

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Note to the reader:

This draft incorporates by reference, the International Energy Conservation Code, 2015 Edition, (IECC) into chapter 5 of the Hawai'i County Code. Proposed changes to the language of the IECC, that has been incorporated into the Code, are indicated using brackets and strike outs for repeals and underscoring for additions.

SECTION 1. Chapter 5, article 4, of the Hawai'i County Code 1983 (2016 Edition, as amended), is repealed.

SECTION 2. Chapter 5, of the Hawai'i County Code 1983 (2016 Edition, as amended), is amended by adding a new article to be designated article 4, and to read as follows:

“Article 4. Energy Conservation.

Sections:

- 5-85(a) The International Energy Conservation Code incorporated.
- 5-85(b)(1) Subsection C101.1 amended.
- 5-85(b)(2) Subsection C101.4 amended.
- 5-85(b)(3) Subsection C102.1 amended.
- 5-85(b)(4) Subsection C103.1 amended.
- 5-85(b)(5) Subsections C103.3.2 and C103.3.3 deleted in their entirety.
- 5-85(b)(6) Subsection C401.2 amended.
- 5-85(b)(7) Subsection C402.1.1 amended.
- 5-85(b)(8) Table C402.1.3 deleted in its entirety and replaced.
- 5-85(b)(9) Subsection C402.2.3 amended.
- 5-85(b)(10) Table C402.4 deleted in its entirety and replaced.
- 5-85(b)(11) Subsection C402.4.3.5 added.
- 5-85(b)(12) Subsection C402.5 amended.
- 5-85(b)(13) Subsection C403.2.4.2.4 added.
- 5-85(b)(14) Subsection C405.2 amended.
- 5-85(b)(15) Subsection C405.2.4 amended.
- 5-85(b)(16) Subsection C405.10 added.
- 5-85(b)(17) Subsection C406.3 amended.
- 5-85(b)(18) Subsection C408.2 amended.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- 5-85(b)(19) Subsection C408.2.4.1 deleted in its entirety.
- 5-85(b)(20) Subsection C408.3.1 amended.
- 5-85(b)(21) Subsection C501.4 amended.
- 5-85(b)(22) Subsection C503.3.1 amended.
- 5-85(b)(23) Subsection R101.1 amended.
- 5-85(b)(24) Subsection R103.1 amended.
- 5-85(b)(25) Subsections R103.3.2 and R103.3.3 deleted in their entirety.
- 5-85(b)(26) Subsection R401.2 amended.
- 5-85(b)(27) Subsection R401.2.1 amended.
- 5-85(b)(28) Subsection R402.1 amended.
- 5-85(b)(29) Table R402.1.2 deleted in its entirety and replaced.
- 5-85(b)(30) Subsection R402.2 amended.
- 5-85(b)(31) Subsection R402.2.5 amended.
- 5-85(b)(32) Subsection R402.3.2 amended.
- 5-85(b)(33) Subsection R402.4.1.2 amended.
- 5-85(b)(34) Subsection R403.5.5 added.
- 5-85(b)(35) Subsection R404.2 added.
- 5-85(b)(36) Subsection R404.3 added.
- 5-85(b)(37) Table R405.5.2(1) amended.
- 5-85(b)(38) Section R407 added.
- 5-85(b)(39) Subsection R501.4 amended.
- 5-85(b)(40) Subsection R503.1.1 amended.
- 5-85(b)(41) Subsection R503.2 amended.

Section 5-84. Purpose.

This article adopts with amendments, the International Energy Conservation Code, 2015 Edition, as it was incorporated into the Hawai'i State Energy Conservation Code that became effective on March 31, 2017. The purpose of the resulting article is to promote the design of energy-efficient building envelopes and installation of energy-efficient mechanical, lighting, and power systems by establishing minimum standards that promote modern and up-to-date energy-efficient performance in the construction, alteration, or equipment of buildings or structures in the County of Hawai'i.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Section 5-85. International Energy Conservation Code adopted.

- (a) The “International Energy Conservation Code, 2015 Edition” herein referred to as the “International Energy Conservation Code,” as copyrighted and published in 2015 by the International Code Council, Incorporated, 500 New Jersey Avenue, 6th Floor, Washington, DC 20001, is incorporated by reference and made a part of this chapter, subject to the amendments hereinafter set forth in this article. The appendices of the International Energy Conservation Code are not adopted except as provided in this article. A copy of the International Energy Conservation Code shall be available for public inspection at the Hilo and Kailua-Kona offices of the department of public works and at the office of the county clerk.
- (b) This incorporation by reference includes all parts of the International Energy Conservation Code, 2015 Edition, subject to the amendments hereinafter set forth.
- (1) Subsection C101.1 of the International Energy Conservation Code is amended to read as follows:

“C101.1 Title. This code shall be known as the [~~International~~] *Energy Conservation Code* of [NAME OF JURISDICTION] Hawai'i County, and shall be cited as such. [It is referred to herein as “this code.”] “This code” when used within the International Energy Conservation Code as incorporated by reference herein, means the Energy Conservation Code of Hawai'i County.”

Comment: Standard language.

See Energy Conservation Code of the State of Hawai'i (hereafter “State ECC”) at §3-181-4, Hawai'i Administrative Rules (hereafter “HAR”).

- (2) Subsection C101.4 of the International Energy Conservation Code is amended to read as follows:

“C101.4 Applicability. Where, in any specific case, different sections of this code or other adopted codes specify different materials, methods of construction or other requirements, the [~~most restrictive shall govern~~] code official shall determine which code requirements shall prevail. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.”

Comment:

Maui Justification: This will allow the code official to review code conflicts and make the most reasonable determination.

See: §16.16B.C101.4, Maui County Code (hereafter “MCC”).

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (3) Subsection C102.1 of the International Energy Conservation Code is amended to read as follows:

“C102.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been *approved* by the *code official* as meeting the intent of this code.

The *code official* may allow lower energy conservation standards for nonstandard building materials, unique or limitations of design, special methods of construction, and geographical location. The *code official* may require construction plans, research reports, and tests prepared by a registered design professional in order to determine whether to allow such lower standards.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by Maui County.*
See: §16.16B.C102.1, MCC.
- B. *The code should not prohibit nonstandard building methods and materials such as those:*
- 1) *Used in indigenous Hawaiian architecture and membrane structures,*
 - 2) *Resulting from design limitations like timber frame construction, open beam roofs, or*
 - 3) *Additions to existing conditions, geographical locations in valleys and other obstructions.*

- (4) Subsection C103.1 of the International Energy Conservation Code is amended to read as follows:

~~**“C103.1 General.** [Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *code official* is authorized to require necessary construction documents to be prepared by a registered design professional.~~

~~**Exception:** The *code official* is authorized to waive the requirements for construction documents or other supporting data if the *code official* determines they are not necessary to confirm compliance with this code.]~~

Construction documents and other supporting data shall be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved, and observed by a duly registered licensed professional as required by chapter 464 of the Hawai'i Revised Statutes and in accordance with the provisions of chapter 5, Hawai'i County Code. The licensed professional

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

shall certify via a signed statement on the plans, that the project complies with this code.

Exception: Any building work that is not required to be prepared, designed, approved, or observed by a licensed professional architect or engineer pursuant to chapter 464, Hawai'i Revised Statutes, shall be certified by the owner."

