BizSavers Program Evaluation Report

PY2018 Long-Lead Projects Volume II of II

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Ameren Missouri

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1. Introduction

This report is the divided into two volumes presenting the results of the impact, process, and cost effectiveness evaluations of the BizSavers Custom, Standard, New Construction, and Retro-Commissioning programs. Volume II contains appendices presenting detailed information regarding evaluation methodologies, data collection instruments, and evaluation results. Volume II is organized as follows:

- Appendix 2 presents site-level gross impact evaluation reports for each site in which measurement and verification of energy savings was performed.
- Appendix 3 contains the online participant survey instrument.
- Appendix 4 presents the heating and cooling interaction factors used in assessment of ex post energy savings of lighting measures in conditioned spaces.
- Appendix 5 contains a glossary of terms used in the evaluation report.

See report Volume I for narrative and summary information pertaining to the evaluation methods and results.

2. Site-Level Estimation of Ex Post Gross Savings

This appendix presents site-level gross impact evaluation reports for each site in which measurement and verification of energy savings was performed.

Site ID 8001

Data Collection

The participant received New Construction lighting incentives from Ameren Missouri for a library building.

For the Engineering Desk Review, the quantity of each lighting product from submitted invoices were matched to the application, along with the lighting specification sheet wattages. The building type was verified from the site's website. The heating and cooling interactive factors were assigned from models previously created by weather zones. The annual hours of use were compared to the operating hours and holiday calendar, for each measure and usage area.

Analysis Results

The savings for the evaluated measures from the incentivized lighting is presented in the following table.

Site 8001 Lighting Retrofit Savings and Algorithm Inputs

Pre Qty	*Post Qty*	*Pre Watts*	*Post Watts*	*Annual HOU*	*HCIF*	*Ex Ante kWh*	*Ex Post Gross kWh*	*Realization Rate*
36	36	75	36	4,132	1.08	5,769	6,219	108%
16	16	56	27	4,132	1.08	1,923	2,073	108%
6	6	75	36	4,132	1.08	962	1,036	108%
6	6	56	27	4,132	1.08	719	775	108%
17	17	44	21	4,132	1.08	1,589	1,713	108%
9	9	44	21	4,132	1.08	841	907	108%
6	6	27	13	4,132	1.08	347	374	108%
2	2	44	21	4,132	1.08	187	202	108%
61	61	166	80	4,132	1.08	21,723	23,417	108%
18	18	166	80	4,132	1.08	6,410	6,910	108%
5	5	87	42	4,132	1.08	935	1,008	108%
2	2	158	76	4,132	1.08	677	729	108%
2	2	316	152	4,132	1.08	1,353	1,459	108%

Pre Qty	*Post Qty*	*Pre Watts*	*Post Watts*	*Annual HOU*	*HCIF*	*Ex Ante kWh*	*Ex Post Gross kWh*	*Realization Rate*
4	4	37	18	4,132	1.08	321	345	108%
10	10	21	10	4,132	1.08	445	480	108%
2	2	21	10	4,132	1.08	89	96	108%
6	6	37	18	4,132	1.08	481	518	108%
25	25	62	30	4,132	1.08	3,339	3,599	108%
11	11	62	30	4,132	1.08	1,469	1,584	108%
4	4	116	56	4,132	1.08	997	1,075	108%
3	3	137	66	4,132	1.08	881	950	108%
16	16	17	8	4,132	1.08	598	645	108%
8	8	145	70	4,132	1.08	2,493	2,687	108%
2	2	91	44	4,132	1.08	392	422	108%
8	8	19	9	4,132	1.08	321	345	108%
1	1	193	93	4,132	1.08	413	445	108%
2	2	133	64	4,132	1.08	570	614	108%
2	2	120	58	4,132	1.08	516	557	108%
1	1	120	58	4,132	1.08	258	278	108%
2	2	21	10	4,132	1.08	89	96	108%
						57,107	**61,559**	**108%**

The savings shown in the table have been aggregated to each unique fixture from with the lighting power density drawings. The Annual Hours of Use and HCIF for the installed areas have been assigned in the table above. The heating cooling interactive factor (HCIF) includes both the waste heat factor (Whf) to include HVAC cooling savings, along with the interactive factor (IF) to for the increase in energy usage for electric heat buildings.

$$kWh_{Ex\ Post\ Gross} = kWh_{savings(Whf)} - kWh_{electric\ heat\ penalty(IF)}$$

$$kWh_{savings(Whf)} = \left(Qty_{pre} x\ Watts_{pre} - Qty_{post} x Watts_{post}\right) x HOU_{annual} x\ W_{hf}\ x\ \frac{1\ kWh}{1{,}000\ Wh}$$

$$kWh_{electric\ heat\ penalty(IF)} = \left(Qty_{pre} x\ Watts_{pre} - Qty_{post} x Watts_{post}\right) x HOU_{annual} x\ \ IF\ x\ \frac{1\ kWh}{1{,}000\ Wh}$$

The peak coincident kW savings were calculated using the algorithm below, with the Coincident Factor applied to the kWh savings from each Measure ID-End Use. When the usage area has electric heat, the HCIF components of Waste Heat Factor and Interactive Factor are used, to consider the peak period occurring in the Summer.

$$kW_{peak\ coincident} = kWh_{savings(Whf)} x\ \ CF$$

The annual lighting hours of operation using secondary sources and the stated hours on the operating hours calculator tab from the application (4,132) were equal to the hours of operation used to calculate ex ante savings (4,132).

A heating and cooling interactive factor of 1.08, applicable to a retail facility in St. Louis, was applied to the ex post lighting energy saving. The ex ante savings estimate did not account for heating and cooling interactive factors.

The peak coincident demand reduction was determined by applying the corresponding end use kW factor to the kWh savings.

The next table presents the energy savings achieved by the measures evaluated for this site. The overall gross realization rate is 108%.

