

# 2021 Application Specifications General Measures

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# Table of Contents

|  |    |
|--|----|
| LED Lighting                             | 3  |
| New Construction Lighting                | 6  |
| Cooling                                  | 7  |
| Controls                                 | 11 |
| Refrigeration                            | 14 |
| Energy Management System (EMS)           | 16 |
| Lighting Energy Management System (LEMS) | 18 |
| Quality Installation                     | 19 |
| Documentation Requirements               | 21 |
| Building Envelope                        | 22 |
| VSD                                      | 23 |
| Appliances                               | 24 |
| Compressed Air                           | 25 |
| Information Technology                   | 26 |
| Custom                                   | 27 |
| Existing Buildings - Feasibility Studies | 29 |
| Existing Buildings - RCx HVAC/Lighting   | 30 |
| Existing Buildings - RCx Other Systems   | 32 |
| Pump and Blower Testing                  | 34 |
| New Construction                         | 35 |
| Whole Building Program Guidelines        | 36 |

## QUESTIONS

If you have program or application questions, call (866) 277-5605 or (602) 385-0900 or email [aps.solutionsforbusiness@dnv.com](mailto:aps.solutionsforbusiness@dnv.com).

## ADDITIONAL RESOURCES

[aps.com](http://aps.com)  
[ceel.org](http://ceel.org)  
[energystar.gov](http://energystar.gov)  
[ahridirectory.org](http://ahridirectory.org)

# LED Lighting

## General LED lighting requirements:

- A manufacturer's specification sheet for each LED lamp/LED fixture/LED component shall accompany every application.
- A room-by-room survey may be requested for complex lighting projects.
- Invoice/purchasing documentation shall reflect manufacturer, model number and quantity of each lamp/fixture/component.
- Removed polychlorinated biphenyl (PCB) ballasts and all lamps must be disposed of properly. Documentation of disposal may be requested by program staff.
- Lighting projects should comply with the Illuminating Engineering Society of North America (IESNA) recommended lighting levels and local code.

## Option A

**Integral lamp or fixture must appear on one of the following lists. If not, reference Option B:**

- ENERGY STAR® Qualified Products List  
[energystar.gov/index.cfm?c=ssl.pr\\_commercial](https://energystar.gov/index.cfm?c=ssl.pr_commercial)
- DesignLights Consortium Qualified Products List  
[designlights.org/QPL](https://designlights.org/QPL)
- Consortium for Energy Efficiency (CEE) Tier II (two) listed  
<https://library.cee1.org/content/commercial-lighting-qualifying-products-lists>

## Option B

LEDs that do not appear on the Qualified Products list of either ENERGY STAR, DesignLights Consortium, or CEE will be evaluated using the minimum performance criteria in the appropriate product category from either ENERGY STAR, DesignLights Consortium, or CEE for the following variables:

- Light output in lumens
- Luminaire efficacy (lm/W)
- Manufacturer's warranty (years)
- Color rendering index (CRI)
- Correlated color temperature (CCT)
- LED lumen maintenance at 6,000 hours
- Manufacturer's estimated lifetime for L70 (70% lumen maintenance at end of useful life)

*Please contact a representative from the Solutions for Business team for assistance in determining if an LED product complies with Option B.*

## EXIT SIGNS

**Measure: Replace incandescent or CFL exit sign with an electroluminescent or light-emitting diode (LED) exit sign**

- Exit sign must be UL or ETL listed, have a minimum lifetime of 10 years and have an input wattage  $\leq$  5 watts.
- Non-electrified and remote exit signs are not eligible.

## LINEAR LED LAMPS

**Measure: Replace 2, 3, 4 & 8 foot T12, T8 or T5 lamps with linear LED lamps. (See General LED Lighting Requirements)**

- Replace linear fluorescent lamps on a one-for-one basis.
- Compatibility between the LED lamp and electronic ballast shall be verified by the contractor.
- Components shall be UL or ETL listed.
- Rebates are paid on a per lamp basis.

*Ballast replacement/LED driver consideration should be given to ballasts that are more than 6 years old.*

Acceptable replacement product types are:

- Lamps Only (“Plug and Play”) (UL Type A)
- Internal Driver/Line Voltage Lamp (UL Type B)
- New External Driver (ballast) and Lamp (UL Type C)

Safety recommendations:

- UL Type B and UL Type C products must be delivered as part of a UL 1598C Classified Luminaire Retrofit Kit with instructions explaining the LED tube must be installed on a luminaire that is already UL Listed.
- The retrofitted luminaire must be clearly identified using the label included with the Retrofit Kit indicating the luminaire has been modified and can no longer operate the originally intended lamp(s).

## DELAMPING

**Measure: Permanent removal of existing fluorescent lamps and lamp holders**

- A signed pre-notification application is required for all delamping projects.
- Contractors/vendors/customers are responsible to ensure IES lighting levels are maintained after retrofit.
- Delamping must be completed in conjunction with linear LED retrofit (delamp only projects are not eligible for rebates).
- Unused tombstones must be removed from the fixture to prevent lamp reinstallation.
- Room-by-room survey and pre-inspection may be requested for delamping projects.

## LED LAMPS

**Measure: Replace CFL, PL, incandescent or halogen lamps with qualified LED products (See General LED Lighting Requirements)**

- Replace non-LED lamps on a one-for-one basis with LED light sources.
- Eligible LED products include screw-in or pin-based lamps and kits.
- Lamps can be replaced with either LED lamps or LED kits.
- Apply for the replacement of 2-foot and greater linear fluorescent lamps under Linear LED Lamps.
- Reflector lamps must be R, BR or PAR series or PAR kits.
- Non-reflector lamps must be A, B, BA or G series.
- MR16 lamps must retain MR16 base.

## OUTDOOR LED FIXTURES

**Measure: Replace or retrofit non-LED outdoor fixtures with qualified LED products on a one-for-one basis (See General LED Lighting Requirements)**

- Rebates are paid based on the installed LED input wattage.
- The installing contractor is responsible to comply with any applicable “Dark Sky Ordinance” or local outdoor light codes or ordinance.

## REFRIGERATED CASE LED LAMPS

**Measure: Replace T12 or T8 fluorescent lamps with qualified LED lamps (See General LED Lighting Requirements)**

- Refrigerated and freezer cases are eligible.
- Replace 5-foot and 6-foot fluorescent lamps on a one-for-one basis.
- Replacement of lamps less than five feet should be applied for under Linear LED rebate.
- Motion sensor must turn the light off when no motion is detected.
- Replacement cases with factory installed LED lamps are eligible for this rebate.

# New Construction Lighting

## LIGHTING POWER DENSITY

**Measure:** Install energy-efficient lighting with lighting power density (LPD) in watts per square foot less than values listed in ASHRAE 90.1-2013 corresponding to the building type of application. Major renovation projects must apply for lighting rebates under Lighting Power Density.

There are two methods available to apply for a rebate. The Building Area Method in which the facility is evaluated on the listed LPD and the Space-by-Space Method in which the aggregated wattages of a variety of areas are evaluated.

- Light levels should meet IES recommendations for each space type.
- Documentation showing how LPD was calculated must accompany final application.
  - Projects over 20,000 square feet: Lighting COMcheck™ or similar documentation stamped by a professional engineer (PE) or registered architect (RA).
  - Projects under 20,000 square feet: Detailed room-by-room survey with associated calculations.
- Rebate = (LPD baseline - LPD actual) x area x \$0.35.
- Area is gross lighted area of each space type.
- Rebate is for interior lighting only (except for parking garages).
- Installed interior lighting power includes all power used by the luminaires including lamps, ballasts, current regulators and control devices.
- The following lighting equipment and applications are excluded from the calculation of interior lighting power:
  1. Display or accent lighting for galleries, museums and monuments
  2. Lighting integral to equipment, instrumentation or appliances
  3. Lighting in retail display windows
  4. Lighting integral to advertising or directional signage
  5. Exit signs
  6. Lighting for theatrical purposes including performance, stage, film and video production
  7. Lighting for television broadcasting in sporting activity areas
- Use the following steps to calculate the actual LPD of the building or space:
  1. Determine the building type(s) and LPD baseline(s).
  2. Determine the gross lighted area corresponding to the building type.
  3. Determine the interior lighting power for corresponding building type.
  4. Rebate = (LPD baseline - LPD actual) x gross lighted area x \$0.35.
- COMcheck™ must be utilized when submitting under the Space-By-Space Method.

