

# **Consumers Energy Business Solutions Program**

*Everyone has the power to save.*

**Equipment Specifications**  
(2010 Program Year)

These specifications cover the measures that are available within the Consumers Energy Business Solutions Program. Please see the program application and policy and procedures manual for more details on the application process.

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## **P.1 EQUIPMENT SPECIFICATIONS**

The following provides the equipment specifications for the measures eligible for incentives. Note: All equipment must be recycled/disposed of according to state, federal and local regulations. Information about the requirements for the state of Michigan can be found at the Michigan Department of Environmental Quality Web site: <http://www.michigan.gov/deq/>.

### **LIGHTING**

#### ***P.1.1 Compact Fluorescent Lamps, Screw In***

Incentives are available to install screw in CFLs that are ENERGY STAR® rated lamps or meet ENERGY STAR criteria.

- **Compact Fluorescent Lamps, Screw In ( $\leq 31$  Watts)**  
Screw in CFLs must be ENERGY STAR rated lamps or meet ENERGY STAR criteria. The lamps must have  $\geq 50$  lumens per watt (LPW).
- **Compact Fluorescent Lamps, Screw In (31 Watts – 115 Watts)**  
High wattage CFLs must replace existing incandescent lamps. The lamp should have a minimum luminous efficacy of 65 lumens per watt (LPW).

#### ***P.1.2 Specialty Compact Fluorescent Lamps***

Incentives are available for replacing existing incandescent lamps, metal halide or induction lamps, or other non-CFL with Specialty CFLs (such as PAR, 3-way, dimmable). A specialty CFL is one that is not non-dimmable, bare spiral, and/or not single wattage. The lamps must meet ENERGY STAR criteria, if available for the type of lamp

#### ***P.1.3 Compact Fluorescent Fixtures***

Incentives are available for interior hardwired compact fluorescent fixtures. Only complete new fixtures or modular hardwired retrofits with hardwired electronic ballasts qualify. The compact fluorescent ballast must be programmed start or programmed rapid start with a power factor (PF)  $\geq 90$  and a total harmonic distortion (THD)  $\leq 20$  percent.

#### ***P.1.4 LED Lighting – Recessed Downlights***

LED recessed downlights must be ENERGY STAR qualified. They must have a minimum efficacy of 35 lumens per watt.

**P.1.5 Standard Linear Fluorescent Retrofit**

Incentives are available for replacing existing T12 lamps and magnetic ballasts with T8 or T5 lamps and electronic ballasts. The new fixture lamps must have a color rendering index (CRI)  $\geq$  80. The electronic ballast must be high frequency ( $\geq$ 20 kHz), UL listed, and warranted against defects for a minimum of five years. Ballasts must have a power factor (PF)  $\geq$  0.90. Ballasts for 4-foot lamps must have total harmonic discharge (THD)  $\leq$  20 percent at full power output. For 2-foot and 3-foot lamps, ballasts must have THD  $\leq$  32 percent at full light output. A manufacturer's specification sheet must accompany the application.

**P.1.6 High Performance 4-foot T8 Lamp and Ballast**

Incentives are available for replacing existing T12 lamps and magnetic ballasts with high performance T8 lamps and electronic ballasts. This measure is based on the Consortium for Energy Efficiency<sup>®</sup> (CEE<sup>®</sup>) high performance T8 specification ([www.cee1.org](http://www.cee1.org)) and is summarized in Table 8-1 on the following page. A list of qualified lamps and ballasts can be found at: <http://www.cee1.org/com/com-lt/com-lt-main.php3>. Both the lamp and ballast must meet the specification in order to qualify for an incentive. A manufacturer's specification sheet must accompany the application.

**Table 8-1: High Performance T8 Specifications**

High Performance T8 Characteristics					
Mean System Efficiency	≥ 90 Mean Lumens per Watt (MLPW) for Instant Start Ballasts				
	≥ 88 MLPW for Programmed Rapid Start Ballasts				
Performance Characteristics for Lamps					
Color Rendering Index (CRI)	≥ 80				
Minimum Initial Lamp Lumens	≥ 3100 Lumens <sup>1</sup>				
Lamp Life	≥ 24,000 Hours				
Lumen Maintenance or Minimum Mean Lumens	≥ 94 percent or ≥ 2900 Mean Lumens				
Performance Characteristics for Ballasts					
	Lamps	Low BF ≤ 0.85	Norm 0.85 < BF ≤ 1.0	High BF ≥ 1.01	
	Instant Start Ballast (BEF)				
	1	> 3.08	> 3.11	NA	
	2	> 1.60	> 1.58	> 1.55	
	3	≥ 1.04	≥ 1.05	≥ 1.04	
	4	≥ 0.79	≥ 0.80	≥ 0.77	
	Programmed Rapid Start Ballast (BEF)				
	1	≥ 2.84	≥ 2.84	NA	
	2	≥ 1.48	≥ 1.47	≥ 1.51	
	3	≥ 0.97	≥ 1.00	≥ 1.00	
	4	≥ 0.76	≥ 0.75	≥ 0.75	
	Ballast Frequency	20 to 33 kHz or ≥ 40 kHz			
	Power Factor	≥ 0.90			
	Total Harmonic Distortion	≤ 20 percent			

**P.1.7 Reduced Wattage 4-foot T8 Lamp and Ballast**

Incentives are available for replacing T12 systems with reduced wattage lamp and electronic ballast systems. The lamps and ballasts must meet the Consortium for Energy Efficiency<sup>®</sup> (CEE<sup>®</sup>) specification ([www.cee1.org](http://www.cee1.org)) and summarized in Table 8-2 on the following page. Qualified lamp and ballast products can be found at <http://www.cee1.org/com/com-It/com-It-main.php3>. Both the lamp and ballast must qualify in order to receive an incentive for the system. A manufacturer’s specification sheet must accompany the application.

