Proposal Summary

Single Family Buried Ducts

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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 February 14, 2023. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by February 28, 2023.

Measure Description

1. **Buried duct prescriptive package:** Proposes a prescriptive alternative path to high performance attics (HPA) to provide an alternative to adding insulation at the roof deck to reduce thermal losses from ducts in vented attics. The measure contemplates fully covering ducts with ceiling insulation to provide an increased thermal barrier against high attic temperatures and requiring “radial” duct layouts to limit duct diameters to facilitate nearly complete coverage by insulation. Additional items to be evaluated include the following:
    - Simplify procedures for verifying the extent of burial, for example by verifying that the maximum diameter of trunks and branches is 10 inches or less.
    - Provide for modeling of and compliance for buried ducts in additions and alterations, which is not currently allowed because QII is required and the QII credit is only available for new homes.
    - Adequacy of existing buried duct tables in the Alternative Calculation Method (ACM) Manual for describing the effective buried duct R-value and methods for improving the accuracy of these tables through the development of empirical and/or theoretical equations.
2. **Prescriptive code requirements for cathedral ceilings**
    - Evaluate and develop prescriptive code requirements for roofs constructed as cathedral ceiling. Potentially, unvented attics insulated at roof level will also apply. This will represent an alternative prescriptive path alongside the existing prescriptive options.

Data Needs/Stakeholder Information Requests

Data needs include:

- **Energy Savings**
  - Are there case studies where the impact on energy efficiency has been looked at for buried ducts?
  - Are there case studies where raised heel trusses are evaluated in combination with buried ducts?
- **Technical Feasibility**
  - Impact on total duct length and installation issues when designing for 10-inch duct diameters and less?
  - Any practical challenges faced to bury ducts effectively?
  - Any challenges on the verification side and cost implications?
- **Market Readiness**
  - How common is it to install buried ducts?
  - How will an increase in total installation of buried ducts affect builders and contractors?
- **Costs**
  - What are the additional material and labor costs associated with raised heel trusses?
  - What are the differences in costs between traditional trunk/branch vs. radial duct design?
- **Economic Impacts**
  - Will increased installation of buried ducts require higher overall trade skills?

Data may be provided anonymously. To participate or provide information, please email Simon Palin, spallin@frontierenergy.com directly and cc info@title24stakeholders.com.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2022 documents are marked with red underlining (new language) and ~~strikethroughs~~ (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in yellow.

Standards

9. **Space conditioning distribution systems**. All space conditioning systems shall meet all applicable requirements of A, ~~or~~ B, or C below:

A. ~~Reserved.~~ **Buried ducts**. Ducts are allowed to be in ventilated attic spaces if the following requirements are met as confirmed by field verification and diagnostic testing to meet the criterion of Reference Residential Appendix Section RA3.1.4.3.x.

i. **Duct insulation and placement.** Ducts shall be insulated to R-6 and shall be installed directly over and in contact with ceiling drywall or 2x4 truss cords.

ii. **Duct diameter**. The nominal diameter of ducts shall not exceed 12 inches.

iii. **Ceiling insulation and radiant barrier**. Ceiling insulation with an R-value of 49 or greater shall be field verified in accordance with Reference Residential Appendix RA3.5, and a radiant barrier meeting the requirements of Section 150.1(c)2 shall be installed.

iv. **Air handler**. The installed air handler shall be in conditioned space or shall be field verified to meet low leakage requirements in accordance with the procedures specified in Reference Residential Appendix RA3.1.4.3.9.

B. **High performance attics**. Air handlers or ducts are allowed to be in ventilated attic spaces when the roof and ceiling insulation level meet Option B in Table 150.1-A. Duct insulation levels shall meet the requirements in Table 150.1-A.

C. **Duct and air handlers located in conditioned space.** Duct systems and air handlers of HVAC systems shall be located in conditioned space, and confirmed by field verification and diagnostic testing to meet the criterion of Reference Residential Appendix Section RA3.1.4.3.8. Duct insulation levels shall meet the requirements in Table 150.1-A.

Revisions to Table 150.1-A which adds Option A are to be developed.

Reference Appendices

A new Section RA3.1.4.3.x covering buried duct verification procedures is under development.