

January 25, 2022

MEMO TO: CARE-67 File

F R O M: Kelly Takaya King, Chair  
Climate Action, Resilience, and Environment Committee

*Kelly T. King*

SUBJECT: **TRANSMITTAL OF INFORMATIONAL DOCUMENT RELATING TO  
THE HAWAI'I STATE ENERGY CONSERVATION CODE** (CARE-67)

The attached informational document pertains to Item 67 on the Committee's agenda.

care:misc:067afile01:ljcm

Attachment

RECEIVED AT CARE MEETING ON 1-26-2022  
COMMITTEE CHAIR KING

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LT. GOVERNOR



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**STATE OF HAWAII**  
**DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES**  
**STATE BUILDING CODE COUNCIL**

P.O. BOX 119, HONOLULU, HAWAII 96810-0119

January 14, 2021

**SUBJECT:** State Energy Code Adoption  
Adopting the 2018 International Energy Conservation Code (IECC) and  
Amendments

The attached document is the Hawai'i State Energy Code Amendments to the 2018 IECC as adopted on December 15, 2020 by the State Building Code Council in accordance with HRS 107-24.

No later than December 15, 2021, the design of all State building construction must comply with the 2018 IECC and attached amendments to the code, in accordance with HRS 107-27.

No later than December 15, 2022, each county in the State of Hawai'i must amend and adopt the 2018 IECC and attached amendments to the code, in accordance with HRS 107-28(a).

If by December 15, 2022, a county does not amend the 2018 IECC and attached amendments, it shall become applicable as an interim county energy code, in accordance with HRS 107-28(b).

State Building Code Council

Attached: Hawai'i State Energy Code Amendments to the 2018 IECC

**Hawai'i State Energy Code**

**Amendments to the**

**2018 International Energy Conservation Code**

**State Building Code Council**

**Effective Date: December 15, 2020**

Subchapter 1      Rules of General Applicability

	Page #
(1) Purpose.....	3
(2) Scope.....	3
(3) Definitions.....	3
(4) Adoption of the <i>International Energy</i> <i>Conservation Code</i> .....	3
(5) Permit authorization.....	3

Subchapter 2      Amendments to the ~~2015~~ 2018 ICC  
*International Energy Conservation Code*

	Page #
(6) Title.....	4
(7) C103 General.....	4
(8) Table C402.1.3 Opaque Thermal Envelope Component Minimum Requirements R-value Method.....	4
(9) C402.2.2 Above-grade walls.....	4
(10) Table C402.4 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements.....	5
(11) C402.4.3.5 Area-weighted SHGC.....	5
(12) C403.2.3 Door switches.....	5
(13) C405.10 Sub-metering.....	5
(14) C501.4 Compliance.....	5
(15) C503.3.1 Roof replacement.....	6
(16) R103 General.....	6
(17) R401.2 Compliance.....	6
(18) R401.2.1 Tropical zone.....	6
(19) R401.3.1 Sampling.....	7
(20) Table R402.1.2 Insulation and Fenestration Requirements by Component - Fenestration.....	7
(21) Table R402.1.2 Insulation and Fenestration Requirements by Component - Insulation.....	8
(22) R402.2 Specific insulation requirements.....	8
(23) R402.2.5 Mass wall.....	8
(24) R402.3.2 Glazed fenestration SHGC.....	8
(25) R403.5.5 Solar water heating.....	8
(26) R403.6.2 Ceiling fans.....	9
(27) Table R405.5.2(1) Simulated performance alternative	9
(28) R407.1 General and R407.2 Requirements.....	9
(29) R501.4 Compliance.....	11
(30) R503.1.1 Building envelope.....	11

**SUBCHAPTER 1****RULES OF GENERAL APPLICABILITY**

**1 Purpose.** The purpose of this chapter is to adopt the state energy conservation code as required by section 107-25, Hawaii Revised Statutes (HRS).

**2 Scope.** This chapter sets forth minimum requirements for the design and construction of buildings for the effective use of energy and is intended to provide flexibility to allow the use of innovative approaches and techniques to achieve the effective use of energy.

**3 Definitions.** In this chapter, unless the context otherwise requires:

"ICC" means the International Code Council.

"IECC Section" means a section of a chapter of the *International Energy Conservation Code*.

"IECC" means the ICC, *International Energy Conservation Code*, ~~2015~~ 2018 edition, as copyrighted by the International Code Council.