**P.1.8 Reduced Wattage 4-foot T8 Lamps (Lamps Only)**

Incentives are available when replacing 32 Watt T8 lamps with reduced wattage T8 lamps when an electronic ballast is already present. The lamps must be reduced wattage in accordance with the Consortium for Energy Efficiency<sup>®</sup> (CEE<sup>®</sup>) specification ([www.cee1.org](http://www.cee1.org)) and summarized in

<sup>1</sup> For lamp with color temperatures ≥ 4500k. 2950 minimum initial lamp lumens are allowed.

Table 8-2 below. Qualified products can be found at <http://www.cee1.org/com/com-It/com-It-main.php3>. The nominal wattage must be 28W (≥ 2585 Initial Lumens) or 25W (≥ 2400 Initial Lumens) to qualify.

**Table 8-2: Reduced Wattage 4-foot Lamps and Ballasts**

Performance Characteristics for Lamps <sup>2</sup>		
Mean System Efficacy	≥ 90 MLPW	
Color Rendering Index (CRI)	≥ 80	
Minimum Initial Lamp Lumens	≥ 2585 Lumens for 28 W	
	≥ 2400 Lumens for 25 W	
Lamp Life <sup>3</sup>	≥ 18,000 hrs at three hours per start	
Lumen Maintenance –or- Minimum Mean Lumens <sup>4</sup>	≥ 94 percent -or- ≥ 2430 Lumens for 28 W ≥ 2256 Lumens for 25 W	
Performance Characteristics for 28 and 25 W Ballasts		
Ballast Frequency	20 to 33 Hz or ≥ 40 kHz	
Power Factor	≥ 0.90	
Total Harmonic Distortion	≤ 20 percent	
Performance Characteristics for Ballasts <sup>5</sup> , 28 W systems		
Ballast Efficiency Factor (BEF)	Instant Start Ballast (BEF)	
BEF = [BF x 100]/Ballast Input Watts Based on: (1) Type of ballast (2) No. of lamps driven by ballast (3) Ballast Factor	Lamps	All BEF Ranges
	1	≥ 3.52
	2	≥ 1.76
	3	≥ 1.16
	4	≥ 0.88
Performance Characteristics for Ballasts <sup>6</sup> , 25 W systems		
Ballast Efficiency Factor (BEF)	Instant Start Ballast (BEF)	
BEF = [BF x 100]/Ballast Input Watts Based on: (1) Type of ballast (2) No. of lamps driven by ballast (3) Ballast Factor	Lamps	All BEF Ranges
	1	≥ 3.95
	2	≥ 1.98
	3	≥ 1.32
	4	≥ 0.99

<sup>2</sup> Lamps ≥4500 K and/or 24,000 hours have a system efficiency specified ≥ 88 MLPW. Minimum initial and mean lumen levels are specified as follows: for 28 W lamps, limits are 2600/2340. For 25 W lamps, limits are 2300/2185.

<sup>3</sup> Life rating is based on an instant Start Ballast tested in accordance with ANSI protocols. When used for Program Start Ballast, life may be increased depending upon the operating hours per start.

<sup>4</sup> Mean lumens measures at 7,200 hours

<sup>5</sup> Multi-Voltage Ballasts must meet or exceed the listed Ballast Efficiency Factor when operated on at least one of the intended operating voltages.

<sup>6</sup> Multi-Voltage Ballasts must meet or exceed the listed Ballast Efficiency Factor when operated on at least one of the intended operating voltages.

**P.1.9 Permanent Lamp Removal (Pre-notification is required)**

Incentives are paid for the permanent removal of existing fluorescent lamps. Permanent lamp removal is the net reduction in the quantity of lamps after a project is completed. Customers are responsible for determining whether or not to use reflectors in combination with lamp removal in order to maintain adequate lighting levels. Lighting retrofits are expected to meet the Illuminating Engineering Society of North America (IESNA) recommended light levels. Unused lamps, lamp holders, and ballasts must be permanently removed from the fixture and disposed of in accordance with local regulations. This measure is applicable when retrofitting from T12 lamps to T8 lamps only. Removing lamps from a T12 fixture that is not being retrofitted with T8 lamps are not eligible for this incentive.

**P.1.10 Exit Signs**

Incentives for high-efficiency exit signs are available and must replace or retrofit an existing incandescent exit sign. Electroluminescent, T1, and light-emitting diode (LED) exit signs are eligible under this category. Non-electrified and remote exit signs are not eligible. All new exit signs or retrofit exit signs must be UL or ETL listed, have a minimum lifetime of 10 years, and have an input wattage  $\leq 5$  Watts per face or be ENERGY STAR<sup>®</sup> qualified.

**P.1.11 LED Traffic and Pedestrian Lights**

Incentives are available for LED traffic lights on a per-signal basis (including arrows) that replace or retrofit an existing incandescent traffic signal. At minimum, red and green lamps must be retrofitted to qualify for the signal incentive. Signals shall have a maximum LED module wattage of 17. Incentives are not available for spare lights. Lights must be hardwired, with the exception of pedestrian hand signals.

**P.1.12 Lighting Controls**

Incentives for passive infrared, ultrasonic detectors and fixture-integrated sensors or sensors with a combination thereof are eligible. All sensors must be hard-wired and control interior lighting fixtures. To assist in incentive processing, please provide the inventory of the controlled fixtures with the Final Application.

