incentive Program allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the Standard Program. The availability of this program option allows customers to propose additional measures and tailor projects to their facility and equipment needs. In general, Custom incentives are available for lighting, HVAC, refrigeration, and motors. Participants can also implement projects involving compressed air, drives, energy management systems, and industrial process measures.

Prior evaluations of this program utilized on-site M&V to provide estimates of gross savings, an approach that will continue through PY6. In addition, the evaluation team will conduct targeted process evaluation to provide actionable feedback to AIC program staff. The following table provides an overview of the evaluation activities planned by year.

Table 17. C&I Custom Program Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=4)	X (n=4)	X (n=4)
Energy Advisor Interviews or Key Account Executive	X (n=5)		X (n=5)
Program Ally Internet Survey	X (n=70)		X (n=70)
Staffing Grant Participant Interviews	X (n=10)		
Participant Survey		Process and NTG (n=70)	
Site Visits	X (n=60)	X (n=60)	X (n=60)
Custom Baseline M&V	X (n=5)	X (n=5)	X (n=5)
Gross Impact Approach	Site M&V	Site M&V	Site M&V
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
Budget	\$222,000	\$200,000	\$180,000

Note: The in-depth interview and Program Ally survey tasks are conducted in conjunction with the Standard Program.

Below we describe the rationale for our planned activities.

➤ **Studies by year**

- **PY4** - Our PY4 evaluation effort will focus on impact analysis given the Custom Program's strong performance over the prior three years and the relative consistency in its design and implementation.

- We will perform site visits to support the impact assessment of the Custom program since the program does not use fixed per-unit savings values. As part of this task, we will provide AIC will site M&V plans for up to 10 sites included in our sample. We expect these to be the largest sites.
 - The team will also perform M&V and/or conduct pre-participation meetings with AIC on up to five large Custom projects to support discussions of the baseline. AIC will choose sites where there is a high level of uncertainty around how the evaluation team will determine baseline savings.
 - Based on three years of prior NTG research and consistency in our findings, the team will apply the PY3 NTGR per the NTG framework for PY4. However, we will also use interviews with Staffing Grant participants in PY4 to focus specifically on the potential spillover from this program offering. We will revisit the NTGR in PY5.
 - In addition, we will implement research tasks aimed at assessing the performance of new program marketing and outreach efforts such as the Staffing Grant Initiative and the addition of Energy Advisor staff.
 - PY5 – The PY5 evaluation will continue to allocate resources to on-site M&V, but also allow the team to revisit the program’s NTGR through customer research.
 - We will gather free ridership and spillover information via telephone surveys with participating customers for use prospectively in PY7. We will continue to apply the PY3 NTGR per the NTG framework in PY5.
 - PY6 – Emphasis on site-based M&V will continue in PY6 given the nature of Custom projects. We will also revisit specific process evaluation tasks geared towards mechanisms for customer recruitment, although we may adjust this focus based on changes to the program throughout the three-year cycle.
 - As in PY4 and PY5, the team will estimate gross impacts based on on-site M&V.
 - We will apply the fixed NTGR from the Order for PY6.
- Potential for updating components of the algorithms within the Statewide TRM
- Custom projects are site specific and therefore generate varied savings. As a result, there are no measures within this program where additional evaluation activity would help to update components within the Statewide TRM.

4.3 C&I RETRO-COMMISSIONING

The Retro-Commissioning Program is completing its third year, having begun in PY2. The PY2 evaluation included both impact and process evaluations due to the newness of the program. The PY3 evaluation only included a process evaluation because the savings from the program did not merit back-to-back impact evaluations.

Despite increases in participation, Retro-Commissioning remains a small portion of the overall portfolio goals. As such, it will have a lower profile in the evaluation scope and budget. For PY4, the evaluation focus will switch from process to impacts. Key program personnel interviews will continue annually.

Table 18. Retro-Commissioning Program Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	x	x	X
Program Manager and Implementer Interviews (SAIC)	X (n=4-5)	X (n=4-5)	X (n=4-5)
RSP Interviews	X (n=6)	X (n=5-6)	
Participant Survey	NTG (n=15)	Process and NTG (n=16)	
Site Visits			X (Up to 6)
Gross Impact Approach	Engineering desk review	Engineering desk review	Engineering desk review and Site M&V
Net Impact Approach	Value from PY4 Evaluation	PY4 Results	PY4 Results
Budget	\$ 83,000	\$ 75,000	\$ 88,000

