



## International Energy Conservation Code Consensus Committee-Residential

### Draft Meeting Agenda (4/3/23 posting)

[Webex Meeting Link](#)

April 13, 2023

1:00 PM EST to 5 PM EST (4 hours)

**Committee Chair:** JC Hudgison, CBO, Assoc. AIA

**Committee Vice Chair:** Bridget Herring

1. Call to order.
2. Meeting Conduct.
  - a. Identification of Representation/Conflict of Interest
  - b. ICC [Council Policy 7](#) Committees: Section 5.1.10 Representation of Interests
  - c. ICC [Code of Ethics](#): ICC advocates commitment to a standard of professional behavior that exemplifies the highest ideals and principles of ethical conduct which include integrity, honesty, and fairness. As part of this commitment it is expected that participants shall act with courtesy, competence and respect for others.
  - d. ICC [Antitrust Compliance Guideline](#)
3. Roll Call.
4. Approve Agenda
5. Approve Minutes-April 6, 2023
6. Administrative issues-staff
7. Action Items-items in bold prioritized for PNNL analysis  
Tabled items from 4/6

RED1-299-22(R403.11.2 language update)	HVACR approve 10-0
RED1-361-22(Appendix RE definitions)	HVACR disapprove 10-0
RED1-320-22(Multi-family H/ERV alignment with IECC-C)	HVACR disapprove 9-0-1
RED1-354-22(R408 water heaters)	HVACR disapprove 10-0
<b>RED1-358-22(Update water heater efficiency options)</b>	<b>HVACR as modified 8-0-2</b>
<b>RED1-355-22(Service water heating efficiencies)</b>	<b>HVACR disapprove 8-0-1</b>
<b>RED1-356-22(Service water heating efficiencies)</b>	<b>HVACR disapprove 9-0</b>
RED1-357-22(Update Table R408.2.3)	HVACR disapprove 9-0-1
RED1-309-22(Testing of ducts inside conditioned space)	HVACR as modified 9-0-1

New proposals

<b>RED1-344-22(More efficient HVAC equip perf option)</b>	<b>HVACR 4/10 agenda</b>
<b>RED1-345-22(Table R408.2 ground source heat pump)</b>	<b>HVACR 4/10 agenda</b>
<b>RED1-347-22(Efficient HVAC equipment)</b>	<b>HVACR 4/10 agenda</b>
<b>RED1-351-22(Update HVAC efficiency options)</b>	<b>HVACR 4/10 agenda</b>
<b>RED1-353-22(Efficient HVAC performance options)</b>	<b>HVACR 4/10 agenda</b>
<b>RED1-75-22(Credit for homeowner education)</b>	<b>Modeling 4/11 agenda</b>
<b>RED1-76-22(Off-site renewables)</b>	<b>Modeling 4/11 agenda</b>
<b>RED1-255-22(Roof reflectance)</b>	<b>Modeling 4/11 agenda</b>
<b>RED1-256-22(Roof reflectance)</b>	<b>Modeling 4/11 agenda</b>
<b>RED1-263-22(Add. Efficiency credits for existing bldgs.)</b>	<b>Existing bldg. approve 4-3</b>
RED1-250-22(Basement wall and slab on grade insulation)	Modeling disapproved
RED1-252-22(Solar absorptance)	Modeling approve 15-0
RECD1-6-22(Source energy proposal)	Modeling as modified 10-4-1
RED1-249-22(R405 Clarifications and sampling R-2)	Modeling as modified 13-0-2
RECD1-8-22(R405 reorganization)	Modeling approve
RED1-65-22(Update R406)	Modeling as modified 16-0
RECD1-7-22(Update R406.5 table)	Modeling approve 7-2-5
RED1-27-22(Glide path to zero net energy)	Modeling as modified 9-3-2
RED1-28-22(Operational carbon rating and energy report)	Modeling as modified 7-4-2
REPCD1-3-22(R408 public comment)	
RED1-85-22(Remove table R408.2.2)	Modeling disapprove 13-0
RED1-63-22(Standard ref design specifications)	Modeling disapprove 12-0-2
RED1-64-22(Standard ref design specifications)	Modeling disapprove 13-0-1
RED1-91-22(Renewable energy appendix)	Electrical as modified 12-0
RECD1-4-22(Committee proposal)	Electrical as modified 12-0
RED1-140-22(Solar ready appendix reference)	Electrical disapprove 12-0
RED1-169-22(Solar Readiness for R-2, R-3, R-4)	Electrical disapprove 12-0
RED1-277-22(Exterior wall envelope)	Existing bldg. approve 7-0
RED1-264-22(Existing buildings modifications)	Existing bldg. as modified 6-1
RECD1-10-22(Addition heating and cooling system ex)	Existing bldg.. approve 7-0

Tabled items from 4/6

RECD1-5-22(on-site fossil fuel burning in additions)	Existing bldgs. Disapprove 4-3-1
RED1-266-22(Additions compliance)	Existing bldgs. Disapprove 6-1
RED1-273-22(Wall alt vapor retarders)	Existing bldigs. As modified 7-0
RED1-2-22(Approved Source)	Admin disapprove 5-0
RED1-16-22(Approved third-party inspection agencies)	Admin as modified 4-0
REPCD1-17-22	
RED1-21-22 PI & II(Renewable energy resources)	Admin disapprove 6-1
RED1-23-22(Renewables and biomass)	Admin disapprove 6-0

8. Other business.

9. Upcoming meetings. April 20 at 1 PM EST

10. Adjourn.

FOR FURTHER IECC Residential INFORMATION BE SURE TO VISIT THE ICC WEBSITE:  
[IECC Residential Website](#)

**Join by phone**

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FOR ADDITIONAL INFORMATION, PLEASE  
CONTACT:

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Director of Energy Programs  
International Code Council  
[kstenger@iccsafe.org](mailto:kstenger@iccsafe.org)



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-299-22 R403.11.2 language update
CDP ID #	1020
Code	IECC RE
Code Section(s)	R403.11.2
Location	base
Proponent	Steven Rosenstock srosenstock@eei.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	With a motion to approve and a proper second discussion opened. Multiple speakers in support of the proposal's approval. Brings consistency to this section
Recommendation	Subcommittee in support of the proposal vote to approve
Vote	approve 10/0/0
Recommendation Date	3/27/23
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee __x_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-361-22 Appendix RE definitions
CDP ID #	1114
Code	IECC RE
Code Section(s)	RE102.1
Location	appendix
Proponent	Steven Rosenstock srosenstock@eei.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Proponent presented the proposal. Motion to approve with a second opened discussion. One interested party the proposal does not support hydrogen as a fuel. Vote to approve failed 2/8/0 vote count. Motion received to disapprove the proposal. Motion carried with a vote of 10/0/0
Recommendation	HVACR and water heating subcommittee recommendation is to disapprove
Vote	10/0/0
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ x _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-320-22 Multifamily H/ERV alignment with IECC-C
CDP ID #	1433
Code	IECC RE
Code Section(s)	R403.6.1
Location	base
Proponent	Mike Moore mmoore@statorllc.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	<p>Proposal on agenda for 1/30/2023 - Proponent asked to have it moved to the subcommittee meeting on 2/13/2023. Subcommittee agreed tabled again new date to be heard 3/27/2023.</p> <p>Proponent presented the proposal on 3/27/2023 "as modified" Motion to approved "as modified" with a second vote failed to approve with a vote count of 0/8/2. Motion to disapprove with a second opened a second round of discussion. After much discussion Sonny Richardson called the question. Vote to call the question approved 10/0/0. Vote to disapproved carried 9/0/1</p>
Recommendation	HVACR and Water Heating recommendation is a vote of disapproval
Vote	Vote to disapprove "as modified" 9/0/1
Recommendation Date	3/27/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	

Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-354-22 R408 water heaters
CDP ID #	999
Code	IECC RE
Code Section(s)	R408.2.3
Location	base
Proponent	Alex Smith asmith@nahb.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Motion to disapprove with a second opened the discussion. Discussion was light as proponents stated that recently approved RED1-313-22 took care of this one.
Recommendation	<b>Recommendation is to disapprove this proposal. Reason statement is recently approved RED1-313-22 takes care of this proposal</b>
Vote	vote to disapprove original proposal 10/0/0
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-358-22 Update water heater efficiency options
CDP ID #	1228
Code	IECC RE
Code Section(s)	R408.2.3 table
Location	base
Proponent	Mary Koban mkoban@ahrinet.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Motion to approve "as modified" opened up the discussion. Most comments positive. All storage volumes and all draw patterns added. Ted Williams spoke of availability of product. All positive to approval
Recommendation	Recommendation vote to approve "as modified"
Vote	8/0/2
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

# RED1-358-22

**IECC: TABLE R408.2.3**

**Proponents:**

Mary Koban, representing AHRI ([mkoban@ahrinet.org](mailto:mkoban@ahrinet.org)); Mark Lyles, representing California IOUs ([markl@newbuildings.org](mailto:markl@newbuildings.org))

**2024 International Energy Conservation Code [RE Project]**

**Delete and substitute as follows:**

~~TABLE R408.2.3 Service water-heating efficiencies~~

<u>Measure Number</u>	<u>Water Heater</u>	<u>Size and Draw Pattern</u>	<u>Type</u>	<u>Efficiency</u>
R408.2.3(1)	Gas-fired storage water heaters	≤ 55 gallons, Medium		UEF ≥ 0.81
		≤ 55 gallons, High		UEF ≥ 0.86
		>55 gallons, Medium or High		UEF ≥ 0.86
R408.2.3 (2)	Gas-fired instantaneous water heaters	Medium or High		UEF ≥ 0.95
R408.2.3 (3)	Electric water heaters	Low, Medium, or High	Integrated HPWH	UEF ≥ 3.30
R408.2.3 (4)	Electric water heaters	Low, Medium, or High	Integrated HPWH, 120 Volt/15 Amp Circuit	UEF ≥ 2.20
		Low, Medium, or High	Split-system HPWH	UEF ≥ 2.20
R408.2.3 (5)	Solar water heaters		Electric backup	SUEF ≥ 3.00
			Gas backup	SUEF ≥ 1.80

TABLE R408.2.3 Service water-heating efficiencies

<u>Measure Number</u>	<u>Water Heater</u>	<u>Size and Draw Pattern</u>	<u>Type</u>	<u>Efficiency</u>
R408.2.3(1)(a)	Gas-fired storage water heaters (option 1)	All storage volumes, all draw patterns		UEF ≥ 0.81
R408.2.3(1)(b)	Gas-fired storage water heaters (option 2)	≤ 55 gallons; Medium		UEF ≥ 0.81
		<55 gallons; High		UEF ≥ 0.86
		>55 gallons; Medium or High		UEF ≥ 0.86
R408.2.3(2)(a)	Gas-fired instantaneous water heaters (option 1)	All storage volumes, Medium or High		UEF ≥ 0.92
R408.2.3(2)(b)	Gas-fired instantaneous water heater (option 2)	All storage volumes, Medium or High		UEF ≥ 0.95
R408.2.3(3)(a)	Electric water heaters (option 1)	All storage volumes, Low, Medium or High	Integrated HPWH	UEF ≥ 3.30
R408.2.3(3)(b)	Electric water heaters (option 2)	All storage volumes, Low, Medium or High	Integrated HPWH	UEF ≥ 3.75

R408.2.3(4)	Electric water heaters (option 3)		Integrated HPWH, 120 Volt/15 Amp Circuit	UEF≥2.20
R408.2.3(5)(a)	Electric water heaters (option 4)		Split-system HPWH	UEF≥2.20
R408.2.3(5)(b)	Electric water heaters (option 5)		Split-system HPWH	UEF≥3.75
R408.2.3(6)(a)	Solar water heaters (option 1)	All storage volumes, all draw patterns	Electric backup	SUEF≥3.00
R408.2.3(6)(b)	Solar water heaters (option 2)	All storage volumes, all draw patterns	Gas backup	SUEF≥1.80

**Reason:**

Dear IECC Residential Sub-Committee and Committee members, please note that the cdpace system did not allow me to edit the existing table. Therefore, I attached the code modification in track changes to this proposal. Please note we only changed a few items and not the entire table as it appears in the code proposal.