# Cooling

## UNITARY AIR-CONDITIONING AND AIR-SOURCE HEAT PUMP EQUIPMENT

**Measure: Install air-conditioning or heat pump units that meet or exceed the qualifying efficiencies as listed on the CEE<sup>SM</sup> Commercial Unitary Specification for split or single packaged units**

- To be eligible for each tier, both the energy efficiency ratio (EER) and integrated EER (IEER)/seasonal EER (SEER) efficiency levels must be achieved.
- Qualified ducted single-phase units <65,000 Btu/h and all ducted three-phase units ≤760,00 Btu/h are eligible for this rebate.
- All units must meet or exceed the listed efficiency ratings to qualify for any rebate.
- All packaged and split system cooling equipment must meet the current Air-Conditioning, Heating and Refrigeration Institute (AHRI) standards (210/240 or 340/360), be UL listed and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC).
- CEE periodically revises its specifications; see [cee1.org](http://cee1.org) for the most recent version.
- An AHRI certificate and manufacturer's specification sheet indicating the system efficiency must accompany the application. AHRI certificates can be obtained by visiting [ahridirectory.org](http://ahridirectory.org).
- Units with rated capacity larger than 760,000 Btu/h may be applied for on the custom application.
- Evaporative coolers and water source heat pumps do not qualify under this standard measure, but may qualify under the custom rebate program.

**UNITARY AIR CONDITIONING SPECIFICATIONS**

| Equipment Type                              | Size Category                     | Heating Section Type          | Subcategory                     | CEE Tier 1            | CEE Tier 2            | CEE Advanced Tier     | Test Procedure |
|---|-----------------------------------|-------------------------------|---------------------------------|-----------------------|-----------------------|-----------------------|----------------|
| Air conditioners, air cooled (cooling mode) | Single Phase Only < 65,000 Btu/h  | All                           | Split system                    | 15 SEER<br>12.5 EER   | 16 SEER<br>13 EER     | 18 SEER<br>13 EER     | AHRI 210/240   |
|   |                                   |                               | Single package                  | 15 SEER<br>12 EER     | 16 SEER<br>12 EER     | 17 SEER<br>12.5 EER   |                |
|   | < 65,000 Btu/h                    | All                           | Split system                    | 15 SEER<br>12.5 EER   | 16 SEER<br>13 EER     | 18 SEER<br>13 EER     | AHRI 210/240   |
|   |                                   |                               | Single package                  | 15 SEER<br>12 EER     | 16 SEER<br>12 EER     | 17 SEER<br>12.5 EER   |                |
|   | ≥65,000 Btu/h and <135,000 Btu/h  | Electric resistance (or none) | Split system and single package | 12.2 EER<br>14 IEER   | 12.2 EER<br>14.8 IEER | 12.6 EER<br>18 IEER   | AHRI 340/360   |
|   |                                   |                               | All other                       | 12 EER<br>13.8 IEER   | 12 EER<br>14.6 IEER   | 12.4 EER<br>17.8 IEER |                |
|   | ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | Split system and single package | 12.2 EER<br>13.2 IEER | 12.2 EER<br>14.2 IEER | 12.2 EER<br>17 IEER   |                |
|   |                                   |                               | All other                       | 12 EER<br>13 IEER     | 12 EER<br>14 IEER     | 12 EER<br>16.8 IEER   |                |
|   | ≥240,000 Btu/h and <760,000 Btu/h | Electric resistance (or none) | Split system and single package | 10.5 EER<br>12.3 IEER | 10.8 EER<br>13.2 IEER | 10.8 EER<br>14.5 IEER |                |
|   |                                   |                               | All other                       | 10.3 EER<br>12.1 IEER | 10.6 EER<br>13 IEER   | 10.6 EER<br>14.3 IEER |                |

**UNITARY HEAT PUMP SPECIFICATIONS**

| Equipment Type                        | Size Category                     | Heating Section Type          | Subcategory                     | CEE Tier 1            | CEE Tier 2        | CEE Advanced Tier | Test Procedure |
|---------------------------------------|-----------------------------------|-------------------------------|---------------------------------|-----------------------|-------------------|-------------------|----------------|
| Heat pumps, air cooled (cooling mode) | Single Phase Only < 65,000 Btu/h  | All                           | Split system                    | 15 SEER<br>12.5 EER   | 16 SEER<br>13 EER | N/A               | AHRI 210/240   |
|                                       |                                   |                               | Single package                  | 15 SEER<br>12 EER     | 16 SEER<br>12 EER | N/A               |                |
|                                       | < 65,000 Btu/h                    | All                           | Split system                    | 15 SEER<br>12.5 EER   | 16 SEER<br>13 EER | N/A               |                |
|                                       |                                   |                               | Single package                  | 15 SEER<br>12 EER     | 16 SEER<br>12 EER | N/A               |                |
|                                       | ≥65,000 Btu/h and <135,000 Btu/h  | Electric resistance (or none) | Split system and single package | 11.8 EER<br>13.6 IEER | N/A               | N/A               | AHRI 340/360   |
|                                       |                                   |                               | All other                       | 11.6 EER<br>13.4 IEER | N/A               | N/A               |                |
|                                       | ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | Split system and single package | 10.9 EER<br>12.8 IEER | N/A               | N/A               |                |
|                                       |                                   |                               | All other                       | 10.7 EER<br>12.6 IEER | N/A               | N/A               |                |
|                                       | ≥240,000 Btu/h and <760,000 Btu/h | Electric resistance (or none) | Split system and single package | 10.3 EER<br>11.8 IEER | N/A               | N/A               |                |
|                                       |                                   |                               | All other                       | 10.1 EER<br>11.6 IEER | N/A               | N/A               |                |

Units greater than 760,000 Btu/h may qualify for a rebate under the custom program.



## DUCTLESS MINI-SPLIT HEAT PUMP EQUIPMENT

**Measure:** Install ductless mini-split heat pump units that meet or exceed the qualifying efficiencies as listed below

- Qualified heat pumps must have a seasonal energy efficiency ratio (SEER) efficiency rating of 19 or higher.
- Qualified units may be either single-phase or three-phase.
- Units may be up to 5.0 tons.
- Indoor units can be wall or ceiling mounted.
- Heat pumps installed above 5,000 feet of elevation must maintain a full heating rating at an outdoor temperature of 0°F.
- A new electrical disconnect and mounting pad for the outdoor unit shall be included.
- All equipment must be UL listed and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC).
- An AHRI certificate and manufacturer's specification sheet indicating the system capacity and efficiency must accompany the application. AHRI certificates can be obtained by visiting [ahridirectory.org](http://ahridirectory.org).

## WATER- AND AIR-COOLED CHILLERS

*A pre-application is required for this measure*

**Measure:** Install water- or air-cooled chiller with integrated part load value (IPLV), expressed as kW/ton, less than or equal to the qualifying efficiency shown on the following chart

| Water- and Air-Cooled Chillers |   |                       |                               |   |
|--------------------------------|---|-----------------------|-------------------------------|---|
| Equipment Type                 | Size Category<br>(1 Ton = 12,000 Btu/h) | Qualifying Efficiency | Equipment Rebate<br>(per ton) | Efficiency Rebate<br>(per unit eff. over<br>qual. eff. per ton) |
| Air-cooled chillers            | <150 tons                               | 0.803 kW/ton - IPLV   | \$5.25                        | \$225.00  |
|                                | ≥150 tons                               | 0.785 kW/ton - IPLV   | \$7.50                        | \$225.00  |
| Water-cooled chillers          | <150 tons                               | 0.504 kW/ton - IPLV   | \$5.25                        | \$225.00  |
|                                | ≥150 tons to <300 tons                  | 0.460 kW/ton - IPLV   | \$5.25                        | \$225.00  |
|                                | ≥300 tons to <400 tons                  | 0.430 kW/ton - IPLV   | \$7.50                        | \$225.00  |
|                                | ≥400 tons to <600 tons                  | 0.430 kW/ton - IPLV   | \$7.50                        | \$225.00  |
|                                | ≥600 tons                               | 0.430 kW/ton - IPLV   | \$7.50                        | \$225.00  |

- Chiller efficiency rating must be based on the current AHRI Standard 550/590 for IPLV Standard Conditions and not based on full-load or NPLV conditions.
- Chiller must meet or exceed the listed Qualifying Efficiency shown, be UL listed and use a minimum ozone-depleting refrigerant (e.g., HCFC or HFC).
- The AHRI net capacity value should be used to determine the chiller tonnage.

