Proposal Summary

2022 California Energy Code (Title 24, Part 6)

Single Family Residential Grid Integration – Pre-Cooling

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Prepared by: Kristin Heinemeier

Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on March 19, 2020. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by April 2, 2020.

Measure Description

This measure will update the voluntary compliance options for Pre-Cooling. The qualifying criteria for this measure will be defined in a proposed new section in Joint Appendix 5. This will continue to provide credit as a "Demand Response Flexibility" measure, but with the following modifications:

- Allow credit for installing a Certified Pre-Cooling Thermostat.
- Only allowed in Climate Zones 9-15
- Credit is limited to 30 percent of the savings calculated by CBECC-RES, using the following Cooling Setpoint Temperature schedules:

Cooling Setpoint Temperature	Standard Setpoint (°F)	Proposed Setpoint (°F)	Cooling Setpoint Temperature	Standard Setpoint (°F)	Proposed Setpoint (°F)
12pm-1am	78	78	12pm-1pm	83	75
1am-2am	78	78	1pm-2pm	82	75
2am-3am	78	78	2pm-3pm	81	75
3am-4am	78	78	3pm-4pm	80	75
4am-5am	78	78	4pm-5pm	79	83
5am-6am	78	78	5pm-6pm	78	83
6am-7am	78	78	6pm-7pm	78	83
7am-8am	83	83	7pm-8pm	78	83
8am-9am	83	83	8pm-9pm	78	83
9am-10am	83	83	9pm-10pm	78	78
10am-11am	83	83	10pm-11pm	78	78

- Criteria for thermostats that are eligible for this credit are provided in a new section JA 5.2, which includes requirements for overrides, usability, setting of Critical Field-Adjusted Parameters (CFAPs), and educational materials to be left behind for consumer. Manufacturer self-certifies that thermostat meets these criteria.
- CFAPs to be identified by designer in CF1R, set by installer and recorded in CF2R, and verified by HERS Rater in CF3R. Defaults and allowed ranges are as follows:

Parameter	Parameter Name	Default	Allowed Ranges	Design Considerations
PC-START	Pre-Cooling Start Time	12:00 PM	4 to 8 hours before NC-START	As late as possible while avoiding on-peak cooling
NC-START	No-Cooling Start Time	4:00 PM	Between 2:00 PM and 6:00 PM	Beginning of Utility's TOU Peak Period
NC-END	No-Cooling End Time	9:00 PM	No later than 11:00 PM	End of Utility's TOU Peak Period
PC-TEMP	Pre-Cooling Temperature Setpoint	75°F	No less than 72°F and at least 8°F below NC-TEMP	As high as possible while avoiding on-peak cooling; subject to occupant comfort constraints
NC-TEMP	No-Cooling Temperature Setpoint	83°F	No less than 78°F and at least 8°F above PC-TEMP	As high as it takes to avoid on-peak cooling; subject to occupant comfort constraints

Draft Code Language

The proposed changes under consideration for the Standards and Reference Appendices are provided below. Changes to the 2019 documents are marked with red underlining (new language) and strikethroughs (deletions).

Standards

Section 150.1(b)3.B: Field Verification.

x. Pre-Cooling. When performance compliance requires field verification of the installation and programming of a Pre-Cooling Thermostat, it shall be field verified in accordance with the procedures in Reference Residential Appendix RA3.4.5.

Reference Appendices

RESIDENTIAL APPENDIX 3.4. FIELD VERIFICATION OF INSTALLED HVAC SYSTEM COMPONENTS AN DEVICES

Residential Appendix 3.4.5: Pre-Cooling Thermostat Verification Procedures

When a Pre-Cooling Thermostat (PCT) is installed and verification of the PCT's programming is required by Section 150.1(b)3.B.x, the installed system equipment shall be verified according to the procedure specified in this section.

The procedure shall consist of visual verification of installation of the following system equipment components and confirmation that the installed equipment is certified to conform with the requirements of JA5.2:

    (a) Verify the PCT matches the make and model reported on the design drawings and CF1R

    (b) Verify that any components required for PCT operation (as specified in the manufacturer's product information) are permanently installed

    (c) Verify that the observed values of the Critical Field-Adjusted Parameters match the values indicated on the CF1R and CF2R, and that they are within the range allowed

    (d) Verify that educational material has be left behind by the installer and made available to the occupants.

JOINT APPENDIX 5 – TECHNICAL SPECIFICATIONS FOR THERMOSTATS

JA5.2 Technical Specifications for Thermostats for Pre-Cooling

JA5.2.1 Introduction

Joint Appendix 5.2 (JA5.2) provides the technical specifications for a Pre-Cooling Thermostat (PCT). A PCT can be an independent device or part of a control system comprised of multiple devices.

