Presentation for County of Maui Council
CARE Committee
from the
Climate Action Advisory Committee
For Maui County

Proposal for Amendments to State of Hawaii IECC 2018 Residential Energy Code For Maui County
Submitted September 14, 2022

climate action advisory committee
For Maui County

Part I:
EV Readiness in New Construction

Rob Weltman

climate action advisory committee
For Maui County

Why EV Chargers in Residences and Businesses?

- 80-85% of charging happens at home across the US
- Residents of MUD (mostly apartment and condo buildings) are generally not able to provide EV charging on their own
- Retrofitting for EV charging also in single family homes may be prohibitive for lower income residents
- It will not be possible to achieve Maui's carbon reduction goals without transitioning ground transportation. Besides the State-wide goal of being overall carbon-negative by 2045, Maui has a goal of 100% EV ground transportation by 2045

climate action advisory committee
For Maui County

Cost of EV Station and Cost of Retrofit

- The average total cost per level 2 charger in a MUD pilot program in Columbus in 2018 was $3.5k
- The California Air Resource Board estimated the total cost per level 2 charger in 2020 to $2.5-3k in a non-residential building
- It estimated the saved retrofit cost to $7k per stall
- It is a major saving for single family residences and potentially a much larger saving for a MUD
- Typical costs for DC Fast Chargers
  - Networked 50kW DCFC – $28,000
  - Networked 150kW DCFC – $75,000
  - NetWorked 350kW DCFC – $140,000

climate action advisory committee
For Maui County

Definitions

- EV-capable: Conduit in place to parking stalls
- EV-ready: Conduit in place + at least 30A power and outlet to the parking stalls
- EV-installed: EV chargers in place and operational

climate action advisory committee
For Maui County

Proposal

- MUD (Multi-Unit Dwelling - Apartment building, Condo)
  - 70% of all parking stalls EV-capable
  - 20% EV-ready
  - 10% EV-installed
- One or two-family dwellings
  - 1 EV-ready space per dwelling unit
- Non-residential (10+ stalls)
  - 40% EV-capable
  - 10% EV-installed
- Chargers must be and remain operational
- Require sufficient PV to provide electricity for each charger to be used
- Building Alterations: where the work area exceeds 50 percent of the original building area or more than 10 parking spaces are substantially modified, are subject to the EV infrastructure requirements for both residential and commercial buildings.
- DC Fast-charger provision: For MUD and Commercial buildings, allow developers to substitute up to seven Level-2 charging spaces with one DC fast-charging space (minimum 20kW).

climate action advisory committee
For Maui County

References

1.http://www4.honolulu.gov/docushare/dsweb/Get/Document-237153/BILL25(2019).pdf

2.https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Building/Sacramento-Streamline/EV-Infrastructure-Reqs-in-CALGreen-Building-Code_April-2020.pdf?la=en#:~:text=The%202019%20California%20Green%20Building,to%20support%20future%20installation%20of

3.https://ww2.arb.ca.gov/sites/default/files/2020-09/CARB_Technical_Analysis_EV_Charging_Nonresidential_CALGreen_2019_2020_Intervening_Code.pdf

4.https://www.energycodes.gov/sites/default/files/2021-07/TechBrief_EV_Charging_July2021.pdf

5.https://governor.hawaii.gov/newsroom/latest-news/governors-office-news-release-governor-david-ige-signs-bills-to-set-carbon-neutral-goal-and-combat-climate-change/

climate action advisory committee
For Maui County

Part II:
Off-Grid and Photovoltaic

David E. Sellers, AIA

climate action advisory committee
For Maui County

Off-Grid Exemption Proposal:

The energy code is designed to cut carbon emissions by reducing energy demand.