Site 8001 Energy and Peak Demand Savings

Program	End Use Category	Ex Ante kWh	Ex Post Gross kWh	Realization Rate	Ex Post Gross kW Reduction
New Construction	Lighting	57,107	61,559	108%	11.69
Total		**57,107**	**61,559**	**108%**	**11.69**

Site ID 8002

Data Collection

The participant received New Construction lighting incentives from Ameren Missouri for lighting installed in a self service storage building and the caretaker's residence space.

For the Engineering Desk Review, the quantity of each lighting product from submitted invoices were matched to the application, along with the lighting specification sheet wattages. The building type was verified from the site's website. The heating and cooling interactive factors were assigned from models previously created by weather zones. The annual hours of use were compared to the operating hours and holiday calendar, for each measure and usage area. The trade ally provided additional information on lighting schedules, and the location of the flush mount LED fixtures.

Analysis Results

The savings for the evaluated measures from the incentivized lighting is presented in the following table.

Site 8002 Lighting Retrofit Savings and Algorithm Inputs

	Pre Qty	*Post Qty*	*Pre Watts*	*Post Watts*	*Annual HOU*	*HCIF*	*Ex Ante kWh*	*Ex Post Gross kWh*	*Realization Rate*
LPD X1 - 2 Lamp LED Fixture	439	439	143	36	3,403	1.04	171,318	166,109	97%
LPD 4 Lamp High Bay LED Fixture	24	24	357	90	3,611	1.04	23,415	24,092	103%
LPD Flush Mount LED	16	16	143	36	729	1.04	7,805	1,298	17%
LPD B1/B2 3 Light Vanity Fixture	3	3	103	26	729	1.04	846	176	21%
LPD Halo RA LED Recessed Fixture	9	9	36	9	2,764	1.04	878	681	78%
Total							**204,262**	**192,355**	**94%**

The savings shown in the table have been aggregated to each unique fixture from with the lighting power density drawings. The Annual Hours of Use and HCIF for the installed areas have been assigned in the table above. The heating cooling interactive factor (HCIF) includes both the waste heat factor (Whf) to include HVAC cooling savings, along with the interactive factor (IF) to for the increase in energy usage for electric heat buildings.

$$kWh_{savings} = \left(Qty_{pre} x\ Watts_{pre} - Qty_{post} x Watts_{post}\right) x HOU_{annual} x\ HCIF x\ \frac{1\ kWh}{1{,}000\ Wh}$$

The peak coincident kW savings were calculated using the algorithm below, with the Coincident Factor applied to the kWh savings from each type of light fixture.

$$kW_{peak\ coincident} = kWh_{savings(Whf)} x\ CF$$

The annual lighting hours of operation were sourced from published operating hours and email correspondence with the trade ally. The hours determined by the operating hours calculator tab within the application (3,650) were similar to the hours from the published schedule (3,403-3,611) for the self service storage area. The hours for the residential live in caretaker, using Missouri TRM hours (729) were less than the application hours (3,650) which were used for all the lighting areas. Building code required lighting controls in the office area had ex post hours (2,764) that are less than the ex ante hours (3,650) which did not consider the reduction by the occupancy sensors.

A heating and cooling interactive factor of 1.08, applicable to a retail facility in St. Louis, was applied to the ex post lighting energy saving. The ex ante savings estimate did not account for heating and cooling interactive factors.

The peak coincident demand reduction was determined by applying the corresponding end use kW factor to the kWh savings.

The next table presents the energy savings achieved by the measures evaluated for this site. The overall gross realization rate is 94%.

Site 8002 Energy and Peak Demand Savings

Program	End Use Category	Ex Ante kWh	Ex Post Gross kWh	Realization Rate	Ex Post Gross kW Reduction
New Construction	Lighting	204,262	192,355	94%	36.54
Total		**204,262**	**192,355**	**94%**	**36.54**

Site ID 8003

Data Collection

The participant received Retro-Commissioning (RCx) Program incentives from Ameren Missouri for measures implemented in a school facility. Measures implemented include discharge air temperature reset, demand control ventilation, duct static pressure reset, additional scheduling and supply fan modulation. BMS data provided by the trade ally for the pre and post period were reviewed to each measure installed.

Analysis Results

Energy savings for the site were calculated using IPMVP Option C: Whole Facility analysis methodology. A monthly pre/post billing data regression was created by equating weather data from the nearest NOAA weather station against monthly billing data. This was done to determine how energy consumption of the facility varied with changes in weather and the implemented measures.

Cooling and heating degree days (CDD & HDD) were calculated for each billing period and used with a pre/post binary flag and school days variables in an electric usage regression resulting in an R^2 of 0.94. From the regression, the following equation was derived and used to calculate monthly energy consumption for the pre and post-retrofit configurations:

$$kWh_{monthly} = 157xCDD + 198xHDD - 58{,}058 \times Pre_{Post} + 3 \times School_{DaysxCDD} + 165{,}284$$

Where:

kWh$_{monthly}$ = Monthly kWh Consumption
CDD = Cooling Degree Days for the Month with a Base Temperature of 55°F
HDD = Heating Degree Days for the Month with a Base Temperature of 55°F
Pre_Post = Pre/Post-Retrofit Binary Flag
School_DaysxCDD = Number of School Days for the Month x Cooling Degree Days