This table comes from aligning process for former code proposals (RECPI-10, REPI-18, REPI-33). AHRI further notes that we made these changes due to new potential tax incentives. On August 16, 2022, President Joe Biden signed the Inflation Reduction Act (IRA) into law. The Act contains dozens of provisions related to climate change and prescription drug prices. It includes measures that provide federal income tax credits for high-efficiency HVAC and water heater products. This proposal aligns Additional Energy Credits with the IRA, provides even more energy credits for higher-efficiency equipment, and will encourage homeowners and builders to install efficient water heater products. Therefore, AHRI members suggest aligning with Energy Star product specifications and CEE tiers when defining efficiency levels for HVAC options in R408.2. AHRI notes that the following sections of R408.2.3 align with Energy Star and CEE tiers

R408.2.3(1)(a)- this is the proposed CEE level for all draw patterns, baseline condensing type WH.

R408.2.3(1)(b)- this is aligned with Energy Star v5.0

R408.2.3(2)(a)- this is a baseline condensing level well above the minimum in the market and will probably align with utility incentives.

R408.2.3(2)(b)- this is aligned with Energy Star v5.0, but it is also important to note that this level is well above current products on the market.

R408.2.3(3)(a)-aligns with Energy Star v5.0

R408.2.3(3)(b)-aligns with CEE levels

R408.2.3(4)-aligns with both CEE levels and Energy Star v5.0

R408.2.3(5)(a)-aligns with Energy Star v5.0

R408.2.3(5)(b)-aligns with CEE levels

R408.2.3.6(a)-aligns with Energy Star v5.0

R408.2.3.(6)-aligns with Energy Star v5.0 and may qualify for federal tax incentives

**Bibliography:**

AHRI notes that the Tax Provisions in the Inflation Reduction Act of 2022 can be found at this link <https://crsreports.congress.gov/product/pdf/R/R47202>

AHRI provides the following link to Energy Star version 5.0

<https://www.energystar.gov/sites/default/files/asset/document/ENERGY%20STAR%20Residential%20Water%20Heaters%20Version%205.0%20Specification%20and%20Partner%20Commitments.pdf>AHRI

provides the following link to the CEE Residential Water Heating Specification

<https://library.cee1.org/content/cee-residential-water-heating-specification/>

**Cost Impact:**

The code change proposal will neither increase nor decrease the cost of construction.

This code change is not expected to increase or decrease the cost of construction. This code will enable more architects, builders and consumers to use energy efficient products due to potential Tax Incentives provided by the Inflation Reduction Act.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-355-22 Service water heating efficiencies
CDP ID #	1417
Code	IECC RE
Code Section(s)	R408.2.3 table
Location	base
Proponent	Ted Williams ngdllc@outlook.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Proponent presented the proposal. Motion to disapprove with a valid second. The discussion was quick and the vote was to disapprove. 8/0/1
Recommendation	Recommendation reason statement is to disapproved because RED1-358-22 takes care of this proposal
Vote	8/0/1 to disapprove
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-356-22 Service water heating efficiencies
CDP ID #	1467
Code	IECC RE
Code Section(s)	R408.2.3 table
Location	base
Proponent	Eric Tate eric.tate@atmosenergy.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Working group chair presented the proposal and made a motion to disapprove second received. Little discussion. Vote to disapprove carried with a vote of 9/0/1
Recommendation	Reason statement – RED1-358-22 takes care of this one Subcommittee recommendation is to disapprove
Vote	Disapprove 9/0/1
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee __x_____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-357-22 Update Table R408.2.3
CDP ID #	1075
Code	IECC RE
Code Section(s)	R408.2.3 table
Location	base
Proponent	Steven Rosenstock srosenstock@eei.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Motion to disapprove with a second. Discussion was light. Motion carried disapprove with a vote of 9/0/1
Recommendation	Reason statement RED1-358-22 takes care of RED1-357,355,356 Subcommittee recommendation is to disapprove
Vote	9/0/1
Recommendation Date	3/27/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee ___ x _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-309-22 testing of ducts inside conditioned space
CDP ID #	1042
Code	IECC RE
Code Section(s)	R403.3.6 table
Location	base
Proponent	Alex Smith asmith@nahb.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Presented by Vladimir Kochkin "as modified". Motion to approved "as modified" with a friendly amendment motion carried with a vote of 9/0/1
Recommendation	Recommendation is to approve "as modified"
Vote	9/0/1
Recommendation Date	
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



# RED1-309-22

Proponents: Alex Smith, representing NAHB (asmith@nahb.org)

## 2024 International Energy Conservation Code [RE Project]

Revise as follows:

TABLE R403.3.6 MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

ROUGH IN	POST CONSTRUCTION	
<b>Duct systems serving more than 1,000 ft<sup>2</sup> of conditioned floor area</b>	<b>cfm/100 ft<sup>2</sup> (LPM/9.29 m<sup>2</sup>)</b>	<b>cfm/100 ft<sup>2</sup> (LPM/9.29 m<sup>2</sup>)</b>
Air handler is not installed	3 (85)	NA
Air handler is installed	4 (113.3)	4 (113.3)
<u>Duct systems located in conditioned space, with air handler not installed</u>	<u>6 (170)</u>	<u>6 (170)</u>
Duct systems located in conditioned space, with air handler installed	8 (226.6)	8 (226.6)
<b>Duct systems serving less than or equal to 1,000 ft<sup>2</sup> of conditioned floor area</b>	<b>cfm (LPM)</b>	<b>cfm (LPM)</b>
Air handler is not installed	30 (849.5)	NA
Air handler is installed	40 (1132.7)	40 (1132.7)
<u>Duct systems located in conditioned space, with air handler not installed</u>	<u>60 (1699.1)</u>	<u>60 (1699.1)</u>
Duct systems located in conditioned space, with air handler installed	80 (2265.4)	80 (2265.4)

**Reason:** It's common practice in many markets around the country to test ducts in conditioned space before the air handler is installed. Air handlers in these situations are often installed after the drywall. Therefore, the code needs to provide a compliance metric for this construction scenario.

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction. The change would have no effect on the cost of construction

## Workgroup Recommendation

This proposal adds a leakage allowance for another case that often occurs during construction. The leakage rate is reasonable given what it is being scaled to. At the start of construction, the air handler is shown as being located in conditioned space. The concern is what happens if the air handler actually ends up outside conditioned space. The Ducts Working Group agreed that there needs to be a footnote to the table that addresses the consequences of the air handler not ending up in conditioned space.

### Recommendation:

1. Approve as Amended with an amendment that addresses the consequences of the air handler not ending up in conditioned space. Vladimir will provide this text for consideration by the RES HVACR-WH Subcommittee.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-250-22 basement wall and slab on grade insulaiton
CDP ID #	1076
Code	IECC RE
Code Section(s)	R405.2 Table
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Disapprove Gayathri Vijayakumar; 2 <sup>nd</sup> Jay Crandell
Recommendation	The sub-committee did not support striking the sections from the Table, but rather advised the proponent to modify the referenced sections instead
Vote	Disapprove 13/0/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-252-22 Solar absorptance
CDP ID #	981
Code	IECC RE
Code Section(s)	R405.4.2(1) Table
Location	base
Proponent	Aaron Phillips aPhillips@asphaltroofing.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve Jay Crandell; 2 <sup>nd</sup> Gayathri Vijayakumar
Recommendation	Aligns terms with those used in the body of the residential code; also consistent with action take for the commercial code
Vote	Approve 15/0/0
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-6-22 Source Multiplier
CDP ID #	
Code	IECC RE
Code Section(s)	R405.1
Location	
Proponent	Gayathri Vijayakumar      gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve as Modified Vladimir Kochkin; 2 <sup>nd</sup> Gayathri Vijayakumar
Recommendation	The change to fixed site-to-source multipliers was supported by the SC because it reduces unnecessary complexity while still allowing flexibility and acknowledges the changes in grid efficiency since the last code cycle. It also expands the site energy savings option to all homes, not just all-electric homes with on-site renewables.
Vote	Approve 10/4/1
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

# RECD1-6-22 Approved As Modified (in red) by Sub-Committee

IECC: R405.2

Proponents: Ian Finlayson, representing IECC RE Economics, Modeling, Metrics subcommittee

## 2024 International Energy Conservation Code [RE Project]

**R405.2 Simulated performance compliance.** Compliance based on total building performance requires that a proposed design meets all of the following:

1. The requirements of the sections indicated within Table R405.2.
2. The proposed total building thermal envelope UA, which is the sum of the U-factor times assembly area, shall be less than or equal to the building thermal envelope UA using the prescriptive U-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.15 in Climate Zones 3 through 8 in accordance with Equation 4-2. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

(Equation 4-2)

For Climate Zones 0-2:  $UA_{\text{Proposed design}} \leq 1.08 \times UA_{\text{Prescriptive reference design}}$

For Climate Zones 3-8:  $UA_{\text{Proposed design}} \leq 1.15 \times UA_{\text{Prescriptive reference design}}$

3. For buildings without a fuel burning appliance for space heating or water heating, the annual energy cost of the proposed design that is less than or equal to 85 percent of the annual energy cost of the standard reference design. For buildings with a fuel burning appliance for space heating or water heating, the annual energy cost of the proposed design that is less than or equal to 80 percent of the annual energy cost of the standard reference design. For dwelling units with greater than 5,000 square feet (465 m<sup>2</sup>) of living space floor area located above grade plane, the annual energy cost of the proposed design shall be reduced by an additional 5 percent of annual energy cost of the standard reference design. Energy prices shall be taken from a source approved by the code official, such as the Department of Energy, Energy Information Administration's State Energy Data System Prices and Expenditures reports. Code officials shall be permitted to require time-of-use pricing in energy cost calculations.

### Revise as follows:

1. The energy use based on source energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost. The source energy multipliers for electricity shall be 2.74 2.51. ~~The source energy multiplier for fuels other than electricity shall be 1.09, for all energy sources shall be obtained from ASHRAE Standard 105 (Tables K2, K4, or K8) or from another data source approved by the code official.~~
2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost ~~for an all-electric building with on-site renewable energy installed.~~

**Reason:** Based on discussion during the 2-28 SC meeting on numerous Panel 1 proposals that sought to remove, add, or delete the reference to Appendix K Tables from ASHRAE Standard 105, the Sub-Committee questioned whether the complexity of adding this Standard was worth it. While the Main Committee supported the inclusion of this Standard in the 1<sup>st</sup> round of comment, upon closer examination, the Table references offer 6 different site-to-source multipliers for electricity which could lead to unnecessary complexity for the code official and software implementers. Additionally, the need for the

site-based Exception was called into question given that it yields the same result as the energy cost calculation.

This proposal is similar to RED1-47, which removes the Exception 2 and restores a more simple approach for source energy savings calculation, when it is selected as an alternative to energy cost savings. It also recognizes that the multipliers have decreased, as evidenced by the values in ASHRAE Std 105. This simplifies the code without negatively affecting energy performance.

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction.

No cost impact.

Edit blue cells in the interactive R405 example calculator to visualize impact of fuel price and site-to-source multipliers on percent savings achieved: <https://www.iccsafe.org/wp-content/uploads/Copy-of-Source-Multipliers.xlsx>



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-249-22 R405 Clarifications and Sampling R-2
CDP ID #	1143
Code	IECC RE
Code Section(s)	R405.1
Location	base
Proponent	Gayathri Vijayakumar      gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve <b>"As Modified"</b> Gayathri Vijayakumar; 2 <sup>nd</sup> Aaron Gary
Recommendation	The sub-committee supported the clarifying edits but could not reach consensus on the proposed edits related to sampling and a new footnote clarifying that measured values should replace assumed values in the simulations prior to CO. The motion was therefore modified to remove the text introducing sampling and the new footnote. That motion was approved.
Vote	Approve 13/1/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

# RED1-249-22 Approved as Modified in red to reference R402 instead of R401, to remove sampling text and remove the new footnote

IECC: SECTION R202, SECTION 202, SECTION R405, R405.1, R405.2, R405.3, R405.3.1, R405.3.2, R405.3.2.1, R405.3.2.2, R405.4, R405.4.1, R405.4.2, TABLE R405.4.2(1), R405.5.1

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

2024 International Energy Conservation Code [RE Project]

## SECTION R202

### GENERAL DEFINITIONS

Revise as follows:

**PROPOSED DESIGN.** A description of the proposed dwelling unit building used to estimate annual energy use for determining compliance based on simulated building performance.

**STANDARD REFERENCE DESIGN.** A version of the proposed design that meets the minimum requirements of this code and is used to determine the maximum annual energy use requirement for compliance based on simulated building performance.

## SECTION R405

### SIMULATED BUILDING PERFORMANCE

Revise as follows:

**R405.1 Scope.** This section establishes criteria for compliance using simulated building performance analysis. Such analysis shall include heating, cooling, mechanical ventilation and service water-heating energy only. Such analysis shall be limited to dwelling units. Spaces other than dwelling units in Group R-2, R-3, or R-4 buildings shall comply with Sections R404 R402 through R404.