- If you do not create carbon when you consume energy you can be exempt from energy code requirements.
- To avoid potentially costly requirements / upgrades to meet energy code buildings with Battery Based energy systems that provide all energy needed will be exempt from energy code requirements.

climate action advisory committee
For Maui County

Excerpt example from Hawaii Island energy code:

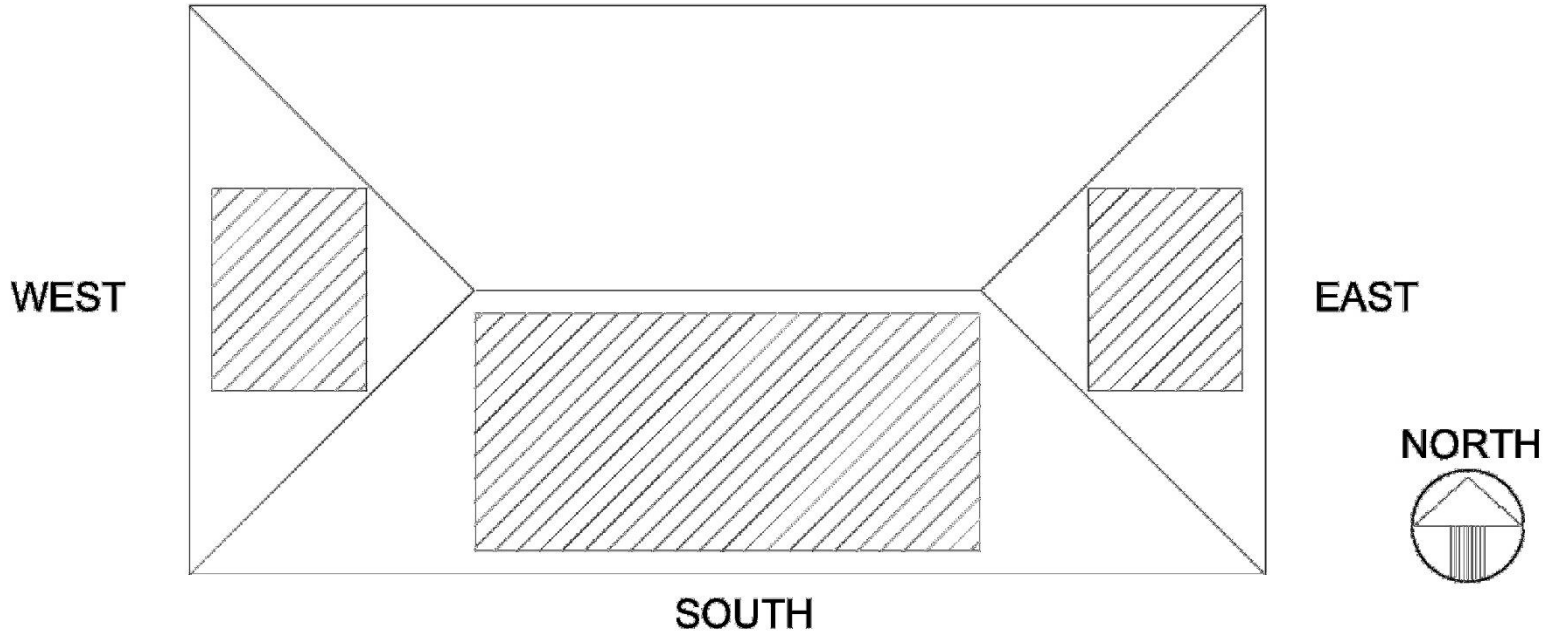
"R402.1 General (Prescriptive).
The *building thermal envelope* shall meet the requirements of Sections R402.1.1 through R402.1.5.

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

1. Those with a peak design rate of energy usage less than 3.4 Btu/h · ft² (10.7 W/m²) or 1.0 watt/ft² (10.7 W/m²) of floor area for space-conditioning purposes.
2. Unconditioned space that does not contain habitable space.
3. Unconditioned dwellings with enclosed habitable areas less than 1,100 square feet.
4. Dwellings with permitted, off-grid, self supplying photovoltaic with battery back up."