Comments:

- A. *State Justification: Standard administrative code language.*
- B. *See State ECC at §3-181-7, HAR, Kauai County at §12-6.4(2), KCC, and Maui County at §16.16B.C103.1, MCC.*

- (5) Subsections C103.3.2 and C103.3.3 of the International Energy Conservation Code are deleted in their entirety.

~~“**C103.3.2 Previous approvals.** This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.~~

~~**C103.3.3 Phased approval.** The *code official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.]”~~

Comments:

- A. *These are administrative provisions that are already addressed elsewhere in the code.*
- B. *Hawai'i County's version of this addition is consistent with the version adopted by Kauai County. See: §12-6.4(31), KCC.*

- (6) Subsection C401.2 of the International Energy Conservation Code is amended to read as follows:

“C401.2 Application. Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1.
2. The requirements of Sections C402 through C405. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

3. The requirements of Sections C402.5, C403.2, C404, C405.2, C405.3, C405.5, C405.6 and C407. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

Exception: Where it is determined by the *code official* that the building configuration is similar to that of a residential building, the requirements in Sections R401.2.1 Tropical Zone shall be permitted to be used.

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by Kauai County. See: §12-6.4(31), KCC.*
- B. *Extends Tropical Zone provisions for small commercial projects with construction similar to that of a residential building.*

- (7) Subsection C402.1.1 of the International Energy Conservation Code is amended to read as follows:

“C402.1.1 Low-energy use buildings. The following low-energy use buildings, or portions thereof separated from the remainder of the building by *building thermal envelope* assemblies complying with this section, shall be exempt from the *building thermal envelope* provisions of Section C402.

1. Those with a peak design rate of energy usage less than 3.4 Btu/h-ft² (10.7 W/m²) or 1.0 watt per square foot (10.7 W/m²) of floor area for space conditioning purposes.
2. [~~Those that do not contain conditioned space~~] Unconditioned space that does not contain occupiable space and/or habitable space.
3. Greenhouses.”

Comments:

- A. *State Justification: The amended language ensures that habitable space, even if unconditioned, will be covered by the provisions of the energy code to increase occupant comfort and reduce the possibility of installing air conditioning in the future.*
See State ECC at §3-181-8, HAR, Kauai County at §12-6.4(11), KCC, and Maui County at §16.16B.C402.1.1, MCC.
- B. *Hawai'i County includes “occupiable” to clarify the exception.*
“Occupiable space” is defined in the IBC 2006 Chapter 2 Section 202.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (8) Table C402.1.3 from the International Energy Conservation Code is deleted in its entirety and replaced with the following:

“TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT
MINIMUM REQUIREMENTS, R-VALUE METHOD^a - CLIMATE ZONE 1

<u>CLIMATE ZONE 1</u>		
	<u>All other</u>	<u>Group R</u>
<u>Roofs</u>		
<u>Insulation entirely above roof deck</u>	<u>R-10ci</u>	<u>R-12.5ci</u>
<u>Metal buildings^{a, b}</u>	<u>R-30 or R-19 with cool roof</u>	<u>R-30 or R-19 with cool roof</u>
<u>Attic and other</u>	<u>R-30 or R-19 with cool roof</u>	<u>R-30 or R-19 with cool roof</u>
<u>Walls, above grade</u>		
<u>Mass</u>	<u>R-5.7ci^c</u>	<u>R-5.7ci^c</u>
<u>Metal building</u>	<u>R-13 + R-6.5ci</u>	<u>R-13 + R-6.5ci</u>
<u>Metal framed</u>	<u>R-13 + R-5ci</u>	<u>R-13 + R-5ci</u>
<u>Wood framed and other</u>	<u>R-13 + R-3.8ci or R-20</u>	<u>R-13 + R-3.8ci or R-20</u>
<u>Walls, below grade</u>		
<u>Below-grade wall</u>	<u>NR</u>	<u>NR</u>
<u>Floors</u>		
<u>Mass</u>	<u>NR</u>	<u>NR</u>
<u>Joist/framing</u>	<u>NR</u>	<u>NR</u>
<u>Slab-on-grade floors</u>		
<u>Unheated slabs</u>	<u>NR</u>	<u>NR</u>
<u>Heated slabs^d</u>	<u>R-7.5 for 12” below</u>	<u>R-7.5 for 12” below</u>
<u>Opaque doors</u>		
<u>Nonswinging</u>	<u>R-4.75</u>	<u>R-4.75</u>

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m², 1 pound per cubic foot = 16 kg/m³.
ci = Continuous insulation, NR = No requirement, LS = Liner system.

- a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
- b. Where using R-value compliance method, a thermal spacer block shall be provided, otherwise use the U-factor compliance method in Table C402.1.4.
- c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having maximum thermal conductivity of 0.44 Btu-in/h-ft²°F. See Section C402.2.3.
- d. Steel floor joist systems shall be insulated to R-38.”

Comments:

- A. *Revised table to include only climate zone 1 requirements.*
- B. *State Justification: Commercial buildings must have Cool Roof Rating Council compliant reflective roofs which significantly reduce the need for insulation, especially in Hawai'i's mild climate. Reducing required insulation by 50% significantly reduces construction costs while minimally increasing interior temperatures.*
- C. *See: Maui County at §16.16B.C402, MCC, and Kauai County at §12-6.4(12), KCC.*

- (9) Subsection C402.2.3 of the International Energy Conservation Code is amended to read as follows:

“C402.2.3 Thermal resistance of 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 C402.1.3, based on framing type and construction materials used in the wall assembly.

Exceptions:

Continuous insulation for wood, metal framed, and mass walls are not required when at least one of the following conditions is met:

1. Walls have a covering with a reflectance of ≥ 0.64 .
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.

The *R*-value of integral insulation installed in concrete masonry units shall not be used in determining compliance with Table C402.1.3.

“Mass walls” shall include walls:

1. Weighing not less than 35 psf (170 kg/m²) of wall surface area.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

2. Weighing not less than 25 psf (120 kg/m²) of wall surface area where the material weight is not more than 120 pcf (1900 kg/m³).
3. Having a heat capacity exceeding 7 Btu/ft² · °F (144 kJ/m² · K).
4. Having a heat capacity exceeding 5 Btu/ft² · °F (103 kJ/m² · K), where the material weight is not more than 120 pcf (1900 kg/m³).”

Comments:

- A. *State Justification: Modeling analysis shows that R-13 is the most impactful level of insulation for buildings and that removing continuous insulation on steel frame walls does not significantly impact whole building energy use. Adding shading to the wall system with a projection factor of at least 0.3 eliminates the need for continuous insulation in exterior wall systems resulting in an energy equivalent installation. In a tropical climate, the impact of wall insulation is diminished for commercial buildings with more importance placed on roof insulation and window solar heat gain coefficient (SHGC). Envelope trade-offs for residential construction can be extrapolated to commercial construction for wall systems allowing the trade-off for a projection factor on wall systems to work for both residential and commercial buildings.*

Adding reflective coatings on wall systems is also an effective trade-off for continuous insulation in residential exterior wall systems. As with the projection factor, this trade-off can be transferred to commercial buildings as an energy neutral trade-off. A reflective coating trade-off for continuous insulation is appropriate for commercial wall systems by providing an energy neutral trade-off. The full analysis is contained in the “Analyses and proposal of Hawaii amendments to the 2015 International Energy Conservation Code,” dated May 2016.

See: State ECC at §3-181-9, HAR.