**4 Adoption of the *International Energy Conservation Code*.** The *International Energy Conservation Code*, ~~2015~~ 2018 Edition as copyrighted and published in ~~2015~~ 2017 by International Code Council, Incorporated, 500 New Jersey Avenue, 6<sup>th</sup> Floor, Washington, DC 20001, is adopted by reference and made a part of this chapter. This incorporation by reference includes all parts of the *International Energy Conservation Code* subject to the amendments hereinafter set forth. ~~The appendices of the ICC, IECC are not adopted except as provided in this chapter.~~

**5 Permit authorization.** Each county may, by ordinance, require that a permit be obtained from the building official for any area regulated by this chapter.

**SUBCHAPTER 2**

The ~~2006~~ 2015 Energy Conservation Code of the State of Hawaii shall be deleted in its entirety and replaced by the ~~2015~~ 2018 International Energy Conservation Code with the proposed amendments.

**AMENDMENTS TO THE 2015 2018 ICC INTERNATIONAL ENERGY CONSERVATION CODE**

**6 Title.** IECC Section 101.1 is amended to read as follows:

**101.1 Title.** This code shall be known as the Energy Conservation Code of the State of Hawai'i and shall be cited as such. It is referred to herein as "this code."

**7 General.** IECC Section C103.1 Sections C103 through C105 and C108 and C109 ~~is~~ are hereby deleted in its their entirety. ~~and replaced with the following:~~

**8 INSULATION COMPONENT R-Value method - IECC TABLE C402.1.3, OPAQUE THERMAL ENVELOPE INSULATION COMPONENT REQUIREMENTS, R-VALUE METHOD** is amended to read as follows:

CLIMATE ZONE 1,  
Mass walls, R-5.7 ci (footnote j)  
j. Mass walls 6" and greater in thickness are excepted from ci requirement

**9 Above-grade walls.** IECC Section C402.2.2 is amended to read as follows:

**C402.2.2 Above Grade Walls.** The minimum thermal resistance (R-value) of materials installed in the wall cavity between framing members and continuously on the walls shall be as specified in Table ~~C402.3~~ C402.1.3, based on framing type and construction materials used in the wall assembly.

**Exceptions:**

Continuous insulation for above grade ~~wood and metal-framed~~ walls and mass walls are not required when one of the following conditions are met:

1. Walls have a covering with a reflectance of  $\geq 0.64$ ; or
2. Walls have overhangs with a projection factor equal to or greater than 0.3. The projection factor is the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first-floor level to the bottom most point of the overhang.

3. Concrete, CMU and similar mass walls are 6 inches or greater in thickness.

**10 Table C402.4 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements<sup>b</sup>** is amended added to the IECC to read as follows:

<sup>b</sup>. Jalousie windows are excepted from SHGC requirements.

**11 Area-weighted SHGC.** Section C402.4.3.5 is added to the IECC to read as follows:

**C402.4.3.5 Area-weighted SHGC.** In commercial buildings, an area-weighted average of fenestration products shall be permitted to satisfy SHGC requirements.

**12 Door switches.** Section C403.2.3 is added to the IECC to read as follows:

**C403.2.3 Door switches.** Opaque and glass doors opening to the outdoors in hotel and motel sleeping units, guest suites and time-share condominiums, shall be provided with controls that disable the mechanical cooling, or reset the cooling setpoint to 90°F or greater within five minutes of the door opening. Mechanical cooling may remain enabled if the outdoor air temperature is below the space temperature.

**13 Sub-metering.** Section C405.10 is added to the IECC to read as follows:

**C405.10 Sub-metering.** In new buildings with tenants, metering shall be collected for the entire building and individually for each tenant occupying 1,000 ft<sup>2</sup> (total enclosed and unenclosed) (93 m<sup>2</sup>) or more. Tenants shall have access to data collected for their space. A tenant is defined as "one who rents or leases from a landlord."

**14 Compliance.** IECC Section C501.4 is amended to read as follows:

**C501.4 Compliance.** Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions and regulations for alterations, repairs, additions and changes of occupancy or relocation, as adopted by the authorities having jurisdiction.