climate action advisory committee
For Maui County

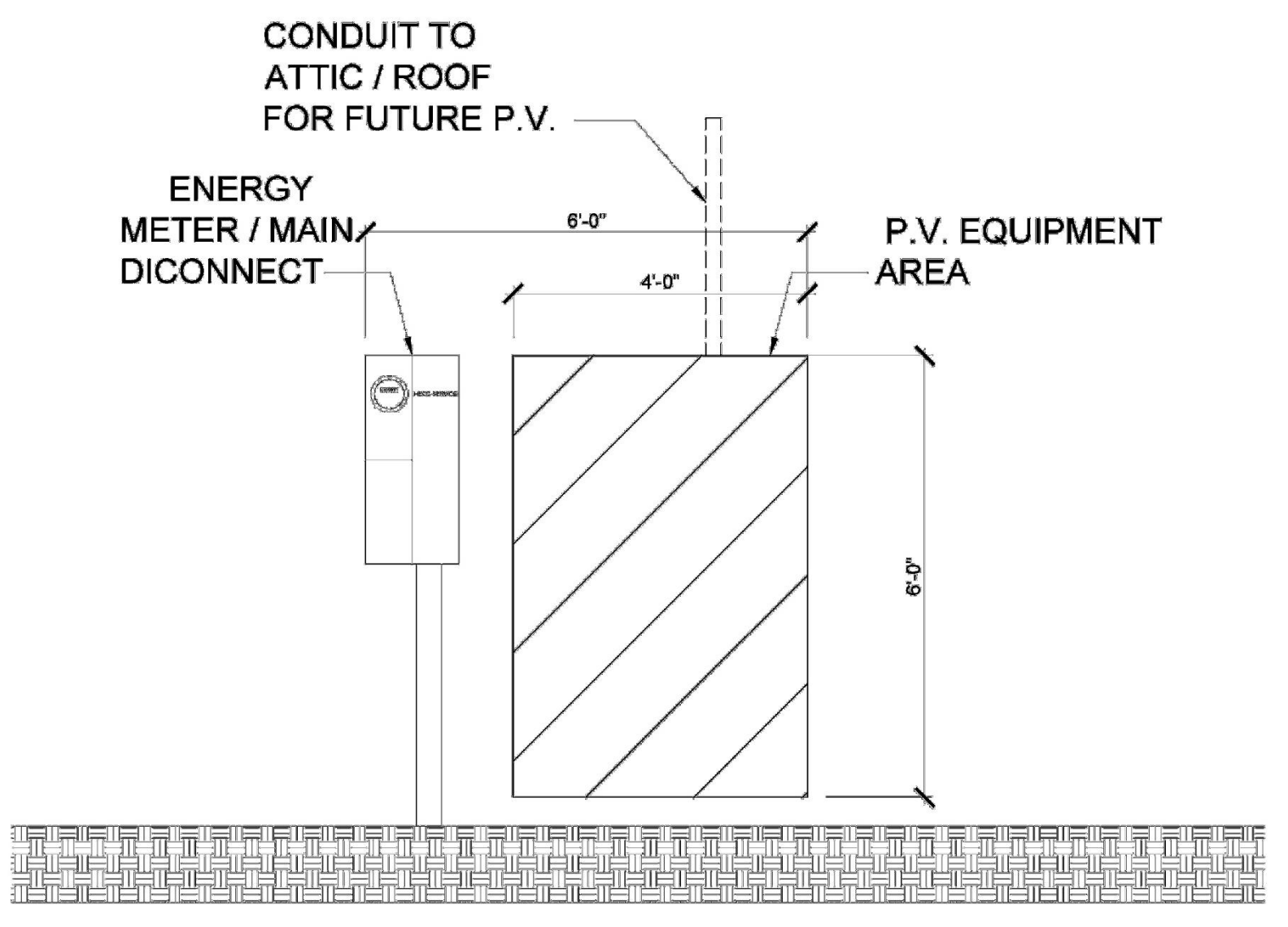
PV Ready Roof



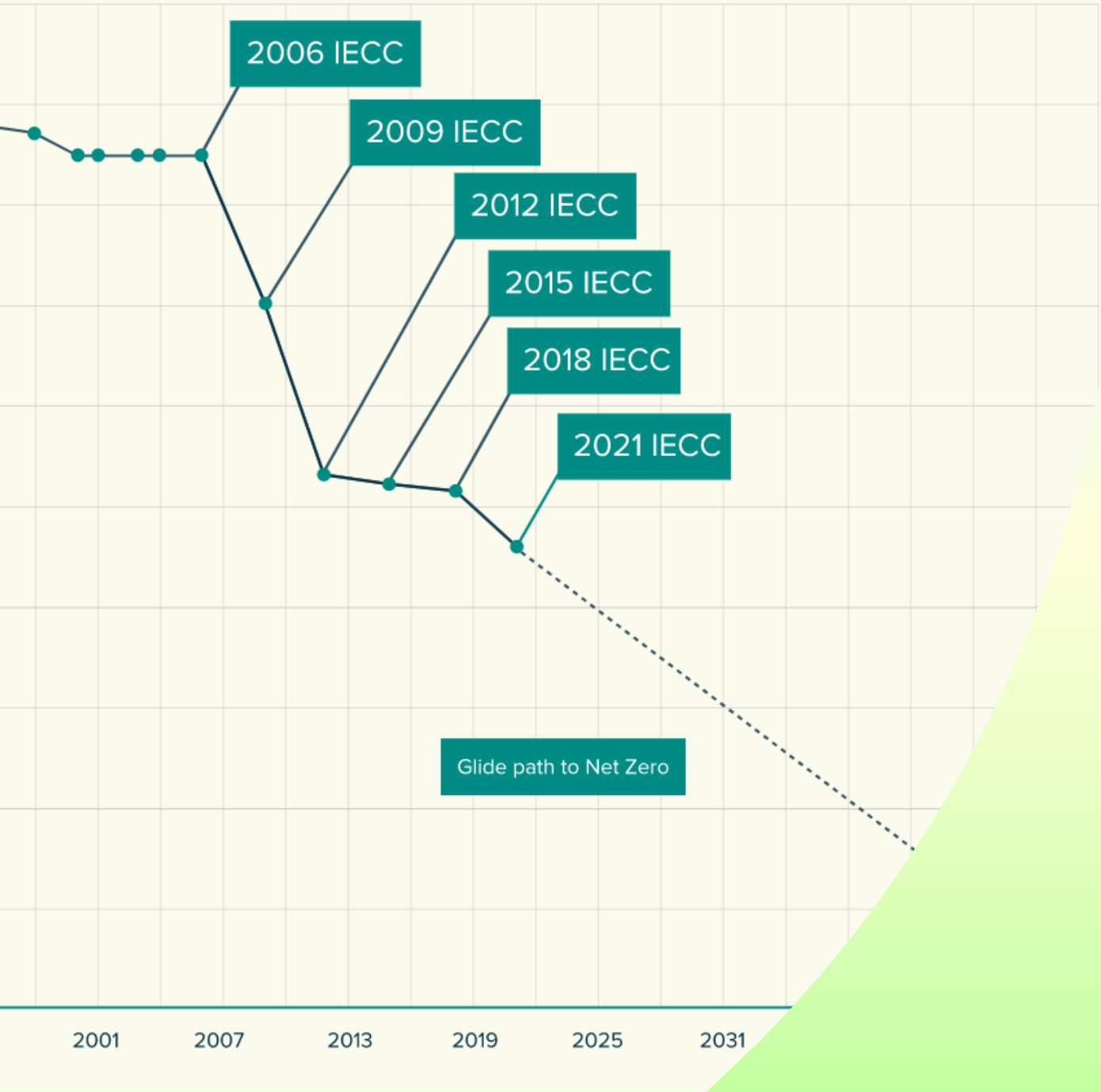
Plumbing vents and other roof penetrations to avoid center 3/4 of roof area on South, East and West faces.

climate action advisory committee
For Maui County

PV Ready Equipment



climate action advisory committee
For Maui County



Part III:

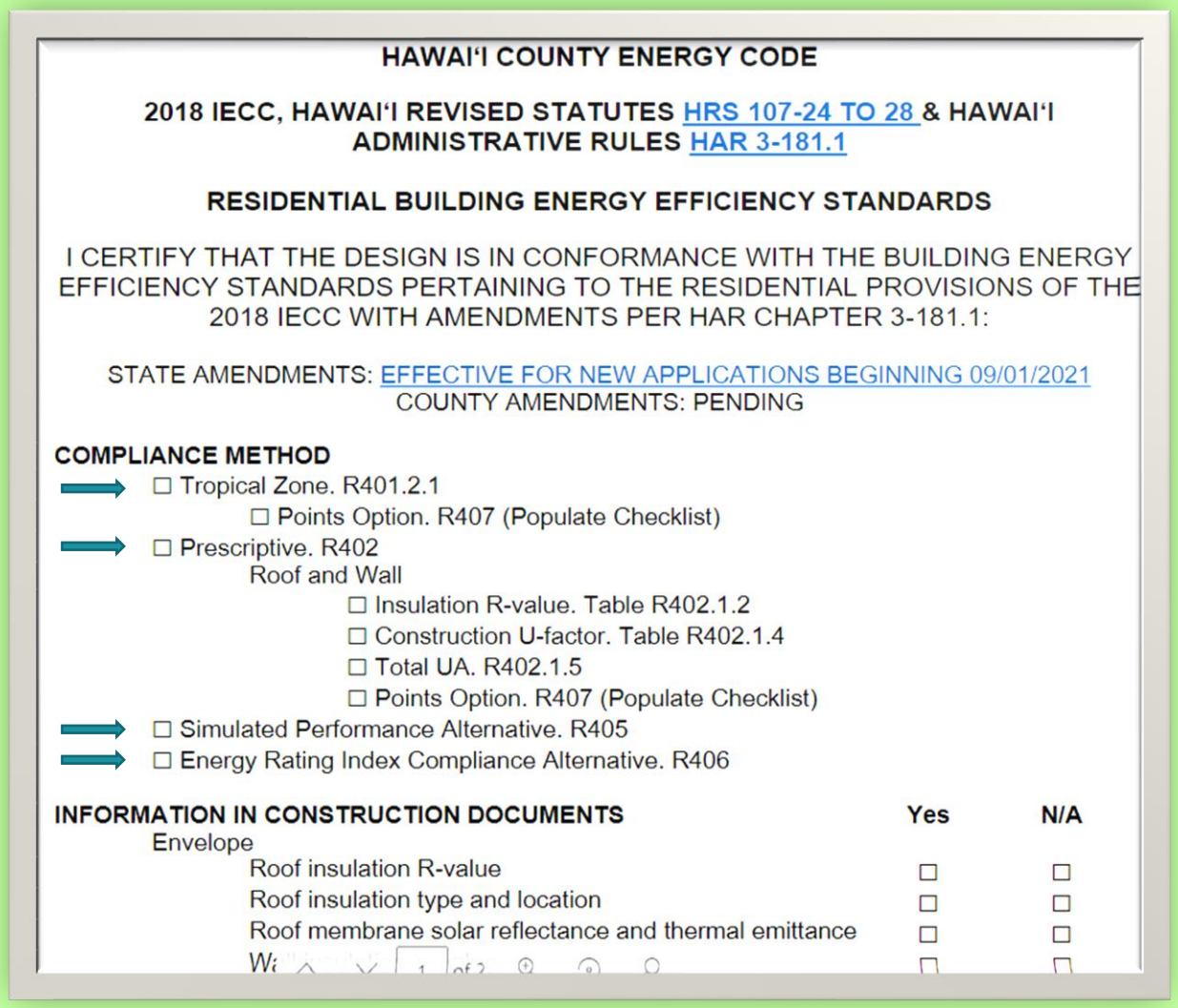
Additional Proposed Amendments to State of Hawaii IECC 2018 Residential Energy Code For Maui County

