

9.4 Refrigeration

The following measures are included in the PY3 Refrigeration program.

9.4 REFRIGERATION		
	Measure	Code
Closers		
9.4.1	Automatic Door Closer for Walk-In Freezer/Cooler (back access door) or Walk-In Cooler	BPR7
9.4.2	Auto Closer for display case door; Reach-in Cooler Door, or Reach-in Freezer Door	BPR13
Curtains, Doors, Anti-Sweat Heater Controls, and Gaskets		
9.4.3	Strip Curtain on Walk-in Coolers or Freezers	BPR1
9.4.4	Night Curtain for Open Cooler	BPR12
9.4.5	Anti-Sweat Heater Control (freezer)	BPR33 (was BPR2)
9.4.6	Anti-Sweat Heater Control (refrigerator)	BPR34 (was BPR3)
9.4.7	Door Gaskets	BPR14 (Discontinued)
9.4.8	Solid Door Freezer (up to 15 cu ft)	BPR27
9.4.9	Solid Door Freezer (15-30 cu ft)	BPR28
9.4.10	Solid Door Freezer (31-50 cu ft)	BPR29
9.4.11	Solid Door Freezer (51+ cu ft)	BPR30
9.4.12	Glass Door Freezer (31-50 cu ft)	BPR31
9.4.13	Glass Door Freezer (51+ cu ft)	BPR32
9.4.14	Evaporator Fan Controls	BPR6
Vending Macines and controls, and Ice Machines		
9.4.15	ENERGY STAR Vending Machine	BPR8
9.4.16	Beverage Machine Control	BPR9
9.4.17	Snack Machine Control	BPR10
9.4.18	High Efficiency Ice Makers (101-200 lbs/24hr capacity)	BPR20
9.4.19	High Efficiency Ice Makers (201-300 lbs/24hr capacity)	BPR21
9.4.20	High Efficiency Ice Makers (301-400 lbs/24hr capacity)	BPR22
9.4.21	High Efficiency Ice Makers (401-500 lbs/24hr capacity)	BPR23
9.4.22	High Efficiency Ice Makers (501-1000 lbs/24hr capacity)	BPR24
9.4.23	High Efficiency Ice Makers (1001-1500 lbs/24hr capacity)	BPR25
9.4.24	High Efficiency Ice Makers (Greater than 1500 lbs/24hr capacity)	BPR26
EC Motors		
9.4.25	EC Motor for Walk-In Cooler	BPR4
9.4.26	EC Motor for Walk-In Freezer	BPR19
9.4.27	EC Motor for Reach-In Cooler	BPR5
9.4.28	EC Motor for Reach-In Freezer	BPR18
Tune-up		
9.4.29	Refrigeration Tune-up	BPR11

9.4.1 Automatic Door Closers for Walk-In Freezer/Cooler (back access door) or Walk-In Cooler Door, or Walk-In Freezer Door

Measure Code: BPR7

Version Date & Revision History:

Draft date: December 17, 2008
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End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New installation or replacement of failed unit (or one which has exceeded useful life, which is defined as eight years.)
- To be installed on low- and medium-temperature main coolers and freezers; or low- and medium temperature reach-in coolers and freezers (-10 thru +41 degrees F)

Eligibility Criteria for New Equipment:

- Installed on the main opaque insulated door (back access door to the cooler in measure BPR13)
- Must firmly close door to within one inch of full closure

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 8 years

Revision Details: In PY4 this measure title was changed from "Automatic Door Closer for Walk-In Freezer (back access door)" to "Automatic Door Closer for Walk-in Freezer/Cooler (back access door) or Walk-In cooler Door, or Walk-in Freezer Door." Previous incentive was \$160/door - changed to \$30/closer. 3-3-2011 Added units to calculation (qty. coolers, qty. freezers).

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_D \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_D \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_D	= Number of doors having automatic closers installed
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery, Restaurant, and other	1.0	1.0	1.0

Table 9.4.1-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Automatic Door Closers for Walk-in Freezers	NA	NA	See Table 9.4.1-3

Table 9.4.1-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery, Restaurant, and other	0.814813	2,919

Demand Savings Calculation (per door) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.1-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.1-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.1-1)} \end{array}$$

Energy Savings Calculation (per door) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.1-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.1-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.1-1)} \end{array}$$

Table 9.4.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Automatic Door Closer for walk-in freezer	\$433	\$30 per closer

9.4.2 Automatic Door Closers for Display Case Door; Reach-In Cooler Door, or Reach-In Freezer Door

Measure Code: BPR13

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New installation or replacement of failed unit (or one which has exceeded useful life, which is defined as eight years.)
- To be installed on low- and medium-temperature main coolers and freezers; or low- and medium temperature reach-in coolers and freezers (-10 through +41 degrees F)

Eligibility Criteria for New Equipment:

- Installed on the glass customer access door (front glass doors to the cooler in measure BPR7)
- Auto-closer must be able to firmly close the door when it is within one inch of full closure.
- For walk-in coolers and freezers, auto-closer device should be applied to the glass reach-in door. The reach-in door must have a minimum perimeter of 16 feet. The auto-closer must be able to firmly close the door. Useful life period for auto-closers is defined as eight years.

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 8 years (for both coolers and freezers)

Revision Details: In PY4 this measure title was changed from "Auto Closer for Display Case Door" to "Auto Closer for Display Case Door: Reach-in Cooler Door, or Reach-in Freezer Door." 3-3-2011 Added units to calculation (number coolers, number freezers).

Referenced Documents: The incremental costs are from the Ameren Illinois Utilities DSM Plan, Appendix B, referenced October 20, 2009.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings			
Coolers			
Measure Demand Savings	ΔkW	=	$NOC \times 0.16 \text{ kW/door/year}$
Measure Energy Savings	ΔkWh	=	$NOC \times 1,138 \text{ kWh/door/year}$
ΔkW		=	Gross customer connected load kW savings for the measure
ΔkWh		=	Gross customer annual kWh savings for the measure
NOC		=	Number of cooler doors
Freezers			
Measure Demand Savings	ΔkW	=	$NOF \times 0.81 \text{ kW/door/year}$
Measure Energy Savings	ΔkWh	=	$NOF \times 2,919 \text{ kWh/door/year}$
ΔkW		=	Gross customer connected load kW savings for the measure
ΔkWh		=	Gross customer annual kWh savings for the measure
NOC		=	Number of freezer doors

Table 9.4.2-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	1.0	1.0	1.0

Table 9.4.2-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Freezer Door	NA	NA	See Table 9.4.2-3
Cooler Door	NA	NA	See Table 9.4.2-3

Table 9.4.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	Reach-In Freezer		Reach-In Cooler	
Grocery	0.81	2919	0.16	1138

Demand Savings Calculation (per closer) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.2-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.2-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.2-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per closer) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.2-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.2-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.2-1)} \\ \hline \end{array}$$

Table 9.4.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Automatic Door Closer	\$160 (freezer and cooler)	\$30/closer

9.4.3 Strip Curtains on Walk-in Coolers or Freezers

Measure Code: BPR1

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Cannot be installed on displays cases
- Must be new installation – cannot be replacing existing strip curtains

Eligibility Criteria for New Equipment:

- New strip curtains or clear plastic swinging doors

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 4 years

Revision Details: 3-3-2011 Added units to calculation (total sq. ft. coolers, total sq. ft. freezers). In PY4 changed calculation to total sq. ft. of cooler curtains and total sq. ft. of freezer curtains.

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times N_D \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times N_D \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per lamp
N_D	= Number of doors having strip curtains installed
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings

Table 9.4.3-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Restaurant, Grocery, and Other	1.0	1.0	1.0

Table 9.4.3-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Walk-in Cooler	NA	NA	See Table 9.4.3-3
Walk-in Freezer	NA	NA	See Table 9.4.3-3

Table 9.4.3-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	Strip Curtains on Walk-In Cooler		Strip Curtains on Walk-In Freezer	
Restaurant	0.010313	128	0.029774	366
Grocery	0.0054965	99.5	0.021831	330.5
Other	0.00790475	113.75	0.0258025	348.25

Demand Savings Calculation (per ft² curtain) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.3-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.3-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.3-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per ft² curtain) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.3-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.3-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.3-1)} \\ \hline \end{array}$$

Table 9.4.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Strip Curtains	\$9.54	\$4 per square foot of curtain

9.4.4 Night Curtain for Open Cooler

Measure Code: BPR12

Version Date & Revision History:

Draft date: September 29, 2009
Effective date: September 29, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Must be installed on an open case (vertical, or horizontal display case) without a cover.
- To be installed on low- and medium-temperature cases (-10 through +41 degrees F)

Eligibility Criteria for New Equipment:

- It is recommended that these film type covers have small, perforated holes to decrease moisture buildup. The cover must be applied for a period of at least six hours (during off hours) in a 24-hour period.
- Include with the project application, a copy of the internal policy document regarding nightly curtain use is required.
- Final payment approval is subject to inspection by the Ameren Illinois staff after installation.

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: 3-3-2011 Added units to calculation (lineal ft. coolers, lineal ft. freezers).

Referenced Documents: The incremental costs are from the Ameren Illinois Utilities DSM Plan, Appendix B, referenced October 20, 2009.

STRIP CURTAIN ENERGY SAVINGS, Refrigeration & Thermal Test Center, Design & Engineering Services, Southern California Edison, accessed October 20, 2009.

ALUMINUM SHIELD INCREASES DISPLAY CASE PERFORMANCE: COVER REDUCES HEAT TRANSFER, Refrigeration & Thermal Test Center, Design & Engineering Services, Southern California Edison, accessed October 20, 2009.

LABORATORY COST FOR ENERGY SAVINGS ON REFRIGERATED DAIRY CASES, Econofrost Report and Document Archive, assessed October 20, 2009.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings		
Measure Demand Savings	ΔkW	= 0 (No coincident savings)
Measure Energy Savings	ΔkWh	= DFL x 94.5 kWh/lineal foot/year
ΔkW		= Gross customer connected load kW savings for the measure
DFL		= Display fixture length (in lineal feet)
ΔkWh		= Gross customer annual kWh savings for the measure

Table 9.4.4-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	1.0	1.0	1.0

*Use a night curtain to help insulate open coolers during hours when the store is closed. The energy savings for this measure use a store closure period (i.e., curtains are on during this period of store closure) of four hours to calculate the energy savings.

Table 9.4.4-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Night Curtain for Open Cooler	NA	NA	See Table 9.4.4-3

Table 9.4.4-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0	94.5

Demand Savings Calculation (per foot of curtain) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.4-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.4-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.4-1)} \end{array}$$

Energy Savings Calculation (per foot of curtain) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.4-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.4-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.4-1)} \end{array}$$

Table 9.4.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Night Curtains	\$38	\$7 lineal foot of curtain

9.4.5 Anti-Sweat Heater Control (Freezer)

Measure Code: BPR33
(Previously BPR2 – same measure but the incentive was per foot, instead of per door, as it is now)

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised August 25, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Must be installed on an existing door that does not have ASH control, or has an ASH control that has failed

Eligibility Criteria for New Equipment:

- Must be installed on FREEZER case door
- Device must sense the relative humidity in the air outside of the display case and reduce or turn off the glass door (if applicable) and frame anti-sweat heaters at low-humidity conditions
- Technologies that can turn off anti-sweat heaters based on sensing condensation (on the inner glass pane) also qualify

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: 8-25-10 Changed this measure so the incentive is now a “per door” basis, rather than per lineal foot of door front (was BPR2 for the \$30 lineal foot incentive).

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Total number of display doors – by width (30”, 32”, 36” or other (specify)).

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per control
N_F	= Number of doors having anti-sweat heaters installed
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per control

Table 9.4.5-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Restaurant	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Other	1.0	1.0	1.0

*There are no operating hour values for this measure.

Table 9.4.5-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Type	Non-Coincident Demand Savings (kW)
Anti-sweat Heater Control - Freezer	NA	NA	See Table 9.4.5-3

Table 9.4.5-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.009634	409
Restaurant	0.009634	409
Other	0.009634	409

Demand Savings Calculation (per door) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.5-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.5-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.5-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per door) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.5-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.5-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.5-1)} \\ \hline \end{array}$$

Table 9.4.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Anti Sweat Heater Control	\$34	\$80 per door

9.4.6 Anti-Sweat Heater Control (Refrigeration)

Measure Code: BPR34
(Previously BPR3 – same measure but the incentive was per foot, instead of per door, as it is now)

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: August 25, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Must be installed on an existing door that does not have ASH control, or has an ASH control that has failed

Eligibility Criteria for New Equipment:

- Must be installed on REFRIGERATOR case door
- Device must sense the relative humidity in the air outside of the display case and reduce or turn off the glass door (if applicable) and frame anti-sweat heaters at low-humidity conditions
- Technologies that can turn off anti-sweat heaters based on sensing condensation (on the inner glass pane) also qualify

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: 8-25-10 Changed this measure so the incentive is now a “per door” basis, rather than per lineal foot of door front (was BPR3 at \$30 per lineal foot.)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Total number of display doors – by width (30”, 32”, 36” or other (specify)).

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per control
N_F	= Number of doors having anti-sweat heaters installed
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per control

Table 9.4.6-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Restaurant	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Other	1.0	1.0	1.0

*There are no operating hour values for this measure.

Table 9.4.6-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Anti-sweat Heater Control	NA	NA	See Table 9.4.6-3

Table 9.4.6-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.007436	389
Restaurant	0.007436	389
Other	0.007436	389

Demand Savings Calculation (per door) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.6-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per door) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.6-1)} \\ \hline \end{array}$$

Table 9.4.6-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Anti Sweat Heater Control	\$34	\$80 per door

9.4.7 Door Gaskets

Measure Code: BPR14
Measure was discontinued

Version Date & Revision History:

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Revised August 4, 2010
End date: October 15, 2010 (accepted thru 11-11-10 if app was not pre-approved)

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Must replace a worn or failed gasket unit (or has exceeded useful life, which is defined as four years)
- To be installed on low- and medium-temperature coolers and freezers (-10 through +41 degrees F)

Eligibility Criteria for New Equipment:

- Replacement gasket must meet the door manufacturer's installation specifications, specifically regarding dimensions, materials, attachment method, style, compression, and magnetism.
- Must replace a worn gasket on the main insulated clear or opaque door of a walk-in cooler or freezer.
- Aisle-side door gaskets are not eligible.

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 4 years

Revision Details: 8-4-10 – the wording was revised by removing the “reach in” option, and clarified to state that only “aisle-side doors” are eligible.

10-15-10 this measure was discontinued because savings were suspect based on ComEd evaluation results.

Referenced Documents: Door Gaskets for Glass Doors of Walk-in Coolers: Southern California Edison Company Work Paper WPSCNRRN0004, Revision 1, October 15, 2007.

Door Gaskets for Main Door of Walk-in Coolers and Freezers: Southern California Edison Company Work Paper WPSCNRRN0001, Revision 1, October 15, 2007.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Coolers	
Measure Demand Savings	$\Delta kW = NLF \times 0.000878 \text{ kW/foot}$
Measure Energy Savings	$\Delta kWh = NLF \times 18 \text{ kWh/foot}$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkWh	= Gross customer annual kWh savings for the measure
NLF	= Number of lineal feet of gasket installed
Freezers	
Demand Savings	$\Delta kW = NLF \times 0.002287 \text{ kW/foot}$
Measure Energy Savings	$\Delta kWh = NLF \times 94 \text{ kWh/foot}$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkWh	= Gross customer annual kWh savings for the measure
NLF	= Number of lineal feet of gasket installed

Table 9.4.7-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	1.0	1.0	1.0

Table 9.4.7-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Door Gaskets	NA	NA	See Table 9.4.7-3

Table 9.4.7-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	Door Gaskets for Freezers		Door Gaskets for Coolers	
Grocery	0.002287	94	0.000878	18

Demand Savings Calculation (per foot of gasket) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.7-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.7-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.7-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per foot of gasket) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.7-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.7-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.7-1)} \\ \hline \end{array}$$

Table 9.4.7-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Door Gaskets	\$5	\$3 per lineal foot of gasket

9.4.8 Solid Door Freezer (up to 15 cu ft)

Measure Code: BPR27

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Solid-door freezer
- Up to 15 cubic feet
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on "AOE Commercial Kitchen Data.xls"

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per ft ³

Table 9.4.8-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.8-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Solid Door Freezer (up to 15 ft ³)	NA	NA	See Table 9.4.8-3

Table 9.4.8-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.0573	502

Demand Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.8-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.8-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.8-1)} \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.8-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.8-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.8-1)} \end{array}$$

Table 9.4.8-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$35/freezer

9.4.9 Solid Door Freezer (15-30 cu ft)

Measure Code: BPR28

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Solid-door freezer
- 15 through 30 cubic feet
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on "AOE Commercial Kitchen Data.xls"

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.4.9-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.9-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Solid Door Freezer (15-30 ft ³)	NA	NA	See Table 9.4.9-3

Table 9.4.9-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.0992	869

Demand Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.9-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.9-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.9-1)} \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.9-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.9-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.9-1)} \end{array}$$

Table 9.4.9-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$50.00/freezer

9.4.10 Solid Door Freezer (31-50 cu ft)

Measure Code: BPR29

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Solid-door freezer
- 31 through 50 cubic feet
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on "AOE Commercial Kitchen Data.xls"

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per ft ³

Table 9.4.10-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.10-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Solid Door Freezer (31-50 ft ³)	NA	NA	See Table 9-4-10-3

Table 9.4.10-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.2407	2109

Demand Savings Calculation (per ft³) =

$$\begin{array}{ccc}
 \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.10-2)} \end{array}} & \times & \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.10-1)} \end{array}} & \times & \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.10-1)} \end{array}}
 \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{ccc}
 \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.10-2)} \end{array}} & \times & \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.10-1)} \end{array}} & \times & \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.10-1)} \end{array}}
 \end{array}$$

Table 9.4.10-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$100.00/freezer

9.4.11 Solid Door Freezer (51+ cu ft)

Measure Code: BPR30

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Solid-door freezer
- 51 cubic feet or more
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on "AOE Commercial Kitchen Data.xls"

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per ft ³

Table 9.4.11-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.11-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Solid Door Freezer (51+ ft ³)	NA	NA	See Table 9.4.11-3

Table 9.4.11-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.4773	4181

Demand Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.11-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.11-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.11-1)} \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.11-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.11-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.11-1)} \end{array}$$

Table 9.4.11-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$200.00/freezer

9.4.12 Glass Door Freezer (31-50 cu ft)

Measure Code: BPR31

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Glass-door freezer
- 31 through 50 cubic feet
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per ft ³

Table 9.4.12-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.12-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Glass Door Freezer (31-50 ft ³)	NA	NA	See Table 9.4.12-3

Table 9.4.12-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.5333	4672

Demand Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.12-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.12-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.12-1)} \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.12-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.12-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.12-1)} \end{array}$$

Table 9.4.12-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$300.00/freezer

9.4.13 Glass Door Freezer (51+ cu ft)

Measure Code: BPR32

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing any size (glass or solid door) freezer

Eligibility Criteria for New Equipment:

- Glass-door freezer
- 51 cubic feet or more
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.4.13-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

Table 9.4.13-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Glass Door Freezer (51+ ft3)	NA	NA	See Table 9.4.13-3

Table 9.4.13-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.8725	7643

Demand Savings Calculation (per ft³) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.13-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.13-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.13-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.13-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.13-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.13-1)} \\ \hline \end{array}$$

Table 9.4.13-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Replace freezer	\$250	\$500.00/freezer

9.4.14 Evaporator Fan Controls

Measure Code: BPR6

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Must be installed in an existing cooler that does not have evaporator fan controls, or has evaporator fan controls that have failed

Eligibility Criteria for New Equipment:

- Installation in medium-temperature walk-in coolers
- Must control at least 1/20 hp
- Must reduce fan power by at least 75% during the off-cycle
- This measure is not applicable if any of the following conditions apply:
 - 1) The compressor runs all the time with high duty cycle
 - 2) The evaporator fan already cycles
 - 3) The evaporator fan motor runs on poly-phase power
 - 4) The evaporator fan motor is not shaded-pole or permanent split capacitor (PSC)
 - 5) Evaporator does not use off-cycle or time-off defrost

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 16 years

Revision Details: In PY4 removed criteria cannot be used if applying for an EC motor incentive (BPR4 or BPR5).