- B. *Maui County Justification: Additionally, exception 3 will reduce the footprint of the structure when using mass wall, which will reduce construction costs. See: §16.16B.C402.2.3, MCC.*
- C. *Kauai County also incorporated change at §12-6.4(13), KCC.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

(10) Table C402.4 from the International Energy Conservation Code is deleted in its entirety and replaced with the following:

“TABLE C402.4
BUILDING ENVELOPE FENESTRATION
MAXIMUM U-FACTOR AND SHGC REQUIREMENTS -
CLIMATE ZONE 1

<u>CLIMATE ZONE</u>	<u>1</u>	
<u>Vertical fenestration</u>		
<u>U-factor</u>		
<u>Fixed fenestration</u>	<u>0.50</u>	
<u>Operable fenestration</u>	<u>0.65</u>	
<u>Entrance</u>	<u>1.10</u>	
<u>SHGC^b</u>		
<u>Orientation^a</u>	<u>SEW</u>	<u>N</u>
<u>PF < 0.2</u>	<u>0.25</u>	<u>0.33</u>
<u>0.2 ≤ PF < 0.5</u>	<u>0.30</u>	<u>0.37</u>
<u>PF ≥ 0.5</u>	<u>0.40</u>	<u>0.40</u>
<u>Skylights</u>		
<u>U-factor</u>	<u>0.75</u>	
<u>SHGC</u>	<u>0.35</u>	

NR = No requirement, PF = Projection factor.

a. “N” indicates vertical fenestration oriented within 45 degrees of true north. “SEW” indicates orientations other than “N.” For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.

b. Exception: Jalousie windows are exempt from SHGC requirements.”

Comments:

- A. *Revised table to include only climate zone 1 requirements.*
- B. *State Justification: Jalousie windows are popular in Hawai‘i as an extremely effective means of passively cooling buildings by reducing or eliminating the need for air conditioning. The SHGC of the individual*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

jalousie blades can be slightly improved, but only at great expense and the improved blades would still be far from code compliance. Given Hawai'i's mild climate, the energy impact of reducing or eliminating air conditioning may far exceed the impact of additional heat gain.

- (11) A new subsection C402.4.3.5 is added to the International Energy Conservation Code 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.

Exception: Jalousie windows are exempt from SHGC requirements.”

Comments:

- A. *State Justification: Modeling by the National Renewable Energy Laboratory (NREL) indicated that shading fenestration was as effective as solar heat gain coefficient (SHGC) requirements in Hawaii's mild climate. Area weighting allows trade-offs between fenestration SHGC allowing a higher SHGC to be installed on the North elevation and offsetting that with lower SHGC requirements for windows on the East, West and South.
See: State ECC at §3-181-10, HAR.*
- B. *State Justification: Jalousie windows are popular in Hawaii as an extremely effective means of passively cooling buildings by reducing or eliminating the need for air conditioning. The SHGC of the individual jalousie blades can be slightly improved, but only at great expense and the improved blades would still be far from code compliance. Given Hawaii's mild climate, the energy impact of reducing or eliminating air conditioning may far exceed the impact of additional heat gain.*

- (12) Subsection C402.5 of the International Energy Conservation Code is amended to read as follows:

“C402.5 Air leakage-thermal envelope (Mandatory). The *thermal envelope* of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building *thermal envelope* ~~[shall]~~ may be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge (75 Pa) ~~[or an equivalent method approved by the code official]~~ and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft² (0.2 L/s • m²). Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.”

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Comment:

Maui County Justification: Due to concerns of timeliness, added costs, and availability of a certified contractor, this “blower door test” is being made optional instead of mandatory. The registered design professional may require this on behalf of the owner.

See: Maui County at §16.16B.C402.5, MCC.

- (13) A new subsection C403.2.4.2.4 is added to the International Energy Conservation Code to read as follows:

“C403.2.4.2.4 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.”

Comment:

State Justification: This change will require automatic controls that reset the cooling system temperature in a hotel and motel sleeping unit, guest suites and time share condominiums when doors to the outdoors are let open. A similar requirement is contained in the American Society of Heating and Air-Conditioning Engineers (ASHRAE) 90.1-2013 Section 6.5.10. Research indicates that there is a potential for significant savings when in-room energy management systems are employed. A study by Pacific Gas and Electric as well as research by Magnum Energy Solutions, found that key card energy control systems provided an estimated savings of 35% - 45% per room. Additionally, prior research conducted for the State of Hawaii indicated that occupancy-based guest room controls could provide at least 5% savings for the entire hotel.

A study conducted in 2002 by Jeff Stein of Taylor Engineering and created for the California Statewide Utility Codes and Standards Program estimated savings of almost 60% for operable windows and/or doors with switches versus operable windows and/or doors without switches. The full analysis is contained in the “Analyses and Proposal of Hawaii Amendments to the 2015 International Energy Conservation Code.

See: State ECC at §3-181-11, HAR.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (14) Subsection C405.2 of the International Energy Conservation Code is amended to read as follows:

“C405.2 Lighting controls (Mandatory). Lighting systems shall be provided with controls as specified in Sections C405.2.1, C405.2.2, C405.2.3, C405.2.4 and C405.2.5.

Exceptions: Lighting controls are not required for the following:

1. Areas designated as security or emergency areas that are required to be continuously lighted.
2. Interior exit stairways, interior exit ramps and exit passageways.
3. Emergency egress lighting that is normally off.
4. Spaces where the designed lighting power densities are less than 70% of the lighting power densities specified in Table C405.4.2(1) and Table C405.4.2(2).”

Comments:

A. *Hawai'i County's version is consistent with the version adopted by Kauai County. See: §12-6.4(16), KCC.*

B. *State Justification: Electrical engineers, including speakers at the 2017 National Energy Codes Conference, indicate that compliance with the lighting controls are difficult and may result in non-compliance. By reducing lighting power density, a 40% energy savings is realized while reducing design, installation and maintenance costs. Including Section C405.1 (occupant sensor controls) is the simplest, most cost effective and most easily maintained control system.*

Including C405.2.4 (specific application controls) is necessary to cover control of hotel and motel guest room lighting as tourism is ubiquitous in Hawaii. Studies indicate that 85% of the savings in lighting is attributable to the LED sources, and 15% to the controls.

- (15) Subsection C405.2.4 of the International Energy Conservation Code is amended to read as follows:

“C405.2.4 Specific application controls. Specific application controls shall be provided for the following:

1. Display and accent light shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.
2. Lighting in cases used for display case purposes shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

3. Hotel and motel sleeping units [~~and~~], guest suites, and time-share condominiums shall have a master control device that is capable of automatically switching off all installed luminaires and switched receptacles within 20 minutes after all occupants leave the room.
Exception: Lighting and switched receptacles controlled by captive key systems.
4. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting, shall have a control device integral to the luminaires or be controlled by a wall-mounted control device provided that the control device is readily accessible.
5. Lighting for nonvisual applications, such as plant growth and food warming, shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.
6. Lighting equipment that is for sale or for demonstrations in lighting education shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.”

Comment:

State Justification: The current International Energy Code language only includes a master control device for hotel and motel sleeping units and guest suites. Time share condominiums are added to the requirements because they have the same transient use pattern as a hotel and motel overnight room and the energy savings potential will be similar.
See: State ECC at §3-181-12, HAR.

- (16) A new subsection C405.10 is added to the International Energy Conservation Code 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 ft² (total enclosed and unenclosed) (93 m³) 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.”