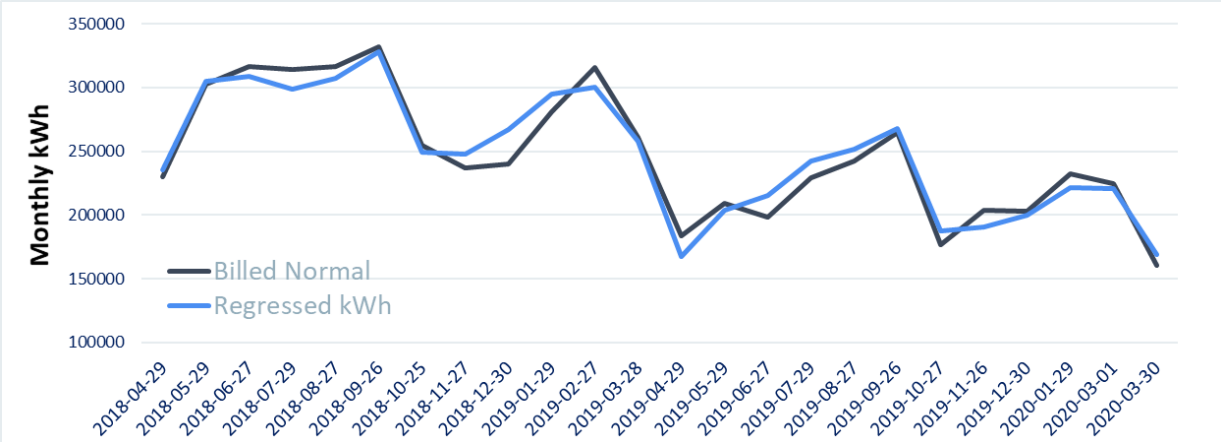
The model for the pre and post period regressed to weather data, has an R^2 value of 0.94 indicating a good fit. The following table presents the T-Statistics for the regression variables, along with the p-Value, which has significance when less than 0.05 :

Significance of kWh Regression Variables

Variable	*T-Stat*	*p-Value*
Intercept	12.3	0.00000000
CDD	8.4	0.00000012
HDD	7.8	0.00000038

Post flag	-10.3	0.00000001
School x CDD	4.1	0.00056954

Electric energy usage values were calculated on a monthly basis using the derived regression equation. The following plot compares the monthly billed kWh to the regressed kWh:



Annual kWh savings for the installed measures were determined by using typical year (TMY3) weather data and the derived equation to calculate monthly pre/post energy consumption of the site. Each month was summed for a year to obtain annual energy savings. Annual kWh savings are the difference between baseline and as-built energy consumption for the facility, and can be seen in the following table:

Monthly kWh Savings

Month	*CDD*	*HDD*	*kWh*		
			Baseline	*As-Built*	*Savings*
Jan	7	796	320,635	262,578	58,058
Feb	17	628	290,709	232,651	58,058
Mar	107	270	242,483	184,425	58,058
Apr	194	114	230,408	172,350	58,058
May	313	32	246,315	188,258	58,058
Jun	664	0	293,889	235,832	58,058
Jul	787	0	295,435	237,378	58,058
Aug	687	0	307,937	249,880	58,058
Sep	464	3	276,551	218,494	58,058
Oct	131	121	220,015	161,957	58,058
Nov	47	362	246,093	188,036	58,058
Dec	2	719	304,733	246,675	58,058
Total			3,275,204	2,578,514	696,690

The ex post savings estimate was less than the application savings, with a realization rate of 89%. During the review of the RCx study and the engineering bin calculations, some of the existing equipment operating started later than the time of day used for the weather bin calculations. The new schedules did align with the calculations. The ex ante calculation utilized a value of an additional hour per day to simulate the existing optimized start sequence. The trended data provided by the trade ally for the pre installation period, indicated that this earlier start rarely occurred for an additional one hour, and only occasionally occurred for more than 20 minutes.

Site 8003 Energy and Peak Demand Savings

Program	End Use Category	Ex Ante kWh	Ex Post Gross kWh	Realization Rate	Ex Post Gross kW Reduction
RCx - HVAC	HVAC	597,473	530,800	89%	235.67
RCx - Cooling	Cooling	186,727	165,890	89%	1151.07
Total		784,200	696,690	**89%**	**386.74**

3. Online Participant Survey

GROUP: Participants across four programs: Standard, Custom, Retro-commissioning, and New Construction

1. Our records indicate you were the main contact for the energy efficient project(s) completed at [FR_LOC1] in [YEAR].

   Many of the following questions are about your organization's financial decision making and the project planning process.

   Were you involved in the decision to complete this project(s)?

   1. Yes, I was involved in the decision to complete the project(s)
   2. No, I was involved in the project(s) but not the decision to complete the project(s)
   3. No, I was not involved in the project(s)
   4. No, I do not work for [ORGANIZATION] but provided services for the project(s)
   88. Don't know

[DISPLAY Q2 IF Q1 = 2-4; THEN Q3, THEN SKIP TO END]

2. Could you please provide the name and contact information of the person most knowledgeable about the decision to install the energy efficient equipment at the [LOCATION]?

   [OPEN ENDED] Name and Email

3. What is your job title or role?

   1. Facilities Manager
   2. Energy Manager
   3. Other facilities management/maintenance position
   4. Chief Financial Officer
   5. Other financial/administrative position
   6. Proprietor/Owner
   7. President/CEO
   8. Manager
   9. Other (Specify) ____

4. Which of the following, if any, does your company have in place at [FR_LOC1]? [Select all that apply]

   1. A person or persons responsible for monitoring or managing energy usage
   2. Defined energy savings goals
   3. A specific policy requiring that energy efficiency be considered when purchasing equipment
   4. Carbon reduction goals

5. Other – please describe: _____
6. None of the above
88. Don't know

5. Had you applied for or received Ameren Missouri incentives for any equipment replacements or building upgrades before the one(s) you did in [YEAR]?

1. Yes
2. No
88. Don't know

[DISPLAY Q6 IF NEW CONSTRUCTION = 1]

6. You recently received incentives through Ameren Missouri's New Construction program. At what point did you learn about the availability of those incentives?