The requirements in this appendix are intended to be compatible with National Electrical Manufacturers Association (NEMA) Standard DC 3-2013 Residential Controls – Electrical Wall Mounted Thermostats and NEMA DC 3 Annex A-2013 Energy-Efficiency Requirements for Programmable Thermostats.

JA5.2.1.1 Manufacturer Self-Certification

A PCT is compliant with Title 24, Part 6, only if it has been certified to the Energy Commission as meeting all of the requirements in this Appendix. Certification to the Energy Commission shall be as specified in Section 110.0.

JA5.2.2 Required Functional Specifications

(1) PCT can be programmed either using a dedicated "Pre-Cooling" mode or using pre-existing schedule programming functionality:

    (a) Pre-Cooling mode: With a simple gesture, initiate a pre-cooling schedule using the selected Pre-Cooling and No-Cooling times and setpoints.

    (b) Programmed schedule: For example, provide named schedules (similar to WAKE, LEAVE, RETURN, SLEEP) for PRE-COOL and NO-COOL, using the selected Pre-Cooling and No-Cooling times and setpoints.

(2) Temporary Override:

    (a) A temporary override shall be provided.

    (b) Temporary override shall be simple to initiate, and it shall not be confused with a permanent override.

    (c) Temporary override shall be limited to no more than 72 hours at a time.

(3) Critical Field-Adjusted Parameters:

    (a) Provides the ability to set the following parameters easily, in such a way that they can be readily confirmed by a HERS Rater:

        ▪ Pre-Cooling Start Time

        ▪ No-Cooling Start Time

        ▪ No-Cooling End Time

        ▪ Pre-Cooling Temperature Setpoint

        ▪ No-Cooling Temperature Setpoint

(4) Usability Considerations.
    (a) It shall be easy to program the pre-cooling schedule correctly.
    (b) It shall be difficult to inadvertently change the pre-cooling schedule or permanently override the pre-cooling strategy.
    (c) It shall be easy to temporarily override the Pre-Cooling and No-Cooling Mode, for a limited amount of time.
    (d) There shall be a clear indication to the user that the Pre-Cooling or No-Cooling Mode is in effect.
(5) Educational Materials:
    (a) The manufacturer shall produce and supply educational material to be left behind by the installer, describing the benefits of the pre-cooling strategy, expected savings, how to implement a temporary override, how to alter the programming if needed, cautions to take when altering the programming to avoid defeating the measure, and explaining how to change the TOU period if utility rate structure changes.

ACM Reference Manual

ACM Reference Manual Section 2.4.11: Pre-Cooling

When pre-cooling is selected, the schedule of space temperature setpoints is modified as described below. The savings derived from this change in setpoint schedule shall be de-rated by **TBD percent** in calculating the final credit, due to the occupancy controllability characteristic of this measure. The credit shall be applied to the Demand Flexibility credit that is a part of the Total EDR and not the Energy Efficiency EDR. When this credit is used, proper programming must be verified according to the procedures found in RA 3.4.5. Pre-cooling shall be accomplished using a Pre-Cooling Thermostat with features certified to the California Energy Commission to comply with the requirements laid out in JA5.2.

Proposed Design

The software assumes the setpoint schedule shown in Table for space cooling for the following hours. For hours other than those listed, the space temperature setpoints shall be as specified in Table 22 of the ACM Reference Manual Section2.5.3.7.

Table xx. Cooling Setpoint Schedule

Time Period	Cooling Setpoint Temperature (°F)
12pm-1pm	75
1pm-2pm	75
2pm-3pm	75
3pm-4pm	75
4pm-5pm	83
5pm-6pm	83
6pm-7pm	83
7pm-8pm	83
8pm-9pm	83

Standard Design

The software assumes the space cooling setpoint schedule specified in Table 22 of the ACM Reference Manual Section 2.5.3.7.

Compliance Manuals

There will be no changes made to the Compliance Manuals.

Compliance Documents

The selected PCT make and model, and the values of the CFAPs will be recorded in the "Special Features" section of three new compliance documents:

- **2022-CF1R-MCH-34-PRECOOL**: The CF1R Certificate of Compliance form will be used to indicate what make and model of PCT will be installed, along with the expected values of the CFAPs.

- **2022-CF2R-MCH-34-PRECOOL**: The CF2R Certificate of Installation form will be used to confirm the make and model of PCT that was installed, along with the implemented values of the CFAPs.

- **2022-CF3R-MCH-34-PRECOOL**: The CF3R Certificate of Verification form will be used to record the results of HERS verification of the installation and configuration of the PCT, including make and model of PCT that was found, observed or tested values of the CFAPs, and the provision of information to educate and support the homeowner.