Comments:

- A. *State Justification: Numerous studies indicate that sub-metering, combined with tenant access to consumption data, results in substantial energy use reduction and is cost effective.*
See: State ECC at §3-181-13, HAR.
- B. *Hawai'i County's version of this proposed change is consistent with the version adopted by the State and Maui County.*
See: State ECC at §3-181-13, HAR and Maui County at §16.16B.C405.10, MCC.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (17) Subsection C406.3 of the International Energy Conservation Code is amended to read as follows:

“C406.3 Reduced lighting power density. The total interior lighting power (watts) of the building shall be determined by using [90] 80 percent of the lighting power values specified in Table C405.4.2(1) times the floor area for the building types, or by using [90] 80 percent of the interior lighting power allowance calculated by the Space-by-Space Method in Section C405.4.2.”

Comment:

State Justification: The current code was written in 2014, allowing Haitz’s law to have considerable effect. Reducing lighting power density also reduces construction costs by requiring fewer fixtures.

- (18) Subsection C408.2 of the International Energy Conservation Code is amended to read as follows:

“C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements. [~~Prior to the final mechanical and plumbing inspections, the~~] The registered design professional or approved agency shall provide evidence of mechanical systems *commissioning* and completion in accordance with the provisions of this section to the owner or owner’s authorized agent.

Construction document notes shall clearly indicate provisions for *commissioning* and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner’s authorized agent and made available to the *code official* upon request in accordance with Sections C408.2.4 and C408.2.5.

Exceptions: The following systems are exempt:

1. Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.
2. Systems included in Section C403.3 that serve individual *dwelling units* and *sleeping units*.”

Comment:

Maui Justification: The registered design professional is responsible for the mechanical systems and service water-heating systems commissioning. The required documents should be submitted to the owner or owner’s representative for their information and record.

See: §16.16B.C408.2, MCC.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (19) Subsection C408.2.4.1 of the International Energy Conservation Code is deleted in its entirety.

~~“[**C408.2.4.1 Acceptance of report.** Buildings, or portions thereof, shall not be considered acceptable for a final inspection pursuant to Section C104.3 until the *code official* has received a letter of transmittal from the building owner acknowledging that the building owner or owner’s authorized agent has received the Preliminary Commissioning Report.]”~~

Comments:

Maui Justification: Verification of submittal of the Preliminary Commissioning Report should be coordinated between the registered design professional and the owner or owner’s representative.

See: §16.16B.C408.2.4.1, MCC.

- (20) Subsection C408.3.1 of the International Energy Conservation Code is amended to read as follows:

~~“**C408.3.1 Functional Testing.** [Prior to passing final inspection, the] The registered design professional shall provide to the owner or owner’s representative evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the *construction documents* and manufacturer’s instructions. Functional testing shall be in accordance with Sections C408.3.1.1 and C408.3.1.2 for the applicable control type.”~~

Comment:

Maui Justification: This amendment simplifies and streamlines the functional testing process.

See: §16.16B.C408.3.1, MCC.

- (21) Subsection C501.4 of the International Energy Conservation Code 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, [respectively, in the *International Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private*~~

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Sewage Disposal Code and NFPA-70] as adopted by the authority having jurisdiction.”

Comment:

State Justification: The proposed amendment strikes language requiring existing building projects to comply with the suite of International codes when these codes may not have been adopted by the local jurisdiction. This amendment is consistent with Hawai'i Revised Statutes 107-25.

See: State ECC at §3-181-14, HAR.

- (22) Subsection C503.3.1 of the International Energy Conservation Code is amended to read as follows:

“C503.3.1 Roof replacement. *Roof [~~replacements shall comply with Table C402.1.3 or C402.1.4 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 at least one of the following:*

1. Energy Star compliant roof covering;
2. Radiant barrier; or
3. Attic ventilation via solar attic fan(s), or ridge ventilation, or gable ventilation.”

Comment:

State Justification: The Roofing Contractors of Hawaii reported that the 2015 IECC code requirement for insulating existing roofs would double the cost. This amendment provides an alternative compliance path which addresses the cost issue.

- (23) Subsection R101.1 of the International Energy Conservation Code is amended to read as follows:

“R101.1 Title. This code shall be known as the [~~International~~] *Energy Conservation Code of [NAME OF JURISDICTION] Hawai'i County*, and shall be cited as such. [~~It is referred to herein as “this code.”~~] “This code” when used within the International Energy Conservation Code as incorporated by reference herein, means the Energy Conservation Code of Hawai'i County.”

Comments:

- A. *Conformed with paragraph (1) of this bill that amends subsection C101.1 of the International Energy Conservation Code.*
- B. *Standard language.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (24) Subsection R103.1 of the International Energy Conservation Code is amended to read as follows:

~~“**R103.1 General.** [Construction documents, technical reports and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents and technical reports shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *code official* is authorized to require necessary construction documents to be prepared by a registered design professional.~~

~~**Exception:** The *code official* is authorized to waive the requirements for construction documents or other supporting data if the *code official* determines they are not necessary to confirm compliance with this code.]~~

Construction documents and other supporting data shall be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved, and observed by a duly registered licensed professional as required by chapter 464 of the Hawai'i Revised Statutes and in accordance with the provisions of chapter 5, Hawai'i County Code. The licensed professional shall certify via a signed statement on the plans, that the project complies with this code.

Exception: Any building, electrical, or plumbing work that is not required to be prepared, designed, approved, or observed by a licensed professional architect or engineer pursuant to chapter 464, Hawai'i Revised Statutes, shall be certified by the owner.”

Comments:

- A. *Conformed with paragraph (4) of this bill that amends subsection C103.1 of the International Energy Conservation Code.*
- B. *State Justification: Standard administrative code language.*

- (25) Subsections R103.3.2 and R103.3.3 of the International Energy Conservation Code are deleted in their entirety.

~~“**R103.3.2 Previous approvals.** This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.~~

~~**R103.3.3 Phased approval.** The *code official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*,~~

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

~~provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.]”~~

Comment:

These are administrative provisions that are already addressed elsewhere in the code.

See: Kauai County §12-6.4(26), KCC.

- (26) Subsection R401.2 of the International Energy Conservation Code is amended to read as follows:

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

1. Sections ~~[R401.1]~~ R401.3 through R404.
2. Section R405 and the provisions of Sections 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.”

Comment:

State Justification: The amendment provides clarifying language on the options available to the code user and specifically references the Tropical zone requirements as an option.

See: State ECC at §3-181-17, HAR.

- (27) Subsection R401.2.1 of the International Energy Conservation Code 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 ~~[occupied space]~~ dwelling unit area is air conditioned.

Comments:

Hawai'i County's version is consistent with the version adopted by the State. See: State ECC at §3-181-18, HAR.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

2. The [~~occupied space~~] dwelling unit is not heated.

Comments:

- A. *Hawai'i County's version is consistent with the version adopted by the State, Kauai County, and Maui County.*
See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.
- B. *State Justification: Occupied space is changed to dwelling unit because occupied space includes all buildings within a project e.g. an unconditioned garage that would be considered out of the scope of this code provision. Dwelling unit is a more appropriate term.*
See: State ECC at §3-181-18, HAR.

3. Solar, wind, or other renewable energy source supplies not less than [~~80~~] 90 percent of the energy for service water heating.

