Evaluation of Ameren Illinois' Business and Residential Electric and Gas Energy Efficiency Programs 2011-2014

Presentation to Stakeholder Advisory Group

April 17, 2012

Areas Covered by Slide Deck

1. Evaluation Workplan Development Strategy
2. EM&V Coordination and Consistency
3. More Detailed Discussion of Specific Methodologic Questions
4. High-level list of EM&V Methodologies/Approaches by program
5. More Detailed, Program-Specific Discussion of EM&V Approaches

Evaluation Workplan Development Strategy

- **Similar Considerations as Plan 1 (PY1-PY3)**
  - Program percent of portfolio savings
  - Budget available for evaluation
- **Different Considerations for Plan 2 (PY4-PY6)**
  - Gas and electric savings across the portfolio
  - SAG NTG Framework
  - Installation verification
  - Past evaluation findings and per-unit savings

Gross Impacts from Per-Unit Values and Participant Verification

- Per-Unit values have been agreed to between Ameren and ICC
  - Residential per-unit savings
  - Commercial per-unit savings
  - If no per-unit value, will use engineering analysis to create per-unit value
  - Beginning in PY5, will use TRM values
- Participation Verification
  - Level of rigor for participation verification activity depends on budget and measure
    - Program tracking DB review with check of invoices as possible on sample of measures
    - Survey self-report
    - On site audits

EM&V Coordination

Ameren Program	ComEd	Nicor*	Integrys
C&I Custom	●	○	○
C&I Standard	●	○	○
C&I Retro-Cx	●	●	●
NRNC	NA for PY4		
Res Lighting	●	NA	NA
Res HVAC	NA	○	○
Behavioral Modification	○	○	NA
Appliance Recycling	●	NA	NA
Home Energy Performance	○	○	○
Energy Efficiency Products	○	○	○
Multi-family	○	○	○
RNC	○	NA	NA

● Have discussed methods
○ Will discuss methods in the near future

*Our understanding is that Navigant is not yet under contract

NTG Framework - Original

- This framework has four points that are provided verbatim from the order :

1. Where a program design and 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 point 1, once a 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 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 point 3, deeming a NTG ratio prospectively may be appropriate if: the program design and market are understood well enough to estimate with reasonable accuracy and 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.

NTG Framework - Simplified

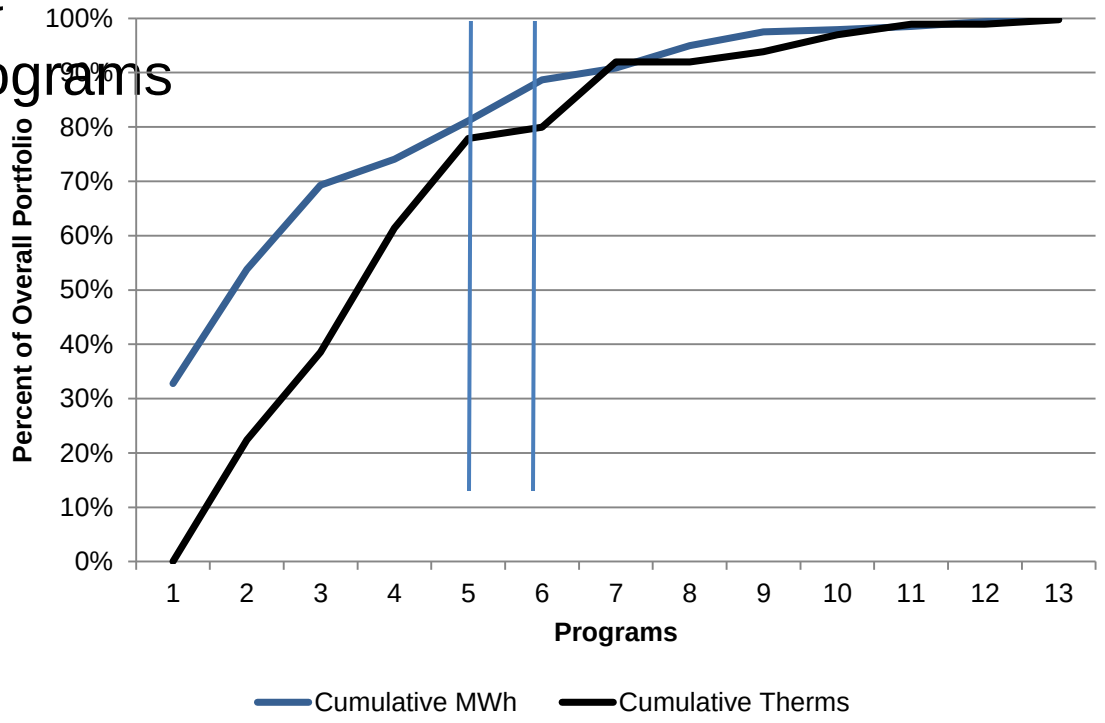
- Our three-point set of rules to follow based on the NTG Framework is somewhat simplified.
  1. If the program design and delivery methods are stable over time and a previous Illinois evaluation has estimated a NTGR, that NTGR is used prospectively until a new value is calculated. When the new value 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 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.