1. Before we even started discussing any new construction project
2. After we had started discussing a project but before selecting the major energy-using equipment
3. After we had started the design but before selecting the major energy-using equipment
4. After we had selected the major energy-using equipment
88. Don't know

Equipment Selection

[FOR EACH PART OF Q7, INSERT FOLLOWING RESPONSE OPTIONS:

1 = No interaction with this type of person or they provided no input

2 = Input had no effect on decision

3 = Small effect on decision

4 = Moderate to large effect on decision

5 = Critical effect – could not have made decision without it

88 = I don't know how the interactions affected the decision

7. How did each of the following affect your decision to install the efficient equipment?

a. [IF STANDARD = 1 OR CUSTOM = 1 OR EMS = 1] Vendor (retailer)
b. [IF STANDARD = 1 OR CUSTOM = 1 OR RCX = 1 OR EMS = 1] Contractor (installer)
c. [IF STANDARD = 1 OR CUSTOM = 1 OR NC = 1] Designer or architect
d. [IF SBDI = 1] SBDI Service Provider (contractor)
e. Ameren Missouri staff member, such as an account representative
f. BizSavers program representative
g. [IF RCX = 1] Audit Results

h. [IF RCX = 1] Your RCx service provider
i. [IF NC = 1] The “design team” process
j. [IF NC = 1] General Contractor
k. [IF NC = 1] The technical analysis study (energy modeling study)
l. Someone else, please specify

[DISPLAY Q8 ONLY IF Q7L = 3 -5]

8. Who was the someone else that affected your decision to install the efficient equipment?

Net-To-Gross Section

Free-Ridership [Do Not Display]

9. Before you knew about the BizSavers Program had you purchased and installed any energy efficient equipment at the [FR_LOC1] location?

1. Yes
2. No
88. Don’t know

10. Has your organization purchased any significant energy efficient equipment in the last three years for which you did not apply for a financial incentive through an energy efficiency program at the [FR_LOC1] location?

1. Yes. Our organization purchased energy efficient equipment but did not apply for incentive.
2. No. Our organization purchased significant energy efficient equipment and applied for an incentive.
3. No significant energy efficient equipment was purchased by our organization.
88. Don’t know

11. Before participating in the BizSavers Program had you implemented any equipment or measure similar to [FR_MEAS 1] at the [FR_LOC1] location?

1. Yes
2. No
88. Don’t know

12. Did you have plans to [INSTALL] the [FR_MEAS 1] at the [FR_LOC1] location before participating in the BizSavers Program?

1. Yes
2. No
88. Don’t know

13. Would you have completed the [FR_MEAS 1] project even if you had not participated in the program?

1. Yes
2. No
88. Don’t know

[DISPLAY Q49 IF Q5= 1]

14. How important was previous experience with the BizSavers Program in making your decision to [INSTALL] the [FR_MEAS 1] at the [FR_LOC1] location?

    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    5. Did not have previous experience with the program.
    88. Don’t know

[DISPLAY Q15 IF SBDI = 1]

15. If the Service Provider that completed the onsite energy assessment had nor not recommended [INSTALLING] the [FR_MEAS 1], how likely is it that you would have [INSTALLED] it anyway?

    1. Definitely would have installed
    2. Probably would have installed
    3. Probably would not have installed
    4. Definitely would not have installed
    88. Don’t know

16. Did a BizSavers Program or other Ameren Missouri representative recommend that you [INSTALL] the [FR_MEAS 1] at the [FR_LOC1] location?

    1. Yes
    2. No
    88. Don’t know

[DISPLAY Q17 IF Q16 = 1]

17. If the BizSavers Program representative had not recommended [INSTALLING] the [FR_MEAS 1], how likely is it that you would have [INSTALLED] it anyway?

    1. Definitely would have installed
    2. Probably would have installed
    3. Probably would not have installed
    4. Definitely would not have installed
    88. Don’t know

18. Would you have been financially able to [INSTALL] the [FR_MEAS 1] at the [FR_LOC1] location without the financial incentive from the BizSavers Program?

    1. Yes

2. No
88. Don’t know

[DISPLAY Q19 IF Q18= 2]

19. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

    1. Yes, that is correct.
    2. No, that is not correct.
    88. Don’t know

[DISPLAY Q20 IF Q19 = 2]

20. In your own words, can you tell me what your organization would have likely done if the financial incentive was not available from the program?

21. If the financial incentive from the BizSavers Program had not been available, how likely is it that you would have [INSTALLED] the [FR_MEAS 1] at the [FR_LOC1] location anyway?

    1. Definitely would have installed
    2. Probably would have installed
    3. Probably would not have installed
    4. Definitely would not have installed
    88. Don’t know

[DISPLAY Q22 IF QUANT > 1]

22. We would like to know whether the availability of information and financial incentives through the [PROGRAM] affected the quantity (or number of units) of [FR_MEAS1] that you purchased and [INSTALLED] at the [FR_LOC1] location.

    Did you purchase and [INSTALL] more [FR_MEAS 1] than you otherwise would have without the program?

    1. Yes
    2. No, program did not affect quantity purchased and [INSTALLED].
    88. Don’t know

[DISPLAY Q23 IF ENERGY_USING = 1]

23. We would like to know whether the availability of information and financial incentives through the BizSavers Program affected the level of energy efficiency you chose for [FR_MEAS 1] at the [FR LOC1] location.

    Did you choose equipment that was more energy efficient than you would have chosen because of the program?

    1. Yes

2. No, program did not affect level of efficiency chosen for equipment.
88. Don't know

[DISPLAY Q24 IF Q23 = 1]

24. What type of equipment, if any, would you have installed if the program was not available?

[DISPLAY Q25 IF NC = 0]

25. We would like to know whether the availability of information and financial incentives through the BizSavers Program affected the timing of your purchase and installation of the [FR_MEAS1] at the [FR_LOC1] location.

Did you purchase and [INSTALL] the [FR_MEAS1] earlier than you otherwise would have without the program?