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of evaporator fan motors being controlled
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.14-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.14-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Evaporator Fan Controls	NA	NA	See Table 9.4.14-3

Table 9.4.14-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.06963	523
Restaurant	0.06963	523
Other	0.06963	523

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.14-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.14-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.14-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.14-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.14-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.14-1)} \end{array}$$

Table 9.4.14-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Evaporator Fan Controls	\$146	\$60 per motor

9.4.15 ENERGY STAR® Vending Machine

Measure Code: BPR8

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New Installations only

Eligibility Criteria for New Equipment:

- Must be ENERGY STAR qualified and listed

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 14 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of machines that are ENERGY STAR®-rated
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.15-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.15-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
ENERGY STAR Vending Machine	NA	NA	See Table 9.4.15-3

Table 9.4.15-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0	1,576

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4-15-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9-4-15-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9-4-15-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9-4-15-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9-4-15-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9-4-15-1)} \end{array}$$

Table 9.4.15-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
ENERGY STAR Vending Machine	\$3,500	\$3,000	\$500	\$100 per unit

9.4.16 Beverage Machine Control

Measure Code: BPR9

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be an add-on to a new beverage machine or an existing beverage machine without controls

Eligibility Criteria for New Equipment:

- Installed on a refrigerated vending machine that contains only non-perishable bottled and canned beverages
- Must have passive infrared sensor to turn off lights after 15-minutes of unoccupied time
- The control logic should power up the machine at two-hour intervals to maintain product temperature and provide compressor protection.
- Cannot be combined with purchases from the On-line store

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 8 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of machines that have controls
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.16-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9-4-16-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Beverage Machine Control	NA	NA	See Table 9.4.16-3

Table 9-4-16-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0	1,612

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.16-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.16-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.16-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.16-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.16-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.16-1)} \end{array}$$

Table 9-4-16-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Beverage Machine Control	\$216	\$100 per unit

(Cannot be combined with ActOnEnergy On-line store purchase)

9.4.17 Snack Machine Control

Measure Code: BPR10

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be an add-on to a new snack machine or an existing snack machine.

Eligibility Criteria for New Equipment:

- Must have passive infrared sensor to turn off lights after 15-minutes of unoccupied time
- Cannot be combined with purchases from the On-line store

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 8 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of machines that have controls
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.17-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.17-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Snack Machine Control	NA	NA	See Table 9.4.17-3

Table 9.4.17-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Lodging	0	387

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.17-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.17-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.17-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.17-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.17-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.17-1)} \\ \hline \end{array}$$

Table 9.4.17-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost (\$)	Incentive Payment (\$)
Snack Machine Control	\$108	\$30 per unit

(Cannot be combined with ActOnEnergy On-line store purchase)

9.4.18 High Efficiency Ice Makers

Measure Code: BPR20

Version Date & Revision History:

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Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 101-200 lbs/24hr capacity
- Maximum 8.5 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.18-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.18-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (101-200#)	NA	NA	See Table 9.4.18-3

Table 9.4.18-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.41	3,614

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.18-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.18-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.18-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.18-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.18-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.18-1)} \end{array}$$

Table 9.4.18-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$296	\$100 per ice maker

9.4.19 High Efficiency Ice Makers

Measure Code: BPR21

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 201-300 lbs/24hr capacity
- Maximum 7.7 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.19-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.19-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (201-300#)	NA	NA	See Table 9.4.19-3

Table 9.4.19-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.26	2,281

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.19-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.19-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.19-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.19-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.19-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.19-1)} \end{array}$$

Table 9.4.19-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$312	\$150 per ice maker

9.4.20 High Efficiency Ice Makers

Measure Code: BPR22

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 301-400 lbs/24hr capacity
- Maximum 6.5 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.20-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.20-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (301-400#)	NA	NA	See Table 9.4.2-3

Table 9.4.20-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.19	1,661

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.20-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.20-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.20-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.20-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.20-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.20-1)} \end{array}$$

Table 9.4.20-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$559	\$150 per ice maker

9.4.21 High Efficiency Ice Makers

Measure Code: BPR23

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 401-500 lbs/24hr capacity
- Maximum 5.5 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.21-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.21-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (401-500#)	NA	NA	See Table 9.4.21-3

Table 9.4.21-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.28	2,464

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.21-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.21-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.21-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.21-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.21-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.21-1)} \end{array}$$

Table 9.4.21-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$981	\$175 per ice maker

9.4.22 High Efficiency Ice Makers

Measure Code: BPR24

Version Date & Revision History:

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Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 501-1000 lbs/24hr capacity
- Maximum 5.2 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.22-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.22-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (501-1000#)	NA	NA	See Table 9.4.22-3

Table 9.4.22-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.34	3,011

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.22-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.22-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.22-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.22-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.22-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.22-1)} \end{array}$$

Table 9.4.22-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$1,485	\$225 per ice maker

9.4.23 High Efficiency Ice Makers

Measure Code: BPR25

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- 1001-1500 lbs/24hr capacity
- Maximum 5.0 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.23-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.23-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (1001-1500#)	NA	NA	See Table 9.4.23-3

Table 9.4.23-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.47	4,106

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.23-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.23-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.23-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.23-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.23-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.23-1)} \end{array}$$

Table 9.4.23-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$1,821	\$350 per ice maker

9.4.24 High Efficiency Ice Makers

Measure Code: BPR26

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- May be a new installation or replacement of an existing unit

Eligibility Criteria for New Equipment:

- Greater than 1500 lbs/24hr capacity
- Maximum 4.6 kWh per 100 lbs ice

Loadshape: Loadshape #4 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of high-efficiency ice makers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.24-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.24-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Ice Maker (1500# +)	NA	NA	See Table 9.4.24-3

Table 9.4.24-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Restaurant, Grocery, and Other	0.5	4,380

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.24-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.24-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.24-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.24-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.24-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.24-1)} \end{array}$$

Table 9.4.24-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Ice Maker	\$2,194	\$350 per ice maker

9.4.25 EC Motor for Walk-In Cooler

Measure Code: BPR4

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: June 1, 2009, and May 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- For replacement of existing standard efficiency shaded-pole evaporator fan motor with Electrically Commutated motor in refrigerated display cases or fan coil in walk-ins

Eligibility Criteria for New Equipment:

- This measure cannot be used in conjunction with the Evaporator Fan Control measure (BPR6)
- Incentives are available for ECM (electronically commutated motor) and PSC (permanent split capacitor) fan motor retrofits in existing refrigerated display cases. New PSC motors must replace shaded pole (S-P) motors. New ECM motors may replace either S-P motors or PSC motors.

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details:

6-1-09 – incentive was \$50/motor, reduced to \$25/motor
5-2010 Split into two measures (BPR4 and BPR19 – previously both measures were encompassed in BPR4)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of motors being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.25-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.25-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
EC Motor for Walk-in Cooler	NA	NA	See Table 9.4.25-3

Table 9.4.25-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
	Walk-in Cooler	
Grocery	0.056556	398
Restaurant	0.033981	399
Other	0.0452685	398.5

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.4.25-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.4.25-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.4.25-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.4.25-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.4.25-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.4.25-1)} \\ \hline \end{array}$$

Table 9.4.25-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
EC Motor for Walk-in Cooler	\$50	\$25/motor

9.4.26 EC Motor for Walk-In Freezer

Measure Code: BPR19

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: May 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- For replacement of existing standard efficiency shaded-pole evaporator fan motor with Electrically Commutated motor in refrigerated display cases or fan coil in walk-ins

Eligibility Criteria for New Equipment:

- This measure cannot be used in conjunction with the Evaporator Fan Controller measure (BPR6)
- Incentives are available for ECM (electronically commutated motor) and PSC (permanent split capacitor) fan motor retrofits in existing refrigerated display cases. New PSC motors must replace shaded pole (S-P) motors. New ECM motors may replace either S-P motors or PSC motors.

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: Split into two measures (BPR4 and BPR19 – previously both measures were encompassed in BPR4)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of motors being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.26-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.26-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
EC Motor for Walk-in Freezer	NA	NA	See Table 9.4.26-3

Table 9.4.26-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
	Walk-in Freezer	
Grocery	0.068665	631
Restaurant	0.038503	748
Other	0.053584	689.5

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.26-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.26-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.26-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.26-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.26-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.26-1)} \end{array}$$

Table 9.4.26-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
EC Motor for Walk-in Freezer	\$50	\$35/motor

9.4.27 EC Motor for Reach-In Cooler

Measure Code: BPR5

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: June 1, 2009, and May 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- For replacement of standard efficiency shaded-pole motor with Electrically Commutated motor

Eligibility Criteria for New Equipment:

- This measure cannot be used in conjunction with the Evaporator Fan Controller measure (BPR6)
- Incentives are available for ECM (electronically commutated motor) and PSC (permanent split capacitor) fan motor retrofits in existing refrigerated display cases. New PSC motors must replace shaded pole (S-P) motors. New ECM motors may replace either S-P motors or PSC motors.

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details:

6-1-09 – incentive was \$35/ motor, reduced to \$25/motor
5-2010 - Split into two measures (BPR5 and BPR18 – previously both measures were encompassed in BPR5)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of motors being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.27-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.27-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
EC Motor for Reach-in Cooler	NA	NA	See Table 9.4.27-3

Table 9.4.27-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.033771	350
Restaurant	0.033771	350
Other	0.033771	350

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.27-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.27-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.27-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.27-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.27-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.27-1)} \end{array}$$

Table 9.4.27-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
EC Motor for Reach-in Cooler	\$89	\$25/motor

9.4.28 EC Motor for Reach-In Freezer

Measure Code: BPR18

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: May 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- For replacement of standard efficiency shaded-pole motor with Electrically Commutated motor

Eligibility Criteria for New Equipment:

- This measure cannot be used in conjunction with the Evaporator Fan Controller measure (BPR6)
- Incentives are available for ECM (electronically commutated motor) and PSC (permanent split capacitor) fan motor retrofits in existing refrigerated display cases. New PSC motors must replace shaded pole (S-P) motors. New ECM motors may replace either S-P motors or PSC motors.

Loadshape: Loadshape #5 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: Split into two measures (BPR5 and BPR18 – previously both measures were encompassed in BPR5)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_M \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings
N_M	= Number of motors being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings

Table 9.4.28-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	1.0	1.0	1.0
School (K-12)	1.0	1.0	1.0
College/University	1.0	1.0	1.0
Retail/Service	1.0	1.0	1.0
Restaurant	1.0	1.0	1.0
Hotel/Motel	1.0	1.0	1.0
Medical	1.0	1.0	1.0
Grocery	1.0	1.0	1.0
Warehouse	1.0	1.0	1.0
Light Industry	1.0	1.0	1.0
Heavy Industry	1.0	1.0	1.0
Average = Miscellaneous	1.0	1.0	1.0

Table 9.4.28-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
EC Motor for Reach-In Freezer	NA	NA	See Table 9.4.28-3

Table 9.4.28-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.036276	462
Restaurant	0.036276	462
Other	0.036276	462

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.28-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.28-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.28-1)} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.28-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.28-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.28-1)} \end{array}$$

Table 9.4.28-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
EC Motor for Reach-In Freezer	\$89	\$35/motor

9.4.29 Refrigeration Tune Up

Measure Code: BPR11

Version Date & Revision History:

Draft date: September 29, 2009
Effective date: September 29, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Cannot have had tune-up or service agreement within the past 12 months

Eligibility Criteria for New Equipment:

- Commercial and industrial grade (non-residential grade) self-contained and non-self contained freezers and coolers (See Table 4a for the checklist of what must be done during the tune-up.)
- Tune-ups may be completed by internal staff, **ONLY** if approval is granted by Ameren prior to submitting this application.
- "Service Cost" includes standard tune-up labor and parts, but does not include repair parts and labor
- Any business that has had a service contract in the prior 12 months are not eligible for this incentive
- If a new service agreement is established, only the first tune-up is eligible for this incentive

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 4 years

Revision Details: In PY4 removed criteria Pre-approval is required for this measure (even if the incentive request is less than \$5,000).

Referenced Documents: The incremental costs are from the Ameren Illinois Utilities DSM Plan, Appendix B, referenced October 20, 2009. 2004-2005 Database for Energy Efficiency Resources (CA DEER database; 2004-05).

Bonus Incentives offered: None

Supplemental Information Collected on the Application:

COMMERCIAL REFRIGERATION TUNE-UP REQUIREMENTS CHECKLIST COMPLETED AND SUBMITTED WITH THE APPLICATION. In addition, the tune-up service fees must be included (the incentive is capped at 50% of the service cost)

Refrigeration service must include the following normal maintenance items (as applicable):

- Clean condenser coils
- Clean evaporator coils
- Clean drain pan
- Inspect/clean fans
- Inspect/repair door seals
- Check/replace belts and bearings
- Check suction pressure & temperature
- Adjust head pressure controls
- Check/adjust refrigerant level
- Check oil level, pressure, cleanliness
- Check sub-cooling & super heat
- Check liquid line temperature
- Inspect/adjust heat reclaim operation
- Tighten all line voltage connections
- Verify proper operation of defrost heaters
- Check defrost heater amperage draw
- Compressor motor amp draw
- Condenser fan amp draw
- Verify proper box/product temperature

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = NTS \times 0.05 \text{ kW/ton/year}$

Measure Energy Savings $\Delta kWh = NTS \times 552 \text{ kWh/ton/year}$

ΔkW = Gross customer connected load kW savings for the measure
 NTS = Number of tons served
 ΔkWh = Gross customer annual kWh savings for the measure

Table 9.4.29-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	1.0	1.0	1.0

Table 9.4.29-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Wattage (watts)	Post Tune-up Wattage (watts)	Non-Coincident Demand Savings (kW)
Refrigeration Tune up	NA	NA	See Table 9.4.29-3

Table 9.4.29-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.05	552

Demand Savings Calculation (per tune-up) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.29-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.29-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.4.29-1)} \end{array}$$

Energy Savings Calculation (per tune up) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.4.29-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.4.29-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.4.29-1)} \end{array}$$

Table 9.4.29-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Refrigeration Tune-up	\$35	The lesser of (\$20/hp for self-contained units and \$20/ton for all other units) OR 50% of the service cost

9.5 Motors

The following measures are included in the PY3 Motors program.

9.5 MOTORS		
MOTORS		
9.5.1	Efficient Motors (ODP and TEFC) - 1-200 hp	
VFD		
9.5.2	Variable Frequency Drives (VFD) for Motors	BPM1

9.5.1 Efficient Motors

Measure Code: N/A

Version Date & Revision History:

Draft date: December 17, 2008
 Effective date: December 17, 2008
 Revised: NA
 End date: **Discontinued** December 31, 2010 (estimated, as stated on application) – actually removed from the app/web site on 1-14-11

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Only new or replacement of failed motors are eligible – “stocked” motors are not eligible

Eligibility Criteria for New Equipment:

- An existing open drip-proof or totally enclosed fan-cooled motor 200 hp or less in size. Motors exceeding 200 hp can utilize the Custom Program.
- High-efficiency motors must be three-phase ODP (Open Drip Proof) or TEFC (Totally Enclosed Fan Cooled) motors that have nominal speeds of 1200, 1800, or 3600 RPM.
- Only NEMA Premium Efficiency motors are eligible. (Customer-provided "NEMA Nominal Efficiency" is used for savings calculations.)
- See Table below for efficiency minimum requirements

MOTOR MINIMUM EFFICIENCIES REQUIREMENTS							
OPEN DRIP-PROOF MOTORS (ODP)				TOTALLY ENCLOSED FAN-COOLED MOTORS (TEFC)			
Size (hp)	Speed (RPM)			Size (hp)	Speed (RPM)		
	1200	1800	3600		1200	1800	3600
NEMA Nominal Efficiency				NEMA Nominal Efficiency			
1	82.5%	85.5%	77.0%	1	82.5%	85.5%	77.0%
1.5	86.5%	86.5%	84.0%	1.5	87.5%	86.5%	84.0%
2	87.5%	86.5%	85.5%	2	88.5%	86.5%	85.5%
3	88.5%	89.5%	85.5%	3	89.5%	89.5%	86.5%
5	89.5%	89.5%	86.5%	5	89.5%	89.5%	88.5%
7.5	90.2%	91.0%	88.5%	7.5	91.0%	91.7%	89.5%
10	91.0%	91.7%	89.5%	10	91.0%	91.7%	90.2%
15	91.7%	93.0%	90.2%	15	91.7%	92.4%	91.0%
20	92.4%	93.0%	91.0%	20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%	25	93.0%	93.6%	91.7%
30	93.6%	94.1%	91.7%	30	93.0%	93.6%	91.7%
40	94.1%	94.1%	92.4%	40	94.1%	94.1%	92.4%
50	94.1%	94.5%	93.0%	50	94.1%	94.5%	93.0%
60	94.5%	95.0%	93.6%	60	94.5%	95.0%	93.6%
75	94.5%	95.0%	93.6%	75	94.5%	95.4%	93.6%
100	95.0%	95.4%	93.6%	100	95.0%	95.4%	94.1%
125	95.0%	95.4%	94.1%	125	95.0%	95.4%	95.0%
150	95.4%	95.8%	94.1%	150	95.8%	95.8%	95.0%
200*	95.4%	95.8%	95.0%	200*	95.8%	96.2%	95.4%

*Motors over 200 hp may be eligible for incentives through the Custom program.

Loadshape: Loadshape #2 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: 1-14-11 this program was removed, now that NEMA premium motors are the standard – they are no longer considered energy-efficient.

Referenced Documents: Motors Standard Measures v1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: In addition to motor specifications the application also requests: Motor Function, Motor Location, and Weekly Hours of Equipment Operation.

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_M \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kW_S \times N_M \times ISR \times \text{Hours}$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_S	= Gross customer connected load kW savings, based on the motor size and type
N_U	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings, based on the motor size and type
Hours	= Weekly hours of use as reported on application times 52 (weeks per year)

Table 9.5.1-1 Energy Factor Assumptions

Open Drip-proof Motor (ODP)				
Size (HP)	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual kW Coincident Peak Savings (kW)
1	1	1	1	0.04
1.5	1	1	1	0.04
2	1	1	1	0.06
3	1	1	1	0.08
5	1	1	1	0.11
7.5	1	1	1	0.25
10	1	1	1	0.39
15	1	1	1	0.53
20	1	1	1	0.66
25	1	1	1	0.98
30	1	1	1	0.99
40	1	1	1	1.33
50	1	1	1	1.36
60	1	1	1	1.57
75	1	1	1	1.95
100	1	1	1	2.54
125	1	1	1	3.02
150	1	1	1	3.49
200	1	1	1	4.42

Table 9.5.1-1 Energy Factor Assumptions (cont.)

Totally Enclosed Fan-cooled Motors (TEFC)				
Size (HP)	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual kW Coincident Peak Savings (kW)
1	1	1	1	0.04
1.5	1	1	1	0.05
2	1	1	1	0.06
3	1	1	1	0.08
5	1	1	1	0.12
7.5	1	1	1	0.26
10	1	1	1	0.41
15	1	1	1	0.56
20	1	1	1	0.65
25	1	1	1	0.90
30	1	1	1	0.90
40	1	1	1	1.19
50	1	1	1	1.19
60	1	1	1	1.43
75	1	1	1	1.79
100	1	1	1	2.39
125	1	1	1	2.85
150	1	1	1	3.31
200	1	1	1	4.31

Demand Savings Calculation (per motor) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.5.1-1)} \end{array}} \times \begin{array}{c} \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.5.1-1)} \end{array}} \times \begin{array}{c} \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.5.1-1)} \end{array}} \end{array}$$

Energy Savings Calculation (per motor) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.5.1-1)} \end{array}} \times \begin{array}{c} \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.5.1-1)} \end{array}} \times \begin{array}{c} \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(from application form X 52} \\ \text{weeks per year)} \end{array}} \end{array}$$

Table 9.5.1-2 Measure Costs (Parts and Labor) and Incentive Levels

Size (HP)	Incremental Cost	Incentive Payment	Incremental Cost	Incentive Payment
	Open Drip-proof Motor (ODP)		Totally Enclosed Fan-cooled Motors (TEFC)	
1	\$32	\$7	\$54	\$7
1.5	\$33	\$9	\$53	\$9
2	\$43	\$11	\$71	\$11
3	\$44	\$16	\$69	\$16
5	\$55	\$20	\$85	\$20
7.5	\$158	\$35	\$209	\$35
10	\$260	\$45	\$334	\$45
15	\$298	\$60	\$508	\$60
20	\$457	\$75	\$636	\$75
25	\$678	\$80	\$1,113	\$80
30	\$764	\$90	\$1,316	\$90
40	\$1,019	\$100	\$1,755	\$100
50	\$1,192	\$125	\$2,162	\$125
60	\$1,509	\$150	\$3,088	\$150
75	\$1,918	\$175	\$4,065	\$175
100	\$2,644	\$250	\$5,969	\$250
125	\$3,980	\$275	\$7,581	\$275
150	\$5,315	\$325	\$9,194	\$325
200	\$8,182	\$450	\$10,969	\$450

9.5.2 Variable Frequency Drives (VFD) for Motors

Measure Code: BPM1

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: NA
End date: December 31, 2010 (estimated)

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Any size

Eligibility Criteria for New Equipment:

- Must be used in conjunction with pumping or air-handling applications
- Minimum equipment operating hours 2,000/year
- Must be installed on an AC motor (DC motors are not eligible)
- May not exceed 500 hp (over 500hp may be eligible under the custom program)
- Redundant/backup units do not qualify
- Routine replacements of existing VFDs do not qualify
- System must be controlled by differential pressure, flow, temperature, or other control variable
- Application must have significant load diversity. Applications meant for power conditioning and other non-varying loads are not eligible
- VFDs must be functional (installed and ready to operate) by May 31, 2012
- External labor may be included in the project cost (but not internal labor)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: 5-7-2011 incentive amount changed from \$75 per horsepower controlled to \$90 per horsepower controlled. In PY4 the measure code was changed from BPM1B to BPM1 and the title was changed from "Variable Frequency Drives (non-HVAC)" to "Variable Frequency Drives (VFD) for Motors."