Planned NTGR Application

Program	Previous Illinois Evaluation NTGR	Significant change in program design or market	Level of Portfolio Savings	Perform NTG analysis and apply retrospectively	Perform NTG analysis and apply prospectively	Year of NTG Analysis	Year of NTGR Application
Lighting	●	●	↑↑↑	●		PY5	PY5 / PY6
Standard	●		↑↑↑		●	PY4	PY6
Custom	●		↑↑↑		●	PY5	PY7
HVAC	●		↑↑↑		●	PY5	PY7
Behavioral Modification	● (net analysis)		↑↑	● (net analysis)		Each Year	Each Year
Retro-Cx	●		↑↑		●	PY5	PY7
Home Energy Performance			↑↑	●		PY4	PY4
Appliance Recycling	●		↑↑		●	PY4	PY6
Electric Space Heat Pilot			↑		●	PY4	If needed, PY6
Multi-family	●		↑		●	PY5	PY7
Moderate Income			↑	Deem NTGR=1		PY4	PY4
Efficient Products		● (new measures)	↑	●		PY4	PY6
Residential New Construction			↑		●	PY6	PY8
Nonresidential New Construction			↑		●	PY5	PY7

Portfolio Evaluation

- 13 Programs – 1 Pilot
  - 9 Residential Programs
  - 1 Residential pilot
  - 4 Commercial Programs



EM&V Activities by Program

- Presented in ordered by MMBTU savings (highest to smallest) using newest information from the PY4 Program Implementation Plans, but the team still needs to have our discussions with many of the program managers
- Presented for the three year assessment period to highlight the variation by year

Residential Lighting

- Provides 33% of PY4 portfolio MWh and 0% of PY4 portfolio Th

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 and storage rate from onsite audits	Participation based on database review, leakage and res/ commercial split from intercepts, and storage rate from onsite audits	Participation based on database review and storage rates from PY5 onsite audits
Net Impact Approach	Fixed Values from Excel File	Customer Intercepts	Customer Intercepts
Budget	**$136,000**	**$200,000**	**$140,000**

Commercial Standard

- Provides 21% of PY4 portfolio MWh and 22% of PY4 portfolio

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	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 and NTG (n=100)	Installation Verification (n=100)	Installation Verification (n=100)
Participant Survey:	Installation Verification and NTG	Process and Installation Verification	Installation Verification
Online Store	(n=90)	(n=90)	(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 Verification	Fixed Values & Site Verification
Net Impact Approach	Fixed Value	Fixed Value	PY4 Results
Budget	**$220,000**	**$250,00**	**$210,000**

Commercial Custom

- Provides 16% of PY4 portfolio MWh and 16% of PY4 portfolio Therms

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	Fixed Value	Fixed Value	Fixed Value
Budget	**$200,000**	**$200,000**	**$180,000**