**15 Roof replacement.** IECC Section C503.3.1 is amended to read as follows (note that options are provided for this amendment):

~~**C503.3.1 Roof replacement.** Roof replacements shall~~

~~comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is uninsulated and is part of the building thermal envelope.~~

**C503.3.1 Roof replacement.** Roof replacement shall comply with Section C402.1.3, C402.1.4, C402.1.5 or C407 where the existing roof assembly is part of the building thermal envelope and contains insulation entirely above the roof deck. Replacement of uninsulated roofs shall include either initial reflectance  $\geq$  85% and aged reflectance  $\geq$  75% 63% or at least two one of the following:

1. EnergyStar compliant covering
2. Radiant barrier, or
3. Attic ventilation via solar fan(s), ridge ventilation or gable vents
4. ~~Two~~ One or more exceptions in Section C402.3

**16 General.** IECC section R103.1 Sections R103 through R105 and R108 and R109 is are hereby deleted in ~~its~~ their entirety. and replaced with the following:

**17 Compliance.** IECC Section R401.2 is amended to read as follows:

**R401.2 Compliance.** Projects shall comply with one of the following:

1. Sections R401.3 through R404
2. Sections R405 and the provisions of Section R401 through R404 labeled "Mandatory."
3. An energy rating index (ERI) approach in Section R406.
4. The Tropical zone requirements in Section R401.2.1.

**18 Tropical zone.** IECC Section R401.2.1 is amended to read as follows:

**R401.2.1 Tropical zone.** *Residential buildings in the tropical zone at elevations below 2,400 feet (731.5 m) above sea level shall be deemed to comply with this chapter where the following conditions are met:*

1. Not more than one-half of the dwelling unit is air conditioned
2. The dwelling unit is not heated.
3. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy for service water heating.
4. Glazing in dwelling units shall have a maximum solar heat gain coefficient as specified in Table R402.1.2.
5. Skylights in dwelling units shall have a maximum U-factor as specified in Table R402.1.4.
6. Permanently installed lighting is in accordance with Section R404.
7. The roof/ceiling complies with one of the following options:

- a. Comply with one of the roof surface options in Table C402.3 and install R-13 insulation or greater.
- b. Install R-19 insulation or greater.
- 8. Roof surfaces have a minimum slope of  $\frac{1}{4}$  inch per foot of run. The finished roof does not have water accumulation areas.
- 9. Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each room. Alternatively, equivalent ventilation is provided by a ventilation fan.
- 10. Bedrooms with exterior walls facing two different direction have operable fenestration or exterior walls facing two different directions.
- 11. Interior doors to bedrooms are capable of being secured in the open position.
- 12. A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest space that is not used as bedroom.
- 13. Walls, floors and ceilings separating air conditioned spaces from non-air conditioned spaces shall be constructed to limit air leakage in accordance with the requirements in Table R402.4.1.1.

**19 General.** Section R401.3.1 Sampling is added to the IECC to read as follows:

**R401.3.1 Sampling.** For builders of multiple single family and multi-family units of similar construction type and envelope systems (i.e. production home building), air infiltration/duct testing may be completed by following Chapter 6 ("standard for Sampled Ratings"), of the current Residential Energy Service Network (RESNET) National Home Energy Rating System Standards.

## **20 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT.**

IECC Table R402.1.2 is added to the table:

### **Window SHGC Requirements**

<b>Projection Factor of overhang from base of average window sill</b>	<b>SHGC</b>
< .30	.25
.30 - .50	.40
≥.50	N/A

Exception: North-facing windows with pf > .20 are exempt from the SHGC requirement. Overhangs shall extend 2 feet on each side of window or to nearest wall, whichever is less.

**21 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENTS.**

IECC Table R402.1.2 is amended to read as follows:

**Climate Zone 1**

**Mass Wall R-Value:**  $\frac{3}{4}$  or NR<sup>j</sup>.

<sup>j</sup> Exception: R-value for mass walls are not required if mass walls meet one of the following requirements:

1. have a reflectance  $\geq 0.64$ .
2. have overhangs with a projection factor  $\geq 0.3$ .
3. are  $\geq 6$  inches in thickness.

**22 Specific insulation requirements (Prescriptive). IECC**

Section R402.2 is amended to read as follows:

**R402.2 Specific insulation requirements**

**(Prescriptive).** In addition to the requirements of Section R402.1, insulation shall meet the ~~specific~~ specified requirements of Sections R402.2.1 through R402.2.13.

**Exception:**

Above-grade walls and roof/ceilings shall be permitted to comply with Section R407.

