

COMMERCIAL ENERGY SERVICES

2018 RETROFIT SPECIFICATIONS

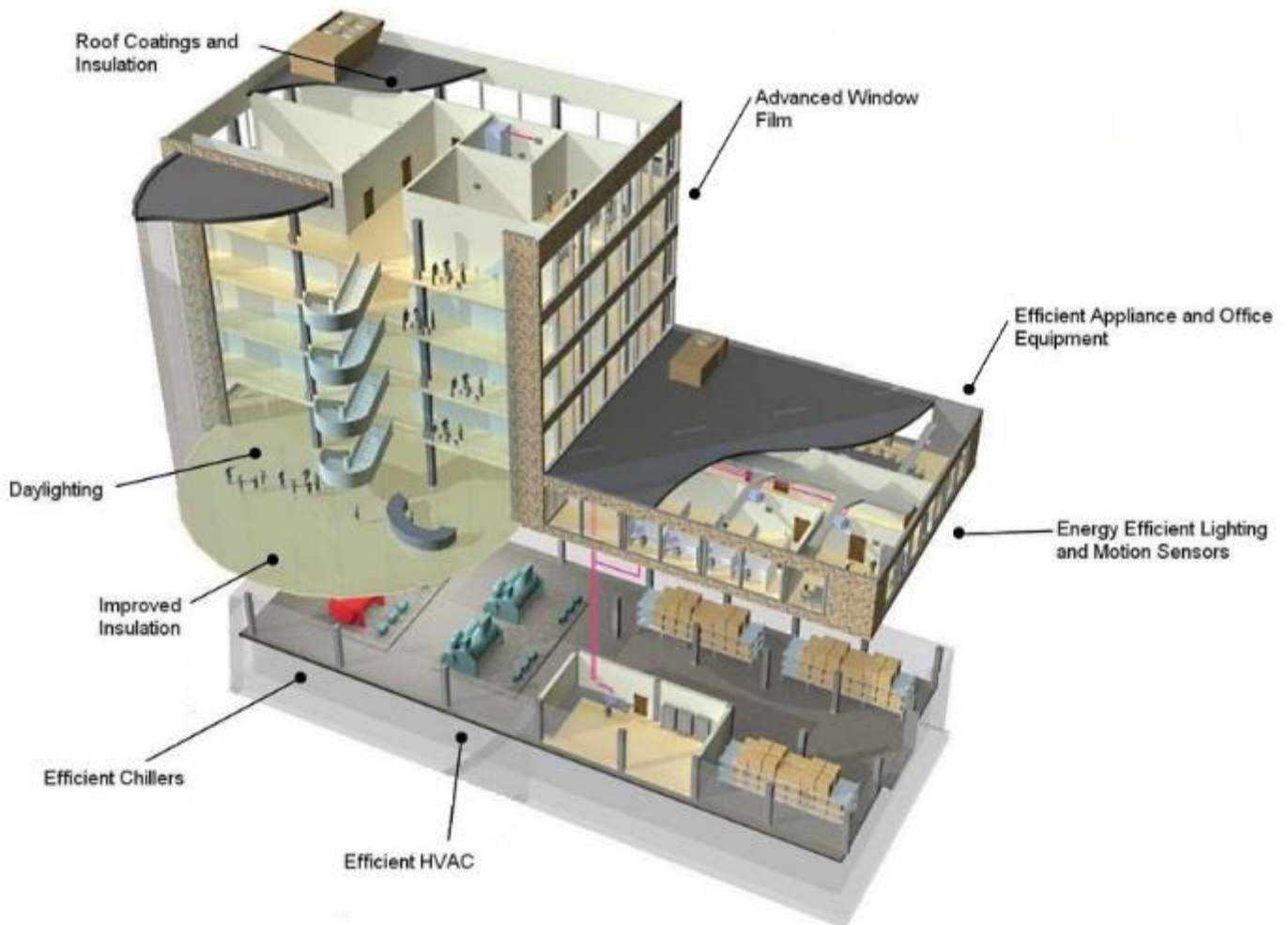


Table of Contents

1	Photographic Evidence.....	4
1.1	Examples of Photographic Documentation of Project.....	4
2	Interior Lighting Specifications.....	6
2.1	LED Required Qualifications — Applies to All LED Measures	6
2.2	Interior Lighting Lamp/Fixture.....	6
2.3	Guestroom LED Lamp	8
2.4	De-Lamping	9
2.5	Standard 4-foot T8 to Reduced Wattage 4-foot T8 or T5.....	9
2.6	Exit Signs.....	9
2.7	LED Refrigerated Case Lighting	10
2.8	LED Channel Signs, Indoor.....	10
2.9	LightingControls-RefrigeratedCases	10
2.10	OccupancySensors	10
2.11	DaylightingControls.....	11
2.12	Bi-Level LED Fixture Control – Stairwell/Hall/Garage.....	11
3	Exterior Lighting Specifications	12
3.1	Garage or Exterior LED Lighting.....	12
3.2	Garage or Exterior High Wattage Screw-In CFLs.....	13
3.3	LED Channel Signs, Outdoor.....	14
3.4	Garage or Exterior Hardwired Compact Fluorescent Fixtures.....	14
4	Cooling Specifications	15
4.1	Air- and Water-Cooled Units.....	15
4.2	Package Terminal AC Units	15
4.3	Programmable Thermostats.....	16
4.4	Window Film.....	16
4.5	Variable Speed Drive on Fans and Pumps	17
4.6	Hotel/Motel HVACOccupancySensors	17
4.7	Air Side Economizer for AHU and RTU	18
5	Commercial Kitchens and Refrigeration Specifications.....	21
5.1	Fryers	21
5.2	Large VatFryers	21
5.3	Griddles.....	21
5.4	ConvectionOvens	21
5.5	Combination Ovens.....	21

5.6	Steam Cookers	21
5.7	Holding Cabinets	22
5.8	VentilationControl-Retrofit.....	22
5.9	VentilationControl-NewHood.....	22
5.10	Anti-Sweat Heater	23
5.11	EC Motors on Walk-In Refrigerated Cases.....	23
5.12	Evaporator Fan Controller	23
5.13	Vending Machine Refurbishment Kit.....	23
5.14	Vending Machine Controls	23
5.15	Snack Machine Controls.....	24
5.16	Floating Head Pressure Controls	24
5.17	Reach-In Cooler Controls	24
5.18	Ice Machines.....	24
5.19	Refrigerator/Freezers.....	24
6	Miscellaneous Specifications.....	26
6.1	Escalator Motor Controller	26
6.2	Commercial Swimming Pool/Spa VSD	26
6.3	VSD Air Compressor Replacement	26
6.4	Compressed Air Nozzles.....	27
6.5	High-Efficiency Battery Chargers	27
6.6	Demand Control Ventilation-Parking Garages.....	27
6.7	Demand Controlled Ventilation-Interior	28
6.8	Irrigation Components	28
7	Transformer and UPS	29
7.1	NEMA Premium™ Efficiency Transformers.....	29
7.2	ENERGY STAR® AC-Output UPS for Non-Data Centers	29
7.3	ENERGY STAR® AC-Output UPS for Non-Data Centers	30
8	Custom Specifications	31
8.1	Retro-Commissioning.....	31
8.2	Incentives	32
8.3	Eligible Measures	32
8.4	Documentation and Savings Calculations	32
8.5	Northern On-Peak Hours	33
8.6	Southern On-Peak Hours	33
8.7	Inspections and Analysis.....	33

1 Photographic Evidence

1.1 Examples of Photographic Documentation of Project

Photographic evidence is required for all projects. Photos of the project before (pre) and after (post) the project is complete are important to assist in understanding the project, confirming the measure type and complexity of the project. Please contact the Commercial Energy Services team if photos cannot be submitted at the time of the pre- or post-application process due to a location issue.

