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2022 Residential Prescriptive Model Reach Code for Existing Buildings

**Version 1.0**

**November 2023**

## Changes from Prior Versions

Please check [LocalEnergyCodes.com](https://localenergycodes.com/content/resources) to obtain the latest version of this document. This document will be updated frequently to comport with new features in the [Cost Effectiveness Explorer](http://explorer.localenergycodes.com/).

## Scope

* All single family and low-rise residential multifamily buildings that undergo certain improvements must include a set of specified measures.
* All reroofs must install a cool roof (certain climate zones only).

## Introduction

This model ordinance language supports a reach code requiring stricter energy performance for projects in existing residential buildings.

This model ordinance would require that a specific set of measures be installed as part of an improvement project. The measures are limited to those that have been found to be cost-effective based on the [*2019 Existing Single Family Residential Building Upgrades Cost-Effectiveness Study*](https://localenergycodes.com/download/873/file_path/fieldList/2019%20Residential%20Retrofit%20Cost-eff%20Report%20(8/27/2021).pdf)*,* and an [update for the 2022 code](https://localenergycodes.com/download/1285/file_path/fieldList/2022%20Residential%20Retrofit%20Memo.pdf). The [Cost-Effectiveness Explorer](https://explorer-production-qa-flexiblepath.vercel.app/) produces a list of measures that have been found to be cost-effective for particular vintages of buildings in each climate zone.

As proposed below, such an ordinance could be structured to amend Title 24, Part 6, Sections 150 and 180 to require compliance as part of a defined project scope.

The study supports separate sets of measures for three different vintages, all of which are pre-2011. While it is possible to specify different requirements for each vintage, a jurisdiction may wish to simplify the requirements to address the predominant vintage(s) in the community.

Amendments to the State Code appear in strikeouts (deletions) and underlines (additions). Such amendments require that the governing body of the local jurisdiction make express findings and cite the authorities used to adopt the ordinance. These vary depending upon the part of the code that is being modified. Refer to [Guide for Local Amendments of Building Standards 2022](https://www.dgs.ca.gov/-/media/Divisions/BSC/05-Resources/Guidebooks/Guide-Local-Amend-of-Bldg-Stnds-02-03-23-Final-rev-10-23.pdf?la=en&hash=8546192D2BDA94AF258B867FC731C45B139891DB) for more information. In addition to the requirements specified in the Guide, the California Energy Commission requires that the findings include a statement to the effect that the local governmental agency’s governing body, has at a public meeting, adopted its determination that the standards are cost-effective.

Amendments to the Energy Code (Title 24, Part 6) must be approved by the [California Energy Commission](https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency-3) (CEC). All amendments must be filed with the [California Building Standards Commission](https://www.dgs.ca.gov/BSC/Codes/Local-Amendments-to-Building-Standards---Ordinances).

Jurisdictions may wish to modify elements of the ordinance, such as those marked with the text “[Optional]”. When modifying the language, ensure all references are maintained and that the ordinance still meets the CEC requirements. Also, edit the Purpose section to reflect the changes.

The headings, footnotes and instructions (in blue) are for staff reference and should be removed from the final ordinance.

Templates for implementation materials are available at [LocalEnergyCodes.com.](https://localenergycodes.com/content/resources/?q=efficiency%20and%20electrification%20for%20additions%20and%20alterations)

The draft ordinance text and CEQA determination language are provided as examples only. Ensure all ordinance materials are reviewed and verified by relevant jurisdiction staff and the city/county attorney.

ORDINANCE AMENDING THE [CITY/COUNTY OF JURISDICTION] BUILDING CODE TO REQUIRE HIGHER ENERGY PERFORMANCE FOR CERTAIN RESIDENTIAL PROJECTS

DELETE ALL BLUE TEXT AND FOOTNOTES

## Findings

## Amendments to the State Building Code require jurisdictions to make certain express findings; additional findings are required to support amendments to the State Energy Code. Refer to [Guide for Local Amendments of Building Standards 2022](https://www.dgs.ca.gov/-/media/Divisions/BSC/05-Resources/Guidebooks/Guide-Local-Amend-of-Bldg-Stnds-02-03-23-Final-rev-10-23.pdf?la=en&hash=8546192D2BDA94AF258B867FC731C45B139891DB) for more information. Required findings include:

## A declaration of the authorities granted by the State to the jurisdiction to amend the code, which include:

* + Health and Safety Code sections 17958.7 and 18941.5
  + Public Resources Code Section 25402.1(h)(2)
  + Section 10-106 of the Building Energy Efficiency Standards
* A determination that the amendments are reasonably necessary to address local climatic, geological, or topographical conditions
* A determination that the proposed standards are cost-effective and a reference to the supporting analysis
* A declaration that the jurisdiction has at a public meeting, adopted its determination that the standards are cost-effective
* A determination that the proposed standards are more stringent than the State Energy Code and that they will require buildings to be designed to consume less energy than permitted by the State Energy Code
* Any findings, determinations, declarations, or reports, including any negative declaration or environmental impact report, required pursuant to the California Environmental Quality Act

## Sample Amendments

Section 1: Amendments

The California Building Code, Title 24, Part 6, adopted by the [City/County of jurisdiction] codified under Chapter [municipal/county code reference (if not adopted in entirety, include local code references for each section)], is amended as specified below. Strikeouts and underlines indicate modifications to the State code.

### Purpose

**Section 100.0 is modified to add new sections (i) and (j) as follows:**

1. Single Family Building Remodel Energy Reach Code - Purpose and Intent.

In addition to all requirements of the California Energy Code applicable to Single Family building additions and alterations, the measures specified herein shall be required for certain projects.

1. Multifamily Building Remodel Energy Reach Code - Purpose and Intent.

In addition to all requirements of the California Energy Code applicable to low-rise multifamily residential remodel projects, the measures specified herein and shall be required for certain projects.

### Definitions

Section 100.1(b) is modified by adding the following definitions:

**COVERED LOW-RISE MULTIFAMILY PROJECT** shall mean any project in any particular dwelling unit in a in a low-rise (three habitable stories or less) multifamily building originally permitted for construction before 2011… [insert definition]. Where the project scope affects multiple dwelling units, each dwelling unit shall be considered as a separate project and the valuation shall be apportioned to each dwelling unit according to the specific scope for each unit. The definition shall not include a project that is considered to be a newly constructed building under the California Energy Code, Title 24, Part 6. [Option: “The determination shall include all addition or alteration permits issued within the past three years.”]

**COVERED SINGLE FAMILY PROJECT** shall mean any project in a single family residential building originally permitted for construction before 2011… [insert definition]. The definition shall not include a project that is considered to be a newly constructed building under the California Energy Code, Title 24, Part 6. [Option: “The determination shall include all addition or alteration permits issued within the past three years.”]

The definition of “Covered Projects” is at the discretion of the local jurisdiction. A few options are offered below. Building/permitting staff should be consulted in this process. It is important to consider the definition in conjunction with the requirements.

[Option 1]

… that requires an electrical permit, a mechanical permit and a plumbing permit, with the exception of projects with a total valuation of less than $XX,XXX [specify value].

[Option 2]

… that includes an addition or alteration with a building permit valuation of $25,000***[[1]](#footnote-2)*** [or other value] or higher.

[Option 3]

… with a building permit valuation of $25,000 [or other value] or higher and that includes any of the following: 1. Any additions, or any change, rearrangement or addition, other than a repair, of the structural elements including foundations, footing, sub-floors, lintels, beams, columns, girders, slabs, roof trusses, staircases, load bearing walls, door frames, window frames, or any other part of the building that resists force or moment. 2. Change or rearrangement of the plan configuration of walls and full-height partitions. 3. Modification of the electrical system, heating or cooling equipment or gas plumbing.

[Option 4]

…that includes an addition, alteration, or remodel that affects a floor area which exceeds twenty percent (20%) [or other value] of the existing floor area, or has a combined valuation of $25,000 [or other value] or more. When any changes are made, such as walls, columns, beams or girders, floor or ceiling joists and coverings (subfloor and drywall), roof rafters, roof diaphragms, foundations, piles or retaining walls or similar components, the floor area of all rooms affected by such changes shall be included in computing floor areas for purposes of applying this definition. This definition does not apply to project scopes that are solely limited to any of the following: the replacement and upgrading of residential roof coverings, exterior wall finishes and/or floor finishes; alterations that add no more than 75 square feet of fenestration; alterations that add no more than 16 square feet of skylight area with a maximum U-factor of 0.55 and a maximum SHGC of 0.30; alterations that are limited to providing access for persons with disabilities; and additions of 300 [or other amount] square feet or less.

