A BILL FOR AN ORDINANCE

RELATING TO THE ADOPTION OF THE HAWAIʻI STATE ENERGY CODE.

BE IT ORDAINED by the People of the City and County of Honolulu:

SECTION 1. Purpose. The purpose of this ordinance is to update the Building Energy Conservation Code of the City and County of Honolulu through the adoption of the Hawaiʻi State Energy Code (December 15, 2020), subject to the local amendments herein.

SECTION 2. Chapter 16B, Revised Ordinances of Honolulu 2021 ("Building Energy Conservation Code"), is repealed.

SECTION 3. The Revised Ordinances of Honolulu 2021 is amended by adding a new Chapter 16B to read as follows:

"**CHAPTER 16B: BUILDING ENERGY CONSERVATION CODE**

ARTICLE 1: BUILDING ENERGY CONSERVATION CODE

§ 16B-1.1 Adoption of the State Energy Code.

The Hawaiʻi State Energy Code (SEC), as adopted by the State of Hawaiʻi on December 15, 2020, which adopts, with modifications, the International Energy Conservation Code, 2018 edition (IECC), as copyrighted by the International Code Council, is adopted by reference and made a part hereof, subject to the following amendments, which, unless stated otherwise, are in the form of amendments to the IECC 2018 edition:

(1) Amending Section C101.1. Section C101.1 is amended to read:

C101.1 Title.

This code shall be known as the Building Energy Conservation Code (BECC) of the City and County of Honolulu (CCH) or the CCH BECC. It is referred to herein as "this code."

(2) Amending Section C101.3. Section C101.3 is amended to read:

C101.3 Intent. This chapter sets forth minimum requirements for the design and construction of buildings for the effective use of energy and is intended to provide

flexibility to allow the use of innovative approaches and techniques to achieve a reduction of greenhouse gas emissions from buildings. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

These measures are intended to help buildings have lower energy costs, improved grid stability, reduced greenhouse gas emissions, and increased resilience from current and future climate impacts.

(3) Amending Section C101.5. Section C101.5 is amended to read:

C101.5 Compliance. Commercial buildings shall meet the provisions of IECC. Compliance and enforcement procedures are in accordance with ROH Chapter 16 Article 10.

(4) Adding Section C103.1. Section C103.1 is added to read:

C103.1 General. When the requirements in this code apply to a building as specified in Section C101.4, plans, specifications, or other construction documents submitted for a building, electrical, or plumbing permit required by the jurisdiction must comply with this code and will be prepared, designed, approved, and observed by a design professional. The responsible design professional shall provide on the plans a signed statement certifying that the project is in compliance 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 HRS Chapter 464.

(5) Adding Section C103.2. Section C103.2 is added to read:

C103.2 Information on construction documents. Construction documents must be drawn to scale upon acceptable material or submitted in an electronic form acceptable to the code official. Construction documents must be of sufficient clarity to indicate the location, nature, and extent of work proposed and show, in sufficient detail, pertinent data, and features of the building, systems, and equipment as herein governed. Details must include, but are not limited to the following, as applicable:

(a) Insulation materials and their thermal resistance (R-values);

(b) Fenestration U-Factors and solar heat gain coefficients (SHGCs);

(c) Area-weighted U-factor and SHGC calculations;

(d) Mechanical system design criteria and power requirements;

(e) Mechanical and service water heating system and equipment types, sizes and efficiencies;

(f) Economizer description;

(g) Equipment and system controls;

(h) Fan motor horsepower (hp) and controls;

(i) Duct sealing, duct and pipe insulation and location;

(j) Lighting fixtures schedule with wattage and control narrative;

(k) Location of daylight zones on floor plans;

(l) Air sealing details;

(m) Electric vehicle ready infrastructure; and

(n) Solar ready infrastructure.

All plans, reports, and documents must be certified by the project design professional or engineer, using the appropriate form shown below and submitted to the code official certifying that the plans and documents conform to the requirements of this code.

CITY AND COUNTY OF HONOLULU
REVISED ORDINANCES OF HONOLULU 2021
CHAPTER 16B

To the best of my knowledge, this project's design substantially conforms to the Building Energy Conservation Code for:

_____ Building Component Systems
_____ Electrical Component Systems
_____ Mechanical Component Systems

Signature: _____Date: _____
Name: _____
Title: _____
License No.: _____

Include only those items that the signator is responsible for. This block shall be on the first sheet of the pertinent plan, e.g. architectural, electrical, and mechanical. The above may be submitted separately to the Code Official in a letter including the identification of the building.

(6) Adding Section C104.1. Section C104.1 is added to read:

C104.1 Fees. Prescribed fees must comply with ROH Chapter 18.

(7) Adding Section C105.2. Section C105.2 is added to read:

C105.2 Required inspections. Inspections must comply with ROH Chapter 16.

(8) Adding Section C105.2.6. Section C105.2.6 is added to read:

C105.2.6 Final inspection. The building must have a final inspection and cannot be occupied until approved. The final inspection must include verification of the installation of and proper operation of all required building controls, and documentation verifying activities associated with required building commissioning have been conducted and any findings of noncompliance corrected.

(9) Adding Section C105.6. Section C105.6 is added to read:

C105.6 Re-inspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections must be made to achieve compliance with this code. The work or installation must then be

resubmitted to the responsible code official for inspection and testing as required by this code.

(10) Adding Section C105.7. Section C105.7 is added to read:

C105.7 Approval. After a building passes all tests and inspections required by this code, the responsible design professional must submit a confirmation letter to the code official certifying that the building has passed all of the tests and inspections required and stating that the building owner has received the Preliminary Commissioning Report, as required by IECC Section C408.2.4.

(11) Adding Section C108.1. Section C108.1 is added to read:

C108.1 Authority. Stop work order must comply with ROH Chapter 18.

(12) Adding Section C109.1. Section C109.1 is added to read:

C109.1 General. Appeals from the actions of the Code Official under this code will be heard by the building board of appeals, subject to and in accordance with the requirements of ROH Chapter 16.

