

5-31-11



Business Program
Program Year Three
June 2010 through May 2011

Technical Reference Manual (TRM)
Standard Measures

No. 2010-4
Measure Savings Algorithms and Cost Assumptions

Please send questions and comments to:

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Summary of Program-year Three Measures, by Type

NEW indicates a new measure for PY3; **Modified** indicates the eligibility criteria or incentive amount have changed from program-year two. The three-part number preceding each measure indicates where this measure is located in this report.

9.1 LIGHTING		
	Measure	Code
Highbay Fixtures		
9.1.1	Highbay Fixture Replacement Option	BPL91
Linear Fluorescent and Occupancy Sensors		
9.1.2	Fluorescent U-bend Relamp and reballast	BPL40 NEW
9.1.3	T12 to T8 (32 watt) Relamp and Reballast	BPL60 Modified
9.1.4	T12 to T8 (low wattage 28 watt) Relamp and reballast	BPL41 NEW
9.1.5	T12 to T8 (ultra low Wattage 25 watt) Relamp and reballast	BPL42 NEW
9.1.6	T8 to T5 Relamp and reballast	BPL44 NEW
9.1.7	New Fluorescent Fixtures	BPL62
9.1.8	T12 to T8 Fluorescent Fixtures with Reflectors	BPL63
9.1.9	T12 to T5 New Fluorescent fixture	BPL43 NEW
9.1.10	Single lamp T5 fluorescent fixture with reflector	BPL45 NEW
9.1.11	High Efficiency Fluorescent Fixtures	BPL64 Modified
9.1.12	Low Glare High Efficiency Recessed Fixtures	BPL65 Modified
9.1.13	Controls for T5 and High Performance T8 Systems	BPL72
9.1.14	Remote Mounted Occupancy Sensors	BPL73
9.1.15	Occupancy Sensors	BPL74
Incandescent Replacements		
9.1.16	CFL Lamps	On-line store
9.1.17	LED Lamps	BPL81
9.1.18	LED Recessed Down Lamps	BPL84
Low Wattage Ceramic Metal Halide (CMH)		
9.1.19	CMH Fixtures: <100 Watts	BPL85 Modified
9.1.20	CMH Fixtures: 100-350 Watts	BPL89 NEW
9.1.21	CMH Integral Ballast Lamps	BPL86
Hard-Wired CFL		
9.1.22	Hard-Wired CFL Fixtures <30 Watts	BPL87
9.1.23	Hard-Wired CFL Fixtures >30 Watts	BPL88
Exterior HID (High Intensity Discharge) Fixtures		
9.1.24	Garage Type Fixtures w/ electronic ballast	BPL50 NEW
9.1.25	Canopy Lighting w/ electronic ballasts	BPL51 NEW
LED Cooler/Freezer Lighting		
9.1.26	LED Cooler/Freezer Lighting	BPL93
9.1.27	LED cooler/Freezer Lighting Controls	BPL94
Miscellaneous		
9.1.28	PSMH/CMH with Electronic Ballasts	BPL75
9.1.29	Controls for H.I.D. Systems	BPL77
9.1.30	LED Exit Signs	BPL78
9.1.31	Permanent Lamp Removal	NA

9.2 HVAC		
	Measure	Code
Seasonal Tune-Ups		
9.2.1	Air Conditioner Tune-Up	BPC21
9.2.2	Gas Boiler Tune-Up	BPH1
9.2.3	Gas Forced-Air Furnace Tune-Up	BPH2

New Cooling Equipment		
9.2.4	AC Systems and Air Source Heat Pumps (Up to 65,000 Btuh; Minimum 14 SEER)	BPC1
9.2.5	AC Systems and Air Source Heat Pumps (Up to 65,000 Btuh; Minimum: 15 SEER)	BPC2 Modified
9.2.6	AC Systems and Air Source Heat Pumps (65,000 through 239,999 Btuh; Minimum 11.5 EER / 11.9 IPLV)	BPC3
9.2.7	AC Systems and Air Source Heat Pumps (65,000 through 239,999 Btuh; Minimum 12 EER / 12.4 IPLV)	BPC4 Modified
9.2.8	AC Systems and Air Source Heat Pumps (240,000 through 759,999 Btuh; Minimum 10.5 EER / 10.9 IPLV)	BPC5
9.2.9	AC Systems and Air Source Heat Pumps(240,000 through 759,999 Btuh; Minimum 10.8 EER / 12.0 IPLV)	BPC6 Modified
9.2.10	AC Systems and Air Source Heat Pumps (760,000 or more Btuh; Minimum 9.7 EER / 11.0 IPLV)	BPC7
9.2.11	AC Systems and Air Source Heat Pumps (760,000 or more Btuh; Minimum 10.2 EER / 11.0 IPLV)	BPC8 Modified
9.2.12	Air-Cooled Chillers	BPC12
New Cooling Equipment		
9.2.13	Room Air Conditioner (ENERGY STAR qualified)	BPC13
9.2.14	Room Air Conditioner (SEHA Tier 1)	BPC14 Modified
9.2.15	PTAC/PTHP	BPC15
New Heating Equipment		
9.2.16	Gas Boiler Replacement (\leq 300 kBtuh input; AFUE 85% minimum	BPH3
9.2.17	Gas Boiler Replacement ($>$ 300 kBtuh input; Thermal Efficiency 90% minimum	BPH4
9.2.18	Gas Furnace Replacement (90% AFUE)	BPH5
9.2.19	Gas Furnace Replacement (92% AFUE)	BPH6
9.2.20	Gas Furnace Replacement (94% AFUE)	BPH7
HVAC Controls		
9.2.21	Variable Frequency Drive on HVAC Motor	BPC20

9.3 LODGING		
	Measure	Code
Lodging (HVAC)		
9.3.1	Guest Room Energy Management (GREM) Controls (PTAC)	BPLD1 NEW
9.3.2	Guest Room Energy Management (GREM) Controls (PTHP)	BPLD2 NEW

9.4 REFRIGERATION		
	Measure	Code
Closers		
9.4.1	Automatic Door Closer for Walk-In Freezer (back access door)	BPR7 Modified
9.4.2	Auto Closer for display case door	BPR13 NEW
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 NEW
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 NEW (Discontinued)
9.4.8	Solid Door Freezer (up to 15 cu ft)	BPR27 NEW
9.4.9	Solid Door Freezer (15-30 cu ft)	BPR28 NEW
9.4.10	Solid Door Freezer (31-50 cu ft)	BPR29 NEW
9.4.11	Solid Door Freezer (51+ cu ft)	BPR30 NEW
9.4.12	Glass Door Freezer (31-50 cu ft)	BPR31 NEW
9.4.13	Glass Door Freezer (51+ cu ft)	BPR32 NEW
9.4.14	Evaporator Fan Controls	BPR6
Vending Machines 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 Modified
9.4.26	EC Motor for Walk-In Freezer	BPR19 NEW
9.4.27	EC Motor for Reach-In Cooler	BPR5 Modified
9.4.28	EC Motor for Reach-In Freezer	BPR18 NEW
Tune-up		
9.4.29	Refrigeration Tune-up	BPR11 NEW

9.5 MOTORS		
MOTORS		
9.5.1	Efficient Motors (ODP and TEFC) - 1-200 hp	
VFD		
9.5.2	Variable Frequency Drives (non-HVAC)	BPM1B

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

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

9.8 AGRICULTURAL EQUIPMENT		
	Measure	Code
Fans		
9.8.1	High Efficiency High Speed Exhaust/ Ventilation Fans (24-35" diameter)	BPA1 NEW
9.8.2	High Efficiency High Speed Exhaust/ Ventilation Fans (36-47" diameter)	BPA2 NEW
9.8.3	High Efficiency High Speed Exhaust/ Ventilation Fans (48-71" diameter)	BPA3 NEW
9.8.4	High Efficiency Circulation Fans (24-35 " diameter)	BPA4 NEW

9.8.5	High Efficiency Circulation Fans (36-47" diameter)	BPA5 NEW
9.8.6	High Efficiency Circulation Fans (48-71" diameter)	BPA6 NEW
9.8.7	High Volume Low Speed (HVLS) Fans	BPA7 NEW
Heater Timers and Waterers		
9.8.8	Equipment Heater Timers	BPA8 NEW
9.8.9	Live Stock Waterer (Electrically heated)	BPA9 NEW
9.8.10	Live Stock Waterer (ground source heated (non-electrical))	BPA10 NEW

9.9 On-line Store		
	Measure	Cdoe
Free CFL offer		
9.9.1	3-pack (15/20/25W)	NA
9.9.2	3-pack (25W)	NA
CFLs		
9.9.3	15W 975 lumens (mini)	NA
9.9.4	15W 1000 lumens	NA
9.9.5	20W 1300 lumens	NA
9.9.6	20W 1400 lumens	NA
9.9.7	25W 1725 lumens	NA
9.9.8	25W1800 lumens (micro max)	NA
9.9.9	30W 2050 lumens	NA
9.9.10	15W flood 750 lumens	NA
9.9.11	23W flood 1300 lumens	NA
9.9.12	14W globe 800 lumens	NA
9.9.13	15 flood (dimmable) 720 lumens	NA
LED Down Lights		
9.9.14	12W 650 lumens (module)	NA
LED Exit Signs		
9.9.15	2W, double sided with battery backup	NA
9.9.16	2.7W exit-sign bulbs	NA
Power Strips		
9.9.17	10 outlet "Smart Strip"	NA
T8 Lamps and Ballasts		
9.9.18	32W, 1-2 lamp configuration	NA
9.9.19	32W, 2-3 lamp configuration	NA
9.9.20	32W, 3-4 lamp configuration	NA
9.9.21	32W T8 lamp 4' (case of 36)	NA
Vending Machine Controls		
9.9.22	Snack Miser (non-refrigerated) – wall mounted	NA
9.9.23	Snack Miser EZ (non-refrigerated) – machine mounted	NA
9.9.24	Vending Miser (refrigerated) – wall mounted	NA
9.9.25	Vending Miser EZ (refrigerated) – machine mounted	NA
Occupancy Sensor		
9.9.26	Wall-switch (PIR, controls 0-800W)	NA

1.0 Introduction

This reference manual provides methods, formulas, and default assumptions for estimating energy savings and peak reduction impacts from measures and projects that receive Standard cash incentives from the Ameren Illinois Business Program. The Custom, Demand Response (E-Smart thermostat), and Retro-Commissioning programs, and Competitive Large Project Incentive program are not addressed in this document.

The reference manual is organized by measure type (as identified in pages 6-9). Each section provides mathematical equations for determining savings (algorithms), as well as default assumptions for all equation parameters that are not based on site-specific information. In addition, any descriptions of calculation methods or baselines are provided, as appropriate. The parameters for calculating savings are listed in the same order for each measure. Algorithms are provided for estimating annual energy and demand impacts. Data assumptions are based on Illinois specific data, where available. Where Illinois data was not available, data from neighboring regions is used where available and in some cases, engineering judgment is used.

Data sources used, in the general order of preference, included, but were not limited to the following:

- AIU Energy Efficiency and Demand Response Plan (dated November 15, 2007)
- AIU Natural Gas Energy Efficiency Plan (dated February 11, 2008)
- 2004-2005 Database for Energy Efficiency Resources (CA DEER database)
- 2007-2008 Database for Energy Efficiency Resources (CA DEER database) Update
- ComEd Program Design Information
- Other EE Program Design Information (e.g. Efficiency Maine, Focus on Energy, etc.)
- GDS/SAIC Staff expertise

A number of programs and incentives were researched and considered for PY3, but were not included, for various reasons. Programs such as green houses, and commercial kitchen measures, such as fryers, convection ovens, dishwashers, etc. were researched but after consideration were not deemed suitable for program-year three. More information about measures not included can be obtained from the Act On Energy technical team.

2.0 Net-to-Gross Savings Calculation

The algorithms shown with each measure calculate gross customer electric savings without counting the effects of line losses from the generator to the customer, free ridership, spillover, or persistence. The algorithms do not distribute the savings among the different costing periods. The formulae for converting gross customer-level savings to net generation-level savings (counting free ridership, spillover and persistence) for the different costing periods are as follows:

$$\text{Net kWh}_i = \Delta \text{kWh} \times (1 + \text{LLF}_i) \times (1 - \text{FR} + \text{SPL}) \times \text{PF} \times \text{AF}_i$$

and

$$\text{Net kW}_j = \Delta \text{kW} \times (1 + \text{LLF}_j) \times (1 - \text{FR} + \text{SPL}) \times \text{PF} \times \text{CF}_j$$

where

NetkWh _i	=	kWh energy savings at generation-level, net of free riders and persistence, and including spillover, for period <i>i</i>
<i>i</i>	=	subscript used to denote variable energy rating periods (Winter Peak, Winter Off-Peak, Summer Peak, Summer Off-Peak)
ΔkWh	=	gross customer annual kWh savings for the measure
LLF _i	=	line loss factor for period <i>i</i>
FR	=	freeridership
SPL	=	spillover for measure
PF	=	persistence factor for measure
AF _i	=	allocation of annual energy savings by season for period <i>i</i>
netkW _j	=	kW demand savings, net of free riders and persistence, and including spillover, for season <i>j</i>
<i>j</i>	=	subscript used to denote variable seasonal peaks (Summer, Winter and Spring/Fall).
ΔkW	=	gross customer connected load kW savings for the measure
LLF _j	=	line loss factor for seasonal peak <i>j</i>
CF _j	=	the percent of kW savings that is concurrent with Illinois seasonal peak, for season <i>j</i>

All of the parameters except line loss factors (LLF), allocation factor (AF), and coincidence factor (CF) for the above equations may be found in the specific section for the measure. AF and CF are summarized in Table 6.0-1.

3.0 Interactive Effects

The TRM provides specific savings algorithms for many prescriptive measures. When a customer installs a prescriptive measure, the savings are determined according to these algorithms. In some cases these algorithms include the effects of interactions with other measures or end uses (e.g., cooling and heating effects from interior lighting waste heat). For “custom” measures, Act On Energy performs site-specific customized calculations. In this case, Act On Energy takes into account interactions between measures (e.g., individual savings from installation of window film and replacement of a chiller are not additive because the first measure reduces the cooling load met by the second measure). Act On Energy will calculate total savings for the package of custom measures being installed, either as a single package or in rank order of measures as described below. If a project includes both prescriptive and custom measures, the prescriptive measures will be calculated in the normal manner. However, the prescriptive measures will be assumed to be installed prior to determining the impacts for the custom measures. Custom interior lighting measures will use the standard prescriptive algorithm to estimate waste heat impacts.

4.0 Persistence

Persistence factors may be used to reduce lifetime measure savings in recognition that initial engineering estimates of annual savings may not persist long term. This might be because a measure is removed or stops functioning prior to the end of its normal engineering lifetime, because it is not properly maintained, it is overridden, it goes out of calibration (controls only), or for some other reason. Each measure algorithm contains an entry for persistence factor. The default value if none is indicated is 1.00 (100%). A value lower than 1.00 will result in a downward adjustment of lifetime savings and total resource benefits. For any measure with a persistence value less than 1.00, the normal measure life ("Engineering Measure Life") will be reduced to arrive at an "Adjusted Measure Life" for the purposes of measure screening, savings, Forward Capacity Market claims, and tracking. The "Adjusted Measure Life" used will be equal to the product of the Engineering Measure Life and the persistence factor. Both the Engineering Measure Life and the Adjusted Measure Life will be shown in each measure algorithm.

5.0 Glossary

The following glossary provides definitions for terms used in this document that are necessary assumptions needed to calculate measure savings.

<u>AIB</u>	“Ameren Illinois Business” database – the database used to record all activity in the Act On Energy business program.
<u>Allocation of Annual Energy Savings by Season (AF):</u>	Allocation factors for defined times of the year that describe when energy savings will be realized for a specific measure. Allocation factors have been developed for four time periods: winter on and off-peak; and summer on and off-peak.
<u>Baseline Efficiency (η_{base}):</u>	The assumed standard efficiency of equipment, absent an Act On Energy program.
<u>Coincidence Factor (CF):</u>	Coincidence factors represent the fraction of connected load expected to be “on” and using electricity coincident with a particular system peak period, on a diversified basis. Coincidence factors are provided for summer and winter peak periods.
<u>Coincident Demand Savings</u>	Same as Demand Savings
<u>Coincident Diversity Factor</u>	The value reflects the fact that the connected load may not be operating at 100% during the peak utility period.
<u>Connected Load:</u>	The maximum wattage of the equipment, under normal operating conditions, when the equipment is “on” (also “Peak Load”).
<u>DEER data</u>	Database for Energy Efficient Resources – developed by the California PUC. www.DEEResources.com/
<u>Demand Interactive Effects</u>	The value reflects the impacts that the energy-efficient upgrade could have on other systems energy demand. For example, a lighting upgrade that reduces the energy demand also reduces the cooling load for a conditioned space. As such, there is a corresponding decrease in the cooling demand. Demand interactive effects factors greater than “1” indicate that there is an additional positive benefit to installation of the efficiency measure.
<u>Demand Savings</u>	Potential change to the peak load by making the upgrade to energy-efficient equipment .
<u>Energy Interactive Effects</u>	The value reflects the impacts that the energy-efficient upgrade could have on other systems energy use. For example, a lighting upgrade that reduces the energy use also reduces the cooling load for a conditioned space. As such, there is a corresponding decrease in the cooling energy use. Energy interactive effects factors greater than “1” indicate that there is an additional positive benefit to installation of the efficiency measure.
<u>Energy Savings</u>	The actual first year energy savings by making the upgrade to energy-

efficient equipment.

Freeridership (FR): A program's **free ridership rate** is the percentage of program participants deemed to be free riders. A **free rider** refers to a customer who received an incentive through an energy efficiency program who would have installed the same or a smaller quantity of the same high efficiency measure on their own within one year if the program had not been offered.

Full Load Hours (FLH): The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW).

High Efficiency (η_{effic}): The efficiency of the energy-saving equipment installed as a result of an efficiency program.

Hours of Operation (HOURS): The annual hours that equipment is expected to operate.

Incremental Cost: The cost difference between the installed cost of the high efficiency measure and the standard efficiency measure.

Installed Cost: High Performance The cost of installing the item as specified, as an energy-efficient option.

Installed Cost: Standard Practice The cost of installing the item as the "standard" non-energy-efficient option. A cost of zero (\$0) indicates that the measure is operating and being replaced by a high performance replacement.

Lifetimes: The number of years (or hours) that the new high efficiency equipment is expected to function. These are generally based on engineering lives, but sometimes adjusted based on expectations about frequency of remodeling or demolition.

Line Loss Factor (LLF): The marginal electricity losses from the generator to the customer meter – expressed as a percent of meter-level savings. The Energy Line Loss Factors vary by period. The Peak Line Loss Factors reflect losses at the time of system peak, and are shown for two seasons of the year (winter and summer). Line loss factors are the same for all measures.

Load Factor (LF): The fraction of full load (wattage) for which the equipment is typically run.

Measure Demand Savings The calculation used to determine the savings for that particular job/measure – including variables such as quantities of units and hours of operation for that business.

Measure Energy Savings The calculation used to determine the savings for that particular job/measure – including variables such as quantities of units and hours of operation for that business.

Non-coincident Demand Savings Demand savings – per the unit specifications – the difference between the baseline and the proposed energy-efficient upgrade (entered as one when this does not apply to the measure)

Persistence Factor (PF): The fraction of gross measure savings obtained over the measure life.

<u>Spillover (SPL):</u>	Spillover refers to energy-efficient equipment installed in any facility in the program service area due to program influences, but without any financial or technical assistance from the Program. It is expressed as a percent or fraction of the gross savings attributable to program participation.
<u>Supplemental Information Collected on the Application</u>	This indicates information collected on the application, in addition to quantities of units. Other pertinent information is also collected from the product specification sheets sent with the application.

6.0 Loadshapes

The following table includes a listing of measure end-uses and associated loadshapes.

