



State Examples of Comprehensive Affordable Cooling Strategies

National Cooling Standards Initiative State
Energy Office Seminar Series

Liepa Braciulyte | June 20, 2024

Photo Courtesy of RL Martin



Session 1: June 4. Preview of CEPC/NASEO Report: Beating the Heat: Recommendations and Considerations for States to Support Cost-Effective Residential Cooling.

Session 2: June 13. Protecting Vulnerable Populations from Extreme Heat.

Session 3: June 20. State Examples of Comprehensive Affordable Cooling Strategies

Session 4: July 2. Funding & Financing the Energy Transition, Braiding Federal & State Funds

Agenda

- Introduction
- **Maren Mahoney**, Arizona Governor's Office of Resilience – 2024 AZ Extreme Heat Preparedness Plan
- **Howard Wiig**, Hawai'i State Energy Office – HI's Cool Surfaces progress
- **Christopher Coll**, NY Dept of Public Services – NY's Energy Affordability Guarantee
- Q&A



Photo Courtesy: NASEO



**Maren Mahoney, Office of Resiliency
Extreme Heat Preparedness Plan
June 20, 2024**

Building a Resilient Arizona for Future Generations



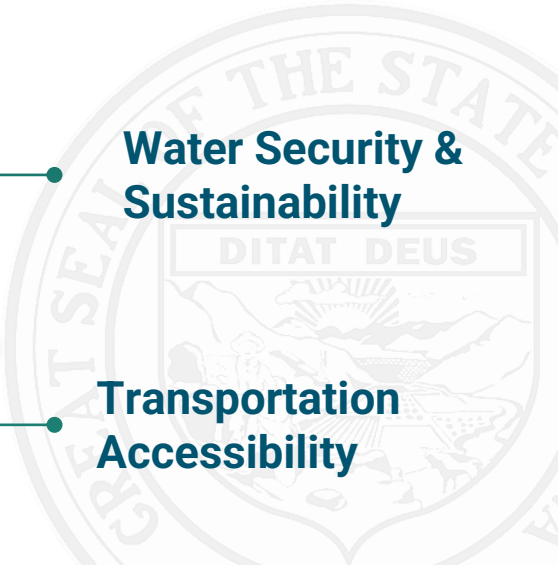
Climate Adaptation & Mitigation

Clean Energy Economy

Water Security & Sustainability

Healthy Forests

Transportation Accessibility



Functions



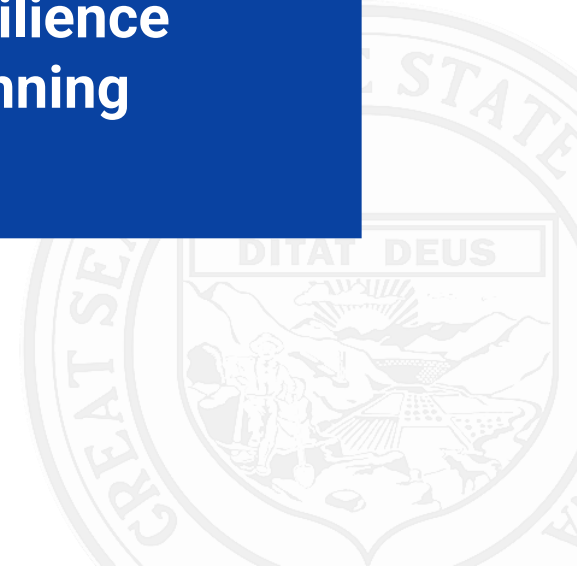
**State
Energy
Office**



**Natural
Resource
Policy**



**Climate
Resilience
Planning**

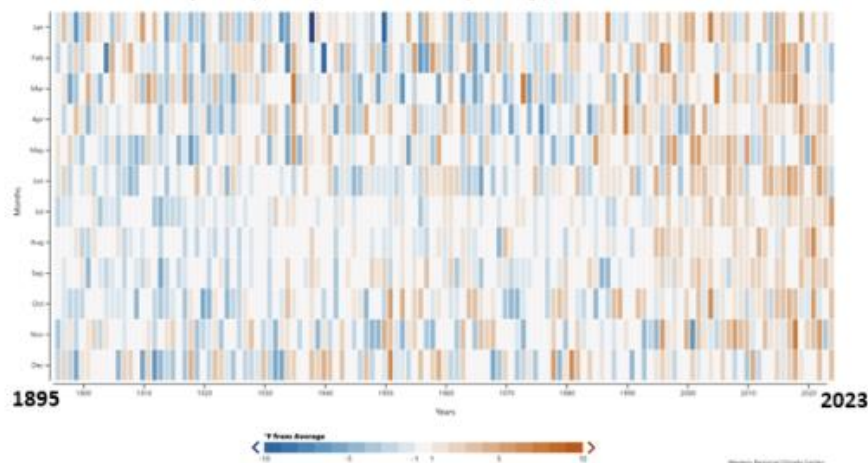


Monthly statewide temperatures are getting warmer, driven more by night temps

warmer, driven more by night temps