**R405.2 Simulated performance compliance.** Compliance based on simulated total building performance requires that a building proposed design meets all of comply with the following:

1. The requirements of the sections indicated within Table R405.2.
2. The proposed total building thermal envelope UA, which is the sum of the U-factor times assembly area, shall be less than or equal to the building thermal envelope UA using the prescriptive U-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.15 in Climate Zones 3 through 8 in accordance with Equation 4-2. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

(Equation 4-2)

For Climate Zones 0-2:  $UA_{\text{Proposed design}} \leq 1.08 \times UA_{\text{Prescriptive reference design}}$

For Climate Zones 3-8:  $UA_{\text{Proposed design}} \leq 1.15 \times UA_{\text{Prescriptive reference design}}$

For each dwelling unit buildings without a fuel burning appliance for space heating or water heating, the annual energy cost of the proposed design that is less than or equal to 85 percent of the annual energy cost of the *standard reference design*. For each dwelling unit buildings with a fuel burning appliance for space heating or water heating, the annual energy cost of the dwelling unit proposed design that is less than or equal to 80 percent of the annual energy cost of the standard reference design. For each dwelling units with greater than 5,000 square feet (465 m<sup>2</sup>) of living space floor area located above grade plane, the annual energy cost of the dwelling unit proposed design shall be reduced by an additional 5 percent of annual energy cost of the *standard reference design*. Energy prices shall be taken from a source *approved by the code official*, such as the Department of Energy, Energy Information Administration's State Energy Data System Prices and Expenditures reports. Code officials shall be permitted to



require time-of-use pricing in energy cost calculations.

**Exceptions:**

1. The energy use based on source energy expressed in Btu or Btu per square foot of *conditioned floor area* shall be permitted to be substituted for the energy cost. The source energy multipliers for all energy sources shall be obtained from ASHRAE Standard 105 (Tables K2, K4, or K8) or from another data source approved by the *code official*.
2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost for an all-electric dwelling unit building with on-site renewable energy installed.

~~3. For buildings with eight or more dwelling units, where the building components' energy specifications are the same in each dwelling unit, simulations shall be permitted on the greater of seven or 20 percent of the dwelling units, whichever is greater in the building. Simulated dwelling units shall include a top floor unit, a ground floor unit, a middle floor unit, and the dwelling unit with the largest dwelling unit enclosure area.~~

**R405.3 Documentation.** Documentation of the software used for the proposed design, as-built dwelling unit, and the parameters for the standard reference design ~~baseline building~~ shall be in accordance with Sections R405.3.1 through R405.3.2.2.

**R405.3.1 Compliance software tools.** Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *code official*.

**Revise as follows:**

**R405.3.2 Compliance report.** Compliance software tools shall generate a report that documents that the *proposed design and as-built dwelling unit* complies with Section R405.23. A compliance report on the *proposed design* shall be submitted with the application for the building permit. Upon completion of the building, a confirmed compliance report based on the confirmed condition of the building shall be submitted to the *code official* before a certificate of occupancy is issued. Compliance reports shall include information in accordance with Sections R405.3.2.1 and R405.3.2.2.

**R405.3.2.1 Compliance report for permit application.** A compliance report submitted with the application for building permit shall include the following:

1. Building street address, or other *building site* identification.
2. The name of the individual performing the analysis and generating the compliance report.
3. The name and version of the compliance software tool.
4. Documentation of all inputs entered into the software used to produce the results for the standard reference design and/or the proposed design ~~rated home~~.
5. A certificate indicating that the *proposed design* complies with Section R405.23. The certificate shall document the building components' energy specifications that are included in the calculation including: component-level insulation *R*-values or *U*-factors; duct system and building envelope air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. **# Where** on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.
6. Where a site-specific report is not generated, the *proposed design* shall be based on the worst-case orientation and configuration of the rated dwelling unit ~~home~~.

**R405.3.2.2 Compliance report for certificate of occupancy.** A compliance report submitted for obtaining the certificate of occupancy shall include the following:

1. Building street address, or other *building site* identification.
2. Declaration of the simulated building performance path on the title page of the energy report and the title page of the building plans.

3. A statement, bearing the name of the individual performing the analysis and generating the report, indicating that the as-built building complies with Section R405.23.
4. The name and version of the compliance software tool.
5. A site-specific energy analysis report that is in compliance with Section R405.43, where all inputs for the proposed design have been replaced in the simulation with confirmed energy features of the as-built dwelling unit.
6. A final confirmed certificate indicating compliance based on inspection, and a statement indicating that the as-built building confirmed-rated design of the built home complies with Section R405.23. The certificate shall report the energy features that were confirmed to be in the building home, including component-level insulation *R*-values or *U*-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation and service water-heating equipment installed.
7. When on-site renewable energy systems have been installed, the certificate shall report the type and production size of the installed system.

**R405.4 Calculation procedure.** Calculations ~~of the proposed design~~ shall be in accordance with Sections R405.4.1 and R405.4.2.

**R405.4.1 General.** Except as specified by this section, the *standard reference design*, ~~and proposed design~~, and as-built dwelling unit shall be configured and analyzed using identical methods and techniques.

**R405.4.2 Residence specifications.** The *standard reference design*, ~~and proposed design~~, and as-built dwelling unit shall be configured and analyzed as specified by Table R405.4.2(1). Table R405.4.2(1) shall include, by reference, all notes contained in Table R402.1.3.

**TABLE R405.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**

Portions of table AND footnotes not shown remain unchanged.

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
	The air leakage rate at a pressure of 0.2 inch w.g. (50 Pa) shall be Climate Zones 0 through 2: 4.0 air changes per hour.  Climate Zones 3, 4, and 5: 3.0 air changes per hour.  Climate Zones 6 through 8: 2.5 air changes per hour.	The measured <sup>d</sup> air <span style="border: 1px solid black; padding: 2px;">exch</span> ange rate. <sup>a</sup>

<p><b>Air exchange rate</b></p>	<p>The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than <math>B \times M</math></p> <p>where:</p> <p><math>B = 0.01 \times CFA + 7.5 \times (Nbr + 1)</math>, cfm.</p> <p><math>M = 1.0</math> where the measured air exchange rate is <math>\geq 3.0</math> air changes per hour at 50 Pascals, and otherwise, <math>M = \text{minimum}(1.7, Q/B)</math></p> <p><math>Q</math> = the proposed mechanical ventilation rate, cfm.</p> <p><math>CFA</math> = conditioned floor area, <math>\text{ft}^2</math>.</p> <p><math>Nbr</math> = number of bedrooms.</p> <p>The mechanical ventilation system type shall be the same as in the proposed design. Heat recovery or energy recovery shall be modeled for mechanical ventilation where required by Section R403.6.1. Heat recovery or energy recovery shall not be modeled for mechanical ventilation where not required by Section R403.6.1.</p>	<p>The <u>measured</u><sup>d</sup> mechanical ventilation rate<sup>b</sup>, <math>Q</math>, shall be in addition to the <u>measured</u> air leakage rate and shall be as proposed.</p>				
<p><b>Thermal distribution systems</b></p>	<p>Duct system leakage to outside:</p> <p>For duct systems serving <math>&gt; 1,000\text{ft}^2</math> of conditioned floor area, the duct leakage to outside rate shall be 4 cfm (113.3 L/min) per 100 <math>\text{ft}^2</math> (9.29 <math>\text{m}^2</math>) of conditioned floor area.</p> <p>For duct systems serving <math>\leq 1,000\text{ft}^2</math> of conditioned floor area, the duct leakage to outside rate shall be 40 cfm (1132.7 L/min).</p>	<p>Duct System Leakage to Outside: The <u>measured</u><sup>d</sup> total duct system leakage rate shall be entered into the software as the duct system leakage to outside rate.</p> <p>Exceptions:</p> <table border="1" data-bbox="1177 1144 1620 1501"> <tr> <td data-bbox="1177 1144 1209 1333">1.</td> <td data-bbox="1209 1144 1620 1333">When duct system leakage to outside is tested in accordance ANSI/RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered.</td> </tr> <tr> <td data-bbox="1177 1333 1209 1501">2.</td> <td data-bbox="1209 1333 1620 1501">When total duct system leakage is measured without the air handler installed, the simulation value shall be 4 cfm (113.3 L/min) per 100 <math>\text{ft}^2</math> (9.29 <math>\text{m}^2</math>) of conditioned floor area.</td> </tr> </table>	1.	When duct system leakage to outside is tested in accordance ANSI/RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered.	2.	When total duct system leakage is measured without the air handler installed, the simulation value shall be 4 cfm (113.3 L/min) per 100 $\text{ft}^2$ (9.29 $\text{m}^2$ ) of conditioned floor area.
1.	When duct system leakage to outside is tested in accordance ANSI/RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered.					
2.	When total duct system leakage is measured without the air handler installed, the simulation value shall be 4 cfm (113.3 L/min) per 100 $\text{ft}^2$ (9.29 $\text{m}^2$ ) of conditioned floor area.					

f. For a *proposed design* ~~home~~ without a proposed cooling system, an electric air conditioner having the prevailing federal minimum efficiency shall be assumed for both the *standard reference design* and the *proposed design*.

~~1. For the *proposed design*, where measured values are not yet available, assumptions shall be permitted. These assumptions shall be permitted to be replaced with measured values prior to obtaining the certificate of occupancy.~~

**R405.5.1 Minimum capabilities.** Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the *standard reference design* and the *proposed design* and shall include the following capabilities:

1. Computer generation of the *standard reference design* using only the input for the *proposed design*. The calculation procedure shall not allow the user to directly modify the building component characteristics of the

*standard reference design.*

2. Calculation of whole-~~dwelling unit building~~ (as a single *zone*) sizing for the heating and cooling equipment in the *standard reference design* residence in accordance with Section R403.7.
3. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.
4. Printed *code official* inspection checklist listing each of the *proposed design* component characteristics from Table R405.4.2(1) determined by the analysis to provide compliance, along with their respective performance ratings such as *R*-value, *U*-factor, SHGC, HSPF<sub>2</sub>, AFUE, SEER<sub>2</sub> and UEF.

**Reason:** This public comment is submitted to accomplish the following:

1. Clarify that for Group R-2 buildings, simulations are performed on the dwelling unit, not the whole building. Common spaces, such as lobbies, stairwells, corridors and amenity spaces shall follow requirements in R401 through R404.
2. For Group R-2, rather than require repetitive modeling of dwelling units with identical features, specifies a list of unit types that must be simulated.
3. Makes more explicit the process prior to CO (i.e., proposed design MUST be updated with as-built information) and creates a footnote to clarify that assumptions for tested results may be used at Proposed Design for the sake of the permit application.
4. Corrected some incorrect section references
5. Updates references to SEER, EF and HSPF to more current ratings

**Bibliography:** None

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction. N/A



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-8-22 Software Validation
CDP ID #	
Code	IECC RE
Code Section(s)	R405
Location	
Proponent	Michael Tillou michael.tillou@pnnl.gov
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve Gayathri Vijayakumar; 2 <sup>nd</sup> Aaron Gary
Recommendation	Provides consistent testing requirements for software compliance tools based on ASHRAE Standard 140.
Vote	Approve 16/0/0
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-065-22 Update R406
CDP ID #	1400
Code	IECC RE
Code Section(s)	R406
Location	base
Proponent	Gayathri Vijayakumar <a href="mailto:gayathri@swinter.com">gayathri@swinter.com</a>
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve <b>"As Modified"</b> Gayathri Vijayakumar; 2 <sup>nd</sup> Aaron Gary
Recommendation	The sub-committee supported the clarifying edits and the modification to require common spaces comply with R402 through R404. Consistent with action on RECD1-8, the sub-committee also supported the new requirement for software to document that the ASHRAE Standard 140 tests had been performed.
Vote	Approve 16/0/0
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <u>    X    </u>
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

**RED1-65-22 Approved As Modified (in red)**

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

2024 International Energy Conservation Code [RE Project]

CHAPTER 2 [RE]

DEFINITIONS

SECTION R202

GENERAL DEFINITIONS

Revise as follows:

**ENERGY RATING INDEX (ERI).** A numerical integer value that represents the relative energy performance of a rated design ~~Rated Home~~ or constructed dwelling unit as compared with the energy performance of the ERI Reference Design, where an ERI value of 100 represents the energy performance of the ERI Reference Design and an ERI value of 0 represents a rated design or constructed dwelling unit ~~home~~ with zero net energy performance.

**ERI REFERENCE DESIGN.** A version of the rated design that meets the minimum requirements of the 2006 *International Energy Conservation Code*.