Referenced Documents: EM&V memo dated December 14, 2010 (ODC Memo Regarding Motors Dated 10-14-10.doc). Toshiba Energy Saving Software (Motors and Drives) CD.

Bonus Incentives offered: 1-4-10 Incentive increased to \$75/ hp controlled (previously \$45) – renamed "BPM1B". Originally set to return to \$45 on 3-31-10, but was instead extended to 5-31-11. In addition, the cap that stated the incentive could be no more than 50% of the project cost was increased so that the incentive could be up to 75% of the project cost.

Supplemental Information Collected on the Application

VFD Use (pick one)	Control before VFD	Manufacturer and Model Number of VFD	Cost of VFD/ External labor	Annual Operating Hours	HP Controlled by VFD
<input type="checkbox"/> Process Fan <input type="checkbox"/> HVAC Fan <input type="checkbox"/> Cooling Tower Fan <input type="checkbox"/> Boiler Draft Fan <input type="checkbox"/> HVAC Heating Pump <input type="checkbox"/> Chilled Water Distribution Pump <input type="checkbox"/> Process Pump <input type="checkbox"/> Drive System (Specify): _____ <input type="checkbox"/> Other (specify): _____	<input type="checkbox"/> Outlet Control Valve <input type="checkbox"/> Bypass Valve <input type="checkbox"/> Discharge Damper <input type="checkbox"/> Inlet Guide Vanes <input type="checkbox"/> Other (specify): _____		\$ _____ (VFD cost) \$ _____ (External labor cost) <u>The incentive may not be more than 75% of these combined costs</u>	_____ (must be at least 2,000 hrs)	_____ (500 hp maximum per VFD)

Algorithms used to calculate savings

Measure Demand Savings NA

Measure Energy Savings $\Delta kWh = \Delta kWh_s \times N_L \times ISR$

ΔkW = Gross customer connected load kW savings for the measure

N_L = Number of vfd's being installed

ISR = In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%

ΔkWh = Gross customer annual kWh savings for the measure

ΔkWh_s = Gross customer connected load kWh savings per vfd

9.5.2-1 Calculated Energy Savings

Per the EM&V memo dated 12/14/2010:

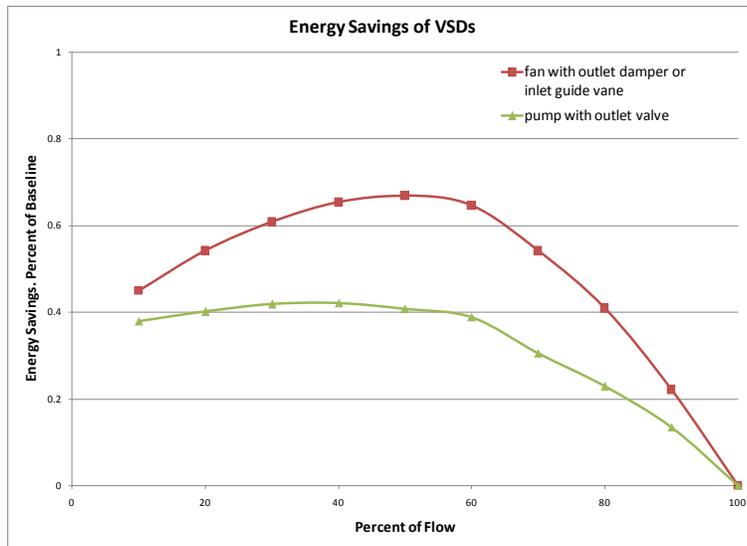
If load profiles are not available (which will most often to be the case), we propose setting a limit on savings of 67% of the baseline energy use for fan VSDs, 42% for pump VSDs, and 67% on all “other” types of VFD use. The graph below illustrates the reason why we chose these limits. To create this figure, we used the Toshiba software to calculate how much the percentage energy savings changes as all hours in the VSD load profile are set to 90% flow, 80%, 70%...down to 10% flow. The energy savings of a VSD is plotted, compared motors driving fans with outlet dampers or inlet guide vanes (Toshiba results are the same for these), and motors driving pumps controlled by outlet valves. This demonstrates that the upper limit on savings for fans is 67%, and for pumps it is 42%.

And the baseline energy use calculated as described below in the evaluation report:

Baseline usage was estimated assuming non-HVAC motors are standard efficiency, 1800 rpm TEFC motors with a load factor of 0.75, drawing our motor efficiency data from the Ameren PY2 TRM, with operating hours as shown in AIB tracking data.

So, the annual energy savings to be reported in AIB for PY3 and going forward would be the minimum of the following:

- Baseline annual energy use times 42% for pump applications
- Baseline annual energy use times 67% for fan applications
- Toshiba energy calculator using site-specific information



Source: ODC Memo Regarding Motors Dated 10-14-10.doc)

Table 9.5.2-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
VFD (non-HVAC)	\$125	\$0	\$125	\$90*

*(incentive may not exceed 75% of the project cost)

9.6 Water Heaters

The following measures are included in the PY3 Water Heater program.

9.6 WATER HEATERS		
	Measure	Code
9.6.1	High Efficiency Tanked Water heater (electric)	BPWH1
9.6.2	High Efficiency Tankless Water Heater (electric)	BPWH2
9.6.3	High Efficiency Tankless Water Heater (gas)	BPWH3
9.6.4	High Efficiency Condensing Tanked Water Heater (gas)	BPWH4
9.6.5	High Efficiency Tanked Water Heater (gas)	BPWH5
9.6.6	Supplemental Plumbing Measures	None

9.6.1 High Efficiency Tanked Water Heater (electric)

Measure Code: BPWH1

Version Date & Revision History:

Draft date: May 24, 2010
Effective date: May 24, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace ELECTRIC commercial-grade tanked water heater with 50 or more gallon storage capacity and input wattage between 12 and 54kW
- Energy factor less than or equal to 0.90, or water heater is five or more years old

Eligibility Criteria for New Equipment:

- New Equipment must be electric powered
- Energy factor greater than or equal to 0.95
- Minimum Thermal Efficiency of 0.98
- Less than 3% standby loss (standby loss is calculated as percentage of annual energy usage)
- Equivalent storage capacity to unit being replaced
- Qualified units must be GAMA/AHRI efficiency rating certified (the certified reference number must be provided and a copy of the certificate of product performance must be included with the application.)

Loadshape: Loadshape #5

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: (None)

Referenced Documents: Food Service Technology Center Reports (5011.07.04 & 5011.07.19) AOE Calculations, Commercial Electric Water Heaters.xlsx
Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certified Product Performance <http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=CWH> accessed 4/1/2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Capacity of the new heater (50-79 gallons, 80-99 gallons, or 100+ gallons)

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kWh_S \times N_{WH} / H \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_{WH} \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkWh_S	= Gross customer connected load kW savings per water heater
N_{WH}	= Number of water heaters being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per unit = $(kWh_B / EF_O) - (kWh_B / EF_N)$
kWh_B	= Estimated typical annual energy usage of ideal unit (EF assumed to be 1)
H	= Hours of operation (assumed to be 8760)
EF_O	= Energy factor of old unit (~0.9)
EF_N	= Energy factor of new unit (~0.95)

Table 9.6.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1	1	1

*Hours are assumed to be 8760 due to that storage water heaters are designed to keep water at a set temp and total usage is averaged over a one year period.

Table 9.6.1-2 Specifications and Calculated Non-coincident Demand Savings

Typical Tank Size (gal)	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Typical 50	3.76	3.55	0.20
Typical 80	10.11	9.55	0.57
Typical 100	16.48	15.53	0.94

Table 9.6.1-3 Calculated Demand and Energy Savings by Type of Business

Typical Tank Size (gal)	Demand Savings (kW)	Energy Savings (kWh)
Typical 50	0.20	1,780.85
Typical 80	0.57	4,962.69
Typical 100	0.94	8,273.63

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.6.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.6.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.6.1-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.6.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.6.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.6.1-1)} \\ \hline \end{array}$$

Table 9.6.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Typical Tank Size (gal)	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Typical 50	\$1,800	\$750	\$1,050	\$150
Typical 80	\$2,250	\$1,200	\$1,050	\$150
Typical 100	\$3,750	\$1,800	\$1,950	\$150

9.6.2 High Efficiency Tankless Water Heater (electric)

Measure Code: BPWH2

Version Date & Revision History:

Draft date: May 24, 2010
Effective date: May 24, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace ELECTRIC commercial-grade tanked water heater 50 or more gallon storage capacity
- Energy factor less than or equal to 0.90, or water heater is five or more years old

Eligibility Criteria for New Equipment:

- New Equipment must be electric powered
- Multiple new units may be installed to meet the demands supplied by the existing tanked unit
- Energy factor greater than or equal to 0.98
- Instantaneous water heater with greater than or equal to 5 GPM output at 70° F temperature rise

Loadshape: Loadshape #5

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: 9-15-2011 Added criteria Multiple new units may be installed to meet the demands supplied by existing tanked unit.

Referenced Documents: Food Service Technology Center Reports (5011.07.04 & 5011.07.19) AOE Calculations, Commercial Electric Water Heaters.xlsx
Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certified Product Performance <http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=CWH> accessed 4/1/2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Capacity of the new heater

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kWh_S \times N_{WH} / H \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_{WH} \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkWh_S	= Gross customer connected load kW savings per water heater
N_{WH}	= Number of water heaters being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per unit = $(kWh_B / EF_O) - (kWh_B / EF_N)$
kWh_B	= Estimated typical annual energy usage of ideal unit (EF assumed to be 1)
H	= Hours of operation (assumed to be 8760)
EF_O	= Energy factor of old unit (~0.9)
EF_N	= Energy factor of new unit (~0.95 to 0.99)

Table 9.6.2-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1	1	1

*Hours are assumed to be 8760 due to that storage water heaters are designed to keep water at a set temp and total usage is averaged over a one year period.

Table 9.6.2-2 Specifications and Calculated Non-coincident Demand Savings

Output (gpm) at delta T 70	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
5.0	3760	3420	0.34
10.0	10110	9210	0.90
15.0	16480	15010	1.47

Table 9.6.2-3 Calculated Demand and Energy Savings by Type of Business

Output (gpm) at delta T 70	Demand Savings (kW)	Energy Savings (kWh)
5.0	0.34	2,991.98
10.0	0.90	7,904.82
15.0	1.47	12,878.51

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.6.2-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.6.2-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.6.2-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.6.2-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.6.2-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.6.2-1)} \\ \hline \end{array}$$

Table 9.6.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Output (gpm) at delta T 70	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
5.0	\$1,800.00	\$750.00	\$1,050.00	\$300/heater
10.0	\$2,250.00	\$1,200.00	\$1,050.00	\$300/heater
15.0	\$3,750.00	\$1,800.00	\$1,950.00	\$300/heater

9.6.3 High Efficiency Tankless Water Heater (gas)

Measure Code: BPWH3

Version Date & Revision History:

Draft date: May 24, 2010
Effective date: May 24, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace GAS commercial-grade tanked water heater 50 or more gallon storage capacity
- Energy factor less than or equal to 0.60, or water heater is five or more years old

Eligibility Criteria for New Equipment:

- New equipment must be gas powered
- Multiple new units may be installed to meet the demands supplied by existing tanked unit.
- Energy factor greater than or equal to 0.82
- Instantaneous water heater with 5 or more GPM output at 70° F temperature rise

Loadshape: Loadshape #5

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: 9-15-2011 incentive amount increased from \$300 per heater to \$1,200 per heater. 9-15-2011 Added criteria Multiple new units may be installed to meet the demands supplied by existing tanked unit. In PY4 removed criteria that only GDS-2 customers are eligible for this measure.

Referenced Documents: Food Service Technology Center Reports (5011.07.04 & 5011.07.19)

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Capacity of the new heater
AOE Calculations, Commercial Electric Water Heaters.xlsx
Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certified Product Performance
<http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=CWH> accessed 4/1/2010

Algorithms used to calculate savings	
Measure Demand Savings	ΔkW = not evaluated for gas units
Measure Energy Savings	$\Delta \text{therms} = \Delta \text{therms}_S \times N \times \text{ISR}$
ΔkW	= Gross customer connected load kW savings for the measure
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_S	= Gross customer therm savings per unit = $(\text{therms}_B / \text{EF}_O) - (\text{therms}_B / \text{EF}_N)$
Therms_B	= Estimated typical annual energy usage of ideal unit (EF assumed to be 1)
EF_O	= Energy factor of old unit (~0.6)
EF_N	= Energy factor of new unit (~0.82 to 0.85)

Table 9.6.3-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1	1	1

*Hours are assumed to be 8760 due to that storage water heaters are designed to keep water at a set temp and total usage is averaged over a one year period.

Table 9.6.3-2 Specifications and Calculated Savings

Output (gpm) at delta T 70	Base Unit Therms	Retrofit Unit Therms
5.0	1,630.56	1,081.23
10.0	4,397.95	2,915.91
15.0	7,164.18	4,750.58

Table 9.6.3-3 Calculated Demand and Energy Savings by Output

Output (gpm) at delta T 70	Energy Savings (therms)
5.0	549.33
10.0	1,481.47
15.0	2,413.60

Table 9.6.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Output (gpm) at delta T 70	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
5.0	\$2,250	\$750	\$1,500	\$1,200/heater
10.0	\$2,700	\$1,200	\$1,500	\$1,200/heater
15.0	\$4,200	\$1,800	\$2,400	\$1,200/heater

9.6.4 High Efficiency Condensing Tanked Water Heater (gas)

Measure Code: BPWH4

Version Date & Revision History:

Draft date: May 24, 2010
Effective date: May 24, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace GAS commercial-grade tanked water heater 50 or more gallon storage capacity
- Energy factor less than or equal to 0.60, or water heater is five or more years old
- Input greater than or equal to 75 MBTUH

Eligibility Criteria for New Equipment:

- New equipment must be gas powered
- Energy factor greater than or equal to 0.80
- Equivalent storage capacity to the unit being replaced

Loadshape: Loadshape #5

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: In PY4 removed criteria that customer must have GDS-2 account, as GDS-2, 3 and 4 customers are now eligible for gas incentives.

Referenced Documents: Food Service Technology Center Reports (5011.07.04 & 5011.07.19)

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Capacity of the new heater (50-79 gallons, 80-99 gallons, or 100+ gallons)

AOE Calculations, Commercial Electric Water Heaters.xlsx

Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certified Product Performance
<http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=CWH> accessed 4/1/2010

Algorithms used to calculate savings	
Measure Demand Savings	ΔkW = not evaluated for gas units
Measure Energy Savings	$\Delta \text{therms} = \Delta \text{therms}_S \times N \times \text{ISR}$
ΔkW	= Gross customer connected load kW savings for the measure
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_S	= Gross customer therm savings per unit = $(\text{therms}_B / \text{EF}_O) - (\text{therms}_B / \text{EF}_N)$
Therms_B	= Estimated typical annual energy usage of ideal unit (EF assumed to be 1)
EF_O	= Energy factor of old unit (~0.6)
EF_N	= Energy factor of new unit (~0.80 to 0.85)

Table 9.6.4-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1	1	1

*Hours are assumed to be 8760 due to that storage water heaters are designed to keep water at a set temp and total usage is averaged over a one year period.

Table 9.6.4-2 Specifications and Calculated Savings

Typical Tank Size (gal)	Base Unit Therms	Retrofit Unit Therms
Typical 50	1,684.92	1,225.82
Typical 80	4,543.95	3,425.47
Typical 100	7,402.99	5,241.83

Table 9.6.4-3 Calculated Demand and Energy Savings by Type of Business

Typical Tank Size (gal)	Energy Savings (therms)
Typical 50	459.10
Typical 80	1,118.48
Typical 100	2,161.16

Table 9.6.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Typical Tank Size (gal)	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Typical 50	\$1,800.00	\$750.00	\$1,050.00	\$300/heater
Typical 80	\$2,250.00	\$1,200.00	\$1,050.00	\$300/heater
Typical 100	\$3,750.00	\$1,800.00	\$1,950.00	\$300/heater

9.6.5 High Efficiency Tanked Water Heater (gas)

Measure Code: BPWH5

Version Date & Revision History:

Draft date: May 24, 2010
Effective date: May 24, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace GAS commercial-grade tanked water heater 50 or more gallon storage capacity
- Energy factor less than or equal to 0.60, or water heater is five or more years old
- Input greater than or equal to 75 MBTUH

Eligibility Criteria for New Equipment:

- New equipment must be gas powered
- Energy factor greater than or equal to 0.65
- Equivalent storage capacity to unit being replaced
- Qualified units must be GAMA/AHRI efficiency rating certified

Loadshape: Loadshape #5

Persistence: The persistence factor is assumed to be one.

Lifetimes 5 years

Revision Details: In PY4 removed criteria that customer must have GDS-2 account, as GDS-2, 3 and 4 customers are now eligible for gas incentives.

Referenced Documents: Food Service Technology Center Reports (5011.07.04 & 5011.07.19)

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Capacity of the new heater (50-79 gallons, 80-99 gallons, or 100+ gallons)

AOE Calculations, Commercial Electric Water Heaters.xlsx

Air-Conditioning, Heating and Refrigeration Institute (AHRI) Certified Product Performance <http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=CWH> accessed 4/1/2010

Algorithms used to calculate savings	
Measure Demand Savings	ΔkW = not evaluated for gas units
Measure Energy Savings	$\Delta \text{therms} = \Delta \text{therms}_S \times N \times \text{ISR}$
ΔkW	= Gross customer connected load kW savings for the measure
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_S	= Gross customer therm savings per unit = $(\text{therms}_B / \text{EF}_O) - (\text{therms}_B / \text{EF}_N)$
Therms_B	= Estimated typical annual energy usage of ideal unit (EF assumed to be 1)
EF_O	= Energy factor of old unit (~0.6)
EF_N	= Energy factor of new unit (~0.65 to 0.7)

Table 9.6.5-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1	1	1

*Hours are assumed to be 8760 due to that storage water heaters are designed to keep water at a set temp.

Table 9.6.5-2 Specifications and Calculated Savings

Typical Tank Size (gal)	Base Fixture Wattage (therms)	Retrofit Fixture Wattage (therms)
Typical 50	1,630.56	1,159.72
Typical 80	4,397.37	3,142.75
Typical 100	7,164.18	4,751.67

Table 9.6.5-3 Calculated Demand and Energy Savings by Type of Business

Typical Tank Size (gal)	Demand Savings (therms)
Typical 50	470.84
Typical 80	984.63
Typical 100	2412.52

Table 9.6.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Typical Tank Size (gal)	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Typical 50	\$1,800.00	\$750.00	\$1,050.00	\$150/heater
Typical 80	\$2,250.00	\$1,200.00	\$1,050.00	\$150/heater
Typical 100	\$3,750.00	\$1,800.00	\$1,950.00	\$150/heater

9.6.6 Supplemental Plumbing Measures

Measure Code: None

Version Date & Revision History:

Draft date: September 2010
Effective date: September, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed equipment or new installation

Eligibility Criteria for New Equipment:

- Must be GDS-2 customer

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: TBD

Revision Details: (None)

Referenced Documents: Summit Blue Illinois Potential Study

These incentives and savings are entered directly into AIB, and are based on the numbers below:

Measure	Amount paid to contractors*	Therm savings	kW savings	kWh savings	Lifetime
Faucet Aerator	\$10 each	6.1	0	82	15 years
Pipe Insulation	\$10 per water heater	8.1	0	109	15 years
Low-Flow Shower Head	\$10 each	15.2	0	204	9 years

*parts are not supplied by ActOnEnergy

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

9.7 Commercial Kitchen Equipment

The following measures are included in the PY3 Commercial Kitchen program.