(13) Amending Section C202. Section C202 ("GENERAL DEFINITIONS") is amended by:

(a) Amending the definition of "CODE OFFICIAL" to read:

CODE OFFICIAL means the director of planning and permitting or the director’s authorized representative.

(b) Amending the definition of "DWELLING UNIT" to read:

DWELLING UNIT means a building or portion thereof that contains living facilities, including permanent provisions for living, sleeping, eating, cooking and sanitation, as required by this code, for not more than one family, or a congregate residence for 16 or fewer persons.

(c) Adding the definition of "ELECTRIC VEHICLE (EV)" to read:

ELECTRIC VEHICLE (EV) means an automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric

motor that draws current from a building electrical service, EVSE, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current.

(d) Adding the definition of "ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)" to read:

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) means equipment for plug-in power transfer including the ungrounded, grounded and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personal protection system and all other fittings, devices, power outlets or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

(e) Adding the definition of "ELECTRIC VEHICLE CHARGER READY" to read:

ELECTRIC VEHICLE CHARGER READY means a designated parking stall that is provided with a dedicated circuit for future Level 2 EVSE. The circuit shall terminate in a suitable termination point such as a receptacle, pullbox, handhole, or junction box located in close proximity to the proposed location of the electric vehicle charger ready stall. The service panel shall include an over-current protection device.

(f) Adding the definition of "HIGH EFFICACY LIGHTING" to read:

HIGH-EFFICACY LIGHTING means an efficacy of not less than 70 lumens per watt for lamps and 55 lumens per watt for fixtures.

(g) Adding the definition of "LIGHT REFLECTANCE VALUE" to read:

LIGHT REFLECTANCE VALUE means the amount of visible light that reflects from a surface expressed as a percentage, where zero means a surface absorbs all light and 100 means a surface reflects all light.

(h) Adding the definition of "OCCUPIABLE SPACE" to read:

OCCUPIABLE SPACE means enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only occupied occasionally and for short periods of time.

(i) Adding the definition of "RENEWABLE ENERGY" to read:

RENEWABLE ENERGY by reference to HRS § 269-91, renewable energy means energy generated or produced using the following sources:

(1) Wind;

(2) Sun;

(3) Falling water;

(4) Biogas, including landfill and sewage-based digester gas;

(5) Geothermal;

(6) Ocean water, currents and waves, including ocean thermal energy conversion;

(7) Biomass, including biomass crops, agricultural, and animal residues and waste and municipal solid waste and other solid waste;

(8) Biofuels; and

(9) Hydrogen produced from renewable energy sources.

(j) Adding the definition of "SOLAR REFLECTANCE (SR)" to read:

SOLAR REFLECTANCE (SR) is the surface capability to reflect solar radiation back to the hemisphere. It is a measure of the solar reflectance and emissivity of materials that can be used as an indicator of how hot they are likely to become when solar radiation is incident on their surface.

(k) Adding the definition of "SOLAR REFLECTANCE INDEX (SRI)" to read:

SOLAR REFLECTANCE INDEX (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. SRI Incorporates both solar reflectance and thermal emissivity in a single value. SRI measures the roof's ability to reject solar heat, defined such

that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100.

(14) Amending Section C401.2. Section C401.2 is amended to read:

C401.2 Application. Commercial buildings shall comply with Section C409 and at least one of the following:

(a) The requirements of ANSHRAE/IESNA 90.1.

(b) The requirements of Section C402 through C405, and C408. In addition, new commercial buildings shall comply with Section C406.

(c) The requirements of Section C402.5, C403.2, C403.3 through C403.3.2, C403.4 through C403.4.2.3, C403.5, C403.7, C403.8.1 through C403.8.4, C403.10.1 through C403.10.3, C403.11, C403.12, C404, C405, C407 and C408. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

(15) Amending Section C402.1.1. Section C402.1.1 is amended to read:

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

(a) Those with a peak design rate of energy usage less than 3.4 Btu/h-ft^2 (10.7 W/m^2) or 1.0 watt per square foot (10.7 W/m^2) of floor area for space conditioning purposes.

(b) Unconditioned space that does not contain occupiable space.

(c) Greenhouses.

(16) Amending Section C402.2.2. Section C402.2.2 is amended to read:

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

Exception: Continuous insulation for above grade walls, and mass walls are not required when at least one of the following conditions is met:

1. Walls have a covering with a light reflectance value of equal to or greater than 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 and have an unpainted finish with or without a clear sealer.

(17) Amending Section C402.4.1.2. Section C402.4.1.2 is amended to read:

C402.4.1.2 Increased skylight area with daylight responsive controls. The skylight area shall be permitted to be not more than six percent of the roof area provided daylight responsive controls complying with Section C405.2.3.1 are installed in daylight zones under skylights.

Exception: Spaces where the designed general lighting power densities are less than 80 percent of the lighting power densities specified in Table C405.3.2(1) or C405.3.2(2).

(18) Amending Section C403.2.2. Section C403.2.2 is amended to read:

C403.2.2 Ventilation. Ventilation, either natural or mechanical, shall comply with the minimum standards of Hawaii Administrative Rules (HAR), Title 11 Department of Health Chapter 39 Air Conditioning and Ventilating.

(19) Amending Section C404.5. Section C404.5 is amended to read:

C404.5 Heated water supply piping. Heated water supply piping shall be in accordance with Sections C404.5.1, C404.5.2 or C404.5.3, as amended.

(20) Amending Section C404.5. Section C404.5 is amended by adding Section C404.5.3 to read:

C404.5.3 Pipe insulation method. Hot water piping system shall be insulated in accordance with Table C403.11.3.

(21) Amending Section C405.2. Section C405.2 is amended by adding Exceptions 4 and 5 to read:

Exceptions:

4. Spaces that use 80 percent or less of the lighting power densities (designated watts per square foot), as specified in Table C405.3.2(1) and Table C405.3.2(2), are exempt from Sections C405.2.2 (Time switch controls) and C405.2.3 (Daylight-responsive controls).