Revise as follows:

**RATED DESIGN.** A description of the proposed building dwelling unit used to determine the energy rating index.

CHAPTER 4 [RE]

RESIDENTIAL ENERGY EFFICIENCY

SECTION R406

ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

Revise as follows:

**R406.1 Scope.** This section establishes criteria for compliance using an Energy Rating Index (ERI) analysis. Such analysis shall be limited to dwelling units. Spaces other than dwelling units in Group R-2, R-3, or R-4 buildings shall comply with Sections ~~R404~~ R402 through R404.

**R406.2 ERI compliance.** Compliance based on the ERI requires that the rated design and as-built dwelling unit meets all of the following:

1. The requirements of the sections indicated within Table R406.2.
2. Maximum ERI values indicated in Table R406.5.

**R406.3 Building thermal envelope.** The proposed total building thermal envelope UA, which is sum of U-factor times assembly area, shall be less than or equal to the building thermal envelope UA using the prescriptive U-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and by 1.15 in Climate Zones 3 through 8, in accordance with Equation 4-3. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

For Climate Zones 0-2:  $UA_{\text{Proposed design}} \leq 1.08 \times UA_{\text{Prescriptive reference design}}$

For Climate Zones 3-8:  $UA_{\text{Proposed design}} \leq 1.15 \times UA_{\text{Prescriptive reference design}}$

(Equation 4-3)

**R406.4 Energy Rating Index.** The Energy Rating Index (ERI) shall be determined in accordance with ANSI/RESNET/ICC 301. The mechanical ventilation rates used for the purpose of determining the ERI shall not be construed to establish minimum ventilation requirements for compliance with this code.

Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the ERI reference design or the rated design.

Revise as follows:

**R406.5 ERI-based compliance.** Compliance based on an ERI analysis requires that the *rated proposed design* and *each* confirmed *as-built dwelling unit* be shown to have an ERI less than or equal to the appropriate value indicated in Table R406.5 when compared to the *ERI reference design* **as follows:**

1. Where on-site renewables are not installed, the maximum ENERGY RATING INDEX NOT INCLUDING OPP applies.
2. Where on-site renewables are installed, the maximum ENERGY RATING INDEX INCLUDING OPP applies.

**Exceptions:**

1. Where the ERI analysis excludes OPP, the maximum ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted.
2. For buildings with twenty or more dwelling units, where approved by the code official, compliance shall be permitted using the Average Dwelling Unit Energy Rating Index, as calculated in accordance with ANSI/RESNET/ICC 301.

**Revise as follows:**

**R406.6 Verification by approved agency.** Verification of compliance with Section R406 as outlined in Sections ~~R406.4~~ and R406.56 shall be completed by an *approved* third party. Verification of compliance with Section R406.2 shall be completed by the authority having jurisdiction or an *approved* third-party inspection agency in accordance with Section R105.4.

**R406.7 Documentation.** Documentation of the software used to determine the ~~ERI~~ *ERI* and the parameters for the *ERI Reference Design residential building* shall be in accordance with Sections R406.7.1 through R406.7.4.

**R406.7.1 Compliance software tools.** Software tools used for determining *ERI* shall be *approved software rating tools as defined by Approved Software Rating Tools in accordance with ANSI/RESNET/ICC 301 and shall have documentation that the software tool has been validated using the Class II, Tier 1 test procedure in ANSI/ASHRAE Standard 140-2017. Software vendors shall publish, on a publicly available website, documentation that the software tool has been validated using the Class II, Tier 1 test procedure in ANSI/ASHRAE Standard 140.*

**R406.7.2 Compliance report.** Compliance software tools shall generate a report that documents that the ~~home and the~~ *ERI* score *ERI* of the *rated design* and *as-built dwelling unit* complies with Sections R406.2, R406.3, ~~R406.4~~ and R406.54. Compliance documentation shall be created for the proposed design and shall be submitted with the application for the building permit. Confirmed compliance documents of the *as-built dwelling unit* shall be created and submitted to the code official for review before a certificate of occupancy is issued. Compliance reports shall include information in accordance with Sections R406.7.2.1 and R406.7.2.2.

**R406.7.2.1 Proposed compliance report for permit application.** Compliance reports submitted with the application for a building permit shall include the following:

1. Building street address, or other *building site* identification.
2. Declare ERI on title page and building plans.
3. The name of the individual performing the analysis and generating the compliance report.
4. The name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the *ERI reference design* and ~~for the~~ *rated design home*.
6. A certificate indicating that the proposed design has an ERI less than or equal to the appropriate score indicated in Table R406.5 when compared to the *ERI reference design*. The certificate shall document the building



component energy specifications that are included in the calculation, including: component level insulation *R*-values or *U*-factors; assumed duct system and building envelope air leakage testing results; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation, and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.

7. When a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated dwelling unit home.

**R406.7.2.2 Confirmed compliance report for a certificate of occupancy.** A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

1. Building street address or other *building site* identification.
2. Declaration of ERI on title page and on building plans.
3. The name of the individual performing the analysis and generating the report.
4. The name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the ERI reference design and ~~for~~ the as-built dwelling unit ~~rated~~ home.
6. A final confirmed certificate indicating that the as-built building ~~confirmed rated design of the built home~~ complies with Sections R406.2, R406.4 and R406.54. The certificate shall report the energy features that were confirmed to be in the building ~~home~~, including: component-level insulation *R*-values or *U*-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed. Where on-site renewable energy systems have been installed on or in the building ~~home~~, the certificate shall report the type and production size of the installed system.

**R406.7.3 Renewable energy certificate (REC) documentation.** Where renewable energy power production is included in the calculation of an ERI, documentation shall comply with Section R404.4.

**R406.7.4 Additional documentation.** The *code official* shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the *ERI reference design*.
2. A certification signed by the builder providing the building component characteristics of the *rated design*.
3. Documentation of the actual values used in the software calculations for the *rated design*.

**R406.7.5 Specific approval.**

Performance analysis tools meeting the applicable subsections of Section R406 shall be *approved*. Documentation demonstrating the approval of performance analysis tools in accordance with Section R406.7.1 shall be provided.

**Revise as follows:**

**R406.7.6 Input values.** Where calculations require input values not specified by Sections R402, R403, R404 and R405, those input values shall be taken from ANSI/RESNET/ICC 301.

CHAPTER 6 [RE]  
REFERENCED STANDARDS

**ANSI**

American National Standards Institute  
25 West 43rd Street, 4th Floor  
New York NY 10036

**Add new standard(s) as follows:**

R406.7.1      ANSI/ASHRAE 140-~~2020~~ 2017 Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs

**Reason:**

Similar to a clean-up proposal for R405, R406 needs to be clear for multifamily that an ERI is only performed on a dwelling unit and that common spaces are still subject to the other code requirements in R402 through R404.

In addition, for large MF, the average ERI of all dwelling units in the building should be permitted to be used to demonstrate compliance with the maximum ERI (rather than each individual dwelling unit being required to meet the max ERI).

Finally, some edits are made to maintain consistency, use defined terms, and underscore that the as-built dwelling unit is also required to be compliant, not just the 'rated design' ERI.

**Bibliography:**

None

**Cost Impact:**

The code change proposal will neither increase nor decrease the cost of construction.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-7-22 ERI w OPP (MOD of RED1-69)
CDP ID #	
Code	IECC RE
Code Section(s)	R406
Location	
Proponent	Gayathri Vijayakumar      gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve Gayathri Vijayakumar; 2 <sup>nd</sup> Rob Salcido
Recommendation	The sub-committee supported the revised ERI maximum values based on analysis provided by PNNL which estimated the ERI with 2 kW of OPP.
Vote	Approve 7/2/5
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-027-22    Glide path to zero net energy
CDP ID #	1119
Code	IECC RE
Code Section(s)	Appendix RG
Location	appendix
Proponent	Gayathri Vijayakumar    gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve <b>as shown on the screen</b> Gayathri Vijayakumar; 2 <sup>nd</sup> Shilpa Surana
Recommendation	The sub-committee supported a Glide Path Appendix as an optional pathway for AHJ's to adopt in order to achieve higher energy conservation without yet requiring net-zero performance or renewable installations. <b>Compared to the version in the monograph, the Proponent had modified the ERI Max values to reflect 10% reduction below 2024 IECC ERI values without OPP and to revise the ERI Max values with OPP, based on recent PNNL analysis.</b>
Vote	Approve 9/3/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <u>    X    </u>
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

## RED1-27-22 Approved as Modified in red

**Note:** yellow is unique text in this Appendix; other text was copied from Main body and will be revised to match Main body, if the copied text has been modified by other approved RED1s.

**IECC: APPENDIX RG (New), RG101 (New), RG405.2 (New), RG406.5 (New), R406.5 (New), RG408.2 (New)**

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com); Mark Lyles, representing California IOUs (markl@newbuildings.org)

2024 International Energy Conservation Code [RE Project]

Add new text as follows:

### APPENDIX RG 2024 IECC Stretch Code RG101 COMPLIANCE

**RG405.2 Simulated Performance compliance.** Compliance based on total building performance requires that a *proposed design* meets all of the following:

1. The requirements of the sections indicated within Table R405.2.
2. The proposed total *building thermal envelope* TC, which is the sum of the U-factor times assembly area and F-factor times perimeter, shall be less than or equal to the *building thermal envelope* TC using the prescriptive U-factors and F-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.10 in Climate Zones 3 through 8 in accordance with Equation 4-2. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

For Climate Zones 0-2:  $TC_{\text{Proposed design}} \leq 1.08 \times TC_{\text{Prescriptive reference design}}$  (Equation 4-2)

For Climate Zones 3-8:  $TC_{\text{Proposed design}} \leq 1.10 \times TC_{\text{Prescriptive reference design}}$

3. For buildings without a fuel burning appliance for space heating or water heating, the annual energy cost of the *proposed design* that is less than or equal to 75 percent of the annual energy cost of the *standard reference design*. For buildings with a fuel burning appliance for space heating or water heating, the annual energy cost of the *proposed design* that is less than or equal to 70 percent of the annual energy cost of the *standard reference design*. For dwelling units with greater than 5,000 square feet (465 m<sup>2</sup>) of living space floor area located above grade plane, the annual energy cost of the *proposed design* shall be reduced by an additional 5 percent of annual energy cost of the *standard reference design*. Energy prices shall be taken from a source *approved* by the *code official*, such as the Department of Energy, Energy Information Administration's State Energy Data System Prices and Expenditures reports. *Code officials* shall be permitted to require time-of-use pricing in energy cost calculations.

#### **Exceptions:**

1. The energy use based on source energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost. The source energy multipliers for all energy sources shall be obtained from ASHRAE Standard 105 (Tables K2, K4, or K8) or from another data source approved by the code official.

2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost for an all-electric building with on-site renewable energy installed.

**RG406.5 ERI-based compliance.** Compliance based on an ERI analysis requires that the *rated proposed design* and confirmed built dwelling be shown to have an ERI less than or equal to the appropriate value indicated in Table R406.5 when compared to the *ERI reference design* as follows:

1. Where on-site renewables are not installed, the maximum ENERGY RATING INDEX NOT INCLUDING OPP applies.

2. Where on-site renewables are installed, the maximum ENERGY RATING INDEX INCLUDING OPP applies.

**Exception:** Where the ERI analysis excludes OPP, the maximum ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted.

**TABLE R406.5 MAXIMUM ENERGY RATING INDEX**

<u>CLIMATE ZONE</u>	<u>ENERGY RATING INDEX NOT INCLUDING OPP</u>	<u>ENERGY RATING INDEX WITH OPP</u>
<u>0-1</u>	45 46	30 27
<u>2</u>	45 46	30 26
<u>3</u>	45	30 24
<u>4</u>	45 48	30 32
<u>5</u>	45 49	30 37
<u>6</u>	45 48	30 39
<u>7</u>	45 47	30 43
<u>8</u>	45 47	30 43

**RG408.2 Additional energy efficiency credit requirements.** No less than two measures shall be selected from Table R408.2 that meet or exceed a total of **twenty** credits. Five additional credits shall be selected for dwelling units with greater than 5,000 square feet (465 m<sup>2</sup>) of living space floor area located above grade plane. Each measure selected shall meet the relevant subsections of Section R408 and receive credit as specified in Table R408.2 for the specific Climate Zone. For *dwelling units* in Group R-2 buildings, where applicable, the requirements shall be met in each dwelling unit in order to receive credit. Interpolation of credits between measures shall not be permitted.

