

# CE215-19

IECC: C405.10 (New), C405.10.1 (New), C405.10.2 (New),  
TABLE C405.10.2 (New), C405.10.2 (New), C405.10.4 (New), C405.10.5(New)

**Proponent:** Marilyn Williams, representing National Electrical Manufacturers Association  
(mar\_williams@nema.org)

## 2018 International Energy Conservation Code

**Add new text as follows:**

**C405.10 Energy Monitoring (Mandatory)** New buildings with a gross conditioned floor area of 25,000 square feet or larger shall be equipped to measure, monitor, record and report energy consumption data in compliance with Section C406.10.1 through C406.10.5.

**Exception:** Individual tenant spaces are not required to comply with this section provided the space has its own utility services and meters and has less than 5,000 square feet of conditioned floor area.

**C405.10.1 Electrical energy metering.** For electrical energy, including all electrical energy supplied to the building and its associated site, including but limited to site lighting, parking, recreational facilities, and other areas that serve the building and its occupants, meters or other measurement devices shall be provided to collect energy consumption data for each end-use category required by Section C405.10.2.

**C405.10.2 End-use metering categories.** Meters or other approved measurement devices shall be provided to collect energy use data for each end-use category indicated in Table 405.10.2. Where multiple meters are used to measure any end-use category, the data acquisition system shall total all of the energy used by that category. Not more than 5 percent of the measured load for each of the end-use categories indicated in Table 405.10.2 shall be permitted to be from a load that is not within that category.

### **Exceptions:**

1. HVAC and water heating equipment serving only an individual dwelling unit shall not require end-use metering.
2. End-use metering shall not be required for fire pumps, stairwell pressurization fans or any system that operates only during testing or emergency.
3. End-use metering shall not be required for an individual tenant space having a floor area not greater than 2,500 square feet where a dedicated source meter complying with Section C405.10.3 is provided.

**TABLE C405.10.2**  
**ENERGY USE CATEGORIES**

<b><u>LOAD CATEGORY</u></b>	<b><u>DESCRIPTION OF ENERGY USE</u></b>
<u>Total HVAC System</u>	<u>Heating, cooling and ventilation including, but not limited to fans, pumps, boilers, chillers, and water heating. Energy used by 120 volt equipment, or by 208/120 volt equipment that is located in a building where the main service is 480/277 volt power, is permitted to be excluded from Total HVAC system energy use.</u>
<u>Interior Lighting</u>	<u>Lighting systems located within the building.</u>

<u>Exterior Lighting</u>	<u>Lighting systems located on the building site but not within the building.</u>
<u>Plug Loads</u>	<u>Devices, appliances and equipment connected to convenience receptacle outlets.</u>
<u>Process Loads</u>	<u>Any single load that is not included in a HVAC, lighting or plug load category and that exceeds 5 percent of the peak connected load of the whole building including, but not limited to data centers, manufacturing equipment and commercial kitchens.</u>
<u>Building Operations and other miscellaneous loads</u>	<u>The remaining loads not included elsewhere in this table including, but not limited to, vertical transportation systems, automatic doors, motorized shading systems, ornamental fountains, ornamental fireplaces, swimming pools, in-ground spas, and snow-melt systems.</u>

**C405.10.3 Meters.** Meters or other measurement devices required by this section shall be configured to automatically communicate energy consumption data to the data acquisition system required by Section C405.10.4. Source meters shall be allowed to be any digital-type meter. Lighting, HVAC, or other building systems that can monitor their energy consumption shall be permitted instead of meters. Current sensors shall be permitted, provided that they have a tested accuracy of plus or minus 2 percent. Required metering systems and equipment shall have the capability to provide at least hourly data that is fully integrated into the data acquisition system and graphical energy report in accordance with Sections C405.10.4 and C405.10.5.

**C405.10.4 Data acquisition system** A data acquisition system shall have the capability to store the data from the required meters and other sensing devices for minimum of 36 months. The data acquisition system shall have the capability to store real-time energy consumption data and provide hourly, daily, monthly, and yearly logged data for each end-use category required by Section C405.10.2.

**C405.10.5 Graphical energy report** A permanent and readily accessible reporting mechanism shall be provided in the building that is accessible by building operation and management personnel. The reporting mechanism shall have the capability to graphically provide the energy consumption for each end-use category required by Section C405.10.2 at least every hour, day, month, and year for the previous 36 months.

**Reason:** The investment made for the infrastructure of a building to comply with the IECC is significant. The assumption that is currently made upon commissioning a facility is that energy efficiency measures will not degrade, or go out of calibration, over time and their energy consumption will not increase as time passes from the time they were commissioned. Such as assumption is completely inaccurate and any payback assumed for energy efficient infrastructure investments will be lengthened, thereby reducing the ROI and increasing the payback period. The only means to retain the energy performance of a building is to continuously monitor energy consumption levels of various energy consuming systems and compare them to previous levels. Monitoring sub-systems provides key indications when changes have been made or systems are not operating to specification, which increases energy consumption. Examples include, but are not limited to:

1. Increase energy consumption in HVAC system loads will point to failures in motors, drive systems, bearings, etc.
2. Degrading building envelope.
3. Configuration changes to the building that may drive increased energy consumption.
4. Increase of energy consumption from lighting loads may indicate changes in arrangement of the office space that resulted in reduced lighting driving the installation of more lighting above permitted energy code levels, failure of occupant sensors, inappropriate lighting schedules, lamps that need to be replaced or cleaned, etc.

5. Monitoring plug loads will indicate when computer equipment is left on during non-working hours and use of space heaters that compromise the efficiency of the facility due to set points on the HVAC system.

The requirements in this proposal save energy by continually monitoring and reporting actionable energy consumption data to building owners and operators. For large buildings, this data is further broken out by the major sub-systems (HVAC, lighting, process loads, and plus loads). There are well documented studies that demonstrates the energy savings from metering and monitoring systems. The 2013 version of ASHRAE Std. 90.1 and several state energy codes have recognized the benefits and require energy monitoring to support a continual high level of performance from the energy efficient investment.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. The code change proposal “will” increase the cost of construction because it will require additional hardware, software and labor during installation. Providing specific cost would violate antitrust laws, however the following link to a report provided by the GSA demonstrates an example of cost and savings:

[https://www.gsa.gov/cdnstatic/Energy\\_Submetering\\_Finance\\_Paper\\_Knetwork\\_2012\\_11\\_269%28508%29.pdf](https://www.gsa.gov/cdnstatic/Energy_Submetering_Finance_Paper_Knetwork_2012_11_269%28508%29.pdf)

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