*A manufacturer's specification/performance sheet with the rated kW/ton-IPLV or COP-IPLV must accompany the application.*

## REBATE CALCULATIONS FOR CHILLERS

**Measure:** The rebate is determined by two components: an equipment rebate and an efficiency rebate, which are applied per ton of cooling installed

- Equipment that meets the minimum qualifying efficiency rating is eligible for a rebate.
- Equipment that exceeds the minimum qualifying efficiency for the equipment size category is eligible for an efficiency rebate (added on a pro-rated basis).
- The rebate for chillers is calculated as follows:

*tonnage X {equipment rebate/ton + [efficiency rebate/ton X (kW/ton qualifying - kW/ton new)]}*

## COMPUTER ROOM AIR CONDITIONER, AIR COOLED

- Install computer room air conditioner, air cooled, that meets or exceeds the Seasonal Coefficient of Performance (SCOP) efficiency listed in the table. Efficiency ratings apply to both up-flow and down-flow units. Rebate is paid per kBtu.

| Cooling Rating       | ≥ SCOP |
|----------------------|--------|
| <65 kBtu             | 2.8    |
| ≥ 65 kBtu < 240 kBtu | 2.6    |
| ≥ 240 kBtu           | 2.4    |

## HVAC EC FAN MOTOR

**Measure:** Replace existing shaded pole (SP) or permanent split-capacitor (PSC) fan motors with electronically commutated (EC) motor on HVAC or data center fan equipment

- Rebates are based on horsepower (hp) of installed motor.
- Ensure EC motor is rated to withstand intended operating conditions.
- EC motor should provide airflow requirements as specified by manufacturer.
- Consult with equipment manufacturer if adding variable speed controls.

## ULTRASONIC HUMIDIFICATION

**Measure:** Replace existing functional steam generator or infrared humidification with ultrasonic humidification.

- Provide photo documentation of existing equipment and nameplate(s).
- Rebate is paid base on the total connected kW reduction.

## PACKAGED TERMINAL AIR CONDITIONER AND HEAT PUMPS (PTAC/PTHP)

**Measure:** Install PTAC or PTHP units with efficiency ratings equal to or greater than what is required by ASHRAE 90.1-2013

- All EER values must be rated at a temperature of 95° F outdoor dry-bulb.

# Controls

## PROGRAMMABLE THERMOSTATS

**Measure: Replace an existing non-programmable thermostat with a programmable thermostat**

- Thermostat must be capable of 7-day, 5-2 or 5-1-1 programming.
- Minimum setback temperature of 8° F shall be programmed for heating and cooling.

*A manufacturer's specification sheet must accompany the application.*

## SMART THERMOSTATS

**Measure: Replace an existing non-programmable thermostat with a wi-fi accessible smart thermostat**

- Select eligible thermostat from drop-down list in application (see Eligible Smart Thermostats list below).
- Replacements of energy management system (EMS) sensors are not eligible.
- Both occupancy and holiday schedules shall be programmed.
- Minimum setback temperature of 8° F shall be programmed for heating and cooling.
- Rebate is paid per installed thermostat.

### ELIGIBLE SMART THERMOSTATS

| Manufacturer | Model Name   |
|--------------|--|
| Alarm.com    | <p><i>In order to receive an APS rebate for the below thermostats, individual must be an Alarm.com customer and thermostat must be connected to an active Alarm.com account.</i></p> <ul style="list-style-type: none"> <li>• Radio Thermostat CT30</li> <li>• Radio Thermostat CT80</li> <li>• Radio Thermostat CT100</li> <li>• Radio Thermostat CT32</li> <li>• Radio Thermostat CT110</li> <li>• Trane ComfortLink Control</li> <li>• RCS Z-Wave Communicating Thermostat</li> <li>• GoControl Z-wave Thermostat</li> <li>• Alarm.com Smart Thermostat - ADC-T3000, ADC-T2000</li> </ul> |
| ecobee       | <ul style="list-style-type: none"> <li>• ecobee3 - EB-STATE3-O2</li> <li>• ecobee3 Lite - EB-STATE3LT-01, EB-STATE3LT-02</li> <li>• ecobee3 Lite Pro Edition - EB-STATE3LT-01, EB-STATE3LTP-02</li> <li>• ecobee4 - EB-STATE4-01</li> <li>• ecobee Smart Thermostat with voice control - EB-STATE5-01</li> </ul>   |
| Emerson      | <ul style="list-style-type: none"> <li>• Sensi™ Wi-Fi Programmable Thermostat - ST55</li> <li>• Sensi Touch Wi-Fi Thermostat - ST75, ST75W, B01N3CEUDH</li> <li>• Sensi Smart Thermostat - 1F87U-42WF</li> </ul>   |

|                                     |  |
|-------------------------------------|--|
| Honeywell Home                      | <ul style="list-style-type: none"> <li>• Wi-Fi Smart Color Thermostat - RTH9585WF, RTH9585WF1004</li> <li>• Wi-Fi 7-Day Programmable Thermostat - RTH6580WF, RET97E5D1005U</li> <li>• Wi-Fi 9000 7-Day Programmable Thermostat - TH9320WF5003</li> <li>• Wi-Fi Smart Thermostat - RTH9580WF</li> <li>• 9000 Smart Thermostat - TH9320/TH9320WVFV</li> <li>• Wi-Fi 7-Day Programmable Touchscreen Thermostat - RTH6580WF, RTH8580WF, ARTH9320WF5003, RET97E5D1005U</li> <li>• VisionPro 8000 Smart Thermostat - TH8321WF1001</li> <li>• Wi-Fi VisionPRO Thermostat - TH8320WF1029/U</li> <li>• Round Smart Thermostat - RCH9310WF</li> <li>• T5+ Smart Thermostat - RCHT8610WF, RCHT8612WF, RCHT8610WF2006, RCHT8612WF2005</li> <li>• T6 Pro Smart Thermostat - TH6320WF2003, TH6220WF2006, TH6320WF2003/U</li> <li>• T9 Smart Thermostat - RCHT9610WFSW2003/U, RCHT9610WFSW, RCHT9510WFW2001</li> <li>• T10 Smart Thermostat - THX321WFS2001W/U</li> </ul> |
| Lux                                 | <ul style="list-style-type: none"> <li>• Lux GEO, LUX KONO</li> <li>• Lux CS1</li> </ul>   |
| Nest                                | <ul style="list-style-type: none"> <li>• Nest Learning Thermostat - T3007ES (stainless steel), T3017US (white), T3021US (copper), T3032US (brass), T3018US (mirror black), T3019US (polished steel), 06285, BH1252-US, T200577, T3016US (black)</li> <li>• Nest Thermostat E - T4000ES</li> <li>• Nest Thermostat - GA02081-US, GA02082-US, GA02083-US, GA01334-US</li> </ul>  |
| Radio Thermostat Company of America | <ul style="list-style-type: none"> <li>• Filtrete 3M-50</li> <li>• CT30</li> <li>• CT50</li> <li>• CT80</li> <li>• CT100</li> </ul>  |
| Vivint                              | <ul style="list-style-type: none"> <li>• Radio Thermostat CT100 with Vivint Go! Control Panel</li> </ul>   |

## NETWORKED THERMOSTATS

### Measure: Replace an existing thermostat with a qualified networked thermostat

- Communication between devices may be hardwired or wireless; and utilize Modbus, BACnet, wireless mesh or other approved communication protocol.
- Single zone thermostats are not eligible for a Networked Thermostat rebate but may be eligible for either Smart or Programmable Thermostat rebates.
- Wireless communication between devices shall not utilize customer wi-fi.
- Minimum setback period must exceed 2,200 hours per year.
- Minimum setback temperature of at least 8°F required in both heating and cooling.
- Holiday schedules must be entered for a minimum of one year. For premises with varying schedules (i.e., schools, seasonal occupancy), the occupancy schedules must be entered for a minimum of one year.
- Rebate is paid per installed thermostat.