### Single Family Requirements

The first two paragraphs of Section 150.0 SINGLE-FAMILY RESIDENTIAL BUILDINGS – MANDATORY FEATURES AND DEVICES are modified to read as follows:

Single-family residential buildings shall comply with the applicable requirements of Sections 150(a) through 150.0(v); in addition, Covered Single Family Projects shall comply with the applicable requirements of Section 150.0(w).

NOTE: The requirements of Sections 150.0(a) through 150.0(v) apply to newly constructed buildings. Sections 150.2(a) and 150.2(b) specify which requirements of Sections 150.0(a) through 150.0(v) also apply to additions or alterations, with the exception that Covered Single Family Projects shall also be required to comply with Section 150.0(w).

A new Section, (w), is added to Section 150.0 as follows:

1. A Covered Single Family Project shall install all applicable measures designated as required according to vintage in Table 150.0-J. [Add reference to table(s) for additional climate zones, if applicable]. Measures shall be installed in accordance with the specifications in Table 150.0-K. Measure verification shall be explicitly included as an addendum to the Certificate of Compliance to be filed pursuant to 2022 Title 24 Section 10-103.

Building vintage is the year in which the original construction permit for the building was submitted, as documented by building department records.

Unless otherwise specified, the requirements shall apply to the entire dwelling unit, not just the additional or altered portion.

Where these requirements conflict with other Energy Code requirements, the stricter requirements shall prevail.

**Exception 1 to Section 150.0(w)**: If the applicant demonstrates that the Energy Budget of the building under the proposed project would be less than or equal to the Energy Budget of the building under the project if it included the required measures.

**Exception 2 to Section 150.0(w)**: Mobile Homes, Manufactured Housing, or Factory-built Housing as defined in Division 13 of the California Health and Safety 12 Code (commencing with Section 17000 of the Health and Safety Code).

**Exception 3 to Section 150.0(w)**: Due to conditions specific to the project, it is technically or economically infeasible to achieve compliance, the Building Administrator may waive some or all of the requirements.

**Exception 4 to Section 150.0(w)**: A measure that is necessary for compliance is beyond the authority of the homeowner because of an HOA covenant.

Table 150.0-J: Required Measures

[Designate required measures from table downloaded from the Cost-Effectiveness Explorer. Delete unused measures and renumber as needed.]

| **Measures** | **Table 150.0-K ID** | **Building Vintage** | | |
| --- | --- | --- | --- | --- |
| **Pre-1978** | **1978-1991** | **1992-2010** |
| Lighting Measures | SF1 |  |  |  |
| Water Heating Package | SF2 |  |  |  |
| R-49 Attic Insulation | SF3 |  |  |  |
| Air Sealing | SF4 |  |  |  |
| Duct Sealing | SF5 |  |  |  |
| New Ducts + Duct Sealing | SF6 |  |  |  |
| Windows | SF7 |  |  |  |
| R-13 Wall Insulation | SF8 |  |  |  |
| PV [Alternate: PV + Electric Ready Pre-Wire] | SF9 |  |  |  |
| Electric Readiness [Optional] | SF10 |  |  |  |

The measures in the Required Measures table shall conform to the specifications in Table 150.0-K.