Reason: This glide path appendix is being offered as a simple option for jurisdictions to adopt to exceed the energy performance 2024 IECC on their "glide path" to net zero energy. To attain that additional performance, this Appendix has three sections that would replace the corresponding sections in the main body of the code: one section from each Compliance option (Prescriptive, Simulated Performance, and ERI).

Where changes are made throughout the public comment period to these three copied sections, those changes would be intended to be updated here as well. Only **highlighted** text is intended to differ.

**Bibliography:**

None

**Cost Impact:**

The code change proposal will increase the cost of construction.

For jurisdictions that adopt this code, local building construction costs at the time of adoption should be considered to determine cost-effectiveness.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-028-22 Operational Carbon Rating and Energy Reporting
CDP ID #	1170
Code	IECC RE
Code Section(s)	Appendix RH
Location	appendix
Proponent	Gayathri Vijayakumar      gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve Gayathri Vijayakumar; 2nd Shilpa Surana
Recommendation	The sub-committee supported the Carbon Rating Appendix as an optional pathway for AHJ's to adopt in order to demonstrate reductions in operational carbon. Based on discussion, a motion to modify the max CO2e Index was made, increasing it to 65 from 55.
Vote	Approve 7/4/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <u>  X  </u> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

# RED1-28-22 Approved as Modified in red by the Sub-Committee

Note: yellow is unique text in this Appendix; other text was copied from Main body and will be revised to match Main body, if the copied text has been modified by other approved RED1s.

IECC: APPENDIX RH (New), RH101 (New), SECTION 202 (New), RH102 (New), RH401.2 (New), RH401.3 (New), RH406.2 (New), RH406.7.2.2 (New)

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

## 2024 International Energy Conservation Code [RE Project]

Add new text as follows:

### APPENDIX RH

#### Operational Carbon Rating and Energy Reporting

#### RH101

#### GENERAL DEFINITIONS

Add new definition as follows:

**CO<sub>2</sub>e INDEX.** A numerical integer value, calculated in accordance with ANSI / RESNET / ICC 301 that represents the relative Carbon Dioxide equivalence (CO<sub>2</sub>e) emissions of a *rated design* as compared with the CO<sub>2</sub>e emissions of the CO<sub>2</sub>e reference design and where an Index value of 100 represents the CO<sub>2</sub>e performance of the CO<sub>2</sub>e reference design and an Index value of 0 (zero) represents a home that emits zero net CO<sub>2</sub>e annually.

Add new text as follows:

#### RH102

#### COMPLIANCE

**RH401.2 Application.** Residential buildings shall comply with Section R406.

**Exception:** Additions, alterations, repairs and changes of occupancy to existing buildings complying with Chapter 5.

**RH401.3 Certificate.** A permanent certificate shall be completed by the builder or other *approved party* and posted on a wall in the space where the furnace is located, a utility room or an *approved location* inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory *label*, service disconnect *label* or other required labels. The certificate shall indicate the following:

1. The predominant R-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, *crawl space walls* and floors and ducts outside *conditioned spaces*.
2. U-factors of fenestration and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for any component of the building envelope, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.
3. The results from any required duct system and building envelope air leakage testing performed on the building.
4. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric



heater is installed in the residence, the certificate shall indicate “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.

5. Where on-site photovoltaic panel systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.

6. For buildings where an Energy Rating Index score is determined in accordance with Section R406, the Energy Rating Index score and CO<sub>2</sub>e Index, both with and without any on-site generation, shall be listed on the certificate.

7. The code edition under which the structure was permitted.

8. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

**RH406.2 ERI and CO<sub>2</sub>e Index compliance.** Compliance based on the ERI and CO<sub>2</sub>e Index requires that the *rated design and confirmed built dwelling* meet all of the following:

1. The requirements of the sections indicated within Table R406.2.

2. Maximum ERI values indicated in Table R406.5.

3. Maximum CO<sub>2</sub>e Index of 55 65, not including OPP, determined in accordance with ANSI/RESNET/ICC 301.

**RH406.7.2.2 Confirmed compliance report for a certificate of occupancy.** A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

1. Building street address or other *building site* identification.

2. Declaration of ERI and CO<sub>2</sub>e Index on title page and on building plans.

3. The name of the individual performing the analysis and generating the report.

4. The name and version of the compliance software tool.

5. Documentation of all inputs entered into the software used to produce the results for the reference design and the constructed dwelling unit.

6. A final confirmed certificate indicating that the *constructed building has been verified to comply* with Sections R406.2 and R406.4. The certificate shall report the energy features that were confirmed to be in the *building*, including: component-level insulation *R-values* or *U-factors*; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed. *The certificate shall report the estimated dwelling unit energy use by fuel type, inclusive of all end-uses.* Where on-site renewable energy systems have been installed on or in *the building*, the certificate shall report the type and production size of the installed system.

**Reason:**

As stated in the [Executive Summary](#) of the “Path Forward on Energy and Sustainability to Confront a Changing Climate,” reduction of greenhouse gas emissions is part of our mission on this Committee. This proposal is a step toward that goal, by reporting an index, similar to ERI, that helps a builder/homeowner understand the performance of their home with

respect to GHG. The calculation of this CO<sub>2</sub>e index has no added cost and requires no additional effort by the builder or rater. The same software that calculates an ERI in 2024 IECC R406 path will be done so in accordance with ANSI 301-2022. That Standard requires software to list this CO<sub>2</sub>e Index on labels & certificates. It will be published in time for reference within the 2024 IECC to include an update to GHG emission factors ([Addendum B](#)). This proposal also provides an achievable but maximum CO<sub>2</sub>e Index and adds the reporting of energy use such that GHG emissions could be calculated separately, if other metrics are being used by the jurisdiction to document GHG performance.

**Bibliography:** None

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction.

The code change proposal will neither increase nor decrease the cost of construction since the reporting of this value is already part of compliance with the referenced Standard.

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## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-085-22 Remove table R408.2.2
CDP ID #	1132
Code	IECC RE
Code Section(s)	R408.2.2 table
Location	base
Proponent	Fredric Zwerg fredric.zwerg@swgas.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Disapprove Gayathri Vijayakumar; 2 <sup>nd</sup> Shilpa Surana
Recommendation	The R408 point structure was strongly supported by the Consensus Committee in the first round of public comment. While the "TBD" values are currently being shown, they will be replaced with point values once PNNL completes the analysis. Therefore, the Sub-Committee did not support the proponent's suggestion to delete the entire table.
Vote	Disapprove 13/0/0
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-063-22 Strike 'Product Class', but errata may resolve?
CDP ID #	
Code	IECC RE
Code Section(s)	R405.4.2(1) Table
Location	
Proponent	Ted Williams ngdllc@outlook.com
Proposal Status	
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	RED1-063-22 was submitted and presented by Ted Williams
Recommendation	<p><b>Disapprove</b></p> <p>Motion: Ted Williams          Second: Gayathri Vijayakumar          Reason Statement: Errata corrected the table that was the subject of the proposed revision, which made the revision no longer necessary</p>
Vote	Approve 12-0-2 [Yes/No/Abstain]
Recommendation Date	03/14/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

## International Energy Conservation Code Code Change Proposal Tracking Sheet



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-064-22 Strike 'Product Class', but errata may resolve?
CDP ID #	
Code	IECC RE
Code Section(s)	R405.4.2(1) Table
Location	
Proponent	Eric Tate
Proposal Status	
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	RED1-064-22 was submitted and presented by Eric Tate
Recommendation	<p><b>Disapprove</b></p> <p>Motion: Ted Williams          Second: Gayathri Vijayakumar          Reason Statement: Errata corrected the table that was the subject of the proposed revision, which made the revision no longer necessary</p>
Vote	Approve 13-0-1 [Yes/No/Abstain]
Recommendation Date	03/14/2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-91-22 Appendix RP On-site Renewable Energy
CDP ID #	
Code	IRC
Code Section(s)	Appendix RP
Location	Appendix
Proponent	Michael Tillou
Proposal Status	SC rev
Subcommittee	RE Elec, Light
Subcommittee Notes	The committee worked together to come to consensus on the placement of renewable energy prescriptive requirements in an appendix while allowing options for improved efficiency to offset, some or all, of the renewable energy requirement. This proposal is consistent with requests from the Consensus Committee last spring.
Recommendation	Motion to approve as modified, PC, 2 <sup>nd</sup> JC (12-0-0)
Vote	12-0-0
Recommendation Date	04032023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

# RED1-91-22

Proponents: Michael Tillou, representing Pacific Northwest National Lab ([michael.tillou@pnnl.gov](mailto:michael.tillou@pnnl.gov))

(Yellow Highlights are committee meeting floor modifications)

## 2024 International Energy Conservation Code [RE Project]

Add new text as follows:

RP

### On-Site Renewable Energy

**RP101 SCOPE.** These provisions shall ~~apply be applicable for new construction~~ where on-site renewable energy is required.

#### **RP102 GENERAL DEFINITION.**

**POTENTIAL SOLAR ZONE AREA.** The combined area of any steep-sloped roofs oriented between 90 degrees and 300 degrees of true north and any low-sloped roofs where the *annual solar access* is 70 percent or greater.

**ANNUAL SOLAR ACCESS.** The ratio of annual solar insolation with shade to the annual solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall ~~are not be included in the determination of annual solar access.~~ Shading from existing permanent natural or person-made obstructions that are external to the building, including but not limited to trees, hills, and adjacent structures, ~~shall be considered~~ **are included in** for annual solar access calculations.

**PHYSICAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT.** A contract for the purchase of renewable electricity from a specific renewable electricity generator to a purchaser of renewable electricity.

RP103

### ON-SITE RENEWABLE ENERGY

**RP103.1 General.** ~~The New buildings~~ shall comply with R401.2 and the requirements of this Section. ~~RP403-4 through RP403-6~~

**RP103.2** ~~One and two family dwellings and townhouses and other R3 Occupancies. Install an on-site renewable energy system with a nameplate DC power rating measured under standard test conditions, of not less than 2kW.~~

**Exceptions:**

- ~~1. A building with a permanently installed domestic solar water heating system with a solar savings fraction of not less than 0.5.~~
- ~~2. A building in climate zone 4C, 5C or 8~~
- ~~3. A building where the potential solar zone area is less than 300 square feet (28 m<sup>2</sup>)~~

**RP103.3 Group R2 and R4 Occupancies.** ~~Buildings containing Group R-2 or R-4 shall install an on-site renewable energy system with a peak rated capacity calculated to be of not less than 0.75 W/ft<sup>2</sup> multiplied by the gross conditioned floor area.~~

**Exceptions:**

- ~~1. A building with a permanently installed domestic solar water heating system with a solar savings fraction of not less than 0.5.~~

2— A building in climate zone 8.

3— A building where the potential solar zone area is less than 300 square feet(28 m²).

**RP103.1.1 Installed Capacity** An *on-site renewable energy* system shall be installed on, or at the site of, the building with a peak rated capacity, measured under standard test conditions, in accordance with one of the following:

1. For one- and two- family dwellings, townhouses and other Group R-3 occupancies, the peak rated capacity shall be no less than 2kW.
2. For Group R-2 or R-4 *residential buildings*, the peak rated capacity shall be no less than 0.75 W/ft2 multiplied by the gross conditioned floor area.
3. Where a building includes both commercial occupancies and R-2 or R-4 occupancies required to comply with this Code, the peak capacity shall be no less than 0.75 W/ft2 multiplied by the gross conditioned floor area of the Group R-2 and R-4 occupancies.

The capacity of installed *on-site renewable energy* systems used to comply with this Appendix shall be in addition to the total capacity of installed *on-site renewable energy* systems used to comply with all other requirements of this Code.

Exceptions:

1. A building with a permanently installed domestic solar water heating system sized with a solar savings fraction of not less than 0.5 based on the total service water heating load of all residential occupancies.
2. One and two family dwellings, townhouses and other Group R-3 Occupancies in climate zone 4C, 5C or 8.
3. Group R-2 or R-4 occupancies in climate zone 8.
4. Buildings where the *potential solar zone area* is less than 300 square feet (28 m²)
5. Buildings with a *physical renewable energy power purchase agreement* with a duration of not less than 15 years from a utility or a community renewable energy facility and for not less than 80 percent of the estimated whole-building electric use on an annual basis.
6. Buildings that demonstrate compliance in accordance with Section RP103.1.1.1

**RP103.1.1.1 Alternate Capacity Determination.** Where compliance is demonstrated in accordance with Section R405 Simulated Building Performance and the *proposed design* and *standard reference design* are adjusted in accordance with Items (1) and (2), the required capacity of the installed renewable energy systems shall be permitted to differ.