Comments:

- A. *Hawai'i County's version is consistent with the version adopted by the State, Kauai County, and Maui County.*
See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC
- B. *State Justification: Solar water heater systems per §196-6.5 Solar water heater systems required for new single-family residential construction Hawai'i Revised Statutes specified to be consistent with state legislation.*
See: §16.16B.R401.2.1, MCC.

4. Glazing in [~~conditioned space has a~~] dwelling units shall have a maximum solar heat gain coefficient [of less than or equal to 0.40, or has an overhang with a projection factor equal to or greater than 0.30] as specified in Table R401.2.1.

Table 401.2.1 Window SHGC Requirements

<u>Projection Factor (pf) of overhang from base of average window sill*</u>	<u>SHGC</u>
<u>< 0.30</u>	<u>0.25</u>
<u>0.30 – 0.49</u>	<u>0.40</u>
<u>≥ 0.50</u>	<u>N/A</u>

***Exceptions:**

- a. North-facing windows with pf > 0.20 are exempt from SHGC requirements. Overhangs shall extend 2 feet on each side of window or to nearest wall, whichever is less.
- b. Jalousie windows are exempt from SHGC requirements.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Comments:

- A. *State Justification: A SHGC projection factor trade-off is provided for the vertical fenestration SHGC to account for the shading effects of overhangs. This provides an energy neutral trade-off. See: State ECC at §3-181-18, HAR.*
- B. *State Justification: Jalousie windows are popular in Hawaii as an extremely effective means of passively cooling buildings by reducing or eliminating the need for air conditioning. The SHGC of the individual jalousie blades can be slightly improved, but only at great expense and the improved blades would still be far from code compliant. Given Hawaii's mild climate, the energy impact of reducing or eliminating air conditioning may far exceed the impact of additional heat gain.*

5. Skylights in dwelling units shall have a maximum U-factor as specified in Table R402.1.2.

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County. See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.*
- B. *State Justification: No thermal or SHGC requirements for skylights were included in Tropical Zone requirements. The skylight provision addition provides a link to the prescriptive requirements in the 2015 IECC. Installing lower SHGC skylights will reduce the cooling load in the space and will increase occupant comfort. See: State ECC at §3-181-18, HAR.*

[5]6. Permanently installed lighting is in accordance with Section R404.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County. See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.

[6. The exterior roof surface complies with one of the options in Table C402.3 or the roof/ceiling has insulation with an R-value of R-15 or greater. If present, attics above the insulation are vented and attics below the insulation are unvented.]

7. [Roof surfaces have a minimum slope of 1/4 inch per foot of run. The finished roof does not have water accumulation areas.]

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

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.

If present, attics above the insulation are vented and attics below the insulation are unvented.

Exception: The roof/ceiling assembly is permitted to comply with Section R407.

Comments:

- A. Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County. See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.*
- B. State Justification: R-13 roof/ceiling insulation with the addition of a cool roof membrane or R-19 insulation only performs equally based on analysis. The analysis shows significant savings using insulation in addition to a cool roof membrane instead of relying on a cool roof membrane only. See: State ECC at §3-181-18, HAR.*

- 8. 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.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County. See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.

- 9. Bedrooms with exterior walls facing two different directions have operable fenestration on exterior walls facing two different directions.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by the State and Kauai County. See: State ECC at §3-181-18, HAR and §12-6.4(31), KCC.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

10. Interior doors to bedrooms are capable of being secured in the open position.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County.

See: State ECC at §3-181-18, HAR, §12-6.4(31), KCC, and §16.16B.R401.2.1, MCC.

11. A ceiling fan [ø], ceiling fan rough-in, or whole-house fan is provided for bedrooms and the largest space that is not used as a bedroom.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by Kauai County.

See: §12-6.4(31), KCC.

12. 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. Blower door test is optional."

Comments:

A. *Hawai'i County's version of this addition is consistent with the version adopted by Maui County.*

See: §16.16B.R401.2.1, MCC.

B. *State Justification: Air sealing between the air conditioned space and non-air conditioned space is important to keep the space conditioning in the areas where it was intended. Sealing up assemblies between the two spaces will also reduce the possibility of moisture issues within the framed cavities.*

See: State ECC at §3-181-18, HAR.

Comment regarding paragraph (27):

Hawai'i County's version intentionally removed the following paragraphs from State ECC at §3-181-18, HAR:

8. *Roof surfaces have a minimum slope of 1/4 inch per foot of run. The finished roof does not have water accumulation areas.*

13. *Jalousie windows shall have an air infiltration rate of no more than 1/2 cfm per square foot (6.1 L/s/m²).*

14. *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.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (28) Subsection R402.1 of the International Energy Conservation Code is amended to read as follows:

“R402.1 General (Prescriptive).

The *building thermal envelope* shall meet the requirements of Sections R402.1.1 through R402.1.5.

Exception: The following low-energy buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section R402.

1. Those with a peak design rate of energy usage less than 3.4 Btu/h · ft² (10.7 W/m²) or 1.0 watt/ft² (10.7 W/m²) of floor area for space-conditioning purposes.
2. [~~Those that do not contain conditioned space.~~] Unconditioned space that does not contain habitable space.
3. Unconditioned dwellings less than 1,100 square feet in size.”

Comments:

A. *Hawai'i County's version of this proposed change is consistent with the version adopted by the State and Maui County, except for Exception 3, which Hawai'i County added. Exception 3 allows 1,100 square feet dwellings to be exempt from the building thermal envelope provisions to support affordable housing pursuant to section 11-7(b), Hawai'i County Code.*

See: State ECC at §3-181-19, HAR and §16.16B.R402.1, MCC.

B. *State Justification:*

The amended language ensures that habitable space, even if unconditioned, will be covered by the provisions of the energy code to increase occupant comfort and reduce the possibility of installing air conditioning in the future.

See: State ECC at §3-181-19, HAR.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

(29) TABLE R402.1.2 of the International Energy Conservation Code is deleted in its entirety and replaced with the following:

“TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

<u>CLIMATE ZONE</u>	<u>FENESTRATION U-FACTOR^b</u>	<u>SKYLIGHT U-FACTOR^b</u>	<u>GLAZED FENESTRATION SHGC^{b, c, g}</u>	<u>CEILING R-VALUE^d</u>	<u>WOOD FRAME WALL R-VALUE^d</u>	<u>MASS WALL R-VALUE^{e, f}</u>	<u>FLOOR R-VALUE</u>	<u>BASEMENT WALL R-VALUE</u>	<u>SLAB R-VALUE & DEPTH</u>	<u>CRAWL SPACE WALL R-VALUE</u>
<u>1</u>	<u>NR</u>	<u>0.75</u>	<u>0.25</u>	<u>30</u>	<u>13</u>	<u>3/4</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

For SI: 1 foot= 304.8 mm

- a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in climate zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. Exception: If fenestration have overhangs with projection factors, the maximum solar heat gain coefficient shall be as specified in Table R401.2.1.
- d. R402.2 allows use of R407.
- e. The second R-value applies when more than half the insulation is on the interior of the mass wall.
- f. Exception: R-value for mass walls are not required if: mass walls have a covering with reflectance of ≥ 0.64 ; mass walls have overhangs with a projection factor equal to or greater than 0.3. CMU or similar mass walls are 6 inches or greater in thickness.
- g. Exception: Jalousie windows are exempt from SHGC requirements.”