**Table 150.0-K: Measure Specifications** [Delete measures from the table that are not in the Required Measures table and renumber accordingly].

|  |  |
| --- | --- |
| **ID** | **Measure Specification** |
| SF1 | Lighting Measures – Replace all interior and exterior screw-in incandescent, halogen, and compact fluorescent lamps with LED lamps. Install photocell controls on all exterior lighting luminaires. |
| SF2 | Water Heating Package: Add exterior insulation meeting a minimum of R-6 to existing storage water heaters. Insulate all accessible hot water pipes with pipe insulation a minimum of ¾ inch thick. This includes insulating the supply pipe leaving the water heater, piping to faucets underneath sinks, and accessible pipes in attic spaces or crawlspaces. Upgrade fittings in sinks and showers to meet current California Green Building Standards Code (Title 24, Part 11) Section 4.303 water efficiency requirements.  Exception 1: Water heater blanket is not required on water heaters less than 20 gallons.  Exception 2: Water heater blanket is not required if application of a water heater blanket voids the warranty on the water heater.  Exception 3: Upgraded fixtures are not required if existing fixtures have rated or measured flow rates of no more than ten percent greater than 2022 California Green Building Standards Code (Title 24, Part 11) Section 4.303 water efficiency requirements.  Exception 4: Water heaters with factory installed insulation of R-24 or greater |
| SF3 | Air Sealing: Seal all accessible cracks, holes, and gaps in the building envelope at walls, floors, and ceilings. Pay special attention to penetrations including plumbing, electrical, and mechanical vents, recessed can light luminaires, and windows. Weather-strip doors if not already present. Verification shall be conducted following a prescriptive checklist[[2]](#footnote-3) that outlines which building aspects need to be addressed by the permit applicant and verified by an inspector. Compliance can also be demonstrated with blower door testing conducted by a certified HERS Rater no more than three years prior to the permit application date that either: a) shows at least a 30 percent reduction from pre-retrofit conditions; or b) shows that the number of air changes per hour at 50 Pascals pressure difference (ACH50) does not exceed ten for Pre-1978 vintage buildings, seven for 1978 to 1991 vintage buildings and five for 1992-2010 vintage buildings. If combustion appliances are located within the pressure boundary of the building, conduct a combustion safety test by a professional certified by the Building Performance Institute in accordance with the ANSI/BPI-1200-S-2017 Standard Practice for Basic Analysis of Buildings[[1]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-us&rs=en-us&wopisrc=https%3A%2F%2Fmballc.sharepoint.com%2Fsites%2F2022ReachCodes%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fcda6b7c015fd465aa2aa8e62faf0dd28&wdenableroaming=1&mscc=1&hid=02f2a94f-f406-568a-4a73-2ef8527f8635-7419&uiembed=1&uih=teams&uihit=files&hhdr=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fteams.microsoft.com%22%2C%22pmshare%22%3Atrue%2C%22surl%22%3A%22%22%2C%22curl%22%3A%22%22%2C%22vurl%22%3A%22%22%2C%22eurl%22%3A%22https%3A%2F%2Fteams.microsoft.com%2Ffiles%2Fapps%2Fcom.microsoft.teams.files%2Ffiles%2F2572368870%2Fopen%3Fagent%3Dpostmessage%26objectUrl%3Dhttps%253A%252F%252Fmballc.sharepoint.com%252Fsites%252F2022ReachCodes%252FShared%2520Documents%252FReach%2520Codes%2520Collaborations%252FResource%2520Development%252FModel%2520Language%252FResidential%2520Retrofits%252FModelReachCode_SF_Renovation_2022_V1.0.docx%26fileId%3Dcda6b7c0-15fd-465a-a2aa-8e62faf0dd28%26fileType%3Ddocx%26ctx%3Dfiles%26scenarioId%3D7419%26locale%3Den-us%26theme%3Ddefault%26version%3D21120606800%26setting%3Dring.id%3Ageneral%26setting%3DcreatedTime%3A1652149056346%22%7D&wdorigin=TEAMS-ELECTRON.teams.files&wdhostclicktime=1652149056222&jsapi=1&jsapiver=v1&newsession=1&corrid=dc37cff8-f289-429b-866a-270f50b61aed&usid=dc37cff8-f289-429b-866a-270f50b61aed&sftc=1&sams=1&accloop=1&sdr=6&scnd=1&sat=1&hbcv=1&htv=1&hodflp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Medium&ctp=LeastProtected#_ftn1), the Whole House Combustion Appliance Safety Test Procedure for the Comfortable Home Rebates Program 2020[[2]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-us&rs=en-us&wopisrc=https%3A%2F%2Fmballc.sharepoint.com%2Fsites%2F2022ReachCodes%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fcda6b7c015fd465aa2aa8e62faf0dd28&wdenableroaming=1&mscc=1&hid=02f2a94f-f406-568a-4a73-2ef8527f8635-7419&uiembed=1&uih=teams&uihit=files&hhdr=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fteams.microsoft.com%22%2C%22pmshare%22%3Atrue%2C%22surl%22%3A%22%22%2C%22curl%22%3A%22%22%2C%22vurl%22%3A%22%22%2C%22eurl%22%3A%22https%3A%2F%2Fteams.microsoft.com%2Ffiles%2Fapps%2Fcom.microsoft.teams.files%2Ffiles%2F2572368870%2Fopen%3Fagent%3Dpostmessage%26objectUrl%3Dhttps%253A%252F%252Fmballc.sharepoint.com%252Fsites%252F2022ReachCodes%252FShared%2520Documents%252FReach%2520Codes%2520Collaborations%252FResource%2520Development%252FModel%2520Language%252FResidential%2520Retrofits%252FModelReachCode_SF_Renovation_2022_V1.0.docx%26fileId%3Dcda6b7c0-15fd-465a-a2aa-8e62faf0dd28%26fileType%3Ddocx%26ctx%3Dfiles%26scenarioId%3D7419%26locale%3Den-us%26theme%3Ddefault%26version%3D21120606800%26setting%3Dring.id%3Ageneral%26setting%3DcreatedTime%3A1652149056346%22%7D&wdorigin=TEAMS-ELECTRON.teams.files&wdhostclicktime=1652149056222&jsapi=1&jsapiver=v1&newsession=1&corrid=dc37cff8-f289-429b-866a-270f50b61aed&usid=dc37cff8-f289-429b-866a-270f50b61aed&sftc=1&sams=1&accloop=1&sdr=6&scnd=1&sat=1&hbcv=1&htv=1&hodflp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Medium&ctp=LeastProtected#_ftn2) or the California Community Services and Development Combustion Appliance Safety Testing Protocol. |