1. **Proposed Design.** Where applicable, the *proposed design* shall comply with one of the following:
  - a. Where one or more systems providing *on-site renewable energy* are included in the *construction documents*, the systems shall be modeled in the *proposed design* with a design capacity not greater than the required capacity in accordance with Section RP103.1.1. A combination of *on-site renewable energy* systems shall be permitted to be included in the *proposed design*.
  - b. Where no *on-site renewable energy* systems are specified in the *construction documents*, no *on-site renewable energy* systems shall be modeled in the *proposed design*.
2. **Standard Reference Design.** Where applicable, the *standard reference design* shall comply with one of the following:
  - a. Where a *proposed design* includes one or more *on-site renewable energy* systems the same systems shall be modeled identically in the *standard reference design* except the total rated capacity of all systems shall be equal to the required capacity in accordance with Section RP103.1.1. Where more than one type of *on-site renewable energy* system is modeled, the total capacity of each system shall be allocated in the same proportion as in the *proposed design*.
  - b. Where the *proposed design* does not include any *on-site renewable energy* systems, an unshaded photovoltaic system shall be modeled in the *standard reference design* in accordance with the performance criteria in Table RP103.1.1.1(1)

**TABLE RP103.1.1.1(1)**  
**PERFORMANCE CRITERIA for STANDARD REFERENCE DESIGN PHOTOVOLTAIC SYSTEMS**

<b>Criteria</b>	<b>Design model</b>
Size:	Rated capacity no less than required in accordance with Section RP103.1.1.



<u>Module Type</u>	<u>Crystalline-0.37%/°C, Crystalline Silicon Panel with a glass cover, 19.1% nominal efficiency and temperature coefficient (Tc Power) of -0.37%/°C.</u>
<u>Array Type:</u>	<u>Rack mounted array with installed nominal operating cell temperature (INOCT) of 103°F (45°C).</u>
<u>Total System Losses (DC output):</u>	<u>11.3%.</u>
<u>Tilt:</u>	<u>0-degrees (mounted horizontally).</u>
<u>Azimuth:</u>	<u>180 degrees.</u>

**RP103.1.24 Renewable energy certificate (REC) documentation. Where RECs are associated with renewable energy power production required by Section RP103.2 or RP103.3, documentation shall comply with Section R404.4 Renewable energy certificate (REC) documentation.**

**RP103.1.3 ERI With OPP Requirements. Where compliance is demonstrated in accordance with Section R406.5 using the Energy Rating Index With OPP, a project shall comply with the requirements of this Appendix if the rated proposed design and confirmed built dwelling are shown to have an ERI less than or equal to the values in Table RP103.1.3.**

**TABLE RP103.1.3**  
**MAXIMUM ENERGY RATING INDEX INCLUDING OPP**

<u>CLIMATE ZONE</u>	<u>ENERGY RATING INDEX WITH OPP</u>
<u>0-1</u>	<u>35</u>
<u>2</u>	<u>34</u>
<u>3</u>	<u>33</u>
<u>4</u>	<u>40</u>
<u>5</u>	<u>43</u>
<u>6</u>	<u>43</u>
<u>7 &amp; 8</u>	<u>46</u>

**RP103.5 Total Building Performance. Where new buildings demonstrate compliance using Section R405 Total Building Performance, the applicable requirements of RP103.2, RP103.3 and RP103.4 shall be met.**

**RP103.6 Energy Rating Index. Where new buildings demonstrate compliance using Section R406 Energy Rating Index, the applicable requirements of RP103.2, RP103.3 and RP103.4 shall be met.**

Reason: On-site electricity generation using photovoltaics is a key technology for reducing greenhouse gas emissions associated with Commercial and Residential buildings. According to the most recent assessment by the National Renewable Energy Lab (NREL) the cost of installed photovoltaics in 2020 was 3% lower than in 2019 and 65-70% lower than the cost of similar sized systems in 2010. With the continued drop in cost of installing on-site PV the cost per kilowatt hour of PV generated electricity is at parity with grid purchased electricity in many States throughout the country. This proposal describes requirements for prescriptive solar PV that must be installed at the time of construction. Analysis by PNNL shows that on-site renewable electricity generation is cost effective across all low-rise multifamily buildings and most single family and one or two unit townhouses. The analysis was done using each of the Residential prototypes in each ASHRAE climate zone. The capacity requirements were established by calculating the highest on-site solar PV capacity that limited electricity export back to the grid. The threshold used for determining these capacities was a grid export limit of less than 0.5% of total annual building electricity consumption. A review of the hourly results showed it was unrealistic to set a hard limit of zero overproduction. When calculating cost effectiveness no credit was taken for electricity that was exported back to the grid. The calculation of grid exports was done on an hourly basis. The proposed requirements reduce purchased energy from the electrical grid which will help reduce green house gas emissions and energy costs for building owners.

PVs provide substantial benefits to the consumer and society by helping to reduce GHG emissions

associated with electricity generation. PV market growth combined with a cleaner grid will support goals of reduced GHG emissions established across the U.S. and others by federal agencies, as well as many states and local governments.

This public comment is in direct response to the feedback provided by the full Residential Committee that REPI-114 be brought back as an optional Appendix.

**Cost Impact: The code change proposal will increase the cost of construction.**

PNNL prepared a cost effectiveness analysis of the proposed changes as part of the original REPI-114 submission in October 2021. This original analysis of residential building solar PV cost effectiveness was calculated using the Life Cycle Cost methodology established by Pacific Northwest National Lab for determining National and State cost effectiveness of the 2021 International Energy Conservation Code. The DOE methodology accounts for the benefits of energy-efficient home construction over the life of a typical mortgage, balancing initial costs against longer term energy savings. The Life-Cycle Cost methodology provides a full accounting over a 30-year period of the cost savings, considering energy savings, the initial investment financed through increased mortgage costs, tax impacts, and residual values of energy efficiency measures. The installed cost of solar PV was based on costs reported in the U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020 published by NREL in 2021. Installed costs were scaled based on solar PV capacity from 2kW up to 200kW and applied based on the calculated capacity required for each prototype in each climate zone. The proposed solar PV capacities were shown to be cost effective for R occupancies in each ASHRAE climate zone except for climate zone 8 and for single family residences in all climate zones except 4C, 5C and 8. An updated analysis was provided to the full committee in May 2022 using the IECC Residential cost effectiveness methodology. The results of that analysis by climate zone are provided below. The analysis has not been updated to reflect any change in the national average cost of small-scale renewables or to capture the impact of the Inflation Reduction Act passed in November 2022 that included renewable tax credits through 2032.

Single Family Dwellings	1A	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
PV Capacity (kW)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PV Generation (kWh)	3,189	3,082	3,480	3,000	3,651	3,458	2,669	3,593	2,304	2,510	3,154	2,355	2,611	2,775	2,444	1,885
PV Cost @ 3.55	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100	\$ 7,100
<b>IECC Cost effectiveness @ \$3.55 per Watt</b>																
3.84% Real w/o SCC	\$2,956	\$2,617	\$3,881	\$2,356	\$4,424	\$3,811	\$1,305	\$4,239	\$146	\$800	\$2,845	\$308	\$1,121	\$1,642	\$591	(\$1,185)
3% Real w/o SCC	\$2,164	\$1,884	\$2,927	\$1,669	\$3,374	\$2,869	\$802	\$3,223	(\$154)	\$386	\$2,073	(\$20)	\$650	\$1,080	\$213	(\$1,251)
7% Real w/o SCC	\$871	\$692	\$1,358	\$555	\$1,645	\$1,321	\$0,30	\$1,547	(\$611)	(\$266)	\$812	(\$525)	(\$97)	\$178	(\$376)	(\$1,312)
3.84% Real w/ SCC	\$4,542	\$4,149	\$5,611	\$3,848	\$6,239	\$5,531	\$2,632	\$6,026	\$1,292	\$2,048	\$4,414	\$1,479	\$2,419	\$3,022	\$1,806	(\$247)
3% Real w/ SCC	\$3,750	\$3,417	\$4,657	\$3,161	\$5,190	\$4,589	\$2,130	\$5,009	\$992	\$1,634	\$3,641	\$1,151	\$1,949	\$2,460	\$1,428	(\$314)
7% Real w/ SCC	\$2,457	\$2,225	\$3,089	\$2,047	\$3,460	\$3,041	\$1,328	\$3,334	\$535	\$982	\$2,381	\$646	\$1,202	\$1,558	\$839	(\$375)
<b>Low-Rise Multifamily</b>																
PV Capacity (kW)	16.22	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
PV Generation (kWh)	25,921	25,050	28,286	24,388	29,675	28,108	21,699	29,208	18,728	20,403	25,634	19,145	21,221	22,554	19,863	15,322
PV Cost @ 2.26/W	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673	\$ 36,673
<b>IECC Cost effectiveness @ \$2.26 per Watt</b>																
3.84% Real w/o SCC	\$45,279	\$42,513	\$52,789	\$40,410	\$57,201	\$52,224	\$31,871	\$55,717	\$22,436	\$27,755	\$44,367	\$23,760	\$30,353	\$34,586	\$26,040	\$11,619
3% Real w/o SCC	\$35,929	\$33,648	\$42,124	\$31,914	\$45,762	\$41,658	\$24,871	\$44,539	\$17,089	\$21,476	\$35,177	\$18,181	\$23,619	\$27,110	\$20,062	\$8,167
7% Real w/o SCC	\$20,320	\$18,862	\$24,280	\$17,753	\$26,606	\$23,982	\$13,251	\$25,824	\$8,276	\$11,081	\$19,840	\$8,975	\$12,451	\$14,683	\$10,177	\$2,574
3.84% Real w/ SCC	\$58,170	\$54,971	\$66,857	\$52,539	\$71,959	\$66,203	\$42,663	\$70,244	\$31,750	\$37,902	\$57,116	\$33,281	\$40,907	\$45,803	\$35,919	\$19,239
3% Real w/ SCC	\$48,821	\$46,106	\$56,192	\$44,043	\$60,521	\$55,637	\$35,662	\$59,065	\$26,403	\$31,623	\$47,926	\$27,702	\$34,173	\$38,327	\$29,940	\$15,788
7% Real w/ SCC	\$33,212	\$31,320	\$38,348	\$29,883	\$41,364	\$37,961	\$24,043	\$40,350	\$17,591	\$21,228	\$32,589	\$18,496	\$23,005	\$25,900	\$20,056	\$10,194
The installed cost of photovoltaic systems was based on published NREL cost data that was further adjusted to account for streamlined permitting under the NREL SolarApp+ program and to account for differences between retrofit and new construction costs. A cost of \$3.55 per installed watt was used for 2kW array capacity and \$2.26 per installed watt was used for a 16kW array capacity.																

## Workgroup Recommendation

Proposal # 1363

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## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-4-22 R404.6.2 Solar-ready zone
CDP ID #	
Code	IRC
Code Section(s)	R404.6.2
Location	Body
Proponent	Kris Stenger
Proposal Status	
Subcommittee	
Subcommittee Notes	The committee discussed changes proposed in RED1-140 and RED1-169 before voting on RECD1-4-22 to remove references to the commercial code. The committee felt that this proposal successfully combined the elements of past committee work and brought clarity to the section.
Recommendation	Motion to approve as modified, JC, 2 <sup>nd</sup> BR (12-0-0)
Vote	12-0-0
Recommendation Date	04032023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

**RECD1-4-22 As Modified** (note: any approved RED1s to R404.6.1 would take precedence) (Yellow Highlights are committee meeting floor modifications)

## 2024 International Energy Conservation Code [RE Project]

### CHAPTER 2 [RE] DEFINITIONS

**ON-SITE RENEWABLE ENERGY.** Energy from renewable energy resources harvested at the building site.

**SOLAR-READY ZONE.** A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

### CHAPTER 4 [RE] RESIDENTIAL ENERGY EFFICIENCY

**R404.6 Renewable energy infrastructure.** The building shall comply with the requirements of R404.6.1 or R404.6.2.

**R404.6.1 One- and two- family dwellings and townhouses.** One- and two-family dwellings and townhouses shall comply with Sections R404.6.1.1 through R404.6.1.4.