Detailed photographs should include:

- A general overview of each that are being retrofitted.
- A close-up photo of each type of measure (lamp/fixture, motor, refrigerator, etc.
- This photo may need to be submitted at the time of the retrofit if the fixture cannot be opened or there are no spare lamps.
- A close-up of the types of bulbs showing wattage details or a close-up of the label on the refrigerator/freezer, motor, etc.
- Photo captions listing the location and type.

Example of photos with captions:

- A general overview of area.



Main area 2x4 troffers

- Close-up of fixture showing number of lamps in fixture – We need to see the number of lamps in the fixture.



2x4 troffers in the main area with 2 T8 lamps each

- Close-up of the types of lamps showing wattage details or a close-up of the label on the refrigerator/freezer, data plate on a motor, etc.



Close-up photo of the fluorescent T8 lamp

2 Interior Lighting Specifications

It is required that the EISA (Energy Independence and Security Act of 2007) standards for general service incandescent lamps be used as the baseline for any general service lamp types, generally "A" type lamps (A19, etc.). Because reduced wattage incandescent lamps are readily available due to the Act, the reduced wattages listed below will be applied whenever a general service lamp is retrofitted.

- Equivalent wattages are: 100W (72W), 75W (53W), 60W (43W), 40W (29W)

2.1 LED Required Qualifications — Applies to All LED Measures

Commercial Energy Services is promoting the use of nationally recognized specifications for LED lighting set forth by ENERGY STAR® and Design Lights™ Consortium (DLC). Minimum requirements for all LED lamps are (some measures have higher requirements):

- 5-year manufacturer's warranty (see below for exceptions)
- Manufacturer specification sheets
- Lighting Facts Label (if available)
- LM-79 test documents (if available)
- LM-80 test documents (if available)

LED Required Minimum Effective Useful Life – Applies to all LED lamps. If the rated hours of an LED lamp do not meet an effective useful life (EUL) of five years, based on the planned operating hours, the lamp must have a minimum 5-year free replacement warranty.

Example: If the specification sheet for a lamp states that there is only a 3-year warranty, the lamp would meet program requirements if the rated life is 25,000 hours and the operating hours are no greater than 5,000 hours annually.

NOTE: LED lamps that are blinking or that are not steady burn are not applicable for this measure and must use the Custom Technology Form. Please contact the Commercial Energy Services team for typical hours of operation for LED lamps that are blinking.

Recommended guidelines for evaluating LED lighting can be found on the CEE website at www.cee1.org/files/SSLPositionPaper090911.pdf. Customers and contractors proposing LED lighting for task areas should consider these recommendations when evaluating the use of LED lighting as an energy efficiency replacement option. Customers considering LED lighting for non-task areas (for example, for entertainment, signage, display, hospitality, and other customer experience purposes) should consider installing a sample to be sure the equipment satisfies their needs before committing to a complete retrofit.

The decision to move forward with the installation of LED lighting is determined by the customer and Commercial Energy Services does not require the manufacturer to submit a testing report, nor does Commercial Energy Services "approve" any specific LED equipment or any other technology.

2.2 Interior Lighting Lamp/Fixture

This incentive is based on the total wattage reduced per lamp or fixture installed, the wattage of the existing lamp/fixture multiplied by the number of existing lamps/fixtures minus the wattage of the new lamp/fixture times the number of new lamps/fixtures. A new LED fixture is defined as the removal of the entire existing fixture, replacing it with a new LED fixture (all as one

unit). Please contact the Commercial Energy Services team to determine if a pre-inspection is required to verify existing lamp fixture wattages or counts. Please provide information/photo confirming existing lamp or fixture wattage.

LED integral lamps (screw-in base lamps or pin-type replacement lamps, such as MR-16s) that replace interior incandescent lamps, CFLs (compact fluorescent lamps) beginning at 3 watts or non-high bay HID lamps. Track lights and down lights also qualify under this measure. Lamps must meet the warranty requirement stated above.

This measure also applies to the retrofit of T8/T5 fluorescent lamps or fixtures to LED linear lamps or new LED fixtures. A LED lamp replacement is defined as the replacement of the T8 or T5 lamp only using the existing fixture. A new LED fixture is defined as the removal of the entire existing fixture, replacing it with a new LED fixture (all as one unit). The incentive is based on the total wattage reduced; the wattage of the existing fixture multiplied by the number of existing fixtures minus the wattage of the retrofitted or new fixtures times the number of retrofitted or new fixtures.

This measure also applies to the replacement of one or more existing high intensity discharge fixtures with new fixtures containing T8 or T5 fluorescent lamps with electronic ballasts or LED high bay screw-in lamps or fixtures. The T8 or T5 lamps should have a color-rendering index (CRI) ≥ 80 . The electronic ballast must be high frequency (≥ 20 kHz), NRTL listed, and warranted against defects for five years. Ballasts for 4-foot lamps must have total harmonic distortion (THD) $\leq 20\%$ at full light output. High output T5/T8 lamps also qualify for this incentive. This incentive may be used in high bay and low bay fluorescent applications. Specifications of the new fixtures, lamps and ballasts, must accompany the application. An inventory of the pre- and post-retrofit fixtures and their wattages must be provided. Retrofit kits are not considered to be new fixtures. This measure may also be used for high wattage incandescent lamps upon approval by the Commercial Energy Services team.

If the existing fixture is used in the retrofit and the fluorescent or HID ballast will remain in operation, the ballast wattage **MUST** be taken into consideration and added to the fixture wattage. If the spec sheet has no mention of the ballast wattage, 3W per lamp will be added for a 4-foot T8 lamp, 4W for an 8-foot T8 lamp and 5W for a T5 lamp. Up to 18W may be used if the HID ballast remains in service.

Spec sheets must be provided with pre-application. The hours of operation and area where new lamps or fixtures will be installed **must be provided** in the application.

NOTE: T12 lamp or fixture retrofits also qualify for this measure but the T8 baseline wattage must be used. However, a T12 HO baseline may still be used for T12 HO retrofits.

NOTE: LED lamps that are in hotel/motel guestrooms are not applicable for this measure and must use the Interior Guestroom LED lamp measure (see requirements below).

Quick Facts:

- Warranty must be a minimum of five years for lamps/fixtures operated 8760 hours.
- Lamps that have a 3-year warranty only qualify if the annual operating hours are less than 5,000 hours.
- Pre/post photos are mandatory. Photos must clearly show lamp configuration and wattage.
- **All new LED Lamp/ fixture projects may require a pre- and post-inspection.** Please contact the Commercial Energy Services team to determine if a pre-inspection is required to verify existing fixture wattages or is photos may be provided in lieu of an

inspection.

- If the ballast remains in the fixture, ballast wattage must be taken into consideration.
- Hours of operation must be provided in application.
- Not applicable for hotel/motel guestrooms or lights that blink.

2.3 Guestroom LED Lamp

This incentive is based on the total wattage reduced per lamp installed, the wattage of the existing lamps multiplied by the number of existing lamp minus the wattage of the new lamps times the number of new lamps. Please contact the Commercial Energy Services team to determine if a pre-inspection is required to verify existing fixture wattages or counts. Please provide information/photo confirming existing lamp or fixture wattage if possible.

LED integral lamps (screw-in base lamps or pin-type replacement lamps, such as MR-16s) that replace interior incandescent lamps or CFLs beginning at 3 watts. Track lights and down lights also qualify under this measure.

NOTE: LED lamps that are blinking or that are not steady burn are not applicable for this measure and must use the Custom Technology Form. Please contact the Commercial Energy Services team for typical hours of operation for LED lamps that are blinking.

This measure also applies to the retrofit of T8/T5 fluorescent lamps or fixtures to LED linear lamps or new LED fixtures. A LED lamp replacement is defined as the replacement of the T8 or T5 lamp only using the existing fixture. A new LED fixture is defined as the removal of the entire existing fixture, replacing it with a new LED fixture (all as one unit). The incentive is based on the total wattage reduced; the wattage of the existing fixture multiplied by the number of existing fixtures minus the wattage of the retrofitted or new fixtures times the number of retrofitted or new fixtures.