Comment:

Hawai'i County's version makes the following changes:

- A. *Revised table to include only climate zone 1 requirements.*
- B. *Reduces the Floor R-Value reduced to zero to reflect Hawai'i's climate.*
- C. *Adds note “c” to allow overhang projection factors to allow exceptions to the glazed fenestration SHGC.*
- D. *Adds notes “e” and “f” because the previous version of the Energy Code did not have R-Value for mass walls. By not having this exemption mass walls will need to add another wall or layer to achieve the R-3/4 value. This would increase the overall floor area or reduce the usable interior floor area of the structure and increase cost of mass wall construction.*
- E. *Adds note “g” because jalousie windows are popular in Hawai'i as an extremely effective means of passively cooling buildings by reducing or eliminating the need for air conditioning. The SHGC of the individual jalousie blades can be slightly improved, but only at great expense and the improved blades would still be far from code compliance. Given Hawai'i's mild climate, the energy impact of reducing or eliminating air conditioning may far exceed the impact of additional heat gain.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (30) Subsection R402.2 of the International Energy Conservation Code 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 requirements of Sections R402.2.1 through R402.2.13.

Exception: Above-grade walls and ceilings shall be permitted to comply with Section R407.”

Comment:

A. *Hawai'i County's version of this amendment is consistent with the version adopted by the State, Kauai County, and Maui County.
See: State ECC at §3-181-20, HAR, §12-6.4(36), KCC, and §16.16B.R402.2, MCC.*

B. *State Justification: The addition of a Points Option (see Section R407) provides energy neutral trade-offs allowing efficiencies in the wall system to be traded-off with increased efficiency levels in other parts of the building. This will allow a prescriptive trade-off for continuous insulation in metal framed walls to be traded off with reflective paint on the walls or shading the walls with an overhang. Full analysis and background information is contained in the “Analyses and Proposal of Hawaii amendments to the 2015 International Energy Conservation Code.”
See: State ECC at §3-181-20, HAR.*

- (31) Subsection R402.2.5 of the International Energy Conservation Code is amended to read as follows:

“R402.2.5 Mass walls. Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs, or any other walls having a heat capacity greater than or equal to 6 Btu/ft² x °F (123 kJ/m² x K).

Exception: Insulation or R-value for mass walls, indicated in Table R402.1.2, is not required when at least one of the following conditions is met:

1. Walls have a covering with a reflectance of ≥ 0.64 .
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.”

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Comments:

- A. *State ECC Justification: Modeling analysis shows that R-13 is the most impactful level of insulation for buildings and that removing continuous insulation on steel frame walls does not significantly impact whole building energy use. Adding shading to the wall system with a projection factor of at least 0.3 eliminates the need for continuous insulation in exterior wall systems resulting in an energy equivalent installation. In a tropical climate, the impact of wall insulation is diminished for commercial buildings with more importance placed on roof insulation and window solar heat gain coefficient (SHGC). Envelope trade-offs for residential construction can be extrapolated to commercial construction for wall systems allowing the trade-off for a projection factor on wall systems to work for both residential and commercial buildings.*

*Adding reflective coatings on wall systems is also an effective trade-off for continuous insulation in residential exterior wall systems. As with the projection factor, this trade-off can be transferred to commercial buildings as an energy neutral trade-off. A reflective coating trade-off for continuous insulation is appropriate for commercial wall systems by providing an energy neutral trade-off. The full analysis is contained in the "Analyses and proposal of Hawaii amendments to the 2015 International Energy Conservation Code," dated May 2016.
See: State ECC at §3-181-9, HAR.*

- B. *The addition of exception 3 will reduce the footprint of the structure when using mass wall, which will reduce construction costs.*

- (32) Subsection R402.3.2 of the International Energy Conservation Code is amended to read as follows:

"R402.3.2 Glazed fenestration SHGC. Fenestration shall have a maximum solar heat gain coefficient as specified in Table R402.1.2. An area-weighted average of fenestration products more than 50-percent glazed shall be permitted to satisfy the SHGC requirements.

Exceptions:

1. Jalousie windows are exempt from SHGC requirements.
2. If fenestration have overhangs with projection factors, the maximum solar heat gain coefficient shall be as specified in Table R401.2.1.

Dynamic glazing shall be permitted to satisfy the SHGC requirements of Table R402.1.2 provided the ratio of the higher to lower labeled SHGC is greater than or equal to 2.4, and the dynamic glazing is automatically controlled to modulate the

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

amount of solar gain into the space in multiple steps. *Dynamic glazing* shall be considered separately from other fenestration, and area-weighted averaging with other fenestration that is not dynamic glazing shall not be permitted.

Exception: *Dynamic glazing* is not required to comply with this section when both the lower and higher labeled SHGC already comply with the requirements of Table R402.1.2.”

Comments:

- A. *Hawai'i County's version of this proposed change is consistent with the version adopted by the State and Maui County, except for the additional Exceptions which Hawai'i County added.*
See: State ECC at §3-181-21, HAR and §16.16B.R402.3.2, MCC
- B. *State Justification: Jalousie windows are popular in Hawaii as an extremely effective means of passively cooling buildings by reducing or eliminating the need for air conditioning. The SHGC of the individual jalousie blades can be slightly improved, but only at great expense and the improved blades would still be far from code compliance. Given Hawaii's mild climate, the energy impact of reducing or eliminating air conditioning may far exceed the impact of additional heat gain.*
- C. *State Justification: The added language links the allowance for an area weighted average SHGC with the specific SHGC requirement in Section R402.3.2. This change will clarify the requirement.*
See: State ECC at §3-181-21, HAR.
- D. *Exception 2 was added to allow overhang projection factors to allow exceptions to the glazed fenestration SHGC.*

- (33) Subsection R402.4.1.2 of the International Energy Conservation Code is amended to read as follows:

“R402.4.1.2 Testing. The building or dwelling unit ~~[shall]~~ may be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). ~~[Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.]~~ Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, if installed at the time of the test, shall be open.
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by Maui County.
See: §16.16B.R402.4.1.2, MCC.*
- B. *Maui Justification: Due to concerns relating to timeliness, added costs, and availability of a certified contractor, this “blower door test” is being made optional instead of mandatory. The registered design professional may require this on behalf of the owner.
See: §16.16B.R402.4.1.2, MCC.*

(34) A new subsection R403.5.5 is added to the International Energy Conservation Code 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, Hawai'i Revised Statutes.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County.
See: State ECC at §3-181-22, HAR, §12-6.4(38), KCC, and §16.16B.R403.5.5, MCC.*
- B. *State Justification: Solar systems per HRS 196-6.5 are specified to be consistent with state legislation.
See: State ECC at §3-181-22, HAR.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (35) A new subsection R404.2 is added to the International Energy Conservation Code to read as follows:

“R404.2 Ceiling Fans. A ceiling fan, ceiling fan rough-in, or whole house fan may be provided for bedrooms and the largest space that is not used as a bedroom.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by Kauai County. See: §12-6.4(40), KCC.*
- B. *State Justification: The effect of ceiling fans can be significant in increasing thermal comfort for the occupants of the space. Ceiling fans result in a perceived cooling effect of 5.4°F to 12. 6°F based on fan speed (air speed of approximately 3.3 ft/s to 9.84 ft/s respectively). Ceiling fans, coupled with the thermal envelope requirements will reduce the need to cool the space with traditional air conditioning. At a minimum, the ceiling fan rough-in would allow the homeowner to easily install a ceiling fan after the house is occupied. The cost of the installation would include only the cost of the fan and installation. Without the rough-in the cost would include providing power to the fan location in addition to support for the fan which could be a barrier to installing fans in the house. See State ECC at §3-181-23, HAR.*