9.7 COMMERCIAL KITCHEN EQUIPMENT		
	Measure	Code
Kitchen Equipment		
9.7.1	3-pan Steamer (Electric)	BPCK1
9.7.2	4-pan Steamer (Electric)	BPCK2
9.7.3	5-pan Steamer (Electric)	BPCK3
9.7.4	6-pan Steamer (Electric)	BPCK4
9.7.5	Hot Holding Cabinet (half)	BPCK5
9.7.6	Hot Holding Cabinet (3/4)	BPCK6
9.7.7	Hot Holding Cabinet (full)	BPCK7
9.7.8	Griddle (electric)	BPCK8
9.7.9	5-pan Steamer (gas)	BPCK9
9.7.10	6-pan Steamer (gas)	BPCK10
9.7.11	Griddle (gas)	BPCK11
9.7.12	Commercial Fryer (gas)	BPCK12
9.7.13	Dishwasher - High Temperature (includes booster heater)	BPCK13
9.7.14	Dishwasher - Low Temperature (no booster heater)	BPCK14
Green Nozzle		
9.7.15	Green Nozzle	NA

9.7.1 3-pan Steamer (Electric)

Measure Code: BPCCK1

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 3-, 4-, 5-, or 6-pan electric steamer

Eligibility Criteria for New Equipment:

- Electric 3 Pan Steamer
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: PY4 – added therm savings. In PY4 the title was updated in specify electric steamers.

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW	= Gross customer connected load kW savings per unit
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh	= Gross customer connected load kWh savings

Table 9.7.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

Table 9.7.1-2 Specifications and Calculated Non-coincident Demand Savings

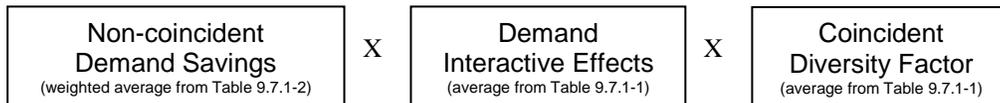
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
3-Pan Steamer	NA	NA	See Table 9.7.1-3

Table 9.7.1-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
Commercial Kitchen	1	4,419	259

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =



Energy Savings Calculation (per unit) =

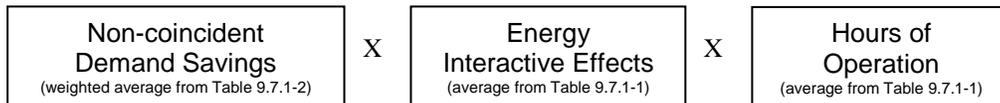


Table 9.7.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Steamer	Incremental Cost	Incentive Payment
3-pan Steamer	\$2,490	\$300/steamer

9.7.2 4-pan Steamer (Electric)

Measure Code: BPCK2

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 4-, 5-, or 6-pan electric steamer

Eligibility Criteria for New Equipment:

- Electric 4 Pan Steamer
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: PY4 – added therm savings. In PY4 the title was updated in specify electric steamers.

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW	= Gross customer connected load kW savings per unit
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh	= Gross customer connected load kWh savings

Table 9.7.2-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

Table 9.7.2-2 Specifications and Calculated Non-coincident Demand Savings

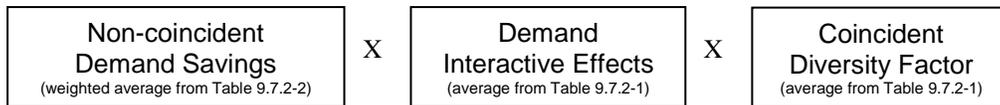
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
4-Pan Steamer	NA	NA	See Table 9.7.2-3

Table 9.7.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
Commercial Kitchen	1.2	5277	285

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =



Energy Savings Calculation (per unit) =

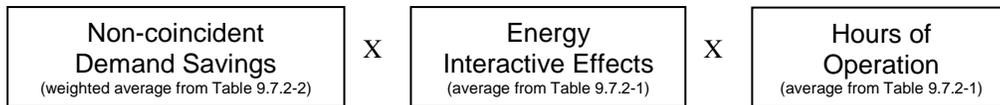


Table 9.7.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Steamer	Incremental Cost	Incentive Payment
4-pan Steamer	\$2,490	\$350/steamer

9.7.3 5-pan Steamer (Electric)

Measure Code: BPCCK3

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 5-, or 6-pan electric steamer

Eligibility Criteria for New Equipment:

- Electric 5 Pan Steamer
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: PY4 – added therm savings. In PY4 the title was updated in specify electric steamers.

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW	= Gross customer connected load kW savings per unit
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh	= Gross customer connected load kWh savings

Table 9.7.3-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

Table 9.7.3-2 Specifications and Calculated Non-coincident Demand Savings

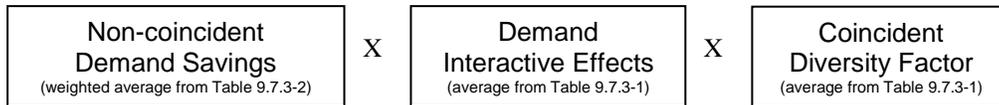
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
5-Pan Steamer	NA	NA	See Table 9.7.3-3

Table 9.7.3-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
Commercial Kitchen	1.4	6135	309

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =



Energy Savings Calculation (per unit) =

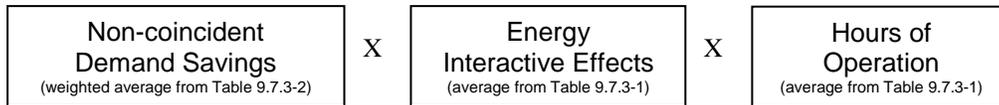


Table 9.7.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Steamer	Incremental Cost	Incentive Payment
5-pan Steamer	\$2,490	\$400/steamer

9.7.4 6-pan Steamer (Electric)

Measure Code: BPCCK4

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 6-pan electric steamer

Eligibility Criteria for New Equipment:

- Electric 6 Pan Steamer
- ENERGY STAR[®] qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: PY4 – added therm savings. In PY4 the title was updated in specify electric steamers.

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW	= Gross customer connected load kW savings per unit
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh	= Gross customer connected load kWh savings

Table 9.7.4-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

Table 9.7.4-2 Specifications and Calculated Non-coincident Demand Savings

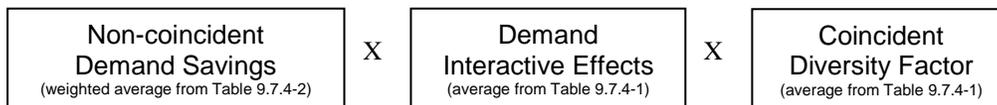
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
6-Pan Steamer	NA	NA	See Table 9.7.4-3

Table 9.7.4-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
Commercial Kitchen	1.6	6993	334

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =



Energy Savings Calculation (per unit) =

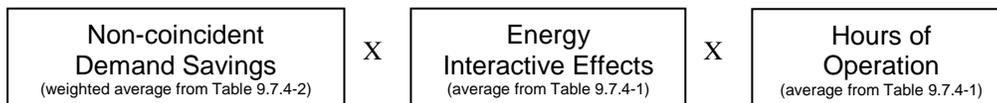


Table 9.7.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Steamer	Incremental Cost	Incentive Payment
6-pan Steamer	\$2,490	\$450/steamer

9.7.5 Hot Holding Cabinet (Half)

Measure Code: BPCCK5

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Electric hot holding cabinet

Eligibility Criteria for New Equipment:

- Electric – Half-Size Cabinet (< 10cu ft)
- ENERGY STAR qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.7.5-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

Table 9.7.5-2 Specifications and Calculated Non-coincident Demand Savings

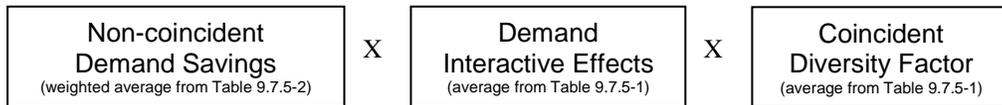
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Hot Holding Cabinet (Half)	NA	NA	See Table 9.7.5-3

Table 9.7.5-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Commercial Kitchen	0.5464	2993

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per ft³) =



Energy Savings Calculation (per ft³) =

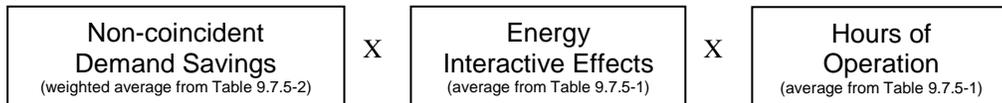


Table 9.7.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Hot Holding Cabinet	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Half Size	\$2,069	\$3,782	\$1,713	\$200/cabinet

9.7.6 Hot Holding Cabinet (3/4)

Measure Code: BPC6

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Three quarter or full size electric hot holding cabinet

Eligibility Criteria for New Equipment:

- Electric – Three-Quarter Cabinet (10 < 16 cu ft)
- ENERGY STAR qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.7.6-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

*5,475 hours a years; based on 15 hours a day, 365 days a year

Table 9.7.6-2 Specifications and Calculated Non-coincident Demand Savings

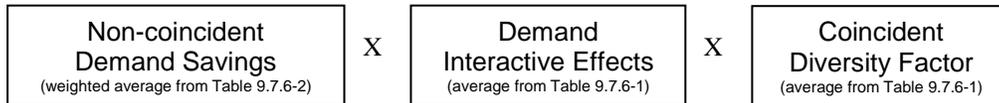
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Hot Holding Cabinet (3/4)	NA	NA	See Table 9.7.6-3

Table 9.7.6-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Commercial Kitchen	0.8196	4489.5

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per ft³) =



Energy Savings Calculation (per ft³) =

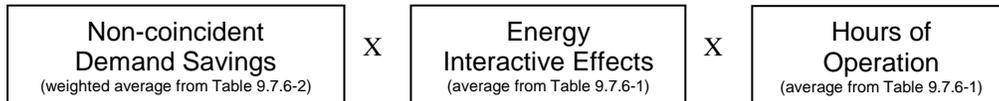


Table 9.7.6-4 Measure Costs (Parts and Labor) and Incentive Levels

Hot Holding Cabinet	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Three Quarter Size	\$2,069	\$3,782	\$1,713	\$300/cabinet

9.7.7 Hot Holding Cabinet (full)

Measure Code: BPCCK7

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Full size electric hot holding cabinet

Eligibility Criteria for New Equipment:

- Electric – Full-Size Cabinet (> 16 cu ft)
- ENERGY STAR qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Kitchen Data.xls”

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.7.7-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

*5,475 hours a years; based on 15 hours a day, 365 days a year

Table 9.7.7-2 Specifications and Calculated Non-coincident Demand Savings

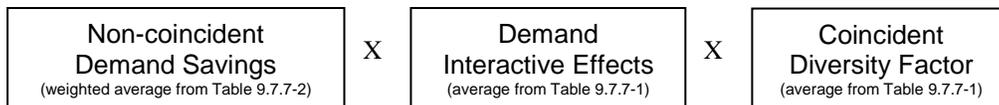
Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Hot Holding Cabinet (full)	NA	NA	See Table 9.7.7-3

Table 9.7.7-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Commercial Kitchen	1.366	7,482.5

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per ft³) =



Energy Savings Calculation (per ft³) =

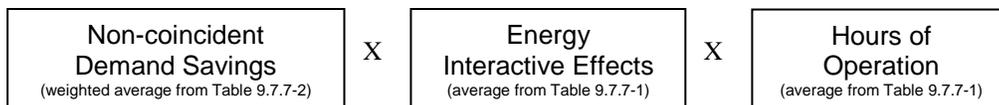


Table 9.7.7-4 Measure Costs (Parts and Labor) and Incentive Levels

Hot Holding Cabinet	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Full Size	\$2,069	\$3,782	\$1,713	\$500/cabinet

9.7.8 Griddle (Electric)

Measure Code: BPC8

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Electric griddle
- Same size or larger than the existing griddle
- ENERGY STAR qualified

Eligibility Criteria for New Equipment:

- \$40/linear foot (width)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: PY4 adjusted kWh to 629 (was 651). In PY4 the title was updated in specify electric steamers.

Referenced Documents: The data and calculations can be found on "AOE Commercial Kitchen Data.xls"

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_s \times ft \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_s \times ft \times ISR$
ΔkW	= Gross customer connected load kW savings for the measure
ΔkW_s	= Gross customer connected load kW savings per ft ³
ft	= Linear Ft of Griddle across its width
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_s	= Gross customer connected load kWh savings per ft ³

Table 9.7.8-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Commercial Kitchen	1.0	1.0	1.0

*4380 hours a years; based on 12 hours a day, 365 days a year

Table 9.7.8-2 Specifications and Calculated Non-coincident Demand Savings

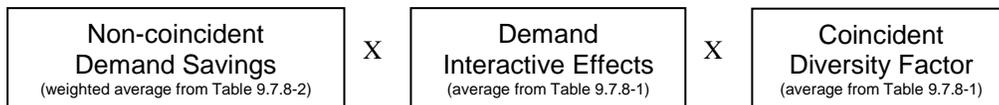
Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Griddle	NA	NA	See Table 9.7.8-3

Table 9.7.8-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW) Per linear foot	Energy Savings (kWh) Per linear foot
Commercial Kitchen	0.149	629

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per lineal foot) =



Energy Savings Calculation (per lineal foot) =

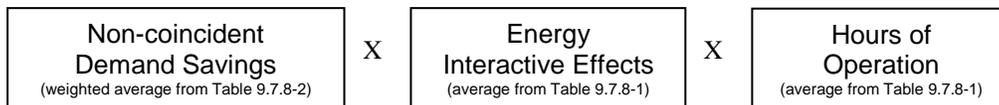


Table 9.7.8-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Electric Griddle	\$800*	\$40.00 per lineal foot

*Incremental cost for a three-foot griddle

9.7.9 5-Pan Steamer (gas)

Measure Code: BCK9

Version Date & Revision History:

Draft date: January 20, 2011
Effective date: February 17, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 5-pan gas steamer
- New installation or replacement
- Replacing gas steamer – any size

Eligibility Criteria for New Equipment:

- ENERGY STAR qualified Commercial Steamer

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Steam Cooker.xlsx”

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Energy Savings	$\Delta\text{therms} = \Delta\text{therms}_s \times N \times \text{ISR}$
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_s	= Gross customer therm savings per unit = $\text{therms}_B - \text{therms}_{EE}$
Therms_B	= Estimated typical annual energy usage of Baseline unit
Therms_{EE}	= Estimated typical annual energy usage of Energy Efficient unit

Table 9.7.9-1 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Gas Steamer (5-pan) Replacement	NA	NA	NA

Table 9.7.9-2 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Base Unit Usage (Therms)	Retrofit Unit Usage (Therms)	Therm Savings
All	NA	NA	2210	880	1330*

*unit is assumed to operate a minimum of 50% time in constant steam mode

Source: AOE Commercial Steam Cooker.xlsx

Energy Star Commercial Steam Cooker savings calculator

<

http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COC>

Table 9.7.9-3 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Steam Cooker (5 Pan)	\$3,762*	\$1,200

*based on average price difference between ENERGY STAR and non-ENERGY STAR units

9.7.10 6-Pan Steamer (gas)

Measure Code: BCK10

Version Date & Revision History:

Draft date: January 20, 2011
Effective date: February 17, 2011
Revised NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- 6-pan gas steamer
- New installation or replacement
- Replacing gas steamer – any size

Eligibility Criteria for New Equipment:

- ENERGY STAR qualified Commercial Steamer

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Energy Star 6 pan Commercial Steam Cooker.xlsx”

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Energy Savings	$\Delta\text{therms} = \Delta\text{therms}_S \times N \times \text{ISR}$
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_S	= Gross customer therm savings per unit = $\text{therms}_B - \text{therms}_{EE}$
Therms_B	= Estimated typical annual energy usage of Baseline unit
Therms_{EE}	= Estimated typical annual energy usage of Energy Efficient unit

Table 9.7.10-1 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Energy Star Commercial Steam Cooker (6 pan)	NA	NA	NA

Table 9.7.10-2 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Base Unit Usage (Therms)	Retrofit Unit Usage (Therms)	Therm Savings
All	NA	NA	2617	1043	1574*

*unit is assumed to operate a minimum of 50% time in constant steam mode

Source: AOE Energy Star 6 pan Commercial Steam Cooker.xlsx

Energy Star Commercial Steam Cooker savings calculator

<

http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COC>

Table 9.7.10-3 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Gas Steam Cooker (6 Pan)	\$6,221*	\$1,200

*based on average price difference between Energy Star and non-Energy Star units.

9.7.11 Griddle (gas)

Measure Code: BCK11

Version Date & Revision History:

Draft date: January 14, 2011
Effective date: February 17, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation or replacement
- Replacing gas griddle – any size

Eligibility Criteria for New Energy-Efficient Equipment:

- Gas griddle
- Same size or larger than the existing griddle
- ENERGY STAR qualified

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: DEER Database, Food Service Technology Center (2009), ENERGY STAR Energy Savings Calculator (2009), ENERGY STAR® Program Requirements for Commercial Griddles V1.0, GDS Natural Gas EE Potential Study in MA (4/2010)

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Energy Savings	$\Delta\text{therms} = \Delta\text{therms}_S \times N \times \text{ISR}$
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_S	= Gross customer therm savings per unit = $\text{therms}_B - \text{therms}_{EE}$
Therms_B	= Estimated typical annual energy usage of Baseline unit
Therms_{EE}	= Estimated typical annual energy usage of Energy Efficient unit

Table 9.7.11-1 Specifications and Calculated Non-coincident Demand Savings

Measure Description (typical width, in feet)	Base Usage (therms)	Retrofit Usage (therms)	Non-Coincident Demand Savings (kW)*
2 feet	886.7	818.4	NA
3 feet	1,212.5	1,063.9	NA
4 feet	1,538.2	1,309.5	NA

Table 9.7.11-2 Calculated Demand and Energy Savings (all building types)

Measure Description (typical width, in feet)	Total Savings (therms)	Total Savings per Lineal Foot (therms/per lineal foot)
2	68.3	34.2
3	148.6	49.5
4	228.7	57.2
Average	148.5	47.0

Table 9.7.11-3 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Griddle	\$800 - \$1,165*	\$50 per lineal foot

*Incremental cost for a three-foot griddle

9.7.12 Commercial Fryer (gas)

Measure Code: BCK12

Version Date & Revision History:

Draft date: January 14, 2011
Effective date: February 17, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New installation or replacement
- Replacing gas or electric – any size

Eligibility Criteria for New Equipment:

- ENERGY STAR qualified (see “Required Documentation” tab)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 12 years

Revision Details: (None)

Referenced Documents: The data and calculations can be found on “AOE Commercial Gas Fryers.xlsx”

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Energy Savings	$\Delta\text{therms} = \Delta\text{therms}_s \times N \times \text{ISR}$
ΔkW	= Gross customer connected load kW savings for the measure
Δtherms	= Gross customer annual therms savings for the measure
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
ΔTherms_s	= Gross customer therm savings per unit = $\text{therms}_B - \text{therms}_{EE}$
Therms_B	= Estimated typical annual energy usage of Baseline unit
Therms_{EE}	= Estimated typical annual energy usage of Energy Efficient unit

Table 9.7.12-1 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Non-Coincident Usage Savings (Therms)*
ENERGY STAR Commercial Gas Fryer (basket < 17" width)	505
ENERGY STAR Commercial Large-Vat Gas Fryer (basket > 17" width)	488

Source: AOE Commercial Gas Fryers.xlsx
 "Gas Fryer Life-Cycle Cost Calculator" Food Service Technology Center

Table 9.7.12-2 Calculated Demand and Energy Savings by Type of Business

All Building Types	Demand Savings (kW)	Energy Savings (kWh)	Base Unit Usage (Therms)	Retrofit Unit Usage (Therms)
ENERGY STAR Commercial Gas Fryer (basket < 17" width)	NA	NA	1627	1122
ENERGY STAR Commercial Large-Vat Gas Fryer (basket > 17" width)	NA	NA	1868	1380

Source: AOE Commercial Gas Fryers.xlsx
 "Gas Fryer Life-Cycle Cost Calculator," Food Service Technology Center.
<http://www.fishnick.com/saveenergy/tools/calculators/gfryercalc.php>.

