Code Amendment Proposal Form
For public amendments proposed to the 2018 editions of the International Codes

Instructions: Upload this form and all accompanying documentation at www.denvergov.org/BuildingCode. If you are submitting your proposal on a separate sheet, make sure it includes all information requested below.

All proposals must be received by April 26, 2019.

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Signature: ___________________________

Co-proposed by: Amber Wood, Denver Department of Public Health and Environment
Jim Meyers, Southwest Energy Efficiency Project

AMENDMENT PROPOSAL

Please use a separate form for each proposal.

1) Code(s) associated with this proposal. Please use acronym: IECC

If you submitted a separate coordination change to another code, please indicate which code: __________________________

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Code Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBC-xxxx</td>
<td>Denver Building Code–xxxx (code) amendments (e.g., DBC-IBC, DBC-IIEBC)</td>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
<tr>
<td>IEBC</td>
<td>International Existing Building Code</td>
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<tr>
<td>IECC</td>
<td>International Energy Conservation Code</td>
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</tbody>
</table>

2) Please check here if a separate graphic file is provided: ☐

Graphics may also be embedded within your proposal below.

3) Use this template to submit your proposal or attach a separate file, but please include all items requested below in your proposal. The only formatting needed is BOLDING, STRIKEOUT AND UNDERLINING. Please do not provide additional formatting such as tabs, columns, etc., as this will be done by CPD.

Code Sections/Tables/Figures Proposed for Revision:
IECC C405.1

Proposal:

Revise Section C405.1 as follows:
C405.1 General (Mandatory). This section covers lighting system controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.

_Dwelling units within multifamily buildings_ shall comply with Section R404.1. _All other dwelling units_ shall comply with Section R404.1 or with Sections C405.2.4 and C405.3. _Sleeping units_ shall comply with Section C405.2.4 and with Section R404.1 or C405.3.

C405.1.1 Lighting for dwelling units and sleeping units. No less than 90% of the luminaires in _dwelling units_ and _sleeping units_ shall be provided by lamps with an efficacy of not less than 65 lm/W or shall be luminaires with an efficacy of not less than 45 lm/W.

_Exception:_ Lighting in accordance with Sections C405.2.4 and C405.3.

C405.1.2 Lighting for refrigerated applications. Lighting installed in walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with the lighting requirements of Section C403.10.1 or C403.10.2.

**Supporting Information:**

**Purpose:**

The purpose of this proposal is to update and clarify the lighting requirements for dwelling units.

**Reason:**

The current language refers to dwelling unit lighting to the lighting requirements in the residential section. The referenced residential code sections include a requirement for "high efficacy lamps." However, the definition of "high efficacy lamps" has not been updated to reflect the changes in the market due to increased federal minimums and greater availability/affordability of LED lighting. Because of this, the code is actually becoming less stringent as the baseline for lighting equipment is raised.

The proposal solves this problem by replacing the reference to the residential lamp efficacy requirements with built-in lighting requirements that reflect what is actually "high-efficiency" in today's market. The proposal also simplifies the requirement by reducing the number of wattage categories. The categories in the residential code are an artifact of incandescent and early compact fluorescent lamp wattages. As lamps have gotten more efficient, the higher wattage categories have become less meaningful. Even a “100W equivalent” LED lamp generally uses 15W or less, which is the middle category in the existing definition.

It also shifts the focus from lamps to light sources. There are more and more lighting products on the market that do not use lamps but rather integrated LEDs. The proposal therefore has separate requirements for lamps and luminaires with integrated lighting.

The proposal also structures the section for greater clarity. Requirements for dwelling unit lighting and refrigerated application have been somewhat shoe-horned into C405.1, leaving the sections bloated and without focus. This proposal breaks the requirements for dwelling unit lighting and refrigerated applications into standalone sub-sections for greater clarity.

**Savings**

When modeled against IECC-2015 using the mid-rise prototype developed by PNNL for code determination studies, savings ranged from 0.2%. Based on U.S. DOE studies, the cost savings by replacing all of the CFLs with higher efficacy LED lighting saves approximately $6 per year per dwelling unit in overall regulated energy costs.

**Referenced Standards:**

NA

**Note:** List any new referenced standards that are proposed to be referenced in the code.

**Impact:**

The effect of the proposal on the cost of construction: ☒ Increase  ☐ Reduce  ☐ No Effect

- This change could potentially increase the cost of construction because it requires higher efficacy lighting (lamps and/or fixtures), which will likely eliminate some lower-end CFL options and/or push builders to newer LED technologies. However, the cost of LEDs has been steadily declining over the last several years and is expected to continue to decline. Based on an analysis by the U.S. Department of Energy’s Building Energy Codes Program conducted during the 2018 IECC Code Development cycle, the estimated and projected prices for LEDs were $4.84 per lamp compared to CFLs at $3.10 per lamp. However, the rapid expansion of the LED lighting market has changed the economics. A spot check of Home Depot in early 2019 showed that a warm white, 60W equivalent A-lamp is as low as $1.24 for both CFL and LED when purchased in packs.
And, LEDs are actually cheaper than CFLs at some sources. At 1000bulbs.com, on online retailer, the same lamps are $1.79/bulb for CFL and $0.99 for LED. Therefore, this code change may actually reduce the cost of construction.

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<tr>
<th>Departmental Impact: (To be filled out by CPD staff)</th>
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**Note:** CITY STAFF ONLY. Discuss the impact of this proposal in this section AND indicate the impact of this amendment proposal for each of the following:

- The effect of the proposal on the cost of review: □ Increase □ Reduce □ No Effect
- The effect of the proposal on the cost of enforcement/inspection: □ Increase □ Reduce □ No Effect