Arizona (Statewide)

Monthly Mean Temperature Departures from 1991-2020 Computed Average(s) from Jan 1895 to Dec 2023



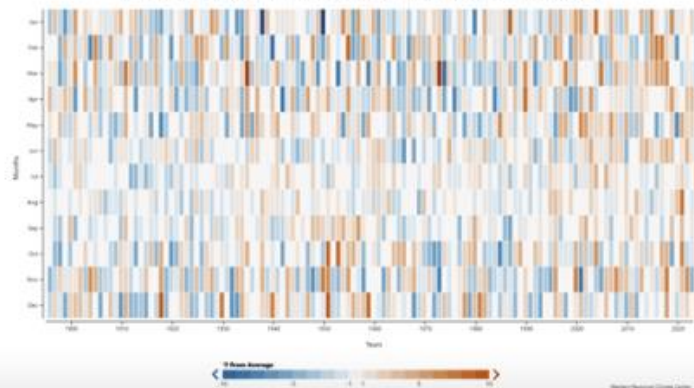
A heat map shows how monthly statewide temperatures have changed over time (since 1895).

Blue colors show cooler months (below average); orange colors show warmer months (above average).

Day (max) monthly statewide temperatures

Arizona (Statewide)

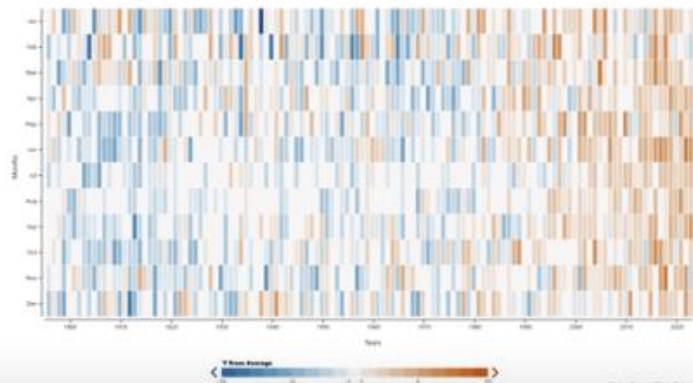
Monthly Maximum Temperature Departures from 1991-2020 Computed Average(s) from Jan 1895 to Dec 2023



Night (min) monthly statewide temperatures

Arizona (Statewide)

Monthly Minimum Temperature Departures from 1991-2020 Computed Average(s) from Jan 1895 to Dec 2023

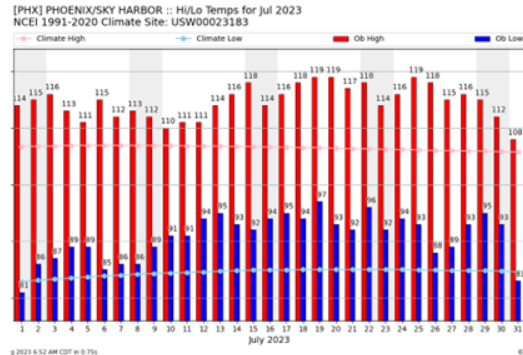


July 2023	Average	Depart	Rank
Apache	75.6°	4.6°	Warmest
Cochise	83.8°	5.7°	Warmest
Coconino	78.5°	5.3°	Warmest
Gila	84.1°	6.0°	Warmest
Graham	85.1°	6.0°	Warmest
Greenlee	80.5°	6.3°	Warmest
La Paz	97.3°	5.9°	Warmest
Maricopa	96.0°	6.6°	Warmest
Mohave	88.1°	5.3°	Warmest
Navajo	77.9°	4.8°	2 nd warmest
Pima	91.0°	5.9°	Warmest
Pinal	93.7°	6.3°	Warmest
Santa Cruz	82.3°	5.7°	Warmest
Yavapai	84.1°	6.0°	Warmest
Yuma	96.7°	6.1°	Warmest

Record coldest	Top 10 coldest	Top 40 coldest	Normal	Top 40 warmest	Top 10 warmest	Record warmest
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Preliminary data from NOAA/NCEI

July 2023 was the hottest month for most AZ counties ever recorded (since 1895)



Phoenix is now ranked as the US city with the hottest monthly temperature (102.7°F).