- (36) A new subsection R404.3 is added to the International Energy Conservation Code to read as follows:

“R404.3 Electrical vehicle charger power. An electrical rough-in of a 30 amp circuit for future electrical vehicle charger may be installed in garage/carport area.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by Kauai County. See: §12-6.4(39), KCC.*
- B. *Maui Justification: Provides low cost option for future installation of an electric vehicle charger. See §16.16B.R404.3, MCC.*

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

(37) TABLE 405.5.2(1) of the International Energy Conservation Code is amended to read as follows:

“TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND
PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame	As proposed
	Gross area: same as proposed	As proposed
	<i>U</i> -factor: as specified in Table R402.1.4	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Basement and crawl space walls	Type: same as proposed	As proposed
	Gross area: same as proposed	As proposed
	<i>U</i> -factor: from Table R402.1.4, with insulation layer on interior side of walls	As proposed
Above-grade floors	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	<i>U</i> -factor: as specified in Table R402.1.4	As proposed
Ceilings	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	<i>U</i> -factor: as specified in Table R402.1.4	As proposed
Roofs	Type: composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Attics	Type: vented with aperture = 1 ft ² per 300 ft ² ceiling area	As proposed
Foundations	Type: same as proposed	As proposed
	Foundation wall area above and below grade and soil characteristics: same as proposed	As proposed
Opaque doors	Area: 40 ft ²	As proposed
	Orientation: North	As proposed
	<i>U</i> -factor: same as fenestration from Table R402.1.4	As proposed
Vertical fenestration other than opaque doors	Total area ^h = (a) The proposed glazing area, where the proposed glazing area is less than 15 percent of the conditioned floor area (b) 15 percent of the conditioned floor area, where the proposed glazing area is 15 percent or more of the conditioned floor area	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

	<i>U</i> -factor: as specified in Table R402.1.4	As proposed
	SHGC: as specified in Table R402.1.2 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: $0.92 - (0.21 \times \text{SHGC for the standard reference design})$	$0.92 - (0.21 \times \text{SHGC as proposed})$
	External shading: none	As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air exchange rate	<p>Air leakage rate of 5 air changes per hour in climate zones 1 and 2, and 3 air changes per hour in climate zones 3 through 8 at a pressure of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but no greater than $0.01 \times CFA + 7.5 \times (N_{br} + 1)$</p> <p>where: <i>CFA</i> = conditioned floor area <i>N_{br}</i> = number of bedrooms Energy recovery shall not be assumed for mechanical ventilation.</p>	<p>For residences that are not tested, the same air leakage rate as the standard reference design.</p> <p>For tested residences, the measured air exchange rate^a.</p> <p>The mechanical ventilation rate^b shall be in addition to the air leakage rate and shall be as proposed.</p>
Mechanical ventilation	<p>None, except where mechanical ventilation is specified by the proposed design, in which case:</p> <p>Annual vent fan energy use: $\text{kWh/yr} = 0.03942 \times CFA + 29.565 \times (N_{br} + 1)$</p> <p>where: <i>CFA</i> = conditioned floor area <i>N_{br}</i> = number of bedrooms</p>	As proposed
Internal gains	$\text{IGain} = 17,900 + 23.8 \times CFA + 4104 \times N_{br}$ (Btu/day per dwelling unit)	Same as standard reference design
Internal mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area	Same as standard reference design, plus any additional mass specifically designed as a thermal storage element ^c but not integral to the building envelope or structure.
Structural mass	For masonry floor slabs, 80 percent of floor area covered by R-2 carpet and pad, and 20 percent of floor	As proposed

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

	directly exposed to room air.	
	For masonry basement walls, as proposed, but with insulation required by Table R402.1.4 located on the interior side of the walls	As proposed
	For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed
Heating systems ^{d, e}	[As proposed for other than electric heating without a heat pump, where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC Commercial Provisions.]	[As proposed]
	<u>Fuel type: same as proposed design.</u>	<u>As proposed</u>
	<u>Efficiencies:</u> <u>Electric: Air-source heat pump with prevailing federal minimum standards.</u>	<u>As proposed</u>
	<u>Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards.</u>	<u>As proposed</u>
	<u>Nonelectric boilers: natural gas boiler with prevailing federal minimum standards.</u>	<u>As proposed</u>
	Capacity: sized in accordance with Section R403.7.	<u>As proposed</u>
Cooling systems ^{d, f}	[As proposed]	
	<u>Fuel type: Electric</u> <u>Efficiency: in accordance with prevailing federal minimum standards.</u>	As proposed
	Capacity: sized in accordance with Section R403.7.	<u>As proposed</u>
Service water heating ^{d, e, f, g}	[As proposed]	[As proposed]
	<u>Fuel type: same as proposed design</u> <u>Efficiency: in accordance with prevailing federal minimum standards.</u>	<u>As proposed</u> <u>As proposed</u>
	Use: Same as proposed design	<u>gal/day = 30 + (10 × N_{br})</u>
Thermal distribution systems	Duct insulation: From Section R403.2.1	
	A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. For tested duct systems, the leakage rate shall be 4 cfm (113.3 L/min) per 100 ft ² (9.29 m ²) of <i>conditioned floor</i> area at a pressure of differential of 0.1 inches w.g. (25 Pa).	As tested or as specified in Table R405.5.2(2) if not tested. Duct insulation shall be as proposed.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

Thermostat	Type: Manual, cooling temperature setpoint = 75°F; Heating temperature setpoint = 72°F	Same as standard reference
------------	---	----------------------------

For SI: 1 square foot = 0.93 m², 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m², 1 gallon (US) = 3.785 L, °C = (°F-32)/1.8, 1 degree = 0.79 rad.

- a. Where required by the *code official*, testing shall be conducted by an *approved* party. Hourly calculations as specified in the *ASHRAE Handbook of Fundamentals*, or the equivalent shall be used to determine the energy loads resulting from infiltration.
- b. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 *ASHRAE Handbook of Fundamentals*, page 26.24 and the “Whole-house Ventilation” provisions of 2001 *ASHRAE Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.
- c. Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.
- d. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.
- e. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design.
- f. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.
- g. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.
- h. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$$AF = A_s \times FA \times F$$

where:

AF = Total glazing area

A_s = Standard reference design total glazing area.

FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

F = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

L and CFA are in the same units.”

Comments:

- A. *Hawai'i County's version of this addition is consistent with the version adopted by the State and Kauai County.*

See: State ECC at §3-181-24, HAR, and §12-6.4(41), KC.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- B. State Justification: Energy neutral trade-offs are proposed by including the ability to trade-off high efficiency heating, cooling and water heating system efficiencies with building envelope features.*

DRAFT

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

(38) A new section R407 is added to the International Energy Conservation Code to read as follows:

SECTION R407
POINTS OPTION

R407.1 General (Prescriptive). Above-grade walls and roofs are permitted to comply with the points option as an alternative to complying with Sections R401.2.1 and R402.2.