#### Exceptions:

1. A dwelling unit with a permanently installed, on-site renewable energy system.
2. A dwelling unit with a solar-ready zone area that is less than 500 square feet (46 m<sup>2</sup>) of roof area oriented between 110 degrees and 270 degrees of true north.
3. A dwelling unit with less than 500 square feet (46m<sup>2</sup>) of roof area oriented between 110 degrees and 270 degrees of true north.
4. Dwelling units where 50 percent of the solar-ready zone area is shaded from direct-beam sunlight by natural objects or by structures that are not part of the building for more than 2500 annual hours between 8:00 a.m. and 4:00 p.m.
5. A dwelling unit that complies with Appendix RC.
6. A dwelling unit with a renewable energy power purchase agreement with a duration of not less than 15 years from a utility or a community renewable energy facility and for not less than 80 percent of the estimated ~~dwelling unit whole-building~~ electric use on an annual basis.
7. A dwelling unit ~~with~~ less than or equal to 1,500 square feet (139 m<sup>2</sup>) of living space ~~floor-area~~ located above grade plane.

**R404.6.1.1 Solar-ready zone area.** The total area of the solar-ready zone shall not be less than 250 square feet (23.2 m<sup>2</sup>) and shall be composed of areas not less than 5.5 feet (1676 mm) in one direction and not less than 80 square feet (7.4 m<sup>2</sup>) exclusive of access or set back areas as required by the *International Residential Code*.

**Exception:** Dwelling units in townhouses three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (186 m<sup>2</sup>) per dwelling shall be permitted to have a solar-ready zone area of not less than 150 square feet (14 m<sup>2</sup>).

**R404.6.1.2 Obstructions.** Solar-ready zones shall be free from obstructions, including but not limited to vents, chimneys, and roof-mounted equipment.

**R404.6.1.3 Electrical service reserved space.** The main electrical service panel shall have a reserved space for a dual pole circuit breaker and shall be labeled "For Future Solar Electric." The reserved space shall be at the opposite (load) end of the busbar from the primary energy source.

**R404.6.1.4 Electrical interconnection.** An electrical junction box shall be installed within 24 inches (610 mm) of the main electrical service panel and shall be connected to a capped roof penetration sleeve or a location in the attic that is within 3 feet (914 mm) of the solar-ready zone by a minimum 1 inch (25 mm) nonflexible metallic conduit or permanently installed wire as approved by the code official. Where the interconnection terminates in the attic, location shall be no less than 12 inches (35 mm) above ceiling insulation. Both ends of the interconnection shall be labeled "For Future Solar Electric".

Revise as follows:

**R404.6.2 Group R occupancies.** Residential buildings other than one- and two-family dwellings and townhouses Buildings in Group R-2, R-3 and R-4 shall comply with the requirements of Sections R404.6.2.1 through R404.6.2.8 Appendix CB.

**R404.6.2.1 General.** A solar-ready zone shall be located on the roof of residential buildings that are three stories or less in height above grade plane, and are oriented between 110 degrees and 270 degrees of true north or have low-slope roofs. Solar-ready zones shall comply with Sections R404.6.2.2 through R404.6.2.8.

**Exceptions:**

1. A building with a permanently installed, on-site renewable energy system.
2. A building with a solar-ready zone area that is shaded for more than 70 percent of daylight hours annually.
3. A building where an approved party certifies that the incident solar radiation available to the building is not suitable for a solar-ready zone.
4. A building where an approved party certifies that the solar-ready zone area required by Section R404.6.2.3 cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas or other obstructions.
5. A building that complies with Appendix RC.
6. A building with a renewable energy power purchase agreement with a duration of not less than 15 years from a utility or a community renewable energy facility and for not less than 80 percent of the estimated electric use of the Residential occupancy portion of the building whole-building electric use on an annual basis.

**R404.6.2.2 Construction document requirements for a solar-ready zone.** Construction documents shall indicate the solar-ready zone.

**R404.6.2.3 Solar-ready zone area.** The total solar-ready zone area shall be not less than 40 percent of the roof area calculated as the horizontally projected gross roof area less the area covered by penthouses, mechanical equipment, rooftop structures, skylights, occupied roof

decks, vegetative roof areas and mandatory access or set back areas as required by the International Fire Code. The solar-ready zone shall be a single area or smaller, separated sub-zone areas. Each sub-zone shall be not less than 5 feet (1524 mm) in width in the narrowest dimension.

**R404.6.2.4 Obstructions.** Solar-ready zones shall be free from obstructions, including pipes, vents, ducts, HVAC equipment, skylights and roof-mounted equipment.

**R404.6.2.5 Roof loads and documentation.** A collateral dead load of not less than 5 pounds per square foot (5 psf) (24.41 kg/m<sup>2</sup>) shall be included in the gravity and lateral design calculations for the solar-ready zone. The structural design loads for roof dead load and roof live load shall be indicated on the construction documents.

**R404.6.2.6 Interconnection pathway.** Construction documents shall indicate pathways for routing of conduit or plumbing from the solar-ready zone to the electrical service panel or service hot water system.

**R404.6.2.7 Electrical service reserved space.** The main electrical service panel shall have a reserved space to allow installation of a dual-pole circuit breaker for future solar electric and shall be labeled "For Future Solar-Renewable Electric." The reserved spaces shall be positioned at the end of the panel that is opposite from the panel supply conductor connection.

**R404.6.2.8 Construction documentation certificate.** A permanent certificate, indicating the solar-ready zone and other requirements of this section, shall be posted near the electrical distribution panel, water heater or other conspicuous location by the builder or registered design professional.

**Reason:** We cannot point to an Appendix for requirements; the requirements have to be stated in the section itself. This proposal takes the requirements from the referenced Appendix CB and copies it into the R404.6.2 section. There are some edits to consider, given that the R404.6.1 section that applies to other residential buildings does not contain some of these sub-sections, as they are covered in R103 and R401.

**Cost Impact:** None. Rather than pointing to an Appendix for a requirement, it brings the requirement text into the actual section.

**Bibliography:** Appendix CB from 2024 IECC-C, 1<sup>st</sup> public comment draft [[https://www.iccsafe.org/wp-content/uploads/IECC2024P1CE\\_2022-09-07-clean-gray-red2.pdf](https://www.iccsafe.org/wp-content/uploads/IECC2024P1CE_2022-09-07-clean-gray-red2.pdf)]



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-140-22 R404.6.2 Group R Occupancies
CDP ID #	
Code	IRC
Code Section(s)	R404.6.2
Location	Body
Proponent	Greg Johnson
Proposal Status	
Subcommittee	
Subcommittee Notes	Given previous committee action on RECD1-4-22, this proposal is no longer necessary.
Recommendation	Motion to disapprove RED1-140-22, BR, 2 <sup>nd</sup> MJ (12-0-0)
Vote	12-0-0
Recommendation Date	04032023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-169-22 R404.6.2 and sections of Appendix RB
CDP ID #	
Code	IRC
Code Section(s)	R404.6.2
Location	Body
Proponent	Greg Johnson
Proposal Status	
Subcommittee	
Subcommittee Notes	Given previous committee action on RECD1-4-22, this proposal is no longer necessary.
Recommendation	Motion to Disapprove RED1-169-22, JC, 2 <sup>nd</sup> BR (12-0-0)
Vote	12-0-0
Recommendation Date	04032023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-277-22
CDP ID #	1134
Code	IECC RE
Code Section(s)	Delete Definition, Revise section R503.1.5
Location	Body
Proponent	Jay Crandell, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)
Proposal Status	
Subcommittee	RE Existing Bldg
Subcommittee Notes	Motion approval as submitted  Reason: Deletes an unneeded definition. If full committee passes RED1-263-22 any coordination issues can be cleaned up in the development round
Recommendation	Approval as submitted
Vote	7-0
Recommendation Date	4/5/23
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____  To Subcommittee _____
Date	



## Code Change Proposal Tracking Sheet

Proposal #	RED1-264-22
CDP ID #	1276
Code	IECC RE
Code Section(s)	Add new and delete definition, revise sections R501.2, R501.7. Delete section R501.4
Location	Body
Proponent	Patricia Chawla, representing Austin Energy (patricia.chawla@austinenergy.com)
Proposal Status	
Subcommittee	RE Existing Bldg
Subcommittee Notes	Motion approval as modified. See modification on next page  Reason: Proposal coordinates and improves code by combining two sections with the same name and similar requirements. Adding a new definition for existing building.
Recommendation	Approval as modified
Vote	6-1
Recommendation Date	4/5/23
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____  To Subcommittee _____
Date	

**RED1-264-22**

**Proponents:** Patricia Chawla, representing Austin Energy (patricia.chawla@austinenergy.com)

## 2024 International Energy Conservation Code [RE Project]

Revise as follows:

Add new definition as follows:

**EXISTING BUILDING.** A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

Revise as follows:

~~**EXISTING STRUCTURE.** A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.~~

Revise as follows:

**R501.2 Compliance.** *Additions, alterations, repairs* or changes of occupancy to, or relocation of, an existing building, building system or portion thereof shall comply with Section R502, R503, R504 or R505, respectively, in this code and the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in the International Residential Code, International Building Code, International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code and NFPA 70 as applicable. Changes where unconditioned space is changed to conditioned space shall comply with Section R502 R501.6.

~~**R501.4 Compliance.** Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in this code and the International Residential Code, International Building Code, International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code and NFPA 70.~~

**~~R501.5~~ R501.4** New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs, provided that hazards to life, health or property are not created. Hazardous materials shall not be used where the code for new construction would not allow their use in buildings of similar occupancy, purpose and location.

**~~R501.6~~ R501.5** Historic buildings. Provisions of this code relating to the construction, repair, alteration, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings provided that a report has been submitted to the code official and signed by the owner, a registered design professional, or a representative of the State Historic Preservation Office or the historic preservation authority having jurisdiction, demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the building.

**~~R501.7~~ R501.6 Change in space conditioning.** Any unconditioned or low-energy space that is altered to become conditioned space shall be required to be brought into full compliance with this code **Section 502** **502**.

**Exception:** Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost otherwise allowed by Section R405.2.

**R503.1.1.2** Roof alterations. Roof insulation ~~shall comply~~ ~~complying~~ with Section R402.1 or an approved design ~~shall be~~ provided for the following roof alteration conditions as applicable:

1. An alteration to roof-ceiling construction where there is no insulation above conditioned space.
2. Roof replacements for roofs with insulation entirely above deck,

**Exceptions:** Where compliance with Section R402.1 cannot be met due to limiting conditions on an existing roof, the following shall be permitted to demonstrate compliance with the insulation requirements:

1. Construction documents that include a report by a registered design professional or other approved source documenting details of the limiting conditions affecting compliance with the insulation requirements.
2. Construction documents that include a roof design by a registered design professional or other ~~approved~~ *approved* source that minimize deviation
3. from the insulation requirements.
4. Conversion of an unconditioned attic space into conditioned space, and
5. Replacement of ceiling finishes exposing cavities or surfaces of the roof-ceiling construction to which insulation can be applied.

Where any of the above requirements are applicable, the above-grade wall alteration shall comply with the insulation and water vapor retarder requirements of Section R702.7 of the International Residential Code. Where the exterior wall coverings are removed and replaced, the above-grade wall alteration shall comply with the water and wind resistance requirements of Section R703.1.1 of the International Residential Code.

**R503.1.1.5** Below-grade wall alterations. Where a ~~below~~ below-grade space is changed to conditioned space, the below-grade walls shall be insulated where required in accordance with Section R402.1. Where the below-grade space is conditioned space and a below-grade wall is altered by removing or adding interior finishes, it shall be insulated where required in accordance with Section R402.1.

**R505.1 General.** Any space that is converted to a dwelling unit or portion thereof from another use or occupancy shall comply with this ~~code~~ chapter.

**Exception:** Where the simulated building performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost allowed by Section R405.2.