Plan Elements

- I. **Cross-agency preparedness for heat season 2024**
- I. **Long-term policy and operational recommendations**

ARIZONA'S
**EXTREME
HEAT
PREPAREDNESS
PLAN**
MARCH 1, 2024



Heat Season 2024 Preparedness

Shelter

Grants for emergency shelter
Heat relief coordinator
18 solar-powered mobile cooling units
Cooling center staffing

Energy

Grid resilience and reliability grants
Grid reliability investments
Shut-off Moratorium
Employee protections

+

Health

State gov't-wide heat response thresholds
State and county dashboard centralization
ADOSH SEP

Disaster Response

Updated Emergency Response and Recovery Plan to include heat
New protocols funnel heat relief requests through emergency mgmt

Longer-Term Recommendations

1

Safe,
Affordable
Housing

2

Adapting and
Updating
Emergency
Response

3

Cooling
Center
Network
and
Supports

4

Data Sets,
Knowledge,
and
Workforce
Development

Governor Hobbs's Post-Plan Actions

*Cross-jurisdiction, cross-sector,
whole of government collaboration and coordination for Plan
implementation*

**Sent letter to
Congressional
delegation,
urging
advocacy on
LIHEAP
allocations**

**Signed into law
protections for
mobile home
tenants that
prevent mobile
park owners from
prohibiting cooling
accessories (like
a/c units)**

**Appointed
the nation's
first state-
level Chief
Heat Officer**

Tier 0: Pre- & Post- Heat Season

October 1- April 30

Activities include:

- AZ Heat Planning Summit, Annual State Heat Workshop
- Heat Awareness Week and other educational campaigns and awareness
- Update heat resources, e.g. toolkits

Tier 1: Heat Season

May 1- September 30

Pre-posturing and providing life-saving assistance throughout the Arizona summer.

NWS Heat Risk 1 - 4.

Examples include:

- Opening heat relief centers (cooling centers, hydration stations, and respite centers)
- Heat Alerts
- Partner meetings
- Cooling center workgroups
- 211 assistance
- Social media campaigns
- Heat relief centers map
- Coordinate resources, e.g. Narcan, cooling towels, water
- Heat Illness Dashboard
- Free or reduced bus passes and/or rideshare vouchers (rural areas)

Tier 1A:

Cautionary Period

The NWS has issued an Excessive Heat Warning.

HeatRisk Values	Risk of Heat Effects	Level of Heat Concern
0	Little to None	Green
1	Minor	Yellow
2	Moderate	Orange
3	Major	Red
4	Extreme	Magenta

Generally, a Heat Watch is issued by the NWS when there is potential to reach a value of 3 or 4 in the next 2-7 days. **A Heat Warning is issued by the NWS when the heat risk value will reach 3 or 4 within the next 12-24 hours.** NWS Extreme Heat Warnings in the Southwest account for regional and temporal differences and incorporate health outcome data (deaths) as displayed in the **HeatRisk map**.

Activities include:

ADHS to provide real-time communications of cautionary periods to partners. Partners to plan to ramp up heat interventions, e.g. extended cooling center hours.

Tier 1B: Exceptional Heat Events

Exceptional Heat Events are defined when the **National Weather Services (NWS) has issued Excessive Heat Warnings for 2 days in a location**

AND

Health heat outcomes exceed the extreme threshold as defined below on a heat warning day or on one of the following 3 days.

- HRI Emergency Department visits are considered extreme when they are in the top 10% when compared to the previous 3 years
- OR
- The number of Heat-Related EMS dispatches are considered extreme when they are in the top 10% when compared to the previous 3 years

The **response returns to Tier 1A: Cautionary Period** when no new Excessive Heat Advisory, Watch, or Warning is issued for the next 3 days **AND** HRI ED visits and EMS dispatches have returned to below the top 10% when compared to the previous 3 years.