If the existing fixture is used in the retrofit and the fluorescent ballast will remain in operation, the ballast wattage **MUST** be taken into consideration and added to the fixture wattage. If the spec sheet has no mention of the ballast wattage, 3W per lamp will be added for a 4-foot T8 lamp, 4W per lamp for an 8-foot T8 lamp and 5W for a T5 lamp. It is recommended to install lamps and fixtures that meet DLC specifications.

NOTE: T12 lamps or fixture retrofits also qualify for the measure but the T8 baseline wattage must be used.

Quick Facts:

- Warranty must be a minimum of five years for lamps/fixtures operated 8760 hours.
- Lamps that have a 3-year warranty only qualify if the annual operating hours are less than 5,000 hours.
- Pre/post photos are mandatory. Photos must clearly show lamp configuration and wattage.
- If the fluorescent ballast will remain in operation, ballast wattage **MUST** be added to the total fixture wattage.
- Pre- and post-inspection may be required.
- Blinking lights or non-steady burn lights must use the Custom Tech form.

2.4 De-Lamping

This measure is available only in conjunction with a retrofit to reduced wattage T8 lamps. De-lamping is eligible for T8 lamps and must involve the permanent removal of existing lamps. This includes the permanent removal of unused lamps, tombstones, and ballasts. In some cases, the customer and/or contractor may find that the use of reflectors in combination with de-lamping is needed to maintain adequate lighting levels. This measure may be used for T12 de-lamping only when retrofitting to reduced wattage T8 lamps and is based on a T8 lamp baseline. **All de-lamping projects require a pre- and post-inspection to qualify for an incentive. This measure is not available in conjunction with the fluorescent to LED measure.**

Quick Facts:

- Requires pre- and post-inspection.
- Eligible for use with T8 lamps.
- Can be used with T12 de-lamping only when retrofitting with reduced wattage T8.

2.5 Standard 4-foot T8 to Reduced Wattage 4-foot T8 or T5

Incentives are available for replacing standard (32W) T8 lamps with reduced wattage T8 lamps when an electronic ballast is already present. The lamps shall be reduced wattage in accordance with the Consortium for Energy Efficiency (CEE) specification (www.cee1.org). The nominal wattage shall be 28W (≥ 2585 lumens) or 25W (≥ 2400 lumens) to qualify. The mean system efficacy shall be ≥ 90 MLPW, CRI ≥ 80 and lumen maintenance at 94%. This can be done on a per lamp basis and ballast replacement is not always necessary. A manufacturer's specification sheet shall accompany the application. This measure may be used for T12 to reduced wattage T8 retrofits with the incentive being based on a T8 baseline (ballast replacement would be required for this type of retrofit, but there is no incentive for the ballast retrofit).

Quick Facts:

- Standard 32W T8s to Reduced Wattage T8s.
- The nominal wattage shall be 28W (≥ 2585 lumens) or 25W (≥ 2400 lumens) to qualify.
- The mean system efficacy shall be ≥ 90 MLPW, CRI ≥ 80 , and lumen maintenance at 94%.
- Can be used with T12 de-lamping only when retrofitting with reduced wattage T8.

2.6 Exit Signs

This measure applies to high-efficiency exit signs that replace or retrofit an existing incandescent exit sign for interior or exterior applications. Electroluminescent and LED exit signs are eligible under this category. Non-electrified and remote exit signs are not eligible. All new exit signs or retrofit exits should be UL- or ETL-listed, and have a minimum lifetime of 10 years, and have an input wattage ≤ 5 watts.

Quick Facts:

- Warranty must be a minimum of 10 years.
- Input wattage must be ≤ 5 watts.
- Supplying pre/post photos will be helpful.

2.7 LED Refrigerated Case Lighting

Incentives are offered for replacing fluorescent refrigerated case lighting with light emitting diode (LED) source illumination. The incentive is paid on a per lamp replaced criteria. Fluorescent lamps, ballasts, and associated hardware are typically replaced with pre-fabricated LED light bars and LED driver units. The eligibility criteria are based on the Design Lights Consortium (DLC) specification (designlights.org). Lamps must have a minimum warranty of five years. All lamps reviewed and listed by other DLC utility sponsors and subscribers may be eligible. Specifications may change as industry standards are updated.

Quick Facts:

- Warranty must be a minimum of five years.
- Supplying pre/post photos will be helpful.

2.8 LED Channel Signs, Indoor

Indoor LED channel sign incentive is available for retrofitting or replacing incandescent, HID, argon-mercury or neon-lighted channel letter signs. For this measure, a channel sign is considered a back lit channel type sign and NOT a sign with screw-in lamps on the front side of the sign. Incentive is available at two different levels, less than or equal to two feet in height and greater than two feet in height. Please provide information confirming height.

Quick Facts:

- Supplying pre/post photos are mandatory.
- Incentives are based on two height levels, include spec sheets with measurements.

2.9 Lighting Controls-Refrigerated Cases

Incentives are available for passive infrared, ultrasonic detectors or fixture-integrated sensors on new or existing refrigerated cases. Closed door cases incentives are on a per door basis. Open cases are incentivized on a per horizontal linear foot of case.

Quick Facts:

- Supplying pre/post photos are mandatory.

2.10 Occupancy Sensors

Only passive infrared and/or ultrasonic detectors are eligible. Wall box or ceiling-mounted sensors shall be hardwired and control interior lighting fixtures. Wall box lighting occupancy sensors, defined as self-contained (no exterior switch pack or relay) units designed to replace a standard wall switch, shall not control more than 500 watts. Remote sensors (wall- or ceiling-mounted) shall not control less than 150 watts or more than 1000 watts. Sensors for high bay fluorescent fixtures are also eligible; they shall control fixtures eligible under the "Interior Lighting Lamp/Fixture" category and must have a total fixture wattage greater than 175 watts. It is recommended that programmable-start ballasts be used whenever occupancy sensors are being employed. Sensors for high bay LED fixtures are eligible; they shall control LED fixtures greater than or equal to 75 watts and less than or equal to 175 watts. This incentive is

for on-off control, if bi-level switching is being employed, the Custom Technology form must be used.

Quick Facts:

- Wall box lighting occupancy sensors should control no more than 500W.
- Remote sensors shall not control less than 150W or more than 1000W.
- Sensors for high bay LED fixtures must control fixtures greater than or equal to 75W and less than or equal to 175W.

2.11 Daylighting Controls

This measure consists of the installation of daylighting controls. These systems use photoelectric controls to take advantage of available daylight in interior building spaces. These controls can be used to turn lights off/on, A-B switching, or continuous dimming. Incentive is based on total fixture watts controlled and as such must be included and calculations attached. This measure cannot be used for integrated occupancy sensors and daylighting control; such a measure must be submitted as a custom measure.

Quick Facts:

- Incentive is based on total fixture watts controlled and as such must be included and calculations attached.

2.12 Bi-Level LED Fixture Control – Stairwell/Hall/Garage

An incentive is available for controlling LED fixtures that have manufacturer integrated occupancy sensors used in areas where code requires lighting 24 hours a day (such as stairwells, halls, and garages). Fixtures with manual “on” override are not eligible. During occupied periods, the fixture should operate at full light output. During unoccupied periods, the fixture should operate at lower light output and wattage. The incentive is paid per watt controlled; the total wattage of fixture being controlled multiplied by the total number of fixtures.

Quick Facts:

- For use where code requires lighting 24 hours a day.
- Fixtures with manual “on” override are not eligible.
- Incentive is per watt controlled.

3 Exterior Lighting Specifications

Note: PCB ballasts and fluorescent lamps must be disposed of properly. The Commercial Energy Services staff may request proper disposal documentation.

