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.

CONTACT INFORMATION

Name: Neil Kolwey, Emily Backus
Date: 4/24/2019
Phone: 303-499-0213
E-mail: nkolwey@swenergy.org
Organization: Southwest Energy Efficiency Project, DDPHE

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Signature:

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>
<th>Acronym</th>
<th>Code Name</th>
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<tbody>
<tr>
<td></td>
<td>(e.g., DBC-IBC, DBC-IEBC)</td>
<td>IGCC</td>
<td>International Green Construction Code</td>
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<td>IBC</td>
<td>International Building Code</td>
<td>IMC</td>
<td>International Mechanical Code</td>
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<tr>
<td>IEBC</td>
<td>International Existing Building Code</td>
<td>IPC</td>
<td>International Plumbing Code</td>
</tr>
</tbody>
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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 C405.4

**Note:** If the proposal is for a new section, indicate (new).

**Proposal:** Add new Section as follows and renumber existing sections:

**C405.4 Lighting for plant growth and maintenance.** (new) Not less than 80 percent of the total Watts of lighting for canopy areas (areas used for plant growth and maintenance) must be provided by luminaires having a photon efficacy of not less than 1.6 μmol/J rated in accordance with ANSI/ASABE S640.
Supporting Information:

The purpose of this proposal is to close a loophole in the IECC that leaves horticultural lighting completely unregulated, which is an especially important omission considering Colorado’s burgeoning cannabis industry.

Reason:

Indoor agriculture energy usage is projected to grow substantially over the next several years, driven in large part (but not entirely) by the legal of medical and recreational marijuana. The cannabis sector currently accounts for about 4% of Denver’s total electricity consumption. In addition, local food movements in cities are driving increased demand for fresh high-quality produce. More restaurants are interested in sourcing ingredients directly from the producer, and in dense urban areas a growing number of new indoor agriculture operations have begun to meet this demand. The potent combination of policy, technology, and market factors is driving a significant expansion in indoor agriculture. As written, the 2018 IEC leaves lighting in this growing energy load completely exempt from efficiency requirements.

This proposal removes the loophole by requiring the majority of lighting used for plant growth or maintenance to meet an efficiency metric. The efficiency metric of 1.6 μmol/J (micromoles per Joule) was developed in collaboration with the New Buildings Institute (NBI) and the American Society of Agricultural and Biological Engineers, and was developed specifically for lighting used for plant growth. It measures the number of photons emitted from the fixture per Joule of energy consumed. This metric is codified as an ANSI standard and is already seeing wide adoption in the industry with over 84 products available that meet this requirement when surveyed in 2016. More information on the metric can be found in the Standard: ANSI/ASABE S640.

This standard of 1.6 micromoles per Joule is based on the typical efficacy of double-ended high pressure sodium (HPS) lamps, which are commonly used for flower rooms. Flower rooms require the most energy-intensive lighting for cannabis growers, followed by the vegetative rooms. DE HPS lamps are about 30% more efficient than standard HPS lamps, which are also commonly used for flower rooms. LED lighting could also be used for flower rooms, as an alternative to DE HPS lamps. For vegetative rooms, the standard would effectively require LED lighting, because the other common lighting types for vegetative rooms (metal halide or fluorescent) would not meet the standard. There are no disadvantages of LEDs for vegetative rooms (other than cost), and LEDs can save up to 80% of the energy consumption compared to metal halide lamps, with somewhat less energy savings compared to fluorescent lamps.

We modified an earlier draft proposal from NBI, which would require 95% of lighting fixtures to meet the standard. Basing the percentage on total watts of lighting rather than number of fixtures is a better way to measure the percentage of lighting. And requiring 80% of the total wattage (rather than 95% of fixtures) allows more flexibility for luminaires in mothering/clone areas to use a less expensive type of lighting, lowering the total cost to growers.

Our proposed amendment was reviewed by DDPHE’s Cannabis Sustainability Work Group; a stakeholder group comprised of representatives from the cannabis industry, ancillary businesses, government, and sustainability experts. The language of this proposed amendment reflects feedback from Work Group members. We also obtained feedback from the Marijuana Industry Group.

Note: This section MUST include these items:

- **Purpose**: State the purpose of the proposed amendment to physical, environmental and customary characteristics that are specific to the City and County of Denver (e.g., clarify the code; revise outdated material; substitute new or revised material for physical, environmental and customary characteristics; add new requirements to the code; delete current requirements, etc. to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver)
- **Reasons**: Clearly justify the change to current code provisions, stating why the proposal is necessary to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver. Proposals that add or delete requirements shall be supported by a logical explanation that clearly shows why the current code does not reflect physical, environmental and customary characteristics that are specific to the City and County of Denver and explains how such proposal will improve the code.
- **Substantiation**: Substantiate the proposed amendment based on technical information and substantiation. Substantiation provided which is reviewed and determined as not germane to the technical issues addressed in the proposed amendment shall be identified as such.
• **Bibliography:** Include a bibliography when substantiating material is associated with the amendment proposal. The proponent shall make the substantiating materials available for review.

**Referenced Standards:**

ANSI/ASABE S640

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

**Impact:**

This would increase the use of more efficient lighting technologies including double-ended high-pressure sodium and LED lamps, and reduce the use of less efficient technologies such as single-ended high pressure sodium and metal halide lamps.

**Note:** 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 construction: ☒ Increase ☐ Reduce ☐ No Effect
- The effect of the proposal on the cost of design: ☐ Increase ☐ Reduce ☒ No Effect
- Is the proposal more or less restrictive than the I-codes: ☒ More ☐ Less ☐ Same

**Departmental Impact:** (To be filled out by CPD staff)

**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