Table 9.7.12-3 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Fryer	\$3795*	\$400

*based on average price difference between Energy Star and non-Energy Star units

9.7.13 Dishwasher – High Temperature (w/booster heater)

Measure Code: BCK13

Version Date & Revision History:

Draft date: January 24, 2011
Effective date: February 17, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New installation or replacement
- Replacing any size

Eligibility Criteria for New Equipment:

- ENERGY STAR qualified
- Must have a booster heater
- Flight-type dishwashers are not eligible

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: Under Counter = 10 years, Door Type = 15 years, Conveyer (Single or Multi Tank) = 20 years

Revision Details: (None)

Referenced Documents: ENERGY STAR Commercial Dishwasher Energy Savings Calculator (2009), ENERGY STAR® Program Requirements for Commercial Dishwashers (October 11, 2007), Focus on Energy Business Programs Deemed Savings Manual (March 22, 2010). The data and calculations can be found on "CalculatorCommercialDishwasherBulk_AOEedited.xls"

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kWh / hpy$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N \times ISR$
Measure Energy Savings	$\Delta therms = \Delta therms_S \times N \times ISR$
ΔkW	= Gross customer connected load coincident kW savings for the measure
hpy	= Hours per year (assumed to be 8760 to provide a conservative estimate)
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer annual kWh savings per unit = $kWh_B - kWh_{EE}$
kWh_B	= Estimated typical annual energy usage of Baseline unit
kWh_{EE}	= Estimated typical annual energy usage of Energy Efficient unit
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
$\Delta therms$	= Gross customer annual therms savings for the measure
$\Delta therms_S$	= Gross customer therm savings per unit = $therms_B - therms_{EE}$
$therms_B$	= Estimated typical annual energy usage of Baseline unit
$therms_{EE}$	= Estimated typical annual energy usage of Energy Efficient unit

A further breakdown of the energy usage of the baseline or energy efficient equipment is as follows:

Algorithms used to unit energy usage	
Energy Savings	$kWh = kWh_{Bldg} + kWh_{Boost} + kWh_{Idle}$
Measure Energy Savings	$therms = therms_{Bldg} + therms_{Boost}$
kWh or $therms$	= Energy usage for baseline or energy efficient equipment
$()_{Bldg}$	= Energy usage from buildings water heater
$()_{Boost}$	= Energy usage from dishwasher booster heater
$()_{Idle}$	= Energy usage from dishwasher in idle mode

The energy calculations from the ENERGY STAR Calculator were changed to provide a more conservative estimate of the kWh and therm savings.

- The daily operating hours of the dishwasher was reduced from 18 to 12 hours.
- 98% efficiency was used for electric water heaters, and 85% efficiency was used for gas water heaters to correspond to our most energy efficient water heater incentives listed under BPWH1-BPWH5.

Table 9.7.13-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

*Hours are assumed to be 4380 (12 hours per day, 365 days per year).

Table 9.7.13-2 Specifications and Calculated Savings

ENERGY STAR Dishwasher	Water Heater Type	Dish-washer Booster Type	Base Electric Demand (kW)	Retrofit Electric Demand (kW)	Base Electric Usage (kWh)	Retrofit Electric Usage (kWh)	Base Gas Usage (therms)	Retrofit Electric Usage (therms)
Under Counter	Electric	Electric	1.81	0.99	15849	8706	0	0
Door Type	Electric	Electric	4.60	3.06	40326	26798	0	0
Single Tank Conveyor	Electric	Electric	5.96	3.93	52208	34412	0	0
Multi Tank Conveyor	Electric	Electric	8.31	4.58	72782	40128	0	0
Under Counter	Gas	Electric	0.76	0.46	6665	4068	361	183
Door Type	Gas	Electric	1.76	1.18	15391	10347	981	647
Single Tank Conveyor	Gas	Electric	2.77	1.95	24254	17095	1100	681
Multi Tank Conveyor	Gas	Electric	3.65	2.29	31964	20090	1606	788
Under Counter	Electric	Gas	1.21	0.69	10601	6056	207	104
Door Type	Electric	Gas	2.98	1.99	26077	17397	561	370
Single Tank Conveyor	Electric	Gas	4.14	2.80	36234	24517	629	389
Multi Tank Conveyor	Electric	Gas	5.65	3.27	49458	28678	918	451
Under Counter	Gas	Gas	0.16	0.16	1418	1418	568	287
Door Type	Gas	Gas	0.13	0.11	1141	947	1542	1017
Single Tank Conveyor	Gas	Gas	0.95	0.82	8280	7200	1729	1071
Multi Tank Conveyor	Gas	Gas	0.99	0.99	8640	8640	2524	1239

Table 9.7.13-3 Calculated Demand and Energy Savings

ENERGY STAR Dishwasher	Water Heater Type	Dish-washer Booster Type	Demand Savings (kW)	Energy Savings (kWh)	Energy Savings (therms)
Door Type	Electric	Electric	1.54	13529	0
Door Type	Gas	Electric	0.58	5044	334
Door Type	Electric	Gas	0.99	8680	191
Door Type	Gas	Gas	0.02	195	525
Multi Tank Conveyor	Electric	Electric	3.73	32654	0
Multi Tank Conveyor	Gas	Electric	1.36	11874	818
Multi Tank Conveyor	Electric	Gas	2.38	20780	467
Multi Tank Conveyor	Gas	Gas	0	0	1285
Single Tank Conveyor	Electric	Electric	2.03	17796	0
Single Tank Conveyor	Gas	Electric	0.82	7158	419
Single Tank Conveyor	Electric	Gas	1.34	11717	239
Single Tank Conveyor	Gas	Gas	0.13	1080	658
Under Counter	Electric	Electric	0.82	7143	0
Under Counter	Gas	Electric	0.30	2597	179
Under Counter	Electric	Gas	0.52	4546	102
Under Counter	Gas	Gas	0	0	281

Table 9.7.13-4 Measure Costs (Parts and Labor) and Incentive Levels

Technology	Incremental Cost	Incentive
Under Counter, High Temp	\$1,000	\$400
Door Type, High Temp	\$2,100	\$700
Single Tank Conveyor, High Temp	\$3,000	\$1,000
Multi Tank Conveyor, High Temp	\$4,000	\$1,500

9.7.14 Dishwasher – Low Temperature (w/out booster heater)

Measure Code: BCK14

Version Date & Revision History:

Draft date: January 24, 2011
Effective date: February 17, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- New installation or replacement
- Replacing any size

Eligibility Criteria for New Equipment:

- ENERGY STAR qualified (see “Required Documentation” tab)
- Flight-type dishwashers are not eligible
- Does not include booster heaters

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: Door Type = 15 years, Conveyer (Single or Multi Tank) = 20 years

Revision Details: (None)

Referenced Documents: ENERGY STAR Commercial Dishwasher Energy Savings Calculator (2009), ENERGY STAR® Program Requirements for Commercial Dishwashers (October 11, 2007), Focus on Energy Business Programs Deemed Savings Manual (March 22, 2010). The data and calculations can be found on “CalculatorCommercialDishwasherBulk_AOEedited.xls”

Bonus Incentives offered: NA

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kWh / H$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N \times ISR$
Measure Energy Savings	$\Delta therms = \Delta therms_S \times N \times ISR$
ΔkW	= Gross customer connected load coincident kW savings for the measure
H	= Hours per year (assumed to be 8760 to provide a conservative estimate)
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer annual kWh savings per unit = $kWh_B - kWh_{EE}$
kWh_B	= Estimated typical annual energy usage of Baseline unit
kWh_{EE}	= Estimated typical annual energy usage of Energy Efficient unit
N	= Number of units being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
$\Delta therms$	= Gross customer annual therms savings for the measure
$\Delta therms_S$	= Gross customer therm savings per unit = $therms_B - therms_{EE}$
$therms_B$	= Estimated typical annual energy usage of Baseline unit
$therms_{EE}$	= Estimated typical annual energy usage of Energy Efficient unit

A further breakdown of the energy usage of the baseline or energy efficient equipment is as follows:

Algorithms used to unit energy usage	
Energy Savings	$kWh = kWh_{Bldg} + kWh_{Idle}$
Measure Energy Savings	$therms = therms_{Bldg}$
kWh or therms	= Energy usage for baseline or energy efficient equipment
$()_{Bldg}$	= Energy usage from buildings water heater
$()_{Idle}$	= Energy usage from dishwasher in idle mode

The energy calculations from the ENERGY STAR Calculator were changed to provide a more conservative estimate of the kWh and therms savings.

- The daily operating hours of the dishwasher was reduced from 18 to 12 hours.
- 98% efficiency was used for electric water heaters, and 85% efficiency was used for gas water heaters to correspond to our most energy efficient water heater incentives listed under BPWH1-BPWH5.

Table 9.7.14-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
All	1.0	1.0	1.0

*Hours are assumed to be 4380 (12 hours per day, 365 days per year).

Table 9.7.14-2 Specifications and Calculated Non-coincident Demand Savings

ENERGY STAR Dishwasher	Water Heater Type	Dish-washer Booster Type	Base Electric Demand (kW)	Retrofit Electric Demand (kW)	Base Electric Usage (kWh)	Retrofit Electric Usage (kWh)	Base Gas Usage (therms)	Retrofit Gas Usage (therms)
Door Type	Electric	None	3.68	2.35	32232	20629	0	0
Door Type	Gas	None	0.02	0.02	196	196	1261	804
Multi Tank Conveyor	Electric	None	4.79	2.88	41920	25222	0	0
Multi Tank Conveyor	Gas	None	0.59	0.59	5184	5184	1446	788
Single Tank Conveyor	Electric	None	3.76	2.51	32912	22027	0	0
Single Tank Conveyor	Gas	None	0.28	0.28	2484	2484	1197	769

Table 9.7.14-3 Calculated Demand and Energy Savings

ENERGY STAR Dishwasher	Water Heater Type	Dish-washer Booster Type	Demand Savings (kW)	Energy Savings (kWh)	Energy Savings (therms)
Door Type	Electric	None	2.9	11602	0
Door Type	Gas	None	0	0	457
Multi Tank Conveyor	Electric	None	4.17	16698	0
Multi Tank Conveyor	Gas	None	0	0	657
Single Tank Conveyor	Electric	None	2.72	10885	0
Single Tank Conveyor	Gas	None	0	0	428

Table 9.7.14-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost
Door Type, Low Temp	\$2,000
Single Tank Conveyor, Low Temp	\$3,000
Multi Tank Conveyor, Low Temp	\$4,000

Table 9.7.14-4a Breakdown of Electric and Gas Incentive Levels based on Water Heater Type

ENERGY STAR Dishwasher	Water Heater Type	Dish-washer Booster Type	Electric Incentive	Gas Incentive	Total Incentive
Door Type	Electric	None	\$500		\$500
Door Type	Gas	None		\$500	\$500
Multi Tank Conveyor	Electric	None	\$750		\$750
Multi Tank Conveyor	Gas	None		\$750	\$750
Single Tank Conveyor	Electric	None	\$500		\$500
Single Tank Conveyor	Gas	None		\$500	\$500

9.7.15 Green Nozzle

Measure Code: NA

Version Date & Revision History:

Draft date: June 9, 2009
Effective date: June 9, 2009
Revised: September 17, 2009
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- It must replace industrial pre-rinse dishwashing spray valves that are connected to gas-fueled water heaters.

Eligibility Criteria for New Equipment:

- The nozzle is offered FREE of charge (a \$100 retail value) with a self install.
- After receipt of a completed and approved application, the nozzle will be shipped directly to the customer. After installation by the customer a photo of the installed nozzle must be sent to ActOnEnergy staff, to verify installation.

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: 9-17-09, changed to self install program. In PY4 removed criteria that customer must have GDS-2 account, as GDS-2, 3 and 4 customers are now eligible for gas incentives.

Referenced Documents: Fisher Nickel Food Service Testing Center (www.fishnick.com)

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Survey conducted while technicians were at a facility installing nozzles. The goal was to determine potential CK projects/interest.

Algorithms used to calculate savings

Manually entered into AIB – each nozzle is credited with 493 net therms of annual savings.

Table 9.7.15-1 Specifications and Calculated Non-coincident Demand Savings

Configuration	Baseline Nozzle (therms used annually)	Efficient Nozzle (therms used annually)	Gross Annual Therms Saved
Pre-rinse Spray Nozzle	NA	NA	1386

Table 9.7.15-2 Calculated Demand and Energy Savings by Type of Business

Building Types	Annual therms saved
Commercial Kitchen	1386

Table 9.7.15-3 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Pre-rinse spray nozzle	NA	NA	NA	None – the product is sent free of charge to the customer (\$100 retail value)

Additional information - Green Nozzle Evaluation³⁴

Inputs	Original Deemed Savings Calculation (Ex ante)	Ex Post Savings Calculation
Flow rate 1 (gal/min) ^[1]	1.6	2.3
Flow rate 2 (gal/min) ^[2]	0.7	0.65
Hours per day ^[3]	3	4.3
Days (days/year) ^[4]	365	362
Heater efficiency ^[5]	70%	67.6%
Temp rise in water heater	70°	73°
Output – Gross Savings	492.6 Therms	1386.2 Therms
NTGR	0.8	0.82
Output - Net Savings	394 Therms	1122.8 Therms

³⁴ EM&V report on pre-rinse spray valve savings

^[1] There is no federal standard for pre-rinse spray valves. Researchers at FSTC estimate the industry average at 3.0 gpm. <http://www1.eere.energy.gov/femp/pdfs/prerinsenozzle.pdf>

^[2] Testing done by FTSC http://www.fishnick.com/equipment/sprayvalves/Bricor_B064_PRV.pdf

^[3] From market research, Fisher Nickel’s expertise, and conversations with CEE’s Commercial Kitchens committee members and program manager

^[4] 312 days/year (6 days per week). It is unlikely that all facilities operate 7 days per week. This represents a more conservative savings estimate

^[5] Baseline used 67.6% “Energy Efficiency Potential of Gas-Fired Commercial Hot Water Heating Systems in Restaurants” http://www.fishnick.com/publications/appliancereports/special/Commercial_Water_Heating_Systems.pdf

9.8 Agricultural Equipment

The following measures are included in the PY3 Agricultural program.

9.8 AGRICULTURAL EQUIPMENT		
	Measure	Code
Fans		
9.8.1	High Efficiency High Speed Exhaust/ Ventilation Fans (24-35" diameter)	BPA1
9.8.2	High Efficiency High Speed Exhaust/ Ventilation Fans (36-47" diameter)	BPA2
9.8.3	High Efficiency High Speed Exhaust/ Ventilation Fans (48-71" diameter)	BPA3
9.8.4	High Efficiency Circulation Fans (24-35 " diameter)	BPA4
9.8.5	High Efficiency Circulation Fans (36-47" diameter)	BPA5
9.8.6	High Efficiency Circulation Fans (48-71" diameter)	BPA6
9.8.7	High Volume Low Speed (HVLS) Fans	BPA7
Heater Timers and Waterers		
9.8.8	Equipment Heater Timers	BPA8
9.8.9	Live Stock Waterer (Electrically heated)	BPA9
9.8.10	Live Stock Waterer (ground source heated (non-electrical))	BPA10

9.8.1 High Speed Exhaust/Ventilation Fan (24-35" diameter)

Measure Code: BPA1

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 24 through 35 inch diameter fan
- minimum 14 cfm/W at 0.10" static pressure
- diffuser equipped

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pin	1.0	1.0	1.0	4018
Solid Floor Market Pin	1.0	1.0	1.0	2432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3295
Layer Cage House	1.0	1.0	1.0	4600
Free Stall Barn	1.0	1.0	1.0	2432
Turkey tunnel	1.0	1.0	1.0	4600
Average = Miscellaneous	1.0	1.0	1.0	2935

Table 9.8.1-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
24-35" diameter fan	450	410	0.04

Table 9.8.1-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.118	372.14

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.1-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.1-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.1-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.1-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.1-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.1-1)} \end{array}$$

Table 9.8.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
24-35" diameter fan	\$600	\$450	\$150	\$25

9.8.2 High Speed Exhaust/Ventilation Fan (36-47" diameter)

Measure Code: BPA2

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 36 through 47 inch diameter fan
- minimum 17.1 cfm/W at 0.10" static pressure
- diffuser equipped

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.2-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pin	1.0	1.0	1.0	4018
Solid Floor Market Pin	1.0	1.0	1.0	2432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3295
Layer Cage House	1.0	1.0	1.0	4600
Free Stall Barn	1.0	1.0	1.0	2432
Turkey tunnel	1.0	1.0	1.0	4600
Average = Miscellaneous	1.0	1.0	1.0	2935

Table 9.8.2-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
36-47" diameter fan	620	520	0.1

Table 9.8.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.198	625.23

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.2-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.2-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.2-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.2-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.2-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.2-1)} \end{array}$$

Table 9.8.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
36-47" diameter fan	\$675	\$525	\$150	\$50

9.8.3 High Speed Exhaust/Ventilation Fan (48-71" diameter)

Measure Code: BPA3

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 48 through 71 inch diameter fan
- minimum 20.3 cfm/W at 0.10" static pressure
- diffuser equipped

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.3-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pein	1.0	1.0	1.0	4018
Solid Floor Market Pin	1.0	1.0	1.0	2432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3295
Layer Cage House	1.0	1.0	1.0	4600
Free Stall Barn	1.0	1.0	1.0	2432
Turkey tunnel	1.0	1.0	1.0	4600
Average = Miscellaneous	1.0	1.0	1.0	2935

Table 9.8.3-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
48-71" diameter fan	1160	980	0.18

Table 9.8.3-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.356	1,122.36

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.3-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.3-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.3-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.3-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.3-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.3-1)} \end{array}$$

Table 9.8.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
48-71" diameter fan	\$750	\$600	\$150	\$100

9.8.4 Circulation Fan (24-35" diameter)

Measure Code: BPA4

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 24 through 35 inch diameter fan
- minimum 12.5 lbf/kW

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.4-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pin	1.0	1.0	1.0	4,018
Solid Floor Market Pin	1.0	1.0	1.0	2,432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3,295
Layer Cage House	1.0	1.0	1.0	4,600
Free Stall Barn	1.0	1.0	1.0	2,432
Turkey tunnel	1.0	1.0	1.0	4,600
Average = Miscellaneous	1.0	1.0	1.0	2,935

Table 9.8.4-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
24-35" diameter fan	450	410	0.04

Table 9.8.4-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.118	372.14

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.4-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.4-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.4-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.4-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.4-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.4-1)} \end{array}$$

Table 9.8.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
24-35" fan	\$600	\$450	\$150	\$25/fan

9.8.5 Circulation Fan (36-47" diameter)

Measure Code: BPA5

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 36 through 47 inch diameter fan
- minimum 18.2 lbf/kW

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.5-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pin	1.0	1.0	1.0	4,018
Solid Floor Market Pin	1.0	1.0	1.0	2,432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3,295
Layer Cage House	1.0	1.0	1.0	4,600
Free Stall Barn	1.0	1.0	1.0	2,432
Turkey tunnel	1.0	1.0	1.0	4,600
Average = Miscellaneous	1.0	1.0	1.0	2,935

Table 9.8.5-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
36-47" diameter fan	620	520	0.1

Table 9.8.5-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.198	625.23

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.5-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.5-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.5-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.5-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.5-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.5-1)} \end{array}$$

Table 9.8.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
36-47" fan	\$675	\$525	\$150	\$50/fan

9.8.6 Circulation Fan (48-71" diameter)

Measure Code: BPA6

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing failed units (end of useful life)

Eligibility Criteria for New Equipment:

- 48 though 71 inch diameter fan
- minimum 23 lbf/kW

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 7 years

Revision Details: (None)

Referenced Documents:

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, Exhaust or Ventilation Fans.xlsx

Bioenvironmental and Structural Systems Laboratory (BESS Labs) Performance tests

<http://bess.illinois.edu/type.asp> accessed 3-30-2010

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(CFM_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.6-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farrowing Pin	1.0	1.0	1.0	4,018
Solid Floor Market Pin	1.0	1.0	1.0	2,432
Partly Slotted Pit floor Pin	1.0	1.0	1.0	3,295
Layer Cage House	1.0	1.0	1.0	4,600
Free Stall Barn	1.0	1.0	1.0	2,432
Turkey tunnel	1.0	1.0	1.0	4,600
Average = Miscellaneous	1.0	1.0	1.0	2,935

Table 9.8.6-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
48-71" diameter fan	1160	980	0.18

Table 9.8.6-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
All	0.356	1,122.36

Demand Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.6-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.6-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.6-1)} \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.6-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.6-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.6-1)} \end{array}$$

Table 9.8.6-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
48-71" fan	\$750	\$600	\$150	\$100/fan

9.8.7 High Volume Low Speed (HVLS) Fan

Measure Code: BPA7

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replacing multiple non-HVLS fans

Eligibility Criteria for New Equipment:

- Horizontally mounted ceiling-type fan
- 20-24 ft diameter fan
- motor must have VFD controls

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 10 years

Revision Details: (None)

Referenced Documents:

David W. Kammel, et al., "Design of High Volume Low Speed Fan Supplemental Cooling System in Freestall Barns."

Hong Li, et al., "Determination of ventilation rates for a Manure-Belt Laying Hen House Using Co2 Balance"

NASS Fact finder for Agriculture, "Quarterly Hogs and Pigs."