3.1 Garage or Exterior LED Lighting

This measure applies to the retrofit of high wattage HID or incandescent outdoor lamps or fixtures to Fluorescent T8/T5 or LED lamps or new fixtures. Induction lamps/fixtures can also be applied for using this measure. A lamp replacement is defined as the replacement of the screw in lamp only using the existing fixture. A new fixture is defined as the removal of the entire existing fixture, replacing it with a new fixture (all as one unit). The incentive is based on the total wattage reduced per lamp or new fixture installed; the wattage of the existing lamp or fixture multiplied by the number of existing lamps or fixtures minus the wattage of the new lamps or fixtures times the number of new lamps or fixtures. Fixture wattage includes any ballast wattages. The T8 or T5 lamps must have a color rendering index (CRI) ≥ 80 and a minimum one year warranty is required. The electronic ballast must be high frequency (≥ 20 kHz), UL listed, and warranted against defects for five years. Ballasts for 4-foot lamps must have total harmonic distortion (THD) ≤ 20 percent at full light output. Please contact the Commercial Energy Services team to determine if a pre-inspection is required to verify existing lamp fixture wattages or counts. Please provide information/photo confirming existing lamp or fixture wattage that may be used in lieu of an inspection.

If the existing fixture is used in the retrofit and the fluorescent or HID ballast will remain in operation, the ballast wattage MUST be taken into consideration and added to the fixture wattage. If the spec sheet has no mention of the ballast wattage, 3W per lamp will be added for a 4-foot T8 lamp and 5W for a T5HO lamp or 8-foot T8 lamp. A total of 18W may be added if the HID ballast remains. It is recommended to install lamps and fixtures that meet DLC specifications.

We define interior as parking areas that are enclosed where it is reasonable to assume that all lighting fixtures operate 24 hours per day, 7 days a week. This will include underground parking structures and standalone parking structures that may be semi-enclosed. Exterior parking areas (including non-24/7 parking garage fixtures) are outdoor parking areas where light fixtures do not operate during the day and typically operate dusk to dawn.

Specification for LED Lamps:

New exterior screw-in LED lamps must have a minimum warranty of five years and liner LED fluorescent lamps must have a minimum warranty of five years. A minimum warranty of three years for an exterior screw-in LED lamp will be accepted only if the **qualifications** stated previously are met. It is recommended to install lamps that meet ENERGY STAR specifications. The LED lamp installed must be for fixture types listed in the table below.

NOTE: LED lamps that are blinking or that are not steady burn are not applicable for this measure and must use the Custom Technology Form. Spec sheets must be provided with pre-application.

Specification for LED Fixtures:

The LED fixture installed must meet the DLC specification listed in the table below for the type of lighting being retrofitted. If the exterior lighting type being replaced is not in the table below, the Custom Technology Form must be used to determine the incentive. Specifications may change as industry standards are updated. Spec sheets must be provided with pre-application.

DLC Criteria for LED Luminaries

Fixture Type	Definition	Minimum Warranty
Outdoor & Roadway	Typical street & parking lot, cobra-head or shoe box, etc.	5 years
Outdoor pole/arm mounted	Commonly in-town street lights, acorn-shaped, etc.	5 years
Parking Garage	Ceiling mounted outdoor or open type such as multi-deck garage or gas station canopy.	5 years
Outdoor wall-mounted	Walk-way or security light affixed to building such as wall packs	5 years
Bollards	Short vertical posts used to provide perimeter light, define a pathway, protect infrastructure, etc.	5 years

Quick Facts:

- Supplying pre/post photos is mandatory.
- Pre- and post-inspection may be required.
- Warranty must be a minimum of five years for lamps/fixtures that operate 8760 hours.,
- Lamps that have a 3-year warranty only qualify if the annual operating hours are less than 5,000 hours.
- New induction lamps/fixtures require a 3-year warranty.
- T8/T5 lamps require a 1-year warranty.
- LED fixtures should qualify under DLC criteria. (See table above)
- Interior: Enclosed and assumed all lighting fixtures operate 24 hrs/day, 7 days/wk.
- Exterior: Outdoor and light fixtures don't operate during the day, dusk to dawn operation.

3.2 Garage or Exterior High Wattage Screw-In CFLs

This incentive applies to screw-in lamps and applies only if an incandescent or high-intensity discharge (HID) lamp is being replaced. This incentive is based on the total wattage reduced per fixture installed, the wattage of the existing fixtures multiplied by the number of existing fixtures minus the wattage of the new fixtures times the number of new fixtures. Fixture wattage for HID fixtures includes any ballast wattages. High wattage screw-in CFLs must be greater than 30W and CFLs must have a lamp/ballast efficacy of ≥ 40 lumens per watt and a minimum one year warranty. We define interior as parking areas that are enclosed where it is

reasonable to assume that all lighting fixtures operate 24 hours per day, 7 days a week. This will include underground parking structures and standalone parking structures that may be semi-enclosed. Exterior parking areas (including non-24/7 parking garage fixtures) are outdoor parking areas where light fixtures do not operate during the daylight hours.

Quick Facts:

- Greater than 30W and a lamp/ballast efficacy of ≥ 40 lumens per watt.
- Interior parking areas: Enclosed and assumed all lighting fixtures operate 24 hrs/day, 7 days/wk.
- Exterior parking: Outdoor and light fixtures don't operate during the day. Typically dusk to dawn operation)
- Minimum 1-year warranty required.

3.3 LED Channel Signs, Outdoor

Outdoor LED channel sign incentive is available for retrofitting or replacing incandescent, HID, argon-mercury or neon-lighted channel letter signs. For this measure, a channel sign is considered a back lit channel type sign and NOT a sign with screw-in lamps on the front side of the sign. Incentive is available at two different levels, less than or equal to two feet in height and greater than two feet in height.

Quick Facts:

- Supplying pre/post photos will be helpful.
- Incentives are based on two height levels, include spec sheets with measurements.

3.4 Garage or Exterior Hardwired Compact Fluorescent Fixtures

Hardwired CFL incentives apply only to complete new fixtures or modular (pin-based) retrofits with hardwired electronic ballasts. The CFL ballast must be programmed 'start' or programmed 'rapid start' with a THD ≤ 20 percent. The lamp should be rated to -20 degrees Fahrenheit. Separate incentives are paid for lamp wattages that are ≤ 29 W and ≥ 30 W.

Quick Facts:

- CFL ballast must be programmed 'start' or programmed 'rapid start' with a THD ≤ 20 percent.
- Lamp should be rated to -20 degrees Fahrenheit.
- Separate incentives are paid for lamp wattages that are < 29 W and > 30 W.
- Three-year warranty required.

4 Cooling Specifications

4.1 Air- and Water-Cooled Units

This measure applies to the installation of new air conditioning or heat pump units that are air, water or use evaporation to be cooled that meet or exceed the qualifying efficiency (EER) shown in the Cooling Technology Form are eligible for an incentive. These units can be either split system or single packaged units. All packaged and split system cooling equipment must meet Air-Conditioning, Heating and Refrigeration Institute (AHRI) standards (210/240, 320 or 340/360), be UL listed, and use a minimum ozone- depleting refrigerant (e.g., HCFC or HFC). All equipment shall meet specified energy efficiency qualifications listed in the Cooling Technology Form; the rated efficiency, at full load for the entire system, shall be greater than or equal to the stated minimum. The minimum efficiencies are based on the Consortium for Energy Efficiency (CEE) Tier 1 requirements (www.cee1.org) and ASHRAE Standard 90.1. Swamp coolers are not eligible under this service.

The total incentive is determined by two components – an equipment incentive and an efficiency incentive. Both the equipment and efficiency incentives are applied per ton of cooling installed. The equipment qualifies for an equipment incentive if the qualifying efficiency is met for the equipment size category. In addition, the efficiency incentive is added on a prorated basis if the equipment exceeds the minimum qualifying efficiency for the equipment size category.

The incentive for air conditioners is calculated as follows:

Tons X [Equipment Incentive/ton + Efficiency Incentive/ton X (EER new – EER qualifying)]

For air-cooled units $\leq 65,000$ Btuh, the SEER value must be entered for both the Unit Efficiency and the Qualifying Efficiency to calculate the incentive amount. The EER value for air-cooled units $\leq 65,000$ Btuh must also be entered under the column heading labeled "EER Value for Units $\leq 65,000$ Btuh." For all other sizes of air-cooled units, use the EER values in the Unit Efficiency and Qualifying Efficiency columns; it is not necessary to enter the EER Value under the column heading labeled "EER Value for Units $\leq 65,000$ Btuh."