5. Corridors, passageways, lobbies, and other circulation spaces within multi-family buildings that are required to remain lighted for egress purposes.

(22) Amending Section C406.3. Section C406.3 is amended to read:

C406.3 Reduced lighting power. The total connected interior lighting power (watts) shall be calculated in accordance with Section C405.3.1 and shall be less than 80 percent of the lighting power density allowance specified in the code, in accordance with Section C405.3.2.

(23) Amending Section C408.2.4.1. Section C408.2.4.1 is amended to read:

C408.2.4.1 Acceptance of reports. Buildings, or portions thereof, shall not be considered acceptable for a certificate of occupancy 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.

(24) Amending Section C408.3.1. Section C408.3.1 is amended to read:

C408.3.1 Functional testing. Prior to issuance of a certificate of occupancy, the registered design professional shall provide 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 must be in accordance with Sections C408.3.1.1 through C408.3.1.3 for the applicable control type.

(25) Adding Section C409. Section C409 is added to read:

C409 Electric vehicle infrastructure. All newly-created parking stalls for newly-constructed residential multi-unit and commercial buildings must comply with one of the electric vehicle readiness compliance pathways specified in Section C409.1 (Prescriptive) or Section C409.2 (Point-based). For purposes of Section C409.1, Section C409.2, and Tables C409.1 and C409.2, the following apply:

(a) **COMMON AREA STALL** means any parking stall that is not intended to be assigned, sold, leased, or attached contractually to a specific dwelling unit or commercial establishment;

(b) **DEDICATED STALL** means any parking stall that is intended to be assigned, sold, leased, or attached contractually to a specific dwelling unit or commercial establishment; and

(c) When computation of the number of required electric vehicle charger ready stalls results in a fractional number with a fraction of 0.5 or greater, the number of required electric vehicle charger ready stalls required will be the next highest whole number.

C409.1 Baseline percentage electric vehicle readiness compliance path. Newly-constructed parking stalls for newly-constructed residential multi-unit buildings that add eight or more new parking stalls must be electric vehicle charger ready for at least 25 percent of the newly-added parking stalls. Newly-constructed parking stalls for newly-constructed commercial buildings that add 12 or more new parking stalls must be electric vehicle charger ready for at least 25 percent of the newly-added parking stalls. Construction Plans must reflect these developments.

Exceptions:

1. For retail uses under ROH Chapter 21, the total number of newly-added parking stalls that must be electric vehicle charger ready is reduced by 20 percent, rounding up to the next whole number.

2. For affordable housing units offered for sale, the total number of newly-added parking stalls that must be electric vehicle charger ready is reduced by 20 percent, rounding up to the next whole number.

3. For affordable housing units offered for rent, none of the total number of newly-added parking stalls are required to be electric vehicle charger ready.

Table C409.1
CHARGE METHODS ELECTRICAL RATING

Charge Method	Normal Supply Voltage (Volts)	Maximum Current (Amps – Continuous)	Supply power
AC Level 2 (enclosed attached residential garages only)	208 to 240V AC, 1-phase	Minimum 16A	208/240V AC/20-100A (16-80A continuous)
AC Level 2	208 to 240V AC, 1-phase	Minimum 32A	208/240V AC/40-100A (32-80A continuous)

C409.2 Points-based electric vehicle readiness compliance path. Newly-constructed parking stalls for newly-constructed residential multi-unit buildings that add eight or more parking stalls must be equipped to achieve no less than one point for every four parking stalls based on the EV charger capacity requirements and values listed in Table C409.2. Newly-constructed parking stalls for newly-constructed commercial buildings that add twelve or more parking stalls must be equipped to achieve no less than one point for every four parking stalls based on the capacity requirements and values listed in Table C409.2. Construction plans must demonstrate that the stalls are equipped to achieve no less than one point for every four parking stalls based on the capacity requirements and values listed in Table C406.8.2.

Retail uses under ROH Chapter 21 may only qualify for compliance points under Table C409.2 in the following two categories:

(a) Dedicated electric vehicle charger ready stalls; or

(b) Common Area Stall with electric vehicle supply equipment installed.

For purposes of compliance under this subsection, building developers may aggregate points across multiple projects and phases; provided that each individual project achieves no less than 10 percent compliance or adds a minimum of one electric vehicle charger ready stall per project, whichever is greater. All aggregation plans under this subsection must be identified and verified by a registered design professional and the building official at the time of permitting.

Exceptions:

1. For retail uses under ROH Chapter 21, the total number of points that would otherwise be required to comply with the points-based requirements under this subsection will be reduced by 20 percent.

2. For affordable housing units offered for sale, the total number of points that would otherwise be required to comply under this subsection will be reduced by 20 percent.

3. For affordable housing units offered for rent, no points under this subsection will be required.

Table C409.2
ELECTRIC VEHICLE READINESS POINT-BASED COMPLIANCE VALUES

			Compliance Points		
Electric Vehicle Charger Capacity Level	**Charging Rate (kW) at 208 Vac**	**Time to charge 50 kW battery (hrs)**	**Dedicated EV Charger Ready Stalls**	**Common Area EV Charger Ready Stalls**	**Common Area Stall w/ EVSE Installed**
Level 2, Minimum 16A	3.4	15	1 (in enclosed attached garage)	N/A	N/A
Level 2, Minimum 32A	6.7	7.5	1	4	7
Level 2, 64A to 80A	13.3	3.8	1	7	14
DCFC 50 kW (480/277 Vac 3-phase)	50.0	1.0	1	25	50

(26) Adding Appendix CB. Appendix CB is a voluntary provision and is added to read:

APPENDIX CB
VOLUNTARY STRETCH CODE - COMMERCIAL

SECTION CB101
GENERAL

CB101.1 Purpose. The purpose of this appendix is to support the City and County of Honolulu's energy and climate goals by accelerating the savings obtained from the commercial building sector through their local building energy codes. The City and County of Honolulu recognizes the need for Hawaiʻi to dramatically reduce greenhouse gas (GHG) emissions to avoid the most catastrophic effects of climate change. This voluntary Stretch Code is supportive of the State's goal of achieving net negative GHG emissions no later than 2045 and advancing implementation of the Oʻahu Resilience Strategy. In addition, the Stretch Code helps deliver significant co-benefits to the community of Honolulu, which will enhance the quality of life within the community. The Stretch Code

was developed to focus on the interaction of commercial buildings with the energy grid, supporting both grid and building decarbonization.