Table 6.0-1 Measure End-Uses and Associated Loadshapes

#	End use	Coincidence Factor (CF)		Allocation of Annual Energy Savings by Season (AF)			
		Winter	Summer	Winter		Summer	
				Peak	Off Peak	Peak	Off Peak
1	Commercial Lighting	50%	70%	50%	10%	30%	10%
2	Commercial Motors	100%	100%	50%	10%	30%	10%
3	Commercial HVAC	1.5%	72%	15%	2.5%	60%	17.5%
4	Commercial Refrigeration	100%	0%	33%	37%	12%	18%
5	Commercial Flat	100%	100%	32%	35%	16%	18%

All loadshape numbers referenced in the measure characterizations correspond to the most recent generation of the loadshape as detailed in the loadshape table shown above. The coincidence factors in the standard load profile shown above are based on the listed assumptions for full load hours. To account for the effect on peak savings from a change in full load hours, use of full load hours different than the standard will result in an automatic adjustment of the coincident peak factors (% of connected load kW) used in screening and reported in the database, unless custom coincident peak factors are also entered. The coincidence factors are multiplied by the ratio of [custom full load hours]/[standard full load hours], with a maximum value of 100% for each factor. As a result, coincidence factors for particular measures may be higher or lower than the standard factors listed above even when a standard load profile is used.

8.0 Mapping Strategy

In many instances the DEER database was used as a basis for savings calculations. For those measures that used the DEER information the following strategy was used to map the building types between those in the DEER database and the building types used in the Act On Energy program.

DEER Market Sector	Act On Energy
Education - Primary School	School/College
Education - Secondary School	
Education - Community College	
Education - University	
Grocery	Grocery
Health/Medical - Hospital	Medical
Health/Medical - Nursing Home	
Lodging - Hotel	Hotel/Motel
Lodging - Motel	
Lodging – Guest Room	
Manufacturing - Light Industrial	Manufacturing/Industrial
Office - Large	Office
Office - Small	
Restaurant - Sit-Down	Restaurant
Restaurant - Fast-Food	
Retail - 3-Story Large	Retail/Service
Retail - Single-Story Large	
Retail - Small	
Storage - Conditioned	Warehouse/Distribution
Storage - Unconditioned	
Warehouse - Refrigerated	

9.0 Commercial Measures (Standard Programs)

Section 9 contains the pertinent information for each Standard measure of the Act On Energy Business Program (this does not include information about: Custom, Demand Response (E-Smart Thermostat), the on-line store, Retro Commissioning, or Competitive Large Project Incentive measures).

This section is organized in the following sub-categories:

- 9.1 Lighting
- 9.2 HVAC
- 9.3 Lodging
- 9.4 Refrigeration
- 9.5 Motors
- 9.6 Water Heaters
- 9.7 Commercial Kitchen Equipment
- 9.8 Agricultural Equipment

Within each section the measures are numbered (e.g, 9.1.1 is the first lighting measure) and within each measure there are four tables (numbered 1-4 (e.g., the first table in the second lighting measure is 9.1.2-1)). This numbering format is followed throughout this manual.

General layout for each measure

First page – general measure information

Algorithms used to calculate Demand Savings and Energy Savings

Table 1 “*Energy Factor Assumptions*” by Building Type – Includes:

- Demand Interactive Effects
- Coincident Diversity Factor
- Energy Interactive Effects
- Annual Operating Hours
- Peak kW Savings (per Watt Reduced)
- kWh Savings (per Watt Reduced)

Table 2 “*Specifications and Calculated Non-coincident Demand Savings*” – Includes:

- Configuration (e.g., lists 4-foot and 8-foot lamps, if both are an option)
- Base Unit Type
- Base Unit Wattage
- Base Fixture Wattage
- Retrofit Unit Type
- Retrofit Unit Wattage
- Retrofit Fixture Wattage
- Non-Coincident Demand Savings (kW)

(This table is deleted when the incentive is calculated on a “watts reduced” basis.)

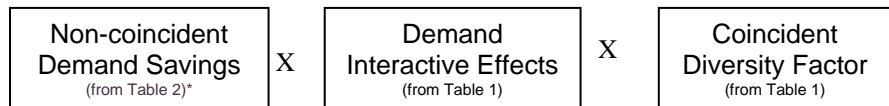
Table 3 “*Calculated Demand and Energy Savings by Type of Business*” – Includes:

- Demand Savings (kW)
- Energy Savings (kWh)

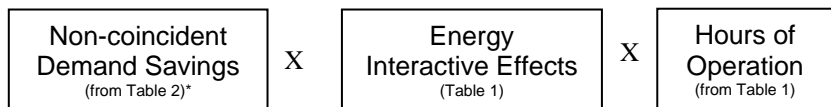
(This table is deleted when the incentive is calculated on a “watts reduced” basis.)

The formulas for Demand Savings and Energy Savings, shown in this table, are included immediately after the table.

Demand Savings Calculation



Energy Savings Calculation



(these calculations are removed for gas measures)

*if the incentive is based on a "watts saved" calculation then the non-coincident demand savings is just $(\text{Watts}_{\text{Base}} - \text{Watts}_{\text{EE}})$

Table 4 "Measure Costs and Incentive Levels" – Includes:

- Installed Cost: High Performance
- Installed Cost: Standard Practice
- Incremental Cost
- Incentive Payment

9.1 Lighting

The following measures are included in the PY3 lighting program

9.1 LIGHTING		
	Measure	Code
Highbay Fixtures		
9.1.1	Highbay Fixture Replacement Option	BPL91
Linear Fluorescent and Occupancy Sensors		
9.1.2	Fluorescent U-bend Relamp and reballast	BPL40 NEW
9.1.3	T12 to T8 (32 watt) Relamp and Reballast	BPL60 Modified
9.1.4	T12 to T8 (low wattage 28 watt) Relamp and reballast	BPL41 NEW
9.1.5	T12 to T8 (ultra low Wattage 25 watt) Relamp and reballast	BPL42 NEW
9.1.6	T8 to T5 Relamp and reballast	BPL44 NEW
9.1.7	New Fluorescent Fixtures	BPL62
9.1.8	T12 to T8 Fluorescent Fixtures with Reflectors	BPL63
9.1.9	T12 to T5 New Fluorescent fixture	BPL43 NEW
9.1.10	Single lamp T5 fluorescent fixture with reflector	BPL45 NEW
9.1.11	High Efficiency Fluorescent Fixtures	BPL64 Modified
9.1.12	Low Glare High Efficiency Recessed Fixtures	BPL65 Modified
9.1.13	Controls for T5 and High Performance T8 Systems	BPL72
9.1.14	Remote Mounted Occupancy Sensors	BPL73
9.1.15	Occupancy Sensors	BPL74
Incandescent Replacements		
9.1.16	CFL Lamps	On-line store
9.1.17	LED Lamps	BPL81
9.1.18	LED Recessed Down Lamps	BPL84
Low Wattage Ceramic Metal Halide (CMH)		
9.1.19	CMH Fixtures: <100 Watts	BPL85 Modified
9.1.20	CMH Fixtures: 100-350 Watts	BPL89 NEW
9.1.21	CMH Integral Ballast Lamps	BPL86
Hard-Wired CFL		
9.1.22	Hard-Wired CFL Fixtures ≤30 Watts	BPL87
9.1.23	Hard-Wired CFL Fixtures >30 Watts	BPL88
Exterior HID (High Intensity Discharge) Fixtures		
9.1.24	Garage Type Fixtures w/ electronic ballast	BPL50 NEW
9.1.25	Canopy Lighting w/ electronic ballasts	BPL51 NEW
LED Cooler/Freezer Lighting		
9.1.26	LED Cooler/Freezer Lighting	BPL93
9.1.27	LED cooler/Freezer Lighting Controls	BPL94
Miscellaneous		
9.1.28	PSMH/CMH with Electronic Ballasts	BPL75
9.1.29	Controls for H.I.D. Systems	BPL77
9.1.30	LED Exit Signs	BPL78
9.1.31	Permanent Lamp Removal	NA

9.1.1 Relamp Highbay Fixture Replacement Option

Measure Code: BPL91

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace HID-type fixtures with T8/T5 fluorescent fixtures with electronic ballasts

Eligibility Criteria for New Energy-Efficient Equipment:

- New T5 or T8 fluorescent fixture with electronic ballasts
- T8 Fluorescent lamps and Ballasts must be listed on the CEE web site (www.cee1.org) – there are no requirements for the T5 lamps and ballasts
- Each unit must have a wattage greater than 125 Watts
- Must be installed in areas with ceiling heights of 16' or greater (if less than 16, call to see if your circumstances would allow this project to be eligible for incentive money)
- Overall fixture efficiency must exceed 80%
- NOTE: replacement of highbay incandescent fixtures with HIF must apply for incentive money through the Act On Energy Custom Program.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹: 15 years

Revision Details: Starting in PY2 (6-1-09) the incentive was reduced from 40 cents per watt reduced, to 25 cents per watt reduced.

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls (REVISED - anything new for PY3?).

Bonus Incentives offered:

11/16/09 through 1/31/10 offered a 10% bonus

10/20/10 Early completion bonus offered – additional 5.5 cents per watt reduced if done by 3/31/11 (and FPW turned in within 30 days of project completion), OR an additional 4.5 cents per watt reduced if project is completed by 4/30/11 (and FPW turned in within 30 days).

Supplemental Information Collected on the Application: None

¹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours	Peak kW Savings Per Watt Reduced	kWh Savings Per Watt Reduced
Office	1.25	0.81	1.17	2,808	0.001	3
School (K-12)	1.23	0.42	1.15	1,873	0.001	2
College/University	1.22	0.68	1.15	3,433	0.001	4
Retail/Service	1.19	0.88	1.11	4,210	0.001	5
Restaurant	1.26	0.68	1.15	5,278	0.001	6
Hotel/Motel	1.14	0.67	1.14	4,941	0.001	6
Medical	1.26	0.74	1.18	6,474	0.001	8
Grocery	1.25	0.81	1.13	5,824	0.001	7
Warehouse	1.09	0.84	1.06	4,160	0.001	4
Light Industry	1.08	0.99	1.04	4,290	0.001	4
Heavy Industry	1.08	0.99	1.04	4,290	0.001	4
Average = Miscellaneous	1.19	0.77	1.12	4,325	0.001	5

Source: DEER database

Demand Savings Calculation (ΔkW_w) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ ((W_{\text{BASE}} - W_{\text{EE}})) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.1-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ (\text{from Table 9.1.1-1}) \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_w) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ ((W_{\text{BASE}} - W_{\text{EE}})) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.1-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ (\text{from Table 9.1.1-1}) \\ \hline \end{array}$$

Table 9.1.1-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost ²	Incentive Payment
Fluorescent highbay system	Per invoice	N/A	\$332 per fixture	\$0.25 per watt reduced

² Used only for TRC calculation purposes

9.1.2 Fluorescent U-bend Relamp and Reballast

Measure Code: BPL40

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Upgrade an existing T12 U-Tube lamps and ballasts

Eligibility Criteria for New Energy-Efficient Equipment:

- Lamps must be T8 U-tube
- 2 lamp fixtures
- Lamps and Ballasts must be listed on the CEE web site (www.cee1.org) (32 watt listed under High Performance, 28 and 25 watt listed under Reduced Wattage)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes³: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

³ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times N_L \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times N_L \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per 2-lamp fixture

N_L = Number of lamps 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 = Energy savings per 2-lamp fixture

Table 9.1.2-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12

Source: DEER database

Table 9.1.2-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
T8 U Tube Lamp 2-lamp, 4 foot	F40T12 / ES	40	89	F32T8 / ES	32	54	0.035

Source: ComEd

Table 9.1.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.035	115
School (K-12)	0.018	75
College/University	0.029	138
Retail/Service	0.037	167
Restaurant	0.030	212
Hotel/Motel	0.027	197
Medical	0.033	361
Grocery	0.035	230
Warehouse	0.032	133
Light Industry	0.037	156
Heavy Industry	0.037	156
Average = Miscellaneous	0.032	176

Demand Savings Calculation (ΔkW_s) =

<div>Non-coincident Demand Savings (from Table 9.1.2-2)</div>	X	<div>Demand Interactive Effects (from Table 9.1.2-1)</div>	X	<div>Coincident Diversity Factor (from Table 9.1.2-1)</div>
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Energy Savings Calculation (ΔkWh_s) =

<div>Non-coincident Demand Savings (from Table 9.1.2-2)</div>	X	<div>Energy Interactive Effects (Table 9.1.2-1)</div>	X	<div>Hours of Operation (from Table 9.1.2-1)</div>
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Table 9.1.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
U-bend relamp and reballast	\$35	\$0 (replacement)	\$35	\$10.00/2-lamp fixture

9.1.3 Relamp and Reballast from T12 to High Performance T8 (32 Watt)

Measure Code: BPL60

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: May 3, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Upgrade an existing T12 lamp/fixture with new T8

Eligibility Criteria for New Energy-Efficient Equipment:

- Lamps must be 32-Watt T8 (or up to 59-watt for 8' lamps)
- "High Performance" lamps and ballasts must be listed on the CEE web site (www.cee1.org) - "Qualifying lamps, 120- and 277-volt ballasts" (high-performance) located at <http://www.cee1.org/com/com-lt/com-lt-main.php3>
- Cannot be combined with purchases from the On-line store

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁴: 11 years

Revision Details: In PY3 (5-3-10) this measure was modified to include only replacement by high-performance (32W) T8 lamps. The replacement by the low-wattage T8 lamps (28w or 25 W) have been split out into their own measures. Also, upgrading T8 to low-wattage T8 lamps is now a custom measure and no longer included with this measure. This measure used to be \$5/lamp, but now that the 32 watt lamps are their own category, this incentive has been reduced to \$3/lamp.

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

⁴ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_s \times N_L \times ISR$$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.3-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Coincident Demand Savings (kW)	Energy Savings (kWh)
4-foot lamps – 1-, 2-, 3-, or 4-lamp HP T8 fixture						
Office	2,808	1.25	0.81	1.17	0.012	40.03
School (K-12)	1,873	1.23	0.42	1.15	0.006	26.24
College/University	3,433	1.22	0.68	1.15	0.010	48.09
Retail/Service	4,306	1.19	0.88	1.11	0.013	58.23
Restaurant	5,278	1.26	0.68	1.15	0.010	73.95
Hotel/Motel	4,941	1.14	0.67	1.14	0.009	68.62
Medical	8,736	1.26	0.74	1.18	0.011	125.59
Grocery	5,824	1.25	0.81	1.13	0.012	80.18
Warehouse	3,597	1.09	0.84	1.06	0.011	46.45
Light Industry	4,290	1.08	0.99	1.04	0.013	54.36
Heavy Industry	4,290	1.08	0.99	1.04	0.013	54.36
Average = Miscellaneous	4,489	1.19	0.77	1.12	0.011	61.25
8-foot lamps – 1-, 2-, 3-, or 4-lamp HP T8 fixture						
Office	2,808	1.25	0.81	1.17	0.016	53.39
School (K-12)	1,873	1.23	0.42	1.15	0.008	34.99
College/University	3,433	1.22	0.68	1.15	0.013	64.14
Retail/Service	4,306	1.19	0.88	1.11	0.017	77.66
Restaurant	5,278	1.26	0.68	1.15	0.014	98.63
Hotel/Motel	4,941	1.14	0.67	1.14	0.012	91.52
Medical	8,736	1.26	0.74	1.18	0.015	167.51
Grocery	5,824	1.25	0.81	1.13	0.016	106.94
Warehouse	3,597	1.09	0.84	1.06	0.015	61.95
Light Industry	4,290	1.08	0.99	1.04	0.017	72.50
Heavy Industry	4,290	1.08	0.99	1.04	0.017	72.50
Average = Miscellaneous	4,489	1.19	0.77	1.12	0.015	81.69

Source: DEER database

Table 9.1.3-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)	Weight Percent-age
Four Foot Lamps								
4-lamp	F40T12 / ES	34	144	F32T8 / ES	28	96	0.012	35%
3-lamp	F40T12 / ES	34	103	F32T8 / ES	28	72	0.010	25%
1-lamp	F40T12 / ES	34	43	F32T8 / ES	28	25	0.018	10%
2-lamp	F40T12 / ES	34	72	F32T8 / ES	28	48	0.012	30%
Weighted Average		----	----	----	----	----	0.012	----
Eight Foot Lamps								
2 lamp	F96T12 / ES	60	132	F96T8	57	100	0.016	75%
1-lamp	F96T12 / ES	60	77	F96T8	57	60	0.017	25%
Weighted Average		----	----	----	----	----	0.016	----

Source: ComEd

Table 9.1.3-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	4-foot Lamp		8-foot Lamp	
Office	0.012	40.03	0.016	53.39
School (K-12)	0.006	26.24	0.008	34.99
College/University	0.010	48.09	0.013	64.14
Retail/Service	0.013	58.23	0.017	77.66
Restaurant	0.010	73.95	0.014	98.63
Hotel/Motel	0.009	68.62	0.012	91.52
Medical	0.011	125.59	0.015	167.51
Grocery	0.012	80.18	0.016	106.94
Warehouse	0.011	46.45	0.015	61.95
Light Industry	0.013	54.36	0.017	72.50
Heavy Industry	0.013	54.36	0.017	72.50
Average = Miscellaneous	0.011	61.25	0.015	81.69

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings <small>(weighted average from Table 9.1.3-2)</small>	X	Demand Interactive Effects <small>(from Table 9.1.3-1)</small>	X	Coincident Diversity Factor <small>(from Table 9.1.3-1)</small>
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings <small>(weighted average from Table 9.1.3-2)</small>	X	Energy Interactive Effects <small>(from Table 9.1.3-1)</small>	X	Hours of Operation <small>(from Table 9.1.3-1)</small>
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Table 9.1.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Four-foot, 1-Lamp Systems	\$28	\$0	\$28	\$3/system
Four-foot, 2-Lamp Systems	\$32	\$0	\$32	\$6/system
Four-foot, 3-Lamp Systems	\$42	\$0	\$42	\$9/system
Four-foot, 4-Lamp Systems	\$47	\$0	\$47	\$12/system
Eight-foot, 4-Lamp Systems	\$47	\$0	\$47	\$12/system
Measure Average	\$39	\$0	\$39	\$3/lamp

9.1.4 T12 to T8 (Low Wattage 28 Watt) Relamp and Reballast

Measure Code: BPL41

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Upgrade an existing T12 lamp/fixture with new reduced wattage T8

Eligibility Criteria for New Energy-Efficient Equipment:

- Lamps must be 28 Watt T8
- "Reduced Wattage" lamps and ballast combinations must be listed on the CEE1.org web site**

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁵: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

⁵ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_L \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_L \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.4-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,210	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,325	1.19	0.77	1.12

Source: DEER database

Table 9.1.4-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)	Weight Percentage
T8 Relamp and Reballast (28W) – four foot								
4-lamp	F40T12 / ES	34	144	F28T8 / ES	28	96	0.012	35%
3-lamp	F40T12 / ES	34	113	F28T8 / ES	28	72	0.014	25%
1-lamp	F40T12 / ES	34	43	F28T8 / ES	28	25	0.018	10%
2-lamp	F40T12 / ES	34	72	F32T8 / ES	28	48	0.012	30%
Weighted Average		----	----	----	----	----	0.013	

Source: ComEd

Table 9.1.4-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.013	43.04
School (K-12)	0.007	28.22
College/University	0.011	51.72
Retail/Service	0.014	61.22
Restaurant	0.011	79.51
Hotel/Motel	0.010	73.79
Medical	0.012	100.08
Grocery	0.013	86.21
Warehouse	0.012	57.77
Light Industry	0.014	58.45
Heavy Industry	0.014	58.45
Average = Miscellaneous	0.012	63.46

Demand Savings Calculation (ΔkW_s) =

<div>Non-coincident Demand Savings (weighted average from Table 9.1.4-2)</div>	X	<div>Demand Interactive Effects (from Table 9.1.4-1)</div>	X	<div>Coincident Diversity Factor (from Table 9.1.4-1)</div>
--	---	--	---	---

Energy Savings Calculation (ΔkWh_s) =

<div>Non-coincident Demand Savings (weighted average from Table 9.1.4-2)</div>	X	<div>Energy Interactive Effects (from Table 9.1.4-1)</div>	X	<div>Hours of Operation (from Table 9.1.4-1)</div>
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Table 9.1.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Four-foot, 1-Lamp Systems	\$28	\$0	\$28	\$5/system
Four-foot, 2-Lamp Systems	\$32	\$0	\$32	\$10/system
Four-foot, 3-Lamp Systems	\$42	\$0	\$42	\$15/system
Four-foot, 4-Lamp Systems	\$47	\$0	\$47	\$20/system

9.1.5 T12 to T8 (Ultra Low Wattage 25 Watts) Relamp and Reballast

Measure Code: BPL42

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Upgrade an existing T12 lamp/fixture with new ultra-low wattage T8"

Eligibility Criteria for New Energy-Efficient Equipment:

- Lamps must be 25 Watt T8 (ultra-low wattage)
- "Reduced Wattage" lamps and ballast combinations must be listed on the CEE1.org web site

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁶: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

⁶ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_L \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_L \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.5-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,210	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,325	1.19	0.77	1.12

Source: DEER database

Table 9.1.5-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)	Weight Percentage
T8 Relamp and Reballast (25W) – four foot								
4-lamp	F40T12 / ES	34	144	F28T8 / ES	25	90	0.014	35%
3-lamp	F40T12 / ES	34	113	F28T8 / ES	25	65	0.016	25%
1-lamp	F40T12 / ES	34	43	F28T8 / ES	25	22	0.021	10%
2-lamp	F40T12 / ES	34	72	F32T8 / ES	25	41	0.016	30%
Weighted Average		----	----	----	----	----	0.016	----

Source: ComEd

Table 9.1.5-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.016	51.91
School (K-12)	0.008	34.03
College/University	0.013	62.38
Retail/Service	0.017	73.83
Restaurant	0.014	95.90
Hotel/Motel	0.012	89.00
Medical	0.015	120.70
Grocery	0.016	103.98
Warehouse	0.014	69.67
Light Industry	0.017	70.49
Heavy Industry	0.017	70.49
Average = Miscellaneous	0.011	76.54

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.5-2)	X	Demand Interactive Effects (from Table 9.1.5-1)	X	Coincident Diversity Factor (from Table 9.1.5-1)
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.5-2)	X	Energy Interactive Effects (from Table 9.1.5-1)	X	Hours of Operation (from Table 9.1.5-1)
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Table 9.1.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Four-foot, 1-Lamp Systems	\$28	\$0	\$28	\$5/system
Four-foot, 2-Lamp Systems	\$32	\$0	\$32	\$10/system
Four-foot, 3-Lamp Systems	\$42	\$0	\$42	\$15/system
Four-foot, 4-Lamp Systems	\$47	\$0	\$47	\$20/system

9.1.6 T8 to T5 Relamp and Reballast

Measure Code: BPL44

Version Date & Revision History:

Draft date: May 3, 2010
Effective date: December 17, 2008
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Upgrade an existing 32watt T8 with T5 system

Eligibility Criteria for New Energy-Efficient Equipment:

- T5 fixtures must use 28 watt T5 lamps (T5HO are not eligible (54 watt)).

