CHAPT 5E - ENERGY CONSERVATION CODE

Draft for discussion purposes
(DPW - Building Division)

3/30/21 Draft

Note to the reader:
This draft incorporates by reference, the International Energy Conservation Code, 2018 Edition, (IECC), and Hawaii State Energy Conservation Code into chapter 5E of the Hawai'i County Code. Proposed changes to the language of the IECC, that have been incorporated into the Code, are indicated using brackets and strike outs for repeals and underscoring for additions.

Please note that this draft does not include PART II of the bill that will contain amendments to other ordinances.

"CHAPTER 5E. ENERGY CONSERVATION CODE.

Article 1. General Provisions.

{Only proposed amendments to chapter 5E are included}

Section 5E-1-3. Scope; exceptions.

This chapter sets forth minimum requirements for the design and construction, alteration, use and occupancy, 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. It shall apply to all commercial and residential buildings, building sites, and associated systems and equipment within the County inland of the shoreline high-water line. Exceptions to these minimum requirements are listed below:

[~~This chapter shall not apply to:~~] **Exceptions**:

(1) Work or installations not covered by the International Energy Conservation Code, [~~2015~~] 2018 Edition, as adopted and amended by the State Energy Conservation Code, chapter 3-181.1, Hawai'i Administrative Rules;

(2) Work on buildings or premises owned by or under the direct control of the Federal government;

(3) [~~Agricultural buildings, structures, and appurtenances without electrical power and plumbing systems are exempt from permit and construction code requirements, pursuant to section 46-88, Hawai'i Revised Statutes, except as otherwise provided for in this construction code.~~] Where a building includes both residential building and commercial building portions, each portion shall be separately considered and meet the applicable provisions of IECC-Commercial Provisions or IECC-Residential Provisions.

Section 5E-1-5. Existing construction and installations.

[~~Construction and installations in existence and permitted pursuant to applicable laws and standards in effect when the work thereon was performed, shall not be deemed to be in violation of subsequent changes to applicable laws or standards, provided that such installations shall be subject to the provisions of section 5-2-3 of the construction administrative code.~~]

(a) Permitted buildings in existence at the time of the adoption of this chapter may have their existing permitted use or occupancy continued if such use or occupancy was legal at the time of the adoption of this chapter, provided such continued use does not constitute a hazard to the general safety and welfare of the occupants and the public.

(b) Alteration, repair, addition, and change of occupancy. Alteration, repair, addition, and change of occupancy to a building or structure in existence at the time of the adoption of this chapter shall comply with the respective commercial or residential requirements of chapter 5 of this Code, relating to existing structures, and the Hawaii County Code Chapter 5C, the Existing Building Code.

Section 5E-1-6. Definitions. *{Only terms that are changed are included.}*

"**Building**" means any structure used or intended for supporting or sheltering any use or occupancy. The term shall include but not be limited to, any structure mounted on wheels such as a trailer, wagon, or vehicle which is parked and stationary for any 24-hour period, and is used for business or living purposes; provided, however, that the term shall not include a push cart or push wagon which is readily movable and which does not exceed 25 square feet in area, nor shall the term include a trailer or vehicle, used exclusively for the purpose of selling any commercial product therefrom, which hold a vehicle license and actually travels on public or private streets.

To the extent context otherwise permits and/or requires, the definitions of "building" as used in chapters: 5A, the building code; 5B, the residential building code; 5C, the existing building code; 5D, the electrical code; 5E, the energy conservation code; and 5F, the plumbing code; are incorporated by reference herein. {202, IBC; 5-71(1).}

"**Building work**" means the design, construction, alteration, relocation, enlargement, replacement, repair, removal, demolition of any building or structure, or any other activities regulated by this chapter. {*5-1-5.}*

"**Construction code**" means collectively: chapter 5, the construction administrative code; chapter 5A, the building code; chapter 5B, the residential building code; chapter 5C, the existing building code; chapter 5D, the electrical code; chapter 5E, the energy conservation code; chapter 5F, the plumbing code; and all administrative rules adopted pursuant to these chapters.

"**Construction code**" means collectively: chapter 5, the construction administrative code; chapter 5A, the building code; chapter 5B, the residential building code; chapter 5C, the existing building code; chapter 5D, the electrical code; chapter 5E, the energy conservation code; chapter 5F, the plumbing code; and all administrative rules adopted pursuant to these chapters.