**23 Mass walls. IECC Section R402.2.5** Mass walls is amended to read as follows:

1. Above-ground walls of concrete block, (concrete masonry units) CMU, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber or solid logs.
2. Any wall having a heat capacity greater than or equal to 6 Btu/ft<sup>2</sup>·°F (123 kJ/m<sup>2</sup>·K).
3. Concrete, CMU and similar mass walls are 6 inches or greater in thickness.

**24 Glazed Fenestration SHGC. IECC Section R402.3.2**

Glazed fenestration SHGC ~~shall include this exception is~~ added to the IECC to read as follows:

**Exceptions:**

2. Jalousie windows are excepted from SHGC requirements.

**25 Solar water heating. Section R403.5.5** is added to the IECC to read as follows:

**R403.5.5 Solar water heating.** Solar water heating systems are required for new single-family residential construction pursuant to section 196-6.5, HRS.

**26 Ceiling fans. Section R403.6.2** is added to the IECC to read as follows:

~~**R404.2 Ceiling fans (mandatory).** A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest space that is not used as bedroom.~~

**R403.6.2 Ceiling fans.** A ceiling fan, rough-in or whole house fan is provided for bedrooms and the largest space that is not used as a bedroom, provided that the whole house mechanical ventilation system complies with the requirements of Table R403.6.1.

**27 Points option.** Section R407 is added to the IECC to read as follows:

**SECTION R407**

**POINTS OPTION**

**R407.1 General (Prescriptive).** Above-grade walls and roof/ceiling assemblies are permitted to comply with the points option as an alternative to complying with Section R401.2.1 and R402.2.

**R407.2 Requirements.** One or more efficiency measures shall be selected for roof/ceiling and above-grade wall systems from Table R407.1 that cumulatively equal or exceed 0 (zero) points.

As an alternative, above-grade walls and roof/ceilings are permitted to comply separately by scoring 0 (zero) or greater.

**TABLE R407.1**  
**POINTS OPTION**

<u>Walls</u>		<u>Standard Home Points</u>	<u>Tropical Home Points</u>
<b><u>Wood Framed</u></b>			
	R-13 Cavity Wall Insulation	0	1
	R-19 Roof/ceiling Insulation	-1	0
	R-19 Roof/ceiling Insulation + Cool roof membrane or Radiant Barrier <sup>3</sup>	0	1
	R-19 Roof/ceiling Insulation + Attic Venting <sup>2</sup>	0	1
	R-30 Roof/ceiling Insulation	0	1
	R-13 Wall Insulation + high reflectance walls <sup>4</sup>	1	2
	R-13 Wall insulation + 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	1	2
	R-13 Wall Insulation + exterior shading wpf=0.3 <sup>6</sup>	1	2
	Ductless Air Conditioner	1	1
	1.071 X Federal Minimum SEER for Air Conditioner	1	1
	1.142 X Federal Minimum SEER for Air Conditioner	2	2
	No air conditioning	Not	2

	<u>installed</u>	<u>Applicable</u>	
	House floor area $\leq 1,000 \text{ ft}^2$	<u>1</u>	<u>1</u>
	House floor area $\geq 2,500 \text{ ft}^2$	<u>-1</u>	<u>-1</u>
	Energy Star Fans <sup>8</sup>	<u>1</u>	<u>1</u>
	Install 1 kW or greater of solar electric	<u>1</u>	<u>1</u>
<b><u>Metal Framed</u></b>			
	R-13 +R 3 Wall Insulation	<u>0</u>	<u>1</u>
	R-13 cavity Wall insulation + R-0	<u>-1</u>	<u>0</u>
	R-13 Wall Insulation + high reflectance walls <sup>4</sup>	<u>0</u>	<u>1</u>
	R-13 wall insulation+ 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	<u>1</u>	<u>2</u>
	R-13 Wall Insulation + exterior shading wpf=0.3 <sup>6</sup>	<u>0</u>	<u>1</u>
	R-30 Roof/ceiling Insulation	<u>0</u>	<u>1</u>
	R-19 Roof/ceiling Insulation	<u>-1</u>	<u>0</u>
	R-19 + Cool roof membrane <sup>1</sup> or Radiant Barrier <sup>3</sup>	<u>0</u>	<u>1</u>
	R-19 Roof/ceiling Insulation + Attic Venting <sup>2</sup>	<u>0</u>	<u>1</u>
	Ductless Air Conditioner <sup>7</sup>	<u>1</u>	<u>1</u>
	1.071 X Federal Minimum SEER for Air Conditioner	<u>1</u>	<u>1</u>
	1.142 X Federal Minimum SEER for Air Conditioner	<u>2</u>	<u>2</u>
	No air conditioning installed	<u>Not Applicable</u>	<u>2</u>
	House floor areas $\leq 1,000 \text{ ft}^2$	<u>1</u>	<u>1</u>
	House floor areas $\geq 2,500 \text{ ft}^2$	<u>-1</u>	<u>-1</u>
	Energy Star Fans <sup>8</sup>	<u>1</u>	<u>1</u>
	Install 1 kW or greater of solar electric	<u>1</u>	<u>1</u>
<b><u>Mass Walls</u></b>			
	R- 3/4 Wall Insulation	<u>0</u>	<u>1</u>
	R-0 Wall Insulation	<u>-1</u>	<u>0</u>
	R-0 Wall Insulation + high reflectance walls <sup>4</sup>	<u>0</u>	<u>1</u>
	R-0 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	<u>1</u>	<u>2</u>
	R-0 Wall Insulation + exterior shading WPF = 0.3 <sup>6</sup>	<u>0</u>	<u>1</u>
	R-19 Roof/ceiling Insulation	<u>-1</u>	<u>0</u>
	R-19 Roof/ceiling Insulation + Cool roof membrane <sup>1</sup> or Radiant Barrier <sup>3</sup>	<u>0</u>	<u>1</u>