Presented by Green Building Hawaii

climate action advisory committee
For Maui County

Begin with Hawaii Amendments to 2018 IECC

- **Carryover from current Maui 2015**
  - NZE for Large Homes > 5,000 sf.
- **Look to BI and HNL County Amendments**
  - Strengthen Compliance and Certification Language Relative to State Code
- **Consider Impact to:**
  - Home Owners
  - Developers
  - Inspectors
  - Permitting Time
  - Enforceability



HAWAIʻI COUNTY ENERGY CODE

2018 IECC, HAWAIʻI REVISED STATUTES HRS 107-24 TO 28 & HAWAIʻI ADMINISTRATIVE RULES HAR 3-181.1

RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

I CERTIFY THAT THE DESIGN IS IN CONFORMANCE WITH THE BUILDING ENERGY EFFICIENCY STANDARDS PERTAINING TO THE RESIDENTIAL PROVISIONS OF THE 2018 IECC WITH AMENDMENTS PER HAR CHAPTER 3-181.1:

STATE AMENDMENTS: EFFECTIVE FOR NEW APPLICATIONS BEGINNING 09/01/2021
COUNTY AMENDMENTS: PENDING

COMPLIANCE METHOD

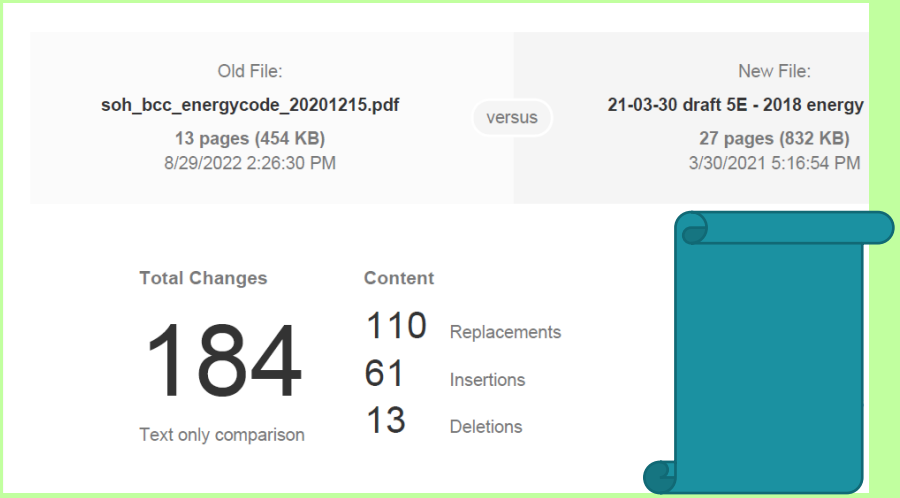
- ☐ Tropical Zone. R401.2.1
  - ☐ Points Option. R407 (Populate Checklist)
- ☐ Prescriptive. R402
  - Roof and Wall
    - ☐ Insulation R-value. Table R402.1.2
    - ☐ Construction U-factor. Table R402.1.4
    - ☐ Total UA. R402.1.5
    - ☐ Points Option. R407 (Populate Checklist)
- ☐ Simulated Performance Alternative. R405
- ☐ Energy Rating Index Compliance Alternative. R406

INFORMATION IN CONSTRUCTION DOCUMENTS	**Yes**	**N/A**
Envelope		
Roof insulation R-value	☐	☐
Roof insulation type and location	☐	☐
Roof membrane solar reflectance and thermal emittance	☐	☐
Wa	☐	☐