## COOL CONTROL

**Measure: Install Cool Control fan delay device on existing direct expansion (DX) units to optimize indoor HVAC fan operation**

- Devices must be installed as intended by control manufacturer.
- Units must be between 2 ton and 6 ton with direct outside air inlets.
- HVAC unit identification shall be included on the invoice for devices.
- Only units that have evaporator fans that cycle with compressor operation are eligible; units with fans that operate to provide ventilation are ineligible for this rebate.
- Rebate is paid per installed device.

## HOTEL ROOM OCCUPANCY CONTROLS

**Measure: Install devices to automatically setback room temperature when the room is unoccupied**

- Acceptable technologies include passive and/or dual technology room occupancy sensors and room keycard activation. Room technologies may be incorporated into a front desk arrival system.
- Rebate is paid per rentable guest room.

# Refrigeration

## STRIP CURTAINS ON WALK-INS

**Measure:** Install new strip curtains or clear plastic swinging doors on doorways of walk-in boxes

- Not available for display cases or for replacement of existing strip curtains.
- Rebate is based on linear foot of door width.

## REACH-IN COOLER CONTROLS

**Measure:** Install controls with passive infrared occupancy sensor to turn off fluorescent lights and other refrigerated systems when the surrounding area is unoccupied for 15 minutes or longer

- Presumes refrigerated unit contains only non-perishable bottled and canned beverages.
- Control logic should power up the machine at two-hour intervals to maintain product temperature.

## HIGH-EFFICIENCY REACH-IN REFRIGERATORS AND FREEZERS

**Measure:** Replace standard reach-in refrigerated cases with or install ENERGY STAR-rated high-efficiency cases, which are designed with components such as electronically commutated motor (ECM) evaporators and condenser fan motors, hot gas anti-sweat heaters or high-efficiency compressors

- Eligible equipment includes one-door, two-door and three-door refrigerators, and freezers.
- All one-door units have a capacity of  $\leq 30$  cubic feet; two-door units are  $\leq 60$  cubic feet; and three-door units are  $\leq 90$  cubic feet.

*A manufacturer's specification sheet must accompany the application.*

## EVAPORATOR FAN MOTOR

**Measure:** Replace standard-efficiency shaded-pole evaporator fan motor in refrigerated display cases or fan coil in walk-ins with electronically commutated motor (ECM) or permanent split-capacitor (PSC) motor

## ANTI-SWEAT HEATER CONTROLS

**Measure:** Install device 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 turn off anti-sweat heaters based on sensing condensation (on the inner glass pane) also qualify.
- The rebate amount is based on the horizontal length of the case.

## FLOATING-HEAD PRESSURE CONTROLS

**Measure:** Convert the head pressure controls of an existing multiplex system from fixed control to floating control to take advantage of low outdoor-air temperatures

- The condensers must use variable speed drive, staged fan-operation or a combination of both.

## AUTOMATIC DOOR CLOSER

**Measure:** Install a new device to automatically close the main insulated door of an existing walk-in cooler or freezer

- Only retrofit installations are eligible for rebates.

## HIGH-EFFICIENCY CONDENSERS

**Measure:** Install new or replace existing refrigeration condensers with higher-efficiency condensers

- Replacement condenser shall meet or exceed required EER.  $EER = \text{total heat rejected (Btu/Hr)} / \text{full-load fan energy (watts)}$ .
- Air cooled condenser —  $EER \geq 105 \text{ Btu/Hr/watt}$ . Temperature differential (TD) between the saturated condensing temperature (SCT) and ambient design temperature must be:
  - 15° F or less for medium temperature (MT) applications.
  - 10° F or less for low temperature (LT) applications.
- Water evaporative condenser:  $EER \geq 240 \text{ Btu/Hr/watt}$ . Tested at 100° F SCT at an ambient wet-bulb condition of 70° F.
- Fans must be either staged or controlled via VSD. Rebates for new VSDs may be applied for separately.
- Manufacturer specifications showing ratings must be provided.

## HIGH-EFFICIENCY COMPRESSORS

**Measure:** Replace existing hermetically sealed with a more efficient unit

- The replacement compressor must not exceed 110% of the existing compressor capacity.
- The invoice must show both the replaced and new compressor model numbers.
- The new compressor must meet or exceed the following coefficient of performance (COP) efficiency for the equipment type listed in the table below:

| EQUIPMENT TYPE         | EFFICIENCY (COP) |
|------------------------|------------------|
| Walk-in cooler         | 4.14             |
| Walk-in freezer        | 1.2              |
| Reach-in freezer       | 1.67             |
| Food service equipment | 2.15             |
| Beverage merchandiser  | 2.15             |

# Energy Management System (EMS)

*A pre-application is required for this measure*

| SYSTEM BEING REPLACED        | TIER 1 REBATE \$/S.F. | TIER 2 REBATE \$/S.F. |
|------------------------------|-----------------------|-----------------------|
| Non-programmable thermostats | \$0.20                | \$0.30                |
| Pneumatic thermostats        | \$0.20                | \$0.30                |
| Digital EMS system           | \$0.10                | \$0.20                |
| Programmable thermostats     | \$0.10                | \$0.20                |
| Integrated lighting control  |                       | \$0.10                |

## General requirements:

- Buildings and spaces within buildings that are not mechanically cooled are not eligible under this section.
- EMS controls for electric resistance heating-only systems may be submitted using the custom application.
- Buildings and spaces that are continuously occupied are only eligible for the Tier 2 rebate.
- Pre- and post-inspections may be required to verify and document stated conditions.
- EMS controllers must be able to address HVAC system requirements for multiple zones and will provide multiple control functions autonomously without access to internet or cloud services. Controllers only capable of addressing a single zone or networked thermostats are not eligible for an EMS rebate but may be eligible for a Smart or Programmable Thermostat rebate.

## Measure: Install EMS to optimize system operation

- Replace existing electric (non-programmable) or pneumatic thermostats.
  - Tier 1 rebate of \$0.20 per square foot of controlled and conditioned space
  - Meeting Tier 2 specification requirements qualifies for \$0.30 per square foot of controlled and conditioned space.
- Replace existing programmable thermostats or digital EMS system.
  - Tier 1 rebate of \$0.10 per square foot of controlled and conditioned space
  - Meeting Tier 2 specification requirements qualifies for \$0.20 per square foot of controlled and conditioned space.
- Overlay systems that monitor, manage or control existing EMS systems are not eligible for this rebate. This would include systems that deploy artificial intelligence (AI) or continuous commissioning systems.
- Software only updates/upgrades to existing EMS are not eligible for this rebate.

## Tier 1 EMS requirements:

- Central time control
- Graphic operator interface
- Trending capability
- Web-based interface with on-site PC-based controls
- Minimum setback temperature of at least 8° F in both heating and cooling
- Minimum setback period must exceed 2,200 hours per year
- Holiday schedules must be entered for a minimum of one year. For premises with varying schedules (i.e., schools, seasonal occupancy), the occupancy schedules must be entered for a minimum of one year.
- Implement at least four enhanced control strategies



**Tier 2 EMS requirements, All Tier 1 requirements plus:**

- For DX and water-source heat pump (WSHP) systems, implement at least seven enhanced control strategies.
- For chilled water (CW) systems, implement at least 10 enhanced control strategies.
- For facilities with both DX and CW systems, all areas must implement at least 10 enhanced control strategies to meet Tier 2 rebate level.