CB101.2 Scope. This code applies to commercial buildings, as defined by the *International Energy Conservation Code* and *ASHRAE Standard 90.1,* that opt to follow the voluntary Stretch Code.

CB101.3 Requirements. Commercial buildings shall comply with the requirements of sections indicated within Table CB101.3 and Sections CB103 through CB105.

Table CB101.3
REQUIREMENTS FOR STRETCH CODE

IECC SECTION	TITLE
Envelope	
C402.5	Air leakage-thermal envelope
Mechanical	
C403.1.1	Calculation of heating and cooling loads
C403.1.2	Data centers
C403.2	System design
C403.3	Heating and cooling equipment efficiencies
C403.4, except C403.4.3, C403.4.4 and C403.4.5	Heating and cooling system controls
C403.5.5	Economizer fault detection and diagnostics
C403.7, except C403.7.4.1	Ventilation and exhaust systems
C403.8, except C403.8.6	Fan and fan controls
C403.9	Large-diameter ceiling fans
C403.11, except C403.11.3	Refrigeration equipment performance
C403.12	Construction of HVAC system elements
C403.13	Mechanical systems located outside of the building thermal envelope
Service Water Heating	
C404	Service water heating

Electrical Power and Lighting	
C405, except C405.3	Electrical power and lighting systems
Maintenance and Commissioning	
C408.1.1	Building operations and maintenance information

SECTION CB102
DEFINITIONS

CB102.1 Definitions. The definitions contained in this section supplement or modify the definitions in the *International Energy Conservation Code* and *ASHRAE Standard 90.1.*

(a) **DEMAND RESPONSE SIGNAL** means a signal that indicates a price or a request to modify electricity consumption for a limited time period.

(b) **DEMAND RESPONSIVE CONTROL** means a control capable of receiving and automatically responding to a *demand response signal*.

(c) **ELECTRIC VEHICLE (EV)** means an automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current. Plug-in hybrid electric vehicles are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats and the like, are not considered electric vehicles.

(d) **ENERGY STORAGE SYSTEM (ESS)** means one or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

SECTION CB103
MINIMUM ENERGY EFFICIENCY

CB103.1 Minimum energy efficiency. All buildings shall be designed using ASHRAE Standard 90.1 Appendix G methodology. Buildings shall achieve a

savings reduction over baseline in accordance with Table 103.1 without the inclusion of on-site renewable energy or renewable energy purchases.

TABLE 103.1
MINIMUM ENERGY SAVINGS OVER BASELINE

Building Type	% Better Than Standard 90.1-2004
High-Rise Apartment	49%
Mid-Rise Apartment	60%
Hospital	56%
Large Hotel	38%
Small Hotel	51%
Large Office	55%
Medium Office	53%
Small Office	59%
Outpatient Healthcare	60%
Fast Food Restaurant	24%
Full Service Restaurant	39%
Standalone Retail	66%
Strip Mall Retail	66%
Primary School	65%
Secondary School	63%
Non-Refrigerated Warehouse	73%
All Others	57%

SECTION CB104
GRID INTEGRATION

CB104.1 General. Buildings shall be designed to comply with this section for the purpose of reducing demand and providing flexibility for the electric grid.

CB104.2 Demand responsive controls. All buildings shall provide controls and capability for grid integration through participation in demand response programs in accordance with this section.

CB104.2.1 Demand responsive water heating. Electric storage water heaters shall be provided with *demand responsive controls* in accordance with Table CB104.2.1 or another equivalent *approved demand responsive control*.

Exceptions:

1. Water heaters that provide a hot water delivery temperature of 180°F (82°C) or greater.

2. Water heaters that comply with Section IV, Part HLW or Section X of the ASME Boiler and Pressure Vessel Code.

3. Water heaters that use 3-phase electric power.

TABLE CB104.2.1
DEMAND RESPONSIVE WATER HEATING

Equipment Type	**SIZE CATEGORY (input)**	**Rated Water Storage Volume**	**Controls**	
			Manufactured Before 7/1/2025	Manufactured on or after 7/1/2025
Electric Storage Water heaters	≤ 12 kW	40-120 gallons	ANSI/CTA-2045-B Level 1 and also capable of initiating water heating to meet the temperature set point in response to a *demand response signal*.	ANSI/CTA-2045-B Level 2, except "Price Stream Communication" functionality as defined in the standard.

CB104.2.2 Heating and cooling systems controls. Heating and cooling systems shall be provided with controls in accordance with Sections CB104.3.1 through CB104.3.6.

CB104.2.2.1 Demand responsive controls. Buildings shall be provided with *demand responsive controls* capable of executing the following actions in response to a *demand response signal*:

(a) Automatically increasing the zone operating cooling set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).

(b) Automatically decreasing the zone operating heating set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).

(c) Automatically decreasing the zone operating cooling set point by the following values: 1°F (0.5°C), 2°F (1°C).

(d) Both ramp-up and ramp-down logic to prevent the building peak demand from exceeding that expected without the DR implementation.

Where a *demand response signal* is not available the heating and cooling system controls shall be capable of performing all other functions. Where thermostats are controlled by direct digital control including, but not limited to, an energy management system, the system shall be capable of *demand responsive control* and capable of adjusting all thermal setpoints to comply. The demand responsive controls shall comply with one of the following:

(a) **CB104.2.2.1.1 Air conditioners and heat pumps with two or more stages of control and cooling capacity of less than 65,000 Btu/h.** Thermostats for Air conditioners and heat pumps with two or more stages of control and a cooling capacity less than 65,000 Btu/h shall be provided with a *demand responsive control* that complies with the communication and performance requirements of AHRI 1380.