**R505.1.1** Unconditioned space. Any unconditioned or low-energy space that is altered to become a conditioned space shall comply with Section ~~R502 R501.7~~ R501.6.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-10-22
CDP ID #	
Code	IECC RE
Code Section(s)	R503.1.2, R503.1.2.1
Location	base
Proponent	Gil Rossmiller, representing IECC RE Existing buildings subcommittee
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	<p>Motion approval as submitted</p> <p>Reason: Deletes "To an addition" in both sections. Having "addition" in the alteration section adds confusion. Removing provides clarity to the code.</p>

Recommendation	Approve as submitted
Vote	7-0
Recommendation Date	4/5/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-263-22
CDP ID #	1085
Code	IECC RE
Code Section(s)	New Definition, Table R408.2, New section R408.2.10, Revise sections R502.2.5 and R503.1.5
Location	base
Proponent	Sean Denniston, representing New Buildings Institute (sean@newbuildings.org)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
	Motion approval as submitted  Reason: Proposal improves Code by including flexibility of the additional energy efficiency table.
Recommendation	Approval as submitted
Vote	4-3
Recommendation Date	4/5/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____  To Subcommittee _____



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RECD1-5-22
CDP ID #	
Code	IECC RE
Code Section(s)	R501.1.1 General
Location	base
Proponent	Gil Rossmiller, Seth Wiley representing IECC RE Existing Building subcommittee
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	<p>Motion to disapprove</p> <p>Reason:          The term fossil fuel is misleading, and the net result will not improve energy efficiency. Wiley comments that very happy to take comments into account and bring proposal to next meeting. Zengell comments again about concerns as stated previously. Swoape comments that the term fossil fuel is misleading citing examples of fuel sources including renewable natural gas. Wiley comments that renewable natural gas is not a fossil fuel. Swoape agrees that renewable natural gas is not a fossil fuel.</p>

Recommendation	Disapproval
Vote	4 votes in favor 3 against
Recommendation Date	3/28/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____ X _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-266-22
CDP ID #	1003
Code	IECC RE
Code Section(s)	R502.1 Additions
Location	base
Proponent	Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
	<p>Motion for Disapproval</p> <p>Reason: Language is not standard code language and terminology has discrepancies. Additions would need to be basically zero energy to comply in the performance option &amp; that would like to see proposal come back in the next round.</p>
Recommendation	Disapproval
Vote	6 in favor of disapproval. 1 against.
Recommendation Date	3/28/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____ <b>Y</b>
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-273-22
CDP ID #	1360
Code	IECC RE
Code Section(s)	R503.1.1.3 Above-grade wall alterations.
Location	base
Proponent	Vladimir Kochkin, representing NAHB (vkochkin@nahb.org)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	<p>Motion Approved as modified by the committee. See modification on sheet 3</p> <p>Reason:            Proposal provides flexibility for construction affecting existing structures – especially with regard to wall assemblies, exterior finishes, and not disturbing existing construction outside scope of work as well as providing for coordination with existing construction.</p>

Recommendation	Approved as modified by the committee
Vote	7 votes in favor. 0 against.
Recommendation Date	3/28/2023
Next Step	To Subcommittee _____ To Advisory Group _____ To Consensus Committee _____
Consensus Committee	

Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	

## MOD for RED1-273-22

As modified in Sub Committee meeting 3/21/2023

**R503.1.1.3 Above-grade wall alterations.** Above-grade wall alterations shall comply with the following ~~requirements~~ as applicable:

1. Where interior finishes are removed ~~exposing and~~ wall cavities ~~are exposed~~, the ~~existing exposed cavities cavity~~ shall be filled with existing or new insulation complying with Section R303.1.4 ~~and an interior vapor retarder shall be provided where required in accordance with Section R702.7 of the International Residential Code.~~

2. Where exterior wall coverings and fenestration are removed and replaced for the full extent of any exterior wall assembly, continuous insulation shall be provided where required in accordance with Section R402.1 or ~~the wall insulation shall be in accordance with an approved design that minimizes deviation from Section R402.1.;~~ ~~Exception: where Class I vapor retarder is present in the existing wall assembly, the alteration shall be exempt from the~~ ~~Where specified, the continuous insulation requirement also shall comply with Section R702.7 of the International Residential Code.~~ Replacement exterior wall coverings shall comply with the water resistance requirements of Section R703.1.1 of the *International Residential Code* and manufacturers' instructions.

~~3. Where Items 1 and 2 apply, the entire wall assembly shall be insulated in accordance with Section R402.1; and,~~

~~34.~~ Where new interior finishes or exterior wall coverings are applied to the full extent of any exterior wall assembly of mass construction, insulation shall be provided where required in accordance with Section R402.1 or an approved design ~~that minimizes deviation from Section R402.1.~~

~~Where any of the above requirements are implemented applicable and resulted in a change of the vapor retarder classification, the above-grade wall alteration shall comply~~

~~with the insulation and water vapor retarder requirements of Section R702.7 of the International Residential Code. Where the exterior wall coverings are removed and replaced, the above-grade wall alteration shall comply with the water and wind resistance requirements of Section R703.1.1 of the International Residential Code.~~

~~**Exception:** Where the existing backing material does not meet the requirements of R703.1.2 for new construction, the alteration shall not reduce the water resistance and wind resistance of the wall assembly.~~





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-002-22 Approved source
CDP ID #	1106
Code	IECC RE
Code Section(s)	Chapter 2
Location	base
Proponent	Fredric Zwerg fredric.zwerg@swgas.com
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	Proposal does not address all of the places in the code where the term is used.
Recommendation	Disapproval
Vote	5-0-0
Recommendation Date	3.01.2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee <input checked="" type="checkbox"/> _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-016-22 Approved third-party inspection agencies
CDP ID #	1004
Code	IECC RE
Code Section(s)	R105.4
Location	base
Proponent	Robby Schwarz robby@btankinc.com
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	Proposal was tabled for several meetings to work on language. Proponent brought back proposal with amendments. Provides better guidance to utilize 3 <sup>rd</sup> party inspection agencies to comply with the code. There were concerns raised by some in attendance that will likely address during the PC2 period.
Recommendation	Table until 3-1-2023 meeting From 3-1-2023 meeting: Table until 3.15.2023 meeting  3-15-2023: Approve as modified.
Vote	4-0-0
Recommendation Date	3-15-2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	
Vote	Affirmative _____ Negative _____ Table _____  To Subcommittee _____
Date	

## RED1-16-22 – Modification

Proponents: Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)

### 2024 International Energy Conservation Code [RE Project]

#### Existing definition in the IECC – no modification

**APPROVED AGENCY.** An established and recognized agency that is regularly engaged in conducting tests furnishing inspection services, or furnishing product certification, where such agency has been *approved* by the *code official*.

#### Add Definition as Follows

**Approved Third Party Inspection agency:** A business, organization, or individual that is competent, independent and is used when the *building official* requires the *owner* to employ a special inspector to develop *compliance documentation*, perform compliance testing, or inspect during construction, specific work as described in this code.

#### Add definition from IBC

**OWNER.** Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

**SPECIAL INSPECTION.** Inspection of construction requiring the expertise of an *approved special inspector*, *approved agency*, or *approved third party inspection agency* in order to ensure compliance with this code and the approved *construction and compliance documents*.

**SPECIAL INSPECTOR.** A qualified person employed or retained by an *approved agency* or *approved third party inspection agency* and *approved* by the *building official* as having the competence necessary to inspect a particular type of construction requiring *special inspection*.

#### SECTION R105 INSPECTIONS

**R105.4 Approved third-party inspection agencies.** The *code official* is authorized to accept reports of third-party inspection agencies ~~not affiliated with the *building design* or *construction*,~~ provided that such agencies are *approved* as to qualifications and reliability relevant to the *building* components and systems that they are inspecting or testing, and authorization is given prior to issuance of the building permit.

**R105.4.1 Authorization of approved third-party inspection agency.** An approved third-party inspection agency shall provide all information as necessary, upon request, for the code official to determine that the agency meets the applicable requirements specified in Sections R105.4.1.1 through R105.4.1.3 and to authorize their work in the jurisdiction.

**R105.4.1.1 Independence.** An approved third-party inspection agency shall be an objective, competent, and independent business identity. The agency shall perform their duties per the express guidance of the code official. The agency shall disclose to the code official any conflicts of interest including where fees for service are derived. The agency shall explicitly understand that they are only able to work within the jurisdiction giving approval if approval is granted. If approval is revoked the code official may reestablish approval at their discretion.

**R105.4.1.2 Equipment.** An approved third-party inspection agency shall have adequate equipment to perform inspections and tests required by the code official and this code. All testing equipment shall be periodically calibrated as required by the manufacturer, testing standards used in this code, or certifications held by the approved agency.

**R105.4.1.3 Personnel.** An approved third-party inspection agency shall ensure employed personnel are properly trained, and upon request, be able to provide written documentation to the code official demonstrating the competence and relevant experience or training of special inspectors who generate compliance documentation, perform the special inspections, and tests during construction.

**R105.4.1.4 Authorization.** Upon approval of the building official the approved third-party inspection agency shall have the authority to pass or fail delegated inspections and tests required by this code.

**R105.4.2 Approved third-party inspections reporting.** Approved third-party inspection agencies shall keep records of special inspections, tests, and compliance documentation required by this code and created by the approved third-party inspection agency or special inspector. The approved agency shall submit reports of special inspections and tests to the code official and to the owner or owner's representative. Reports shall indicate that work inspected or tested was or was not completed in conformance to the approved construction documents or the requirements of this code. A final report documenting required special inspections and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted, along with other required compliance documentation, at a point in time agreed upon prior to the start of work by the approved third-party inspection agency and the building official.

Reason Statements:

In relation to the International Energy Conservation Code, third-party inspection agencies and building officials currently have a variety of ideas regarding what should constitute the work of the agency. For the ERI path, for example, many

Raters understand that they must develop an ERI score, but do not fully understand their relationship to inspection of other requirements in the IECC. Jurisdictions having authority, are often either abdicating inspections or believe that Rater's are looking at mandatory inspection items. In addition, the creation of a HERS Index score is different from the creation of an ERI score for code compliance. A HERS Index score is an asset rating which allows for the derating of the R-value of poorly installed insulation in the energy model, as the objective is to benchmark the energy performance of the home on the HERS Index scale as it was built. An IECC ERI evaluation of the installation of Insulation does not allow for the deration of poorly installed insulation. If insulation is not installed in accordance with the manufactures instruction and the guidance given in Table R402.4.1.1, then the installation should fail inspection and be reinstalled until it meets the mandatory requirement of the code. This disconnect in understanding is the genesis of this code change proposal.

Members of the committee and other interested parties suggested that a modification be made to this proposal that looked at the Special Inspection section of the IBC. Approved agencies and Special inspections are defined and handled differently in the IRC and IBC compared to the IECC, however, there was good information in Chapter 17 Section 1703 Approvals in the IBC that was incorporated in this Modification. Section 1703 of the IBC specifically address the relationship between an approved agency and the jurisdiction having authority.

The clarity gained in the relationship between the authority having jurisdiction and the approved third-party inspection agency is crucial as we progress into more complicated and meaningful energy codes. Nationally, jurisdictions are losing experienced professionals to retirement. Consequently, more third-party inspection agencies are stepping in to fill the gap. These third-party inspection agencies tend to be solely focused on energy and are capable, and eager to work in the energy code compliance niche. They are filling a need for jurisdictions that are either understaffed or lack a desire to fully enforce the energy components of the code. This proposal clearly defines a path forward to meet the need by defining scope and responsibilities to better ensure compliance and thus achieve expected energy savings.

**Cost Impact:**

This proposal does not increase cost but better allocates dollars currently being spent to ensure that the job being undertaken by approved third party inspection agencies truly meets the needs of the authority having jurisdiction.



## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-021-22 PI Renewable energy resources
CDP ID #	1247
Code	IECC RE
Code Section(s)	R202
Location	base
Proponent	Tom Ortiz tortiz@npga.org
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	3/01/23 SC feels that RED1-21-22 P1, RED1-21-22 P2, RED1-22-22, RED1-23-22, and REPCD1-17-22 should be moved to a later meeting to be able to give the proponent and interested parties ample time to discuss the proposed changes 3/01/23 - SC Some liked where the proposal was going, but doesn't think it's ready yet. Code official needs more to enforce. Made motion to disapprove also based on consistent actions of commercial committee.
Recommendation	3/01/23 Table until 3.29.2023 meeting (unan 5-0-0) 3/29/23 Disapprove
Vote	6-1-0
Recommendation Date	3.29.2023
Next Step	To Subcommittee To Advisory Group _____ To Consensus Committee _____
Consensus Committee	
Committee Response	

Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	





## International Energy Conservation Code Code Change Proposal Tracking Sheet

Proposal #	RED1-023-22 Renewables and biomass
CDP ID #	1071
Code	IECC RE
Code Section(s)	R202
Location	base
Proponent	Diana Burk     diana@newbuildings.org
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	<p>03/01/23 SC feels that RED1-21-22 P1, RED1-21-22 P2, RED1-22-22, RED1-23-22, and REPCD1-17-22 should be moved to a later meeting to be able to give the proponent and interested parties ample time to discuss the proposed changes</p> <p>03/29/23 Similar to commercial concerns that this proposal isn't ready yet and additional work needs to be done to properly track at the code official level.</p>
Recommendation	<p>03/01/23 Table until 3.29.2023 meeting</p> <p>03/29/23 Disapproval</p>
Vote	6-0-0
Recommendation Date	3.29.2023
Next Step	<p>To Subcommittee _____</p> <p>To Advisory Group _____</p> <p>To Consensus Committee _____</p>
Consensus Committee	
Committee Response	

Vote	Affirmative _____ Negative _____ Table _____ To Subcommittee _____
Date	