

3. The controls shall automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space. Controls shall automatically return lighting to their previous settings if occupancy is detected within 30 seconds of lights being turned off.
4. General lighting in each control zone shall turn off or uniformly reduce lighting power to no more than 20 percent of full power within 20 minutes after all occupants have left the
3. ~~The controls shall be configured so that general lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power in a reasonably uniform illumination pattern within 20 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.~~
45. ~~The For *general lighting* also served by *daylight responsive controls* as required by Section C405.2.3, the occupant sensor control and the *daylight responsive controls* shall be configured such that any daylight responsive control will activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected, so that power does not exceed the lesser of: the allowed power in Section C405.2.3.1 and the allowed power in Items 2 through 4 of this section.~~

Updated April 17, 2019

CE195-19: Withdrawn by Proponent

CE195-19

Withdrawn

CE215-19: Highlighted text has been added to Section C405.10.1

CE215-19

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association (mar_williams@nema.org)

C405.10.1 Electrical energy metering. For electrical energy, including all electrical 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 C405.10.2.

Updated 4/17/2019

CE216-19: Replace reason statement with the following (no change to the code sections):

CE216-19

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association

Reason:

This proposal will:

1. Increase building energy efficiency

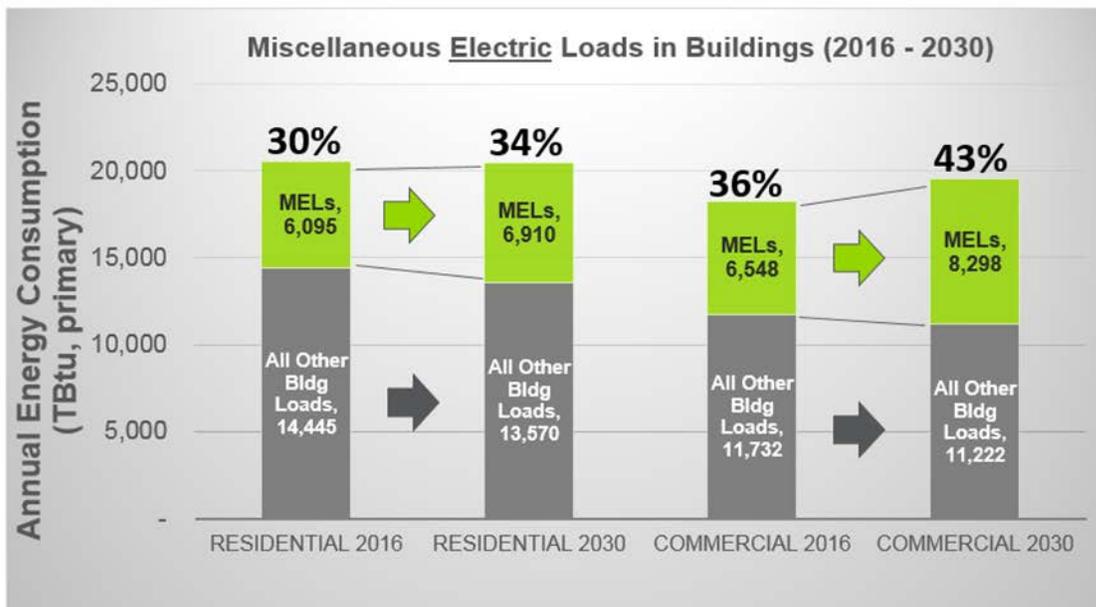
2. Offer a well-studied, cost effective efficiency measure
3. Maintain building occupant's safe usability
4. Keep enforceability simple
5. Align with other energy efficiency codes, increasing design compliance.

Although commercial buildings continue to decrease their energy use through more efficient lighting, mechanical, and domestic water systems, the Miscellaneous Electrical Loads (MELs) energy segment continues to rise. More and more electrical power consuming devices are being plugged into building electrical systems. Some, such as fans, space heaters, printers, monitors, plug in lamps are left on, when spaces are unoccupied. Other devices may be left plugged in and continue to draw power even when inactive or in standby modes. This wastes energy and is counter to the energy efficiency aim of the IECC.

Some jurisdictions which adopt the IECC for their commercial buildings, like Florida and Washington, have amended the IECC to include automatic receptacle control, thereby addressing the growing energy consumption concern of these loads. For more than eight years, other energy efficiency codes have included automatic receptacle control provisions to reduce the wasted energy. Yet, the IECC lags behind offering no viable solution to the growing receptacle and miscellaneous loads on commercial building electrical systems. The Annual Energy Outlook of 2015 from the US EIA, indicate that these load categories will grow from 36% of a commercial buildings energy use, to 43% over the next 15 years.

Miscellaneous Electric Loads vs Total Building Energy Use

According to EIA Annual Energy Outlook (AEO, 2015), under business-as-usual scenario, contribution of Miscellaneous Electric Loads (MELs, electric) to total building energy consumption is projected to increase from 30% to 34% for the residential sector and from 36% to 43% for the commercial sector for 2016 – 2030.



EIA Annual Energy Outlook, 2015

U.S. DEPARTMENT OF **ENERGY** | Energy Efficiency & Renewable Energy

This provision simply assures receptacle loads that are not needed when building occupants leave high receptacle load use areas, are automatically turned off, saving the energy that would otherwise be wasted. It requires that controlled receptacles clearly be marked as required by NFPA 70, to

eliminate user confusion of proper use, and provides good practice exceptions where controlling receptacles would endanger safety and security, or areas of continuous operation.