| SF4 | R-49 Attic Insulation: Attic insulation shall be installed to achieve a weighted assembly U-factor of 0.020 or insulation installed at the ceiling level shall have a thermal resistance of R-49 or greater for the insulation alone. Recessed downlight luminaires in the ceiling shall be covered with insulation to the same depth as the rest of the ceiling. Luminaires not rated for insulation contact must be replaced or fitted with a fire-proof cover that allows for insulation to be installed directly over the cover. [Option: the R-value may be reduced in milder climates; update measure name in Table 150.0-J accordingly]  Exception: In buildings where existing R-30 is present and existing recessed downlight luminaires are not rated for insulation contact, insulation is not required to be installed over the luminaires. |
| SF5 | Duct Sealing: Air seal all space conditioning ductwork to meet the requirements of the 2022 Title 24 Section 150.2(b)1E. The duct system must be tested by a HERS Rater no more than three years prior to the Covered Single Family Project permit application date to verify the duct sealing and confirm that the requirements have been met.  Exception: Buildings without ductwork or where the ducts are in conditioned space. |
| SF6 | New Ducts + Duct Sealing: Replace existing space conditioning ductwork with new R-8 ducts that meet the requirements of 2022 Title 24 Section 150.0(m)11. This measure may not be combined with the Duct Sealing measure in this Table. To qualify, a preexisting measure must have been installed no more than three years before the Covered Single Family Project permit application date. |
| SF7 | Windows: Replace at least 50% of existing windows with high performance windows with an area-weighted average U-factor no greater than 0.32. |
| SF8 | R-13 Wall Insulation: Install wall insulation in all exterior walls to achieve a weighted U-factor of 0.102 or install wall insulation in all exterior wall cavities that shall result in an installed thermal resistance of R-13 or greater for the insulation alone. |
| SF9 | PV: Install a solar PV system that meets the requirements of 2022 Title 24 Section 150.1(c)14. The system shall be sized such that the estimated annual kWh production shall not exceed the projected annual kWh demand.  [Alternate]: PV+ Electric Ready Pre-Wire   1. Install a solar PV system that meets the requirements of 2022 Title 24 Reference Appendix JA11. The system shall be sized such that the estimated annual kWh production shall not exceed the projected annual kWh demand. 2. Upgrade the panelboard serving the individual dwelling to provide circuit breaker spaces for a heat pump water heater, heat pump space heater, electric cooktop and electric clothes dryer with the capacities specified in California Energy Code Section 150.0 (n), (t), (u) and (v); or, provide electrical load calculations and appliance specifications for serving all of these end-uses with a minimum 100-amp panel. 3. Install any one [or two] of the measures below:    1. Heat Pump Water Heater Ready, as specified in Section 150.0(n)1.    2. Heat Pump Space Heater Ready, as specified in Section 150.0(t).    3. Electric Clothes Dryer Ready, as specified in Section 150.0(v).    4. Electric Cooktop Ready, as specified in Section 150.0(u).    5. Energy Storage Systems (ESS) Ready, as specified in Section 150.0(s).    6. EV Charger Ready. Install a dedicated 208/240-volt branch circuit as specified in the California Green Building Code, Title 24, Part 11, Section A4.106.8.1,which otherwise applies to new construction. |
| SF10 | [Optional] Electric Readiness  If the project includes a kitchen or laundry room remodel, upgrade the panelboard serving the individual dwelling to provide circuit breaker spaces for a heat pump water heater, heat pump space heater, electric cooktop and electric clothes dryer with the capacities specified in California Energy Code Section 150.0 (n), (t), (u) and (v); or, provide electrical load calculations and appliance specifications for serving all of these end-uses with a minimum 100-amp panel.  In addition, if the project includes a kitchen remodel comply with the Electric Cooktop Ready requirement, as specified in Section 150.0(u) and if the project includes a laundry room remodel comply with the Electric Clothes Dryer Ready requirement, as specified in Section 150.0(v).  Exception: If an electrical permit is not otherwise required for the project other than compliance with this measure. |