- **Lighting Occupancy Sensors**

Passive infrared, ultrasonic detectors and fixture-integrated sensors or sensors with a combination thereof are eligible. All sensors must be hard-wired and control interior lighting fixtures. To assist in incentive processing, please provide the inventory of the controlled fixtures with the Final Application.

- **Central Lighting Control**

Incentives are available for automated central lighting control systems with override capabilities. The occupants' schedule of operation must be taken into consideration when programming the system. This measure includes time clocks, package programmable relay panels, and complete building automation controls. Photo sensors may also be incorporated into the central lighting control system. Incentive is calculated per square foot of lighting controlled.

- **Switching Controls for Multilevel Lighting**

This measure should be used with daylight or occupancy sensors and is applicable to spaces that require various lighting schemes (ex. classrooms, auditoriums, conference rooms). Multilevel lighting switching controls are also applicable to warehouse settings with skylights, where they can be combined with occupancy sensors and/or daylight controls. When combined with daylight or occupancy sensors, commissioning is highly recommended to ensure proper performance of the switching controls. Incentive is calculated per square foot of lighting controlled.

- **Daylight Sensor Controls**

Incentives are available for daylight sensor controls in spaces with reasonable amounts of sunlight exposure and areas where task lighting is not critical. The controls can be on/off, stepped or continuous (dimming). The on/off controller should turn off artificial lighting when the interior illuminance meets the desired indoor lighting level. The stepped controller generally dims the artificial lighting 50 percent when the interior illuminance levels reach 50 percent of the desired lighting levels. Continuous or dimming controllers dim artificial lighting proportional to the available daylight. All types of daylight sensor controls are required to be commissioned in order to ensure proper sensor calibration and energy savings. Incentive is calculated per square foot of lighting controlled.

### ***P.1.13 Exterior or Garage Lighting***

Incentives are available in exterior or garage applications for replacing existing high intensity discharge fixtures with LED or Induction fixtures. Fixture replacement must result in at least a 40 percent power reduction. LED fixtures should have a minimum efficacy of 35 lumens per watt. Applications include canopy lighting and wall packs. This measure is applicable to exterior fixtures that are typically on about 12 hours a night. Photocells or time clocks should be utilized at facilities that do not control exterior fixtures during daylight hours.

#### **Exterior Lighting, Bi-level Control with Override**

Incentives are available for installing exterior bi-level controls to HID lighting that reduce lighting levels by at least 50 percent when the space is unoccupied. The HID lighting must have an electronic ballast capable of reduced power levels, and be coupled with motion sensors to bring the light back to full lumen output for security reasons. The controls include on/off controls,

dimmers, and hi-lo ballast controls. This measure is applicable to exterior fixtures that are on during the night.

**P.1.14 New T8/T5 Fluorescent Fixtures (Pre-notification is required)**

Incentives for this measure require replacing one or more existing fixtures with new fixtures containing T8 or T5 lamps and electronic ballasts. The T8 or T5 lamps must have a color rendering index (CRI)  $\geq 80$ . The electronic ballast must be high frequency ( $\geq 20$  kHz), UL listed, and warranted against defects for five years. Ballasts must have a power factor (PF)  $\geq 0.90$ . Ballasts for 4-foot lamps must have total harmonic distortion (THD)  $\leq 20$  percent at full light output. For 2- and 3-foot lamps, ballasts must have THD  $\leq 32$  percent at full light output. High output T5/T8 lamps also qualify for this incentive. This incentive can be used in high-bay and low-bay fluorescent applications. Specifications of the new fixtures, lamps and ballasts, must accompany the final application. If specification sheets are not included, the default fixture wattages provided in the table below will be used instead. Incentives are only available for new fixtures. Retrofit kits are not considered to be new fixtures.

**Table 8-3: Default Fixture Wattages (Standard Linear Fluorescent)**

Fixture Description	Default Fixture Wattage
1-lamp, 4-foot F32 T8	31
2-lamp, 4-foot F32 T8	58
3-lamp, 4-foot F32 T8	85
4-lamp, 4-foot F32 T8	112
1-lamp, 8-foot F59 T8	58
2-lamp, 8-foot F59 T8	112
1-lamp, 2-foot F17 T8	20
2-lamp, 2-foot F17 T8	33
3-lamp, 2-foot F17 T8	48
4-lamp, 2-foot F17 T8	63
1-lamp, 3-foot F25 T8	26
2-lamp, 3-foot F25 T8	43
3-lamp, 3-foot F25 T8	78
4-lamp, 3-foot F25 T8	86
1-lamp, 4-foot F28 T5	32
2-lamp, 4-foot F28 T5	65
3-lamp, 4-foot F28 T5	93
4-lamp, 4-foot F28 T5	126

**Table 8-4: Default Fixture Wattages  
(High Output and High Performance Linear Fluorescent)**

Fixture Description	Default Fixture Wattage
1-lamp, 4-foot F32 T8 HP ballast	38
2-lamp, 4-foot F32 T8 HP ballast	74
3-lamp, 4-foot F32 T8 HP ballast	110
4-lamp, 4-foot F32 T8 HP ballast	144
6-lamp, 4-foot F32 T8 HP ballast	220
2-lamp, 8-foot T8 HO	160
1-lamp, F54 T5 HO	62
2-lamp, F54 T5 HO	122
3-lamp, F54 T5 HO	185
4-lamp, F54 T5 HO	243
6-lamp, F54 T5 HO	365
8-lamp, F54 T5 HO	486