"[~~**ICC 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.~~]

"**Permit**" means a formal authorization issued by the authority having jurisdiction that authorizes performance of specified work, pursuant to the following chapters:

(1) 5, the construction administrative code;
(2) 5A, the building code;
(3) 5B, the residential building code;
(4) 5C, the existing building code;
(5) 5D, the electrical code;
(6) 5E, the energy conservation code; and
(7) 5F, the plumbing code.

"**Person**" means any individual, firm, partnership, association, or corporation, or its or their successors or assigns, according to the context thereof.

"[~~**Section**" means a section of a chapter of the Uniform Plumbing Code.~~]

Section 5E-1-8. Conflict.

(a) If any provisions of this code conflict with or contravene provisions of the State Energy Code, found in chapter 3-181, Hawai'i Administrative Rules, or the International Energy Conservation Code, [~~2015~~] 2018 Edition, that have been incorporated by reference, the provisions of this code shall prevail as to all matters and questions arising out of the subject matter of such provisions.

(b) In situations where two or more provisions of this code and any applicable law, other than those provided for in subsection (a), cover the same subject matter, the stricter shall be complied with.

Section 5E-1-9. References to model codes.

The codes and standards referenced in this code shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 5E-1-8.

(1) Wherever referenced in this code, the International Building Code shall mean the Building Code, chapter 5A, Hawai‘i County Code.
(2) Wherever referenced in this code, the International Residential Code shall mean the Building Code, chapter 5B, Hawai‘i County Code.
(3) Wherever referenced in this code, the International Existing Building Code, shall mean the existing building code, chapter 5C, Hawai‘i County Code.
(4) Wherever referenced in this code, the ICC Electrical Code shall mean the electrical Code, chapter 5D, Hawai‘i County Code.
(5) Wherever referenced in this code, the International Energy Conservation Code, shall mean the energy conservation code, chapter 5E, Hawai‘i County Code.
(6) Wherever referenced in this code, the International Plumbing Code shall mean the plumbing code, chapter 5F, Hawai‘i County Code.
(7) Wherever in this Code reference is made to the International Fuel Gas Code, the provisions of the International Fuel Gas Code shall be deemed to be only guidelines and not mandatory.
(8) Wherever in this Code reference is made to the International Mechanical Code, the provisions of the International Mechanical Code shall be deemed to be only guidelines and not mandatory.
(9) Wherever in this Code reference is made to the International Property Maintenance Code, the provisions of the International Property Maintenance Code shall be deemed to be only guidelines and not mandatory.
(10) Wherever referenced in this code, the International Fire Code shall mean the Fire Code, chapter 26, Hawai‘i County Code.

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment of appliance, the condition of the listing shall govern.

Article 2. Installation Requirements.

{Article 2 is deleted in its entirety and replaced with the following}

Section 5E-2-1. International Energy Conservation Code adopted.

(a) The "International Energy Conservation Code, 2018 Edition" herein referred to as the "International Energy Conservation Code," as copyrighted and published in 2017 by the International Code Council, Incorporated, 4051 West Flossmoor Road, Country Club Hills, IL 60478, is incorporated by reference and made a part of this code, 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.

(b) The scope, technical specifications, and exemptions set forth in the International Energy Conservation Code, 2018 Edition, are hereby adopted as the standard for building work covered by this code, provided there are no specific provisions in any other section of this code covering the particular matter.

(c) A copy of the International Energy Conservation Code, 2018 Edition, 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.

(d) The International Energy Conservation Code, 2018 Edition, adopted and incorporated by reference into this code, shall be subject to the amendments hereinafter set forth.

(1) IECC-Commercial Provisions Chapter 1, "Scope and Administration," of the International Energy Conservation Code is deleted in its entirety.

(2) Subsection C202 "Definitions" of the International Energy Conservation Code is amended by adding the following new definitions to be appropriately inserted and to read as follows:

"**CODE OFFICIAL.** The director of the department of public works of the County of Hawai'i, the director's authorized representative, or other designated authority charged with the administration and enforcement of this code."

"**COOL ROOF.** A cool roof is a roofing system that can deliver high solar reflectance, and high thermal emittance as specified in Table C402.3."

"**HABITABLE SPACE.** A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces."

"**OCCUPIABLE SPACE.** A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code."

"**UNCONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the unconditioned space."

"**UNCONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and is not directly nor indirectly heated or cooled."