[[1]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-us&rs=en-us&wopisrc=https%3A%2F%2Fmballc.sharepoint.com%2Fsites%2F2022ReachCodes%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fcda6b7c015fd465aa2aa8e62faf0dd28&wdenableroaming=1&mscc=1&hid=02f2a94f-f406-568a-4a73-2ef8527f8635-7419&uiembed=1&uih=teams&uihit=files&hhdr=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fteams.microsoft.com%22%2C%22pmshare%22%3Atrue%2C%22surl%22%3A%22%22%2C%22curl%22%3A%22%22%2C%22vurl%22%3A%22%22%2C%22eurl%22%3A%22https%3A%2F%2Fteams.microsoft.com%2Ffiles%2Fapps%2Fcom.microsoft.teams.files%2Ffiles%2F2572368870%2Fopen%3Fagent%3Dpostmessage%26objectUrl%3Dhttps%253A%252F%252Fmballc.sharepoint.com%252Fsites%252F2022ReachCodes%252FShared%2520Documents%252FReach%2520Codes%2520Collaborations%252FResource%2520Development%252FModel%2520Language%252FResidential%2520Retrofits%252FModelReachCode_SF_Renovation_2022_V1.0.docx%26fileId%3Dcda6b7c0-15fd-465a-a2aa-8e62faf0dd28%26fileType%3Ddocx%26ctx%3Dfiles%26scenarioId%3D7419%26locale%3Den-us%26theme%3Ddefault%26version%3D21120606800%26setting%3Dring.id%3Ageneral%26setting%3DcreatedTime%3A1652149056346%22%7D&wdorigin=TEAMS-ELECTRON.teams.files&wdhostclicktime=1652149056222&jsapi=1&jsapiver=v1&newsession=1&corrid=dc37cff8-f289-429b-866a-270f50b61aed&usid=dc37cff8-f289-429b-866a-270f50b61aed&sftc=1&sams=1&accloop=1&sdr=6&scnd=1&sat=1&hbcv=1&htv=1&hodflp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Medium&ctp=LeastProtected#_ftnref1) <http://www.bpi.org/sites/default/files/ANSI%20BPI-1200-S-2017%20Standard%20Practice%20for%20Basic%20Analysis%20of%20Buildings.pdf>