R407.2 Requirements. One or more efficiency measures shall be selected for roof and above-grade wall systems from Table R407.1 that cumulatively equal or exceed 0 (zero) points. As an alternative, above-grade walls and roofs 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>
<u>Wood Framed</u>		
<u>R-13 Cavity Wall Insulation</u>	<u>0</u>	<u>1</u>
<u>R-19 Roof Insulation</u>	<u>-1</u>	<u>0</u>
<u>R-19 Roof Insulation + Cool roof membrane¹ or Radiant Barrier³</u>	<u>0</u>	<u>1</u>
<u>R-19 Roof Insulation + Attic Venting²</u>	<u>0</u>	<u>1</u>
<u>R-30 Roof Insulation</u>	<u>0</u>	<u>1</u>
<u>R-13 Wall Insulation + high reflectance walls⁴</u>	<u>1</u>	<u>2</u>
<u>R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances⁵</u>	<u>1</u>	<u>2</u>
<u>R-13 Wall Insulation + exterior shading wpf=0.3⁶</u>	<u>1</u>	<u>2</u>
<u>Ductless Air Conditioner⁷</u>	<u>1</u>	<u>1</u>
<u>1.071 X Federal Minimum SEER for Air Conditioner</u>	<u>1</u>	<u>1</u>
<u>1.142 X Federal Minimum SEER for Air Conditioner</u>	<u>2</u>	<u>2</u>
<u>No air conditioning installed</u>	<u>Not Applicable</u>	<u>2</u>
<u>House floor area ≤ 1,000 ft²</u>	<u>1</u>	<u>1</u>
<u>House floor area ≥ 2,500 ft²</u>	<u>-1</u>	<u>-1</u>
<u>Energy Star Fans⁸</u>	<u>1</u>	<u>1</u>
<u>Install 1 kW or greater of solar electric</u>	<u>1</u>	<u>1</u>
<u>Metal Framed</u>		
<u>R-13 +R 3 Wall Insulation</u>	<u>0</u>	<u>1</u>
<u>R-13 cavity Wall Insulation + R-0</u>	<u>-1</u>	<u>0</u>
<u>R-13 Wall Insulation + high reflectance walls⁴</u>	<u>0</u>	<u>1</u>
<u>R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances⁵</u>	<u>1</u>	<u>2</u>

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

<u>Walls</u>	<u>Standard Home Points</u>	<u>Tropical Home Points</u>
<u>R-13 Wall Insulation + exterior shading wpf=0.3⁶</u>	<u>0</u>	<u>1</u>
<u>R-30 Roof Insulation</u>	<u>0</u>	<u>1</u>
<u>R-19 Roof Insulation</u>	<u>-1</u>	<u>0</u>
<u>R-19 + Cool roof membrane¹ or Radiant Barrier³</u>	<u>0</u>	<u>1</u>
<u>R-19 Roof Insulation + Attic Venting²</u>	<u>0</u>	<u>1</u>
<u>Ductless Air Conditioner⁷</u>	<u>1</u>	<u>1</u>
<u>1.071 X Federal Minimum SEER for Air Conditioner</u>	<u>1</u>	<u>1</u>
<u>1.142 X Federal Minimum SEER for Air Conditioner</u>	<u>2</u>	<u>2</u>
<u>No air conditioning installed</u>	<u>Not Applicable</u>	<u>2</u>
<u>House floor area ≤ 1,000 ft²</u>	<u>1</u>	<u>1</u>
<u>House floor area ≥ 2,500 ft²</u>	<u>-1</u>	<u>-1</u>
<u>Energy Star Fans⁷</u>	<u>1</u>	<u>1</u>
<u>Install 1 kW or greater of solar electric</u>	<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/ft² 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 ≥ 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 in all bedrooms and the largest space that is not used as a bedroom.”

Comments:

A. *Hawai'i County's version of this addition is consistent with the version adopted by the State and Kauai County.*

See: State ECC at §3-181-25, HAR, and §12-6.4(42), KC.

B. *State Justification: The Points Option provides energy neutral trade-offs for different building assembly types. A prescriptive format was selected to increase the usability of the compliance approach. Energy analysis and research was done to determine the point allowances for each feature. All of the features are given +/- 1 point with the exception of high efficiency cooling equipment which is either given one (1) or two (2) points based on the SEER rating. The options that are included in the code reflected trade-offs from earlier versions of the Hawai'i code e.g. eliminating continuous insulation for metal framed walls by using reflective paint or high SEER cooling equipment as a trade-off for continuous insulation.*

See: State ECC at §3-181-25, HAR.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

- (39) Subsection R501.4 of the International Energy Conservation Code 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 and regulations for *alterations, repairs, additions* and changes of occupancy or relocation, [~~respectively, in the *International Residential Code, International 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 adopted by the authorities having jurisdiction.”

Comments:

A. *Hawai'i County's version of this addition is consistent with the version adopted by the State, Kauai County, and Maui County.*

See: State ECC at §3-181-26, HAR, §12-6.4(43), KCC, and §16.16B.R501.4, MCC.

B. *State Justification: The proposed amendment strikes language requiring existing building projects to comply with the suite of International codes when these codes may not have been adopted by the local jurisdiction. This amendment is consistent with Hawai'i Revised Statutes 107-25.*

See: State ECC at §3-181-26, HAR.

- (40) Subsection R503.1.1 of the International Energy Conservation Code is amended to read as follows:

“R.503.1.1 Building envelope. Building envelope assemblies that are part of the alteration shall comply with Section R402.1.2 or R402.1.4, Sections R402.2.1 through R402.2.13, R402.3.1, R402.3.2, R402.4.3 and R402.4.4.

Exception: The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
3. Construction where the existing roof, wall or floor cavity is not exposed.
4. Roof recover.
5. [~~Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.~~] Roof replacement of uninsulated roofs which include at least one of the following:
 - a. Energy Star compliant roof covering;
 - b. Radiant barrier; or

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

c. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation.

6. Surface-applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing or fenestration assembly to be replaced.”

Comment:

State Justification (per Maui County):

The Roofing Contractors of Hawaii reported that the 2015 IECC code requirement for insulating existing roofs would double the cost. This amendment provides an alternative compliance path which addresses the cost issue.

See: §16.16B.R503.1.1, MCC.

- (41) Subsection R503.2 of the International Energy Conservation Code is amended to read as follows:

“R503.2 Change in space conditioning.

Any nonconditioned or low-energy space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

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 R405.3.

Comment:

Hawai'i County's version of this addition is consistent with the version adopted by Kauai County. See: §12-6.4(45), KCC.

SECTION 3. Severability. If any provision of this ordinance, or the application thereof to any person or circumstance, is held invalid, the invalidity does not affect other provisions or applications of the ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this ordinance are severable.

SECTION 4. Work performed under a permit issued before the effective date of this ordinance and which is inspected on or after the effective date shall be approved if it meets the requirements of either this code or the code being replaced by this ordinance.

Hawai'i County Energy Code
Annotated Draft for Discussion Purposes
10/22/19

SECTION 5. This ordinance shall apply to all applications for permits to be issued pursuant to chapters 5, 9, and 17, Hawai'i County Code, that are deemed complete by the Department of Public Works on or after the effective date of this ordinance. An application accepted before the effective date shall be approvable if it meets the requirements of either this ordinance or the code being replaced by this ordinance.

SECTION 6. This ordinance shall take effect upon its approval, but nothing in this ordinance shall be construed to prohibit any person from complying with the provisions of this article and any amendments thereto adopted prior to the enactment of this ordinance.

DRAFT