R402.4.1.2 Testing & R401.3 Certificate

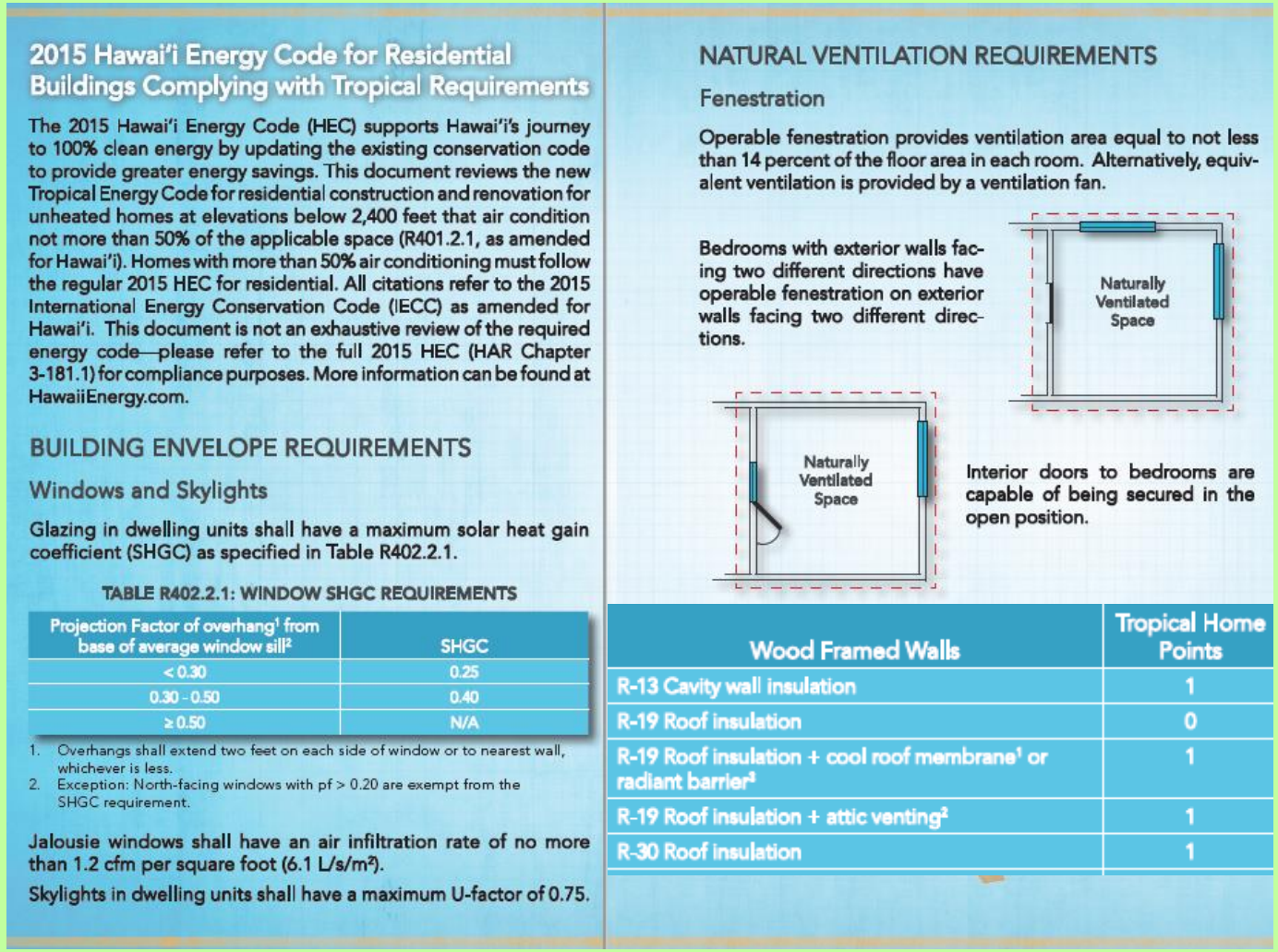
(BI) Remove- ~~When required by the code official,~~

- A permanent certificate shall be completed by the builder or 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:
- List insulation R-values of ceiling and walls
- Window U-factors
- Window Solar heat gain coefficient (SHGC)
- List the types and efficiencies of A/C and water heaters
- Identify conditioned and unconditioned spaces.
- Results from any required duct system and building envelope air leakage testing done (BLOWER DOOR)
- 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."



climate action advisory committee
For Maui County

R401.2.1 Tropical Zone Exemption



2015 Hawai'i Energy Code for Residential Buildings Complying with Tropical Requirements

The 2015 Hawai'i Energy Code (HEC) supports Hawai'i's journey to 100% clean energy by updating the existing conservation code to provide greater energy savings. This document reviews the new Tropical Energy Code for residential construction and renovation for unheated homes at elevations below 2,400 feet that air condition not more than 50% of the applicable space (R401.2.1, as amended for Hawai'i). Homes with more than 50% air conditioning must follow the regular 2015 HEC for residential. All citations refer to the 2015 International Energy Conservation Code (IECC) as amended for Hawai'i. This document is not an exhaustive review of the required energy code—please refer to the full 2015 HEC (HAR Chapter 3-181.1) for compliance purposes. More information can be found at HawaiiEnergy.com.

