



**BSR/ASHRAE/IES Addendum cp
to ANSI/ASHRAE/IES Standard 90.1-2016**

Public Review Draft

Proposed Addendum cp to Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

**Second Public Review Draft (May 2019)
(Draft Shows Proposed Independent Substantive
Changes to Previous Public Review Draft)**

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FOREWORD

Addendum cp proposed language for Appendix G to address the new proposed renewable energy requirements in addendum by. The original proposed approach follows the method approved for the 5% renewable energy cap introduced in Addendum s that adjusted the calculation of the Performance Cost Index Target (PCI_t) for compliance with ASHRAE 90.1.

This ISC addresses comments to the 1stPRD asking that PCI_t remain independent of any renewable energy included in the Proposed Design that is not required prescriptively. The ISC also makes a change to the definition of PBP_{PRE} so that the method used to determine the prescriptive on-site renewable allowance is the same as in Section 11. These changes will allow Appendix G to continue to be used by other standards and guidelines such as ASHRAE Standard 189.1 that would have been negatively impacted by the original proposal.

This addendum impacts an optional performance path in the standard designed to provide increased flexibility and therefore was not subjected to cost effectiveness analysis.

[Note to Reviewers: This public review draft makes proposed independent substantive changes to the previous public review draft. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the previous draft are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.]

Addendum cp to 90.1-2016

Revise the Standard as follows (IP Units)

4.2.1.1 New Buildings

New *buildings* shall comply with either the provisions of

- a. Section 5, “*Building Envelope*”; Section 6, “*Heating, Ventilating, and Air Conditioning*”; Section 7, “*Service Water Heating*”; Section 8, “*Power*”; Section 9, “*Lighting*”; and Section 10, “*Other Equipment*,” or
- b. Section 11, “*Energy Cost Budget Method*,” or
- c. Appendix G, “*Performance Rating Method*.”

When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCI_t) when calculated in accordance with the following:

~~When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCI_t) when calculated in accordance with the following:~~

$$PCI_t = [BBUEC + (BPF \times BBREC) - PNA - PRE] / BBP$$

where

PCI = Performance Cost Index calculated in accordance with Section G1.2.

BBUEC = Baseline *Building Unregulated Energy Cost*, the portion of the annual *energy cost* of a *baseline building design* that is due to *unregulated energy use*.

BBREC = Baseline *Building Regulated Energy Cost*, the portion of the annual *energy cost* of a *baseline building design* that is due to *regulated energy use*.

BPF = *Building Performance Factor* from Table 4.2.1.1. For *building area types* not listed in Table 4.2.1.1 use “All others.” Where a *building* has multiple *building area types*, the required BPF shall be equal to the area-weighted average of the *building area types*.

BBP = *Baseline Building Performance*.

PBP = Proposed *Building Performance* including the reduced, annual purchased energy cost associated with ~~all~~ *on-site renewable energy generation systems*

PBP_{nre} = Proposed *Building Performance* without any credit for reduced annual energy costs from *on-site renewable energy generation systems*.

PBP_{pre} = Proposed *Building Performance* excluding any renewable energy system in the proposed design and including an *on-site renewable energy system* that meets but not exceeds the requirements of Section 10.5.1.1 modeled following the requirements for a *budget building design* in Table 11.5.1 ~~using option b~~.

PRE = PBP_{nre} - PBP_{pre}

~~PNA = Proposed renewable energy contribution not allowed for compliance~~

When $(PBP_{PRE} - PBP) / BBP > 0.05$, new *buildings*, *additions to existing buildings* and/or *alterations to existing buildings* shall comply with the following:

$$PCI + [(PBP_{PRE} - PBP) / BBP] - 0.05 < PCI_t$$

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PBP_{nre} - Proposed Building Performance No Renewable Energy

PBP_{pre} - Proposed Building Performance Prescriptive Renewable Energy

PRE - Prescriptive Renewable Energy

~~PNA – Proposed Not Allowed~~

$$\text{Additional Renewable contribution} = \text{PBP}_{\text{nre}} - \text{PBP}_{\text{pre}} - \text{PBP}$$

$$\text{Renewable Fraction} = (\text{PBP}_{\text{nre}} - \text{PBP}_{\text{pre}} - \text{PBP}) / \text{BBP}$$

If Renewable Fraction \leq 0.05 then PNA = 0,

otherwise PNA = ~~Additional Renewable Contribution – (0.05 x BBP)~~

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Section 4.2.1.1 has been previously modified by addendum s and addendum x both of which are approved for publication. If this proposal is approved for publication, the section will be appear as follows. Text that did not appear in addendum s, addendum x or in the previous sections of this draft, are shown below in strikethrough/underline:

4.2.1.1 New Buildings

New *buildings* shall comply with Sections 4.2.2 through 4.2.5 and either the provisions of

- a. Section [5](#), “*Building Envelope*”; Section [6](#), “*Heating, Ventilating, and Air Conditioning*”; Section [7](#), “*Service Water Heating*”; Section [8](#), “*Power*”; Section [9](#), “*Lighting*”; and Section [10](#), “*Other Equipment,*” or
- b. Section [11](#), “*Energy Cost Budget Method,*” or
- c. Normative Appendix G, “*Performance Rating Method.*”

When using [Appendix G](#), the Performance Cost Index (PCI) of new *buildings, additions to existing buildings and/or alterations to existing buildings* shall be less than or equal to the Performance Cost Index Target (PCI_t) when calculated in accordance with the following:

$$\text{PCI}_t = [\text{BBUEC} + (\text{BPF} \times \text{BBREC}) - \text{PRE}] / \text{BBP}$$

where

PCI = Performance Cost Index calculated in accordance with Section G1.2.

BBUEC = Baseline *Building Unregulated Energy Cost*, the portion of the annual *energy cost* of a *baseline building design* that is due to *unregulated energy use*.

BBREC = Baseline *Building Regulated Energy Cost*, the portion of the annual *energy cost* of a *baseline building design* that is due to *regulated energy use*.

BPF = *Building Performance Factor* from Table 4.2.1.1. For *building area types* not listed in Table 4.2.1.1 use “All others.” Where a *building* has multiple *building area types*, the required BPF shall be equal to the area-weighted average of the *building area types*.

BBP = *Baseline Building Performance*.

PBP = Proposed Building Performance including the reduced, annual purchased energy cost associated with *all on-site renewable energy generation systems*

PBP_{nre} = Proposed Building Performance without any credit for reduced annual energy costs from on-site renewable energy generation systems.

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PBP_{pre} = Proposed Building Performance excluding any renewable energy system in the proposed design and including an *on-site renewable energy system* that meets but not exceeds the requirements of Section 10.5.1.1 modeled following the requirements for a *budget building design* in Table 11.5.1.

$$PRE = PBP_{nre} - PBP_{pre}$$

When $(PBP_{PRE} - PBP) / BBP > 0.05$, new *buildings, additions to existing buildings* and/or *alterations to existing buildings* shall comply with the following:

$$PCI + [(PBP_{PRE} - PBP) / BBP] - 0.05 < PCI_t$$

Informative Note

PBP_{nre} - Proposed Building Performance No Renewable Energy

PBP_{pre} - Proposed Building Performance Prescriptive Renewable Energy

PRE - Prescriptive Renewable Energy
