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**2024 International Energy Conservation Code [CE Project]**

Revise as follows:

C405.13 Energy monitoring. New buildings ~~Buildings~~ with a gross conditioned floor area of not less than 10,000 square feet (929 m2) shall be equipped to measure, monitor, record and report energy consumption data in compliance with Sections C405.13.1 through C405.13.5. A plan for quantifying annual energy type and end-use disclosure in compliance with Sections C405.13.1 through C405.13.8 shall be submitted with the construction documents.

Exceptions:

1. ***Buildings* less than 10,000 square feet (929 m2).**
2. **~~Existing buildings~~**
3. **1. R-2 occupancies with less than 10,000 square feet (929 m2) of *common area*.**
4. **2. Individual tenant spaces are not required to comply with this section provided that the space has its own utility services and meters and has less than 5,000 square feet (464.5 m2) ~~with their own utility service and meter.~~ of conditioned floor area.**

C405.13.1 ~~Electrical e~~ Energy metering. For all ~~electrica~~l energy supplied to the building and its associated site, including but not 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 C405.13.2.

Exception: End use categories which are served by fuel oil or propane tanks

C405.13.2 End-use ~~electric~~ metering categories. Meters or other approved measurement devices shall be provided to collect energy use data for each end-use category indicated in Table C405.13.2. 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 C405.13.2 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 (232 m2) where a dedicated source meter complying with Section C405.13.3 is provided.**

TABLE C405.13.2 ~~ELECTRICAL~~ ENERGY USE CATEGORIES

|  |  |
| --- | --- |
| **LOAD CATEGORY** | **DESCRIPTION OF ENERGY USE** |
| **Total HVAC system** | **Heating, cooling and ventilation, including but not limited to fans, pumps, furnaces, heat pumps, boilers, and 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.** |
| **Interior lighting** | **Lighting systems located within the building.** |
| **Exterior lighting** | **Lighting systems located on the building site but not within the building.** |
| **Plug loads** | **Devices, appliances and equipment connected to convenience receptacle outlets.** |
| **Process load** | Any single load that is greater than 5 percent of the peak connected load (electric or non-electric) of the whole building and not included in an 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 and commercial laundry equipment. |
| ***Electric vehicle* charging** | ***Electric vehicle* charging loads.** |
| **Building operations and other miscellaneous loads** | **The remaining electric and non-electric 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.** |
| **~~Electric~~ H~~h~~ot water heating for uses other than space conditioning** | **Energy used to generate hot water.**  **~~Exception: Electric water heating with design capacity that is less than 10 percent of building service rating.~~** |

C405.13.3 ~~Electrical~~ 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 C405.13.4. Source meters shall be allowed to be any digital-type meter. Lighting, HVAC or other building systems that can self-monitor their energy consumption shall be permitted instead of meters. Current sensors shall be permitted, provided that they have a tested accuracy of ±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 C405.13.4 and C405.13.5. Non-intrusive load monitoring (NILM) packages that extract energy consumption data from detailed electric waveform analysis ~~can~~ shall be permitted to substitute ~~substituted~~ for individual meters if the equivalent data ~~can be made~~ is available for collection in Section C405.13.4 and reporting in Section C405.13.5.

C405.13.4 ~~Electrical e~~Energy data acquisition system. A data acquisition system shall have the capability to store the data from the required meters and other sensing devices for a 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 C405.13.2. The data acquisition system shall have the capability of providing building total peak electric demand and the time(s) of day and time(s) ~~of year~~ per month at which the peak occurs. Peak demand shall be integrated over the same time period as the underlying whole building meter reading rate~~, which is~~ ~~typically 15 minutes but shall be no longer than one hour~~.

C405.13.5 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 ~~electrical~~ energy consumption for each end-use category required by Section C405.13.2 ~~at least~~ not less than every hour, day, month and year for the previous 36 months. ~~The graphical report shall also incorporate natural gas interval data or the ability to enter gas utility bills into the report.~~

*C405.13.6 Non-electrical energy metering. Consumption of non-electrical fuel or energy sources including district heating or cooling,~~energy such~~ ~~as gas, district heating or cooling, unregulated fuel sources, or other non-renewable energy~~ shall be ~~automatically~~ metered in accordance with Section C405.13.2 and C405.13.3.~~or a method developed for usage calculation annually or more frequently from energy bills. Natural gas usage~~ ~~shall be monitored through on site interval metering or from utility interval data.~~*

C405.13.7 Renewable energy. ~~The ability to measure the production of~~ ~~o~~On-site renewable energy sources shall be ~~provided~~ metered with ~~the same~~ ~~or greater~~ not less frequency ~~as~~ than non-renewable energy ~~metered~~ systems in accordance with Section C405.13.3..

C405.13.8 Plan for disclosure. The plan for annual energy use data gathering and disclosure shall include the following:

1. **Property information including: ~~building type, total gross floor area, year built or year planned for construction completion, and occupancy~~ ~~type~~.**
   1. **Address**
   2. **Gross floor area**
   3. **Year occupied**
   4. **Occupancy classifications, with respective floor areas**
2. **Total annual building site energy use ~~per~~ by unit area ~~(square foot) of gross floor area~~ as collected or documented through Section C405.13.5 ~~(electrical)~~ and Section C405.13.6 ~~(non-electrical)~~ ~~sources~~, separated by energy and fuel type ~~(electric, gas, district cooling or~~ ~~heating, unregulated fuel sources etc.). Electrical energy shall be further broken down by load type as identified in Table C405.13.2~~.**
3. **Annual site generated renewable energy ~~per~~ by unit area ~~(square foot) of gross floor area~~.**
4. **~~Peak electric demand per unit area (square foot) of gross floor area, with an estimate of relative building system contribution to that peak,~~ ~~and the time and date of the peak.~~**
5. **For projects using the Section C407 Simulated Building Performance approach to show compliance, include the following information from the building simulation:**
   1. **Modeling software used.**
   2. **Assumptions made that impact the simulated annual energy use per unit (square foot or square meter) of gross floor area (e.g. occupancy schedules, daylighting assumptions, climate file, plug loads, envelope performance including use of shading systems).**
   3. **Simulated annual energy use per unit (square foot or square meter) of gross floor area.**
   4. **Peak load, the time of date and time of peak and the hourly load profile on the day that experiences peak load.**

Reason: General language clean-up has been done (CEDI-30,34,35), plus:

CEDI-30: The initial proposal under CEPI-203 altered the sub-metering requirements to focus solely on electrical and renewable systems with non-electric systems only requiring a utility meter. This is a substantial content change that regressed metering requirements for non-electric metering in way that does not support efficient building operation. The proposed revisions would reinstate the non-electric metering requirements present in the code today while refining the language proposed for the additional electric submetering added by CEPI-203.

An additional change was made to the exceptions as currently listed in the code that serves to clarify the intent of those exceptions.

CEDI-34: The current language requires extensive submetering of all uses of electricity while allowing an annual estimate or calculation of all other forms of energy. If you "can't manage what you can't measure", it makes no sense to measure one form of energy and basically ignore other forms of energy that may be the majority of energy consumption, costs, and emissions. Therefore, the proposed changes require all forms of energy to be measured and monitored equally, to maximize the energy savings from on-site metering of end-uses.

Not included in this modified proposal (changes to C405.13.8.5) nor changes to electric vehicle charging loads (Table C405.13.2).

Cost Impact: The code change proposal will increase the cost of construction. While most of this proposal is editorial in nature, ensuring non-electric energy is measured and monitored in the same way as electrical energy will increase the cost of construction but will increase energy savings for non-electrical energy through more effective monitoring and control.