AOE Fan Calculations, HVLS Fans.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_F \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_F \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per fan = $(lbf_N / VER_N - CFM_B / VER_B)$
N_F	= Number of fans being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
CFM_B	= Baseline unit flow @ 0.10 SP
CFM_N	= New efficient unit flow @ 0.10 SP
VER_B	= Baseline unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
VER_N	= New efficient unit Ventilating Efficiency ratio (cfm/Watt) @ 0.10 SP
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per fan = $\Delta kW_S \times H$
H	= Fan/Facility operation hours

Table 9.8.7-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Solid Floor Market Pen	1.0	1.0	1.0	2,432
Partly Slotted Pit floor Pen	1.0	1.0	1.0	3,295
Free Stall Barn	1.0	1.0	1.0	2,432
Average = Miscellaneous	1.0	1.0	1.0	2,731

Table 9.8.7-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
HVLS fan	4560	1490	3.07

Table 9.8.7-3 Calculated Demand and Energy Savings by fan Size

Fan Size (diameter)	Demand Savings (kW)	Energy Savings (kWh)
20'	2.408	6,576.85
22'	3.128	8,543.34
24'	3.668	10,018.22

Demand Savings Calculation (per fan) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.7-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.7-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.7-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.7-2)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.7-1)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.7-1)} \\ \hline \end{array}$$

Table 9.8.7-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
HVLS Fan – 20"	\$5,750	\$1,600	\$4,150	\$1,000
HVLS Fan – 22"	\$5,980	\$1,800	\$4,180	\$1,000
HVLS Fan – 24"	\$6,325	\$2,100	\$4,225	\$1,000

"The incremental savings and costs are from a comparison between seven typical sized (about 48 inches in diameter) industrial low volume low speed (LVLS) fans and one high-volume low-speed fan. There are three HVLS manufactures Big Ass Fans, Rite Hite, Macro-Air. Manufacture averaged costs range from \$5,750.00 to \$6,325.00 depending on the fan size and the controls installed. LVLS fans are much more common than HVLS fans as of date so both cost and sizes can vary significantly. The assumptions used in this comparison are based on the most common LVLS fans. Industrial LVLS fan costs range from \$230.00 to \$300.00 each (\$1,600.00 to \$2,100.00 for 7 fans) depending on size and manufacture."

9.8.8 Equipment Heater Timers

Measure Code: BPA8

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Tractor Engine Block Heater with no Timer

Eligibility Criteria for New Equipment:

- UL-Listed Outdoor timer rated for minimum of 15 amps continuous duty
- Max of 4 hour heating prior to use
- Maximum of two timers/facility
- .

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 5 years

Revision Details: (None)

Referenced Documents:

Manitoba Hydro Power Smart "Car warmers, block heaters and energy controls."
AOE Calculations, Engine Block Heater Timers.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = n/a$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_T \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkWh_S	= Customer connected load kWh savings per timer
N_T	= Number of timers
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
kW_{BH}	= Name plate load of heating elements for block heater, assumed as 1 kW.
kW_N	= Name plate load of heating element for new efficient unit (= 0 for ground source units)
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per timer = $kW_{BH} \times H_s$
H_s	= Heater operation hour Savings (assumed to be 532 hours, 6 hour reduction during days below 32F)

Table 9.8.8-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farm	1.0	1.0	1.0	2,216*

*Operating Hours - 2126 hours possible operation time when temp drop below 32F

Table 9.8.8-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts – without timer)	Retrofit Unit Wattage (watts – with timer)	Non-Coincident Demand Savings (kW)
Engine Block Heater Timer	1063	531.5	0.53

Table 9.8.8-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Farm	0.00	531.50

Demand Savings Calculation (per timer) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.8-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.8-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.8-1)} \end{array}$$

Energy Savings Calculation (per timer) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.8-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.8-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.8-1)} \end{array}$$

Table 9.8.8-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Engine Block Heater Timer	\$50	\$0	\$50	\$10/timer

9.8.9 Live Stock Waterer (Electrically Heated)

Measure Code: BPA9

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace open waterers with sinking or floating water heater

Eligibility Criteria for New Equipment:

- Electrically heated thermally insulated waterer
- Minimum 2" insulation
- Thermostat required on units with heating element >250 Watt
- Equivalent herd size watering capacity of old unit

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 10 years

Revision Details: (None)

Referenced Documents:

Prairie Agricultural Machinery Institute Research Update 706, "Energy Free Water Fountains"
AOE Calculations, Livestock Water Tanks.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_T \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_T \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per tank = $kW_B - kW_N$
N_T	= Number of Tanks being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
kW_B	= Name plate load of heating elements for baseline unit
kW_N	= Name plate load of heating element for new efficient unit (= 0 for ground source units)
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per tank = $\Delta kW_S \times H$
H	= Heater operation hours (assumed to be 3034 hours)

Table 9.8.9-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farm	1.0	1.0	1.0	3,040

Table 9.8.9-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Waterer (electric)	1,100	575	0.525

Table 9.8.9-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Farm	0.525	1,592.85

Demand Savings Calculation (per waterer) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.9-2)} \end{array}} \times \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.9-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.9-1)} \end{array}}
 \end{array}$$

Energy Savings Calculation (per waterer) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.9-2)} \end{array}} \times \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.9-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.9-1)} \end{array}}
 \end{array}$$

Table 9.8.9-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Live Stock Waterer (Electrically Heated)	\$787.50	\$0	\$787.50	\$75/waterer

9.8.10 Live Stock Waterer (Ground Source Heated (non-electrical))

Measure Code: BPA10

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: May 3, 2010
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- Replace open waterers with sinking or floating water heater

Eligibility Criteria for New Equipment:

- Frost free, energy free, or ground source heated units with no electrical heating element
- Minimum 2" insulation
- Drinking access closes automatically
- Water connection housed in a heat pipe riser
- Equivalent herd size watering capacity of old unit

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 10 years

Revision Details: (None)

Referenced Documents:

Prairie Agricultural Machinery Institute Research Update 706, "Energy Free Water Fountains"
AOE Calculations, Livestock Water Tanks.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings	
Measure Demand Savings	$\Delta kW = \Delta kW_S \times N_T \times ISR$
Measure Energy Savings	$\Delta kWh = \Delta kWh_S \times N_T \times ISR$
ΔkW	= Customer connected load kW savings for the measure
ΔkW_S	= Customer connected load kW savings per tank = $kW_B - kW_N$
N_T	= Number of Tanks being replaced
ISR	= In service rate, or the percentage of units rebated that actually get used. For prescriptive measures, this is assumed to be 100%
kW_B	= Name plate load of heating elements for baseline unit
kW_N	= Name plate load of heating element for new efficient unit (= 0 for ground source units)
ΔkWh	= Gross customer annual kWh savings for the measure
ΔkWh_S	= Gross customer connected load kWh savings per tank = $\Delta kW_S \times H$
H	= Heater operation hours (assumed to be 3034 hours)

Table 9.8.10-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Farm	1.0	1.0	1.0	3,040

Table 9.8.10-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Unit Wattage (watts)	Retrofit Unit Wattage (watts)	Non-Coincident Demand Savings (kW)
Waterer (non-electrical)	1,100	0	1.1

Table 9.8.10-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Farm	1.10	3,337.40

Demand Savings Calculation (per waterer) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.10-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.10-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.10-1)} \end{array}$$

Energy Savings Calculation (per waterer) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.10-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.10-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.10-1)} \end{array}$$

Table 9.8.10-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Live Stock Waterer (Ground Source Heated)	\$1,450	\$0	\$1,450	\$100/waterer

9.9 On-line Store

9.9.1-9.9.44 Items for Sale through the On-line Store

Measure Code: NA

Version Date & Revision History:

Draft date: March 2009
Effective date: March 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Equipment to be Replaced:

- None

Eligibility Criteria for New Equipment:

- Products ordered are assumed to be installed immediately at the address associated with the account number used to purchase the items

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: NA

Revision Details: (None)

Referenced Documents:

Illinois Commerce Commission ICC Docket No. 07-0539
EFI Product Sheet V10 8-27-09

Bonus Incentives offered:

- Reduced pricing Jan 4 – March 31, 2010 (everything 50% off (except for Smart strips and LED down lights), added three free CFLs offer, free shipping)
- Free shipping continued into PY3
- Reduced pricing Jan 4 – May 31, 2011 (everything 50% off (except for Smart strips), added three free CFLs offer, free shipping continued)
- Reduced pricing ,(except for Smart strips), three free CFL offer and free shipping extended through Aug 31, 2011
- Free shipping extended through PY4

Supplemental Information Collected on the Application:

Products are paid for with a credit card by the customer and drop shipped directly to the customer by EFI. This information is collected through the EFI web site.

The following table lists the products offered, the cost to customers (and the current sale price) and the kWh savings per item.

9.9 On-line Store								
	AOE Code	Measure	Cost to customer (regular price)	Cost to customer (sale price thru 8-31-11)	Cost to customer (as of 9-1-11)	Savings Claimed (kWh)	EFI Product Code**	Gross cents per kWh
Free CFL offer (expired 8-31-11)								
9.9.1		3-pack (15/20/25W)	\$6.52	\$0		651.7?	IK.002IK.A002	
9.9.2		3-pack (25W)	\$6.00	\$0		837.9	IK.001	
9.9.3		6-pack (23W)	\$18.75	\$0		1720	IK.720	
CFLs								
9.9.4		15W 975 lumens (mini)	\$2.25	\$0.50	\$1.25	167.6	1100.886 (866?)	
9.9.5		15W 1000 lumens	\$3.75	\$0.50	\$1.00	167.6	1100.886 (323)	
9.9.6		20W 1300 lumens	\$4.00	\$0.50	\$1.00	204.8	1100.842 (324)	
9.9.7		20W 1400 lumens	\$2.75	\$0.50	1.75	204.8	1100.842	
9.9.8		25W 1725 lumens	\$2.25	\$0.50	\$1.00	186.2	1100.859	\$0.0045
9.9.9		25W/1800 lumens (micro max)	\$3.95	\$0.50	\$1.00	186.2	1100.859 (827)	
9.9.10		30W 2050 lumens	\$3.75	\$1.00	1.75	260.7	1100.874	
9.9.11		15W flood 750 lumens	\$6.50	\$1.75	\$3.50	167.60	1160.611	\$0.0179
9.9.12		23W flood 1300 lumens	\$6.50	\$1.75	\$3.50	286.70	1160.080	\$0.0105
9.9.13		14W globe 800 lumens	\$5.50	\$1.75	\$3.50	171.30	1100.784	\$0.0117
9.9.14		15W flood (dimnable) 720 lumens	\$13.50	\$4.98	\$9.95	167.60	1160.607	\$0.0179
LED Down Lights								
9.9.15	BPL84	12W 650 lumens (module)	\$125.00	\$74.00	10.00	301.00	1440.901	
9.9.16		10.5W 650 lumens (module)	\$125.00	\$74.00	\$74.00	309.00	1440.905 (901)	
LED Bulbs								
9.9.17		LED bulb 12W A19 2700	\$66.25		\$43.75	177	1100.146	
9.9.18		LED bulb 17W PAR38	\$69.25		\$46.25	216	1100.147	
9.9.19		LED bulb 7W PAR20	\$26.25		\$11.25	142	1100.145	
9.9.20		LED Downlight, 10.5W, 575 lumens	\$70.00		\$48.75		1440.903	
9.9.21		LED Downlight, 10.5W, 650 lumens	\$125.00		\$74.00		1440.901	
9.9.22		LED Lightbulb, 7W, 250 lumens	\$26.25		\$11.35		1100.145	
9.9.23		LED Lightbulb, 12.5W, 800 lumens	\$29.95		\$19.95		1100.142	
9.9.24		LED Lightbulb, 12W, 660 lumens	\$66.25		\$43.75		1100.146	

9.9.25		LED Lightbulb, 17W, 880 lumens	\$69.25		\$46.25		1100.147	
LED Exit Signs								
9.9.26	BPL78	4W, double sided with battery backup	\$25.75	\$6.88	\$13.75	342.00	1180.100	\$0.0351
9.9.27	BPL82	2.7W exit-sign bulbs	\$17.00	\$3.75	\$7.50	342.00	1180.090	\$0.015
Power Strips								
9.9.28		10 outlet "Smart Strip"	\$32.50	\$32.50	\$32.50	0.00	7005.148 (152)	
9.9.29		7 outlet "Smart Strip"				0.00	7005.145	
T8 Lamps and Ballasts								
9.9.30		32W, 1-2 lamp configuration	\$18.75	\$6.25	\$12.50	NA	1060.602	
9.9.31		32W, 2-3 lamp configuration	\$22.10	\$6.25	\$12.50	NA	1060.603	
9.9.32		32W, 3-4 lamp configuration	\$24.00	\$6.25	\$12.50	NA	1060.604	
9.9.33		Ballast T8 32W, 1 lamp configuration				61.8	1010.881	
9.9.34		Ballast T8 32W, 2 lamp configuration				88.98	1010.882	
9.9.35		Ballast T8 32W, 3 lamp configuration				166.90	1010.883	
9.9.36		Ballast T8 32W, 4 lamp configuration				198.57	1010.884	
9.9.37		32W T8 lamp 4' (case of 36) 30K	\$120.00	\$108.00	\$120.00	61.25/lamp *	1000.606 (K.713)	
9.9.38		32W T8 lamp 4' (case of 36) 41K					1000.603	
Vending Machine Controls								
9.9.39	BPR10	Snack Miser (non-refrigerated) – wall mounted	\$160.00	\$24.50	\$49.00	387.00*	7005.507 (505)	
9.9.40	BPR10	Snack Miser EZ (non-refrigerated) – machine mounted	\$160.00	\$24.50	\$41.00	387.00*	7005.507 (506)	
9.9.41	BPR9	Vending Miser (refrigerated) – wall mounted	\$234.00	\$39.50	\$79.00	1,612.00*	7005.501	
9.9.42	BPR9	Vending Miser EZ (refrigerated) – machine mounted	\$234.00	\$39.50	\$71.00	1,612.00*	7005.503 (502)	
Occupancy Sensor								
9.9.43	BPL73	Wall-switch (PIR, controls 0-800W)	\$40.00	\$10.00	\$20.00	186.00	1500.500	\$0.1075
9.9.44		Motion-Sensing wall switch	\$40.00	\$10.00	\$20.00	186.00	1500.510	\$0.1075

*savings information taken from the standard lighting program.

**Some measures have multiple codes due to frequent turn-over of products (different mfg but otherwise similar products)

Shipping expenses

Order amount	Shipping total
under \$20	\$5.00
\$20.01 - \$40.00	\$7.50
\$40.01 - \$75.00	\$9.00

Order amount	Shipping total
\$75.01 - \$125.00	\$12.00
\$125.01 - \$200.00	\$15.00
\$200.01+	\$18.00

9.10 Steam Trap

9.10 STEAM TRAP		
	Measure	Code
9.10.1	Steam Trap Survey (HVAC)	BPST1 NEW
9.10.2	Steam Trap Repair/Replacement (HVAC)	BPST2 NEW
9.10.3	Mass Replacement of Steam Traps (no survey conducted) (HVAC)	BPST3 NEW
9.10.4	Steam Trap Survey (Industrial Process)	BPST4 NEW
9.10.5	Steam Trap Repair/Replacement (Industrial Process)	BPST5 NEW
9.10.6	Mass Replacement of Steam Traps (no survey conducted) (Industrial Process)	BPST6 NEW

9.10.1 Steam-Trap Survey (HVAC)

Measure Code: BPST1

Version Date & Revision History:

Draft date: June 21, 2011
Effective date: June 21, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be in service to be eligible for incentives

Eligibility Criteria for New Energy-Efficient Equipment:

- Survey incentive is available for all tested traps. No incentive will be given for traps that are out of service.
- If external labor is used then the incentive cannot be greater than the invoice cost

Loadshape: NA

Persistence: NA

Lifetimes: NA

Revision Details: Incentive amount doubled 7-18-11

Referenced Documents: N/A

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Project cost

Savings: There are no savings claimed for surveys

Incentive: \$30 per trap

9.10.2 Steam-Trap Repair/Replacement (HVAC)

Measure Code: BPST2

Version Date & Revision History:

Draft date: June 21, 2011
Effective date: June 21, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be malfunctioning and leaking steam to be eligible
- Repair incentive is not available for traps that are failed closed or are plugged.

Eligibility Criteria for New Energy-Efficient Equipment:

- Leaking traps must be **repaired or replaced**
- Incentive cannot be greater than the invoice cost (project costs include parts and external labor)

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 11 years

Revision Details: Incentive doubled 7-18-11

Referenced Documents: Focus Deemed Savings Manual and Steam Trap Calculator.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Project cost

Table 9.10.2-1 Calculated Demand and Energy Savings by Type of Business

Building Types	Therm Savings
Office	910
School (K-12)	910
College/University	910
Retail/Service	910
Restaurant	910
Hotel/Motel	910
Medical	910
Grocery	910
Warehouse	910
Light Industry	910
Heavy Industry	910
Average = Miscellaneous	910

Table 9.10.2-2 Measure Costs (Parts and Labor) and Incentive Levels

Trap Size	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
<=15 psig	\$150	\$0 (replacement)	\$150	\$100/trap

9.10.3 Mass Replacement of Steam Traps (no survey conducted) - (HVAC)

Measure Code: BPST3

Version Date & Revision History:

Draft date: June 21, 2011
 Effective date: June 21, 2011
 Revised: NA
 End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be in service to be eligible for incentives

Eligibility Criteria for New Energy-Efficient Equipment:

- If replacement is done without a survey, the program will assume that 30 percent of the traps were leaking and will pay a repair incentive on 30% of the total potential incentive.
- The incentive cannot be greater than the invoice cost (project costs include parts and external labor).

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 11 years

Revision Details: Incentive doubled 7-18-11

Referenced Documents: Focus Deemed Savings Manual and Steam Trap Calculator.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: project cost

Table 9.10.3-1 Calculated Demand and Energy Savings by Type of Business

Building Types	Therm Savings
Office	273
School (K-12)	273
College/University	273
Retail/Service	273
Restaurant	273
Hotel/Motel	273
Medical	273
Grocery	273
Warehouse	273
Light Industry	273
Heavy Industry	273
Average = Miscellaneous	273

Table 9.10.3-2 Measure Costs (Parts and Labor) and Incentive Levels

Trap Size	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment*
<=15 psig	\$150	\$0 (replacement)	\$150	\$100/trap x 30%

*The incentive is calculated as follows: (total number of traps, X \$100 X 30% (to incentivize only the 30% that are assumed failed))

9.10.4 Steam-Trap Survey (Industrial Process)

Measure Code: BPST4

Version Date & Revision History:

Draft date: June 21, 2011
Effective date: June 21, 2011
Revised NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be in service to be eligible for incentives

Eligibility Criteria for New Energy-Efficient Equipment:

- Survey incentive is available for all tested traps. No incentive will be given for traps that are out of service.
- If external labor is used then the incentive cannot be greater than the invoice cost

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: NA

Revision Details: Incentive doubled 7-18-11

Referenced Documents: N/A

Bonus Incentives offered: None

Supplemental Information Collected on the Application: project cost

Savings: There are no savings claimed for surveys

9.10.5 Steam Trap Repair/ Replacement (Industrial Process)

Measure Code: BPST5

Version Date & Revision History:

Draft date: June 21, 2011
Effective date: June 21, 2011
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be malfunctioning and leaking steam to be eligible
- Repair incentive is not available for traps that are failed closed or are plugged.

Eligibility Criteria for New Energy-Efficient Equipment:

- Leaking traps must be **repaired or replaced**
- Incentive cannot be greater than the project invoice cost (project costs include parts and external labor)

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 11 years

Revision Details: Incentive doubled 7-18-11

Referenced Documents: Focus Deemed Savings Manual and Steam Trap Calculator.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: project cost

Table 9.10.5-1 Calculated Demand and Energy Savings by Type of Business

Building Types	Therm Savings (<50 psig)	Therm Savings (50-125 psig)	Therm Savings (126-225 psig)	Therm Savings (>225 psig)
Office	196	756	1084	2075
School (K-12)	196	756	1084	2075
College/University	196	756	1084	2075
Retail/Service	196	756	1084	2075
Restaurant	196	756	1084	2075
Hotel/Motel	196	756	1084	2075
Medical	196	756	1084	2075
Grocery	196	756	1084	2075
Warehouse	196	756	1084	2075
Light Industry	196	756	1084	2075
Heavy Industry	196	756	1084	2075
Average = Miscellaneous	196	756	1084	2075

Table 9.10.5-2 Measure Costs (Parts and Labor) and Incentive Levels

Trap Size	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
<50 psig	\$200	\$0 (replacement)	\$200	\$100/trap
50-125 psig	\$400	\$0 (replacement)	\$400	\$200/trap
126-225 psig	\$600	\$0 (replacement)	\$600	\$300/trap
>225 psig	\$800	\$0 (replacement)	\$800	\$400/trap

9.10.6 Mass Replacement of Steam Traps (no survey conducted) (Industrial Process)

Measure Code: BPST6

Version Date & Revision History:

Draft date: June 21, 2011
 Effective date: June 21, 2011
 Revised: NA
 End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Traps must be in service to be eligible for incentives

Eligibility Criteria for New Energy-Efficient Equipment:

- If replacement is done without a survey, the program will assume that 30 percent of the traps were leaking and will pay a repair incentive on 30% of the total potential incentive.
- The incentive cannot be greater than the invoice cost (project costs include parts and external labor).