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁷: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

⁷ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.6-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,210	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,325	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.6-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(from Table 9.1.6-1)} \end{array}}$$

Energy Savings Calculation (ΔkWh_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.6-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(from Table 9.1.6-1)} \end{array}}$$

Table 9.1.6-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
4 lamp T8 to 3 lamp	\$28	0	\$28	\$0.25/watt

28W T5				reduced
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9.1.7 New Fluorescent Fixtures

Measure Code: BPL62

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace T12 fixture with T5, or high-performance or low-wattage T8 fixture

Eligibility Criteria for New Energy-Efficient Equipment:

- May use 32W T8, 28W T8, 25W T8, 28W T5, or 54W T5 (T5HO) lamps
- Lamps and Ballasts must be listed on the CEE web site (www.cee1.org)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁸: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

⁸ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times N_L \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.7-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,210	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,325	1.19	0.77	1.12

Source: DEER database

Table 9.1.7-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)	Weight Percentage
Four Foot Lamps								
4-lamp	F40T12 / ES	34	144	F32T8 / ES	28	96	0.012	35%
3-lamp	F40T12 / ES	34	103	F32T8 / ES	28	72	0.010	25%
1-lamp	F40T12 / ES	34	43	F32T8 / ES	28	25	0.018	10%
2-lamp	F40T12 / ES	34	72	F32T8 / ES	28	48	0.012	30%
Weighted Average		----	----	----	----	----	0.012	----
Eight Foot Lamps								
2 lamp	F96T12 / ES	60	132	F96T8	57	100	0.016	75%
1-lamp	F96T12 / ES	60	77	F96T8	57	60	0.017	25%
Weighted Average		----	----	----	----	----	0.016	----

Source: ComEd

Table 9.1.7-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	4-foot Lamp		8-foot Lamp	
Office	0.012	40.03	0.016	53.39
School (K-12)	0.006	26.24	0.008	34.99
College/University	0.010	48.09	0.013	64.14
Retail/Service	0.013	58.23	0.017	77.66
Restaurant	0.010	73.95	0.014	98.63
Hotel/Motel	0.009	68.62	0.012	91.52
Medical	0.011	125.59	0.015	167.51
Grocery	0.012	80.18	0.016	106.94
Warehouse	0.011	46.45	0.015	61.95
Light Industry	0.013	54.36	0.017	72.50
Heavy Industry	0.013	54.36	0.017	72.50
Average = Miscellaneous	0.011	61.25	0.015	81.69

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.7-2)	X	Demand Interactive Effects (from Table 9.1.7-1)	X	Coincident Diversity Factor (from Table 9.1.7-1)
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.7-2)	X	Energy Interactive Effects (from Table 9.1.7-1)	X	Hours of Operation (from Table 9.1.7-1)
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Table 9.1.7-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Four-foot, 1-Lamp Systems	\$64	\$0	\$64	\$5/system
Four-foot, 2-Lamp Systems	\$75	\$0	\$75	\$10/system
Four-foot, 3-Lamp Systems	\$84	\$0	\$84	\$15/system
Four-foot, 4-Lamp Systems	\$98	\$0	\$98	\$20/system
Eight-foot, 4-Lamp Systems	\$98	\$0	\$98	\$20/system
Measure Average	\$82	\$0	\$82	\$5/lamp

9.1.8 T12 to T8 Fluorescent Fixtures with Reflectors

Measure Code: BPL63

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace T12 fixture with high-performance or low-wattage T8 fixture, with a reflector

Eligibility Criteria for New Energy-Efficient Equipment:

- May use 32W T8, 28W T8, or 25W T8 lamps
- Lamps and Ballasts must be listed on the CEE web site (www.cee1.org)
- Each unit must include an aluminum/silver or new white integral reflector with a minimum surface reflectivity of 87%

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

Persistence: The persistence factor is assumed to be one.

Lifetimes⁹: 15 years

Revision Details: PY2 allowed T5 or T8 to be installed

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

⁹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times N_L \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.8-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Four-foot lamps, 1-, 2-, 3-, or 4-lamp fixtures, HP T8				
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12
Eight-foot lamps, 1- or 2-lamp fixtures, HP T8				
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12

Table 9.1.8-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)	Weight Percent-age
Four Foot Lamps								
4-lamp	F40T12 / ES	34	144	F32T8 / ES	28	96	0.012	35%
3-lamp	F40T12 / ES	34	103	F32T8 / ES	28	72	0.010	25%
1-lamp	F40T12 / ES	34	43	F32T8 / ES	28	25	0.018	10%
2-lamp	F40T12 / ES	34	72	F32T8 / ES	28	48	0.012	30%
Weighted Average		----	----	----	----	----	0.012	----
Eight Foot Lamps								
2 lamp	F96T12 / ES	60	132	F96T8	57	100	0.016	75%
1-lamp	F96T12 / ES	60	77	F96T8	57	60	0.017	25%
Weighted Average		----	----	----	----	----	0.016	----

Source: ComEd

Table 9.1.8-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)
	4-foot Lamp		8-foot Lamp	
Office	0.012	40.03	0.016	53.39
School (K-12)	0.006	26.24	0.008	34.99
College/University	0.010	48.09	0.013	64.14
Retail/Service	0.013	58.23	0.017	77.66
Restaurant	0.010	73.95	0.014	98.63
Hotel/Motel	0.009	68.62	0.012	91.52
Medical	0.011	125.59	0.015	167.51
Grocery	0.012	80.18	0.016	106.94
Warehouse	0.011	46.45	0.015	61.95
Light Industry	0.013	54.36	0.017	72.50
Heavy Industry	0.013	54.36	0.017	72.50
Average = Miscellaneous	0.011	61.25	0.015	81.69

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.8-2)	X	Demand Interactive Effects (from Table 9.1.8-1)	X	Coincident Diversity Factor (from Table 9.1.8-1)
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings (weighted average from Table 9.1.8-2)	X	Energy Interactive Effects (from Table 9.1.8-1)	X	Hours of Operation (from Table 9.1.8-1)
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Table 9.1.8-4 Typical Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Four-foot, 1-Lamp Systems	\$67	\$0	\$67	\$7/system
Four-foot, 2-Lamp Systems	\$67	\$0	\$67	\$14/system
Four-foot, 3-Lamp Systems	\$81	\$0	\$81	\$21/system
Four-foot, 4-Lamp Systems	\$81	\$0	\$81	\$28/system
Measure Average	\$77	\$0	\$77	\$7/lamp

9.1.9 T12 to T5 New Fluorescent Fixture

Measure Code: BPL43

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace an existing T12 system with T5 high efficiency fixture

Eligibility Criteria for New Energy-Efficient Equipment:

- May use 28W T5, 49W T5 (T5HO), or 54W T5 (T5HO)
- Specular reflector kits are NOT eligible for this incentive (see highbay measure)
- New fixture does not have to have a reflector

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁰: 12 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

¹⁰ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_W \times N_F \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_W \times N_F \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.9-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,210	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,325	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.9-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(from Table 9.1.9-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.9-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(from Table 9.1.9-1)} \\ \hline \end{array}$$

Table 9.1.9-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Replace T12 fixture with T5 fixture	Per invoice	N/A	\$180/fixture	\$0.25/watt reduced

9.1.10 Single Lamp T5 Fluorescent Fixture with Reflector

Measure Code: BPL45

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace an existing HID fixture for aisle lighting in a warehouse/ distribution facility

Eligibility Criteria for New Energy-Efficient Equipment:

- Single lamp T5 fixture with reflector(white or specular)
- May use 28W T5 or 54W T5 (T5HO)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹¹: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls

Bonus Incentives offered: T12 ramp-down bonus (see Appendix B)

Supplemental Information Collected on the Application: None

¹¹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Demand Savings } \Delta kW = \Delta kW_W \times N_F \times \text{ISR}$$

$$\text{Energy Savings } \Delta kWh = \Delta kWh_W \times N_F \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.10-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ (W_{\text{BASE}} - W_{\text{EE}}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(from Table 9.1.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(from Table 9.1.10-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ (W_{\text{BASE}} - W_{\text{EE}}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(from Table 9.1.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(from Table 9.1.10-1)} \\ \hline \end{array}$$

Table 9.1.10-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
T5 Lamp Fixture	\$65	\$0	\$65	\$0.25 per watt

				reduced
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9.1.11 High Efficiency Fluorescent Fixtures

Measure Code: BPL64

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace 3- or 4-lamp T12 recessed or surface mounted troffer (lensed) or parabolic (egg crate) fixture with T5 or high-performance T8 Lamps and ballasts

Eligibility Criteria for New Energy-Efficient Equipment:

- Recessed or surface mounted T5 or high performance T8 troffer or parabolic fixture
- Lamps and Ballasts must be listed on the CEE web site (www.cee1.org)**
- May use 28W T5 or 54W T5 (T5HO)
- Overall fixture efficiency must exceed 83% for prismatic lensed fixtures and 75% for parabolic fixtures

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹²: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

¹² Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.11-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.11-1}) \end{array}} \times \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ (\text{from Table 9.1.11-1}) \end{array}}$$

Energy Savings Calculation (ΔkWh_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.11-1}) \end{array}} \times \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ (\text{from Table 9.1.11-1}) \end{array}}$$

Table 9.1.11-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
HE Fluorescent Fixture	\$120	\$0	\$120	\$0.25 per watt reduced

9.1.12 Low Glare High Efficiency Recessed Fixtures

Measure Code: BPL65

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised May 3, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace 3- or 4-lamp T12 recessed or surface mounted low-glare (semi-indirect) fixture with T5 or high-performance T8 Lamps and ballast

Eligibility Criteria for New Energy-Efficient Equipment:

- Recessed or surface mounted T5 or high performance T8 semi-indirect fixture•
- Lamps and Ballasts must be listed on the CEE web site (www.cee1.org)**
- May use 28W T5 or 54W T5 (T5HO)
- Overall fixture efficiency must exceed 80%
- Must be a new fixture incorporating advanced glare control features (semi-indirect lighting)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹³: 15 years

Revision Details: In PY3 (5-3-10) this measure was modified so the new fixtures going in were not limited to two or three lamp fixtures with one ballast – the new fixture could be any number of lamps. The incentive was also changed from \$20/fixture to \$0.25 per watt reduced.

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

¹³ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_W \times N_F \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_W \times N_F \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.12-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,306	1.19	0.88	1.11
Restaurant	5,278	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	8,736	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	3,597	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,489	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (per watt reduced) =

$$\boxed{\text{Non-coincident Demand Savings } (W_{BASE} - W_{EE})} \times \boxed{\text{Demand Interactive Effects (from Table 9.1.12-1)}} \times \boxed{\text{Coincident Diversity Factor (from Table 9.1.12-1)}}$$

Energy Savings Calculation (per watt reduced) =

$$\boxed{\text{Non-coincident Demand Savings } (W_{BASE} - W_{EE})} \times \boxed{\text{Energy Interactive Effects (from Table 9.1.12-1)}} \times \boxed{\text{Hours of Operation (from Table 9.1.12-1)}}$$

Table 9.1.12-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost*	Incentive Payment
Recessed semi-indirect fluorescent fixture	Per invoice	N/A	\$337	\$0.25 per watt reduced

*low glare, high efficiency recessed fixture

9.1.13 Controls for T5 and High Performance T8 Systems

Measure Code: BPL72

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation – may not replace existing control

Eligibility Criteria for New Energy-Efficient Equipment:

- May be used for Highbay applications
- Controls for HIF Systems
- Occupancy Control (Hi/Lo-HIF) or Daylight Dimming Control (DDS-HIF)
- Incentive may not be combined with other control incentives
- Ballast must be automatically controlled based on occupancy or daylight
- Microprocessor controlled, all digital PIR sensor
- Zero arc point switching to reduce stress on relay
- Multiple output
- Selectable lamp switching
- Supports multiple mounting heights
- Wall, ceiling, or fixture mounted only – cannot be switch plate mounted
- Multiple passive infrared options
- Must control from 125 through 800 watts (over 800 watts is custom)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁴: 10 years

Revision Details: PY2 did not have a limit of 800 watts, only “control a minimum of 125 watts”

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. For high-occupancy buildings (offices, retails, etc) the Time Off is 20% (source: DEER). For low-occupancy buildings (warehouses, etc) the Time Off is 50%. The Annual Operating Hours are taken from DEER's non-CFL Table, except for Guest Rooms operating hours, which have been corrected to 1,145 hrs.

Bonus Incentives offered:

T12 and controls bonus (10%) 11/16/09-1/31/10

Supplemental Information Collected on the Application: Wattage controlled, per control

¹⁴ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times W_{CTRL} \times N_C \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_s \times W_{CTRL} \times N_C \times ISR$

ΔkW = Gross customer connected load kW savings per watt controlled for the measure
 ΔkW_s = Demand savings per watts controlled
 W_{CTRL} = Watts controlled by HIF control
 N_C = Number of controls 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 kWh savings for the measure
 ΔkWh_s = Energy savings per watt controlled

Table 9.1.13-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings*	kWh Savings*
Daylight Sensors and Occupancy Sensors (Hi/Lo)						
Office	2,808	1.25	0.81	1.17	0.0002025	0.66
School (K-12)	1,873	1.23	0.42	1.15	0.0001033	0.43
College/University	3,433	1.22	0.68	1.15	0.0001659	0.79
Retail/Service	4,210	1.19	0.88	1.11	0.0002094	0.93
Restaurant	5,278	1.26	0.68	1.15	0.0001714	1.21
Hotel/Motel	4,941	1.14	0.67	1.14	0.0001528	1.13
Medical	6,474	1.26	0.74	1.18	0.0001865	1.53
Grocery	5,824	1.25	0.81	1.13	0.0002025	1.32
Warehouse	4,160	1.09	0.84	1.06	0.0004578	2.20
Light Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Heavy Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Average = Miscellaneous	4,325	1.19	0.77	1.12	0.0002656	1.33

Source: DEER database

* Per Watt Controlled

Demand Savings Calculation (ΔkW_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(from Table 9.1.13-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(from Table 9.1.13-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(from Table 9.1.13-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(from Table 9.1.13-1)} \\ \hline \end{array}$$

Table 9.1.13-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Occupancy Sensor –	\$50	\$15/control

Hi/Lo		
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9.1.14 Remote Mounted Occupancy Sensors

Measure Code: BPL73

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation – may not replace existing control

Eligibility Criteria for New Energy-Efficient Equipment:

- Wall or ceiling mounted only – cannot be fixture or switch plate mounted
- Must control from 125 through 800 watts (over 800 watts is custom)
- Ultrasonic or Passive Infrared sensor controlling non-highbay fixtures

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁵: 10 years

Revision Details: PY2 did not have a limit of 800 watts, only “control a minimum of 125 watts”

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. For high-occupancy buildings (offices, retail, etc) the Time Off is 20% (source: DEER). For low-occupancy buildings (warehouses, etc) the Time Off is 50%. The Annual Operating Hours are taken from DEER's non-CFL Table, except for Guest Rooms operating hours, which have been corrected to 1,145 hrs.

Bonus Incentives offered:

T12 and controls bonus (10%) 11/16/09-1/31/10

Supplemental Information Collected on the Application: Wattage controlled, per control

¹⁵ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_S \times W_{CTRL} \times N_{OS} \times ISR$$

$$\text{Measure Energy Savings } \Delta kWh = \Delta kWh_S \times W_{CTRL} \times N_{OS} \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings per watts controlled

W_{CTRL} = Watts controlled by HIF control

N_{OS} = Number of occupancy sensors 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 = Energy savings per watts controlled

Table 9.1.14-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings*	kWh Savings*
Office	2,808	1.25	0.81	1.17	0.0002025	0.66
School (K-12)	1,873	1.23	0.42	1.15	0.0001033	0.43
College/University	3,433	1.22	0.68	1.15	0.0001659	0.79
Retail/Service	4,210	1.19	0.88	1.11	0.0002094	0.93
Restaurant	5,278	1.26	0.68	1.15	0.0001714	1.21
Hotel/Motel	4,941	1.14	0.67	1.14	0.0001528	1.13
Medical	6,474	1.26	0.74	1.18	0.0001865	1.53
Grocery	5,824	1.25	0.81	1.13	0.0002025	1.32
Warehouse	4,160	1.09	0.84	1.06	0.0004578	2.20
Light Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Heavy Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Average = Miscellaneous	4,325	1.19	0.77	1.12	0.0002656	1.33

Source: DEER database

* Per Watt Controlled

Demand Savings Calculation (ΔkW_S) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(from Table 9.1.14-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(from Table 9.1.14-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_S) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(from Table 9.1.14-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(from Table 9.1.14-1)} \\ \hline \end{array}$$

Table 9.1.14-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Remote Mounted	\$145	\$25/control

Occupancy Sensor		
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9.1.15 Occupancy Sensors

Measure Code: BPL74

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation – may not replace existing control

Eligibility Criteria for New Energy-Efficient Equipment:

- Manual On/Auto Off Occupancy Sensor OR Auto On/Auto Off Occupancy Sensor
- Must control from 125 through 800 watts (over 800 watts is custom)
- Wall switch plate controls only – cannot be wall, ceiling, or fixture mounted
- Ultrasonic or Passive Infrared sensor controlling non-highbay fixtures
- Socket-based and fixture-mounted occupancy sensors do not qualify
- Cannot be combined with purchases from the On-line store

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁶: 10 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. For high-occupancy buildings (offices, retails, etc) the Time Off is 20% (source: DEER). For low-occupancy buildings (warehouses, etc) the Time Off is 50%. The Annual Operating Hours are taken from DEER's non-CFL Table, except for Guest Rooms operating hours, which have been corrected to 1,145 hrs.