\*HP = High Power

**Table 8-5: Default Fixture Wattages (Metal Halides and High Pressure Sodium)**

Fixture Description	Default Fixture Wattage
32W HID	43
50W HID	72
75W HID	93
100W HID	128
150W HID	190
175W HID	210
250W HID	290
360W PS HID	365
400W HID	455
750W HID	850
1000W HID	1080
1500W HID	1610
2-lamp, 8-foot T12 HO	210
2-lamp, 8-foot T12 VHO	380
2-lamp, 8-foot T12	132
4-lamp, 8-foot T12	264

**P.1.15 Examples of Common Lighting Retrofits**

Examples of the incentives associated with common retrofits found in the commercial sector are shown in the tables below. In order to calculate the incentives for replacing metal halides with new T8 and T5 fixtures, the applicant must provide the wattage reduction from the retrofit.

**Table 8-6: Metal Halide to New T8/T5 Common Retrofit Examples**

Existing Measure	Retrofitted Measure	Wattage Reduction	Incentive
250W MH	3-lamp, 4-foot T5 HO	105	\$36.75
400W MH	4-lamp, 4-foot T5 HO	212	\$74.20
400W MH	6-lamp, 4-foot T5 HO	90	\$31.50
750W MH	8-lamp, 4-foot T5 HO	364	\$127.40
1000W MH	Two 6-lamp, 4-foot T5 HO	350	\$122.50
150-175W MH	3-lamp, 4-foot F32 T8	115	\$40.25
250W MH	4-lamp, 4-foot F32 T8 HP ballast	146	\$51.10
400W MH	6-lamp, 4-foot F32 T8 HP ballast	235	\$82.25
400W MH	8-lamp, 4-foot F32 T8 HP ballast	167	\$58.45
1000W MH	Two 8-lamp, 4-foot F32 T8	504	\$176.40
4-lamp, 8-foot T12 HO	4-lamp, 4-foot T5 HO	177	\$61.95

**HVAC (ELECTRIC)**

**P.1.16 Unitary and Split Air Conditioning Systems and Air Source Heat Pumps**

New unitary air conditioning units or air source heat pumps that meets or exceeds the qualifying cooling efficiencies shown in the HVAC Electric Incentives Table 6-2 are eligible for an incentive. They can be either split systems or single package units. The efficiency of split systems is based on an ARI reference number. Water-cooled systems, evaporative coolers, and water source heat pumps do not qualify under prescriptive, but may qualify for a custom incentive. All packaged and split system cooling equipment must meet Air Conditioning and Refrigeration Institute (ARI) standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC). A manufacturer's specification sheet indicating the system efficiency must accompany the application. Disposal of the existing unit must comply with local codes and ordinances. Incentives for heat pumps are available only for the replacement of an existing heat pump.

**P.1.17 Room Air Conditioners**

Incentives are available for room air conditioning units that are through-the-wall (or built-in) self-contained units that are 2 tons or less. There are two eligible efficiency levels as listed by the CEE<sup>®</sup> ([www.cee1.org](http://www.cee1.org)). A unit must qualify under ENERGY STAR<sup>®</sup> standards. The minimum requirements and eligible equipment are listed in the CEE<sup>®</sup> high efficiency room air conditioning specifications ([www.cee1.org](http://www.cee1.org)). These units are with and without louvered sides, without reverse cycle (i.e., heating), and casement. The qualifying efficiencies are provided in Table 8-7 below. Disposal of existing unit must comply with local codes and ordinances.

**Table 8-7: Qualifying A/C efficiencies**

Size (Btuh)	2000 ENERGY STAR <sup>®</sup> (EER)
< 8,000 (< 0.67 tons)	10.7
8,000 - 13,000 (0.57 - 1.2 tons)	10.8
14,000 - 19,999 (1.3 - 1.7 tons)	10.7
≥ 20,000 (>1.7 tons)	9.4

**P.1.18 Package Terminal AC and Heat Pump Units (PTAC/PTHP)**

Incentives are available for package terminal air conditioners and heat pumps that are through-the-wall self contained units that are two tons (24,000 Btuh) or less. Only units that have an EER greater than or equal to  $11.99 - (0.234 * \text{Capacity} / 1000)$ , where capacity is in Btuh, qualify for the incentive (10 percent above IECC 2006 Standard). All EER values must be rated at 95°F outdoor dry-bulb temperature.

**P.1.19 Ground-source Heat Pumps**

New ground source heat pumps that meet or exceed the qualifying Energy Efficiency Ratio (EER) as listed in the HVAC Incentive Worksheet Table are eligible for an incentive. Equipment with an EER equal to 17 receives a fixed incentive; equipment with an EER value greater than the qualifying value will be paid \$1.00 per 0.1 EER incremental increase. All equipment must meet Air Conditioning and Refrigeration Institute (ARI) standards (325 or 330) and be UL listed. EER is the efficiency at standard (ARI/ISO) conditions of 77°F entering water for closed-loop models and 59°F entering water for open-loop systems. A manufacturer's specification sheet indicating the system efficiency for cooling and heating must accompany the application. Disposal of the existing unit must comply with local codes and ordinances. Incentives for heat pumps are available only for the replacement of an existing heat pump.