**Required documentation:**

- Documentation supporting the conditioned space on the application. This information can typically be found on facility drawings or a spreadsheet indicating the space measurements.
- System points list that shows all components integrated to EMS
- EMS manufacturer specifications
- Sequence of operation clearly indicating:
  - Occupied, setback time periods and established temperatures
  - Occupied, unoccupied and holiday scheduling
  - On/off control of motors (as applicable)
  - EMS screenshots displaying system settings (temperature set points, schedules, programming logic, etc.) to document the Enhanced Control Strategies implemented from the list below:

- |   |   |
|---|---|
| 1. Chilled Water Temperature Reset                            | 12. Improved Outside Air Volume Control             |
| 2. Chiller Compressor Sequencing                              | 13. Limit OA During Morning Warm-Up/Cool Down Cycle |
| 3. Condenser Water Temperature Reset                          | 14. Night Ventilation Purge                         |
| 4. Cooling & Heating Lockout on Outside Air Temperature (OAT) | 15. Outside Air Damper Control                      |
| 5. Cooling Tower Fan Speed Control                            | 16. Optimal Start/Stop                              |
| 6. Cooling Tower Fan Staging                                  | 17. Secondary Chilled Water Loop Pressure           |
| 7. Dead Band Control for Heating and Cooling                  | 18. Static Pressure Reset                           |
| 8. Demand Control Ventilation                                 | 19. Summer/Winter Volume Change                     |
| 9. Distribution Pump Speed Control                            | 20. Supply Air Temperature Reset                    |
| 10. Distribution Pump Sequencing                              | 21. Unoccupied Temperature Setback                  |
| 11. Occupancy Sensor Integration                              | 22. Zone-by-Zone Scheduling                         |

# Lighting Energy Management System (LEMS)

**Measure: Install lighting energy management system (LEMS)**

- Must be installed in conjunction with an approved integrated HVAC EMS project.
- Rebate of \$0.10 per square foot of illuminated and controlled interior space. The LEMS may be a freestanding lighting controller or integrated with a HVAC control system.

**Required documentation:**

Documentation supporting the square feet of the controlled space. This information can typically be found on facility drawings. If only specific areas are being controlled, please provide a spreadsheet indicating the space measurements.

- System points list
- Sequence of operation clearly indicating the on/off times
- Areas that are illuminated 24/7/365 are not eligible for this rebate
- Facilities that had LEMS installed previously do not qualify

**Pre- and post-inspections may be required to verify stated conditions.**

- Confirmation of the programming functionality may be requested.

# Quality Installation

## QUALITY INSTALLATION – RETROFIT

Quality installation is split into two phases. Phase I includes sizing, testing and repair activities. Phase II involves sealing ducts based on the Phase I test results. The rebate requirements are summarized as follows:

### Phase I

1. System sizing: Must use Air Conditioning Contractors Association (ACCA) standard calculations and provide documentation
  - Manual N for load estimation
  - Manual CS for system selection
  
2. Refrigerant charge and airflow (RCAF)
  - Perform RCAF testing, correct refrigerant charge and/or airflow to meet the RCAF criteria below.
  - Supply all equipment pressures, subcool and superheat readings, indoor (return) dry-bulb and wet-bulb, outdoor ambient temperature, indoor coil temperature split and duct static readings for return and supply duct.

### Phase II

#### Contractor must be Building Performance Institute (BPI) certified

*Rebate is only for duct leakage and repairs that can be performed on ductwork located in non-conditioned spaces.*

#### Ducts outside the thermal envelope

If leakage is >25 CFM per ton, perform Phase II duct sealing as follows:

1. Seal ducts until leakage is below 25 CFM per ton. Leakage of up to 60 CFM per ton is allowed for major renovation projects where the ducts were not replaced.
2. Measure duct leakage before and after sealing to verify that required leakage targets were met.

#### Ducts inside the thermal envelope

1. If leakage is >40 CFM per ton, perform Phase II duct sealing.
2. Measure duct leakage before and after sealing to verify that required leakage targets were met.

For larger systems, it is recommended to take pre- and post-project photos for all duct sealing and state the exact locations sealed.

#### RCAF Criteria

| SYSTEM TYPE               | CRITERIA  |
|---------------------------|---|
| Testing requirements      | Outdoor temperature must be 55° F - 115° F for systems with R410A equipment. Outdoor temperature must be 60° F - 115° F for systems with R22 equipment. Indoor dry-bulb return air plenum must be between 70° F - 84° F during the test. Indoor wet-bulb (return) must be 50° F or greater during the test. |
| For fixed orifice systems | +/- 5° F of target superheat +3° F / -5° F of target temp split   |
| Testing requirements      | +/- 3° F of target subcooling +3° F / -5° F of target temp split  |
| For fixed orifice systems | +/- 5° F of target superheat +3° F / -5° F of target temp split   |

### Documentation requirements

Provide the following information for each system:

- Equipment sizing calculations
- Amount of refrigerant added or removed
- System size (tons)
- Target and actual for supply/return temperature differentials from all tests
- Equipment model number
- Air flow CFM from all tests
- Nameplate refrigerant quantity
- Duct leakage CFM from all tests
- Target and actual superheat or subcool temps from all tests
- Outdoor ambient temperature

### QUALITY INSTALLATION – NEW CONSTRUCTION

Quality installation is split into two phases. Phase I includes sizing, testing and repair activities. Phase II involves sealing ducts based on the Phase I test results. The rebate requirements are summarized as follows:

#### Phase I

1. System sizing: must use air-conditioning contractor
2. Association (ACCA) standard calculations and provide documentation
  - Manual N for load estimation
  - Manual CS for system selection
  - Manual Q for duct sizing
3. Perform RCAF testing, correct refrigerant charge and/or airflow to meet the RCAF criteria below.

#### Phase II

**Contractor must be Building Performance Institute (BPI) certified**

##### Ducts outside the thermal envelope

If leakage is >25 CFM per ton, perform Phase II duct sealing.

1. Seal ducts until leakage is below 25 CFM per ton. Leakage of up to 60 CFM per ton is allowed for major renovation projects where the ducts were not replaced.
2. Measure duct leakage after sealing to verify that required leakage targets were met.

##### Ducts inside the thermal envelope

1. If leakage is >40 CFM per ton, perform Phase II duct sealing.
2. Measure duct leakage before and after sealing to verify that required leakage targets were met.

**RCAF criteria**

| SYSTEM TYPE               | CRITERIA   |
|---------------------------|--|
| Testing requirements      | Outdoor temperature must be 55° F - 115° F for systems with R410A equipment. Outdoor temperature must be 60° F - 115° F for systems with R22 equipment. Indoor dry-bulb return air plenum must be between 70°F - 84° F during the test. Indoor wet-bulb (return) must be 50° F or greater during the test. |
| For fixed orifice systems | +/- 5° F of target superheat +3° F / -5° F of target temp split  |
| For systems with TXV      | +/- 3° F of target subcooling +3° F / -5° F of target temp split   |
| All                       | Air flow 325-450 CFM per ton or +3° F / -5° F of target temp split between supply and return air   |

**Documentation Requirements**

Provide the following information for each system:

- Equipment sizing calculations
- Amount of refrigerant added or removed
- System size (tons)
- Target and actual for supply/return temperature differentials from all tests
- Equipment model number
- Air flow CFM from all tests
- Nameplate refrigerant quantity
- Duct leakage CFM from all tests
- Target and actual superheat or subcool temps from all tests
- Outdoor ambient temperature

# Building Envelope

## HIGH-PERFORMANCE WINDOWS AND GLASS DOORS

**Measure:** New windows and glass door can utilize any combination of glazing, coating, internal film and gas filling to meet the specified U-factor and solar heat gain coefficient (SHGC)

- Glazing with east, south and west exposures are eligible.
- U-factor must be 0.32 Btu/hr-ft<sup>2</sup>-° F or less.
- U-factor is at center of glass.
- SHGC must be 0.40 or less.
- Films or coatings that are added to existing glazing may be considered as a custom measure.
- Provide a schedule indicating the model number, U-factor, SHGC, square foot per window, the quantity of windows and the exposure.
- Rebate is paid on a per-square-foot basis.
- It is recommended that the invoice include the performance specifications.

*A manufacturer's specification sheet must accompany the application.*

## SHADE SCREEN

**Measure:** Add fixed exterior physical shading screens to windows. This measure is applicable only to retrofit of existing facilities.