Activities include: Enhanced public health response, e.g. extended cooling center hours, media release, HANs.

Tiered thresholds for more coordinated cross-agency and cross-jurisdictional heat preparedness

COOLtainers







OFFICE OF THE GOVERNOR

KATIE HOBBS

Affordable Cooling Strategies in Hawai'i

NASEO Program

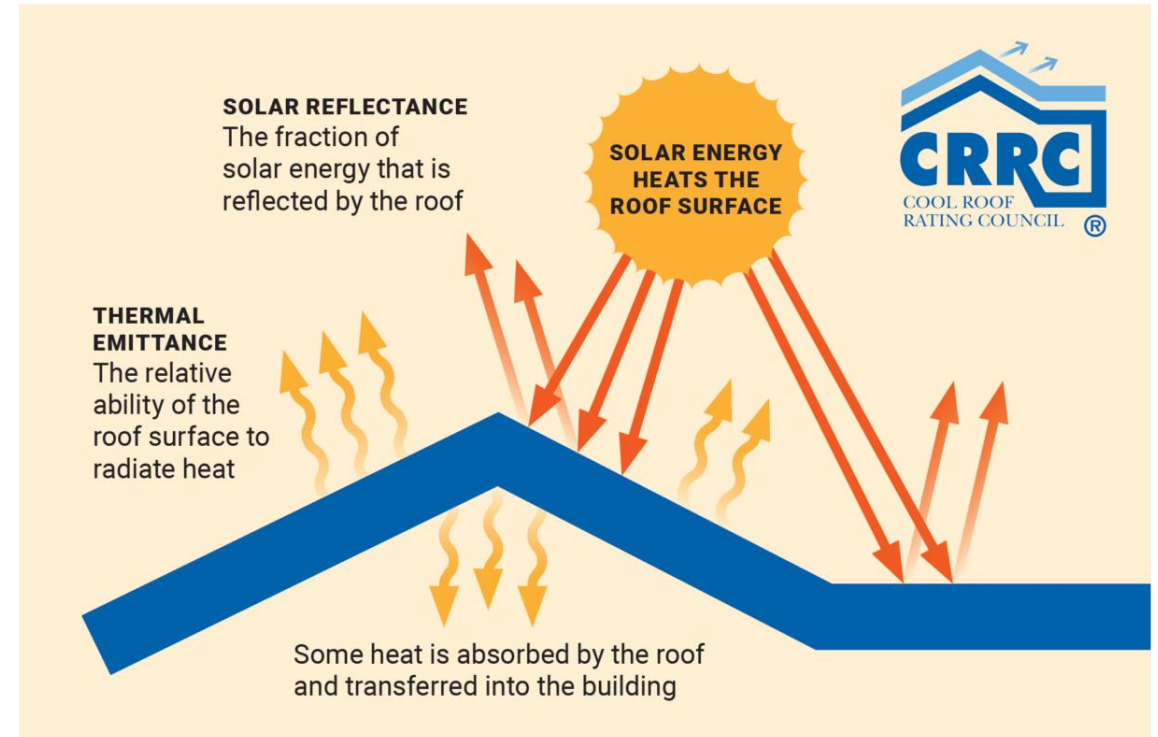
State Examples of Comprehensive Affordable Cooling Strategies