Bonus Incentives offered:

T12 and controls bonus (10%) 11/16/09-1/31/10

Supplemental Information Collected on the Application: Wattage controlled, per control

¹⁶ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times W_{CTRL} \times N_{OS} \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_s \times W_{CTRL} \times N_{OS} \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_s = Demand savings per watts controlled
 W_{CTRL} = Watts controlled by HIF control
 N_{OS} = Number of occupancy sensors 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 = Energy savings per watts controlled

Table 9.1.15-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings*	kWh Savings*
Office	2,808	1.25	0.81	1.17	0.0002025	0.66
School (K-12)	1,873	1.23	0.42	1.15	0.0001033	0.43
College/University	3,433	1.22	0.68	1.15	0.0001659	0.79
Retail/Service	4,210	1.19	0.88	1.11	0.0002094	0.93
Restaurant	5,278	1.26	0.68	1.15	0.0001714	1.21
Hotel/Motel	4,941	1.14	0.67	1.14	0.0001528	1.13
Medical	6,474	1.26	0.74	1.18	0.0001865	1.53
Grocery	5,824	1.25	0.81	1.13	0.0002025	1.32
Warehouse	4,160	1.09	0.84	1.06	0.0004578	2.20
Light Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Heavy Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Average = Miscellaneous	4,325	1.19	0.77	1.12	0.0002656	1.33

Source: DEER database

* Per Watt Controlled

Demand Savings Calculation (ΔkW_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(from Table 9.1.15-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(from Table 9.1.15-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(per watt controlled)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(from Table 9.1.15-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(from Table 9.1.15-1)} \\ \hline \end{array}$$

Table 9.1.15-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
Occupancy	\$50	\$20/control

Sensor		
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9.1.16 CFL Lamps

Measure Code: None

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacement of incandescent, or CFL bulbs (limit 100 per year)

Eligibility Criteria for New Energy-Efficient Equipment:

- Ameren Illinois Utility business customers with an electric delivery service rate of DS-2 ("small businesses") are eligible to use the On-line store at the ActOnEnergy.com web site

Was incentivized in PY1 – then moved to the on-line store only in PY2.

See ActOnEnergy.com (For my business – Small business on-line store) for discounted CFLs.

9.1.17 LED Lamps

Measure Code: BPL81

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace 100W or less incandescent lamps

Eligibility Criteria for New Energy-Efficient Equipment:

- Must have minimum efficacy of 35 lumens per Watt
- Lamps must be listed on the ENERGY STAR website: energystar.gov
- Medium base (Edison or candelabra base only)
- Minimum 18,000 hour rated life

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁷: 8 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

¹⁷ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times N_L \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times N_L \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.17-1 Energy Factor Assumptions

ComEd Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings	kWh Savings
Office	2,616	1.25	0.81	1.17	0.023	68
School (K-12)	1,873	1.23	0.42	1.15	0.012	48
College/University	3,433	1.22	0.68	1.15	0.019	88
Retail/Service	4,117	1.19	0.88	1.11	0.023	102
Restaurant	4,816	1.26	0.68	1.15	0.019	124
Hotel/Motel	4,941	1.14	0.67	1.14	0.017	126
Medical	6,474	1.26	0.74	1.18	0.021	171
Grocery	5,824	1.25	0.81	1.13	0.023	147
Warehouse	4,160	1.09	0.84	1.06	0.020	98
Light Industry	4,290	1.08	0.99	1.04	0.024	100
Heavy Industry	4,290	1.08	0.99	1.04	0.024	100
Average = Miscellaneous	4,257	1.19	0.77	1.12	0.020	106

Source: DEER database

Table 9.1.17-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
LED Lamp	Incandescent	28	n/a	LED	6	n/a	0.022

Source: ComEd

Demand Savings Calculation (ΔkW_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.17-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.17-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(from Table 9.1.17-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.17-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.17-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(from Table 9.1.17-1)} \\ \hline \end{array}$$

Table 9.1.17-3 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
LED lamp	\$20	0	\$20	\$10/lamp

9.1.18 LED Recessed Down Lamps

Measure Code: BPL84

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace 60-100W incandescent lamps

Eligibility Criteria for New Energy-Efficient Equipment:

- LED recessed downlight ≤ 18 Watts
- Lamps must be listed on the ENERGY STAR website: energystar.gov
- Minimum luminaire efficiency of 35 lumens/Watt
- Cannot be combined with purchases from the On-line store

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁸: 16 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

¹⁸ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_S \times N_L \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.18-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,616	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,117	1.19	0.88	1.11
Restaurant	4,816	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,257	1.19	0.77	1.12

Source: DEER database

Table 9.1.18-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Lamp Wattage (watts)	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Lamp Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
LED Recessed Down Lamp	Incandescent	75	75	LED	12	12	0.063

Demand Savings Calculation (ΔkW_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.18-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.18-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(from Table 9.1.18-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_s) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.18-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.18-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(from Table 9.1.18-1)} \\ \hline \end{array}$$

Table 9.1.18-3 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
LED Recessed Down Lamp	\$100	n/a	\$100	\$10/fixture

9.1.19 CMH Fixtures <100 Watts

Measure Code: BPL85

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised May 3, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace incandescent fixtures less than 100 watts

Eligibility Criteria for New Energy-Efficient Equipment:

- Permanently-wired fixtures
- Containing FUL or cUL listed CMH lamps and ballast

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

Persistence: The persistence factor is assumed to be one.

Lifetimes¹⁹: 12 years

Revision Details: In PY3 (5-3-10) this was split into two measures – it used to include the CMH fixtures that are 100-350 watts too – that is now its own measure (BPL89)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

¹⁹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Saving} \quad \Delta kW = \Delta kW_W \times N_F \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_W \times N_F \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.19-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,616	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,117	1.19	0.88	1.11
Restaurant	4,816	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,257	1.19	0.77	1.12

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ (\text{from Table 9.1.19-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ (\text{from Table 9.1.19-1}) \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ (\text{from Table 9.1.19-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ (\text{from Table 9.1.19-1}) \\ \hline \end{array}$$

Table 9.1.19-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
CMH fixture < 100 watts	\$221	n/a	\$221	\$20/fixture

9.1.20 CMH Fixtures: 100-350 Watts

Measure Code: BPL89

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace incandescent fixtures 100-350 watts

Eligibility Criteria for New Energy-Efficient Equipment:

- Permanently-wired fixtures
- Containing FUL or cUL listed CMH lamps and ballast

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁰: 12 years

Revision Details: In PY3 (5-3-10) this was split into two measures – it used to include the CMH fixtures that are 100-350 watts too – that is now its own measure (BPL89)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²⁰ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.20-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,616	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,117	1.19	0.88	1.11
Restaurant	4,816	1.26	0.68	1.15
Hotel/Motel	4,941	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,257	1.19	0.77	1.12

Demand Savings Calculation (ΔkW_W) =

$$\left(\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array} \right) \times \left(\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.20-1}) \end{array} \right) \times \left(\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ (\text{from Table 9.1.20-1}) \end{array} \right)$$

Energy Savings Calculation (ΔkWh_W) =

$$\left(\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array} \right) \times \left(\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.20-1}) \end{array} \right) \times \left(\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ (\text{from Table 9.1.20-1}) \end{array} \right)$$

Table 9.1.20-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
CMH fixture 100 <	\$221	\$0	\$221	\$35/fixture

fixture < 350 watts				
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9.1.21 CMH Integral Ballast Lamps

Measure Code: BPL86

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace existing 70-100W incandescent or flood lamps

Eligibility Criteria for New Energy-Efficient Equipment:

- CMH lamps \leq 25W
- CMH lamps must be UL or cUL listed
- Requires reflector lamp and integrated ballast
- Minimum 10,500 hour rated life

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²¹: 5 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²¹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times N_L \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times N_L \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Demand savings per lamp

N_L = Number of lamps 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 = Energy savings per lamp

Table 9.1.21-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,808	1.00	1.00	1.00
School (K-12)	1,873	1.00	1.00	1.00
College/University	3,433	1.00	1.00	1.00
Retail/Service	4,210	1.00	1.00	1.00
Restaurant	5,278	1.00	1.00	1.00
Hotel/Motel	4,941	1.00	1.00	1.00
Medical	6,474	1.00	1.00	1.00
Grocery	5,824	1.00	1.00	1.00
Warehouse	4,160	1.00	1.00	1.00
Light Industry	4,290	1.00	1.00	1.00
Heavy Industry	4,290	1.00	1.00	1.00
Average = Miscellaneous	4,325	1.00	1.00	1.00

Table 9.1.21-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
CMH Integral Ballast Lamps	Incandescent	80	CMH	35	0.045

Table 9.1.21-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.045	126
School (K-12)	0.045	84
College/University	0.045	154
Retail/Service	0.045	189
Restaurant	0.045	238
Hotel/Motel	0.045	222
Medical	0.045	291
Grocery	0.045	262
Warehouse	0.045	187
Light Industry	0.045	193
Heavy Industry	0.045	193
Average = Miscellaneous	0.045	195

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings (from Table 9.1.21-2)	X	Demand Interactive Effects (from Table 9.1.21-1)	X	Coincident Diversity Factor (from Table 9.1.21-1)
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings (from Table 9.1.21-2)	X	Energy Interactive Effects (from Table 9.1.21-1)	X	Hours of Operation (from Table 9.1.21-1)
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Table 9.1.21-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
CMH Integral Ballast Lamps	\$20	n/a	\$20	\$5/lamp

9.1.22 Hard-wired CFL Fixtures \leq 30 Watts

Measure Code: BPL87

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace incandescent with permanently-wired CFL

Eligibility Criteria for New Energy-Efficient Equipment:

- Permanently-wired fixtures with Electronic Ballast
- Up to or equal to 30 Watts

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²²: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²² Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_F \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_F \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings

N_F = Number of fixtures 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 = Energy savings

Table 9.1.22-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,616	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,117	1.19	0.88	1.11
Restaurant	4,816	1.26	0.68	1.15
Hotel/Motel	6,206	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,372	1.19	0.77	1.12

Source: DEER database

Table 9.1.22-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Hard-wired CFL Fixtures < 30 watts	Incandescent	77	CFL	20	0.057

Table 9.1.22-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.058	175
School (K-12)	0.030	123
College/University	0.047	225
Retail/Service	0.060	261
Restaurant	0.049	316
Hotel/Motel	0.044	404
Medical	0.053	436
Grocery	0.058	376
Warehouse	0.052	252
Light Industry	0.061	255
Heavy Industry	0.061	255
Average = Miscellaneous	0.052	280

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings (from Table 9.1.22-2)	X	Demand Interactive Effects (from Table 9.1.22-1)	X	Coincident Diversity Factor (from Table 9.1.22-1)
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings (from Table 9.1.22-2)	X	Energy Interactive Effects (from Table 9.1.22-1)	X	Hours of Operation (from Table 9.1.22-1)
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Table 9.1.22-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Hard-wired CFL Fixtures < 30 watts	\$46	n/a	\$46	\$25/fixture

9.1.23 Hard-wired CFL Fixtures > 30 Watts

Measure Code: BPL88

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace incandescent with permanently-wired CFL

Eligibility Criteria for New Energy-Efficient Equipment:

- Permanently-wired fixtures Electronic Ballast
- More than 30 Watts

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²³: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²³ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

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 = Demand savings

N_F = Number of fixtures 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 = Energy savings

Table 9.1.23-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	2,616	1.25	0.81	1.17
School (K-12)	1,873	1.23	0.42	1.15
College/University	3,433	1.22	0.68	1.15
Retail/Service	4,117	1.19	0.88	1.11
Restaurant	4,816	1.26	0.68	1.15
Hotel/Motel	6,206	1.14	0.67	1.14
Medical	6,474	1.26	0.74	1.18
Grocery	5,824	1.25	0.81	1.13
Warehouse	4,160	1.09	0.84	1.06
Light Industry	4,290	1.08	0.99	1.04
Heavy Industry	4,290	1.08	0.99	1.04
Average = Miscellaneous	4,372	1.19	0.77	1.12

Source: DEER database

Table 9.1.23-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
Hard-wired CFL Fixtures > 30 watts	Incandescent	160	CFL	47	0.113

Table 9.1.23-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.114	344
School (K-12)	0.058	242
College/University	0.093	444
Retail/Service	0.118	514
Restaurant	0.096	623
Hotel/Motel	0.086	796
Medical	0.105	859
Grocery	0.114	740
Warehouse	0.103	496
Light Industry	0.120	502
Heavy Industry	0.120	502
Average = Miscellaneous	0.103	551

Demand Savings Calculation (ΔkW_s) =

Non-coincident Demand Savings <small>(from Table 9.1.23-2)</small>	X	Demand Interactive Effects <small>(from Table 9.1.23-1)</small>	X	Coincident Diversity Factor <small>(from Table 9.1.23-1)</small>
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Energy Savings Calculation (ΔkWh_s) =

Non-coincident Demand Savings <small>(from Table 9.1.23-2)</small>	X	Energy Interactive Effects <small>(from Table 9.1.23-1)</small>	X	Hours of Operation <small>(from Table 9.1.23-1)</small>
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Table 9.1.23-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Hard-wired CFL Fixture > 30 watts	\$100	n/a	\$100	\$35/fixture

9.1.24 Garage Type Fixtures w/Electronic Ballasts

Measure Code: BPL50

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacement of HID fixtures such as mercury vapor, high pressure sodium, and metal halide

Eligibility Criteria for New Energy-Efficient Equipment:

- Must have electronic ballast.
- Fixtures must be controlled by exterior photocell or time clock to qualify.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁴: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Hours of operation (dusk to dawn, or other (specify)

²⁴ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.24-1 Energy Factor Assumptions

Building Types	Operating Hours*	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	4380	1.0	0.0	1.0
School (K-12)	4380	1.0	0.0	1.0
College/University	4380	1.0	0.0	1.0
Retail/Service	4380	1.0	0.0	1.0
Restaurant	4380	1.0	0.0	1.0
Hotel/Motel	4380	1.0	0.0	1.0
Medical	4380	1.0	0.0	1.0
Grocery	4380	1.0	0.0	1.0
Warehouse	4380	1.0	0.0	1.0
Light Industry	4380	1.0	0.0	1.0
Heavy Industry	4380	1.0	0.0	1.0
Average = Miscellaneous	4380	1.0	0.0	1.0

* Dusk-down controls required so annual operating hours are 8760/2 or 4380 annual hours.

Demand Savings Calculation (ΔkW_W) =

Non-coincident Demand Savings <small>($W_{BASE} - W_{EE}$)</small>	X	Demand Interactive Effects <small>(from Table 9.1.24-1)</small>	X	Coincident Diversity Factor <small>(from Table 9.1.24-1)</small>
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Energy Savings Calculation (ΔkWh_W) =

Non-coincident Demand Savings <small>($W_{BASE} - W_{EE}$)</small>	X	Energy Interactive Effects <small>(from Table 9.1.24-1)</small>	X	Hours of Operation <small>(from Table 9.1.24-1)</small>
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Table 9.1.24-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Retrofit HID Kit	\$200	\$0	\$200.00	\$0.25 watt reduced
New HID Fixture with Pulse Start and Electronic ballast	\$300	\$0	\$300.00	\$0.25 watt reduced

9.1.25 Canopy Lighting w/Electronic Ballasts

Measure Code: BPL51

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacement of HID fixtures such as mercury vapor, high pressure sodium, and metal halide
- Must be mounted under a canopy

Eligibility Criteria for New Energy-Efficient Equipment:

- Must have electronic ballast
- Fixtures must be controlled by exterior photocell or time clock to qualify

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁵: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Hours of operation (dusk to dawn, or other (specify)

²⁵ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.25-1 Energy Factor Assumptions

Building Types	Operating Hours*	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Office	4380	1.0	0	1.0
School (K-12)	4380	1.0	0.0	1.0
College/University	4380	1.0	0.0	1.0
Retail/Service	4380	1.0	0.0	1.0
Restaurant	4380	1.0	0.0	1.0
Hotel/Motel	4380	1.0	0.0	1.0
Medical	4380	1.0	0.0	1.0
Grocery	4380	1.0	0.0	1.0
Warehouse	4380	1.0	0.0	1.0
Light Industry	4380	1.0	0.0	1.0
Heavy Industry	4380	1.0	0.0	1.0
Average = Miscellaneous	4380	1.0	0.0	1.0

* Dusk-down controls required so annual operating hours are 8760/2 or 4380 annual hours.

Demand Savings Calculation (ΔkW_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.25-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ (\text{from Table 9.1.25-1}) \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_W) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.25-1}) \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ (\text{from Table 9.1.25-1}) \\ \hline \end{array}$$

Table 9.1.25-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Retrofit HID Kit	\$200	\$0	\$200.00	\$0.25 watt reduced
New HID Fixture with Pulse Start and Electronic ballast	\$300	\$0	\$300.00	\$0.25 watt reduced

9.1.26 LED Cooler/Freezer Lighting

Measure Code: BPL93

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Refrigerated case lighting, replacing T-8, T-10, and or T-12 fluorescent lamps with LED lighting

Eligibility Criteria for New Energy-Efficient Equipment:

- 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)
- Qualifying LED lighting system must replace existing five-foot equivalent fluorescent lighting in existing low-temperature or medium- temperature display cases. Minimum wattage requirement for these sources is 18 watts. The product must be tested to IES LM79 and IES LM80 by a third party DOE accredited lab and carry a warranty on the light source and power supplies for 3 years or more. The LED luminaires must have a minimum efficacy of 35 lumens per watt and have a CRI of 75 or above.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁶: 11 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 9-10-09 Light Calcs, PECL LED Case Lighting With and Without Motion Sensors presentation dated 1-5-10, and EVALUATION OF FLUORESCENT, LED, AND FIBER OPTIC LIGHTING SYSTEMS IN LOW TEMPERATURE REACH-IN FREEZER DISPLAY CASES, Refrigeration & Thermal Test Center Design & Engineering Services, Southern California Edison, 12-4-07, and New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, dated 10-15-10.

Bonus Incentives offered:

T12 bonus (10%) 11/16/09-1/31/10
T12 Ramp down bonus (15%) 6/15/10-12/31/10
T12 Ramp down bonus (10%) 1/1/11-TBD (5/31/11?)

Supplemental Information Collected on the Application: None

²⁶ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_D \times N_D \times \text{ISR} \times (1 + \text{CF}/\text{CEF})$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_D \times N_D \times \text{ICR} \times (1 + \text{CF}/\text{CEF})$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_D = Demand Savings per unit

N_D = Number of doors with associated fixtures 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_D = Energy Savings per unit

h = Annual operating hours

CF/CEF = Compressor Factor /Commercial Efficiency Factor (Is equal to 0.45. Figure is arrived at by blending the figure of 0.45 for compressors and the figure of 0.45 for commercial units, estimating each represents 50% of the units encountered. The compressor factor is arrived at by blending the figure of 0.40 for refrigerators and coolers, and the figure of 0.51 for freezers.

[The factors are based on effective refrigeration compressor EER values of 6.7 (1.8 kW/ton) and 5.25 Btu/Wh (2.3 kW/ton), respectively, and the assumption that 20% of the case lighting load is not converted into a case cooling load.