- Windows with east, south and west exposures are eligible.
- Shading coefficient must be 0.30 or less at a 30° profile angle.
- Interior window shades, such as blinds and drapes, and movable door screens do not qualify.
- A window schedule indicating the quantity, current window type, actual window surface dimensions, orientation, and brand and model number of screen material, along with specifications sheets must be provided.
- Rebate is paid on an installed per-square-foot basis.
- It is recommended that the invoice include the performance specifications.

*A manufacturer's specification sheet must accompany the application. Please contact a representative from the Solutions for Business team for a basic window schedule program.*

## VSD

### RETROFIT VARIABLE SPEED DRIVES

**Measure: Install VSD on existing motor to reduce energy use**

- Must permanently remove or disable any throttling devices such as inlet vanes, bypass dampers or throttling valves.
- VSDs replacing existing VSDs are only eligible for rebates if existing VSDs have been non-operational for at least six months.
- VSDs purchased for “soft start” only applications are not eligible for rebates.
- A 3% impedance choke is recommended to handle any power factor corrections that may occur. VSDs are sensitive to overvoltage.
- The VSD rebate is based on the lower value of the equipment horsepower or rated horsepower of the VSD.
- Rebate rate varies by equipment application (\$/HP) as shown in the table below:

| MEASURE                     | REBATE | MEASURE                          | REBATE |
|-----------------------------|--------|----------------------------------|--------|
| Air compressor              | \$70   | Chilled water pump               | \$70   |
| Chiller compressor          | \$30   | Condenser water pump             | \$40   |
| Cooling tower/condenser fan | \$35   | Domestic water booster/well pump | \$50   |
| HVAC fan                    | \$70   | Other VSD                        | \$50   |
| Process                     | \$35   | Refrigerant compressor           | \$50   |
| Refrigeration fan           | \$70   | Pool pump                        | \$70   |
| Waste water blower          | \$70   | Other blower                     | \$70   |

### POOL PUMP VARIABLE SPEED DRIVES

**Measure: Install VSD on existing pump to reduce energy use**

- Pump drives shall be installed and programmed to meet the local commercial code requirements.
- Pump drives must operate a minimum of eight hours per day at a reduced speed.
- Maximum reduced speed operation shall not exceed 90% of motor nameplate RPM or 54Hz.
- The VSD rebate is based on the lower value of the equipment horsepower or rated horsepower of the VSD.

### NEW CONSTRUCTION VARIABLE SPEED DRIVES

**Measure: Install VSD on motors to reduce energy use**

- Must not install any throttling devices such as inlet vanes, bypass dampers or throttling valves.
- VSDs required by ASHRAE 90.1-2013 are not eligible for rebates. Reference ASHRAE 90.1-2013 for this information; if the equipment is not required it may be eligible for a rebate. See table above for details.
- VSDs purchased for “soft start” only applications are not eligible for rebates.
- A 3% impedance choke is recommended to handle any power factor corrections that may occur.
- The VSD rebate is based on the lower value of the equipment horsepower or rated horsepower of the VSD.

# Appliances

## HEAT PUMP DOMESTIC HOT WATER

**Measure: Replace existing electric domestic hot-water heater with a heat pump domestic hot-water heater (HPWH)**

- Rebate is paid in two tiers based on unit efficiency:
  - Tier 1: energy factor (EF) or coefficient of performance (COP) of  $\geq 2.35$  and  $< 2.5$  = \$200 per HPWH
  - Tier 2: EF or COP of  $\geq 2.5$  = \$250 per HPWH
- HPWH shall be installed with minimum of 1,000 cubic feet of surrounding air space.
- HPWH shall have either 50- or 80-gallon capacity.
- Installation must be in compliance with applicable building codes.

*A manufacturer's specification sheet showing heat factor (HF) or COP must accompany the application.*



# Compressed Air

## ZERO LOSS CONDENSATE DRAIN

**Measure: Install no loss/ Zero Loss Condensate Drain (trap) on compressed air system that wastes no air in the purging of condensate.**

- Device shall have a float or level sensor that operates an electric solenoid or ball valve to maintain the condensate level in the reservoir below the high level point, or a float activates a pneumatic signal to an air cylinder to open a ball valve through a linkage to expel the condensate in the reservoir to the low level point.
- Rebate is paid per unit.

## ADDITIONAL COMPRESSED AIR RECEIVER

**Measure: Install additional compressed air receiver (storage tank) that will allow the system pressure to be reduced.**

- Installation of the storage device shall meet all applicable codes and industry standards.
- Rebate is based on nameplate horsepower of the primary compressor(s). Horsepower of standby / redundant compressors are not eligible.

# Information Technology

## COMPUTER POWER MANAGEMENT SOFTWARE

**Measure: Install software to allow computers to be put into low-power settings during appropriate hours**

- The software installed must automatically control the power settings of networked personal computers at the server level.
- Software must be capable of managing power consumption for each individual PC and must be capable of reporting energy savings results.
- A report directly from the network energy management software that verifies the number of PCs controlled by the system must be supplied. Report must include an individual identifier for each computer.
- Individual computers are eligible for one rebate once every six years. If the software license is transferred to a new computer, the six-year period transfers with the license.
- A schedule identifying the computers by ID number or serial number must accompany the final application.

## DATA CENTER MEASURES THAT MAY BE CONSIDERED CUSTOM MEASURES

- Virtualization
- Ventilation enhancements
  - Hot aisle/cold aisle containment
  - Other airflow-optimization techniques
- HVAC enhancements
  - Water-side economizers
  - Improved control strategies
- Power management
  - High-efficiency uninterruptable power supply (UPS) equipment
  - High-efficiency transformers

## Custom

*A pre-application is required for this measure*

Custom rebates are calculated based on the amount of energy saved (kWh) during two time periods that occur in the first year after the project is completed: (1) annual kWh saved and (2) summer on-peak kWh saved during the hours of 3:00 p.m. to 8:00 p.m., weekdays, June 1 to September 30.

The rebate calculation is based on the lower result of:

- Annual kWh saved x \$0.02/kWh saved + summer on-peak kWh saved x \$0.18/kWh saved
- or
- 75% of implementation costs

Customer/contractor shall submit detailed calculation supporting both annual and summer peak period savings.

Actual rebate payments will be based on either (1) documented electrical energy (kWh) reduction or (2) an electrical energy reduction estimate approved by APS Solutions for Business program staff. In no case will the rebate payment exceed 75% of the energy efficiency-related project costs, which are defined as the incremental costs associated with implementing the energy-saving measures. Pursuant to Arizona Corporation Commission decisions, when calculating incremental measure cost, APS is required to reduce the incremental measure costs by any known monetary rebates available from other entities (such as tax credits), regardless of whether a customer applies for them.

### PROJECT ELIGIBILITY

The APS Solutions for Business program offers custom rebates for energy efficiency improvements that do not fall under the standard offering, but have isolated and measurable or verifiable energy savings. All custom measures must pass a Benefit to Cost test, also called a Societal Cost Test (SCT), as defined and calculated by DNV using energy savings and incremental measure costs provided by the customer. Discontinued standard measures will not be considered for a custom rebate.

Equipment replacement projects must demonstrate that the old equipment has been eliminated from the resale market.

- Standard measures can be included with a custom application (rather than submitting separate applications) when those measures have interactive energy-saving effects.
- Ineligible projects include but are not limited to: cool roofs, electrical generation projects such as renewables, fuel switching and customer-owned on-site generation.
- Lighting projects should comply with the Illuminating Engineering Society of North America (IESNA) recommended lighting levels and local code.

## SUPPORTING DOCUMENTATION

Please attach the following documentation, in addition to required documentation as described in the APS Solutions for Business Program Policies and Procedures:

- Complete description of the proposed project, the products and technologies used, and how they will be employed. Include definitions of the base case and details of the proposed equipment (provide manufacturer's specification sheets for both base and proposed cases, if possible).
- All facilities, buildings or equipment that will be affected by the project; include all APS account numbers.
- Detailed cost breakdown by measure.