➤ Studies by year

- **PY4** – The previous evaluation effort focused on the processes of the program. Therefore, the PY4 evaluation will focus on program impacts that the evaluation team has not evaluated for two years.
 - The Impact evaluation in PY4 is really a new beginning for the impact approach. The PY2 impact evaluation focused on compressed air projects, as these were the only projects in the program. So far, PY4 is roughly 50/50 compressed air and healthcare sector plus one commercial project.
 - Similar to the Custom Program, retro-commissioning evaluation does not use fixed per-unit values for the impact assessment. We will perform engineering reviews of program files in PY4 to determine gross impacts for the program.
 - We will conduct NTG focused interviews with participants to expand on NTG research conducted in PY3. We will use this updated NTGR retrospectively in PY4.
- **PY5** – In this evaluation period, we focus our budget on surveys with customers to assess program processes and potentially revisit the program NTGR.
 - The gross impact effort will consist of engineering desk review with targeted calls to customers to clarify questions.
 - Based on the outcome of PY4 efforts and discussions with AIC and ICC staff, we may collect self-report data for an NTGR from PY5 participants for use prospectively in PY7. However, we will apply the PY4 NTGR for PY5.

- Because we plan to talk directly with customers in PY5, we will also include a short, targeted process assessment of the program. We will inquire about satisfaction with implementation aspects of the program such as interactions with the retro-commissioning agents and quality of the initial audit. We expect to work with AIC to determine if there are other areas for inclusion.
- PY6 – We expect the mix of projects begun in PY4 to continue through PY6. Thus, lessons learned and recommendations from PY4 will facilitate analysis in PY5 and especially PY6 since the later projects will be able to adjust to the PY4 recommendations from the outset.
 - For PY6, we will add on-site M&V effort for gross impacts as well as engineering desk reviews.
 - We will continue to apply the PY4 NTGR in PY6 per the NTG framework.
- Potential for updating components of the algorithms within the Statewide TRM
 - Retro-commissioning programs are site-specific with varied savings. While many of the AIC projects are based on savings from compressed air systems, the systems-based approach used through this program is not part of the current Statewide TRM, nor do we recommend that any retro-commissioning measure become a deemed measure.
 - There are no measures within this program where additional evaluation activity would help to update components within the Statewide TRM.

4.4 C&I NEW CONSTRUCTION

AIC expects the commercial new construction program to begin as a separate program in PY5. We will include any new construction projects in our custom analysis for PY4, although we have no plans to call them out separately.

Table 19. Commercial New Construction Planned Evaluation Activities by Program Year

Activity	PY4	PY5	PY6
Program Material Review	This program will not be fully rolled out in PY4	X	X
Program Manager and Implementer Interviews (SAIC)		X	X
Participant Survey		X	
Gross Impact Approach		Engineering desk review of sample or census of projects. Adjust ex ante savings based on engineering review.	Engineering review of sample or census of projects. Adjust ex ante savings based on engineering review.
Net Impact Approach		Secondary Research or Deemed Value (per NTG Framework)	PY5 Value

Activity	PY4	PY5	PY6
Budget	\$0	\$17,500	\$25,000

➤ **Studies by year**

- **PY4** – AIC has traditionally handled new construction projects within the Custom Program. We expect this to occur once again in PY4 and we have allocated no evaluation funds to this program for PY4. We will include them in our Custom Program evaluation.
- **PY5** – We expect these projects to move into their own program. Even for PY5, though, probable low participation and low overall level of savings for the portfolio drives our approach.
 - The evaluation will focus on review of program records and confirmation of ex ante savings through an engineering desk review of a sample of sites. (We may perform this review on a census of sites if there are fewer than seven projects in PY5.) This evaluation will determine a realization rate between the ex ante and ex post findings that we will apply to determine the ex post gross impacts.
 - Because there have been new construction rebates available for the past four years, although not within a specific program, we believe that an NTGR calculated in PY5 should be used prospectively. Additionally, we expect this program to have a small level of savings. We will gather information from participants to obtain a self-reported NTGR for prospective use by evaluators in PY7.
 - Because we plan to talk directly with customers in PY5, we will also include a short, targeted process assessment of the program. We will inquire about satisfaction with implementation aspects of the program such as interactions with the implementation team, time to obtain the rebate check, and professional capabilities of the implementation team. We expect to work with AIC to determine if there are other areas for inclusion.
- **PY6** – We expect to continue seeing economic difficulties in play, leading to low participation and low expected savings from this program.
 - We will continue our PY5 efforts and determine gross impacts through an engineering review of a sample of projects to calculate a realization rate between the ex ante and ex post findings.
 - We will use the fixed NTGR value from the Order to determine PY6 net impacts.

➤ **Potential for updating components of the algorithms within the Statewide TRM**

- Commercial New Construction programs may use a systems approach that provides incentives for specific lighting or HVAC systems. However, these are not typically a high-impact measure and are not part of the current Statewide TRM, nor do we recommend that any new construction measure become a deemed measure.

There are no measures within this program where additional evaluation activity would help to update components within the Statewide TRM.