Compressor Factor = $0.28 \text{ ton/kW} \times 1.8 \text{ kW/ton} \times 0.8 = 0.40$ for refrigerators and coolers, and $0.28 \text{ ton/kW} \times 2.3 \text{ kW/ton} \times 0.8 = 0.51$ for freezers

The commercial efficiency factor figure is arrived at by blending the figure of 0.41 for refrigerators and coolers, and the figure of 0.52 for freezers. [The factors are based on starting values of 0.51 for refrigerators and coolers and 0.65 for freezers, respectively, and the assumption that 20% of the case lighting load is not converted into a case cooling load. Commercial Efficiency Factor = $0.51 \times 0.8 = 0.41$ for refrigerators and coolers, and $0.65 \times 0.8 = 0.52$ for freezers

Table 9.1.26-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	5,824	1.0	1.0	1.0

Source: DEER database

Table 9.1.26-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Fixture Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
LED Cooler/freezer Lighting (per door)	81.0	42	0.039

(watts are per door)

Table 9.1.26-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery (per door)	0.057	329.6

Demand Savings Calculation (ΔkW_D) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.1.26-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.1.26-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.1.26-1)} \end{array}$$

Energy Savings Calculation (ΔkWh_D) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.1.26-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.1.26-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.1.26-1)} \end{array}$$

Table 9.1.26-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
LED Refrigerated Display Case Lighting	\$300/system	\$25/door

9.1.27 LED Cooler/Freezer Lighting Controls

Measure Code: BPL94

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation or replacement of failed control

Eligibility Criteria for New Energy-Efficient Equipment:

- 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)
- Wall, ceiling, or case- mounted controls
- Must control at least 80 watts

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁷: 11 years

Revision Details: (None)

Referenced Documents:

PECI LED Case Lighting With and Without Motion Sensors presentation dated 1-5-10, and EVALUATION OF FLUORESCENT, LED, AND FIBER OPTIC LIGHTING SYSTEMS IN LOW TEMPERATURE REACH-IN FREEZER DISPLAY CASES, Refrigeration & Thermal Test Center Design & Engineering Services, Southern California Edison, 12-4-07, and New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, dated 10-15-10. Still waiting on report from SCE Refrigeration Technology Center. Will keep checking with them to get report once it is complete.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²⁷ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_{CTRL} \times N_{CTRL} \times ISR \times (1+CF/CEF) = 0$

Measure Energy Savings $\Delta kWh = \Delta kWh_{CTRL} \times N_{CTRL} \times ICR \times (1+CF/CEF) \times SFPHC$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_{CTRL} = Demand Savings per unit

W_{CTRL} = Watts controlled by installing control unit, found in table below

N_{CTRL} = Number of controls 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%

$SFPHC$ = Sensor full-power hours coefficient. For LED lights, it is expected the sensors will turn off the lights 30% of the time. The factor is then 0.3

ΔkWh = Gross customer annual kWh savings for the measure

ΔkWh_{CTRL} = Energy Savings per unit

CF/CEF = Compressor Factor /Commercial Efficiency Factor (Is equal to 0.45)

Figure is arrived at by bending the figure of 0.45 for compressors and the figure of 0.45 for commercial units, estimating each represents 50% of the units encountered. The compressor factor is arrived at by blending the figure of 0.40 for refrigerators and coolers, and the figure of 0.51 for freezers.

[The factors are based on effective refrigeration compressor EER values of 6.7 (1.8 kW/ton) and 5.25 Btu/Wh (2.3 kW/ton), respectively, and the assumption that 20% of the case lighting load is not converted into a case cooling load. Compressor Factor = $0.28 \text{ ton/kW} \times 1.8 \text{ kW/ton} \times 0.8 = 0.40$ for refrigerators and coolers, and $0.28 \text{ ton/kW} \times 2.3 \text{ kW/ton} \times 0.8 = 0.51$ for freezers. The commercial efficiency factor figure is arrived at by blending the figure of 0.41 for refrigerators and coolers, and the figure of 0.52 for freezers.

[The factors are based on starting values of 0.51 for refrigerators and coolers and 0.65 for freezers, respectively, and the assumption that 20% of the case lighting load is not converted into a case cooling load. Commercial Efficiency Factor = $0.51 \times 0.8 = 0.41$ for refrigerators and coolers, and $0.65 \times 0.8 = 0.52$ for freezers

Table 9.1.27-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects
Grocery	0	1.0	0.0	1.0

Table 9.1.27-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Watts Controlled (per door)	Non-Coincident Demand Savings (kW)
LED Cooler/Freezer Lighting Controls	42	0.057

Table 9.1.27-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0	106.4

Demand Savings Calculation (ΔkW_{CTRL}) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.1.27-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.1.27-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.1.27-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_{CTRL}) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.1.27-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.1.27-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.1.27-1)} \\ \hline \end{array}$$

Table 9.1.27-4 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Incremental Cost	Incentive Payment
LED Refrigerated Case Lighting Controls	\$300/system	\$12/sensor

9.1.28 PSMH/CMH with Electronic Ballasts

Measure Code: BPL75

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacement of 400W HID with 320/350W PSMH/CMH lamps and electronic ballast

Eligibility Criteria for New Energy-Efficient Equipment:

- 320/350W Pulse-Start Metal-Halide (PSMH) or Ceramic Metal-Halide (CMH) lamps and electronic ballast

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁸: 16 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Light Calcs – FINAL ComEd.xls.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

²⁸ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_W \times N_F \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_W \times N_F \times ISR$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_W = Demand Savings per fixture
 W_{BASE} = Baseline connected kW from current fixture
 W_{EE} = Energy efficient connected kW from proposed fixture
 N_F = Number of fixtures 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_W = Energy Savings per fixture

Table 9.1.28-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects		
Office	2,616	1.25	0.81	1.17		
School (K-12)	1,873	1.23	0.42	1.15		
College/University	3,433	1.22	0.68	1.15		
Retail/Service	4,117	1.19	0.88	1.11		
Restaurant	4,816	1.26	0.68	1.15		
Hotel/Motel	6,206	1.14	0.67	1.14		
Medical	6,474	1.26	0.74	1.18		
Grocery	5,824	1.25	0.81	1.13		
Warehouse	4,160	1.09	0.84	1.06		
Light Industry	4,290	1.08	0.99	1.04		
Heavy Industry	4,290	1.08	0.99	1.04		
Average = Miscellaneous	4,372	1.19	0.77	1.12		

Source: DEER database

Demand Savings Calculation (ΔkW_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.28-1}) \end{array}} \times \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ (\text{from Table 9.1.28-1}) \end{array}}$$

Energy Savings Calculation (ΔkWh_W) =

$$\boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ (W_{BASE} - W_{EE}) \end{array}} \times \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ (\text{from Table 9.1.28-1}) \end{array}} \times \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ (\text{from Table 9.1.28-1}) \end{array}}$$

Table 9.1.28-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
PSMH and/or CMH lamps (250 watt)	\$206	n/a	\$206	\$40/fixture

and 320 watt)				
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9.1.29 Controls for H.I.D. Systems

Measure Code: BPL77

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- May replace existing control, or new installation

Eligibility Criteria for New Energy-Efficient Equipment:

- Fixture mounted only – cannot be wall, ceiling, or switch plate mounted
- Controls for occupancy based high-low-control (Hi/Lo-HIF) or Daylight control (DDS-HIF)
- Ballast must be automatically controlled based on occupancy or daylight
- Must provide for continuous dimming or stepped dimming of at least 50%
- Integrated HID control module and passive infrared occupancy sensor
- Must control from 125 through 800 watts (over 800 watts is custom)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes²⁹: 10 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. For high-occupancy buildings (offices, retails, etc.) the Time Off is 20% (source: DEER). For low-occupancy buildings (warehouses, etc) the Time Off is 50%. The Annual Operating Hours are taken from DEER's non-CFL Table, except for Guest Rooms operating hours, which have been corrected to 1,145 hrs.

Bonus Incentives offered:

T12 and controls bonus (10%) 11/16/09-1/31/10

Supplemental Information Collected on the Application: Wattage controlled, per control

²⁹ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_S \times W_{CTRL} \times N_C \times ISR$$

$$\text{Measure Energy Savings } \Delta kWh = \Delta kWh_S \times W_{CTRL} \times N_C \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure
 ΔkW_S = Demand savings per watts controlled
 W_{CTRL} = Watts controlled by HIF control
 N_C = Number of controls 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 = Energy savings per watts controlled

Table 9.1.29-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings*	kWh Savings*
Daylight Sensor, Occupancy Sensor (Hi/Lo)						
Office	2,808	1.25	0.81	1.17	0.0002025	0.66
School (K-12)	1,873	1.23	0.42	1.15	0.0001033	0.43
College/University	3,433	1.22	0.68	1.15	0.0001659	0.79
Retail/Service	4,210	1.19	0.88	1.11	0.0002094	0.93
Restaurant	5,278	1.26	0.68	1.15	0.0001714	1.21
Hotel/Motel	4,941	1.14	0.67	1.14	0.0001528	1.13
Medical	6,474	1.26	0.74	1.18	0.0001865	1.53
Grocery	5,824	1.25	0.81	1.13	0.0002025	1.32
Warehouse	4,160	1.09	0.84	1.06	0.0004578	2.20
Light Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Heavy Industry	4,290	1.08	0.99	1.04	0.0005346	2.23
Average = Miscellaneous	4,325	1.19	0.77	1.12	0.0002656	1.33

Source: DEER database

* Per Watt Controlled

Demand Savings Calculation (ΔkW_S) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(Watts controlled – per the application)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(from Table 9.1.29-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(from Table 9.1.29-1)} \\ \hline \end{array}$$

Energy Savings Calculation (ΔkWh_S) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(Watts controlled – per the application)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(from Table 9.1.29-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(from Table 9.1.29-1)} \\ \hline \end{array}$$

Table 9.1.29-2 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
Controls for H.I.D.	\$165	n/a	\$165	\$40/control

Systems				
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9.1.30 LED Exit Signs

Measure Code: BPL78

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Retrofit of existing incandescent or fluorescent fixture only

Eligibility Criteria for New Energy-Efficient Equipment:

- LED, T-1 or Electroluminescent Exit Signs
- Signs may be one or two-sided
- Cannot be combined with purchases from the On-line store

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

Persistence: The persistence factor is assumed to be one.

Lifetimes³⁰: 15 years

Revision Details: (None)

Referenced Documents: The incremental costs are from the GDS Model Ameren IL Lighting dated 6-9-08. Coincident Diversity Factors, Demand Interactive Effects and Energy Interactive Effects are taken from DEER database.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

³⁰ Measure Life Study prepared for The Massachusetts Joint Utilities by ERS. November 17, 2005.

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_F \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_F \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Demand savings

N_F = Number of fixtures 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 = Energy savings

Table 9.1.30-1 Energy Factor Assumptions

Building Types	Annual Operating Hours	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings	kWh Savings
Office	8,760	1.18	1.00	1.11	0.041	342
School (K-12)	8,760	1.18	1.00	1.11	0.041	342
College/University	8,760	1.18	1.00	1.11	0.041	342
Retail/Service	8,760	1.18	1.00	1.11	0.041	342
Restaurant	8,760	1.18	1.00	1.11	0.041	342
Hotel/Motel	8,760	1.18	1.00	1.11	0.041	342
Medical	8,760	1.18	1.00	1.11	0.041	342
Grocery	8,760	1.18	1.00	1.11	0.041	342
Warehouse	8,760	1.18	1.00	1.11	0.041	342
Light Industry	8,760	1.18	1.00	1.11	0.041	342
Heavy Industry	8,760	1.18	1.00	1.11	0.041	342
Average = Miscellaneous	8,760	1.18	1.00	1.11	0.041	342

Source: DEER database

Table 9.1.30-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Base Lamp Type	Base Fixture Wattage (watts)	Retrofit Lamp Type	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
LED Exit Sign	Incandescent	40	LED	5	0.035

Demand Savings Calculation (per lamp) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.30-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.30-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(from Table 9.1.30-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per lamp) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(from Table 9.1.30-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(from Table 9.1.30-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(from Table 9.1.30-1)} \\ \hline \end{array}$$

Table 9.1.30-3 Measure Costs (Parts and Labor) and Incentive Levels

Fixture Technology	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
LED Exit Sign	\$35	n/a	\$35	\$20/sign

9.1.31 Permanent Lamp Removal

Measure Code: None

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised PY2
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Removal of linear fluorescent lamps

Eligibility Criteria for New Energy-Efficient Equipment:

- A minimum of 100,000 kWh reduced per year is required to be eligible for this Custom incentive

Revision Details: Was split out into its own measure and included in the Custom Application in PY2.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

9.2 HVAC Systems

The following measures are included in the PY3 HVAC program.

9.2 HVAC		
	Measure	Code
Seasonal Tune-Ups		
9.2.1	Air Conditioner Tune-Up	BPC21
9.2.2	Gas Boiler Tune-Up	BPH1
9.2.3	Gas Forced-Air Furnace Tune-Up	BPH2
New Cooling Equipment		
9.2.4	AC Systems and Air Source Heat Pumps (Up to 65,000 Btuh; Minimum 14 SEER)	BPC1
9.2.5	AC Systems and Air Source Heat Pumps (Up to 65,000 Btuh; Minimum: 15 SEER)	BPC2 Modified
9.2.6	AC Systems and Air Source Heat Pumps (65,000 through 239,999 Btuh; Minimum 11.5 EER / 11.9 IPLV)	BPC3
9.2.7	AC Systems and Air Source Heat Pumps (65,000 through 239,999 Btuh; Minimum 12 EER / 12.4 IPLV)	BPC4 Modified
9.2.8	AC Systems and Air Source Heat Pumps (240,000 through 759,999 Btuh; Minimum 10.5 EER / 10.9 IPLV)	BPC5
9.2.9	AC Systems and Air Source Heat Pumps (240,000 through 759,999 Btuh; Minimum 10.8 EER / 12.0 IPLV)	BPC6 Modified
9.2.10	AC Systems and Air Source Heat Pumps (760,000 or more Btuh; Minimum 9.7 EER / 11.0 IPLV)	BPC7
9.2.11	AC Systems and Air Source Heat Pumps (760,000 or more Btuh; Minimum 10.2 EER / 11.0 IPLV)	BPC8 Modified
9.2.12	Air-Cooled Chillers	BPC12
New Cooling Equipment		
9.2.13	Room Air Conditioner (ENERGY STAR qualified)	BPC13
9.2.14	Room Air Conditioner (SEHA Tier 1)	BPC14 Modified
9.2.15	PTAC/PTHP	BPC15
New Heating Equipment		
9.2.16	Gas Boiler Replacement (\leq 300 kBtuh input; AFUE 85% minimum)	BPH3
9.2.17	Gas Boiler Replacement ($>$ 300 kBtuh input; Thermal Efficiency 90% minimum)	BPH4
9.2.18	Gas Furnace Replacement (90% AFUE)	BPH5
9.2.19	Gas Furnace Replacement (92% AFUE)	BPH6
9.2.20	Gas Furnace Replacement (94% AFUE)	BPH7
HVAC Controls		
9.2.21	Variable Frequency Drive on HVAC Motor	BPC20

9.2.1 Air Conditioner Tune-up

Measure Code: BPC21

Version Date & Revision History:

Draft date: January 19, 2009
Effective date: January 19, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Cannot have standing maintenance contract, or tune-up within the past 12 months

Eligibility Criteria for New Energy-Efficient Equipment:

- Minimum 3-ton unit
- Complete tune-up, as specified
- PRE-APPROVAL IS REQUIRED – Ameren approved technicians only

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: The measure life is three years.

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application:

Required Supplemental Documentation:

- Include a copy of contractor invoices that detail the work performed to identify tune-up items, as well as additional labor and parts to improve/repair air conditioner performance

Tune-up requirements (to be completed by an Ameren approved technician)

- Check refrigerant charge
- Identify and repair leaks if refrigerant charge is low
- Measure and record refrigerant pressures
- Measure and record temperature drop at indoor coil
- Clean condensate drain line
- Clean outdoor coil and straighten fins
- Clean and straighten indoor and outdoor fan blades
- Clean indoor coil with spray-on cleaner and straighten fins
- Repair damaged insulation – suction line
- Change air filter
- Measure and record blower amp draw
- Measure and record compressor integrity (MOhm)
- Measure and record condenser fan motor amp draw

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times T \times N_T \times ISR$

Measure Energy Savings $\Delta kWh = \Delta kWh_s \times T \times N_T \times ISR$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings

T = Tonnage of unit being tuned

N_T = Number of units being tuned-up

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 9.2.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.39	878
School (K-12)	1.0	1.0	1.0	0.39	878
College/University	1.0	1.0	1.0	0.39	878
Retail/Service	1.0	1.0	1.0	0.39	878
Restaurant	1.0	1.0	1.0	0.39	878
Hotel/Motel	1.0	1.0	1.0	0.39	878
Medical	1.0	1.0	1.0	0.39	878
Grocery	1.0	1.0	1.0	0.39	878
Warehouse	1.0	1.0	1.0	0.39	878
Light Industry	1.0	1.0	1.0	0.39	878
Heavy Industry	1.0	1.0	1.0	0.39	878
Average = Miscellaneous	1.0	1.0	1.0	0.39	878

Table 9.2.1-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Services Provided	Non-Coincident Demand Savings (kW)*
Air Conditioner Tune-up	As listed in the application form	1.0

Table 9.2.1-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
All	0.39	878	0

Table 9.2.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment*
Air Conditioner Tune-up	\$35	\$25/ton of cooling

*The incentive is capped at 50% of the tune-up cost, excluding replacement-part costs. Customers already under an existing service contract, or a service agreement in the past 12 months, do not qualify for incentives. Tune ups are performed by a contractor approved by Ameren Illinois Utilities.

9.2.2 Gas Boiler Tune-up

Measure Code: BPH1

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: January 19, 2009
Revised: August 31, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Cannot have standing maintenance contract, or tune-up within the past 12 months
- Must be an Ameren Illinois Utilities gas delivery service GDS-2 customer

Eligibility Criteria for New Energy-Efficient Equipment:

- Complete tune-up, as specified
- Applicants must be a GDS-2 natural gas customer of Ameren Illinois Utilities
- PRE-APPROVAL IS REQUIRED

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 3 years

Revision Details: 8-31-10 incentive reduced from 50 cents per kBtu to 25 cents per kBtu

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application:

Required Supplemental Documentation:

- Include a copy of contractor invoices that detail the work performed to identify tune-up items, as well as additional labor and parts to improve/repair boiler performance

Tune-up requirements (to be completed by an Ameren approved technician)

- Clean fireside surfaces.
- Inspect all refractory. Patch and wash coat as required.
- Inspect gaskets on front and rear doors and replace as necessary.
- Seal and close front and rear doors properly.
- Clean low and auxiliary low water cut-off controls, then re-install using new gaskets.
- Clean plugs in control piping.
- Remove all hand hole and man hole plates. Flush boiler with water to remove loose scale and sediment.
- Replace all hand hole and man hole plates with new gaskets.
- Open feedwater tank manway, inspect and clean as required. Replace manway plate with new gasket.
- Clean burner and burner pilot.
- Check pilot electrode and adjust or replace.
- Clean air damper and blower assembly.
- Clean motor starter contacts and check operation.
- Make necessary adjustments to burner for proper combustion.

- Perform all flame safeguard and safety trip checks.
- Check all hand hole plates and man hole plates for leaks at normal operating temperatures and pressures.
- Troubleshoot any boiler system problems as requested by on-site personnel.

Algorithms used to calculate savings

Measure Natural Gas Savings $\Delta NG = NG_I \times T_S$

ΔNG = Gross customer annual natural gas savings for the measure, therms
 NG_I = Boiler natural gas input, kbtu
 T_S = Annual natural gas savings for the measure (0.572283737 therms for all gas boilers)

Table 9.2.2-1 Energy Factor Assumptions

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

Table 9.2.2-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Services Provided	Non-Coincident Demand Savings (kW)*
Gas Boiler Tune-up	As listed in the application form	0

Table 9.2.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
All	NA	NA	0.572283737

Table 9.2.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment*
Gas Boiler Tune-up	\$35	\$0.50/kBtuh input

*The incentive is capped at 50% of the tune-up cost, excluding replacement-part costs. Customers already under an existing service contract, or a service agreement in the past 12 months, do not qualify for incentives. Tune ups are performed by a contractor approved by Ameren Illinois Utilities.

9.2.3 Gas Forced-Air Furnace Tune-up

Measure Code: BPH2

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: January 19, 2009
Revised: August 31, 2010
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Cannot have standing maintenance contract, or tune-up within the past 12 months
- Must be an Ameren Illinois Utilities gas delivery service GDS-2 customer

Eligibility Criteria for New Energy-Efficient Equipment:

- Complete tune-up, as specified
- PRE-APPROVAL IS REQUIRED

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 3 years

Revision Details: 8-31-10 – the incentive was reduced from 50 cents per kBtu to 25 cents.