(3) Subsection C401.2, "Application" 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.
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:
For buildings 2,500 square feet or less with 4 tons of cooling or less 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."
{from Proposed COH Amendment carryover from IECC 2015 as amended}

(4) TABLE C402.1.3, "OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD" of 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

CLIMATE ZONE 1		
	All other	**Group R**
Roofs		
Insulation entirely above roof deck	R-20ci	R-25ci
Metal buildings[a, b]	[~~R-19 + R11 LS~~] R-30 or R-19 with cool roof[k]	[~~R-19 + R11 LS~~] R-30 or R-19 with cool roof[k]
Attic and other	[~~R-38~~] R-30 or R-19 with cool roof[k]	[~~R-38~~] R-30 or R-19 with cool roof[k]
Walls, above grade		
Mass[g]	R-5.7ci[c,j]	R-5.7ci[c,j]
Metal building	R-13 + R-6.5ci	R-13 + R-6.5ci
Metal framed	R-13 + R-5ci	R-13 + R-5ci
Wood framed and other	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20
Walls, below grade		
Below-grade wall[d]	NR	NR
Floors		
Mass[e]	NR	NR
Joist/framing	NR	NR
Slab-on-grade floors		
Unheated slabs	NR	NR
Heated slabs[h]	R-7.5 for 12” below	R-7.5 for 12” below

	+ R-5 full slab	+ R-5 full slab
Opaque doors		
Nonswinging	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
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-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3
f. Steel floor joist systems shall be insulated to R-38.
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.
j. Mass walls 6" and greater in thickness are excepted from ci requirement.
k. Cool roof is defined as a 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.

{*State IECC Amendment (8) COH Carryover for cool roofs*}

(5) Subsection C402.2.3 "Thermal resistance of above-grade walls" 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 above grade walls, and mass walls are not required when one of the following conditions are met:
1. Walls have a covering with a reflectance of ≥ 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.

The *R*-value of integral insulation installed in concrete masonry units shall not be used in determining compliance with Table C402.1.3 except as otherwise noted in the table. In determining compliance with Table C402.1.4, the use of the U-factor of concrete masonry units with integral insulation shall be permitted.

"Mass walls" where used as a component in the thermal envelope of a building shall comply with one of the following:

1. Weighing not less than 35 pounds per square foot (170 kg/m^2) of wall surface area.
2. Weighing not less than 25 pounds per square foot (122 kg/m^2) of wall surface area where the material weight is not more than 120 pcf (1900 kg/m^3).
3. Having a heat capacity exceeding 7 Btu/ft^2 · °F (144 kJ/m^2 · K).
4. Having a heat capacity exceeding 5 Btu/ft^2 · °F (103 kJ/m^2 · K), where the material weight is not more than 120 pcf (1900 kg/m^3)."

{*State IECC Amendment (9)*}

(6) Table C402.4, "BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS" of 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

CLIMATE ZONE	1	
Vertical fenestration		
U-factor		
Fixed fenestration	0.50	
Operable fenestration	0.65	
Entrance doors	1.10	
SHGC[b]		
Orientation[a]	SEW	N

PF < 0.2	0.25	0.33
0.2 ≤ PF < 0.5	0.30	0.37
PF ≥ 0.5	0.40	0.40
Skylights		
U-factor	0.75	
SHGC	0.35	

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."

{*State IECC Amendment (10)*}

(7) Subsection C402.4.3.5, "Area-weighted SHGC" 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."

{*State IECC Amendment (11)*}

(8) Subsection C402.5, "Air leakage-thermal envelope (Mandatory)" 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 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/ft^2 (0.2 L/s · m^2). Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7."

{*Proposed COH Amendment Carryover*}

(9) Subsection C403.2.3, "Door Switches" is added to the International Energy Conservation Code 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."

{*State IECC Amendment (12)*}

(10) Subsection C405.2, "Lighting Controls (Mandatory)" of the International Energy Conservation Code is amended to read as follows:

"**C405.2 Lighting controls (Mandatory).** Lighting systems shall be provided with controls that comply with one of the following.

1. Lighting controls as specified in Sections C405.2.1 through C405.2.6.
2. Luminaire level lighting controls (LLLC) and lighting controls as specified in Sections C405.2.1, C405.2.4 and C405.2.5. The LLLC luminaire shall be independently capable of:

2.1 Monitoring occupant activity to brighten or dim lighting when occupied or unoccupied, respectively.

2.2 Monitoring ambient light, both electric light and daylight, and brighten or dim artificial light to maintain desired light level.

2.3 For each control strategy, configuration and reconfiguration of performance parameters including; bright and dim setpoints, timeouts, dimming fade rates, sensor sensitivity adjustments, and wireless zoning configurations.