Quick Facts:

- A manufacturer's specification sheet indicating the system efficiency **must** accompany the application.
- All equipment must meet Institute (AHRI) standards (210/240, 320 or 340/360) and be UL listed.
- All equipment must use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC).

4.2 Package Terminal AC Units

Package terminal air conditioners and heat pumps are through-the-wall self-contained units that are two tons (24,000 Btuh or less). These units are cool small areas and are commonly used for individual rooms. Only units that have an EER greater than or equal to $[12 - (0.213 \times \text{capacity in Btu/h} / 1000)]$ qualify for an incentive. All EER values shall be rated at 95°F outdoor dry-bulb temperature. These units have a combination of heating and cooling assemblies intended for mounting through the wall. It includes refrigeration, outdoor louvers, forced

ventilation, and may connect to external heating source or have electric resistance heating.

Quick Facts:

- EER greater than or equal to $[13.08 - (0.2556 \times \text{capacity in Btu/h} / 1000)]$ qualify for an incentive.
- All EER values shall be rated at 95°F outdoor dry-bulb temperature.
- Units are re through-the-wall self-contained units that are two tons (24,000 Btuh or less).

4.3 Programmable Thermostats

This measure applies to programmable thermostats that replace any non-programmable thermostat to automatically set back the temperature during periods of non-occupancy. New thermostat must be capable of maintaining at least two separate programs (to address the different comfort needs of weekdays and weekends) and up to four temperature settings for each program. After installation, the thermostat must be programmed such that the time schedule is set up based on the typical occupied time of the space that is served by the HVAC unit that the thermostat controls. The un-occupied set points must be set to a maximum of 63°F for heating and a minimum of 82°F for cooling. Recommended un-occupied set points are 55°F for heating and of 87°F for cooling. Contactor should work with the customer on the most appropriate settings that still meet the required values.

Contractor must provide a photograph of the existing thermostat (or a representative sample for buildings with multiple installations) as well as a photo of the newly installed thermostat with the final documents.

Contractor must also provide training on the operation of the newly installed thermostat to appropriate staff (such employees who work in the space and building maintenance staff).

Quick Facts:

- Must be capable of maintain at least two and up to four temperature setting each.
- The un-occupied set points must be set to a maximum of 63°F for heating and a minimum of 82°F for cooling.
- Pre- and post-photos are required.

4.4 Window Film

Measure applies to window film installed to reduce the solar gain through the affected window. Incentives are not available for windows with northern exposure (+/- 45° of true north). Film must meet one of the following requirements:

- For clear, single-pane glass, the solar heat gain coefficient (SHGC of the window film) must be less than 0.39.
- For clear, double-pane glass, the SHGC of the window film must be less than 0.35.
- For applications that don't meet either of the previous requirements, the film must have an SHGC < 0.47 and visible transmittance/solar heat coefficient (VT/SHGC) ratio > 1.3.

Specification and square footage installed of each film type and what side of the building the film is installed **must be documented** clearly on the invoice.

Quick Facts:

- Incentives are not available for windows with northern exposure (+/- 45° of true north).
- SHGC for single pane glass must be <0.39.
- SHGC for double pane glass must be <0.35.

4.5 Variable Speed Drive on Fans and Pumps

Variable speed drives (VSDs), which are installed on either fans or pumps, are eligible for this incentive. The VSD installation must result in energy savings. The installation of a VSD must accompany the permanent removal or disabling of any throttling devices such as inlet vanes, bypass dampers, and throttling valves. A 3% impedance choke is recommended to handle any power factor corrections that may occur. VSDs are sensitive to over voltage. Applicant must indicate whether the VSD is operation at a fixed speed or will the speed will vary through the operation under the VSD Operation heading and the expected hours of operation per individual pump. The system type for the VSD must also be indicated.

System types that can be selected are: CHW pump (chilled water pump), HW pump (hot water pump), AHU (air handling unit), CT fan (cooling tower fan) and CW pump (condenser water pump).

VSDs that do not qualify under this measure (such as VSDs on air compressor motors) must use the Custom Application to apply for an incentive. Equipment must operate more than 1500 hours annually.

Quick Facts:

- The VSD installation must result in energy savings.
- Equipment must operate more than 1500 hours annually.

4.6 Hotel/Motel HVAC Occupancy Sensors

Incentives are available for sensors that control PTAC, heat pump or fan coil (served by chilled water) units for individual hotel/motel 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 eight degrees from the operating set point, but a setback of at least five degrees is required. Occupancy sensors must engage set back within 30 minutes of non-occupancy. The incentive is per guestroom 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. The Cooling Technology form has an entry for whether the project is at a hotel or motel. Properties where the majority of guestrooms are entered from the outside (no interior hallway) are considered motels. All others are considered hotels.

Quick Facts:

- Sensors controlled by a front desk system are not eligible.
- Occupancy sensors must engage set back within 30 minutes of non-occupancy.
- The incentive is per guestroom controlled, not per sensor.

- Properties where the majority of guestrooms are entered from the outside (no interior hallway) are considered motels.

4.7 Air Side Economizer for AHU and RTU

This measure consists of retrofitting roof-top units (RTUs), air handling units (AHUs), split direct-expansion (DX) systems, or unit ventilators (UVs), which were designed without economizers. Repairing systems which have inoperable economizer controls are not eligible for this measure. The area served must be air conditioned space. New damper actuators and controls must be installed to the existing system with the proper calibration. **Pre-approval is required.**

Quick Facts:

- Pre-approval is required.
- Repairing systems which have inoperable economizer controls are not eligible for this measure.
- New damper actuators and controls must be installed to the existing system with the proper calibration.

5 Commercial Kitchens and Refrigeration Specifications

Only electric equipment qualifies for incentives. All equipment must replace existing electric equipment or be new equipment. ENERGY STAR maintains a list of qualifying products and specifications at www.energystar.gov or www.CEE1.org. To determine if non-ENERGY STAR models meet the ASTM standard, contact your manufacturer's representative. The equipment must be owned, leased to own, or on a minimum 5-year lease. Replacement of gas equipment does not qualify for an incentive except for gas equipment installed under the natural gas incentive available to Northern Nevada natural gas customers (see application for qualifications).

5.1 Fryers

The fryer shall meet or exceed ENERGY STAR specifications which are a heavy load cooking energy efficiency of > 80% utilizing American Society for Testing and Materials (ASTM) Standard F1361 and a normalized idle energy rate \leq 1,000 watts (based on a 15-inch fryer).

5.2 Large Vat Fryers

The commercial fryer shall have a tested heavy load (French fry for large vats) cooking energy efficiency of > 80% utilizing ASTM Standard F2144 for large vat fryers. Multiple vat configurations are paid per qualifying vat.

5.3 Griddles

The griddle shall meet or exceed ENERGY STAR specifications which are a heavy load cooking energy efficiency of > 70% utilizing ASTM Standard F1275 and a normalized idle energy rate \leq 320 watts 2 per foot.

5.4 Convection Ovens

The oven shall meet or exceed ENERGY STAR specifications which are a heavy load potato cooking energy efficiency of > 70% utilizing ASTM Standard F1496 and an idle energy rate of \leq 1.0 kW for half size and \leq 1.6 kW for full size.

5.5 Combination Ovens

The oven shall meet or exceed heavy load cooking energy efficiency of > 60% utilizing ASTM Standard F1639.

5.6 Steam Cookers

The commercial steam cooker shall meet ENERGY STAR specifications for energy efficiency or shall have a tested heavy load potato cooking energy efficiency of > 50% utilizing ASTM Standard F1484.