HVAC

- Provides 5% of PY4 portfolio MWh and 23% of PY4 portfolio

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 verification only.	Telephone Survey n=150 (- 30 per measure x 5 equipment types)	Telephone Survey for verification only n=150
Metering	48meters installed; proportional mix of CAC, ASHP, GSHP (May 2012).	CAC meters removed, heat pump data downloaded (Oct 2012) 48 meters installed in furnaces and boilers (Oct 2012)	Meter removals: boiler meters; furnace meters ASHP meters; GSHP meters
Gross Impact Approach	Fixed values from Excel File	Statewide TRM	Statewide TRM and/ or PY4 metering results for cooling equipment
Net Impact Approach	Fixed NTGR from Excel File	Fixed NTGR from Excel File	Fixed NTGR from Excel File
Budget	**$132,500**	**$158,500**	**$ 170, 000**

Behavioral Modification

- Provides 7% of PY4 portfolio MWh and 17% of PY4 portfolio Therms
- Database crosscheck will remove overlaps with other program savings

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	OPOWER and Ameren Interviews (n=2)	OPOWER and Ameren Interviews (n=2)	OPOWER and Ameren Interviews (n=2)
Treatment and Control Group Survey			Random sample of 200 dropped[a] group/ 200 treatment from Pilot
			Random Sample of 200 Treatment/ 200 Control participants (if needed)
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 also include a persistence analysis.
			Billing analysis (gas/ electric) for original Pilot participants in 3rd 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**

a The program has a natural persistence experiment in place when they discontinue mailings to 107,000 customers in May 2012. We will also conduct interviews with this group after the two-year mark to study persistence.

Retro-Commissioning

- Provides 8% of PY4 portfolio MWh and 2% of PY4 portfolio Therms

Activity	PY4	PY5	PY6
Program Material Review	x	x	X
Program Manager and Implementer Interviews (SAIC)	4-5	4-5	4-5
Market Actor Interviews		5-6	
Participant Survey		16	
Site Visits	none	none	Up to 6
Gross Impact Approach	Engineering desk review	Engineering desk review	Engineering desk review and M&V
Net Impact Approach	Fixed Value	Fixed Value	Fixed Value
Budget	**$68,000**	**$75,000**	**$88,000**

Program Specific Questions - Residential

- **Behavior Programs:** How will persistence be measured?
- **Home Performance With Energy Star (Comprehensive Residential Retrofits):**
  - How will evaluators validate savings claims from audit tools to ensure forecasted savings are realized in practice?
  - Conversion rates between audits and installations are low in IL. Perform process evaluation to understand how conversion rates can be increased to match "best-in-class" conversion rates in other programs.
- **Multi-Family**
  - How can program designs for Multi-Family be altered to achieve comprehensive retrofits in multi-family that go beyond the low-cost, direct install measures?
- **Lighting**
  - How will residential lighting NTG values be calculated to ensure consistent results?
  - What approach will evaluators take to determine new residential lighting baseline given EISA? Assess impact of "hoarding" and stocking practices.

Program Specific Questions – Commercial

- **Distribution of Lighting Measures:** Collect and report information on the distribution of commercial lighting measures. What percent are T-8 versus high-performance T-8 versus new technologies (such as LEDs). Goal is to assess baseline so that programs can move towards pushing more advanced lighting technologies.
- **Impact of New Commercial Lighting Standards:** What is the remaining inventory of old, inefficient bulbs, and how does this impact changing baselines?
- **Process Evaluations: Commercial New Construction and Custom**
  - Are retrofits single measure or comprehensive?
  - How "deep" are savings?
  - Develop recommendations on how to move customers to more comprehensive projects
  - New Construction: What percent of projects are prescriptive versus comprehensive? Is program getting to customers early in program design and influencing architect's plan in comprehensive way?