(b) **CB104.2.2.1.2 All other HVAC systems.** Thermostats for HVAC systems shall be provided with a *demand responsive control* that complies with one of the following:

(1) Certified Open ADR 2.0a VEN, as specified under Clause 11, Conformance.

(2) Certified Open ADR 2.0b VEN, as specified under Clause 11, Conformance.

(3) Certified by the manufacturer as being capable of responding to a *demand response signal* from a certified Open ADR 2.0b VEN by automatically implementing the control functions requested by the VEN for the equipment it controls.

(4) IEC 62746-10-1.

(5) The communication protocol required by a controlling entity, such as a utility or service provider, to participate in an automated demand response program.

(6) The physical configuration and communication protocol of CTA 2045-A or CTA 2045-B.

Exceptions:

1. Group I occupancies.
2. Group H occupancies.
3. Controls serving *data center systems.*
4. Occupancies or applications requiring precision in indoor temperature control as *approved* by the *code official*.

CB104.2.3 Energy storage readiness. Buildings shall comply with one of CB104.2.3.1 or CB104.2.3.2.

CB104.2.3.1 Electrical energy storage energy capacity. Each building shall have an ESS with rated energy capacity and rated storage capacity as follows:

(a) ESS rated energy capacity (kWh) ≥ 1.0 x Installed PV System Rated Power (kW_{DC}).

(b) ESS rated power capacity (kW) ≥ 0.25 x Installed PV System Rated Power (kW_{DC})

Exception: DC-coupled battery systems shall comply with energy capacity only.

CB104.2.3.2 Electrical energy storage system ready. Each building shall have a reserved ESS-ready area to accommodate future electrical storage meeting the following electrical criteria:

(a) Energy storage system rated energy capacity (kWh) ≥ Area of three largest stories (ft^2) x 0.0008 kWh/ft.

(b) Energy storage system rated power capacity (kW) ≥ Area of three largest stories (ft^2) x 0.0002 kW/ft^2.

CB104.2.3.2.1 ESS-ready location. Each ESS-ready area shall be located in accordance with Section 1207 of the *International Fire Code.*

CB104.2.3.2.2 ESS-ready minimum area requirements. Each ESS-ready area shall be sized in accordance with the designated rating of the planned

system UL9540 or UL9540a. Where rated to UL9540a, the spacing shall be per the manufacturer's instructions.

CB104.2.3.2.3 Electrical distribution equipment. The onsite electrical distribution equipment shall have sufficient capacity, rating, and space to allow installation of overcurrent devices and circuit wiring in accordance with NFPA 70 for future electrical ESS installation meeting the criteria of Section CB104.2.3.1.

CB104.2.3.2.4 Information on construction documents. Construction documents shall include the following information for ESS systems:

(a) Location reserved for inverters, metering equipment, ESS, and a pathway reserved for routing of raceways or conduit from the renewable energy system to the point of interconnection with the electrical service and the ESS.

(b) Location and layout of a designated area for ESS.

(c) Rated energy capacity and rated power capacity of the installed or planned ESS.

CB104.3 Demand Responsive Performance. Buildings shall demonstrate designed and modeled grid integration in accordance with this section.

CB104.3.1 Grid Peak Contribution. Buildings shall demonstrate an average reduction in grid-delivered electricity demand during on-peak hours. Buildings shall achieve a Grid Peak Contribution Improvement over baseline in accordance with Table 104.3.1 without the inclusion of on-site renewable energy or renewable energy purchases. The Annual Grid Peak Contribution Improvement shall be calculated using the following equations:

$$GPCI_{annual} = \frac{(GPCI_1 + GPCI_2 + \cdots + GPCI_{365})}{365} \quad \text{(Equation 104.3.1.1)}$$

$$GPCI_n = \frac{(D_{base,on\ peak} - D_{proposed,on\ peak})}{D_{base,on\ peak}} \quad \text{(Equation 104.3.1.2)}$$

Where:

$GPCI_{annual}$ = Annual average Grid Peak Contribution Improvement.

$GPCI_n$ = Grid Peak Contribution Improvement for day *n.*

$D_{base,\ on\ peak}$ = Average of the baseline building net electricity demand during on-peak hours.

$D_{proposed,\ on\ peak}$ = Average of the proposed building net electricity demand during on-peak hours.

On-peak hours = those hours beginning at 5 pm (hour 17) and ending at 10 pm (hour 22), for all days of the year.

TABLE 104.3.1
MINIMUM ANNUAL GRID PEAK CONTRIBUTION IMPROVEMENT OVER BASELINE

Building Type	**Minimum Annual GPCI**
High-Rise Apartment	54%
Mid-Rise Apartment	66%
Hospital	61%
Large Hotel	42%
Small Hotel	56%
Large Office	60%
Medium Office	58%
Small Office	65%
Outpatient Healthcare	66%
Fast Food Restaurant	26%
Full Service Restaurant	43%
Standalone Retail	72%
Strip Mall Retail	72%
Primary School	71%
Secondary School	69%
Non-Refrigerated Warehouse	80%
All Others	63%

CB104.3.2 Demand Flexibility Capability. Buildings shall demonstrate the ability to reduce net grid-delivered electricity demand averaged over a period of four hours, without changing indoor air temperatures by more than 4°F (2°C). Buildings shall demonstrate a Demand Flexibility Capability (DF) of no less than 10% using the following equations:

$$DF = \frac{D_S}{D_{AMRD}} \quad \text{(Equation 104.3.2.1)}$$

$$D_S = \frac{D_{WH,1}+D_{WH,2}+D_{WH,3}+D_{WH,4}}{4} \quad \text{(Equation 104.3.2.2)}$$

$$D_{WH,n} = D_{proposed,n} - D_{flexible,n} \quad \text{(Equation 104.3.2.3)}$$

$$D_{AMRD} = \frac{D_{N10}}{10} \quad \text{(Equation 104.3.2.4)}$$

Where:

DF = Demand Flexibility Capability.

D_s = Demand shed (kW).