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application:

Required Supplemental Documentation:

- Include a copy of contractor invoices that detail the work performed to identify tune-up items, as well as additional labor and parts to improve/repair boiler performance
- Tune-up requirements (to be completed by an Ameren approved technician)
- Record pre-tune-up and post-tune-up measurements of boiler/furnace combustion efficiency
 - Adjust draft control
 - Maintain constant draft through the system to ensure complete combustion accounting for temperature and barometric changes
 - Install flue restrictions in the flue stack to control flow
 - Check completeness of combustion with CO and O2 sensors (Results from this testing will affect the fuel input/air input measure)
 - Clean fire side of heat exchanger
 - Scrub HX manually to remove buildup from combustion gases and more efficiently transfer heat from the source to the stream/water
 - Seal combustion chamber with a ceramic sealant to reduce heat loss from chamber
 - Optimize fuel input based on combustion completeness results

Algorithms used to calculate savings

Measure Natural Gas Savings $\Delta NG = NG_I \times T_S$

ΔNG = Gross customer annual natural gas savings for the measure, therms
 NG_I = Forced-air furnace natural gas input, kbtu
 T_S = Annual natural gas savings for the measure (0.572283737 therms for all gas forced-air furnaces)

Table 9.2.3-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours
Office	0	1.0	1.0	NA
School (K-12)	0	1.0	1.0	NA
College/University	0	1.0	1.0	NA
Retail/Service	0	1.0	1.0	NA
Restaurant	0	1.0	1.0	NA
Hotel/Motel	0	1.0	1.0	NA
Medical	0	1.0	1.0	NA
Grocery	0	1.0	1.0	NA
Warehouse	0	1.0	1.0	NA
Light Industry	0	1.0	1.0	NA
Heavy Industry	0	1.0	1.0	NA
Average = Miscellaneous	0	1.0	1.0	NA

Table 9.2.3-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Services Provided	Non-Coincident Demand Savings (kW)
Forced Air Furnace Tune-up	As listed in the application form	0

Table 9.2.3-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
All	NA	NA	0.572283737

Table 9.2.3-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment*
Gas Forced-Air Furnace Tune-up	\$35	\$0.50/kBtuh input

*The incentive is capped at 50% of the tune-up cost, excluding replacement-part costs. Customers already under an existing service contract, or a service agreement in the past 12 months, do not qualify for incentives. Tune ups are performed by a contractor approved by Ameren Illinois Utilities.

9.2.4 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (up to 65,000 btuh input, minimum 14 SEER)

Measure Code: BPC1

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- Up to 65,000 Btuh input
- Minimum efficiency: 14 SEER

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.4-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.30831	766.14
Medical	1.0	1.0	1.0	0.27797	1236.81
Restaurant	1.0	1.0	1.0	0.42035	1031.19
Grocery	1.0	1.0	1.0	0.35884	942.58
School/College	1.0	1.0	1.0	0.37191	749.31
Warehouse	1.0	1.0	1.0	0.26084	489.56
Retail/Service	1.0	1.0	1.0	0.37191	749.31
Mfg. Industrial	1.0	1.0	1.0	0.36222	787.24
Hotel/Motel	1.0	1.0	1.0	0.32121	1449.9
Other	1.0	1.0	1.0	0.33928	911.34

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.4-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.4-1

Table 9.2.4-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.30831	766.14
School/College	0.37191	749.31
Retail/Service	0.37191	749.31
Grocery	0.35884	942.58
Restaurant	0.42035	1031.19
Hotel/Motel	0.32121	1449.9
Medical	0.27797	1236.81
Warehouse	0.26084	489.56
Manufacturing/Industrial	0.36222	787.24
Other	0.33928	911.34

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.4-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.4-1)} \\ \hline \end{array}$$

Table 9.2.4-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
<65,000 Btuh Minimum SEER 14	\$113	\$15 per ton

9.2.5 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (up to 65,000 btuh input, minimum 15 SEER)

Measure Code: BPC2

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- Up to 65,000 Btuh input
- Minimum efficiency: 15 SEER

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: Previous incentive was \$30

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.5-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Facility Type	1.0	1.0	1.0	0.36545	908.14
Office	1.0	1.0	1.0	0.33511	1491.06
Medical	1.0	1.0	1.0	0.47749	1171.37
Restaurant	1.0	1.0	1.0	0.41598	1092.68
Grocery	1.0	1.0	1.0	0.42905	864.44
School/College	1.0	1.0	1.0	0.31799	596.8
Warehouse	1.0	1.0	1.0	0.42905	864.44
Retail/Service	1.0	1.0	1.0	0.41937	911.43
Mfg. Industrial	1.0	1.0	1.0	0.37835	1707.83
Hotel/Motel	1.0	1.0	1.0	0.39643	1064.83

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.5-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.5-1

Table 9.2.5-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.36545	908.14
School/College	0.42905	864.44
Retail/Service	0.42905	864.44
Restaurant	0.47749	1171.37
Hotel/Motel	0.37835	1707.83
Medical	0.33511	1491.06
Grocery	0.41598	1092.68
Warehouse	0.31799	596.8
Manufacturing/Industrial	0.41937	911.43
Other	0.39643	1064.83

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.5-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.5-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.5-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.5-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.5-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.5-1)} \\ \hline \end{array}$$

Table 9.2.5-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
<65,000 Btuh Minimum SEER 15	\$172	\$60 per ton

9.2.6 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (65,000 thru 239,999 btuh input, minimum 11.5 EER / 11.9 IPLV)

Measure Code: BPC3

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 65,000 through 239,999 Btuh
- Minimum efficiency: 11.5 EER / 11.9 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.6-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.33143	833.59
Medical	1.0	1.0	1.0	0.30546	1409.6
Restaurant	1.0	1.0	1.0	0.44875	1162.35
Grocery	1.0	1.0	1.0	0.37691	972.41
School/College	1.0	1.0	1.0	0.39704	865.89
Warehouse	1.0	1.0	1.0	0.29032	552.75
Retail/Service	1.0	1.0	1.0	0.37691	972.41
Mfg. Industrial	1.0	1.0	1.0	0.38984	866.37
Hotel/Motel	1.0	1.0	1.0	0.34725	1606.73
Other	1.0	1.0	1.0	0.36266	1026.9

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.6-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.6-1

Table 9.2.6-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.33143	833.59
School/College	0.39704	865.89
Retail/Service	0.37691	972.41
Restaurant	0.44875	1162.35
Hotel/Motel	0.34725	1606.73
Medical	0.30546	1409.6
Grocery	0.37691	972.41
Warehouse	0.29032	552.75
Manufacturing/Industrial	0.38984	866.37
Other	0.36266	1026.9

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.6-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.6-1)} \\ \hline \end{array}$$

Table 9.2.6-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=65,000 Btuh and <240,000 Btuh Min. 11.5 EER	\$73	\$15 per ton

9.2.7 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (65,000 through 239,999 btuh input, minimum 12 EER / 12.4 IPLV)

Measure Code: BPC4

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 65,000 through 239,999 Btuh
- Minimum efficiency: 12 EER / 12.4 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: Previous incentive was \$30

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.7-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.36941	894.81
Medical	1.0	1.0	1.0	0.33546	1517.25
Restaurant	1.0	1.0	1.0	0.4904	1247.78
Grocery	1.0	1.0	1.0	0.43094	1060.22
School/College	1.0	1.0	1.0	0.43537	925.56
Warehouse	1.0	1.0	1.0	0.32572	608.4
Retail/Service	1.0	1.0	1.0	0.43094	1060.22
Mfg. Industrial	1.0	1.0	1.0	0.4343	927.71
Hotel/Motel	1.0	1.0	1.0	0.38652	1729.24
Other	1.0	1.0	1.0	0.40434	1107.91

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.7-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.7-1

Table 9.2.7-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.36941	894.81
School/College	0.43537	925.56
Retail/Service	0.43094	1060.22
Restaurant	0.4904	1247.78
Hotel/Motel	0.38652	1729.24
Medical	0.33546	1517.25
Grocery	0.43094	1060.22
Warehouse	0.32572	608.4
Manufacturing/Industrial	0.4343	927.71
Other	0.40434	1107.91

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.7-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.7-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.7-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.7-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.7-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.7-1)} \\ \hline \end{array}$$

Table 9.2.7-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=65,000 Btuh and <240,000 Btuh Min. 12 EER	\$97	\$60 per ton

9.2.8 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (240,000 thru 759,999 btuh, minimum 10.5 EER / 10.9 IPLV)

Measure Code: BPC5

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 240,000 through 759,999 Btuh
- Minimum efficiency: 10.5 EER / 10.9 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.8-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.33106	618.09
Medical	1.0	1.0	1.0	0.25409	886.22
Restaurant	1.0	1.0	1.0	0.4087	485.76
Grocery	1.0	1.0	1.0	0.34249	524.27
School/College	1.0	1.0	1.0	0.3225	553.63
Warehouse	1.0	1.0	1.0	0.2478	106.63
Retail/Service	1.0	1.0	1.0	0.34249	524.27
Mfg. Industrial	1.0	1.0	1.0	0.35207	495.54
Hotel/Motel	1.0	1.0	1.0	0.27358	1205.26
Other	1.0	1.0	1.0	0.31942	599.97

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.8-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.8-1

Table 9.2.8-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.33106	618.09
School/College	0.3225	553.63
Retail/Service	0.34249	524.27
Restaurant	0.4087	485.76
Hotel/Motel	0.27358	1205.26
Medical	0.254089	886.22
Grocery	0.34249	524.27
Warehouse	0.2478	106.63
Manufacturing/Industrial	0.35207	495.54
Other	0.31942	599.97

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.8-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.8-1)} \\ \hline \end{array}$$

Table 9.2.8-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=240,000 Btuh and <760,000 Btuh Min. 10.5 EER	\$193	\$15 per ton

9.2.9 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (240,000 thru 759,999 btuh, minimum 10.8 EER / 12.0 IPLV)

Measure Code: BPC6

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 240,000 through 759,999 Btuh
- Minimum efficiency 10.8 EER / 12.0 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: Previous incentive was \$30

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.9-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.27388	808.21
Medical	1.0	1.0	1.0	0.27925	919.19
Restaurant	1.0	1.0	1.0	0.44415	516.06
Grocery	1.0	1.0	1.0	0.37583	556.19
School/College	1.0	1.0	1.0	0.35157	575.14
Warehouse	1.0	1.0	1.0	0.27458	118.09
Retail/Service	1.0	1.0	1.0	0.37583	556.19
Mfg. Industrial	1.0	1.0	1.0	0.38471	517.59
Hotel/Motel	1.0	1.0	1.0	0.27134	1122.45
Other	1.0	1.0	1.0	0.33679	632.13

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.9-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.9-1

Table 9.2.9-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.27388	808.21
School/College	0.35157	575.14
Retail/Service	0.37583	556.19
Restaurant	0.44415	516.06
Hotel/Motel	0.27134	1122.45
Medical	0.27925	919.19
Grocery	0.37583	556.19
Warehouse	0.27458	118.09
Manufacturing/Industrial	0.38471	517.59
Other	0.33679	632.13

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.9-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.9-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.9-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.9-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.9-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.9-1)} \\ \hline \end{array}$$

Table 9.2.9-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=240,000 Btuh and <760,000 Btuh Min. 10.8 EER	\$247	\$60 per ton

9.2.10 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (760,00 or more btuh input, minimum 9.7 EER / 11.0 IPLV)

Measure Code: BPC7

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 760,000 or more Btuh
- Minimum efficiency 9.7 EER / 11.0 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.10-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.19654	712.55
Medical	1.0	1.0	1.0	0.20095	200.95
Restaurant	1.0	1.0	1.0	0.32325	412.63
Grocery	1.0	1.0	1.0	0.27359	457.45
School/College	1.0	1.0	1.0	0.25193	499.47
Warehouse	1.0	1.0	1.0	0.20371	87.73
Retail/Service	1.0	1.0	1.0	0.27359	457.45
Mfg. Industrial	1.0	1.0	1.0	0.28233	448.37
Hotel/Motel	1.0	1.0	1.0	0.21853	1124.73
Other	1.0	1.0	1.0	0.24716	489.04

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.10-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.10-1

Table 9.2.10-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.19654	712.55
School/College	0.25193	499.47
Retail/Service	0.27359	457.45
Restaurant	0.32325	412.63
Hotel/Motel	0.21853	1124.73
Medical	0.20095	815.43
Grocery	0.27359	457.45
Warehouse	0.20371	87.73
Manufacturing/Industrial	0.28233	448.37
Other	0.24716	557.31

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.10-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.10-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.10-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.10-1)} \\ \hline \end{array}$$

Table 9.2.10-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=760,000 Btuh min. 9.7 EER	\$167	\$15 per ton

9.2.11 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps (760,000 or more btuh input, minimum 10.2 EER / 11.0 IPLV)

Measure Code: BPC8

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

- 760,000 or more Btuh
- Minimum efficiency 10.2 EER / 11.0 IPLV

Unitary refers to the fact that all of the components necessary to heat, cool, dehumidify, filter, and move air are included in one or more factory-made assemblies. Unitary equipment is available as single package or as split systems. Single package units include all of the necessary functions and components in one package that is installed outside the building. Split systems are made up of an indoor unit (fan and cooling/heating coils) and an outdoor unit (condenser and compressor). An air source heat pump is a type of heat pump that uses the outside air as a heat source or heat sink to heat or cool an interior space.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls. The efficiency of split systems is based on an Air Conditioning and Refrigeration Institute (ARI) reference number. Water-cooled systems, evaporative coolers, and water-source heat pumps do not qualify under this program, but may qualify under the Custom Incentive Program. Unitary and split system cooling equipment must meet ARI standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). All required efficiencies are based on the Consortium for Energy Efficiency (CEE) high efficiency commercial air conditioning and heat pump specifications (www.cee1.org).

Bonus Incentives offered: Previous incentive was \$30

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_U \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_U \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.11-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Peak kW Savings Per Ton	kWh Savings Per Ton
Office	1.0	1.0	1.0	0.24424	769.29
Medical	1.0	1.0	1.0	0.24907	878.4
Restaurant	1.0	1.0	1.0	0.39096	470.5
Grocery	1.0	1.0	1.0	0.33727	518.41
School/College	1.0	1.0	1.0	0.30746	540.56
Warehouse	1.0	1.0	1.0	0.23028	109.61
Retail/Service	1.0	1.0	1.0	0.33727	518.41
Mfg. Industrial	1.0	1.0	1.0	0.34469	490.5
Hotel/Motel	1.0	1.0	1.0	0.24357	1080.15
Other	1.0	1.0	1.0	0.29831	597.32

Note: Table above is based on DEER 2005 information for Sacramento/Zone 12 then adjusted to Ameren service territory based on Cooling Degree Days difference.

Table 9.2.11-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Unitary and Split Air Conditioning Systems and Air Source Heat Pumps	NA	NA	See Table 9.2.11-1

Table 9.2.11-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Office	0.24424	769.29
School/College	0.30746	540.56
Retail/Service	0.33727	518.41
Restaurant	0.39096	470.5
Hotel/Motel	0.24357	1080.15
Medical	0.24907	878.4
Grocery	0.33727	518.41
Warehouse	0.23028	109.61
Manufacturing/Industrial	0.34469	490.5
Other	0.29831	597.32

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.11-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.11-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.11-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.11-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.11-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.11-1)} \\ \hline \end{array}$$

Table 9.2.11-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
>=760,000 Btuh min. 10.2 EER	\$203	\$60 per ton

9.2.12 Air-Cooled Chillers

Measure Code: BPC12

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace any size existing air-cooled chiller

Eligibility Criteria for New Energy-Efficient Equipment:

- IPLV (Integrated Part Load Value) rated at less than or equal to 1.04 kW/ton
- Air-cooled only, no water-cooled chillers

The chiller efficiency rating must be based on ARI standard 550/590–2003 for IPLV conditions and not based on full-load conditions. The chillers must meet ARI standards 550/590–2003, be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). The ARI net capacity value should be used to determine the chiller tons. A manufacturer specification sheet with the rated kW/ton-IPLV or COP-IPLV must accompany the application.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 20 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times N_U \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings table below

N_U = Number of units (tons capacity) 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 9.2.12-1 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 9.2.12-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Air Cooled Chiller	NA	NA	See Table 9.2.12-3

Table 9.2.12-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Grocery	0.25666	270.6
Hotel/Motel	0.2672	457.45
Manufacturing/Industrial	0.27742	259.46
Medical	0.263	360.47
Office	0.26443	295.77
Other	0.26435	307.66
Retail/Service	0.25666	270.6
School/College	0.26509	239.23

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.12-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.12-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.12-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.12-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.12-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.12-1)} \\ \hline \end{array}$$

Table 9.2.12-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Air-Cooled Chillers	\$126.70/ton	\$20/ton

9.2.13 Room Air Conditioners (Tier 2)

Measure Code: BPC13

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

BPC13	<ul style="list-style-type: none"> • Less than 8000 Btuh input • 10.7 EER (ENERGY STAR® qualified)
	<ul style="list-style-type: none"> • 8000 through 19,990 Btuh input • 10.8 EER (ENERGY STAR qualified)
	<ul style="list-style-type: none"> • 14,000 through 19,999 Btuh input • 10.7 EER (ENERGY STAR qualified)
	<ul style="list-style-type: none"> • 20,000 or more Btuh input • 9.4 EER (ENERGY STAR qualified)

- Room air conditioning units are through-the-wall (or built-in) self-contained units that are two tons or less.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 9 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

A unit can either qualify under ENERGY STAR® standards or under Super Efficient Home Appliance (SEHA) Tier 1 standards. The minimum requirements and eligible equipment that meet CEE high efficiency room air conditioning specifications can be found at www.cee1.org. There are two eligible efficiency levels as listed by the CEE. These units are with and without louvered sides, without reverse cycle (i.e., heating), and casement.

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times N_U \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times N_U \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.13-1 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 9.2.13-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Room Air Conditioner (Tier 2)	NA	NA	See Table 9.2.13-3

Table 9.2.13-3 Calculated Demand and Energy Savings by Type of Business

Building Type	Demand Savings (kW savings/ton)				Energy Savings (kWh savings/ton)			
	<8,000 btuh	8000 to 13,999 btuh	14,000 to 19,999 btuh	>20,000 btuh	<8,000 btuh	8000 to 13,999 btuh	14,000 to 19,999 btuh	>20,000 btuh
Grocery	0.2	0.2	0.2	0.23	912.77	904.31	912.77	1,039
Hotel/Motel	0.2	0.2	0.2	0.23	533.77	528.82	533.77	607.58
Medical	0.2	0.2	0.2	0.23	671.31	665.1	671.31	764.16
Mfg/Industrial	0.2	0.2	0.2	0.23	692.69	686.27	692.69	788.49
Office	0.2	0.2	0.2	0.23	679.82	673.53	679.82	773.84
Restaurant	0.2	0.2	0.2	0.23	822.52	814.19	822.52	936.27
Retail/Service	0.2	0.2	0.2	0.23	607.19	601.57	607.19	691.16
School/College	0.2	0.2	0.2	0.23	450.84	446.67	450.84	513.19
Warehouse	0.2	0.2	0.2	0.23	472.61	468.24	472.61	537.97
Other	0.2	0.2	0.2	0.23	450.84	446.67	450.84	513.19

Demand Savings Calculation (per unit) =

Non-coincident Demand Savings <small>(weighted average from Table 9.2.13-3)</small>	X	Demand Interactive Effects <small>(average from Table 9.2.13-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.2.13-1)</small>
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Energy Savings Calculation (per unit) =

Non-coincident Demand Savings <small>(weighted average from Table 9.2.13-3)</small>	X	Energy Interactive Effects <small>(average from Table 9.2.13-1)</small>	X	Hours of Operation <small>(average from Table 9.2.13-1)</small>
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Table 9.2.13-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Room Air Conditioner (Tier 2)	\$138.53	\$25/ton

9.2.14 Room Air Conditioners

Measure Code: BPC14

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replacing existing unit of equivalent size

Eligibility Criteria for New Energy-Efficient Equipment:

BPC14	<ul style="list-style-type: none"> • Less than 8000 Btuh input • 11.2 EER (SEHA Tier 1)
	<ul style="list-style-type: none"> • 8000 through 13,999 Btuh input • 11.3 EER (SEHA Tier 1)
	<ul style="list-style-type: none"> • 14,000 through 19,999 Btuh input • 11.2 EER (SEHA Tier 1)
	<ul style="list-style-type: none"> • 20,000 or more Btuh input • 9.8 EER (SEHA Tier 1)

- Room air conditioning units are through-the-wall (or built-in) self-contained units that are two tons or less.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 9 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

A unit can either qualify under ENERGY STAR® standards or under Super Efficient Home Appliance (SEHA) Tier 1 standards. The minimum requirements and eligible equipment that meet CEE high efficiency room air conditioning specifications can be found at www.cee1.org. There are two eligible efficiency levels as listed by the CEE. These units are with and without louvered sides, without reverse cycle (i.e., heating), and casement.