**P.1.20 Air- and Water-cooled Chillers**

Chillers are eligible for an incentive if they have a rated kW/ton for the Integrated Part Load Value (IPLV) and/or EER that is less than or equal to the qualifying Level 1 (10 percent below IECC 2006 standard) efficiency shown in the table below. The chiller efficiency rating must be based on ARI Standard 550/590-2003 for IPLV and/or 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's specification sheet with the rated full load kW/Ton or COP and kW/Ton-IPLV or COP-IPLV must accompany the application. Qualifying efficiencies for chillers are summarized in Table 8-8 below. There is a fixed incentive for reaching the minimum qualifying efficiency, and incremental incentives for every 0.01 kW/ton-IPLV reduction from the minimum required.

**Table 8-8: Water Cooled Qualifying Chiller Efficiencies (kW/ton)**

Equipment Category	Capacity Range (Btu/hr)	IPLV	Full Load
Screw, Scroll, or Helical-Rotary	<150 tons	0.612	0.711
	150 – 300 ton	0.567	0.648
	> 300 ton	0.513	0.576
Centrifugal	<150 tons	0.603	0.630
	150 – 300 ton	0.540	0.567
	> 300 ton	0.495	0.522
Reciprocating	All	0.630	0.753

**GAS****General Clause for Heating Measures**

The incentive is eligible only for retrofit projects using natural gas as the primary fuel source. If a dual-fuel system is used, or if natural gas is the back-up or redundant fuel, the custom incentive application should be used. The incentives for boilers are only available for equipment used in space heating conditions, except for steam traps. Equipment for process load qualifies under the custom program.

**P.1.21 Steam Trap Survey and Repair/Replacement**

The customer may apply for the survey incentive, the repair incentive, or both. The **survey** incentive is available for all steam traps, functional, failed closed, or plugged. The **repair** incentive is only available for repair or replacement of traps that have malfunctioned and **are leaking steam**. It is not available for traps which have failed closed or are plugged. The

incentive is available once in a 24 month period per facility. Replacement with an orifice trap is not eligible for incentive. Steam trap survey and repair work must be recorded and attached to the incentive application by the vendor. A spreadsheet with survey/repair/replacement results must be provided. The spreadsheet at a minimum must contain:

- System nominal steam pressure
- Annual hours of operation
- Number of steam traps serviced
- Per steam trap:
  - ID tag number
  - Location type of trap
  - Type of trap
  - Orifice size (if repair or replaced)
  - Condition:
    - Functioning
    - Malfunctioning, not leaking steam
    - Malfunctioning, leaking steam
  - Survey/repair date
  - Survey/repair technician

**P.1.22 High Efficiency Space Heating Boiler**

Boiler incentives are only available for equipment used in space heating conditions. Equipment for process loads do not qualify. Boilers purchased for backup or redundancy are not eligible. Boilers must modulate their firing rate and have a sealed combustion unit. Applicant must submit boiler specifications with steady state boiler input and output ratings. The ratings will be defined per ANSI Standard Z21.13 and use supply and return water temperatures. Note that high efficiency condensing boilers will provide the rated efficiency only if return water is cold enough to condense the flue gases. If the heating system cannot meet the requirement, a non-condensing boiler may be a better choice. Qualifying efficiencies are shown in Table 8-9 below. For units with an input rating less than 300,000 Btu/h, the efficiency should be given as an AFUE value. For units with an input rating greater than or equal to 300,000 Btu/h, the efficiency should be given as a combustion efficiency value.

**Table 8-9:** Minimum Efficiency Requirements for High Efficiency Space Heating Boilers

Incentive Level	Minimum Efficiency
Level 1	≥86% - < 90%
Level 2	≥90%

### **P.1.23 Boiler Tune-up**

This incentive is only available for natural gas space-heating boilers. The minimum burner size for measure eligibility is 110,000 Btuh. The incentive is available once in a 24 month period. The service provider must perform before and after combustion efficiency tests and record the results on the boiler tune-up incentive application. Burner must be adjusted to improve combustion efficiency as needed. The incentives are only available for equipment used in space heating conditions. Equipment for process load does not qualify. Please provide a document with the following information:

- Boiler annual hours of operation
- Technician performing tune-up
- The contractor or technician performing the tune-ups needs to initial that each requirement listed below has been completed to qualify for the incentive:
  - Measure pre and post combustion efficiency using an electronic flue gas analyzer.
  - Include a copy of the combustion analyzer test
  - Adjust air flow and reduce excessive stack temperatures
  - Adjust burner and gas input, manual or motorized draft control
  - Clean burners, combustion chamber and heat exchange surface, when weather or operating schedule permits
  - Seal combustion chamber
  - Clean and inspect burner nozzles
  - Check for proper venting
  - Complete visual inspection of system piping and installation
  - Check safety controls
  - Check adequacy of combustion air intake
  - Provide the following data:
    - Date of tune-up
    - Unit Input capacity (MBtuh)
    - Boiler information(location, make & model #)
    - Type (hot water, low pressure steam, high pressure steam)
    - Combustion efficiency (pre and post)
    - Stack temperature (pre and post)
    - Oxygen level (pre and post)
    - Carbon dioxide (pre and post)
    - Carbon monoxide (pre and post)

### **P.1.24 Boiler Modulating Burner Control**

Incentives are available for boiler modulating burner controls. The control must have a turn-down ratio of 5 to 1 or greater. Boiler must operate a minimum of 4,000 hours per year to be eligible for this incentive. The incentive is eligible only for retrofit projects, not for new controls on a new boiler. The incentives are only available for equipment used in space heating conditions.

**P.1.25 Boiler Water Reset Control**

Incentives are available for boiler water reset controls. Outside air temperature reset or cutout control incentives are for existing space heating boilers only. A new boiler with boiler reset controls is not eligible. The system must be set so that the minimum temperature is not more than 10 degrees above manufacturer's recommended minimum return temperature. For controls on multiple boilers to qualify, control strategy must stage the lag boiler(s) only after the first boiler stage(s) fail to maintain the boiler water temperature called for by the reset control.