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 C405.3.2(1) and Table C405.3.2(2)."

{*Proposed COH Amendment Carryover*}

(11) Subsection C405.10, "Sub-metering (Mandatory)" is added to the International Energy Conservation Code to read as follows:

"**C405.10 Sub-metering (Mandatory).** 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."

{*State IECC Amendment (13)*}

(12) Subsection C408.2 "Mechanical systems and service water-heating systems commissioning and completion requirements" 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*."

{*Proposed COH 2015 Amendment Carryover*}

(13) Subsection C408.2.4.1, "Acceptance of report" 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 C105.2.6 until the *code official* has received the Preliminary Commissioning Report from the building owner or owner's authorized agent.~~]"

{*Proposed COH 2015 Amendment Carryover*}

(14) Subsection C408.3.1, "Functional Testing" 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 through C408.3.1.3 for the applicable control type."

{*Proposed COH 2015 Amendment Carryover*}

(15) Subsection C501.4, "Compliance" 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 this code, the International Building Code, International Existing Building Code, International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code*, *International Property Maintenance Code*, *International Private Sewage Disposal Code* and NFPA 70~~] as adopted by the authority having jurisdiction*."*

{*State Amendment (14) Proposed COH 2015 Amendment Carryover*}

(16) Subsection C503.3.1, "Roof replacement" of the International Energy Conservation Code is amended to read as follows:

"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 ≥ 85% and aged reflectance ≥ 63% or at least 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. One or more exceptions in Section C402.3."

{*State Amendment (15)*}

(17) IECC-Residential Provisions Chapter 1, "Scope and Administration," of the International Energy Conservation Code is deleted in its entirety.

(18) Subsection R202, "Definitions" of the International Energy Conservation Code is amended by adding the following new definitions to be appropriately inserted and to read as follows:

"**CODE OFFICIAL.** The director of the department of public works of the County of Hawai'i, the director's authorized representative, or other designated authority charged with the administration and enforcement of this code."

"**COOL ROOF.** A cool roof is a roofing system that can deliver high solar reflectance, and high thermal emittance as specified in table C402.3."

"**HABITABLE SPACE.** A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces, garages or carports, and similar areas are not considered habitable spaces."

"**OCCUPIABLE SPACE.** A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code."

"**UNCONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the unconditioned space."

"**UNCONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and is not directly nor indirectly heated or cooled."

{*Proposed COH 2015 Amendment Carryover*}

(19) Subsection R401.2, "Compliance" 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 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. Point approach in Section R407."

{*Proposed COH Amendment to include Section R407*}

(20) Subsection R401.2.1, "Tropical zone" 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)~~] 5,000 feet above sea level shall be deemed to comply with this chapter provided that the following conditions are met:

1. Not more than one-half of the [~~*occupied* space~~] dwelling unit area is air conditioned.
2. The [~~*occupied* space~~] dwelling unit is not heated.
3. Solar, wind, or other renewable energy source supplies not less than [~~80~~] 90 percent of the energy for service water heating.

   Exception: A water heating device as approved via Solar Hot Water Heater Variance by the Department of Business, Economic Development & Tourism, Hawai'i State Energy Office.

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

Table 401.2.1
Vertical Fenestration Glazing SHGC Requirements

Projection Factor (pf) of overhang from base of	SHGC

average vertical fenestration glazing sill*	
< 0.30	0.25
0.30 – 0.49	0.40
≥ 0.50	N/A

*Exceptions:

a. North-facing vertical fenestration glazing with pf > 0.20 are exempt from SHGC requirements. Overhangs shall extend 2 feet on each side of vertical fenestration glazing or to nearest wall, whichever is less.
b. Jalousie windows are exempt from SHGC requirements.
c. "N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N".

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

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

[~~6~~]7. [~~The exterior roof surface complies with one of the options in Table C402.3 or the roof or ceiling has insulation with an R-value of R-15 or greater. Where attics are present, attics above the insulation are vented and attics below the insulation are unvented.~~] 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.

[~~7. Roof surfaces have a slope of not less than onefourth unit vertical in 12 units horizontal (21-percent slope). The finished roof does not have water accumulation areas.~~]

8. Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each habitable room. Alternatively, equivalent ventilation of 2 air changes per hour is provided by a mechanical ventilation fan.
9. Bedrooms with exterior walls facing two different directions have operable fenestration on exterior walls facing two different directions.
10. Interior doors to bedrooms are capable of being secured in the open position.