Howard C. Wiig

June 20th, 2024

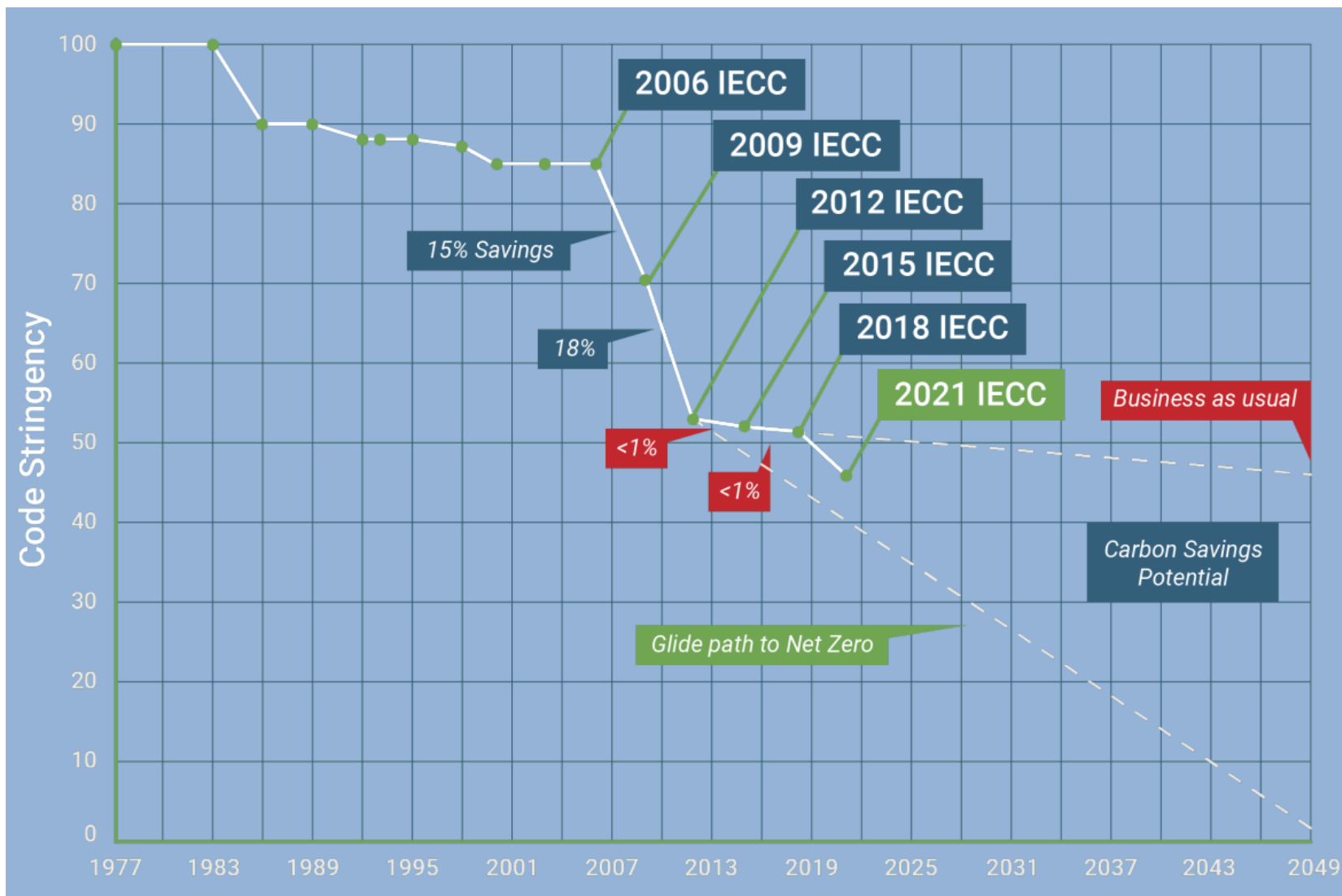
First, Energy Codes Are Best

The best way to scale the number of cool roofs and walls is to amend energy building codes to require that new and renovated homes and buildings include an area-weighted average solar reflectances (SR) or solar reflective indices (SRI).



This illustration describes the flow of radiant energy as heat between the sun, roof surface, building interior, and surroundings. The higher the solar reflectance, the more solar energy is reflected away from the roof surface. Some of the solar energy is absorbed by the roof as heat. The higher the thermal emittance, the more of this absorbed heat is radiated away from the roof surface. IMAGE CREDIT: COOL ROOF RATING COUNCIL.

Source: Energy Efficient Codes Coalition. <https://energyefficientcodes.org/iecc/>



Area - Weighted Average = Strategy

The best way to convince designers and lawmakers that the requirement is feasible is to include “area-weighted average.” This means that designers can choose different colors as long as the overall average is an SRs or SRIs meeting the minimum values.

DYI: The labor cost of applying cool surfaces can be -0-

Skilled and fairly strong homeowners can coat their own roofs and walls. Strength and skill is needed to safely lift fifty-five pound five-gallon pails onto roofs. The cost of the coating material vs. the labor is roughly 50-50.

Cool roofs and walls reduce cost and interior temperatures

Reflective surfaces reflect and emit the sun's radiant energy, reducing interior temperatures and AC loads.

Reduced AC loads reduce peak loads, lower electricity bills and reduce the amount of greenhouse gas used to produce electricity.

Cool surfaces are resource-efficient

Roofs and walls often require no additional materials because most surfaces need waterproofing in any case.