**P.1.26 Pipe Wrap – Steam Boiler**

Incentives are available for pipe wrap on a steam boiler. A minimum of 1 inch of R-4 pipe insulation must be added to existing bare commercial or industrial steel pipe system applications. The bare pipe size must be at least ½ inch or larger. A minimum of 10 linear feet of pipe must be insulated. Insulation used for pipes should be high density fiberglass shaped for pipes and blankets, batts of fiberglass or mineral wool for flat sections. Applications must include the manufacturer's name, insulation material type, and the material k-value or R-value rating. All hot surfaces should be insulated.

**P.1.27 Condensing Furnace**

Condensing furnaces must be 92 percent AFUE (Annual Fuel Utilization Efficiency) or greater and have a sealed combustion unit. Air handlers are not eligible for the incentive. Chimney liners must be installed where a high efficiency natural gas furnace replaces atmospherically drafted equipment that was vented through the same flue as a gas water heater. Flue closure protocol must be used when a high efficiency furnace is installed and the chimney is no longer in use. The incentives are available only for equipment used in space heating conditions. Equipment purchased for backup or redundancy is not eligible. Rooftop units also qualify.

**P.1.28 Infrared Heaters**

Only building space heating applications are eligible for this incentive. High-intensity and low-intensity heaters are eligible. Low-intensity heaters must use outside non-conditioned air for combustion. Heaters must have electronic ignition.

**P.1.29 Programmable Thermostat**

Incentives are available for programmable thermostats. Programmable thermostats must meet ENERGY STAR® criteria and must replace any non-programmable thermostat to automatically adjust the temperature at pre-selected times. To meet ENERGY STAR standards, they must be capable of maintaining two separate programs (to address the different comfort needs of

weekdays and weekends) and up to four temperature settings for each program. A current list may be found at

[http://downloads.energystar.gov/bi/qplist/prog\\_thermostat\\_prod\\_list.pdf](http://downloads.energystar.gov/bi/qplist/prog_thermostat_prod_list.pdf).

### **P.1.30 Guest Room Energy Management Control (Gas Heat)**

Incentives are available for sensors that control PTAC, heat pump, and other HVAC units for individual hotel rooms. Sensors controlled by a front desk system are not eligible. Sensors must be controlled by automatic occupancy detectors, and it is recommended that during unoccupied periods, the default setting for controlled units differ by at least 8 degrees from the operating set point. The incentive is per guest room controlled, not per sensor; for multi room suites the incentive is available per room controlled, if a sensor is installed in each room. Replacement or upgrades of existing occupancy-based controls are not eligible as a prescriptive incentive.

### **P.1.31 Demand Control Ventilation**

Incentive are available to install ventilation controls on existing buildings that use carbon dioxide levels to measure occupancy and modify the percentage of outside air based on variable levels. Only building with space heating and cooling applications are eligible. Conditioned spaces must be kept between 65°F and 75°F during operating hours. Systems must have current fresh air requirements equal or greater to 10 percent of supply air requirements. Carbon dioxide (CO<sub>2</sub>) sensors must be installed in conjunction with fully functioning air side economizers. Dual temperature air-side economizers with zone-level CO<sub>2</sub> sensors for rooftop units qualify, and return system CO<sub>2</sub> sensors are required for built up systems. Controlled space must meet the minimum requirements of the current ASHRAE 62 standard, as well as all local building code, and manufacturer's recommendations. Incentive is calculated per square foot controlled.

### **P.1.32 Water Heat Pipe Wrap – Hot Water Boiler**

To qualify for this incentive, a minimum of 1 inch of R-4 pipe insulation must be added to existing bare commercial or industrial steel pipe system applications. The bare pipe size must be at least ½ inch or larger. A minimum of 10 linear feet of pipe must be insulated. Insulation used for pipes should be high density fiberglass shaped for pipes and blankets, batts of fiberglass or mineral wool for flat sections. Applications must include the manufacturer's name, insulation material type, and the material k-value or R-value rating. All hot surfaces should be insulated.

### **P.1.33 Pre-rinse Sprayers - < 1.6 gpm (Gas Water Heater)**

To qualify for this incentive, the low-flow, high efficiency pre-rinse sprayer must be less than or equal to 1.6 gallons per minute (gpm) must replace a sprayer of 2.2 gpm or greater. Most

installed sprayers are 2.5 gpm or greater. Customer must be a gas customer of the utility, and use gas fueled water heating.

#### **P.1.34 Gas Storage Water Heater**

To qualify for this incentive, the heater must replace existing natural gas water heater that meets the criteria in Table 8-10 shown below.

**Table 8-10:** Minimum efficiency requirements for gas storage water heaters.

Size (Gallons)	Minimum Efficiency
≤80	0.62 Energy Factor
>80	88% Thermal Efficiency

#### **P.1.35 Gas Tankless Water Heater**

To qualify for this incentive, the heater must replace existing natural gas water heater. Unit must be power vented with an Energy Factor of 0.82 or greater.

#### **P.1.36 High Efficiency Clothes Washer (Gas Water Heater)**

Incentives are available for high efficiency clothes washers that use a gas water heater. The high efficiency clothes washers wash more clothes than standard clothes washers that are Department of Energy (DOE) 2007 compliant while using less water and energy. The annual cycles per washer per year is assumed to be 950 cycles for commercial high efficiency clothes washers. Qualified clothes washers must meet a minimum efficiency of CEE<sup>®</sup> Tier 2, with a Modified Energy Factor (MEF) ≥ 2.00 and a Water Factor (WF) ≤ 6.00.