Bonus Incentives offered: Previous incentive was \$30

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times N_U \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.14-1 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 9.2.14-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Room Air Conditioner	NA	NA	See Table 9.2.14-3

Table 9.2.14-3 Calculated Demand and Energy Savings by Type of Business

Building Type	Demand Savings (kW savings/ton)				Energy Savings (kWh savings/ton)			
	<8,000 btuh	8000 to 13,999 btuh	14,000 to 19,999 btuh	>20,000 btuh	<8,000 btuh	8000 to 13,999 btuh	14,000 to 19,999 btuh	>20,000 btuh
Office	0.25	0.25	0.25	0.28	851.8	842.41	851.8	952.83
Medical	0.25	0.25	0.25	0.28	841.14	831.86	841.14	940.9
Restaurant	0.25	0.25	0.25	0.28	1,030.60	1,019.23	1,030.60	1,152.82
Grocery	0.25	0.25	0.25	0.28	1,143.67	1,131.06	1,143.67	1,279.31
School/College	0.25	0.25	0.25	0.28	564.89	558.66	564.89	631.89
Warehouse	0.25	0.25	0.25	0.28	592.17	585.64	592.17	662.4
Retail/Service	0.25	0.25	0.25	0.28	760.8	752.4	760.8	851.03
Mfg/Industrial	0.25	0.25	0.25	0.28	867.92	858.35	867.92	970.86
Hotel/Motel	0.25	0.25	0.25	0.28	668.8	661.42	668.8	748.11
Other	0.25	0.25	0.25	0.28	564.89	558.66	564.89	631.89

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.14-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.14-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.14-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.14-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.14-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.14-1)} \\ \hline \end{array}$$

Table 9.2.14-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Room Air Conditioner Tier 1	\$80.89	\$60/ton

9.2.15 PTAC/PTHP

(Package Terminal Air Conditioner / Package Terminal Heat Pump)

Measure Code: BPC15

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Replace any size existing PTAC/PTHP units

Eligibility Criteria for New Energy-Efficient Equipment:

- EER must be greater than: $13.08 - (0.2556 \times \text{Btuh Capacity} / 1000)$. All EER values must be rated at 95°F outdoor dry-bulb temperature.
- Through-the-wall self contained units that are two tons (24,000 Btuh) or less

Description: A PTAC is a packaged terminal air conditioner that cools and heats. A PTAC provides warm air through an electric resistance heater (heat strip). A PTHP is a packaged terminal heat pump. A PTHP uses its compressor year round to heat or cool. In warm weather, it efficiently captures heat from inside your building and pumps it outside for cooling. In cool weather, it captures heat from outdoor air and pumps it into your home, adding heat from electric heat strips as necessary to efficiently provide heat.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Demand Savings $\Delta kW = \Delta kW_s \times N_U \times ISR$

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

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings

N_U = Number of units (tons capacity) being replaced

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.15-1 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 9.2.15-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
PTAC/PTHP	NA	NA	See Table 9.2.15-3

Table 9.2.15-3 Calculated Demand and Energy Savings by Type of Business

Description	kW Savings/ton		kWh Savings/ton	
	All Sizes, Retrofit	All Sizes, New Construction	All Sizes, Retrofit	All Sizes, New Construction
Office	0.239	0.0083	180.84	6.28
Medical	0.239	0.0083	212.51	7.38
Restaurant	0.239	0.0083	212.51	7.38
Grocery	0.239	0.0083	244.18	8.48
School/College	0.239	0.0083	102.37	3.56
Warehouse	0.239	0.0083	180.84	6.28
Retail/Service	0.239	0.0083	244.18	8.48
Mfg/Industrial	0.239	0.0083	212.51	7.38
Hotel/Motel	0.239	0.0083	212.51	7.38
Other	0.239	0.0083	212.51	7.38

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.15-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.15-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.2.15-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.2.15-3)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.2.15-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.2.15-1)} \\ \hline \end{array}$$

Table 9.2.15-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
PTAC/PTHP	\$80	\$15

9.2.16 Gas Boiler Replacement (\leq 300 kBtuh input)

Measure Code: BPH3

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Must replace an existing natural-gas fueled boiler
- Customer must have GDS-2 gas account

Eligibility Criteria for New Energy-Efficient Equipment:

- Hot water only (no steam)
- Less than or equal to 300 kBtuh input
- AFUE 85% minimum

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Natural Gas Savings $\Delta NG = NG_I \times T_S$

ΔNG = Gross customer annual natural gas savings for the measure, therms

NG_I = Boiler natural gas input, kbtu

T_S = Annual natural gas savings for the measure (1.216102941 therms for all gas boilers)

Table 9.2.16-1 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 9.2.16-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Gas Boiler Replacement (< 300 kBtuh input)	NA	NA	0

Table 9.2.16-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Saving
All	NA	NA	1.216102941

Table 9.2.16-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Boiler Replacement (<300 kbtuh input)	\$3,200	\$1.00/kBtuh input

9.2.17 Gas Boiler Replacement (> 300 kBtuh Input)

Measure Code: BPH4

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Must replace an existing natural-gas fueled boiler
- Customer must have GDS-2 gas account

Eligibility Criteria for New Energy-Efficient Equipment:

- Hot water only (no steam)
- Greater than 300 kBtuh input
- Thermal Efficiency 90% minimum

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: 9-1-10 bonus increased by 50% (to \$3.00) for the remainder of PY3

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Natural Gas Savings $\Delta NG = NG_I \times T_S$

ΔNG = Gross customer annual natural gas savings for the measure, therms

NG_I = Boiler natural gas input, kbtu

T_S = Annual natural gas savings for the measure (2.432205882 therms for all gas boilers)

Table 9.2.17-1 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Gas Boiler Replacement (> 300 kBtuh input)	NA	NA	0

Table 9.2.17-2 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
All	NA	NA	2.432205882

Table 9.2.17-3 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Boiler Replacement (>300 kBtuh input)	\$5,000	\$2.00/kBtuh input

9.2.18 Gas Furnace Replacement (90% AFUE)

Measure Code: BPH5

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Must replace an existing natural-gas fueled furnace
- Customer must have GDS-2 gas account

Eligibility Criteria for New Energy-Efficient Equipment:

- ENERGY STAR qualified furnace (90% AFUE)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings**Measure Natural Gas Savings** $\Delta NG = NG_I \times T_s$ ΔNG = Gross customer annual natural gas savings for the measure, therms NG_I = Gas furnace natural gas input, kbtu T_s = Annual natural gas savings for the measure (2.432205882 therms for all gas furnaces)**Table 9.2.18-1 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 9.2.18-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Gas Furnace Replacement (90% AFUE)	NA	NA	0

Table 9.2.18-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm savings
All	NA	NA	2.432205882

Table 9.2.18-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Furnace Replacement (90% AFUE)	\$111 per 12,000 btuh of heating capacity	\$2.00/kBtuh input

9.2.19 Gas Furnace Replacement (92% AFUE)

Measure Code: BPH6

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Must replace an existing natural gas fueled furnace
- Customer must have GDS-2 gas account

Eligibility Criteria for New Energy-Efficient Equipment:

- ENERGY STAR qualified furnace (92% AFUE)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: 9-1-10 bonus increased by 50% (to \$3.75) for the remainder of PY3

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

Measure Natural Gas Savings $\Delta NG = NG_I \times T_s$

ΔNG = Gross customer annual natural gas savings for the measure, therms
 NG_I = Gas furnace natural gas input, kbtu
 T_s = Annual natural gas savings for the measure (2.918647059 therms for all gas furnaces)

Table 9.2.19-1 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 9.2.19-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Gas Furnace Replacement (92% AFUE)	NA	NA	0

Table 9.2.19-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
All	NA	NA	2.918647059

Table 9.2.19-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Furnace Replacement (92% AFUE)	\$111 per 12,000 btuh of heating capacity	\$2.50 kBtuh input

9.2.20 Gas Furnace Replacement (94% AFUE)

Measure Code: BPH7

Version Date & Revision History:

Draft date: February 6, 2009
Effective date: February 6, 2009
Revised: NA
End date: TBD

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- Must replace an existing natural gas fueled furnace
- Customer must have GDS-2 gas account

Eligibility Criteria for New Energy-Efficient Equipment:

- ENERGY STAR qualified furnace (94% AFUE)

Loadshape: NA

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: 9-1-10 bonus increased by 50% (to \$4.50) for the remainder of PY3

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings
Measure Natural Gas Savings $\Delta NG = NG_I \times T_s$

ΔNG = Gross customer annual natural gas savings for the measure, therms
 NG_I = Gas furnace natural gas input, kbtu
 T_s = Annual natural gas savings for the measure (3.405088235 therms for all gas furnaces)

Table 9.2.20-1 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 9.2.20-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
Gas Furnace Replacement (94% AFUE)	NA	NA	0

Table 9.2.20-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)	Therm Savings
Office	NA	NA	3.405088235

Table 9.2.20-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Gas Furnace Replacement (94% AFUE)	\$111 per 12,000 of heating capacity	\$3.00/kBtuh input

9.2.21 Variable Frequency Drives on HVAC Motors

Measure Code: BPC20

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installations only

Eligibility Criteria for New Energy-Efficient Equipment:

- Any size unit
- Used in conjunction with pumping or air handling applications
- Minimum 2,000 hours annual operation
- May not control motor over 500 hp (over 500 hp is Custom)
- Redundant/Backup units do not qualify
- NOTE – This increased incentive will be in effect for all applications received through December 31, 2010.
- A new motor with VFD.
- A variable-frequency drive (VFD) is a system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor. A variable frequency drive is a specific type of adjustable-speed drive.

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 15 years

Revision Details: (None)

Referenced Documents: HVAC Standard Measures v3.xls

Bonus Incentives offered: 1-4-10 Incentive increased to \$75/ hp controlled (previously \$45). 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: Hp controlled, project cost (incentive is capped at 75% of project cost).

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_{HP} \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_{HP} \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings

N_{HP} = Total Horse Power being controlled

ISR = In service rate, or the percentage of units rebated that actually get used. For standard 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 9.2.21-1 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 9.2.21-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)*
VFDs on HVAC Motors	NA	NA	0

Table 9.2.21-3 Calculated Demand and Energy Savings by Type of Business

Building Types	kW Savings/hp	kWh Savings/hp	kWh Savings/hp
	Motors (All Sizes)	Chilled Water Pump Applications (All Sizes)	Fan Applications (All Sizes)
Office	0	850	701
Medical	0	850	701
Restaurant	0	850	701
Grocery	0	850	701
School/College	0	850	701
Warehouse	0	850	701
Retail/Service	0	850	701
Mfg/Industrial	0	850	701
Hotel/Motel	0	850	701
Other	0	850	701

Demand Savings Calculation (per unit) =

Non-coincident Demand Savings <small>(weighted average from Table 9.2.21-2)</small>	X	Demand Interactive Effects <small>(average from Table 9.2.21-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.2.21-1)</small>
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Energy Savings Calculation (per unit) =

Non-coincident Demand Savings <small>(weighted average from Table 9.2.21-2)</small>	X	Energy Interactive Effects <small>(average from Table 9.2.21-1)</small>	X	Hours of Operation <small>(average from Table 9.2.21-1)</small>
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Table 9.2.21-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Incremental Cost	Incentive Payment
Variable Frequency Drives on HVAC Motors	\$200 per hp	\$75/hp controlled (many not exceed 75% of the project cost)

9.3 Lodging

The following measures are included in the PY3 Lodging program.

9.3 LODGING		
	Measure	Code
Lodging (HVAC)		
9.3.1	Guest Room Energy Management (GREM) Controls (PTAC)	BPLD1 NEW
9.3.2	Guest Room Energy Management (GREM) Controls (PTHP)	BPLD2 NEW

9.3.1 Guest Room Energy Management (PTAC)

Measure Code: BPLD1

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation

Eligibility Criteria for New Energy-Efficient Equipment:

- Electric heat Package Terminal Air Conditioners (PTAC) systems only
- Occupancy control must be key activated or sense body heat or motion and must control the HVAC system serving the room.

Loadshape: TBD

Persistence: The persistence factor is assumed to be one.

Lifetimes: 14 years

Revision Details: (None)

Referenced Documents: Business Programs: Deemed Savings Manual V1.0, Energy Reduction Associated with the Installation of the Entergize Energy Control System: Pilot Installation Evaluation

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Number of Guest Rooms

Algorithms used to calculate savings

Measure Demand Savings ΔkW = 0.1 (Based on vacancy)

Measure Energy Savings ΔkWh = #Rooms x 714 kWh/year

ΔkW = Gross customer connected load kW savings for the measure

ΔkWh = Gross customer annual kWh savings for the measure

Table 9.3.1-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours	Peak kW Savings Per Watt Reduced	kWh Savings Per Watt Reduced
Hotel/Motel	1.0	1.0	1.0	8,760	0	0

Table 9.3.1-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
GREM (PTAC)	1540	1540?	1.0

Table 9.3.1-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Hotel/Motel	0.1 (based on vacancy)	1,211

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(weighted average from Table 9.3.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(average from Table 9.3.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(average from Table 9.3.1-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(weighted average from Table 9.3.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(average from Table 9.3.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(average from Table 9.3.1-1)} \\ \hline \end{array}$$

Table 9.3.1-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
GREM (PTAC)	\$396	\$0	\$396	\$80/room

9.3.2 Guest Room Energy Management (PTHP)

Measure Code: BPLD2

Version Date & Revision History:

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

Eligibility Criteria

Eligibility Criteria for Baseline Equipment to be Replaced:

- New installation

Eligibility Criteria for New Energy-Efficient Equipment:

- Electric Package Terminal Heat Pumps (PTHP) systems only
- Occupancy control must be key activated or sense body heat or motion and must control the HVAC system serving the room.

Loadshape: TBD

Persistence: The persistence factor is assumed to be one.

Lifetimes: 14 years

Revision Details: (None)

Referenced Documents: Business Programs: Deemed Savings Manual V1.0, Energy Reduction Associated with the Installation of the Entergize Energy Control System: Pilot Installation Evaluation

Bonus Incentives offered: None

Supplemental Information Collected on the Application: Number of Guest Rooms

Algorithms used to calculate savings

Measure Demand Savings ΔkW = 0.1 (Based on vacancy)

Measure Energy Savings ΔkWh = #Rooms x 1211 kWh/year

ΔkW = Gross customer connected load kW savings for the measure

ΔkWh = Gross customer annual kWh savings for the measure

Table 9.3.2-1 Energy Factor Assumptions

Building Types	Demand Interactive Effects	Coincident Diversity Factors	Energy Interactive Effects	Annual Operating Hours	Peak kW Savings Per Watt Reduced	kWh Savings Per Watt Reduced
Hotel/Motel	1.0	1.0	1.0	8,760	0	0

Table 9.3.2-2 Specifications and Calculated Non-coincident Demand Savings

Measure Description	Base Unit Wattage (watts)	Retrofit Fixture Wattage (watts)	Non-Coincident Demand Savings (kW)
GREM (PTHP)	910	910	1.0

Table 9.3.2-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Demand Savings (kW)	Energy Savings (kWh)
Hotel/Motel	0.1 (base on vacancy)	714

Demand Savings Calculation (per unit) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.3.2-2)} \end{array}} \times \boxed{\begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.3.2-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.3.2-1)} \end{array}} \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{c} \boxed{\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.3.2-2)} \end{array}} \times \boxed{\begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.3.2-1)} \end{array}} \times \boxed{\begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.3.2-1)} \end{array}} \end{array}$$

Table 9.3.2-4 Measure Costs (Parts and Labor) and Incentive Levels

Measure Description	Installed Cost: High Performance	Installed Cost: Standard Practice	Incremental Cost	Incentive Payment
GREM (PTHP)	\$396	\$0	\$396	\$50/room

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 (back access door)	BPR7 Modified
9.4.2	Auto Closer for display case door	BPR13 NEW
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 NEW
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 NEW (Discontinued)
9.4.8	Solid Door Freezer (up to 15 cu ft)	BPR27 NEW
9.4.9	Solid Door Freezer (15-30 cu ft)	BPR28 NEW
9.4.10	Solid Door Freezer (31-50 cu ft)	BPR29 NEW
9.4.11	Solid Door Freezer (51+ cu ft)	BPR30 NEW
9.4.12	Glass Door Freezer (31-50 cu ft)	BPR31 NEW
9.4.13	Glass Door Freezer (51+ cu ft)	BPR32 NEW
9.4.14	Evaporator Fan Controls	BPR6
Vending Machines 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 Modified
9.4.26	EC Motor for Walk-In Freezer	BPR19 NEW
9.4.27	EC Motor for Reach-In Cooler	BPR5 Modified
9.4.28	EC Motor for Reach-In Freezer	BPR18 NEW
Tune-up		
9.4.29	Refrigeration Tune-up	BPR11 NEW

9.4.1 Automatic Door Closers for Walk-In Freezers

Measure Code: BPR7

Version Date & Revision History:

Draft date: December 17, 2008
Effective date: December 17, 2008
Revised: October 25, 2010
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)
- A walk-in freezer without automatic door-closers installed

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: Previous incentive was \$160/door - changed to \$30/closer

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) =

Non-coincident Demand Savings <small>(weighted average from Table 9.4.1-2)</small>	X	Demand Interactive Effects <small>(average from Table 9.4.1-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.4.1-1)</small>
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Energy Savings Calculation (per door) =

Non-coincident Demand Savings <small>(weighted average from Table 9.4.1-2)</small>	X	Energy Interactive Effects <small>(average from Table 9.4.1-1)</small>	X	Hours of Operation <small>(average from Table 9.4.1-1)</small>
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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

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: (None)

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 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 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	0.081	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: (None)

Referenced Documents: Refrigeration Standard Measuresv1.xls

Bonus Incentives offered: None

Supplemental Information Collected on the Application: None

Algorithms used to calculate savings

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_D \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_D \times ISR$$

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) =

Non-coincident Demand Savings <small>(weighted average from Table 9.4.3-2)</small>	X	Demand Interactive Effects <small>(average from Table 9.4.3-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.4.3-1)</small>
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Energy Savings Calculation (per ft² curtain) =

Non-coincident Demand Savings <small>(weighted average from Table 9.4.3-2)</small>	X	Energy Interactive Effects <small>(average from Table 9.4.3-1)</small>	X	Hours of Operation <small>(average from Table 9.4.3-1)</small>
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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: (None)

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) =

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

Energy Savings Calculation (per foot of curtain) =

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

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) =

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

Energy Savings Calculation (per door) =

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

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:

Draft date: September 29, 2009
Effective date: September 29, 2009
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 measures 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 ΔkW = NLF x 0.000878 kW/foot

Measure Energy Savings ΔkWh = NLF x 18 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 ΔkW = NLF x 0.002287 kW/foot

Measure Energy Savings ΔkWh = NLF x 94 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 ft³

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 ft³

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 ft³

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 ft³

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) =

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

Energy Savings Calculation (per ft³) =

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

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 ft³

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 ft³

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) =

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

Energy Savings Calculation (per ft³) =

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

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 ft³

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 ft³

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) =

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

Energy Savings Calculation (per ft³) =

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

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 ft³

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 ft³

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) =

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

Energy Savings Calculation (per ft³) =

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

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 ft³

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 ft³

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
- Cannot be used if applying for an EC Motor incentive (BPR4 or BPR5)
- 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: (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 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) =

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

Energy Savings Calculation (per unit) =

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

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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_M \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_M \times \text{ISR}$$

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) =

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

Energy Savings Calculation (per unit) =

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

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 Act On Energy 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 Act On Energy On-line store purchase)

9.4.18 High Efficiency Ice Makers

Measure Code: BPR20

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:

- 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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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:

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:

- 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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_M \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_M \times \text{ISR}$$

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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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) =

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

Energy Savings Calculation (per unit) =

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

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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times N_M \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times N_M \times ISR$$

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
- Pre-approval is required for this measure (even if the incentive request is less than \$5,000)

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

Persistence: The persistence factor is assumed to be one.

Lifetimes: 4 years

Revision Details: None

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 condensor 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 ΔkW = NTS x 0.05 kW/ton/year

Measure Energy Savings ΔkWh = NTS x 552 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) =

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

Energy Savings Calculation (per tune up) =

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

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 (non-HVAC)	BPM1B

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: 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) =

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

Energy Savings Calculation (per motor) =

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

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 (non-HVAC)

Measure Code: BPM1B

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, 2011
- 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: (None)

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

$$\Delta \text{kWh} = \Delta \text{kWh}_S \times N_L \times \text{ISR}$$

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%.