$D_{WH, n}$ = Building net electricity demand reduction (kW) during Window Hour n, where n = 1, 2, 3, or 4.

Window Hours = the four hours constituting a continuous time period including the single hour of highest net electricity demand over the year and the three hours of highest net electricity demand adjacent to that hour.

$D_{proposed,n}$ = Hourly net electricity demand (kW) of the proposed building, not including the effects of behind-the-meter demand flexibility strategies.

$D_{flexible,n}$ = Hourly net electricity demand (kW) of the proposed building, including the effects of non-scheduled behind-the-meter demand flexibility strategies (including, but not limited to, space temperature set point adjustments, discharge of battery ESS, HVAC compressor or fan speed adjustments, or water heating staging/control).

D_{AMRD} = Building adjusted maximum reference demand (kW).

D_{N10} = sum of building net electric demand of the 10 highest net demand hours annually (kW).

SECTION CB105
COMMISSIONING AND OPERATIONS

CB105.1 General. Buildings shall be designed and operated to aid in compliance with energy reporting, benchmarking, and performance-based requirements from the jurisdiction or building owner to aid in reducing overall energy consumption and grid impacts and diagnosing performance issues.

CB105.2 Mechanical systems and service water-heating systems commissioning and completion requirements. Buildings containing 25,000 square feet or more of conditioned space shall comply with the commissioning and completion requirements of Section C408.2. Exceptions for system sizing shall not be allowed under the application of this stretch code.

CB105.3 Energy reporting. A data acquisition system having the capability to store the data from the required meters and other sensing devices is required. Data stored by the data acquisition system shall be shared with the jurisdiction on an annual basis for no less than 36 months. Data shall be provided in hourly, daily, monthly, and yearly logged data for each end-use category required by Table CB105.3.

TABLE CB105.3
ENERGY USE CATEGORIES

LOAD CATEGORY	DESCRIPTION OF ENERGY USE
Total HVAC system	Heating, cooling and ventilation, including but not limited to fans, pumps, boilers, chillers, and water heating. Energy used by 120-volt equipment, or by 208/120-volt equipment that is located in a building where the main service is 480/277-volt power, is permitted to be excluded from total HVAC system energy use.
Interior lighting	Lighting systems located within the building.
Exterior lighting	Lighting systems located on the building site but not within the building.
Plug loads	Devices, appliances and equipment connected to convenience receptacle outlets.

Process load	Any single load that is not included in HVAC, lighting or plug load category and that exceeds 5 percent of the peak connected load of the whole building, including but not limited to data centers, manufacturing equipment, and commercial kitchens.
Electric vehicle charging	Electric vehicle charging loads.
Building operations and other miscellaneous	The remaining loads not included in this table, including but not limited to vertical transportation systems, automatic doors, motorized shading systems, ornamental fountains, ornamental fireplaces, swimming pools, in-ground spas and snow-melt systems.

SECTION CB106
REFERENCED STANDARDS

AHRI	Air Conditions, Heating and Refrigeration Institute 2311 Wilson Blvd. Suite 400 Arlington, VA 22201
1380-2019	Demand Response Through Variable Capacity HVAC System in Residential and Small Commercial Applications CB104.2.2.1.1
ASME	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990
ASME/BPVC-2019	Boiler and Pressure Vessel Code CB104.2.1
CTA	Consumer Technology Association 1919 S. Eads Street Arlington, VA 22202
ANSI/CTA-2045-B	Modular Communications Interface for Energy Management T104.2.1

ANSI/CTA-2045-A	2018 Modular Communication Interface for Energy Management CB104.2.2.1.2
IEC	International Electrotechnical Commission IEC Regional Centre for North America 446 Main Street 16th Floor Worcester, MA 01608
IEC 62746-10-1-2018	Systems interface between customer energy management system and the power management system Part 10-1: Open Automated demand response CB104.2.2.1.2
OpenADR	Open ADR Alliance 111 Deerwood Road Suite 200 San Roman, CA 94583
2.0a and 2.0b – 2019	Profile Specification Distributed Energy Resources CB104.2.2.1.2
UL	Underwriters Laboratories LLC 333 Pfingsten Road Northbrook, IL 60062
9540-2020	Standard for Energy Storage Systems and Equipment CB104.2.3.2.2
9540A-2019	Standard for Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems CB104.2.3.2.2

(27) Amending Section R101.5. Section R101.5 is amended to read:

R101.5 Compliance. Compliance and enforcement procedures are in accordance with ROH Chapter 16, Article 10, and Chapter 18, Article 7.

(28) Adding Section R103.1. Section R103.1 is added to read:

R103.1 General. Construction documents and other supporting data must be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved and observed by a duly licensed design

professional, as required by HRS Chapter 464. The responsible design professional must provide on the plans a signed statement certifying that the project is in compliance with this Section R103.2 of 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 HRS Chapter 464. Specifications and necessary computations need not be submitted when authorized by the code official.

(29) Adding Section R103.2. Section R103.2 is added to read:

R103.2. Information on construction documents. Construction documents must be drawn to scale upon suitable material or submitted in an electronic form acceptable to the code official. Construction documents must be of sufficient clarity to indicate the location, nature, and extent of work proposed and show, in sufficient detail, pertinent data, and features of the building, systems, and equipment as herein governed.

All plans, reports, and documents must be certified by the project design professional or engineer, using the appropriate form shown below and submitted to the code official certifying that the plans and documents conform to the requirements of this code.

CITY AND COUNTY OF HONOLULU
REVISED ORDINANCES OF HONOLULU 2021
CHAPTER 16B

To the best of my knowledge, this project's design substantially conforms to the Building Energy Conservation Code for:

_____ Building Component Systems
_____ Electrical Component Systems
_____ Mechanical Component Systems

Signature: _____Date: _____
Name: _____
Title: _____
License No.: _____

Include only those items that the signator is responsible for. This block shall be on the first sheet of the pertinent plan, e.g. architectural, electrical, and mechanical. The above may be submitted

separately to the code official in a letter including the identification of the building.