R-19 Roof Insulation + Attic Venting	<u>0</u>	<u>1</u>
R-30 Roof Insulation	<u>0</u>	<u>1</u>
Ductless Air Conditioner <sup>7</sup>	<u>1</u>	<u>1</u>
1.071 X Federal Minimum SEER for Air Conditioner	<u>1</u>	<u>1</u>
1.142 X Federal Minimum SEER for Air Conditioner	<u>2</u>	<u>2</u>
No air conditioning installed	Not Applicable	<u>2</u>
House floor area $\leq 1,000$ ft <sup>2</sup>	<u>1</u>	<u>1</u>
House floor area $\geq 2,500$ ft <sup>2</sup>	<u>-1</u>	<u>-1</u>
Energy Star Fans <sup>8</sup>	<u>1</u>	<u>1</u>
Install 1 kW or greater of solar electric	<u>1</u>	<u>1</u>

1. Cool roof with three-year aged solar reflectance of 0.55 and 3-year aged thermal emittance of 0.75 or 3-year aged solar reflectance index of 64.
2. One cfm/ft<sup>2</sup> attic venting.
3. Radiant barrier shall have an emissivity of no greater than 0.05 as tested in accordance with ASTM E-408. The radiant barrier shall be installed in accordance with the manufacturer's installation instructions.
4. Walls with covering with a reflectance of  $\geq 0.64$ .
5. Energy Star rated appliances include refrigerators, dishwashers, and clothes washers and must be installed for the Certificate of Occupancy.
6. The wall projection factor is equal to the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom most point of the overhang.
7. All air conditioning systems in the house must be ductless to qualify for this credit.
8. Install ceiling fans or whole house fans in all bedrooms and the largest space that is not used as a bedroom.

**28 Compliance.** IECC Section R501.4 is amended to read as follows:

**R501.4 Compliance.** Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions and regulations for alterations, repairs, additions and changes of occupancy or relocation, as adopted by the authorities having jurisdiction.

**29 Building envelope.** IECC Section R503.1.1 is amended to read as follows:

**R503.1.1 Building envelope.**

**Exception:** The following alterations ~~need not~~ shall not be required to comply with the requirements for new construction provided that the energy use of the building is not increased:

5. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during a roof replacement shall meet one of the following:

1. R-30 cavity insulation or the cool roof requirements in Section C402.3 for residential buildings.

2. R-19 cavity insulation or the cool roof requirements in Section C402.3 for Tropical Zone residential buildings.
3. When uninsulated roof sheathing is exposed during alteration, at least two of the following must be installed:
  - a. Energy Star compliant roof covering;
  - b. Radiant barrier;
  - c. Attic ventilation via solar attic fans or ridge ventilation of gable ventilation;  
or
  - d. A minimum of one ~~two~~ exceptions listed in C402.3.

Footnote to exception: Shake roofs on battens must be replaced with materials that result in equal or improved energy efficiency.