No additional materials involve no additional cost.

Finally, cool surfaces can last 10-15 years longer than hot surfaces.

Cost-benefit analysis needed

Hawai'i is planning have a study conducted on the costs and benefits of an aged SR of .63 and a TE of 75.

The evaluation will Honolulu assume climate data, \$0.43/kWh cost, the same warranty coverage, R-19 insulation and a flat commercial roof.

Evaluation to include:

- Retail cost of 5-gallon pails
- Estimated lives of cool roofs vs. absorbent roofs
- Rebates or credits available
- Maximum surface temperatures, cool vs. absorbent

With the Energy Star rating discontinued, Hawai'i's code uses Title 24 specifications

The EPA Energy Star rating for cool roofs was discontinued in 2022

The Hawai'i Roofing Contractors Association, Hawai'i's agreed to amend the 2018 IECC to allow an option to insulation by substituting California's Title 24 requirements for flat commercial roofs (aged SR 0.63, thermal emittance 0.75, SRI 75).

California's Title 24 Roof Reflectance Requirement

A. Roofing Products. Shall meet the requirements of Section 110.8 and the applicable requirements of Subsections i through ii:

i. Nonresidential buildings:

a. Low-sloped roofs in Climate Zones 1 through 16 shall have:

1. A minimum aged solar reflectance of 0.63 and a minimum thermal emittance of 0.75; 04

2. A minimum Solar Reflectance Index (SRI) of 75.

Consider: Definition of Solar Reflectance for Walls ASHRAE 90.1, 2019

Addendum s removes the use of solar reflectance index (SRI) for walls and replaces it with the more accurate and relevant term—solar reflectance (SRI is still used when referring to roofs). The proposal also adds requirements for south-, east-, and west-facing walls to have a minimum solar reflectance of 0.30 in Climate Zone 0.

Hawai'i State Energy Code

Amendments to the 2018 International Energy Conservation Code
(2018 IECC)

State Building Code Council

Effective Date: December 15, 2020

Hawai'i 2018 IECC

C503.3.1 Roof replacement.

Replacement of uninsulated roofs shall include either initial reflectance $\geq 85\%$ and aged reflectance $\geq 75\%$ 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 (Three-year SRI of 55 and three-year aged TE of 0.75 or an three-year aged SRI of 64

Hawai'i 2018 IECC

R 401.2.1 Tropical zone

- 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.

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

7. The roof/ceiling complies with one of the following options:

- a. Comply with one of the roof surface options in Table C402.3 and install R-13 insulation or greater. (Three-year SRI of 55 and a three-year thermal emittance of 0.75 of a three-year thermal emittance of 64)
- b. Install R-19 insulation or greater

Hawai'i 2018 IECC

TABLE R407.1 Points Option

Tropical Home Points Wood Framed

- R-19 Roof/ceiling Insulation + Cool roof membrane or Radiant Barrier
- R-19 insulation (-1 point)
- R-19 Roof/ceiling Insulation + Attic Venting or Radiant Barrier
- R-30 Roof/ceiling Insulation
- R-13 Wall Insulation + high reflectance walls (reflectance of 0.64) •
- R-13 Wall insulation + 90% high efficacy lighting and Energy Star Appliances •
- R-13 Wall Insulation + exterior shading

Hawai'i 2018 IECC

R503 Alterations Part 1

(Shall comply with new building requirements) Exception:

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

- 1.R-30 cavity insulation or the cool roof requirements in Section C402.3 for residential buildings.
- 2.R-19 cavity insulation or the cool roof requirements in Section C402.3 for Tropical Zone residential buildings.

Hawai'i 2018 IECC

R503 Alterations Part 2

3. When uninsulated roof sheathing is exposed during alteration, at least two of the following must be installed:
- a. Energy Star compliant roof covering
 - b. Radiant barrier
 - c. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation
 - d. A minimum of one two exceptions listed in C402.3.