Loadshape: Loadshape #1 (Table 6.0-1).

Persistence: The persistence factor is assumed to be one.

Lifetimes: 11 years

Revision Details: Incentive doubled 7-18-11

Referenced Documents: Focus Deemed Savings Manual and Steam Trap Calculator.xlsx

Bonus Incentives offered: None

Supplemental Information Collected on the Application: project cost

Table 9.10.6-1 Calculated Demand and Energy Savings by Type of Business

Building Types	Therm Savings (<50 psig)			
Office	58.8	226.8	325.2	622.5
School (K-12)	58.8	226.8	325.2	622.5
College/University	58.8	226.8	325.2	622.5
Retail/Service	58.8	226.8	325.2	622.5
Restaurant	58.8	226.8	325.2	622.5
Hotel/Motel	58.8	226.8	325.2	622.5
Medical	58.8	226.8	325.2	622.5
Grocery	58.8	226.8	325.2	622.5
Warehouse	58.8	226.8	325.2	622.5
Light Industry	58.8	226.8	325.2	622.5
Heavy Industry	58.8	226.8	325.2	622.5
Average = Miscellaneous	58.8	226.8	325.2	622.5

Table 9.10.6-2 Measure Costs (Parts and Labor) and Incentive Levels

Trap Size	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment*
<50 psig	\$200	\$0 (replacement)	\$200	\$100/trap x 30%
50-125 psig	\$400	\$0 (replacement)	\$400	\$200/trap x 30%
126-225 psig	\$600	\$0 (replacement)	\$600	\$300/trap x 30%
>225 psig	\$800	\$0 (replacement)	\$800	\$400/trap x 30%

*The incentive is calculated as follows: (total number of traps, X \$(incentive) X 30% (to incentivize only the 30% that are assumed failed))

Appendix A - Application Processing Checklist

Pre-Approval Procedures:

1. **Jennifer Grenhoff** (Administrative Assistant) - Receive application via mail, fax, e-mail, or on-line (on-line application) (ALL applications initiate the process shown below in the Ameren office in Peoria). Applications that come in as a result of communications between the customer/ally and SAIC or GDS program staff located outside Peoria must be forwarded to Jennifer Grenhoff immediately upon receipt along with a summary of any communications with the customer/ally prior to receipt of the incentive application.
2. **Jennifer** - Conduct initial brief review for complete customer and facility information (e-mails, signatures, hours of operations, etc). If application is incomplete, send an e-mail request or call to obtain missing information.
3. **Jennifer** - Verify customer eligibility with account number using AIB (**Ameren Illinois Business** database). If the project is eligible and paperwork is complete, then input the project into AIB and assign a TR (technical reviewer) as appropriate. File application on the P: drive in appropriate customer folder. If it is a government entity or Commonwealth Edison (ComEd customer), notify the customer/program ally of their ineligibility status by e-mail and carbon copy (CC) the Illinois Department of Commerce and Economic Opportunity (DCEO) or ComEd DCEO (whichever is appropriate). Contact information for DCEO is "andreaireiff@illinois.gov" and for ComEd is "comedsmartideas@kema.com."
4. **Jennifer** - Send "Confirmation of Receipt" e-mail to customer and contractor/program ally (if applicable). For Standard projects with incentives of less than \$10,000.00 submitted for pre-approval, send "Acknowledgement E-mail" to customer and program ally. Copy Jon Carls (Key Account Executive Manager) and the KAE (Key Account Executive) on confirmation and acknowledgement e-mail messages (if applicable). Also blind carbon copy (BCC) ActOnEnergyProjects at "actonenergyprojects@ameren.com" and Margie Yankowski (Call Center) at "margie.yankowski@gdsassociates.com" on all acknowledgment e-mails.
5. **Jennifer** - Review incentive amount. If the project has an incentive request of \$25,000.00 or more, the customer will need to complete the Large Incentive Request Form (LIRF). E-mail this form to the customer if the customer has not sent it along with the application. When the LIRF is received, forward to Lance for review and approval. Once approved, notify the TR and upload the signed LIRF into AIB.

On-Line Lighting Applications:

The process for applications received via the on-line application option is very similar to that listed above, except rather than receiving a fax, hard copy, or electronic copy of the application, a notice will appear on **Jennifer's** dashboard indicating that an on-line application has been submitted. The link to the application is opened and the process outlined above is completed.

AIB and Project Tracking Log Entries -

1. Initial entries to AIB: Jennifer is the only one making initial entries into AIB.
2. Modifications to AIB: Jennifer will make most AIB modifications such as project status change, customer/program ally updates and the Estimated Completion Date (ECD). TRs will complete any updates to the "Measures" section in AIB.

TR responsibilities -

1. Review the application for missing and additional information requirements.
2. Continue communications with customer/ally via e-mail with a CC to Jennifer. Follow-up with customer/ally by phone if necessary to resolve any open issues. Record any conversations or copy/paste any correspondence to the "Notes" section in AIB. Upload any correspondence to the "Files" section in AIB. All correspondence with the customer/ally should **originate** from the AIB "Notes" section.

3. Enter measure information into AIB as required.
4. There are times when changes to the savings and/or values are necessary in both Standard and Custom projects. Items that can be changed include kWh, kW, therms, and incentive amounts. Examples of causes of changes include, but are not limited to, imprecise values being calculated in AIB, incorrect values being calculated in AIB, a recent program change that has not yet included in AIB, and incentive capping. While there is no maximum amount that can be adjusted, it is expected that these adjustments should be rare. It is also expected that any adjustments will be discussed with another program representative prior to being implemented, and that the changes and reasons for the changes will be recorded in AIB for future reference.
5. With the exception of retrocommissioning applications, each TR has the authority to pre-approve any project with an incentive that is less than \$10,000.00.
6. For projects requiring a pre-installation inspection and/or an in-progress inspection, the TR will first complete the analysis and then request a pre-installation and/or an in-progress inspection, completing the AIB "Inspection" section and then writing and then e-mailing a short note to Robert Miller through the AIB "Notes" section. Robert Miller will approve or disapprove the request, filling out the AIB "Inspection" section and then writing and e-mailing the requesting TR as appropriate through the "Notes" section in AIB. If the request is denied, the pre-approval process continues as detailed below. If the request is approved, Robert Miller's note back to the requesting TR will indicate approval of the request, identify the inspector, detail any additional instructions, and note that AIB has been updated accordingly. The same note will also CC the assigned inspector. The inspector will schedule and complete the inspection, fill out the "Inspections" section in AIB, and upload the inspection form and any pictures to the "Files" section in AIB. Finally, the inspector will e-mail the requesting TR and Robert Miller that the inspection has been completed and note any discrepancies, using the "Notes" section in AIB to do so. Once the inspection is successfully completed, the TR will then continue the analysis process.
7. All projects with incentives that are over \$10,000.00 require secondary review. All retrocommissioning projects require a secondary review. All projects with incentives that are more than \$100,000.00 require a tertiary review. Additionally, any TR may request a secondary review of any project, regardless of incentive size, as part of the process.
8. In general, Rodney Rhoads, Scott Schultz, and Andy Vaughn will send projects requiring secondary review to Chris Durand and Dave Kilgore. Chris Durand and Dave Kilgore will send projects requiring secondary review to Robert Miller. Robert Miller will send projects requiring secondary review to Chris Durand, Dave Kilgore, or a senior ActOnEnergy program engineer, as appropriate. Tertiary reviews will be sent to a senior ActOnEnergy program engineer, as appropriate.
9. Technical review duration should be NO MORE than 10 business days once all required technical information has been provided by the customer/ally.

Pre-approval Letters and TR Communications

1. Jennifer – When the TR and the secondary reviewer have made their recommendation, the project will show up on Jennifer's dashboard to prepare and send the pre-approval letter to customer/program ally. Also BCC the project's primary technical reviewer, Cheryl Miller (Ameren Illinois Energy Efficiency (EE) Business Program Manager), ActOnEnergyProjects and Margie Yankowski. Also, CC Jon Carls and the firm's Key Account Executive (KAE) (when applicable).
2. **Jennifer** - Update AIB to reflect re-approval status and upload letter to the "Files" section in AIB.
3. **TRs** – As project estimated completion dates approach, TRs will contact clients and allies to inform them the project is coming due and that they must submit their final paperwork in accordance with program guidelines. TRs will incorporate new ECDs into the project file or close-out projects that never commenced. As project estimated completion dates are passed and no final paperwork has been submitted, the

corresponding TRs are to follow-up for updated ECDs, request final paperwork, or close-out projects out that never commenced.

Final Application Approval Procedures:

1. **Jennifer** - Receive application for payment via mail, fax, or e-mail (ALL applications initiate the process shown below in the Ameren office in Peoria). *Applications which come in as a result of communications between the customer/ally and SAIC or GDS program staff located outside Peoria must be forwarded to Jennifer Grenhoff immediately upon receipt along with a summary of any communications with the customer/ally prior to receipt of the incentive application.*
2. **Jennifer** - Send "Confirmation of Receipt" email to customer and contractor/program ally (if applicable). Copy Jon Carls and the KAE on acknowledgement email (if applicable). Also copy ActOnEnergyProjects, and Margie Yankowski on all acknowledgment emails.
3. **Jennifer** -
 - a. If the application is for payment has **SKIPPED** pre-approval, confirm the eligibility of the project and then follow steps 2, 3, 5, 6 from above.
 - i. **Ineligible projects include: Custom projects, HVAC Tune-Up projects, Retrocommissioning projects, and all projects with incentives of \$10,000.00 or more.**
 - ii. **TRs will have ten days from date of receipt of complete final paperwork to make their final approval recommendations.**
 - b. If the application is for payment and **HAS** previously received a pre-approval letter: follow the next steps.
4. **Selected Technical Reviewer** –
 - a. Review submitted invoices and measures entered into AIB.
 - b. If measures and amounts differ from those previously pre-approved, update the "Notes" section in AIB with details regarding why the scope and/or quantity or quality of the equipment changed. Also include how this change will affect the incentive, bonuses, and/or other monetary figures.
 - c. Calculate energy savings and resulting incentives accordingly.
 - d. With the exception of retrocommissioning applications, each TR has the authority to pre-approve any project with an incentive that is less than \$10,000.00.
 - e. For projects requiring a post-installation inspection, the TR will first complete the analysis and then request a post-installation inspection, completing the AIB "Inspection" section and then writing and then e-mailing a short note to Robert Miller through the AIB "Notes" section. Robert Miller will approve or disapprove the request, filling out the AIB "Inspection" section and then writing and e-mailing the requesting TR as appropriate through the "Notes" section in AIB. If the request is denied, the final approval process continues as detailed below. If the request is approved, Robert Miller's note back to the requesting TR will indicate approval of the request, identify the inspector, detail any additional instructions, and note that AIB has been updated accordingly. The same note will also CC the assigned inspector. The inspector will schedule and complete the inspection, fill out the "Inspections" section in AIB, and upload the inspection form and any pictures to the "Files" section in AIB. Finally, the inspector will e-mail the requesting TR and Robert Miller that the inspection has been completed and note any discrepancies, using the "Notes" section in AIB to do so. Once the inspection is successfully completed, the TR will then continue the analysis process.
 - f. All projects with incentives that are over \$10,000.00 require secondary review. All retrocommissioning projects require a secondary review. All projects with incentives that are more than \$100,000.00 require a tertiary review. Additionally, any TR may request a secondary review of any project, regardless of incentive size, as part of the process.

Appendix B – Program Chronology

YEAR ONE

Program Launch (June 23, 2008)

- Standard HVAC, Lighting, Refrigeration, and Motors
- Standard offering set to mirror ComEd's measure list and incentive levels.
- Custom (5 cents/kwh, 1.5-7 years payback, 10-50% incremental cost)
- Pre-approval required for all custom projects and for standard projects over \$25k incentive level
- Large incentive request form required for custom projects over \$25k incentive level

Large Incentive Request Form Requirement Modified (August 1, 2008)

- Large incentive request form required for all standard and custom projects over \$25k incentive level

Standard Program Fully Subscribed (September 11, 2008)

- All projects reviewed under custom program
- All projects must be pre-approved
- Eligibility criteria for standard measures still apply
- Standard measures incentivized at greater than 5 cents/kwh adjusted to 5 cents/kwh
- Standard measures incentivized at less than 5 cents/kwh remain at standard incentive level

Minimum Payback Threshold Reduced to 1.0 Year (December 8, 2008)

- Minimum payback threshold reduced from 1.5 to 1.0 year for custom program due to economic slowdown

Analysis of Previously Denied or Incentive Capped Projects at 1.5 Year Payback (December 8, 2008)

- Review of projects which were previously denied due to payback less than 1.5 years or deferred due to incentive cap at 1.5 year minimum payback
- Projects already implemented or implementation in progress not eligible
- Pre-approval of projects no longer denied nor incentive capped due to relaxation to 1.0 year payback

Incentive Cap Per Facility Per Program Year Increased (January 1, 2009)

- Incentive cap per facility per program year increased from \$100k to \$200k to allow large firms to implement additional projects
- Incentive cap per project per facility per program year limited to \$100k

Analysis of Previously Denied Projects (January 5, 2009)

- Analysis of projects previously denied to re-assess eligibility and consider granting one time exceptions with the submittal of a large incentive request form
- Projects already implemented or implementation in progress not eligible
- Pre-approval of limited projects based on this analysis effort.

Incentive Bonus Program Launched (January 8, 2009)

- Incentive bonus of 10% of calculated incentive level provided for all new incentive applications received after effective date until PY1 incentive funds are exhausted to encourage submission of applications to meet PY1 goals.

Program Ally Gift Card Program Launched (January 13, 2009)

- \$500 VISA gift card to be awarded to program ally for the first 25 projects with incentive level greater than \$10k to encourage submission of applications to meet PY1 goals.

- Gift card awarded to ally when incentive to customer is approved for payment

Small Business HVAC Tune-Up Program Launched (January 19, 2009)

- Standard program developed for GDS-2 (small commercial gas) customers that included incentives for energy efficient boilers and forced-air furnaces, as well as boiler/furnace tune-ups for existing systems
- Incentives for air conditioner tune-ups were also included to encourage bundling of services with the boiler/furnace tune-ups

Enhanced Custom Application Released (January 20, 2009)

- Enhanced custom application released to include pre-calculated incentive levels at 5 cents/kwh for 8 of the most active standard lighting measures to streamline the custom application process.

YEAR TWO

Program Year 2 Launch (May 1, 2009)

- Standard lighting and custom applications appear on ActOnEnergy.com
- Custom incentive 5 cents/kwh for lighting, 7 cents/kwh for non-lighting. 1-7 years payback, 10-50% incremental cost
- Pre-approval required for all projects
- Started accepting applications for PY2 on May 1, 2009
- Large incentive request form required for custom projects over \$25k incentive level
- Standard motors, refrigeration and HVAC uploaded to the website June 2, 2009

Green Nozzle Program (Launched June 9, 2009)

- Interns installed pre-rinse nozzles in food service/commercial kitchens (nozzles save 493 gross therms each)
- Nozzles provided to customers at no cost
- Installers conducted a survey within the kitchen to help develop the commercial kitchens program in PY3

E-Smart Programmable Thermostat (Triad Offer launched July 29, 2009)

- Sent 5,000 mailers to electric and gas customers offering them free air-conditioning and furnace tune-up along, along with a free programmable thermostat.
- Worked with local HVAC contractors to perform these services and install E-Smart thermostat at no cost to customer
- Limited to the first 400 people who registered for the program
- Actual install of thermostats commenced on 9-17-09
- Initially rolled out in Peoria area only

Online Lighting Application (Launched July 31, 2009)

- Functionality added to ActOnEnergy.com which allows lighting projects to be submitted online

Green Nozzle Program via Mail (Launched September 17, 2009)

- Sent nozzles via mail to a customer instead of a direct install
- Allowed for customers to participate in more rural areas
- Customers required to send picture of installed nozzle

Co-branding Opportunities for Program Allies (Launched September 25, 2009)

- AOE developed brochures include Program Overview, Lighting, HVAC, Refrigeration and Custom

- Brochures designed to be co-branded with Program Ally logo, phone number, website, and email address

Grocery/Convenience Store Program (Launched September 29, 2009)

- Application created incorporating measures commonly used by grocery/convenience stores
- Included new incentives for:
 - LED lighting
 - LED lighting controls
 - Gaskets
 - Refrigeration or freezer tune-ups
 - Night curtains for open cases

E-Smart Thermostat Rolled-out to Champaign, Decatur and Metro East (November 3, 2009)

- Mailers sent-out to zip codes within 30 mile radius of Champaign and Metro East St. Louis Area along with a 10 mile radius around Decatur
- Thermostat install only (Triad offer expired)

T12 Special Incentive (Launched November 16, 2009)

- 10% bonus incentive for qualifying applications submitted by January 31, 2010
- Upgrade T12 lamps to high-efficiency T8 or T5 lamps.
- Install lighting controls – such as occupancy sensors and daylight dimming systems that automatically turn lights off when they are not needed.
- Replace high bay (HID-type) fixtures with high-efficiency T8 or T5 lights.

VFD Incentive Increase (Launched January 4, 2010)

- Incentive increased from \$45 to \$75 per HP controlled for HVAC & Motor VFDs
- Valid for VFD project applications submitted between January 4, 2010 and March 31, 2010
- Increased percent of project covered by incentive from 50% to 75%

E-Smart Thermostat Rolled-out to Bloomington-Normal (January 4, 2010)

- Mailers sent-out to zip codes within a 30 mile radius of Bloomington
- Thermostat install only (Triad offer expired)

Small Business Online Store (Promotion launched January 4, 2010)

- Discounted cost of all products (except recessed LED lighting) by 50% for all purchases through March 31, 2010
- Offered choice of three free 23 watt bulbs or a free 13/18/23 watt pack, one per account through March 31, 2010
- Created Chamber Challenge with gave credit to chamber for each product their member purchased - winning chamber received \$1,000

Across the Board Incentive Bonus (Launched February 2, 2010)

- 15% bonus incentive added to all new applications received after effective date until PY2 incentive funds exhausted (to encourage submission of applications to meet PY2 goals)
- T12 Special Incentive was rolled into this offer

Program Ally Gift Card Program (Launched February 2, 2010)

- \$500 VISA gift card for each program ally who submits project application with incentive of \$10K or greater thru end of February (project must be completed in PY2)
- Gift card actually awarded to eligible allies at final close-out of PY2

E-Smart Thermostat \$50 Customer/Contractor Bonus (Launched January 4, 2010)

- \$50 per thermostat bonus offered to customers who directly applied for E-Smart Program
- \$500 bonus offered to contractors who installed at least 100 thermostats

VFD Incentive Extended (March 23, 2010)

- VFD \$75 incentive extended until May 31, 2011

Program Year 3 – Customer Incentive Changes, by Effective Date

Bonus offerings are indicated in **Blue**

Measure changes are shown in **Red**

Other application changes shown in **Green**

- **5/3/2010** – Program Year 3 applications released.
- **6/15/2010** – **T12 Phase-Out Bonus; 15% bonus**; Applies to measures BPL40, BPL41, BPL42, BPL43, BPL60, BPL62, BPL63, BPL64, BPL65, BPL93, and T12 custom projects³⁵; Applies retroactively and to all Program Year 3 applications submitted on or before 12/31/2010; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011.³⁶
- **6/22/2010** – **Elmwood, IL Tornado Bonus; 50% bonus on electric incentives (gas incentives do not apply for the bonus)**; Initial application must be submitted on or after 6/22/2010 and the last day to submit is 6/30/2011; No restrictions on project completion date.
- **7/20/2010** - **New applications posted with updated requirements for BPL40 and BPL43**. Please see application editing notes for more specifics.
- **8/1/2010** – **Symposium Coupon Bonus; 15% bonus**; Initial application must be submitted on or after 8/1/2010 and the last day to submit is 12/31/2010; No restrictions on project completion date.
- **8/25/2010** – **Anti-Sweat Heater Control; Unit incentive changed from \$30 per lineal foot to \$80 per door**; This changed measures BPR2 and BPR3 to BPR 33 and BPR34, respectively; Change applied immediately and extends through the remainder of the program year.
- **8/31/2010** – **Gas Boiler and Forced-Air Furnace Tune-Up; Unit incentive reduced from \$0.50 to \$0.25 per kBtuh input**; Applies to BPH1 and BPH2; Reduction applied immediately and extends through the remainder of the program year.
- **9/1/2010** – **Energy-Efficient Heating Upgrades Bonus; 50% bonus**; Applies to measures BPH4, BPH6, and BPH7; Initial application must be submitted on or after 9/1/2010; The bonus will end at the end of Program Year 3 or after 400 heaters/boilers are approved, whichever is first; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011.³⁷
- **9/27/2010** – **New applications posted with updated requirements for water heaters**. Please see application editing notes for more specifics.