1. Yes
2. No, program did not affect did not affect timing of purchase and [INSTALLATION].
88. Don't know

[DISPLAY Q26 IF Q25 = 1]

26. When would you otherwise have [INSTALLED] the equipment?

1. Less than 6 months later
2. 6-12 months later
3. 1-2 years later
4. 3-5 years later
5. More than 5 years later
88. Don't know

[DISPLAY Q27 IF NUMBER OF MEASURE TYPES > 1]

27. Our records indicate you [INSTALLED_FR2] [FR_MEAS2] at the [FR_LOC2] location in addition to [FR_MEAS1] at the [FR__LOC1] location. Did both of these projects go through the same decision making process or was a separate decision made for each?

1. The same decision making process applies to both projects.
2. A different decision making process applies to each project.
3. We did not [INSTALL_FR2] [FR_MEAS2] at the [FR_LOC2] location.
88. Don't know

[IF Q27 = 1, CYCLE THROUGH Q11- Q27 FOR FR_MEAS2]

General Spillover Questions

[DISPLAY IF SPILLOVER = 0]

28. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive for.

Since participating in the BizSavers Program has your organization installed any ADDITIONAL energy efficiency measures at this facility or at your other facilities within Ameren Missouri's service territory that did NOT receive incentives through Ameren Missouri's BizSavers Program?

1. Yes
2. No
88. Don't know

[DISPLAY Q29 IF Q28 = 1]

29. What additional equipment have you installed? [MULTI SELECT]

1. Lighting
2. Lighting controls or occupancy sensors
3. Unitary or split air conditioning system or chiller
4. Refrigeration equipment
5. Kitchen equipment
6. Something else
96. Didn't implement any measures [SKIP TO FIRMOGRAPHICS]
88. Don't know [SKIP TO FIRMOGRAPHICS]

[DISPLAY Q50 IF Q28 = 1]

50. Why didn't you apply for or receive incentives for those items? [MULTI SELECT RANDOMIZE ORDER, BUT FIX OTHER AND DON'T KNOW]

1. Didn't know whether equipment qualified for financial incentives
2. Equipment did not qualify for financial incentives
3. Too much paperwork for the financial incentive application
4. Financial incentive was insufficient
5. Didn't have time to complete paperwork for financial incentive application
6. Didn't know about financial incentives until after equipment was purchased
7. Other reason (please describe): _____
8. We did receive an incentive from Ameren Missouri for that equipment [SKIP TO FIRMOGRAPHICS]
88. Don't know

The same measure specific questions used in PY2018 were included in the survey of PY2018 long-lead decision makers.

Firmographic

51. Which of the following best describes the type of work that your firm or organization does at [FR_LOC1]?

    1. Industrial
    2. Restaurant (not fast food)
    3. Fast food restaurant
    4. Retail
    5. Office
    6. Grocery and convenience
    7. School
    8. Lodging
    9. Warehouse
    10. Other – specify: ____
    88. Not sure

52. Does your organization rent, own and occupy, or own and rent the facility to someone else at this location?

    1. Own
    2. Own and occupy
    3. Own and rent to someone else
    88. Don't know

53. Including all the properties, how many separate work locations does your organization own or lease space in, in Ameren Missouri territory? (A work location may consist of multiple buildings in close proximity to each other, such as a university campus – please indicate the number of locations) _____

54. Please list any other properties that could benefit from energy efficient electric or gas equipment upgrades which may qualify for an incentive. Please provide company name, contact person, and phone number and/or email address. _____ [OPEN-ENDED RESPONSE]

55. How many square feet (indoor space) is the part of the property at [LOCATION] that your firm or organization occupies? (If your firm or organization occupies the entire property, indicate the total size of that property.)

    1. Less than 5,000
    2. 5,001 to 10,000
    3. 10,001 to 20,000
    4. 20,001 to 50,000
    5. 50,001 to 75,000

6. 75,001 to 100,000
7. 100,001 to 250,000
8. 250,001 to 500,000
9. 500,001 to 1,000,000
10. More than 1,000,000
88. Not sure