Mahalo,

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Resources

HSEO Website

<https://energy.hawaii.gov/what-we-do/energy-efficiency/Hawaii-energy-building-code-iecc-updates/>





Department
of Public Service

Energy Affordability Guarantee Pilot

June 20, 2024

Context

- Achievement of New York State energy and climate goals requires strategies to decarbonize homes and buildings, including for lower-income households
- Significant barriers to adoption of heat pumps for lower-income households include first cost, operating costs, and need for pre-weatherization and electrification work (structural deficiencies, electric panel/service upgrades, health and safety issues).
- To date, limited insights are available on energy burden implications associated with the conversion from fossil-fuel based heating to heat pump solutions
- Energy affordability guarantee intended to mitigate energy burden impact for low-income households that fully electrify (heat pump for space and water heating) through EmPower+

Energy Affordability Guarantee Overview

- Energy Affordability Guarantee established in 2023 State of the State
- Guarantee funded through FY25 NYS Budget Appropriation (\$50M)
- DPS staff report/proposal filed May 15, public comment period open through July 15
- EmPower+ participants that fully electrify (heat pump for space and water heating)
- Guarantee to be provided for the useful life of the equipment (estimated to be 15 years)
- Guarantee can transfer to owners or tenants when a change in occupancy occurs
- Will be administered as a pilot to inform policy, strategy, and programs to support electrification in the low-income market segment

Affordability Guarantee Objectives

- 1) Mitigate the potential for an increase in household energy burdens because of converting to a heat pump for space and water heating.
- 2) Create insights to drive a broader strategy for creating affordable access to heat pump solutions for lower income households.
- 3) Understand the options for determining customer-specific energy burdens and providing tailored bill discounts to customers to achieve energy burden reduction goals.

Pilot Design

- 2 Pilot Stages, with a total commitment of a Guarantee for up to 15 years (EUL of heat pump)

Phase 1- Enrollment and Data Collection	Phase 2- Energy Burden Maintenance
<ul style="list-style-type: none"> • 2 years in length (minimum of 2 heating seasons) • Baselineing of electricity consumption and calibration of guarantee level • Initial insights on project composition and electricity use profiles available to inform program ancillary workstreams • Annual reports on Pilot status and key metrics • Implementation transition plan developed (hand off admin to Staff) • Evaluation after 2 years 	<ul style="list-style-type: none"> • Approximately 13 years • Maintain flexibility to incorporate Guarantee into future iterations of Energy Affordability Program • Implementation transition to Staff (after year 3) • Participant recertification every year • Monitoring of electricity consumption and income to deliver right-sized Guarantee • Annual reporting on Pilot/participant status and key metrics

- Pilot size- approximately 1,000 households, based on EmPower+ production projections

Guarantee Level

- Staff recommends that the Guarantee level be calculated for each participant monthly for the first two years of the Pilot by applying the participant's target energy burden to the net monthly electric bill for the participant (monthly electric costs - monthly EAP credit).
 - If a participant receives EAP and is identified as a gas or other heat customer, it is important that the EAP benefit be adjusted to reflect that the primary heating fuel of the home is electric.

- Staff expects that after collecting and monitoring two years of billing data, it will be possible to establish a baseline to anticipate future electric consumption of the household.
 - Following the first two years of the Pilot, Staff would assess the potential for reducing the frequency of calculating and applying the Guarantee level.