Steam Cooker Maximum Idle Rate

Pan Capacity	Idle Rate (Watts)
3-pan	400
4-pan	530
5-pan	670
6-pan or larger	800

5.7 Holding Cabinets

This measure does not include cook and hold equipment. All measures shall be electric hot food holding cabinets that are fully insulated and have solid doors in full, three-quarter and half sizes respectively. Qualifying cabinets shall not exceed the maximum idle energy rate of 20 watts per cubic foot in accordance with the ASTM Standard F2140 test method as stated in ENERGY STAR. Cook and hold equipment and units < ½ size may be eligible and should be applied for as a custom incentive.

Efficient Holding Cabinets Energy Usage Specifications

Cabinet Size	Qualifying Energy Rate
Full Size	Insulated with ER \leq 0.4 kW
3/4 Size	Insulated with ER \leq 0.3 kW
1/2 Size	Insulated with ER \leq 0.2 kW

5.8 Ventilation Control-Retrofit

This incentive applies toward the purchase and installation of a new commercial kitchen exhaust hood control system installed in an existing dedicated commercial kitchen exhaust hood and make-up air system. The control system must be used in conjunction with variable speed fan motor controls. Only pre-approved control systems will qualify for an incentive. Contact the Commercial Energy Services team for a current list of qualified vendors. The incentive is per exhaust fan horsepower.

5.9 Ventilation Control-New Hood

This incentive applies toward the purchase and installation of a new commercial kitchen exhaust hood control system installed in a new dedicated commercial kitchen exhaust hood and make-up air system. The incentive is per exhaust fan hp. The control system must be used in conjunction with variable speed fan motor controls. Only pre-approved control systems will qualify for an incentive. Please see the Commercial Energy Services Policies and Procedures for details on approved control systems.

5.10 Anti-Sweat Heater

Customer must install a device that senses the relative humidity in the air outside of the display case and reduces cycle time or turns off the glass door (if applicable) and frame anti-sweat heaters at low humidity conditions. Technologies that can turn off anti-sweat heater based on sensing condensation (on inner glass pane) also qualify.

5.11 EC Motors on Walk-In Refrigerated Cases

This measure is applicable to the replacement of an existing standard-efficiency shaded-pole evaporator fan motor in refrigerated walk-in boxes or cases (coolers or freezers). The replacement unit must be an electronically commutated motor (ECM). An ECM is a brushless DC motor with an electronically controlled commutator that allows the motor to operate much more efficiently than the shaded-pole motors with an electro-mechanical commutator typically used in refrigeration applications. Brand new cases do not qualify for this measure.

5.12 Evaporator Fan Controller

This measure is for the installation of controls in medium temperature walk-in coolers. The controller reduces airflow of the evaporator fans when there is no refrigerant flow. The measure must control a minimum of 1/20 HP where fans operate continuously at full speed. The measure also must reduce fan motor power by at least 75% during the off cycle. This measure is NOT applicable if any of the following conditions apply:

- 1) The compressor runs all the time with high duty cycle.
- 2) The evaporator fan does not run at full speed all the time.
- 3) The evaporator fan motor runs on polyphase power.
- 4) The evaporator fan motor is not shaded-pole or permanent split capacitor.
- 5) Evaporator does not use off-cycle or time-off defrost.

5.13 Vending Machine Refurbishment Kit

This measure applies only to the installation of ENERGY STAR Tier II Refurbishment Kits to **upgrade a machine that does not meet the requirements of ENERGY STAR Tier II**. Refurbishment kits are to retrofit existing machines to bring them to ENERGY STAR Tier II energy use standards and must meet the ENERGY STAR Program requirements of Refrigerated Beverage Vending Machines Eligibility Criteria Version 2.0, Tier II. Please see the Policies & Procedures Manual for additional information.

Quick Facts:

- This incentive is payable to the vending machine owners and NOT the end user.

5.14 Vending Machine Controls

The device eligible for this incentive must be used for refrigerated vending machines that only contain non-perishable food items limited to bottled and canned beverages. Controller must include a passive infrared occupancy sensor to turn off fluorescent lighting and compressor when surrounding area is unoccupied for 15 minutes or longer. Control logic should periodically power up machine at intervals to maintain product temperature and for compressor protection.

5.15 Snack Machine Controls

Incentives are available for motion controls on non-refrigerated snack machines. The snack machine 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.

5.16 Floating Head Pressure Controls

This measure applies to the installation of a head pressure control valve (flood-back control valve) to lower minimum condensing head pressure from a fixed position (180 psig for R-22) to a saturated pressure equivalent to 70 degrees F or less. Either a balanced-port or electronic expansion valve that is sized to meet the load requirement at a 70-degree condensing temperature must be installed and vary head pressure based on outdoor air temperature. Alternatively, a device may be installed to supplement refrigeration feed to each evaporator attached to condenser that is reducing head pressure. Compressor must be 1hp or larger.

5.17 Reach-In Cooler Controls

This incentive applies to the installation of controls with passive infrared occupancy sensor to turn off fluorescent lights and other refrigerated systems (containing only non-perishable beverages) when the surrounding area is unoccupied for 15 minutes or longer for stand-alone reach-in coolers with or without doors are eligible.

5.18 Ice Machines

This specification covers machines generating 60 grams (2 oz.) or lighter ice cubes, as well as flaked, crushed and fragmented ice makers. Performance data is based on AHRI Standard 810. Air-cooled (self-contained, ice making heads, or remote condensing) or Water-cooled machines with an independent and isolated compressor and ice formation feeds on a closed-chilled water loop are eligible. The efficiency specifications for the two qualifying tiers are equivalent to ENERGY STAR or CEE Tier 2. The entire AHRI tested Ice making system must be purchased to qualify. Remote machines must be purchased with qualifying remote condenser or remote condenser/compressor unit. Visit www.ahrinet.org for product information and testing procedures. Specifications are available at www.energystar.gov/cfs or www.CEE1.org. The test method must be in accordance with the Air-Conditioning and Refrigeration Institute (AHRI) Standard 810.

5.19 Refrigerator/Freezers

The refrigeration system shall be built-in (packaged). Cases with remote refrigeration systems do not qualify for a prescriptive incentive. See table below for Efficient Refrigerators/Freezers Energy Usage Specifications.

Quick Facts:

- Applicant must provide proof that the appliance meets the ENERGY STAR Version 2 specifications using ANSI/ASHRAE Standard 72-2005 (38°F +/- 2°F for refrigerators and 0°F +/- 2°F for freezers).

Efficient Refrigerators/Freezers Energy Usage Specifications

Product Volume (Cubic Feet)	Maximum Daily Energy Consumption (kWh/Day)	
	Refrigerator	Freezer
Solid Door		
$0 < V < 15$	$< 0.089V + 1.411$	$< 0.250V + 1.250$
$15 < V < 30$	$< 0.037V + 2.200$	$< 0.400V - 1.000$
$30 < V < 50$	$< 0.056V + 1.635$	$< 0.163V + 6.125$
$50 < V$	$< 0.060V + 1.416$	$< 0.158V + 6.333$
Glass Door		
$0 < V < 15$	$< 0.118V + 1.382$	$< 0.607V + 0.893$
$15 < V < 30$	$< 0.140V + 1.050$	$< 0.733V - 1.000$
$30 < V < 50$	$< 0.088V + 2.625$	$< 0.250V + 13.500$
$50 < V$	$< 0.110V + 1.500$	$< 0.450V + 3.500$

6 Miscellaneous Specifications

6.1 Escalator Motor Controller

Motor controllers eligible for an incentive are units that control electric escalator or horizontal people mover operation only on three-phase, 480-volt induction motors, ranging in size from 10hp to 40hp. This measure does not apply to baggage moving equipment or any other constant speed varying load situation, but can be applied for as a custom measure. Controller cannot be used in bypass mode. The device must meet all required local, state, and federal codes. The following documentation must be provided by the customer or vendor:

- Written description and *documentation* showing that the device reduces actual kWh.
- The minimum savings required to be eligible is 352 kWh/hp annually.
- Letter from a nationally recognized testing lab demonstrating product safety certification.
- Letter stating that the EMC device cannot void end use equipment manufacturer's warranty.
- At the discretion of the Commercial Energy Services team, submit to testing/monitoring to verify savings claims. This discretion will depend on the information (description and documentation) provided, so any testing of the device already performed should be submitted. If required, testing will involve having pre- and post- installation measurements completed on 1-3 projects.