Expressed safety concerns where extensive use of extension cords and plug strips would be used are unfounded. There are no documented studies validating this problem exists. The proposed language requires either a split duplex receptacle with a controlled or uncontrolled receptacle in the same device, or an uncontrolled receptacle be located no more than 12 inches from a controlled receptacle. This provides occupants in an automatic receptacle-controlled space, clear access to both label marked controlled receptacles and uncontrolled receptacles.

Although there are no requirements for receptacle density in commercial buildings, a design professional will ensure there is an appropriate distribution of receptacles to effectively accomplish the mission of the building. There's no evidence that the distribution of receptacle outlets and controlling some of them has any adverse impact on the utility of this requirement.

Enforceability of this provision is straight forward for building departments and their inspectors. Construction drawings indicate which receptacles are controlled and which are uncontrolled. Onsite inspection will clearly show complying labelled receptacles and operation is easily varied with the shut-off controls already in place with the lighting system.

There have been a considerable number of studies over the years that share the viability and cost effectiveness of automatic receptacle control. Some noted here.

1. One study demonstrated effectiveness (e.g. Zhang2012) with simply payback on this type of equipment between 1.5 and 9 years for small and large offices. This considers the most comprehensive information on office plug load types, installation densities, usage patterns, and power states based on field surveys and monitoring (Kawamoto 2000, 2001; Moorefield, Frazer & Bendt 2011; Roberson 2002, 2004; Roth 2002, 2004; Sanchez 2007; Webber 2001, 2005).
2. A CASE initiative study for CA Title 24-2013 found that smaller office buildings (10,000 sqft) had an annual electrical savings of 4,900 kwh/year and a demand savings of 1.97 kW. Based on installed costs and utilization of lighting control system elements already installed. The simple payback was 4.2 years. For larger office buildings (175,000 sqft) the annual electrical savings were 107,000 kwh/year and a demand savings of 23.6 kW for a simple payback of 2.4 years.
3. A GSA Green Proving Ground Program study conducted in 8 buildings with monitored receptacle control through market available plug strips found "Results underscored the effectiveness of schedule-based functionality, which reduce plug loads at workstations by 26%, even though advanced computer power management was already in place, and nearly 50% in printer room and kitchens." In the study buildings, receptacle loads averaged 21% of building energy use and monitored more than 295 devices over three different test periods to validate the findings. It found payback through timer scheduled control of kitchens of 0.7 years, printer rooms of 1.1 years and miscellaneous devices in 4.1 years. At workstations, the payback was 7.8 years.
4. A study done on "Office Space Plug Load Profiles and Energy Savings Interventions" at the University of Idaho and presented at the ACEEE summer Study in 2012 found that average savings of 0.60 kWh/SF Yr. with plug strip control interventions. This study provided guidance for utility programs to assist with development of plug load efficiency measures and was based on a more detailed report, "Plug Load Profiles" (Acker, B. et. al. 2012).
5. The DOE Better Buildings program issued a December 2015 "Decision Guides for Plug and Process Loads Controls" to help educate and guide decision processes for effective receptacle-based load control. It highlights that "Plug and Process Loads" account for 33% of the total energy consumed by commercial buildings. It sites seven decision strategies including that of Integrated plug load controls with other building systems as one of the largest for energy savings across most building types for whole-building retrofit and new construction categories.

6. A study performed “Advancing the Last Frontier: Reduction of Commercial Plug Loads” presented at the ACEEE summer study of 2016, indicated field study results demonstrating savings of 19% when deploying plug in control strategies in office workstation environments.

Updated 4/17/2019

CE218-19: Replace code change with the following (no change to the reason or cost impact):

CE218-19

Proponent: Eric Makela, New Buildings Institute, representing Northwest Energy Codes Group (ericM@newbuildings.org)

2018 International Energy Conservation Code

Revise as follows:

SECTION C406 ADDITIONAL EFFICIENCY REQUIREMENTS PACKAGE OPTIONS

C406.1 Requirements-Additional energy efficiency credit requirements. Buildings shall ~~comply~~ New buildings shall achieve a total of 10 credits from Tables C406.1(1) through C406.1(5) where the table is selected based on the use group of the building. Where a building contains multiple use groups, credits from each use group shall be weighted by floor area of each group to determine the weighted average building credit. Alternatively, credits shall be calculated in accordance with the relevant subsection of C406. Credits from the tables or calculation shall be achieved where a building complies with one or more of the following:

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.
7. Enhanced envelope performance in accordance with Section C406.8.
8. Reduced air infiltration in accordance with Section C406.9

Add new text as follows:

**TABLE C406.1(1)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP B OCCUPANCY**

<u>Sub-section / Climate Zone:</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>
<u>C406 .2.1: 5% Heating Eff Imprv.</u>	NA	1	NA	NA	1	1	NA	1									
<u>C406 .2.2: 5% Cooling Eff Imprv.</u>	6	6	5	5	4	4	3	3	3	2	2	2	1	2	2	2	1
<u>C406 .2.3: 10 % Heating Eff Imprv.</u>	NA	1	NA	NA	2	1	1	2	2	NA	1						