56. How can the BizSavers Program implementation team provide you with better service? _____ [OPEN-ENDED RESPONSE]

4. Heating and Cooling Interactive Factors

Building Type	Cooling Type	Heating Type	Cape Girardeau			Jefferson City			Kirksville			St. Louis		
			kWh HIF	kWh CIF	Peak Demand HCIF	kWh HIF	kWh CIF	Peak Demand HCIF	kWh HIF	kWh CIF	Peak Demand HCIF	kWh HIF	kWh CIF	Peak Demand HCIF
Assembly	Packaged Single Zone	Gas	0.00	0.14	1.12	0.00	0.15	1.34	0.00	0.13	1.26	0.00	0.14	1.33
Assembly	Packaged Single Zone	Heat Pump	-0.11	0.14	1.12	-0.11	0.15	1.34	-0.10	0.12	1.23	-0.11	0.14	1.31
Bio Manufacturer	Packaged Single Zone	Gas	0.00	0.10	1.54	0.00	0.11	1.57	0.00	0.10	1.49	0.00	0.11	1.59
Bio Manufacturer	Packaged Single Zone	Heat Pump	-0.05	0.11	1.54	-0.06	0.11	1.58	-0.08	0.10	1.49	-0.06	0.11	1.60
Conditioned Storage	Packaged Single Zone	Gas	0.00	0.09	2.30	0.00	0.10	2.15	0.00	0.08	2.30	0.00	0.10	1.92
Conditioned Storage	Packaged Single Zone	Heat Pump	-0.09	0.10	2.31	-0.10	0.10	2.17	-0.09	0.08	2.30	-0.09	0.10	1.94
Education (Community College)	VAV+Packaged Single Zone	Heat Pump	0.00	0.07	1.48	0.00	0.08	1.43	0.00	0.07	1.43	0.00	0.09	1.42
Education (Community College)	VAV+Packaged Single Zone	Gas	0.00	0.07	1.48	0.00	0.08	1.43	0.00	0.07	1.43	0.00	0.09	1.42
Education (High School)	Fan Coil+Packaged Single Zone	Gas	0.00	0.10	1.18	0.00	0.10	1.14	0.00	0.08	1.16	0.00	0.09	1.23
Education (High School)	Fan Coil+Packaged Single Zone	Heat Pump	-0.03	0.10	1.18	-0.03	0.10	1.14	-0.03	0.08	1.16	-0.03	0.09	1.23
Education (High School)	VAV	Gas	0.00	0.08	1.18	0.00	0.09	1.09	0.00	0.06	1.18	0.00	0.08	1.07
Education (Primary School)	Packaged Single Zone	Gas	0.00	0.09	1.11	0.00	0.09	1.14	0.00	0.08	1.17	0.00	0.09	1.17
Education (Primary School)	Packaged Single Zone	Heat Pump	-0.10	0.09	1.11	-0.11	0.09	1.14	-0.11	0.08	1.16	-0.11	0.09	1.16
Education (Relocatable Classroom)	Packaged Single Zone	Electric Resistance	-0.28	0.11	1.11	-0.30	0.11	1.12	-0.34	0.09	1.13	-0.30	0.11	1.12
Education (Relocatable Classroom)	Packaged Single Zone	Heat Pump	-0.08	0.06	1.09	-0.09	0.06	1.09	-0.09	0.05	1.11	-0.09	0.06	1.10
Education (Relocatable Classroom)	Packaged Single Zone	Gas	0.00	0.09	1.09	0.00	0.09	1.09	0.00	0.07	1.11	0.00	0.08	1.10
Education (University)	VAV	Gas	0.00	0.08	1.41	0.00	0.09	1.38	0.00	0.09	1.61	0.00	0.09	1.36
Hospital	VAV+Packaged Single Zone	Heat Pump	0.00	0.07	1.18	0.00	0.07	1.21	0.00	0.06	1.18	0.00	0.07	1.17
Hospital	VAV+Packaged Single Zone	Gas	0.00	0.07	1.18	0.00	0.07	1.21	0.00	0.06	1.18	0.00	0.07	1.17
Hotel	PVAV+PTHP+PSZ	Heat Pump	-0.01	0.20	1.29	-0.01	0.20	1.38	-0.01	0.16	1.37	-0.01	0.18	1.31
Hotel	VAV+FPFC+PHP	Heat Pump	0.00	0.11	1.23	0.00	0.11	1.21	0.00	0.10	1.36	0.00	0.11	1.43
Hotel	VAV+PTAC+PSZ	Electric Resistance	-0.16	0.20	1.30	-0.19	0.20	1.39	-0.26	0.16	1.38	-0.20	0.19	1.35
Hotel	VAV+PTHP+PSZ	Heat Pump	-0.01	0.20	1.29	-0.01	0.19	1.37	-0.01	0.16	1.36	-0.01	0.18	1.37
Light Manufacturing	Packaged Single Zone	Gas	0.00	0.09	1.52	0.00	0.10	1.49	0.00	0.08	1.48	0.00	0.09	1.46
Light Manufacturing	Packaged Single Zone	Heat Pump	-0.09	0.09	1.53	-0.09	0.10	1.50	-0.08	0.08	1.48	-0.09	0.10	1.46
Motel	Packaged Terminal AC	Electric Resistance	-0.22	0.17	1.43	-0.24	0.16	1.40	-0.29	0.15	1.38	-0.24	0.16	1.44
Motel	Packaged Terminal HP	Heat Pump	-0.04	0.16	1.41	-0.04	0.16	1.39	-0.03	0.14	1.36	-0.04	0.15	1.43
Nursing Home	Fan Coil+Packaged Single Zone	Heat Pump	0.00	0.14	1.52	0.00	0.14	1.34	0.00	0.12	1.38	0.00	0.14	1.35
Nursing Home	VAV	Gas	0.00	0.09	1.54	0.00	0.10	1.47	0.00	0.08	1.53	0.00	0.09	1.44
Nursing Home	Fan Coil+Packaged Single Zone	Gas	0.00	0.14	1.52	0.00	0.14	1.34	0.00	0.12	1.38	0.00	0.14	1.34
Office (Large)	Water Loop Heat Pump	Heat Pump	-0.06	0.24	1.39	-0.07	0.23	1.41	-0.08	0.19	1.40	-0.07	0.22	1.41
Office (Large)	VAV	Gas	0.00	0.10	1.32	0.00	0.09	1.30	0.00	0.08	1.30	0.00	0.09	1.41
Office (Small)	Packaged Single Zone	Gas	0.00	0.10	1.39	0.00	0.11	1.38	0.00	0.09	1.37	0.00	0.11	1.36
Office (Small)	Packaged Single Zone	Heat Pump	-0.09	0.11	1.39	-0.10	0.11	1.38	-0.09	0.09	1.38	-0.09	0.11	1.37
Restaurant (Fast Food)	Packaged Single Zone	Gas	0.00	0.10	1.24	0.00	0.11	1.33	0.00	0.09	1.37	0.00	0.10	1.33
Restaurant (Fast Food)	Packaged Single Zone	Heat Pump	-0.08	0.10	1.25	-0.08	0.11	1.33	-0.08	0.09	1.37	-0.08	0.10	1.34
Restaurant (Full-Service)	Packaged Single Zone	Gas	0.00	0.12	1.21	0.00	0.13	1.36	0.00	0.11	1.40	0.00	0.12	1.35
Restaurant (Full-Service)	Packaged Single Zone	Heat Pump	0.00	0.03	1.29	0.00	0.04	1.28	0.00	0.02	1.36	0.00	0.03	1.09
Retail (Large 3-Story)	VAV	Gas	0.00	0.08	1.35	0.00	0.10	1.36	0.00	0.10	1.33	0.00	0.11	1.34
Retail (Large Single-Story)	Packaged Single Zone	Gas	0.00	0.10	1.26	0.00	0.11	1.28	0.00	0.09	1.32	0.00	0.10	1.29
Retail (Large Single-Story)	Packaged Single Zone	Heat Pump	-0.09	0.10	1.28	-0.10	0.11	1.29	-0.08	0.09	1.31	-0.09	0.10	1.28
Retail (Small)	Packaged Single Zone	Gas	0.00	0.11	1.26	0.00	0.11	1.25	0.00	0.10	1.30	0.00	0.11	1.28
Retail (Small)	Packaged Single Zone	Heat Pump	-0.10	0.11	1.27	-0.10	0.12	1.26	-0.09	0.10	1.30	-0.10	0.11	1.28
Freezer Space (Low Temp)	N/A	N/A	0.00	1.50	1.50	0.00	1.50	1.50	0.00	1.50	1.50	0.00	1.50	1.50
Med. Temp Refrig Space	N/A	N/A	0.00	1.29	1.29	0.00	1.29	1.29	0.00	1.29	1.29	0.00	1.29	1.29
High Temp Refrig. Space	N/A	N/A	0.00	1.18	1.18	0.00	1.18	1.18	0.00	1.18	1.18	0.00	1.18	1.18
Walk-in/In Store Refrigerator	N/A	N/A	0.00	1.40	1.40	0.00	1.40	1.40	0.00	1.40	1.40	0.00	1.40	1.40