³⁵ T12 custom projects using the T12 Phase-Out Bonus cannot use any of the other bonuses.

³⁶ Projects that had pre-approval prior to 10/6/2010 and an Estimated Completion Date (ECD) later than 4/30/2011 will have 60 days to submit their final paperwork. This puts them past the 6/30/2011 requirement.

³⁷ *Ibid.*

- **10/12/2010** – Door Gaskets; BPR14 removed from application on 10/15/2010; Customers without pre-approval have until 11/11/2010 (30 days) to submit final applications for door gaskets.
- **10/20/2010** – Custom Projects; \$0.02/kWh bonus for projects completed by 3/31/2011 and final paperwork submitted by 4/30/2011, \$0.01/kWh bonus for projects completed by 4/30/2011 and final paperwork submitted by 5/31/2011; Initial application must be submitted on or after 10/20/2010; The bonus will end at the end of Program Year 3 or when additional bonus money is exhausted, whichever is first.
- **10/20/2010** – High-Bay Lighting; \$0.055 bonus for projects completed by 3/31/2011 and final paperwork submitted by 4/30/2011, \$0.045 bonus for projects completed by 4/30/2011 and final paperwork submitted by 5/31/2011; Initial application must be submitted on or after 10/20/2010; The bonus will end at the end of Program Year 3 or when additional bonus money is exhausted, whichever is first.
- **10/20/2010** – Compressed Air and Healthcare Retro Commissioning; \$0.02/kWh bonus for projects completed by 3/31/2011 and final paperwork submitted by 4/30/2011, \$0.01/kWh bonus for projects completed by 4/30/2011 and final paperwork submitted by 5/31/2011; Applies to savings up to 2 million kWh above minimum kWh commitment. For savings over 2 million kWh above minimum kWh commitment, bonus is paid out at 50%; Applies retroactively to all Program Year 3 applications; The bonus will end at the end of Program Year 3 or when additional bonus money is exhausted, whichever is first.
- **10/25/2010** – Automatic Door Closer for Walk-In Freezer/Cooler; BPR7 unit incentive reduced from \$160 to \$30 per door; Customers without pre-approval have until 11/24/2010 (30 days) to submit final applications for \$160 incentive.
- **10/25/2010** – New applications posted with updated requirements for T5 lighting, LED lighting, Anti-Sweat Heater Controls, and Automatic Door Closers. Please see application editing notes for more specifics.
- **11/11/2010** – BPL63 requirement change; BPL63 now requires completely new fixtures, retrofit kits do not apply; Customers and allies without pre-approval have until 12/11/2010 (30 days) to submit final applications based on the old understanding of this measure. We have contacted allies who have frequently used this measure in this manner in the past and let them know of the change.
- **1/1/2011** – T12 Phase-Out Bonus; 10% bonus; Applies to measures BPL40, BPL41, BPL42, BPL43, BPL60, BPL62, BPL63, BPL64, BPL65, BPL93, and T12 custom projects³⁸; Applies to all Program Year 3 applications submitted on or after 1/1/2011; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011.
- **1/10/2011** – Motor incentives no longer offered; Motors removed from application on 01/12/2011. Customers without pre-approval have until 1/10/2011 to submit final applications for motors.
- **1/10/2011** – VFD requirement change; Incentives for direct drive VFDs removed from application on 2/11/2011. Customers without pre-approval have until 2/11/2011 to submit final applications for VFDs controlling direct drive motors.
- **1/12/2011** – New applications posted with updated requirements for exterior lighting, HVAC equipment, and refrigeration. Please see application editing notes for more specifics.
- **1/24/2011** – Online Store Reduced Pricing. Online store has reduced pricing on many of the products through 3/31/2011; A free 3-pack of Compact Fluorescent Lights (CFLs) is also available for each DS-2 customer.

³⁸ T12 custom projects using the T12 Phase-Out Bonus cannot use any of the other bonuses.

- **2/4/2011** – New applications posted with updated requirements for exterior lighting. Please see application editing notes for more specifics.
- **2/14/2011** – Sweet Deal Bonus; 15% bonus. (Please note: the Sweet Deal Bonus was extended on 4/4/2011, see below). Applies to all electric measures except T12 retrofits; Applies to Program Year 3 applications submitted with electric measures from 2/14/2011 through 3/31/2011; Equipment must be purchased on or after 2/14/2011; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011; For projects without pre-approval, project must be completed by 3/31/2011.
- **2/21/2011** – New commercial kitchens application posted with incentives for additional energy efficient kitchen equipment. Please see application editing notes for more specifics.
- **2/21/2011** – Commercial Kitchens Upgrades Bonus; 25% bonus. Applies to measures BPCCK9, BPCCK10, BPCCK11, BPCCK12, BPCCK13 (with gas savings), & BPCCK14 (with gas savings); Applies to Program Year 3 applications from GDS-2 customers submitted from 2/21/2011 to 5/31/2011; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011.
- **3/1/2011** – No pre-approvals required or given for standard projects under \$10,000. Administrative review is performed and acknowledgement letter issued.
- **3/1/2011** – No pre-approvals required or given for furnace and air conditioner tune-ups under \$10,000. Administrative review is performed and acknowledgement letter issued.
- **3/2/2011** – Facility walkthrough offered to customers. Email sent out to customers and Key Account Executives for Act On Energy engineers to perform a walkthrough at customer's facilities through the month of March
- **3/3/2011** – Post-installation inspections waived for standard and custom projects under \$100,000. Projects with reviews completed after 3/3/2011 will have inspections waived if the incentive amount is under \$100,000, except for retrocommissioning projects and projects with issues that the technical reviewer determines to warrant an inspection.
- **3/7/2011** – New applications posted with policy changes from 3/1/2011 and minor updates to refrigeration measures Please see application editing notes for more specifics.
- **3/8/2011** – Online Store Available to All Customers. Online store open to all Ameren Illinois electric business customers.
- **3/18/2011** – Online Store Reduced Pricing Extension. Online store reduced pricing extended through 5/15/2011; Two free 3-packs of Compact Fluorescent Lights (CFLs) are now also available for each customer.
- **4/1/2011** – Aerator Program - Increased Ally Incentives. Ally incentives for installation of aerators for GDS-2 customers increased to add in cost of aerator and \$100 for installation visit.
- **4/4/2011** – Sweet Deal Bonus Extension; 15% bonus. Applies to all electric measures except T12 retrofits; Applies retroactively to Program Year 3 applications submitted with electric measures from 2/14/2011 through 5/31/2011; Equipment must be purchased on or after 2/14/2011; Project must be completed by 5/31/2011; Final paperwork must be received by 6/30/2011.
- **4/22/2011** – Mailer with Compact Fluorescent Light (CFL) Offer Mailers sent out to customers for two free 3-packs of CFLs.
- **5/9/2011** – Announcement of next T12 bonus ramp-down. Currently bonus is at 10%. Email sent out to customers and allies of next ramp-down of T12 bonus to occur on 10/31/2011. Current bonus applies to measures BPL40, BPL41, BPL42, BPL43, BPL60,

- BPL62, BPL63, BPL64, BPL65, BPL66, BPL93, and T12 custom projects ; For projects receiving pre-approval or an estimated incentive letter, the 10% bonus applies to all Program Year 4 applications submitted on or before 10/31/2011; For projects not receiving pre-approval, the 10% bonus applies to projects with equipment purchased on or before 10/31/2011; Project must be completed by 5/31/2012; Final paperwork must be received by 6/30/2012.
- **5/10/2011** – Symposium Coupon Bonus; 15% bonus. For projects requiring pre-approval, initial application must be submitted by 10/31/2011; For projects not requiring pre-approval and completed before 10/31/2011, coupon is to be sent in with final paperwork; For projects not requiring pre-approval and completed after 10/31/2011, initial application must be submitted by 10/31/2011; Coupon cannot be applied to T12 lighting or Custom Large Project Incentive; Project must be completed by 5/31/2012; Final paperwork must be received by 6/30/2012.
 - **5/13/2011** - Online Store Reduced Pricing Extension. Online store reduced pricing extended into PY4 through 8/31/2011. Two free 3-packs of Compact Fluorescent Lights (CFLs) offer from PY3 extended to 8/31/2011.
 - **6/20/2011** – Final paperwork on PY3 projects does not need to include signed Incentive Payment Request. Final PY3 applications processed 6/20/2011 and after do not need a signed Incentive Payment Request in order to expedite processing.
 - **7/8/2011** – Final paperwork cutoff for PY3. No additional applications to be processed under PY3

Program Year 4 – Customer Incentive Changes, by Effective Date

- **3/11/2011** - Program Year 4 Competitive Large Project Incentive (CLPI) applications released. CLPI applications due 5/16/2011; CLPI application includes a 15% bonus for projects completed by 5/31/2012 and paperwork submitted by 5/31/2012.
- **4/25/2011** - Program Year 4 Custom application released
- **5/6/2011** - Program Year 4 Standard Lighting and HVAC applications released. Applications pre-approved prior to this date will use PY3 measures and incentives.
- **5/20/2011** - Program Year 4 Grocery, Lodging, VFD, Agriculture, and Commercial Kitchen applications released. Applications pre-approved prior to 5/6/2011 will use PY3 measures and incentives.
- **6/14/2011** - Low-flow Pre-rinse Spray Nozzle installations in Springfield, Champaign, and Peoria areas to start. Customers with nozzle installations will be able to receive one free LED exit sign or retrofit kit.
- **6/20/2011** - HVAC application updated; Chiller tune-ups added (BPC22 and BPC23); HVAC VFD incentive increased to from \$75/hp to \$90/hp (BPC20). HVAC VFD incentive increase retroactive for all PY4 applications pre-approved after 5/6/2011. See application editing notes for more specifics.
- **6/20/2011** - Application policy updates to be released on all applications during next update. Clarification provided on incentive caps and eligibility for DS-5 customers. See application editing notes for more specifics.
- **6/23/2011** - Program Year 4 Steam Trap application released. Projects started after 6/22/2011 are eligible for incentives
- **6/30/2011** - Steam Trap applications revised with minor wording changes. Please see application editing notes for more specifics.
- **7/8/2011** - PY3 projects submitted after this date to be processed as PY4. Projects completed in PY3, but submitted after 6/30/2011 will lose all bonuses.

- **7/14/2011** - T8 to reduced wattage T8 retrofits processed under BPL44. T8 to T8 retrofits to be processed under BPL44 starting on 7/14/2011. T8 to T8 retrofits require both new lamps and ballasts. Lighting application will be updated with this information on next release (8/8/2011).
- **7/20/2011** - Aerator Program; Increased Incentives. Incentives for aerators, showerheads, and pipe insulation doubled for jobs generated by plumbers: aerators (\$20), showerheads (\$30), and pipe insulation (\$20). \$100 per facility for aerator visits is still applicable. ActOnenergy generated jobs are still at \$10, \$15, and \$10, respectively.
- **7/22/2011** - Program Year 4 Staffing application released. Staffing application due 9/23/2011. All projects listed on application must be completed by 12/31/2012.
- **7/25/2011** - Custom gas incentives increased from \$0.80/therm to \$1.20/therm. New custom application posted. Applies to custom applications submitted on or after 7/25/2011. Additional reporting requirements for custom projects with incentives over \$100,000 added to the application.
- **7/25/2011** - Steam Trap incentives doubled. Applies to steam trap applications submitted on or after 7/25/2011. Application updated with the new incentive amount on 7/27/2011.
- **7/25/2011** - Tankless gas water heater incentives increased (BPWH3) from \$300 to \$1200/heater. Applies to measure BPWH3; Application must be submitted on or after 7/25/2011. Commercial Kitchen application updated on 8/8/2011. HVAC application updated on 9/16/2011.
- **7/27/2011** - Program Year 4 Compressed Air Retro Commissioning application released. Now includes both a survey incentive of 80% of the survey cost and an implementation incentive for the kWh saved. Additional details and changes available in application.
- **8/3/2011** - Program Year 4 Health Care Retro Commissioning application released. Now includes both a survey incentive and implementation incentive for kWh and therms saved. Additional details and changes available in application.
- **8/4/2011** - CEE list ballasts and lamps required to be on same list. For BPL60, BPL41, and BPL42, it is now required that the lamps and ballasts be located on the same list (e.g. 32W lamps must have corresponding 32W ballasts in order to be eligible for the relamp/reballast incentive).
- **8/8/2011** - Lighting and Commercial Kitchens applications updated. Low wattage occupancy sensors added (BPL79) to Lighting application. Low wattage occupancy sensors retroactive for all PY4 applications pre-approved after 5/6/2011; BPL44 and BPWH3 updated (see prior notes on 7/14 and 7/25/2011); See application editing notes for more specifics.
- **8/25/2011** - Steam Trap application changed such that repair/replacement is capped at total project cost (internal labor not considered in the cost). The incentive for repair/replacement measures cannot be greater than the project cost (project costs include parts and external labor). If only a survey was done and internal labor was used, there is no cap on the incentive. This change is effective immediately. Application updated and released on 8/29/2011.
- **8/31/2011** - Online Store Reduced Pricing Ends. Online store reduced pricing ends on 8/31/2011.
- **9/1/2011** - Custom Project Review to include Workbook. Custom projects submitted on or after 9/1/2011 now require a workbook to be filled out by the technical reviewer or energy advisor.
- **9/6/2011** - VFD application updated. VFD cap is corrected such that is based on a per VFD basis; See application editing notes for more specifics.

- **9/8/2011** - LED Exit Sign Retrofit Kits incentive \$10 per kit. LED Exit Sign Retrofit Kits will be added to the lighting application in the future as BPL82 at \$10 per kit; Currently being processed under BPL78 with same kWh savings and \$10 incentive level.
- **9/8/2011** - No internal labor allowed on refrigeration tune-ups (BPR11). Change to refrigeration tune-ups to match with HVAC tune-ups
- **9/15/2011** - Impact Statement to replace Large Incentive Request Form (LIRF) on custom projects. Impact statements are required for all custom projects that are above \$10,000 and for projects where TR determines it is appropriate; Impact statement takes the place of the LIRF on custom projects; LIRF is still required for standard projects greater than \$25,000.
- **9/16/2011** - HVAC application updated. BPWH2 and BPWH3 updated. BPWH3 updated (see prior note on 7/25/2011); Multiple units allowed under BPWH2 and BPWH3 to meet demands of existing unit; See application editing notes for more specifics.
- **9/26/2011** - Lighting application updated. BPL82 added (see prior note on 9/8/2011); See application editing notes for more specifics.
- **10/14/2011** - Program Year 4 Compressed Air Leak application released. Projects completed on or after 10/17/2011 are eligible for incentives
- **10/17/2011** - Natural Gas Program Ally Bonus. Applies to referring program ally for application submitted with gas incentive measures; Initial application received and equipment purchased on or after 10/17/2011; The bonus will end at the end of Program Year 4; Project must be completed by 5/31/2012; Final paperwork must be received by 6/30/2012; Bonus cap is \$10,000 per project; Healthcare Retro Commissioning, aerators, showerheads, green nozzle, pipe insulation, and steam trap surveys are not eligible.
- **10/17/2011** - T12 bonus ramp-down extended and coupon added for early completion. T12 ramp-down extension; Current bonus applies to measures BPL40, BPL41, BPL42, BPL43, BPL60, BPL62, BPL63, BPL64, BPL65, BPL66, BPL93, and T12 custom projects³⁹; The 10% bonus applies to all Program Year 4 applications submitted on or before 5/31/2011; Project must be completed by 5/31/2012; Final paperwork must be received by 6/30/2012; Projects with (1) applications submitted and equipment purchased after 10/17/2011 and (2) project completed and paperwork submitted by 3/31/2012 will receive a 10% coupon that can be used on a PY5 energy efficiency project, excluding T12 incentives.

³⁹ T12 custom projects using the T12 Phase-Out Bonus cannot use any of the other bonuses.

Appendix C – Custom and Standard Revised Technical Review Process

1. **Application intake review criteria:** *once these criteria are verified an e-mail is issued to the customer informing them their application has been received.* The application must include:
 - Company name
 - Ameren Utility account number
 - Customer contact name and e-mail/phone info (e-mail required for notifications of application receipt, pre-approval, final approval, etc.)
 - Contractor/Ally contact name and info
 - Requested incentive amount
 - Estimated Completion Date (ECD)-date is checked to insure it is within 90 days of pre-approval (standard incentives) or within the program year (custom incentives)
 - Customer Signature-verifies they understand terms and conditions
 - Landlord authorization-if required
 - Payment Release Authorization form-if incentive will be paid to party other than customer installing the energy efficiency upgrades.
 - Large Incentive Request Form (LIRF)-required for incentive requests larger than \$25,000
 - LIRF must be reviewed and approved by the program manager to insure the customer's request for ActOnEnergy funds is due to a justified need. Examples of a justified need are: Customer/company requires projects to have a minimum payback and the proposed project will not meet this minimum without an incentive. Capital is limited and incentive will allow for energy improvement project to proceed by reducing the impact on the capital budget. Utility energy costs are high and energy efficiency improvements will offer significant operating cost reductions.
2. **Application technical pre-approval review criteria:** *once these criteria are verified an e-mail is issued to the customer informing them their application has been pre-approved.*
 - Customer submission of baseline energy usage: This information can be submitted in one of several forms. Technical reviewers examine the information and verify supporting documentation has been supplied by the customer or ally.
 - Custom application-actual energy usage as shown on previous utility bills or estimates based on energy studies or calculated from exiting equipment name plates and cut sheets.
 - Standard application calculated measures-Customer supplies existing equipment energy usage values. ActOnEnergy staff perform a check to verify that the submitted values are in line with typical values.
 - Standard application deemed Measures -Customer indicates a specific type of upgrade and an assumed baseline value is used by ActOnEnergy. These baseline values are determined from industry accepted values and coded into the ActOnEnergy database.
 - Customer submission of proposed upgrade energy usage: This information can be submitted in one of several forms. Technical reviewers examine the information and verify supporting documentation has been supplied by the customer or ally.
 - Custom application-proposed energy usage as estimated based on equipment name plates and cut sheets.

- Standard deemed measures-Customer indicates a specific type of upgrade and an assumed baseline value is used by ActOnEnergy. These baseline values are determined from industry accepted values and coded into the ActOnEnergy database.
- Calculation of energy savings: Savings are calculated based on the difference between the baseline energy value and the proposed system energy value.
 - There are times when changes to the savings and/or values are necessary in both Standard and Custom projects. Items that can be changed include kWh, kW, therms, and incentive amounts. Examples of causes of changes include, but are not limited to, imprecise values being calculated in AIB, incorrect values being calculated in AIB, a recent program change that has not yet included in AIB, and incentive capping. While there is no maximum amount that can be adjusted, it is expected that these adjustments should be rare. It is also expected that any adjustments will be discussed with another program representative prior to being implemented, and that the changes and reasons for the changes will be recorded in AIB for future reference.
 - There are times when the customer facility type will not exactly match the facility types used by ActOnEnergy to determine operating hours and the follow-on energy usage. In cases like these, the technical reviewer is to opt for the ActOnEnergy facility type that best describes the customer's facility, and to use that facility type when conducting the analysis. This situation should also be noted in the "Notes" section in AIB.

3. Application Incentive pre-approval review criteria

Almost all incentives are calculated based on the energy saved. However, some of the incentive rates presented to customers are deemed to reduce the calculations associated with a review. Deemed incentive rates are typically on a per unit basis (lamps, motors, controllers, etc) or per length (fan diameter, etc.) Deemed values are calculated and tabulated for each measured and outlined under each measure description in this TRM.

4. Facility pre-approval inspection criteria:

- Incentive requests of \$100,000 or larger require a facility inspection prior to issuance of pre-approval.
- Incentive request of \$50,000 or larger and within 60 miles of an inspector's office require a facility inspection prior to issuance of pre-approval.

5. Application final approval for payment review: *once these criteria are verified an e-mail is issued to the customer informing them their application has approved for payment and a check will be sent via mail.*

- Final application is reviewed to insure completion date is listed and prior to ECD listed in pre-approval
- Customer signature is verified
- Invoices are reviewed to assure orders were placed after pre-approval was given, equipment that was pre-approved was ordered, all equipment was ordered and installed as described in initial application.
- Final requested incentive amount is verified as equal to or below the value pre-approved.
- Verification that final installation inspection was satisfactorily completed.

6. Facility final installation inspection criteria:

- Incentive requests of \$25,000 or larger require a facility inspection prior to issuance of final approval.

- Incentive request of greater than \$10,000 but less than \$25,000 and within 60 miles of an inspector's office requires a facility inspection prior to issuance of final approval.

7. Incentive payment process/Check issuance

- Project submitted to Program Manager for final review
- Once approved, check requested from check issuer
- Upon receipt of check from issuer, check sent to client using USPS Registered Mail