C&I Energy Efficiency Program Guidelines
Building Automation System/Energy Management System Upgrades

The following is the minimum information required for energy conservation measures (ECM's) related to building controls. Projects applying for incentives related to building controls strategies must comply with all applicable requirements listed herein.

BMS/BAS System Definition:
The BAS/BMS comprises both hardware and software that provides complete integration of a building's HVAC systems. The BAS/BMS can continuously and automatically monitor and—through control of the HVAC mechanical and refrigeration systems—maintain desired ambient temperature, static pressure, relative humidity, indoor air quality, and energy management.

The control system normally consists of several microprocessor-based controllers that have electronic sensors connected to measure temperatures, pressures, electrical current, status, and other environmental variables. These inputs can be either binary (on/off), such as fan status, or analog (variable), such as static pressure. The signals from the analog inputs are digitized for further processing. The controllers run a program to compare the measured values to the desired results and, using proportional-integral-derivative (PID) algorithms, determine how the system outputs should be controlled.[1]

Required Project Documentation
All projects must provide the following documentation.

1. A detailed scope of work narrative that contains all equipment in the proposed measure and includes existing system operation.
    a. Provide the existing system operation, including unit name, capacity, electrical power requirements, hours of operation, etc.
    b. Indicate the extent of work to be done. For example, does the scope of work consist of only software/programming upgrades, installation of VFD's or control sensors?
    c. Provide a list of all new or modified control points
    d. Provide both material and labor costs to implement the proposed control strategies
2. Mechanical Equipment Schedule – sequence of operation for equipment
    a. Schedule should identify mechanical equipment controlled, including Air Handlers, Chillers, Pumps, Cooling Towers, and Heat Exchangers, and associated control parameters, such as capacities, flow rates, and set points. This is to properly determine baseline of equipment
3. The control sequence of operation from the control's vendor describing controlled parameters, such as set point ranges, etc.
4. An engineering analysis of the estimated energy savings based on implementation of the proposed measure. Use the existing system operation as the baseline.
    a. In cases where a project includes multiple ECMs, the engineering analysis must ensure that energy savings impacts due to each measure do not overlap. For example, if one measure is time of day shutdown, and the next measure is static pressure reset, the baseline energy consumption for the static pressure reset measure shall use the reduced hours of time of day shutdown.

Specifications

1. BMS/BAS systems must include the following:
    a. If incorporated with Demand Control Ventilation, real-time carbon-dioxide monitoring at the operator interface is required.

[1] ASHRAE Guideline 13-2015

   b. Central time control
   c. Real-time outside air damper positioning
   d. Graphic operator interface
   e. System ability to generate reports such as fault detection and diagnostics report, energy use intensity (EUI), etc.
   f. Web-based interface with PC-based controls
   g. Minimum setback space temperature of at least +/- 5°F in both heating and cooling mode except for facilities that are occupied 24/7
2. The following list of measures if combined with the BMS measure may fall under different measure category, incentive amount may not be the same as BMS measure.
   a. Variable Speed Drive on HVAC Chiller
   b. Variable Speed Drive on Fan or Pump
   c. Chilled Water Reset Controls
   d. Demand Controlled Ventilation
   e. Packaged RTU Advanced Controls
   f. Air-Side Economizer
   g. Wireless Pneumatic Thermostat
   h. WiFi Thermostat