6.2 Commercial Swimming Pool/Spa VSD

This prescriptive incentive applies to all swimming pool and spa pump systems 10hp or less. This measure is for conversion of existing single speed pump systems to variable speed systems for controlling the flow rate of commercial pool/spa pumps. If the replacement system is larger in horsepower than the original system, the replacement system shall be capable of being dialed back to match the flow of the original system and shall be activated. Incentives are based on the horsepower of the pump that is replaced or the new pump, **whichever is smaller**. Systems shall have an operating automatic programmable scheduling & capacity control capability. Incentive is based on 8,760 hours of operations annually. If not 8,760 hours of operations annually, the incentive will be prorated based on the ratio of the number of hours the system operates to 8,760. As an example, if the pump is found to operate 6,000 hours annually, the incentive would be 6,000/8,760 of the prescriptive amount.

Quick Facts:

- Motors must be ≤ 10 hp to apply for this measure.
- Pumps for fountains or water features are not applicable for this measure but may use the Custom Technology Form.
- Customers with existing motors greater than 10hp can apply for an incentive using the Custom Tech form.

6.3 VSD Air Compressor Replacement

This measure applies to the replacement of an existing air compressor that is 50hp or smaller with a new variable speed drive controlled air compressor. Only one compressor on a compressed air system (connected by piping) can qualify for this VSD incentive. Air compressors on multiple-compressor systems must operate the new, VSD, air compressor at least 2,080 hours per year

and be set up to control load variations and not base loaded. Back-up and redundant air compressor are not eligible.

Quick Facts:

- VSD compressors must be 50hp or less.
- Redundant air compressors are not eligible.
- Only one compressor on a compressed air system can qualify.
- The new VSD air compressor must operate at least 2,080 hours annually and not be base loaded.

6.4 Compressed Air Nozzles

The engineered nozzle must replace simple open pipe/tube assemblies connected to a compressed air system. The nozzle usage must be 2,000 hours or more per year. Engineered nozzles must be between 1/8" and 1/2" in diameter. It is recommended that there be an effective means of matching the load with the air compressor. At 80 psi, the flow rate through the air nozzle or air jet should be equal to or less than the values shown in the table below:

Qualifying SCFM (Standard Cubic Feet per Minute) Ratings

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

Quick Facts:

- The nozzle usage must be 2,000 hours or more per year.
- Engineered nozzles must be between 1/8" and 1/2" in diameter.

6.5 High-Efficiency Battery Chargers

New 3-phase high frequency charger(s) shall have a minimum power conversion efficiency of 92%, and a minimum 8-hour shift operation, 5-days per week. The new battery charger must replace either a ferro resonant or silicon controlled rectifier (SCR) charger. This measure is only applicable to battery charging for forklifts, golf carts and other electric vehicles.

6.6 Demand Control Ventilation-Parking Garages

Incentives are available for the control of exhaust ventilation fans for an existing enclosed parking garage using carbon monoxide sensor and controls. Pre- and Post-condition information must be provided and data logging may be required, please contact a Commercial Energy Services engineer for details prior to commencing project. The control system must vary the number of fans on line, the fan speed, or fan blade pitch in response to the carbon monoxide and/or nitrogen dioxide concentration as sensed at representative locations in the garage. Systems must be capable of turning off fan power during periods of low activity as compared to high-activity periods. Standard operating conditions for fan must be at or above 50 Hertz if a VFD is present to qualify for this prescriptive measure otherwise customers may apply for an incentive using the Custom Technology Form.

Quick Facts:

- A Commercial Energy Services engineer needs to be contacted for details prior to commencing the project.
- Standard operating conditions for fan must be at or above 50 Hertz if a VFD is present to qualify for this prescriptive measure otherwise customers may apply for an incentive using the Custom Technology Form.

6.7 Demand Controlled Ventilation-Interior

Incentives are available for retrofitting existing building ventilation systems with controls that vary outside air volume based on carbon dioxide (or other air quality parameter) levels to measure occupancy. Buildings must have cooling to be applicable. Conditioned spaces must be kept between 65°F and 75°F during operating hours. Systems must currently have fresh air requirements equal or greater than 10% of supply air requirements. Carbon dioxide sensors must be installed in conjunction with fully functioning economizers with zone level sensors for roof top units and return system sensors for built up systems. The incentive is calculated per square foot of area controlled and a floor plan must be submitted with the Final Application.

Quick Facts:

- Conditioned spaces must be kept between 65°F and 75°F during operating hours.
- Systems must currently have fresh air requirements equal or greater than 10% of supply air requirements.
- The incentive is calculated per square foot of area controlled and a floor plan must be submitted with the Final Application.

6.8 Irrigation Components

Incentives are available for:

- **Nozzles** - new flow controlling type nozzles for impact sprinklers or new nozzles for impact sprinkler replacing existing worn nozzle of same flow rate or less.
- **Sprinklers** - new rotating type sprinklers that replace impact sprinklers (entire pivot must be upgraded; flow may not be increased).
- **Regulators** - new low pressure regulators, entire pivot must be upgraded.
- **Gaskets** - new pipe section and riser cap gaskets for wheel lines, hand lines, or portable main lines, entire line must be upgraded.

For sprinklers and nozzles, incentive is limited to no more than two units per sprinkled acre. The supply pump must have an effective means of matching the load.

7 Transformer and UPS

7.1 NEMA Premium™ Efficiency Transformers

Single or three phase low voltage dry-type distribution transformers meeting or exceeding the NEMA Premium™ efficiency requirements at 35% load, provided in the table on the technology page, are eligible for incentives. Find information on the NEMA Premium efficiency program at <https://www.nema.org/Technical/Pages/NEMA-Premium-Efficiency-Transformers-Program.aspx>.

Low voltage dry-type distribution transformers have the following characteristics:

- Input voltage of 600 volts or less
- Air-cooled
- Does not use oil as a coolant

Non-distribution transformers, such as transformers with multiple voltage taps where the highest is at least 20% more than the lowest; and transformers designed to be used in special purpose applications, such as drive transformers, rectifier transformers, auto-transformers, impedance transformers, regulating transformers, sealed and non-ventilating transformers, machine tool transformers, welding transformers, grounding transformers, and testing transformers, are not eligible for a prescriptive incentive, but as with liquid and medium voltage transformers, may apply for custom incentives. Utility-owned transformers are not eligible.

Quick Facts:

- Utility-owned transformers are not eligible.

7.2 ENERGY STAR® AC-Output UPS for Non-Data Centers

This incentive applies to the installation of ENERGY STAR-qualified AC-output uninterruptable Power Supply (UPS) systems in non-data centers. The installed system must meet or exceed the average loading- adjusted efficiency values required by the ENERGY STAR UPS program, reproduction in the table on the technology form. Units over 10 kW are not eligible for a prescriptive incentive but may apply for an incentive using the Custom Technology form.

Eligible products include:

- Consumer UPS systems intended to protect desktop computers and related peripherals.
- Commercial UPSs intended to protect small business and branch office communication technology equipment such as servers, network switches/routers, and small storage arrays.

This measure does not include telecommunications DC-output UPSs/rectifiers, products internal to a computer or another end-use, or industrial UPSs specifically designed to protect industrial manufacturing processes.

Variable and Frequency Dependent (VFD): Also known as passive, standby, offline or standby power supply (SPS), VFDs may be referred to as the UPS with the highest input dependency. This designation occurs because output voltage is dependent on changes in AC input voltage and frequency, and is not intended to provide additional corrective functions. VFDs provide basic protection to the load against power outage.

Voltage Independent (VI): Also known as a line interactive UPS, a VI protects the load from power outages, much like a VFD. It also protects the load from the continuous application of under and

over voltage, typically from 5 to 30 minutes. A VI has a lower input dependency than a VFD, but a higher input dependency than a VFI.