BUILDING ENVELOPE REQUIREMENTS

Windows and Skylights

Glazing in dwelling units shall have a maximum solar heat gain coefficient (SHGC) as specified in Table R402.2.1.

TABLE R402.2.1: WINDOW SHGC REQUIREMENTS

Projection Factor of overhang[1] from base of average window sill[2]	SHGC
< 0.30	0.25
0.30 - 0.50	0.40
≥ 0.50	N/A

1. Overhangs shall extend two feet on each side of window or to nearest wall, whichever is less.
2. Exception: North-facing windows with pf > 0.20 are exempt from the SHGC requirement.

Jalousie windows shall have an air infiltration rate of no more than 1.2 cfm per square foot (6.1 L/s/m²).

Skylights in dwelling units shall have a maximum U-factor of 0.75.

NATURAL VENTILATION REQUIREMENTS

Fenestration

Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each room. Alternatively, equivalent ventilation is provided by a ventilation fan.

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

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

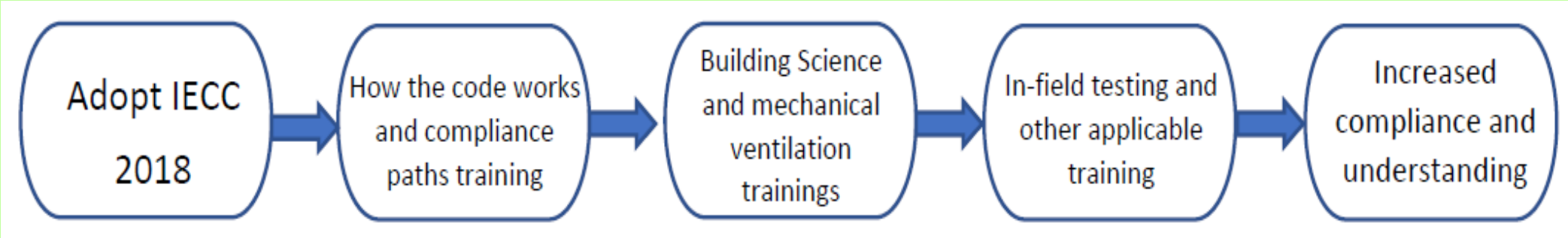
Wood Framed Walls	Tropical Home Points
R-13 Cavity wall insulation	1
R-19 Roof insulation	0
R-19 Roof insulation + cool roof membrane[1] or radiant barrier[3]	1
R-19 Roof insulation + attic venting[2]	1
R-30 Roof insulation	1

- **(BI) Make More Homes Eligible**
  Unheated homes at elevations below ~~2,400~~ 5000 feet that air condition not more than 50%...
- **Stop the Abuse**
  - Close the loophole for homes and multi-family units that are built and add AC immediately after permitting.
  - Require compliance along one of the alternate pathways in place at the time it was built.

climate action advisory committee
For Maui County

Why have an Adoption Implementation Plan?

- Maui is in need of affordable housing, utilizing 3rd party certifications lessens the load of county permitting and inspectors while ensuring homes are built to a high quality and energy efficient standard.
- Buildings can follow a Prescriptive or Performance pathway
  - Checklist vs Energy Simulation
- Blower Door Testing Required for all Homes (Except Tropical Exemption) to be done by Accredited Organization.
  - HERS Rater /BPI / Commissioning Agent or Engineer



climate action advisory committee
For Maui County

MAHALO!

Contact for CAAC

Dr. Genesis Young, genesis@teranjy.org

climate action advisory committee
For Maui County