5. BUDGET ALLOCATIONS BY YEAR

Opinion Dynamics has worked with all the project managers involved in the evaluation to thoughtfully move evaluation budgets between the three years. The table below provides an overview of the budget allocations by year. These are shown in order based on planned evaluation spending in PY4. Note that the total evaluation budgets shown by year align with our contracted amounts.

Table 20. Budget Allocations by Program Year

	Program	PY4	PY5	PY6
1	Commercial Standard	\$220,000	\$250,000	\$210,000
2	Commercial Custom	\$222,000	\$200,000	\$180,000
3	Residential Lighting	\$136,000	\$200,000	\$140,000
4	HVAC	\$132,500	\$158,500	\$170,000
5	Behavioral Modification	\$80,000	\$60,000	\$135,000
6	Efficient Products	\$74,500	\$55,000	\$78,000
7	Commercial Retro-Commissioning	\$83,000	\$75,000	\$88,000
8	Appliance Recycling	\$58,000	\$16,500	\$63,000
9	Home Energy Performance/ESHP	\$46,500	\$114,000	\$60,000
10	Moderate Income	\$34,500	\$35,000	\$50,000
11	Multifamily	\$20,000	\$80,000	\$25,000
12	Residential New Construction	\$10,000	\$10,000	\$20,000
13	Commercial New Construction	\$0	\$17,500	\$25,000
Program Level Efforts		\$1,117,000	\$1,271,500	\$1,244,000
	Other Evaluation Activities	\$166,000	\$146,000	\$146,000
	Technical Reference Manual	\$125,000	\$150,000	\$150,000
	Planning	\$100,000	\$30,000	\$30,000
Total Non-Program Level Efforts		\$391,000	\$326,000	\$306,000
	Contingency	\$9,942	\$6,602	\$12,206
TOTAL		\$1,517,942	\$1,604,102	\$1,562,206

As shown in the table above, in addition to the program-specific budgets, approximately 15% of the annual budgets are allocated to tasks such as our work on the Statewide TRM, cost-effectiveness analyses, or evaluations of the program tracking databases. These budgets will be detailed each

year. (See the PY4 Evaluation Plan.) Our team has also allocated budget for program management tasks (~5%), such as coordination with AIC, the ICC, the SAG and/or other Illinois utilities. Again, these will be broken out each year in the annual plans.

A. HIGH-IMPACT MEASURES

The statewide effort to create a single technical reference manual (TRM) began in December 2011 and continues through 2012. Table 21 provides the listing of high-impact measures (HIM) for the TRM. The HIM will be created first in the TRM and are the most likely candidates for the evaluation studies to provide updates to specific components of the impact algorithms.

Table 21. High-Impact Measures in Statewide Technical Reference Manual

Measure	Residential Electric	Commercial Electric	Residential Natural Gas	Commercial Natural Gas
1	Standard Bulbs	T8/T5 New Fluorescent Fixtures with Electronic Ballast	High-Efficiency Furnace (92% and 95% AFUE), Boilers (AFUE 90-95%)	Steam Trap, Buy Down
2	Heat Pump Water Heaters >=2.0	Pulse Start or Ceramic MH lamps	Low• flow shower heads/Aerators	Furnaces, up to 150 MBTU
3	ER CAC .14.5 SEER	High• Performance or Reduced Wattage Fluor Lamp and Ballast	Air Infiltration Reduction	Boiler Tune up
4	Appliance Recycling • Refrigerators, Freezers, RAC	VSD for HVAC and Process Motors	Tankless Water Heater (EF 0.82)	Hydronic Boilers, 85% or greater
5	Specialty Bulbs	Screw-in CFLs	Wall Insulation	HE Pre-Rinse Spray Valve, Low• Flow Pre-Rinse
6	Air Sealing Electric CAC	Delamp, Fluorescent Lamp, add Reflector	Storage Water Heater, E Factor 0.67	Boiler Reset Controls, Retrofit
7	ECM added to high-efficiency furnace	Lighting Occupancy Sensors	Basement/Sidewall Insulation	Programmable Thermostat
8	High-Efficiency Clothes Washers	Delamp, Fluorescent Lamp, Ballast, Holders	Thermostats	Tankless Water Heater
9	Air Source Heat Pumps SEER 14.5			Commercial Steamer, ENERGY STAR Rated with E of >38%
10	Pool Pumps			Radiant Heaters/Circulation Fans

Source: 1209 - HIM - Residential Gas.xlsx, High Impact List

B. NET-TO-GROSS FRAMEWORK

AIC is required to follow an NTGR framework set out in the re-hearing Order.