#### **P.1.37 High Efficiency Pool Heater**

Incentives are available for high efficiency pool heaters. Heater must be equal to or greater than 84 percent thermal efficiency and must replace pre-existing pool heater. Heater must be rated between 500,000 Btuh and 2,000,000 Btuh. Must have an on/off switch and have no pilot light. The pool heater cannot be used as a back-up for solar water-heating.

#### **P.1.38 Pool Covers**

To qualify for this incentive, the pool size must be between 400 square feet and 4,000 square feet to qualify for the incentive. Equipment must be new, and the cover must be a manual, semi-automatic or automatic pool cover.

## **MOTORS & DRIVES**

### **P.1.39 NEMA Premium Motors**

Motors eligible for an incentive are three-phase AC induction motors, 1 HP to 250 HP, of open drip-proof (open) and totally enclosed fan-cooled (closed) classifications. Rewound motors do not qualify. Incentives are based on the motor's Nominal Full Load Efficiencies, tested in accordance with IEEE (Institute of Electrical and Electronics Engineers) Standard 112, method B, that meet or exceed the NEMA Premium efficiency standards on the Motor Incentives Worksheet. The application must include the manufacturer's performance data sheet that at least shows equipment type, equipment size, model number, and efficiency rating. Customers should consider matching RPMs of the existing pump or fan when installing energy efficient motors that inherently have higher speeds (less slip), which may affect electric energy use.

**Program incentives for this measure are available until December 19, 2010. Per new federal efficiency standards enacted in H.R. 6, all general purpose motors (subtype I) manufactured after December 19, 2010, with a power rating between 1 horsepower and 200 horsepower are required to have nominal full-load efficiencies equal to or greater than the NEMA MG- 1 (2006) Table 12-12 (aka "NEMA Premium®" efficiency) levels.**

### **P.1.40 Variable Frequency Drives**

- **Variable Frequency Drives on HVAC Fans and HVAC Pumps**

Variable-frequency drives (VFDs) installed on existing HVAC fans and HVAC pumps are eligible for this incentive. Redundant or back-up units do not qualify. New chillers with integrated VFDs are eligible under the chiller incentive and installing VFDs on existing chillers and package unit compressors may be eligible under the custom incentive. VFDs on new equipment are not eligible. The installation of a VFD must accompany the permanent removal or disabling of any throttling devices such as inlet vanes, bypass dampers, and throttling valves. VFDs for non-HVAC applications may be eligible for a custom incentive, which include process motors (except smaller process pumping applications), chillers, and air compressors. The incentive is per controlled HP.

- **Variable Frequency Drives for Process Pumping**

VFD must be used in conjunction with a process (non HVAC) pumping application. Redundant or back-up units do not qualify. Routine replacement of existing VFDs does not qualify. VFD speed must be automatically controlled by differential pressure, flow, temperature, or other variable signal. The installation of a VFD must accompany the permanent removal or disabling of any throttling devices such as throttling valves. To

qualify for this incentive, the pump must operate at least 2,000 hours per year. The incentive is per controlled HP and only eligible for controlled motors less than or equal to 50 HP.

## **MISCELLANEOUS**

### ***P.1.41 Beverage Vending Machine Controllers***

Incentives are available for certain beverage vending machine controllers. The controller must include a passive infrared occupancy sensor to turn off fluorescent lights and other vending machine systems when the surrounding area is unoccupied for 15 minutes or longer. Also, the control logic should power up the machine at a minimum of every two hours to maintain product temperature and provide compressor protection. For refrigerated beverage machines located indoors, backlighting lamps and ballasts should be removed to obtain additional energy savings.

### ***P.1.42 Hotel HVAC Occupancy Sensor (Electric Heat)***

Incentives are available for sensors that control PTAC, heat pump, and other HVAC units for individual hotel rooms. Sensors controlled by a front desk system are not eligible. Sensors must be controlled by automatic occupancy detectors, and it is recommended that during unoccupied periods, the default setting for controlled units differ by at least 8 degrees from the operating set point. The incentive is per guest room controlled, not per sensor; for multi-room suites the incentive is available per room controlled, if a sensor is installed in each room. Replacement or upgrades of existing occupancy-based controls are not eligible as a prescriptive incentive.

### ***P.1.43 Intelligent Surge Protector***

Incentives are available for surge protectors with built-in plug-load detection and control capabilities. The intelligent surge protector (power strip) must include at least one uncontrolled socket which a primary device would be connected to. Turning the primary device (usually a computer) on or off will subsequently turn the associated controlled devices in the power strip on or off (ex. printers, monitors, etc.). The intelligent power strip may also contain sockets for devices that require a constant supply of power; these will not be affected by the control device.

### ***P.1.44 Energy Efficient Ice Makers***

The incentive offering covers ice machines that generate 60 grams (2 oz.) or lighter ice cubes, flaked, crushed, or fragmented ice. Only air-cooled machines qualify (self-contained, ice-making heads, or remote condensing). The machine must have a minimum capacity of 101 pounds of ice per 24-hour period. The minimum efficiency required is per ENERGY STAR® or CEE® Tier 2 ([www.cee1.org](http://www.cee1.org)). A manufacturer's specification sheet must accompany the application shows rating in accordance with ARI Standard 810.