Guarantee Limit

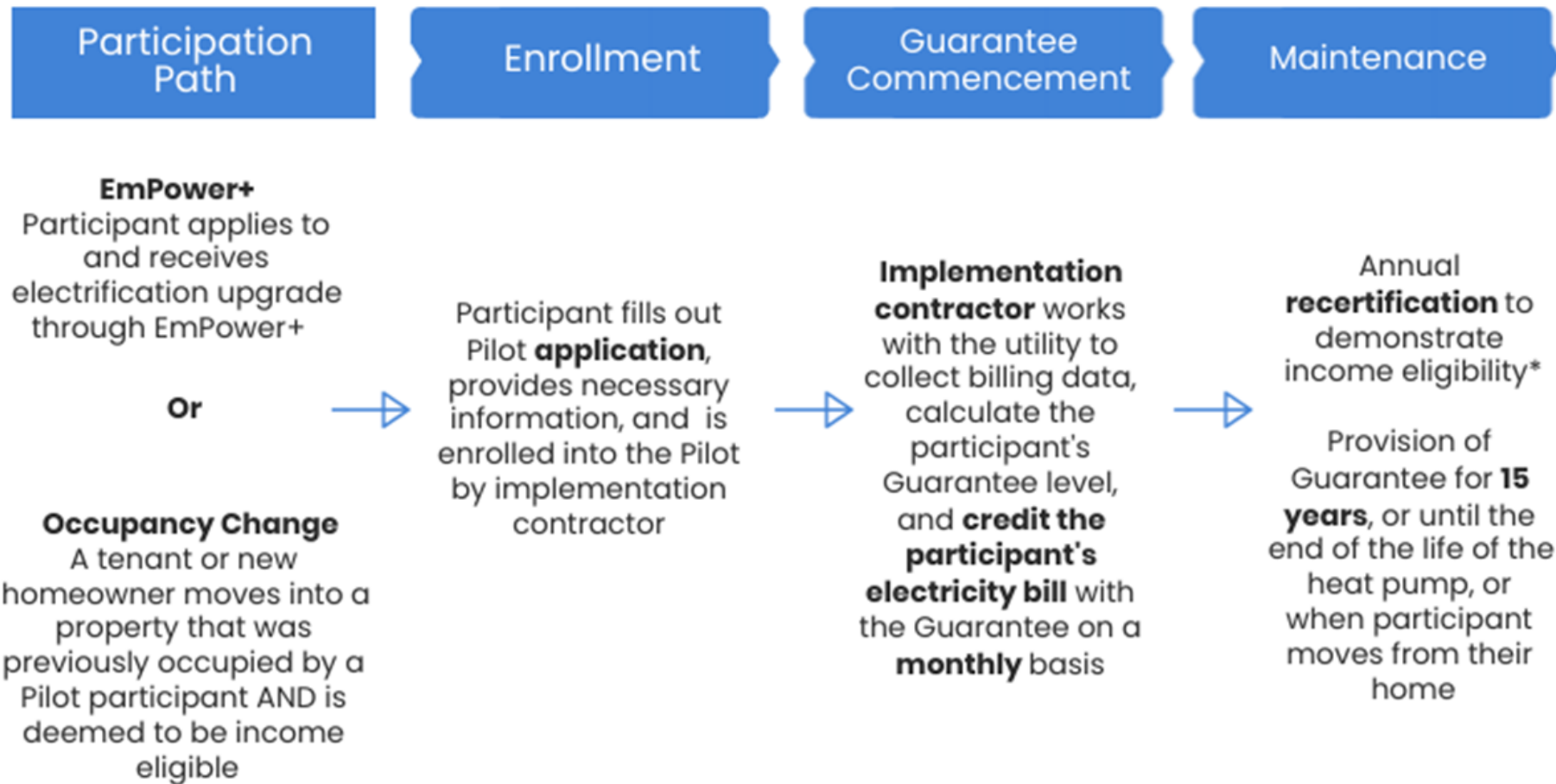
- Budget appropriation calls for establishment of a cap on the total amount of kWh consumption that would be covered by the Guarantee
- Intended to encourage energy efficient behavior of participants
- Staff recommends setting the Guarantee Limit at 150% of avg. electric consumption of low-income customers with electric heat in each utility territory
 - Based on sensitivity analysis of estimated incremental electricity usage for a home heating with a heat pump in each utility territory (Staff modeled Limits based on 100%, 125%, and 150% of average electric usage for low-income customers in each service territory)
 - Staff will actual electricity consumption and cost for participants and consider adjustments to the Guarantee limit if actual electricity consumption exceeds the established limit during the heating season (November through March)
 - Electrification projects to include a monitor on electric panel to isolate the electricity consumed by the heat pump

Participant Eligibility Criteria

Staff recommends the following seven eligibility criteria for the Pilot:

- the participant must be income eligible for services under EmPower+ by NYSERDA, and enrolled in that program;
- the participant must agree to an annual recertification to ensure that the participant remains income-eligible for the Guarantee;
- if a participant resides in a rental property and moves to a new housing situation, that dwelling must also be eligible for Empower+ services, or eligibility to receive the Guarantee would be suspended;
- for a tenant moving into a rental property that was previously occupied by a Pilot participant, the tenant must be determined to be income eligible to receive the Guarantee;
- if a participant is not enrolled in EAP at the time of enrollment in the Pilot, they must be enrolled to take part in the Pilot; and
- even if the participant is enrolled in budget billing, have a DPA, or has arrears, they are still eligible for the Guarantee if they meet the other six eligibility criteria.

Energy Affordability Guarantee Participant Journey



**During the annual recertification process, if the participant is determined to be over income, the Guarantee will be suspended and will not be provided until it is determined that the participant is income eligible once again.*



Questions