## SAVINGS CALCULATIONS

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

- Concise description of the existing energy systems to be affected
- Facility physical description and occupancy (including activities in building and hours of operation)
- Location of affected equipment
- Condition and age of equipment if a 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 savings calculations for both the annual and summer peak hour periods. Summary of the calculated 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.

It is the applicant's responsibility to present a convincing case for estimating energy savings. If it is unclear whether your preferred method is sufficient, contact the program team at (866) 277-5605 or (602) 385-0900. Existing buildings may be eligible for a rebate for feasibility or retro-commissioning studies. New construction projects may be eligible for design assistance. See the Technical Assistance and Studies Application for details.

## ENERGY SAVINGS ANALYSIS

Inspections and all submitted documentation of pre-existing conditions will be reviewed to determine project eligibility and to estimate the base case energy usage. Applicants will be responsible for submitting complete documentation that indicates the basis for projected energy savings. We reserve the right to require pre- and/or post-measurement and verification for any project. Customers agree to abide by the APS determination of project baselines, which will be based on conservative estimates in absence of verifiable data. Where applicable, ASHRAE 90.1-2013 shall be used as the project baseline unless another baseline is mutually agreed upon. Projects where a baseline energy use cannot be established may be disqualified.

# Existing Buildings - Feasibility Studies

## ENERGY STAR® BENCHMARKING

Establish an energy usage baseline by benchmarking the facility using the ENERGY STAR Portfolio Manager ([energystar.gov](http://energystar.gov)). For building types not included in Portfolio Manager, an alternative approach can be used to benchmark the energy usage.

- Provide copy of ENERGY STAR Portfolio Manager documentation.
- Provide approved alternative benchmarking documentation.
- The one-time maximum rebate for ENERGY STAR Benchmarking is \$250 per facility.

## FEASIBILITY STUDY – DISCOVERY PHASE

Rebates are available to perform detailed engineering analysis to investigate the economics and technical feasibility of one or more energy efficiency investment options. Eligible buildings must have at least 25,000 square feet of conditioned floor space.

Applications for approval must include a brief description of each proposed measure including:

- Study cost per task
- Existing systems or base case and proposed system
- Proposed methodology for analysis
- Estimated potential energy savings and costs to implement
- Estimated schedule to complete each task

A written report must be submitted with the rebate application and include the study findings, methodology and supporting documentation. Please provide this documentation with the application.

- ENERGY STAR Benchmarking as outlined above.
- The study must develop estimates of incremental measure costs, potential APS rebates and energy (kW and kWh) savings.
- The accuracy of the estimates should be aligned with the study purpose. Higher accuracy is typically required to make the final investment decision than what is needed to simply screen options for additional evaluation.
- The study must identify and discuss barriers to implementation in the context of potential project economics.
- ASHRAE Level II - Energy Survey and Engineering Analysis will meet the aforementioned requirements.

## FEASIBILITY STUDY – IMPLEMENTATION PHASE

Implementation phase rebates are available when the final rebate application(s) for the qualified measures from the “Discovery Phase” are submitted. Facilities are eligible for one combined feasibility study rebate every five years. Lighting-only audits do not meet the feasibility study requirements.

Rebates for feasibility study are provided in two phases: discovery and implementation. Rebates are capped at 50% of the study cost up to \$2,500 per phase per facility.

# Existing Buildings - RCx HVAC/Lighting

## RETRO-COMMISSIONING – HVAC/LIGHTING SYSTEMS

Retro-commissioning (RCx) services are designed to assess the operational and maintenance components of complex HVAC and lighting control systems in existing buildings to develop a strategy to optimize the systems' energy efficiency. Typical tasks include identifying and implementing relatively low-cost operational improvements, and documenting these opportunities in a retro-commissioning report.

To be eligible for facility RCx services, the facilities must have a minimum of 25,000 square feet of conditioned floor space and utilize a chilled water system or water-source heat pumps (WSHP) for more than 50% floor area of conditioned space. In addition, facilities must utilize a central building energy management system (EMS). Facilities are eligible for one RCx rebate every five years. Facilities that have received rebate payments for EMS or feasibility study measures within the last five years are ineligible. It is strongly recommended that an implementation budget be established along with the scope of work. Implementation budgets are often in the 20% - 40% range of the total RCx cost.

The intent of the study is to identify and implement low-cost and no-cost operations and maintenance improvements, as well as to identify energy efficiency opportunities requiring capital investment.

RCx should be conducted in three-phase s:

**Phase 1 - Benchmarking:** ENERGY STAR Benchmarking (see feasibility study specifications)

**Phase 2 - Evaluation:** At a minimum, HVAC/lighting systems retro-commissioning services should involve all of the following activities:

- Review all applicable equipment sequencing and operating schedules.
- Assess the existing condition and operation of economizers.
- Assess current control capability.
- Review and assess maintenance procedures.
- Identify low-cost/no-cost repairs.
- Itemize Phase 1 and 2 tasks and costs on the rebate application.
- Identify improvements that will require capital investment including estimated savings, costs, rebates, payback, etc.
- Submit a progress RCx report with identified repairs and capital investment improvements. The intent is to allow APS program staff to review and provide feedback prior to the implementation phase and submission of the final application.

**Phase 3 - Implementation:** At a minimum, HVAC/lighting systems retro-commissioning services should involve all of the following activities:

- Implement no-cost/low-cost repairs and recommended energy-efficient measures with a payback of less than one year within six months of completion of retro-commissioning. This may include replacing components and revising control sequences that fail the assessment. Submit final application *after* implementation phase.

<sup>1</sup> Evaluation of district cooling and heating plant is qualified for feasibility study rebate. District plant optimization is covered under custom measure application.

- Calculate and document kW and kWh savings achieved from these efforts.
- Itemize Phase 3 tasks and costs on the rebate application.
- Submit a final RCx report following the instructions below.

A written report should be developed and contain the following items at a minimum:

- General facility description and summary of scope of work
- A description and assessment of the energy system(s)
- List of actions that were implemented including actual cost and supporting savings calculations documenting the energy impact for each action
- List of recommended energy efficiency measures that require capital investment including estimated cost and energy impact

RCx rebates are calculated based on the amount of energy saved (kWh) during two time periods that occur in the first year after the project is completed: (1) annual kWh saved and (2) summer on-peak kWh saved during the hours of 3:00 p.m. to 8:00 p.m., weekdays, June 1 to September 30.

The rebate calculation is based on the lower result of:

- Annual kWh saved x \$0.02/kWh saved + summer on-peak kWh saved x \$0.18/kWh saved
- or
- 75% of implementation costs
- or
- \$100,000

Energy savings resulting from capital hardware investment can be considered as standard and/or custom measures and are not subject to the RCx incentive cap.

If no savings are achieved during the RCx study, the project will be treated as a feasibility study. Rebates for feasibility study are capped at 50% of the study cost up to \$5,000 per facility in two steps.

1. Up to \$2,500 will be rebated upon approval of the submitted feasibility study
2. Up to an additional \$2,500 will be rebated after successful implementation of measures requiring capital investment as identified in the study

# Existing Buildings - RCx Other Systems

## RETRO-COMMISSIONING – OTHER SYSTEMS

RCx services of non-HVAC, non-lighting systems are designed to assess the operational and maintenance components of other electric-consuming systems in existing facilities to develop a strategy to optimize the systems' energy efficiency. Facilities are eligible for one RCx rebate every five years. It is strongly recommended that a repair budget be established along with the scope of work.

These systems can include:

- Complex water pumping systems of 100 hp and larger
- Industrial process
- Compressed air systems of 50 hp and larger

Typical tasks include identifying and implementing low-cost and no-cost operational improvements and documenting these opportunities in a RCx report.

**Phase 1 - Evaluation:** At a minimum, other systems retro-commissioning services must involve all of the following activities:

- Review of all applicable equipment sequencing and operating schedules.
- Assess current control capability.
- Review and assess maintenance procedures.
- Identify low-cost/no-cost repairs.
- Itemize Phase 2 tasks and costs on the rebate application.

**Phase 2 - Implementation:** At a minimum, other systems RCx services must involve all of the following activities:

- Implement low-cost/no-cost repairs as previously identified. This may include replacing components and revising control sequences that fail the assessment.
- Calculate and document kW and kWh savings achieved from these efforts.
- Identify improvements that will require capital investment.