**P.1.45 Pre-rinse Sprayers < 1.6 gpm with electric hot water heating**

To qualify for this incentive, a low-flow, high efficiency pre-rinse sprayer less than or equal to 1.6 gallons per minute (gpm) must replace a sprayer of 2.2 gpm or greater. Most installed sprayers are 2.5 gpm or greater. Customer must be an electric customer of the utility, and use electric hot water heating.

**P.1.46 LED Lighting for Refrigeration Cases**

Incentives are for replacing fluorescent refrigerated case lighting with light-emitting diode (LED) source illumination. Fluorescent lamps, ballasts, and associated hardware are typically replaced with pre-fabricated LED light bars and LED driver units.

**P.1.47 Anti-sweat Heater Controls**

Incentives are available for anti-sweat heater controls. To qualify for this incentive, a control device is installed that senses the relative humidity in the air outside of the display case and reduces or turns 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. The incentive is based on the total number of doors controlled on the case.

**P.1.48 Night Covers**

Incentives are available for night covers installed on open refrigerated display cases in supermarkets and grocery stores. The purpose of night covers is to reduce the amount of heat loss from the open refrigerated display cases during facility non-operating hours. The store must have a minimum of six non operating hours per day for this measure to qualify. To decrease moisture build-up, it is recommended that the night covers are perforated. Applicant should consider using proper compressor capacity modulation and ensure the case manufacturer has no objections to use of a night cover.

**P.1.49 Network Power Management Software**

This measure is for the control of desktop computers only. Installation must allow centralized control at the server level of the power management settings (sleep mode and shutdown) of desktop computers on a distributed network. The software must have a reporting feature that allows monitoring and validation of energy savings. Qualifying software must result from: a new installation, where none previously existed; or an upgrade of an operating system or other network support software where the desktop computer power management function did not previously exist. When contacted, customers must allow Consumers Energy access to customers' property site to verify: the software installation, the location of the installed control

software (at the server level), and the number of desktop computers controlled by the system. This measure is not applicable for the control of laptop and laptop stations.

A copy of the software license agreement and a report (print-out) directly from the network energy management software that shows (a) the location and (b) the number of desktop computers that are being controlled by the system must be attached to and included with the final application.

#### **P.1.50 Barrel Wraps for Injection Molders and Extruders**

Insulated blankets strapped around barrels of extruders or injection molders are eligible for this incentive. Blankets must be installed on previously un-insulated barrels, in accordance with manufacturer recommendations.

#### **P.1.51 Demand Control Ventilation**

Install ventilation controls on existing buildings that use carbon dioxide levels to measure occupancy and modify the percentage of outside air based on variable levels. Only buildings with space heating and cooling applications are eligible. Conditioned spaces must be kept between 65°F and 75°F during operating hours. Systems must have current fresh air requirements equal or greater to 10 percent of supply air requirements. Carbon dioxide sensors must be installed in conjunction with fully functioning air side economizers. Dual temperature air-side economizers with zone-level CO<sub>2</sub> sensors for rooftop units qualify, and return system CO<sub>2</sub> sensors are required for built up systems. Controlled space must meet the minimum requirements of the current ASHRAE 62 standard, as well as all local building code, and manufacturer's recommendations. Incentive is calculated per square foot controlled.

#### **P.1.52 Engineered Nozzle**

Incentives are available for engineered nozzles that replace simple open pipe/tube assemblies connected to a compressed air system. Usage of the nozzles must be 2,000 hours or greater per year. The Engineered nozzles must be between 1/8" and 1/2" in diameter. Air jets and nozzles must have an SCFM rating at 80 psig less than or equal to those rated in Table 8-11 below.

**Table 8-11:** Qualifying SCFM ratings for compressed air engineered nozzles.

Size (inch)	SCFM
1/8	10
1/4	17
3/8	18
1/2	18

**P.1.53 High Efficiency Clothes Washer (Electric Water Heater)**

Incentives are available for high efficiency clothes washers that wash more clothes than standard clothes washers that are DOE 2007 compliant while using less water and energy. Qualified clothes washers must meet a minimum efficiency of CEE<sup>®</sup> Tier 2, with a Modified Energy Factor (MEF)  $\geq 2.00$  and a Water Factor (WF)  $\leq 6.00$ .

**CUSTOM****P.1.54 Custom Measures**

The Business Solutions Program staff will review each custom application. These measures will be reviewed based on (but not limited to) the following criteria: energy savings, verifiability, cost, measure life, and payback period. All equipment purchased for custom projects must be new. Applicants must provide the calculations documenting the estimated energy (kWh and/or MCF) savings. The calculations, assumptions supporting the kWh and/or MCF impact estimates and the resulting incentive amount are subject to the Business Solutions Program staff review and approval.

**Pre-notification is required for all custom incentive applications.** The pre-notification step provides an assurance that the methodology meets the program requirements. The Applicant must provide sufficient information and calculations to estimate the energy impacts. Business Solutions Program staff engineers will work with customers, their installing contractor or consultant to review the proposed savings methodology and to identify the information necessary to support the savings estimate and to collect any additional data needed to verify the savings.

Measurement and verification activities, including power measurements or monitoring for a period of time prior to and after the measure is installed may be required to document that energy impacts are consistent with the pre-approved estimates. In some cases, Consumers Energy may monitor the energy use of the base case (pre-retrofit) system as well as the post-retrofit system in order to establish the pre-retrofit energy and demand requirements. See Section P.12 and the Business Solutions Program Custom Application for more details.

The final incentive amount will be based on the final savings documented through the Final Application and may include post-retrofit measurement review. This may be greater or less than the savings and/or incentive amount originally estimated in the pre-notification estimate, and may also be limited to the reserved amount based on fund availability.