Voltage and Frequency Independent (VFI): Also known as double conversion, or online, a VFI has the lowest input dependency of the three UPS types. It is similar to VI systems in that it protects the load from power outages, under and over voltages, and frequency variations. It also protects the load from the adverse effects of these variations without depleting the stored energy source. VFI systems can provide an electrical firewall between the input power and the sensitive electronic equipment. While VFDs and VIs provide filters of the input utility power, a VFI functions as a layer of insulation from power-quality issues.

Single-Normal-Mode: A UPS that operates in only one input dependency mode (i.e., VFD, VI, or VFI mode).

Multiple-Normal-Mode: Also known as hybrid or double conversion on demand, this type of UPS can operate in more than one input dependency mode. One mode is always VFD; the other mode is either VI or VFI. For example, a UPS operates as a VFD when the power conditions are within certain set points and switches over to a higher input dependency mode when the power conditions are outside of that pre-set window.

7.3 ENERGY STAR® AC-Output UPS for Non-Data Centers

Minimum Average Efficiency: The average efficiency of the UPS, based on standardized loadings, which is calculated using the equation below:

$$\text{Eff}_{\text{AVG}} = t_{25\%} \times \text{Eff}_{25\%} + t_{50\%} \times \text{Eff}_{50\%} + t_{75\%} \times \text{Eff}_{75\%} + t_{100\%} \times \text{Eff}_{100\%} \quad \%$$

- Eff_{AVG} is the average loading-adjusted efficiency.
- t^{n%} is the proportion of time spent at the particular n% of the reference test load, as specified in the loading assumptions provided in the following table.
- Eff^{n%} is the efficiency at the particular n% of the reference test load, as measured according to the ENERGY STAR test method.

Output Power	Input Dependency	Proportion of Time Spent at Specified Proportion of Reference Test Load, t _{n%}			
		25%	50%	75%	100%
p < 1.5kW	VFD	0.2	0.2	0.3	0.3
	VI or VFI	0	0.3	0.4	0.3
1.5kW <	VFD, VI or VFI	0	0.3	0.4	0.3

8 Custom Specifications

The Custom Incentive Application must be used for all projects that are not covered by a Prescriptive Application. Custom project applications **require** supporting equipment performance information and calculations documenting the on- and non-on-peak energy savings that are expected to result from the project. The required information typically includes performance data for the base case and the high efficiency equipment that is installed as well as the annual operating load profile/conditions for that equipment. Measurement and verification activities are likely to be required to document that energy impacts are consistent with pre-approved estimates. **A pre- and/or post-inspection may be required.**

INCOMPLETE APPLICATIONS WILL NOT BE REVIEWED. Please see the Commercial Energy Services Policies & Procedures document for additional information.

Please contact us to receive a Lighting Custom Calculation Spreadsheet to assist with your analysis.

8.1 Retro-Commissioning

The Custom Incentive Application must also be used for retro-commissioning projects. The retro-commissioning component is a monitoring based measure using analytics, pre/post data and measurement & verification to validate savings and is not a maintenance based measure. Monitoring based retro-commissioning is differentiated from maintenance based measures by the use of real time data that includes:

- The identification of issues within the building's operation
- Establishment of baseline energy use using system trend data
- Commissioning of energy conservation measures
- Verification of ongoing savings
- Identification of further opportunities for energy savings

Examples of qualifying measures are:

- Chilled water supply temperature reset
- Chilled water plant optimization
- Chiller sequencing strategy
- Condenser water reset
- Flow optimization
- Static pressure reset
- EMS controls upgrades
- Optimize economizer settings
- VAV box control optimization
- Supply air temperature reset
- Implementation of schedule controls modifications (HVAC, lighting)

Data should include regression models, pre/post trend data, detailed energy calculations, etc. All assumptions, methodologies and measured and/or logged data should be submitted.

NOTE: Retro-commissioning is the only measure within the Commercial Energy Services application that the 50% cost limit does not apply. Retro-commissioning measures have a cost limit of 100% of project costs or the measure incentive, whichever is less. Project costs can include material, labor (internal labor is pro-rated based on the complexity of the work done), burden/overhead, taxes, delivery fees and rental costs.

8.2 Incentives

The amount of the incentive will be calculated as \$0.10 for the first year of all on-peak kilowatt hours (kWh) saved plus \$0.05 for non-on-peak kWh saved.

Actual incentive payments will be based on either (1) documented on and non-on-peak electrical energy (kWh) reduction or (2) a corrected on and non-on-peak electrical energy reduction estimate to account for changes in the project. Under **no** circumstances will the incentive payment exceed 50% of incremental project cost.

Quick Facts:

- Incentive payments will not the incentive payment exceed 50% of incremental project cost.

8.3 Eligible Measures

Please see the Documentation and Savings Calculations section regarding the baseline for custom fluorescent lighting retrofit projects. Any qualifying measures or projects that are NOT eligible under the Commercial Energy Services prescriptive measures that will result in a permanent, non-reversible energy efficiency improvement must use the Custom Technology Form in order to receive an incentive. The project must have isolated, measurable or verifiable electric energy savings. The Commercial Energy Services team may require documentation on equipment that is replaced or permanently removed from service. Please refer to the Commercial Energy Services Policy and Procedures for more detailed information.

Quick Facts:

- Ineligible projects include (but are not limited to) electrical generation projects, fuel switching, and customer owned on-site generation.

8.4 Documentation and Savings Calculations

The only accepted baseline for all fluorescent lamp/fixture retrofits is a standard T8 or standard HO (high output) T8 lamp/fixture.

Include all relevant data that will allow an engineer to duplicate the savings estimate indicated, such as:

- Concise description of the existing energy systems to be affected.
- Pump/motor curves for VSD projects.
- Facility physical description and occupancy (including activities in building and hours of operation).
- Location of affected equipment.
- Condition and age of equipment if degradation in nameplate efficiency is assumed.
- Hours of operation of the affected equipment.
- Number of existing units.
- Ratings of equipment (wattage, nameplate, tonnage, voltage, etc.).
- Measure-by-measure summary of the calculated demand savings associated with the project.
- Historical peak power (if demand metered) and/or energy consumption data.
- Clearly indicate all assumptions and variables used in the analysis.
- Describe the basis or rationale for each assumption and variable.
- The equipment loading profile.

- For network PC management software projects, the software used must provide base case and post case trend data.

8.5 Northern On-Peak Hours

Peak electric energy savings must be calculated as the average energy reduction expected during the entire on-peak and non-on-peak period. Peak period hours are:

NV Energy Northern Service Territory Summer On-Peak Period:

1 p.m. to 6 p.m. (July 1 through Sept. 30); Monday through Friday only

Winter On-Peak Period:

5 p.m. to 9 p.m. (Oct. 1 through June 30); 7 days/week

Please refer to the Commercial Energy Services Policy and Procedures definitions page for a description of the Northern and Southern Service Territories.

It is up to the applicant to document the energy savings. We strongly suggest that the applicant contact the Commercial Energy Services team at 800-342-6335 to discuss acceptable savings documentation methods and calculations.

8.6 Southern On-Peak Hours

NV Energy Southern Service Territory Summer On-Peak Period:

1 p.m. to 7 p.m. (June 1 through Sept. 30); 7 days/week

All other hours are in the non-on-peak period

Please refer to the Commercial Energy Services Policy and Procedures definitions page for a description of the Northern and Southern Service Territories. **It is up to the applicant to document the energy savings. We strongly suggest that the applicant contact the Commercial Energy Services Team at 800-342-6335 to discuss acceptable savings documentation methods and calculations.**

8.7 Inspections and Analysis

All custom projects are subject to a pre-inspection to confirm pre-existing conditions. Custom incentive applications must therefore be submitted prior to commencement of demolition or removal of existing equipment. Applicants will be responsible for submitting complete documentation that indicates the basis for projected energy savings. The applicant must understand that monitoring or measurements of both pre- and post-retrofit systems may be required and that the applicant or his contractor are responsible for the costs of monitoring, measurements and any savings calculations that may be required.