**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](http://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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**CONTACT INFORMATION**

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Organization: New Buildings Institute

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Signature: 

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**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-IEBC)</td>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
<tr>
<td>IEBC</td>
<td>International Existing Building Code</td>
</tr>
<tr>
<td>IECC</td>
<td>International Energy Conservation Code</td>
</tr>
</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 C405.4

**Proposal:**

Add new Section as follows and renumber existing sections:

**C405.4 Lighting for plant growth and maintenance.** Not less than 95 percent of the permanently installed luminaires used for plant growth and maintenance shall have a photon efficiency of not less than 1.6 μmol/J rated in accordance with ANSI/ASABE S640.
**Supporting Information:**

**Purpose:**

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 legalization of medical and recreational marijuana. The Northwest Power and Conservation Council projects that indoor marijuana growing operations alone will add as much as 300 average megawatts by 2030. That is equivalent to 1.5% of total regional electricity demand. It is reasonable to expect that Colorado is facing a similar situation. Indoor agriculture operations not related to marijuana are expanding too.

The price of LEDs has fallen dramatically in the past few years and 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. This potent combination of policy, technology, and market factors is driving a dramatic expansion in indoor agriculture. As written, the 2018 IECC 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 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. Lighting Power Density was developed as a metric to evaluate the light usable for visual tasks relative to the power consumed. Likewise, this metric was developed specifically to measure the light usable for plant growth relative to the power 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 ANSI Standard: ANSI/ASABE S640.

Using a typical High-Pressure Sodium lamps (a common growing light) as the baseline, this requirement will result in 78% savings for lighting. That is a substantially lower lighting load and a reduction in the cooling load.

**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

- The proposal could marginally add to the cost of construction. The cost of horticultural lighting fixtures is actually driven to a large extent by reflectors and ventilation needs (horticultural lighting is positioned very close to the plants and venting the heat is essential) and not just lighting technology. Therefore, fixture cost can vary dramatically, from $25/fixture to almost $1000/fixture for High Pressure Sodium fixtures and from $75/fixture to well over $1000/fixture for LED. And advancements and expanding market share of LED lighting has narrowed the impact of lighting technology. Therefore, lighting that meets this requirement can be obtained for less than lighting that does not. The only projects that will see an increase in cost are those that would have used the absolute cheapest lighting that does not meet the requirement.

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

- There should be no increased cost for design since the proposal results in just a specification change.

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

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[Header: Supporting Information]

[Body: Purpose:
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