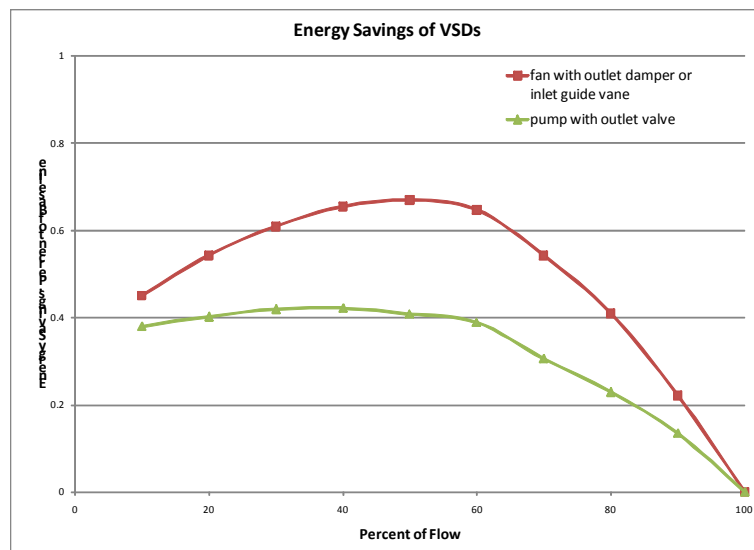
And the baseline energy use calculated as described below in the evaluation report:

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	\$75*

*(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 NEW
9.6.2	High Efficiency Tankless Water Heater (electric)	BPWH2 NEW
9.6.3	High Efficiency Tankless Water Heater (gas)	BPWH3 NEW
9.6.4	High Efficiency Condensing Tanked Water Heater (gas)	BPWH4 NEW
9.6.5	High Efficiency Tanked Water Heater (gas)	BPWH5 NEW

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 kWh 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
- 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: (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

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 kWh 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) =

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

Energy Savings Calculation (per unit) =

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

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
- Must have an Ameren Illinois Gas Delivery Service Rate of GDS2 to be eligible.

Eligibility Criteria for New Equipment:

- New equipment must be gas powered
- 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: (None)

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	1,684.92	1,232.87
10.0	4,543.95	3,324.84
15.0	7,402.99	5,416.82

Table 9.6.3-3 Calculated Demand and Energy Savings by Output

Output (gpm) at delta T 70	Energy Savings (therms)
5.0	452.05
10.0	1,219.11
15.0	1,986.17

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	\$300/heater
10.0	\$2,700	\$1,200	\$1,500	\$300/heater
15.0	\$4,200	\$1,800	\$2,400	\$300/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
- Must have an Ameren Illinois Gas Delivery Service Rate of GDS2 to be eligible.

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: (None)

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
- Must have an Ameren Illinois Gas Delivery Service Rate of GDS2 to be eligible.

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 (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)

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	1,684.92	1,555.31
Typical 80	4,543.95	4,194.42
Typical 100	7,402.99	6,833.53

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

Typical Tank Size (gal)	Demand Savings (therms)
Typical 50	129.61
Typical 80	349.53
Typical 100	569.46

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 Act On energy

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

9.7.1 Steamer (3-Pan)

Measure Code: BPCK1

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: (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

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_s \times \text{ISR}$$

$$\text{Measure Energy Savings } \Delta kWh = \Delta kWh_s \times \text{ISR}$$

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)
Commercial Kitchen	1	4,419

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.7.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.7.1-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.1-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.7.1-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.7.1-1)} \\ \hline \end{array}$$

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 Steamer (4-Pan)

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: (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 = 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)
Commercial Kitchen	1.2	5277

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =

Non-coincident Demand Savings (weighted average from Table 9.7.2-2)	X	Demand Interactive Effects (average from Table 9.7.2-1)	X	Coincident Diversity Factor (average from Table 9.7.2-1)
--	---	--	---	---

Energy Savings Calculation (per unit) =

Non-coincident Demand Savings (weighted average from Table 9.7.2-2)	X	Energy Interactive Effects (average from Table 9.7.2-1)	X	Hours of Operation (average from Table 9.7.2-1)
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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 Steamer (5-Pan)

Measure Code: BPCK3

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: (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

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_s \times \text{ISR}$$

$$\text{Measure Energy Savings } \Delta kWh = \Delta kWh_s \times \text{ISR}$$

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)
Commercial Kitchen	1.4	6135

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.3-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.7.3-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.7.3-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.3-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.7.3-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.7.3-1)} \\ \hline \end{array}$$

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 Steamer (6-Pan)

Measure Code: BPCK4

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: (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 = 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)
Commercial Kitchen	1.6	6993

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.7.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.7.4-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per unit) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.7.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.7.4-1)} \\ \hline \end{array}$$

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

Steamer	Incremental Cost	Incentive Payment
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6-pan Steamer	\$2,490	\$450/steamer
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9.7.5 Hot Holding Cabinet (Half)

Measure Code: BPCK5

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

$$\text{Measure Demand Savings } \Delta kW = \Delta kW_s \times \text{ISR}$$

$$\text{Measure Energy Savings } \Delta kWh = \Delta kWh_s \times \text{ISR}$$

 ΔkW = Gross customer connected load kW savings for the measure

 ΔkW_s = Gross customer connected load kW savings per ft³

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 ft³
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) =

Non-coincident Demand Savings <small>(weighted average from Table 9.7.5-2)</small>	X	Demand Interactive Effects <small>(average from Table 9.7.5-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.7.5-1)</small>
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Energy Savings Calculation (per ft³) =

Non-coincident Demand Savings <small>(weighted average from Table 9.7.5-2)</small>	X	Energy Interactive Effects <small>(average from Table 9.7.5-1)</small>	X	Hours of Operation <small>(average from Table 9.7.5-1)</small>
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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
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Half Size	\$2,069	\$3,782	\$1,713	\$200/cabinet
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9.7.6 Hot Holding Cabinet (3/4)

Measure Code: BPCK6

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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_S \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_S \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_S = Gross customer connected load kW savings per ft³

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 ft³

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) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \hline \text{(average from Table 9.7.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \hline \text{(average from Table 9.7.6-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per ft³) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \hline \text{(weighted average from Table 9.7.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \hline \text{(average from Table 9.7.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \hline \text{(average from Table 9.7.6-1)} \\ \hline \end{array}$$

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
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Three Quarter Size	\$2,069	\$3,782	\$1,713	\$300/cabinet
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9.7.7 Hot Holding Cabinet (full)

Measure Code: BPCK7

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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times \text{ISR}$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times \text{ISR}$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings per ft³

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 ft³

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) =

Non-coincident Demand Savings <small>(weighted average from Table 9.7.7-2)</small>	X	Demand Interactive Effects <small>(average from Table 9.7.7-1)</small>	X	Coincident Diversity Factor <small>(average from Table 9.7.7-1)</small>
--	---	--	---	---

Energy Savings Calculation (per ft³) =

Non-coincident Demand Savings <small>(weighted average from Table 9.7.7-2)</small>	X	Energy Interactive Effects <small>(average from Table 9.7.7-1)</small>	X	Hours of Operation <small>(average from Table 9.7.7-1)</small>
--	---	--	---	--

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
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9.7.8 Griddle

Measure Code: BPCK8

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 smaller 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: (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

$$\text{Measure Demand Savings} \quad \Delta kW = \Delta kW_s \times ft \times ISR$$

$$\text{Measure Energy Savings} \quad \Delta kWh = \Delta kWh_s \times ft \times ISR$$

ΔkW = Gross customer connected load kW savings for the measure

ΔkW_s = Gross customer connected load kW savings per ft³

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 ft³

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	651

Source: AOE Commercial Kitchen Data.xls

Demand Savings Calculation (per lineal foot) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(weighted average from Table 9.7.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand Interactive Effects} \\ \text{(average from Table 9.7.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident Diversity Factor} \\ \text{(average from Table 9.7.8-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per lineal foot) =

$$\begin{array}{|c|} \hline \text{Non-coincident Demand Savings} \\ \text{(weighted average from Table 9.7.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy Interactive Effects} \\ \text{(average from Table 9.7.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of Operation} \\ \text{(average from Table 9.7.8-1)} \\ \hline \end{array}$$

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

Fixture Technology	Incremental Cost	Incentive Payment
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Electric Griddle	\$800*	\$40.00 per lineal foot
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*Incremental cost for a three-foot griddle

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:

- Must be an Ameren Illinois GDS-2 gas delivery customer
- 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 Act On Energy 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

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 Energy Factor Assumptions

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

*assumed at 3 hours a day, for 365 days

Table 9.7.15-2 Specifications and Calculated Non-coincident Demand Savings

Configuration	Baseline Nozzle (therms used annually)	Efficient Nozzle (therms used annually)	Annual Therms Saved
Pre-rinse Spray Nozzle	876	383	493

Table 9.7.15-3 Calculated Demand and Energy Savings by Type of Business

Building Types	Annual therms saved
Commercial Kitchen	493

Table 9.7.15-4 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)

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

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) =

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

Energy Savings Calculation (per fan) =

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

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) =

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

Energy Savings Calculation (per fan) =

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

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) =

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

Energy Savings Calculation (per fan) =

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

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) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.4-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.4-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.4-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.4-1)} \\ \hline \end{array}$$

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 through 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) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.6-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per fan) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.6-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.6-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.6-1)} \\ \hline \end{array}$$

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
- Electrical timers with Thermostat – this verbiage was in CD's document, but we don't say this on the application
- A simple high amperage timer to control the engine block heaters.

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 ΔkW = n/a

Measure Energy Savings ΔkWh = $\Delta kWh_s \times N_F \times ISR$

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) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.8-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per timer) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.8-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.8-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.8-1)} \\ \hline \end{array}$$

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) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.9-2)} \end{array} \times \begin{array}{c} \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.9-1)} \end{array} \times \begin{array}{c} \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.9-1)} \end{array}$$

Energy Savings Calculation (per waterer) =

$$\begin{array}{c} \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.9-2)} \end{array} \times \begin{array}{c} \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.9-1)} \end{array} \times \begin{array}{c} \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.9-1)} \end{array}$$

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) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.10-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Demand} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Coincident} \\ \text{Diversity Factor} \\ \text{(average from Table 9.8.10-1)} \\ \hline \end{array}$$

Energy Savings Calculation (per waterer) =

$$\begin{array}{|c|} \hline \text{Non-coincident} \\ \text{Demand Savings} \\ \text{(weighted average from Table 9.8.10-2)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Energy} \\ \text{Interactive Effects} \\ \text{(average from Table 9.8.10-1)} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{Hours of} \\ \text{Operation} \\ \text{(average from Table 9.8.10-1)} \\ \hline \end{array}$$

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

9.9.1-9.9.26 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:

- Customers must be DS-2 delivery service
- 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 CFOs 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 CFOs offer, free shipping continued)

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				
	Measure	Cost to customer (regular price)	Cost to customer (sale price) 1-?-11 thru 5-31-11	Savings Claimed (kWh)
Free CFL offer				
9.9.1	3-pack (15/20/25W)	\$6.52	\$0	558.60
9.9.2	3-pack (25W)	\$6.00	\$0	614.4
CFLs				
9.9.3	15W 975 lumens (mini)	\$2.25	\$0.50	167.60
9.9.4	15W 1000 lumens	\$3.75	\$0.50	167.6
9.9.5	20W 1300 lumens	\$4.00	\$0.50	186.20
9.9.6	20W 1400 lumens	\$2.75	\$0.50	186.20
9.9.7	25W 1725 lumens	\$2.25	\$0.50	204.80
9.9.8	25W1800 lumens (micro max)	\$3.95	\$0.50	204.80
9.9.9	30W 2050 lumens	\$3.75	\$1.00	206.70
9.9.10	15W flood 750 lumens	\$6.50	\$1.75	167.60
9.9.11	23W flood 1300 lumens	\$6.50	\$1.75	286.70
9.9.12	14W globe 800 lumens	\$5.50	\$1.75	171.30
9.9.13	15 flood (dimmable) 720 lumens	\$13.50	\$4.98	167.60
LED Down Lights				
9.9.14	12W 650 lumens (module)	\$125.00	\$74.00	301.00
LED Exit Signs				
9.9.15	2W, double sided with battery backup	\$25.75	\$6.88	342.00
9.9.16	2.7W exit-sign bulbs	\$17.00	\$3.75	342.00
Power Strips				
9.9.17	10 outlet "Smart Strip"	\$32.50	NA	0.00
T8 Lamps and Ballasts				
9.9.18	32W, 1-2 lamp configuration	\$18.75	\$6.25	NA
9.9.19	32W, 2-3 lamp configuration	\$22.10	\$6.25	NA
9.9.20	32W, 3-4 lamp configuration	\$24.00	\$6.25	NA
9.9.21	32W T8 lamp 4' (case of 36)	\$120.00	\$108.00	61.25/lamp*
Vending Machine Controls				
9.9.22	Snack Miser (non-refrigerated) – wall mounted	\$79.00	\$24.50	387.00*
9.9.23	Snack Miser EZ (non-refrigerated) – machine mounted	\$79.00	\$24.50	387.00*
9.9.24	Vending Miser (refrigerated) – wall mounted	\$179.00	\$39.50	1,612.00*
9.9.25	Vending Miser EZ (refrigerated) – machine mounted	\$179.00	\$39.50	1,612.00*
Occupancy Sensor				
9.9.26	Wall-switch (PIR, controls 0-800W)	\$40.00	\$10.00	186.00

*savings information taken from the standard lighting program.

Shipping expenses

Order amount	Shipping total
under \$20	\$5.00
\$20.01 - \$40.00	\$7.50
\$40.01 - \$75.00	\$9.00
\$75.01 - \$125.00	\$12.00
\$125.01 - \$200.00	\$15.00
\$200.01+	\$18.00

Appendix A - Application Processing Checklist

Pre-Approval Procedures:

1. **Jenny Bethel** (Administrative Assistant) - Receive application via mail, fax, e-mail, or 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 Jenny Bethel with a copy to **Lance Escue** (Program Manager) immediately upon receipt along with a summary of any communications with the customer/ally prior to receipt of the incentive application.
2. **Jenny** - 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. **Jenny** - 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 publicly funded business or ComEd customer, notify the customer/program ally of their ineligibility status by e-mail and cc ComEd or DCEO (whichever is appropriate). Contact info for ComEd is comedsmartideas@kema.com and for DCEO is andrea.reiff@illinois.gov.
4. **Jenny** - Send "Confirmation of Receipt" e-mail to customer and contractor/program ally (if applicable). Copy Jon Carls (Key Account Executive Manager) and the KAE (Key Account Executive) on acknowledgement e-mail (if applicable). Also BCC ActOnEnergyProjects, David Gibson, and Margie Yankowski (Call Center) on all acknowledgment e-mails.
5. **Jenny** - Review incentive amount. If it is any type of project with an incentive request of \$25K 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 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 **Jenny's** dashboard indicating that an on-line application has been submitted. The link to the application is opened and the process outlines above is completed.

AIB and Project Tracking Log Entries -

1. Initial entries to AIB and Project Tracking Log: Jenny is the only one making initial entries into AIB and the Project Tracking Log.
2. Modifications to AIB: Jenny will make most AIB modifications such as project status change, customer/program ally updates and Estimated Completion Dates. TRs complete updates to the measures section.
3. Modifications to Project Tracking Log: Jenny will make ALL modifications to the Project Tracking Log.

TR responsibilities -

1. Review the application for missing and additional information requirements.
2. Continue communications with customer/ally via email with a cc to Jenny. Follow up with customer/ally by phone if necessary to resolve any open issues. Upload any correspondence in the "Notes" to record the results of any phone conversations with customer/ally.
3. Enter measure updates into AIB as required

4. For all applications assigned to Scott Schultz (mostly Grocery and Lighting) and Andy Vaughn (mostly Lighting and a few Grocery), secondary are to be sent for to Chris Durand for review. Scott may recommend pre-approval (without a secondary review) if the project has the incentive of \$500 or less. Projects assigned to Rod Rhoads(all HVAC and some lighting) do not require a secondary review if the project incentive is less than \$5,000. Applications assigned to Chris Durand(VFD and lighting), Dave Kilgore (Custom, VFD, HVAC, Lighting), Rob Miller, David Gibson to do require a secondary review unless the project incentive is over \$5,000.
5. All projects over \$5K require secondary review. Rod Rhoads sends all secondary reviews to Dave Kilgore. Dave Kilgore and Chris Durand sends secondary reviews to Rob Miller. Rob Miller sends secondary reviews to David Gibson, Chris Durand or David Kilgore. David Gibson sends secondary review to Rob Miller. **Projects assigned to David Gibson (as primary) are by request only.
6. Technical review duration should be NO MORE than 10 business days once all required technical information has been provided by the customer.

Pre-approval Letters and TR Communications

1. Jenny – When the TR and the secondary reviewer have made their recommendation, the project will show up on Jenny/Meaghan's dashboard to prepare and send pre-approval letter to customer/program ally. Also BCC: Selected TR, David Gibson, Cheryl Miller (AIU EE Business Program Manager), ActOnEnergyProjects and Margie Yankowski. Also, CC: Jon Carls and KAE (when applicable).
2. **Jenny** - Update AIB to reflect re-approval status and upload letter into the projects files.
3. **TRs** – As project completion dates are passed and no final paperwork has been submitted, the corresponding TRs are to follow for updated ECD, or request final paperwork.

Final Application Approval Procedures:

1. **Jenny** - Receive application for payment via mail, fax, or email (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 Jenny Bethel immediately upon receipt along with a summary of any communications with the customer/ally prior to receipt of the incentive application.*
2. **Jenny** - 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, David Gibson, and Margie Yankowski on all acknowledgment emails.
3. **Jenny** -
 - a. If the application is for payment has **SKIPPED** pre-approved, 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 and all projects \$5K or more.**
 - ii. **TRs will have an additional 10 day time frame for final approval recommendation**
 - b. If the application is for payment and **HAS** previously received a pre-approval letter: follow the next steps.
4. **Selected Technical Reviewer (TR)** –
 - a. Review invoices and measures.
 - b. If measures and amounts differ from the pre-approval, make notes in AIB when making recommendation and include the details of why it changed. (project scope and/or bonus)
 - c. For all applications assigned to Scott Schultz (mostly Grocery and Lighting) and Andy Vaughn (mostly Lighting and a few Grocery), secondary are to be sent for to Chris Durand for review. Scott may recommend approval (without

- d. All projects over \$5K require secondary review. Rod Rhoads sends all secondary reviews to Dave Kilgore. Dave Kilgore and Chris Durand send secondary reviews to Rob Miller. Rob Miller sends secondary reviews to David Gibson, Chris Durand or David Kilgore. David Gibson sends secondary reviews to Rob Miller
- 5. **Jenny** – Update AIB reflecting the “Approved” status
- 6. **Jenny** – Once recommendations’ are complete, Lane Escue will give final approval on each project and Approval for Payment letter is to customer and ally/contractor (if applicable). Also BCC: Selected TR, David Gibson, Cheryl Miller, ActOnEnergyProjects and Margie Yankowski. Also, CC: Jon Carls and KAE (if applicable).

REMINIDERS:

- **When dealing with AIB, Technical Reviewers are limited to updating measures only (DO NOT click the pre-approved or approved buttons).**
- **When dealing with the Project Tracking Log, Jenny will be the only one making changes.**

Appendix B – Program-Year One and -Two 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 projects³¹; 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 6/30/2011.³²
- **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 6/30/2011.³³
- **9/27/2010** – **New applications posted with updated requirements for water heaters.** Please see application editing notes for more specifics.

³¹ T12 custom projects using the T12 Phase-Out Bonus cannot use any of the other bonuses.

³² 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.

³³ *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 projects³⁴; 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.

³⁴ 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 Act on Energy 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 exiting equipment energy usage values. Act On Energy 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 Act on Energy. These baseline values are determined from industry accepted values and coded into the Act on Energy 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 Act on Energy. These baseline values are determined from industry accepted values and coded into the Act on Energy database.
- Calculation of energy savings: Savings are calculated based on the difference between the baseline energy value and the proposed system energy value.

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