Additional Programs

Home Energy Performance (and Pilot)

- Provides 3% of PY4 portfolio MWh and 12% of PY4 portfolio Therms

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	2 to 4	2 to 4	2 to 4
Market Actor Interview	CSG Energy Advisors, HEP Program Allies n=10-15		CSG Energy Advisors, HEP Program Allies n=10-15
Participant Survey[a]	Process, verification, NTG n=TBD		Process, verification n=TBD
Site Visits		DHW metering for application in the Statewide TRM[b]	
Gross Impact Approach	HEP: Application of Deemed Savings/ Engineering Analysis	HEP: Statistically Adjusted Engineering Analysis	HEP: Application of SAE Results
	ESHP: Application of Deemed Savings/ Engineering Analysis	TBD	TBD
Net Impact Approach	HEP: PY4 Results	PY4 Results	PY4 Results
	ESHP: Default of 0.8	ESHP: Default of 0.8	PY4 Results
Budget	**$46,500**	**$114,000**	**$60,000**

[a] The participant survey will also include participants from the Home Energy Performance program and the Electric Space Heat Pilot program.

[b] DHW metering will activities are budgeted within TRM activities.

Appliance Recycling

- Provides 4% of PY4 portfolio MWh and 0% of PY4 portfolio Th

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)		Telephone survey (n=140)
Gross Impact Approach	Fixed per-unit values from Excel Files	Statewide TRM values	Statewide TRM values
Net Impact Approach	Fixed NTGR from Excel Files	Fixed NTGR from Excel Files	Results from PY4
Budget	**$68,000**	**$16,500**	**$63,000**

Multi-family

- Provides 3% of PY4 portfolio MWh and 2% of PY4 portfolio Therms

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 from Excel File / Engineering Analysis	Fixed Values from Excel File / Engineering Analysis	Fixed Values from Excel File / Engineering Analysis
Net Impact Approach	Fixed NTGR from Excel File	Fixed NTGR from Excel File	Fixed NTGR from Excel File
Budget	**$20,000**	**$80,000**	**$25,000**

Residential Energy Efficient Products

- Provides 1% of PY4 portfolio MWh and 2% of PY4 portfolio Therms

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=30)	
Participant Survey	Telephone survey n=210 (30 per product)		Telephone survey n=210 (30 per product)
Gross Impact Approach	Fixed per-unit values from Excel File	Statewide TRM values	Statewide TRM values
Net Impact Approach	Fixed NTGR from Excel File	Fixed NTGR from Excel File	PY4 Results
Budget	**$74,500**	**$55,000**	**$78,000**

Moderate Income

- Provides 0.4% of PY4 portfolio MWh and 3% of PY4 portfolio Therms

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews	2	2	2)
Market Actor Interviews [a]	Energy Assistnace Foundation, HEP Energy Auditors, Program Allies n=5-7	Energy Assistnace Foundation, HEP Energy Auditors, Program Allies n=5-7	Energy Assistnace Foundation, HEP Energy Auditors, Program Allies n=5-7
Participant Survey [b]	Process, verification, NTG n=TBD		Process, verification n=TBD
Gross Impact Approach	Application of Excel File Values/ Engineering Analysis	Statistically Adjusted Engineering Analysis	Application of Statistically Adjusted Engineering Analysis Coefficients
Net Impact Approach	PY4 Results	PY4 Results	PY4 Results
Budget	**$34,500**	**$35,000**	**$50,000**

[a] Notably, we will combine our market actor interview efforts with our Home Energy Performance evaluation

[b] The participant survey will also include participants from the Home Energy Performance program and the Electric Space Heat Pilot program.

Nonresidential New Construction

- Provides 0.5% of PY4 portfolio MWh and 1% of PY4 portfolio Therms

Activity	PY4	PY5	PY6
Program Material Review	This program is not planned to be rolled out for 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.	Engineering review, supported by site visit of sample or census of projects.
		Adjust ex ante savings based on engineering review.	Adjust ex ante savings based on engineering review.
Net Impact Approach		Fixed Value	Fixed Value
Budget	**$0**	**$17,000**	**$25,000**

Residential New Construction

- Provides 0.1% of PY4 portfolio MWh and 0.2% of PY4 portfolio Therms

Activity	PY4	PY5	PY6
Program Material Review	X	X	X
Program Manager and Implementer Interviews (CSG)	X	X	X
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	Fixed NTGR from Excel File	Fixed NTGR from Excel File	Fixed NTGR from Excel File
Budget	**$10,000**	**$10,000**	**$20,000**