5. Glossary of Terms

Adjustments: Modifications on ex ante analysis conditions (e.g. hours of lighting operation) because of observations made by ADM field technicians during the measurement and verification (M&V) on-site visit, which change baseline energy or energy demand values.

Baseline: The projected scenario where the subject project or program was not implemented. Baseline conditions are sometimes referred to as “business-as-usual” conditions. Baselines are defined as either project-specific baselines or performance standard baselines.

Confidence (level): A confidence level is a value that indicates the reliability of a calculated estimate from a sample. A higher confidence level indicates a stronger estimate that is more likely to lie within the population parameter. It is an indication of how close an estimated value derived from a sample is to the true population value of the quantity in question. The confidence level is the likelihood that the evaluation has captured the true impacts of the program within a certain range of values (i.e., precision).

Cost-effectiveness: The present value of the estimated benefits produced by an energy efficiency program compared to the estimated total costs to determine if the proposed investment or measure is desirable (e.g., whether the estimated benefits exceed the estimated costs from a societal perspective). It is an indicator of the relative performance or economic attractiveness of any energy efficiency investment or practice.

Deemed Savings: An estimate of the gross energy savings or gross energy demand savings for a single unit of an installed energy efficiency measure. This estimate (a) comes from data sources and analytical methods that are widely accepted for the particular measure and purpose, and (b) is applicable to the situation being evaluated.

Demand: The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr., kBtu/hr., therms/day, etc.

Effective Useful Life: An estimate of the median number of years that the efficiency measures installed under a program are still in place and operable.

Energy Efficiency: The use of less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way or using less energy to perform the same function. “Energy conservation” is a term that has also been used, but it has the connotation of doing without a service to save energy rather than using less energy to perform the same function.

Energy Efficiency Measure: Installation of equipment, subsystems or systems, or modification of equipment, subsystems, systems, or operations on the customer side of

the meter, for the purpose of reducing energy and/or demand (and, hence, energy and/or demand costs) at a comparable level of service.

Engineering Model: Engineering equations used to calculate energy usage and savings. These models are usually based on a quantitative description of physical processes that transform delivered energy into useful work such as heat, lighting, or motor drive. In practice, these models may be reduced to simple equations in spreadsheets that calculate energy usage or savings as a function of measurable attributes of customers, facilities, or equipment (e.g., lighting use = watts × hours of use).

Evaluation: The performance of studies and activities aimed at determining the effects of a program. This includes any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluative efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost-effectiveness.

Ex Ante: The saving calculated by the implementation contractor, Lockheed Martin, per the TRM. These numbers are developed prior to ADM's analysis.

Ex Post: The savings that have been verified by the EM&V contractor. This includes adjustments for equipment that may not have been installed, calculation errors, and differences in assumptions.

Free Rider: A program participant who would have implemented the program measure or practice in the absence of the program incentive. Free riders can be total (who would have implemented all of the same measures without the incentives), partial (who would have implemented some of the same measures without the incentives), or deferred (who would have implemented the measures, but at some time in the future).

Ex Ante kWh Savings: The estimation of electrical energy (kWh) expected to be saved by implementing energy efficiency measures, calculated by the implementation contractor before measures are enacted and without considering externalities like free ridership and spillovers. Savings are typically reported as annual savings.

Ex Ante Peak kW Savings: The estimation of electrical energy demand (kW) expected to be saved by implementing energy efficiency measures, calculated by the implementation contractor before measures are enacted and without considering externalities like free ridership and spillovers. Savings are typically reported as annual savings.

Ex Post Gross kWh Savings: The estimation of electrical energy (kWh) saved by implementing energy efficiency measures, calculated by ADM, after measures were enacted, and without considering externalities like free ridership and spillovers. Savings are typically reported as annual savings.

Ex Post Gross Peak kW Savings: The estimation of electrical energy demand (kW) saved by implementing energy efficiency measures, calculated by ADM, after measures were enacted, and without considering externalities like free ridership and spillovers. Savings are typically reported as annual savings.

Gross kWh Savings Realization Rate: The ratio of ex post (or "realized") gross kWh savings over ex ante gross kWh savings.

Gross Peak kW Savings Realization Rate: The ratio of ex post (or "realized") gross kW savings over ex ante gross kW savings.

Gross Realization Rate: The ratio of ex post gross energy savings over ex ante gross energy savings

Gross Savings: The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

Impact Evaluation: An evaluation of the program-specific, directly induced changes (e.g., energy and/or demand usage) attributable to an energy efficiency program.