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

{*Proposed State Amendment (18) include Table 401.2.1 State Amendment (20) and COH 2015 Amendment Carryover*}

(21) Subsection R401.3, "Certificate (Mandatory)" of the International Energy Conservation Code is amended to read as follows:

"**R401.3 Certificate (Mandatory).** A permanent certificate shall be completed by the builder or [~~other approved party~~] registered design professional and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall:

1. List the predominant *R*-values of insulation installed in or on ceiling/roof, walls, [~~foundation components such as slabs, basement walls, crawl space walls and floors~~] and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area.
2. List the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be *listed* for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.
3. Indicate which areas have been designed and constructed as conditioned or unconditioned space.
4. Include the following text: "The addition of mechanical cooling or heating to an unconditioned space requires a permit. The addition of cooling without proper design and

construction can have adverse health, safety, and conservation consequences.”””

{*Proposed COH 2015 Amendment Carryover*}

(22) Subsection 401.3.1, “Sampling” is added to the International Energy Conservation Code 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.”

{*Proposed State Amendment (19)*}

(23) Subsection 402.1, “General (Prescriptive)” 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.

Exceptions:

1. 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.

1.1 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.

1.2 Those that do not contain conditioned space.

2. Log homes designed in accordance with ICC 400.

3. Dwellings with permitted, off-grid, self supplying photovoltaic with battery back up.”

{*Proposed COH Amendment*}

(24) Subsection R402.1.2. “Insulation and fenestration criteria” of the International Energy Conservation Code is amended to read as follows:

“**R402.1.2 Insulation and fenestration criteria.**

The *building thermal envelope* shall meet the requirements of Table R402.1.2, [~~based on the climate zone specified in Chapter 3~~]

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

{*Proposed State Amendment (22) COH 2015 Carryover*}

(25) TABLE R402.1.2., "INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT" 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]

CLIMATE ZONE	FENES-TRATION *U*-FACTOR[b]	SKYLIGHT *U*-FACTOR [b]	GLAZED FENES-TRATION SHGC [b, c, g]	CEILING *R*-VALUE [d]	WOOD FRAME WALL *R*-VALUE [d]	MASS WALL *R*-VALUE [e, f]	FLOOR *R*-VALUE	BASEMENT WALL *R*-VALUE	SLAB *R*-VALUE & DEPTH	CRAWL SPACE WALL *R*-VALUE
1	NR	0.75	0.25	30	13	3/4 or NR	0	0	0	0

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. R402.1.2 and R402.2 allow 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."

{*Proposed State Amendment (21) and COH 2015 Amendment Carryover*}

(26) Subsection R402.2, "Specific insulation requirements (Prescriptive)" 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~~] 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."

{*Proposed State Amendment (22) COH 2015 Carryover*}

(27) Subsection R402.2.5, "Mass walls" of the International Energy Conservation Code is amended to read as follows:

"**R402.2.5 Mass walls.** Mass walls where used as a component of the building thermal envelope shall be one of the following:

1. Above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick nut not brick veneer, adobe, compressed earth block, rammed earth, and solid timber/logs.

2. Any other walls having a heat capacity greater than or equal to 6 Btu/ft^2 x °F (123 kJ/m^2 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."

{*Proposed State Amendment (23)*}

(28) Subsection R402.3.2, "Glazed fenestration SHGC" 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 fenestrations 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 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 be prohibited.

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

{*Proposed State Amendment (24) and COH Carryover*}

(29) Subsection R402.4.1.2, "Testing" of the International Energy Conservation Code is amended to read as follows:

"**R402.4.1.2 Testing.** The building or dwelling unit shall 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 RESNET/ICC 380, 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*.

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, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be 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."

{*Proposed COH Amendment*}

(30) Subsection R403.5.5, "Solar water heating" 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.

Exception: A water heating device as approved via Solar Hot Water Heater Variance by the Department of Business, Economic Development & Tourism, Hawai'i State Energy Office."

{*Proposed State Amendment (25) and COH Carryover*}

(31) Subsection R403.6.2, "Ceiling fans" 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 habitable 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."