The net-to-gross framework is described in the Order with the bullet points copied verbatim below:

1. Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has an estimated NTG ratio, that ratio can be used prospectively until a new evaluation estimates a new NTG ratio.
2. In cases that fall under the paragraph above, once new evaluation results exists, these would be used going forward, to be applied in subsequent program years following their determination until the next evaluation, and so on.
3. For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes - either in the program design or delivery, or changes in the market itself - NTG ratios established through evaluations would be used retroactively, but could also then be used prospectively if the program does not undergo continued significant changes, similar to the first paragraph above.
4. For programs falling under the third paragraph above, deeming a NTG ratio prospectively may be appropriate if: the program design and market are understood well enough to estimate with reasonable accuracy an initial NTG (e.g., based on evaluated programs elsewhere); or it is determined that the savings and benefits of the program are not sufficient to devote the evaluation resources necessary to better estimate a NTG ratio.
5. Recommendations of the SAG to the Commission regarding application of this framework shall be submitted with adequate time for Commission review. If the SAG is not in unanimous agreement in its recommendation, the Commission requests that any recommendation that has the support of more than a majority of SAG members be submitted to the Commission along with a discussion and enumeration of the dissenting opinions.

We have created a three-point set of rules to follow based on the above language that is somewhat simplified.

1. If the program design and delivery methods are stable over time and a previous Illinois evaluation has estimated a NTGR, that NTGR is used prospectively until a new value is calculated. When the new value is calculated, it will be applied prospectively.
2. For existing programs that have been evaluated previously, but are undergoing significant changes in program design or in the market served by that program, or for existing and new programs that have not yet had an evaluation, a NTGR is calculated and applied retroactively (i.e., for the year in which program participants are included in the research).
3. If a previous Illinois evaluation has not occurred, it is possible to deem a NTGR based on secondary research showing other NTGR values from similar programs. This approach is used in two cases:
 - a. If the program design and market is well understood
 - b. If the savings of the program are not sufficient to devote evaluation resources.

We have gone through each program and applied the three-point logic based on our understanding of the programs and markets.

C. PY4 AGREED FIXED PER-UNIT SAVINGS

The embedded files contain the agreed fixed values for the residential and commercial portfolios.



AIC PY4 RES Measure
Values.xlsx



AIC PY4 BUS
Measure Values.xlsx

D. DESCRIPTION OF LATENT GROWTH CURVE ANALYSIS

In support of the Behavioral Modification evaluation in PY6, we propose conducting two impact studies for the OPOWER programs that combine all customers into a single analysis by fuel source, e.g. electric and gas study. To estimate program impacts as well as persistence over time, we propose using Latent Growth Curve Analysis (LGCA). Below we provide some basic information on LGCA at the request of the ICC.

Drawing on LGCA, our team will analyze all Electric and Gas cohorts across time by using a single comparative model. Through this work, we will be able to: (1) estimate total unique impacts by program cohort; (2) total combined impacts by cohort and fuel source; (3) total impacts by fuel source; and (4) persistence curves over time for each fuel source across the cohorts. We describe this method in greater detail.

LGCA provides some advantages over more commonly-used methods for impact evaluations. It predicts kWh consumption patterns, adjusting for climate and other covariates, and also provides a cross-sectional time series analysis. By using LGCA, our team will be able to describe the shape of consumption curves (e.g. first participant consumption goes down, then, levels off, another participant's consumption goes down, then up, then levels off, etc), and how the consumption curves of different groups differ (treatment vs. control, high vs. low consumers, etc).

- **Different Participant Entry Times:** If customers enter the messaging program at different times, different program exposure periods will have to be taken into account. In the cross-sectional time series analysis, this would be handled by a length-of-exposure term; in latent growth curve analysis, it would be handled by having the time 1 date be something different for different participants, with those of shorter duration falling out of the analysis later in the program period. (E.g. If the participant was delayed by three months, then they would fall out of the analysis 3 months earlier than early entrants.)
- **Decay Effects:** For short-term program follow-ups, it can be difficult to tease out the decay of program effects from seasonal effects. This will be more feasible over a three year period where season/weather effects can be statistically controlled and decay can be modeled while controlling for those variables. A large sample size is also a benefit.
- **Market Segmentation:** Segmentation can be accomplished based on how customer characteristics predict consumption and savings patterns. The time series cross sectional analysis can do this on the basis of overall savings. The latent growth curve analysis can do it on the basis of the shape of each customer's consumption curve.
- **Accounting for Participants Opting Out:** Participants who ask to have reports discontinued will remain in the analysis. Their usage patterns may reflect this decision, and their unique usage patterns can be predicted by either a dummy to represent dropout, or by a series of dummies, one for each time point that indicates when the dropout is in or out of the program for a given month.

In addition to these analytical advantages, some additional statistical advantages of this method are: 1) measurement error can be estimated and removed from the relations of interest, 2) errors can be correlated (over time and between predictor variables), 3) Predictor variables can be

correlated, and 4) mediating relations can be estimated (showing by what mechanism the treatment affects outcomes). These are not trivial advantages for understanding how the program works over time for different groups.