A written report must be developed and contain the following items at a minimum:

- General facility description and summary of scope of work
- A description and assessment of the energy system(s)
- List of actions that were implemented including actual cost and supporting calculations documenting the energy impact for each action
- List of recommended energy efficiency measures that require capital investment including estimated cost and energy impact



RCx rebates are calculated based on the amount of energy saved (kWh) during two time periods that occur in the first year after the project is completed: (1) annual kWh saved and (2) summer on-peak kWh saved during the hours of 3:00 p.m. to 8:00 p.m., weekdays, June 1 to September 30.

The rebate calculation is based on the lower result of:

- Annual kWh saved x \$0.02/kWh saved + summer on-peak kWh saved x \$0.18/kWh saved

or

- 75% of implementation costs

or

- \$100,000

Energy savings resulting from capital hardware investment can be considered as standard and/or custom measures and are not subject to the RCx incentive cap.

If no savings are achieved during the RCx study, the project will be treated as a feasibility study. Rebates for feasibility study are capped at 50% of the study cost up to \$5,000 per facility in two steps.

1. Up to \$2,500 will be rebated upon approval of the submitted feasibility study
2. Up to an additional \$2,500 will be rebated after successful implementation of measures requiring capital investment as identified in the study

# Pump and Blower Testing

## WATER AND WASTE WATER

Rebates are available to conduct performance testing of pump and blower systems to determine equipment efficiencies, and investigate economics and technical feasibility of energy savings opportunities. Eligible equipment must work at 15 horsepower or more, and operate a minimum of 3,000 hours annually. Rebates are paid at 50% of testing activities up to \$10,000 per site. Equipment is eligible for a testing rebate every five years.

The testing report must include the following information at a minimum, and should reflect the performance of the equipment under typical operating conditions. If equipment operates under varying demand requirements, multiple tests should be conducted to determine equipment performance across the range of typical operating conditions.

General report requirements:

- APS account and meter numbers (include all pages of one monthly bill)
- Pump location (address, plant ID, pump ID, serial number)
- Motor & pump/blower nameplate data (horsepower, speed RPM, voltage, nominal capacity)
- Constant-speed or variable-speed control
- Pump or blower type
- Description summarizing equipment demand requirements and operating conditions

Testing/measurement report requirements:

- APS account number electrical input: amperage, voltage, power factor, kW
- Equipment output: suction pressure (or lift), discharge pressure, total dynamic pressure, capacity (gpm or cfm), speed (RPM)

Analysis requirements:

- Overall plant efficiency (wire-to-water or wire-to-air)
- Annual production (acre-feet, gallons, or cubic feet)
- Annual operating hours
- Annual energy savings calculations
- Economic analysis, ROI

# New Construction

## DESIGN ASSISTANCE

Rebates are available to help offset the incremental cost of various planning and design activities that have the potential to result in energy savings in new facilities.

Potential activities that are eligible for a rebate include:

- Business-case assessment for energy-saving technologies
- Building energy simulation
- Business-case assessment for LEED® certification
- First-time incorporation of energy efficiency concepts into the building design
- LEED® certification process facilitation
- Design document review

Only new buildings and major renovation projects are eligible for design assistance rebates. Eligible buildings must have at least 25,000 square feet of conditioned floor space.

The decision to fund a design assistance activity will be made by the APS Solutions for Business team and will be based on an assessment of the activity's potential impact on the energy efficiency of the current and future projects.

If the Whole Building track is being utilized, please apply for Design Assistance using the Whole Building application.

Itemize design assistance tasks and costs on the rebate application. Rebates for design assistance shall be the lower of 50% of cost or \$10,000 per facility.

# Whole Building Program Guidelines

APS Solutions for Business offers a whole building rebate to encourage building owners/developers and design teams to design and construct highly efficient buildings. Whole building applications will be subject to the rebates that are in effect at occupancy/final application.

The program consists of two financial rebates: the modeling rebate and construction rebate. The construction rebate is based on the modeled energy savings relative to ASHRAE 90.1-2013. The building owner/developer is eligible for a modeling rebate to help offset the cost of energy modeling activities.

## STANDARD AND CUSTOM REBATES

Keep in mind that the whole building approach is not the only option for new construction and major renovation projects. Some buildings may see better financial rebates through the standard and custom applications. The APS Solutions for Business program consists of standard rebates, custom rebates and technical assistance rebates.

Standard rebates include:

- High-performance windows and glass doors
- HVAC packaged/split AC & HP/chillers
- VSD
- Lighting power density
- High efficiency computer room air conditioning (CRAC) units

Custom rebates include all measures not covered by standard rebates. Any project pursuing standard and/or custom rebates are not eligible for a construction rebate and design team rebate. The modeling rebate is eligible with standard and custom rebates. If you have any questions or unsure which programs would best suit your project, please contact the APS Solution for Business team.

## GENERAL REQUIREMENTS AND ELIGIBILITY

Eligible projects that qualify for APS Solutions for Business whole building program rebates must meet the following criteria:

- The facility must be located within APS service territory, receive retail electric service on an eligible APS rate schedule and pay into the demand side management adjustment charge.
- The project must be either a new construction building, where all energy-consuming systems are being designed simultaneously, or a major renovation involving the removal and redesign of at least two building systems (such as lighting and mechanical systems).
- The building must show energy savings of at least 10% over the established baseline.
- The facility and facility staff must be made available for a post-occupancy inspection. APS Solutions for Business staff will determine if an inspection is required.

## MODELING REQUIREMENTS

The following modeling requirements must be met for all APS Solutions for Business whole building program rebates.

- Simulation modeling software must be utilized, such as eQUEST, EnergyPlus, EnergyPro, HAP or TRACE. Other software products with hour-by-hour, multi-zone output capabilities may be accepted with prior approval by the APS program team.
- Savings should be calculated for interior buildings systems only. Exterior systems (equipment and lighting) should not be included in calculations; however, exterior systems should be applied for additional standard or custom rebates. Process loads must be the same for both baseline and proposed design and be included in the calculation. Renewable generation is not eligible for rebates through the APS Solution for Business program. Gas consumption should not be included in calculation.
- For buildings using ASHRAE 90.1 baseline, model should follow Appendix G standards (including errata; excluding addenda).
- Facilities served by a district cooling plant should contact the Solutions for Business team.
- Final model must be based on the as-built building and reflect facility operation at time of rebate payment.
- Hourly energy savings data must be provided in Excel format with application submission for both baseline and final energy model. Data must include at a minimum: time stamp (e.g., month/day/hour) and energy consumption (kWh) for entire year.

## REBATE COMPONENTS

### Modeling rebate requirements

All projects pursuing an APS Solutions for Business construction rebate are eligible for a modeling rebate. The rebate is paid at 50% of the energy modeling cost, capped at \$10,000 per building. Projects pursuing a modeling rebate must meet the following requirements.

- A modeling summary report and the Building Performance Form must be provided by the modeler. Contact the APS Solutions for Business staff for detailed summary report requirements.
- Rebates may be signed over to a third party at the request of the building owner/developer. **Note: The modeling rebate counts toward the APS customer annual rebate cap.**

### Construction rebate requirements

Construction rebates are paid to the building owner/developer at the time of building occupancy. The rebate is calculated based on the amount of energy saved (kWh) during two time periods that occur in the first year after the project is completed: (1) annual kWh saved and (2) summer on-peak kWh saved during the hours of 3:00 p.m. to 8:00 p.m., weekdays, June 1 to September 30.

Annual kWh saved x \$0.02/kWh saved + summer on-peak kWh saved x \$0.18/kWh saved

Rebates for large customers (>100 kW aggregate demand) are capped at \$500,000 per owner/developer (APS customer) per year. For small customers (<100 kW aggregate demand), rebates are capped at \$150,000 per owner/developer per year. Any additional rebates beyond the cap will be paid at 50% of the eligible rebate amount.

To be eligible for an APS Solutions for Business construction rebate, a project Final Construction Rebate Form must be provided within six months of building occupancy.