{*Proposed State Amendment (26)*}

(32) Section R407, "R407 POINTS OPTION" is added to the International Energy Conservation Code 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 Sections R401.2.1, R402.1.2 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

		Standard Home Points	**Tropical Home Points**
Wood Framed			
Wall Insulation (Must choose 1)	No Cavity Wall Insulation	Not Applicable	0
	R-13 Cavity Wall Insulation	0	1

	R-13 Wall Insulation + high reflectance walls[4]	1	2
	R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances[5]	1	2
	R-13 Wall Insulation + exterior shading wpf=0.3[6]	1	2
Roof Insulation (Must choose 1)	R-19 Roof Insulation	-1	0
	R-19 Roof Insulation + Cool roof membrane[1] or Radiant Barrier[3]	0	1
	R-19 Roof Insulation + Attic Venting[2]	0	1
	R-30 Roof Insulation	0	1
	R-13 Roof Insulation + Cool roof membrane[1] or Radiant Barrier[3]	Not Applicable	0
Mechanical / Electrical Systems (Choose ONLY if applies to scope of work)	Ductless Air Conditioner[7]	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 installed	Not Applicable	2
Must choose if applies to new construction and/or additions (House floor area to be considered as existing dwelling size plus new square footage)	House floor area ≤ 1,000 SF	1	1
	House floor area ≥ 2,500 SF	-1	-1
	Energy Star Fans[8]	1	1
	Install 1 kW or greater of solar electric	1	1
	Reduce fenestration from 14% to 10%	Not Applicable	-1

Metal Framed			
Wall Insulation (Must choose 1)	No cavity wall insulation	Not Applicable	0
	R-13 + R 3 Wall Insulation	0	1
	R-13 cavity Wall Insulation + R-0	-1	0
	R-13 Wall Insulation + high reflectance walls[4]	0	1
	R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances[5]	1	2
	R-13 Wall Insulation + exterior shading wpf=0.3[6]	0	1
Roof Insulation (Must choose 1)	R-30 Roof Insulation	0	1
	R-19 Roof Insulation	-1	0
	R-19 + Cool roof membrane[1] or Radiant Barrier[3]	0	1
	R-19 Roof Insulation + Attic Venting[2]	0	1
	R-13 + Cool roof membrane[1] or Radiant Barrier[3]	Not Applicable	0
Mechanical / Electrical Systems (Choose ONLY if applies to scope of work)	Ductless Air Conditioner[7]	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 installed	Not Applicable	2
Must choose if applies to new construction and/or additions (house floor area to be considered as existing dwelling size plus new square footage)	House floor area ≤ 1,000 SF	1	1
	House floor area ≥ 2,500 SF	-1	-1
	Energy Star Fans[7]	1	1
	Install 1 kW or greater of solar electric	1	1
	Reduce fenestration from 14% to 10%	Not Applicable	-1

SF = Square Feet

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^2 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 final inspection.

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 habitable space that is not used as a bedroom."

(33) Subsection R501.4, "Compliance" 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 regulations for *alterations, repairs, additions* and changes of occupancy or relocation, *[~~respectively, in the International Residential Code, International Building Code, International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code and NFPA 70~~]* as adopted by the code official."

{*Proposed State Amendment (28)*}

(34) Subsection R502.1.3. Subsection R502.1.3 Existing plus addition compliance (Tropical Zone) is added the International Energy Conservation Code to read as follows:

"**R502.1.3 Existing plus addition compliance (Tropical Zone).** Building additions may comply with Section R401.2.1."

{*Proposed COH Amendment to allow for additions to comply with Tropical Zone provisions.}*

(35) Subsection R503.1.1, "Building envelope" of the International Energy Conservation Code is amended to read as follows:

"**R503.1.1 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 shall not be required to comply with the requirements for new construction provided that 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 re-cover.
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.~~] a roof replacement shall meet one of the following:
   a. R-30 cavity insulation or the cool roof requirements in Section C402.3 for *residential buildings.*
   b. R-19 cavity insulation or the cool roof requirements in Section C402.3 for Tropical Zone *residential buildings.*
   c. When uninsulated roof sheathing is exposed during alteration, at least two of the following must be installed:
      1. Energy Star compliant roof covering;
      2. Radiant barrier;
      3. Attic ventilation via solar attic fans or ridge ventilation of gable ventilation; or
      4. A minimum of one exception listed in C402.3.

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

(36) Subsection R503.1.2, "Change in space conditioning" of the International Energy Conservation Code is amended to read as follows:

"**R503.1.2 Existing plus alteration compliance (Tropical Zone).** Building alterations may comply with Section R401.2.1."

(37) Subsection R503.2, "Change in space conditioning" 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.

Exceptions:

1. 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.
2. When specified in the tropical zone, and the total conditioned space does not exceed 50% of the habitable floor area, and, R-19 is installed over the conditioned space, and Split ductless air conditioner systems with a SEER rating in the top 25% of readily available units are installed."