(30) Amending Section R202. Section R202 is amended to read:

Section R202 General Definitions.

(a) Add the definition of "High-Efficacy Lighting" to read:

HIGH-EFFICACY LIGHTING means an efficacy of not less than 70 lumens per watt for lamps and 55 lumens per watt for fixtures.

(b) Add the definition of "LIGHT REFLECTANCE VALUE" to read:

LIGHT REFLECTANCE VALUE means the amount of visible light that reflects from a surface expressed as a percentage, where zero means a surface absorbs all light and 100 means a surface reflects all light.

(c) Add the definition "OCCUPIABLE SPACE" to read:

OCCUPIABLE SPACE means an enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only occupied occasionally and for short periods of time.

(31) Amending Section R401.2. Section R401.2 is amended to read:

R401.2 Compliance. Buildings shall comply with Section R408 and either Sections R401.2.1, R401.2.2, R401.2.3, or R401.2.4. Single-family homes over 7,000 sf shall additionally comply with Section R401.3.

R401.2.1 Prescriptive compliance. Buildings shall comply with Sections R401 through R404.

R401.2.2 Total building performance. Buildings shall comply with Section R405.

R401.2.3 Energy rating index. Buildings shall comply with Section R406.

R401.2.4 Tropical zone. Buildings shall comply with Section R407.

(32) Amending Section R401.2.1. Section R401.2.1 is re-numbered to R407.1:

R407.1 Tropical zone. [no change in text]

(33) Amending Section R401.3. Section R401.3 is re-numbered to read R401.4:

R401.4 Certificate (Mandatory). [no change in text]

R401.4.1 Sampling. [no change in text]

(34) Adding Section R401.3. Section R401.3 is added to read:

R401.3 Large home compliance. Single-family homes greater than 7,000 square feet shall comply with Section R401.3.1. Single-family homes greater than 7,000 square feet that have 2,000 square feet or more of conditioned space shall comply with Sections R401.3.1 and R401.3.2.

(35) Adding Subsection R401.3.1. Subsection R401.3.1 is added to read:

R401.3.1 Minimum efficiency. Buildings shall comply with the following requirements, except where a requirement is preempted by a variance approved pursuant to HRS § 196-6.5. These measures shall be treated as mandatory, and no credit shall be taken for the measures in the compliance path selected for compliance with Section R401.2:

(a) Where used, installed electric water heaters, air conditioners over 2.5 tons (30,000 Btu), electric pool and spa pumps, and electric pool and spa heaters shall be smart appliances capable of responding to grid signals.

(b) Exterior walls shall have a minimum area-weighted initial solar reflectance of 0.30 or a minimum insulation R-value of R-13.

(c) Roofs shall be constructed with two of the following:

(1) A minimum insulation R-value of R-30.

(2) Attic venting in compliance with International Residential Code Section R806.1 Radiant barrier with an emittance of 0.05 or less, tested in accordance with ASTM C1371 or ASTM E408.

(3) Roofs, based on slope, shall meet either an initial or three-year aged solar reflectance index (SRI) value in accordance with Table R401.3.1.4.

Table R401.3.1.4
ROOF SOLAR REFLECTANCE INDEX

	Slope	Initial SRI	3-year aged SRI
Low-sloped roof	≤ 2:12	82	64
Steep-sloped roof	> 2:12	28	25

(d) High efficacy lighting shall be defined as 90 lumens per watt for the purpose of meeting Section R404 requirements.

(36) Adding Subsection R401.3.2. Subsection R401.3.2 is added to read:

R401.3.2 Additional efficiency. Buildings shall comply with the following requirements, except where a requirement is preempted by a variance approved pursuant to HRS § 196-6.5. These measures shall be treated as mandatory, and no credit shall be taken for the measures in the compliance path selected for compliance with Section R401.2:

(a) Compliance must be completed in accordance with Section R401.2.2 or R401.2.3.

(b) For projects complying via Section R406, maximum ERI value of 52 not including on-site power production calculated in accordance with RESNET/ICC 301.

(c) For projects complying via Section R405, must be 10% lower than the standard reference design.

(d) HVAC systems shall be multi-stage or variable capacity systems.

(e) Thermostats shall be provided with a *demand responsive control* that complies with the communication and performance requirements of AHRI 1380 and capable of communicating with the Virtual End Node (VEN) using a wired or wireless bi-directional communication pathway that provides the homeowner the ability to voluntarily participate in utility

demand response programs, where available. The thermostat shall be capable of executing the following actions in response to a *demand response signal*:

(1) Automatically increasing the zone operating set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).

(2) Automatically decreasing the zone operating set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).

(3) The thermostat shall be capable of performing all other functions provided by the control when the grid-integrated controls are not available.

(37) Amending Section R402.1. Section R402.1 is amended to read:

R402.1 General (Prescriptive). The building thermal envelope shall comply with the requirements of Sections R402.1.1 through R402.1.5.

Exceptions: 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/m^2) or 1.0 watt per square foot (10.7 W/m^2) of floor area for space conditioning purposes.

2. Unconditioned space that does not contain occupiable space.

(38) Amending Table R402.1.2. Row 1 of Table R402.1.2 (Climate Zone 1) is amended to read:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i,j]	FLOOR R-VALUE	BASEMENT' WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	CRAWL SPACE` WALL R-VALUE
1	NR	0.75	0.25	30	13	3 / 4	NR	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. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.
e. There are no SHGC requirements in the Marine Zone.
f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
g. Alternatively, insulation sufficient to fill the framing cavity, R-19 minimum.
h. The first value is cavity insulation, the second value is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation.
i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall. Therefore, as an example, "3/4 means R-4 cavity insulation is on the interior of the mass wall.
j. Exception: R-value for mass walls are not required if mass walls meet one of the following requirements:
(1) have a reflectance ≥ 0.64,
(2) have overhangs with a projection factor ≥ 0.3,
(3) Concrete, CMU and similar mass walls are 6 inches or greater in thickness, and have an unpainted finish with or without a clear sealer.