Interaction Factors: Changes in energy use or demand occurring beyond the measurement boundary of the M&V analysis.

kWh Savings Target: The goal of energy savings for programs and their components set by utility companies before the programs began.

Measure: Energy efficient equipment or service that is implemented to conserve energy.

Measurement: A procedure for assigning a number to an observed object or event.

Measurement and Verification (M&V): The data collection, monitoring, observations, and analysis by field technicians used for the calculation of ex post gross energy and demand savings for individual sites or projects. M&V can be a subset of program impact evaluation.

Metering: The collection of energy-consumption data over time using meters. These meters may collect information with respect to an end-use, a circuit, a piece of equipment, or a whole building (or facility). Short-term metering generally refers to data collection for no more than a few weeks. End-use metering refers specifically to separate data collection for one or more end-uses in a facility, such as lighting, air conditioning or refrigeration. Spot metering is an instantaneous measurement (rather than over time) to determine an energy-consumption rate.

Monitoring: Gathering of relevant measurement data, including but not limited to energy-consumption data, over time to evaluate equipment or system performance. Examples include chiller electric demand, inlet evaporator temperature and flow, outlet evaporator temperature, condenser inlet temperature, and ambient dry-bulb temperature and relative

humidity or wet-bulb temperature, for use in developing a chiller performance map (e.g., kW/ton vs. cooling load and vs. condenser inlet temperature).

Net Ex Post kWh Savings: The estimation of electrical energy (kWh) savings from programs or measures after the measures have been installed and after adjusting for possible externalities, such as free ridership and spillovers.

Net Ex Post Peak kW Savings: The estimation of electrical energy demand (kW) savings from programs or measures after the measures have been installed and after adjusting for possible externalities, such as free ridership and spillovers.

Net Savings: The amount of energy reduced based on the project after subtracting the negative free ridership effects and adding the positive spillover effects. Therefore, net savings equal gross savings, minus free ridership, plus the summation of participant spillovers, and non-participant spillovers. It is a better estimate of how much energy reductions occurred particularly because of the program incentive(s).

Net-to-Gross-Ratio (NTGR): A factor representing net program savings divided by gross program savings. It is applied to gross program impacts to convert gross program impacts into net program load impacts that are adjusted for free ridership and spillover. Net-to-Gross-Ratio (NTGR) = (1 – Free-Ridership % + Spillover %), also defined as Net Savings / Gross Savings.

Non-participant: A consumer who was eligible but did not participate in the subject efficiency program in a given program year. Each evaluation plan should provide a definition of a non-participant as it applies to a specific evaluation.

Participant: A consumer who received a service offered through the subject efficiency program in a given program year. The term “service” is used in this definition to suggest that the service can be a wide variety of services, including financial rebates, technical assistance, product installations, training, energy efficiency information or other services, items, or conditions. Each evaluation plan should define “participant” as it applies to the specific evaluation.

Peak Demand: The maximum level of metered demand during a specified period, such as a billing month or a peak demand period.

Peak kW Savings Target: The goal of energy demand savings set by the utility company for their program or program component before the program time frame begins.

Portfolio: Either (a) a collection of similar programs addressing the same market (e.g., a portfolio of residential programs), technology (e.g., motor-efficiency programs), or mechanisms (e.g., loan programs) or (b) the set of all programs conducted by one organization, such as a utility (and which could include programs that cover multiple markets, technologies, etc.).

Primary Effects: Effects that the project or program are intended to achieve. For efficiency programs, this is primarily a reduction in energy use per unit of output.

Process Evaluation: A systematic assessment of an energy efficiency program's process. The assessment includes documenting program operations at the time of the examination and identifying and recommending improvements to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction.

Program: A group of projects, with similar characteristics and installed in similar applications. Examples could include a utility program to install energy-efficient lighting in commercial buildings, a developer's program to build a subdivision of homes that have photovoltaic systems, or a state residential energy efficiency code program.

Project: An activity or course of action involving one or multiple energy efficiency measures, at a single facility or site.

Ratepayer Impact Test (RIM): RIM tests measure the distributional impacts of conservation programs from the viewpoint of all the utility's customers. The test measures what happens to average price levels due to changes in utility revenues and operating costs caused by a program. A benefit/cost ratio less than 1.0 indicates the program will influence prices upward for all customers. For a program passing the TRC but failing the RIM, average prices will increase, resulting in higher energy service costs for customers not participating in the program.

Regression Analysis: A statistical analysis of the relationship between a dependent variable (response variable) to specified independent variables (explanatory variables). The mathematical model of their relationship is the regression equation.

Reporting Period: The time following implementation of an energy efficiency activity during which savings are to be determined.

Secondary Effects: Unintended impacts of the project or program such as rebound effect (e.g., increasing energy use as it becomes more efficient and less costly to use), activity shifting (e.g., movement of generation resources to another location), and market leakage (e.g., emission changes due to changes in supply or demand of commercial markets). These secondary effects can be positive or negative.

Spillover: A positive externality related to a participant or non-participant enacting additional energy efficiency measures without an incentive because of a participant's experience in the program. There can be participant and/or non-participant spillover rates depending on the rate at which participants (and non-participants) adopt energy efficiency measures or take other types of efficiency actions on their own (i.e., without an incentive being offered).

Stipulated Values: See "deemed savings."

Total Resource Cost Test (TRC): This test compares the program benefits of avoided supply costs against the costs for administering a program and the cost of upgrading equipment. This test examines efficiency from the viewpoint of an entire service territory. When a program passes the TRC, this indicates total resource costs will drop, and the total cost of energy services for an average customer will fall.

Uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall with some degree of confidence.

Utility Cost Test (UCT): Also known as the Program Administrator Test (PACT), this test measures cost-effectiveness from the viewpoint of the sponsoring utility or program administrator. If avoided supply costs exceed program administrator costs, then average costs will decrease.