(39) Amending Section R402.2.5. Section R402.2.5 is amended to read:

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

(a) Above-ground walls of concrete block (concrete masonry units) CMU, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber or solid logs.

(b) Any wall having a heat capacity greater than or equal to 6 Btu/ft2·˚F (123 kJ/m^2·K).

(c) Mass walls shall comply with the insulation requirements of Table R402.1.2 or the U-factor requirements of Table R402.1.4.
Exceptions: Insulation or R-value for mass walls, indicated in Table R402.1.2, is not required when one of the following conditions is met:

1. Walls have a covering with a light reflectance value greater than or equal to 0.64;

2. Walls have overhangs with a projection factor greater than or equal to 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; or

3. Concrete, CMU and similar mass walls are 6 inches or greater in thickness and have an unpainted finish with or without a clear sealer.

(40) Amending Section R403.5.1. Section R403.5.1 is amended by deleting the word "Mandatory" and adding Exceptions 1 and 2 to read:

R403.5.1 Heated water circulation and temperature maintenance systems.

Exceptions:

1. Piping located under a floor slab.

2. Buried piping.

(41) Amending Section R403.5.1.1. Section R403.5.1.1 is amended to read:

R403.5.1.1 Circulation systems. Heated water circulation systems may be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Controls for circulating hot water system pumps shall start the pump based on the identification of a demand for hot water within the occupancy. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water.

(42) Amending Section R403.5.1.2. Section R403.5.1.2 is amended to read:

R403.5.1.2 Heat trace systems. Electric heat trace systems may comply with IEEE 515.1 or UL 515. Controls for such systems shall automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

(43) Amending Section R403.5.3. Section R403.5.3 is amended to read:

R403.5.3 Hot water pipe insulation (Prescriptive). Insulation for hot water piping with a thermal resistance, R-value, of not less than R-3 shall be applied.

Exceptions:

1. Piping located under a floor slab.

2. Buried piping.

3. Piping serving only one dwelling unit.

(44) Amending Section R403.6. Section R403.6 is amended to read:

R403.6 Mechanical ventilation (Mandatory). The building shall be provided with ventilation that complies with the requirements of the Housing Code, as specified in Chapter 16A, as applicable, or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

R403.6.1 Whole-house mechanical ventilation system fan efficacy. Fans used to provide whole-house mechanical ventilation shall meet the efficacy requirements of Table 403.6.1.

Exception: Where an air handler that is integral to tested and listed HVAC equipment is used to provide whole-house mechanical ventilation, the air handler shall be powered by an electronically commutated motor.

TABLE R403.6.1
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY (CFM/WATT)	AIR FLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom utility room	10	1.4 cfm/watt	< 90
Bathroom, utility room	90	2.8 cfm/watt	Any

For SI: 1 cfm = 28.3 L/min.
a. When tested in accordance with HVI Standard 916.

(45) Adding an exception to Section R403.6.2. Section R403.6.2 is amended by adding the exception to read:

Exception: For production home building, ceiling fan junction boxes shall be provided for bedrooms and the largest interior space that is not used as a bedroom, and ceiling fan equipment shall be provided as a buyer's option.

(46) Amending Section R404.1. Section R404.1 is amended by adding Section R404.1.2 to read:

R404.1.2 High-efficacy lighting. An efficacy of not less than 70 lumens per watt for lamps and 55 lumens per watt for fixtures.

(47) Adding Section R408. Section R408 is added to read:

SECTION R408
SOLAR AND ELECTRIC VEHICLE READINESS

R408.1 Solar conduit and electrical panel readiness. Construction documents shall indicate a location for inverters, metering equipment, battery equipment, energy storage equipment, and other equipment necessary to interconnect a residence with on-site solar energy generation facilities with the electrical grid in compliance with applicable laws, statutes, and utility tariffs. Construction documents shall indicate a pathway for routing of conduit from the

solar panel location to the point of interconnection with electrical service. New single-family detached dwellings, two-family detached dwellings, and duplexes shall install for each residence an electrical panel with reserved space to accommodate not less than a five Kilowatt (AC) photovoltaic system. New multifamily dwellings shall install an electrical panel that includes space reserved to accommodate a photovoltaic system: (1) sized to serve common area electrical loads, or (2) sized to the roof space available. The reserved space shall be clearly labeled as solar PV ready. All feeders and electrical distribution equipment, including switchgear, switchboards, and panel boards that will be fed simultaneously by the electrical grid and other power sources shall be sized to support the installation of future solar energy generation systems per the interconnection requirements of the Electrical Code. New residential buildings shall also install conduit not less than one and one-half inches to provide a pathway from the electrical panel to the inverter location and from the inverter location to the underside of the roof sufficient to allow future installation of solar equipment. If conduits are to be installed between separate buildings or other structures, construction documents shall provide sufficient details to show that compliance with the Electrical Code's restrictions on the number of power supplies to each building or other structure has been examined.

R408.2 Electric vehicle readiness. In addition to what is required by the Electrical Code, if a building permit application involves installation of an electrical panel and parking area for a multifamily dwelling of three stories or less or a detached dwelling or duplex, a dedicated receptacle or junction box for an electric vehicle must be provided with a minimum AC Level 2 charge (208 to 240V AC 1-phase minimum 16A) in each enclosed attached garage."

SECTION 4. Severability. If any provision of this ordinance, or the application thereof to any person or circumstances, is held invalid, the invalidity does not affect other provisions or applications of the ordinance that can be given effect without the invalid provision or application, and to this end the provisions of this ordinance are severable.

A BILL FOR AN ORDINANCE

SECTION 5. This ordinance takes effect 90 days after its approval.

INTRODUCED BY:

Tommy Waters (br)

DATE OF INTRODUCTION:

February 16, 2023
Honolulu, Hawaiʻi

Councilmembers

APPROVED AS TO FORM AND LEGALITY:

Deputy Corporation Counsel

APPROVED this _____day of _____, 20 _____.

RICK BLANGIARDI, Mayor
City and County of Honolulu