[[2]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-us&rs=en-us&wopisrc=https%3A%2F%2Fmballc.sharepoint.com%2Fsites%2F2022ReachCodes%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fcda6b7c015fd465aa2aa8e62faf0dd28&wdenableroaming=1&mscc=1&hid=02f2a94f-f406-568a-4a73-2ef8527f8635-7419&uiembed=1&uih=teams&uihit=files&hhdr=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fteams.microsoft.com%22%2C%22pmshare%22%3Atrue%2C%22surl%22%3A%22%22%2C%22curl%22%3A%22%22%2C%22vurl%22%3A%22%22%2C%22eurl%22%3A%22https%3A%2F%2Fteams.microsoft.com%2Ffiles%2Fapps%2Fcom.microsoft.teams.files%2Ffiles%2F2572368870%2Fopen%3Fagent%3Dpostmessage%26objectUrl%3Dhttps%253A%252F%252Fmballc.sharepoint.com%252Fsites%252F2022ReachCodes%252FShared%2520Documents%252FReach%2520Codes%2520Collaborations%252FResource%2520Development%252FModel%2520Language%252FResidential%2520Retrofits%252FModelReachCode_SF_Renovation_2022_V1.0.docx%26fileId%3Dcda6b7c0-15fd-465a-a2aa-8e62faf0dd28%26fileType%3Ddocx%26ctx%3Dfiles%26scenarioId%3D7419%26locale%3Den-us%26theme%3Ddefault%26version%3D21120606800%26setting%3Dring.id%3Ageneral%26setting%3DcreatedTime%3A1652149056346%22%7D&wdorigin=TEAMS-ELECTRON.teams.files&wdhostclicktime=1652149056222&jsapi=1&jsapiver=v1&newsession=1&corrid=dc37cff8-f289-429b-866a-270f50b61aed&usid=dc37cff8-f289-429b-866a-270f50b61aed&sftc=1&sams=1&accloop=1&sdr=6&scnd=1&sat=1&hbcv=1&htv=1&hodflp=1&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush&rct=Medium&ctp=LeastProtected#_ftnref2) <https://comfortablehomerebates.com/wp-content/uploads/3.-2020-CHR-Whole-House-Combustion-Appliance-Safety-Test-Procedure.pdf>

Section 150.2(b)1Ii Steep-sloped roofs, is modified to read as follows: [Exclude this section if cool roofs are not cost-effective in the local climate zone.]

i.   **Steep-sloped roofs.**Steep-sloped roofs shall meet the following:

New roofing products ~~in~~[~~Climate Zones~~](https://energycodeace.com/site/custom/public/reference-ace-2022/Documents/gloss_climatezones.htm)~~4 and 8 through 15~~ shall have a minimum aged solar reflectance of ~~0.20~~ 0.25 and a minimum thermal emittance of 0.75~~, or a minimum SRI of 16~~.

### Multifamily Requirements

The first two paragraphs of Section 180.0, MULTIFAMILY BUILDINGS - ADDITIONS, ALTERATIONS, AND REPAIRS TO EXISTING MULTIFAMILY BUILDINGS, are modified as follows:

Additions, alterations, and repairs to existing attached dwelling units and common use areas in multifamily buildings, existing outdoor lighting for these occupancies, and internally and externally illuminated signs, shall meet the requirements specified in Sections 100.0 through 110.10, and 160.1, and 160.3 through 170.2 that are applicable to the building project, and either the performance compliance approach (energy budgets) in Section 180.1(b) (for additions) or 180.2(c) (for alterations), or the prescriptive compliance approach in Section 180.1(a) (for additions) or 180.2(b) (for alterations), for the Climate Zone in which the building is located. Climate zones are shown in FIGURE 100.1-A. In addition, a Low-Rise Multifamily Covered Project shall meet the requirements specified in Section 180.2(d), and any reroofing project in a low-rise multifamily building shall meet the requirements specified in Section 180.2(e). [Exclude the last phrase if cool roofs are not cost-effective in the local climate zone.]

A new Section, (d), is added to Section 180.2 as follows:

1. A Covered Low-Rise Multifamily Project shall install all applicable measures designated as required according to vintage in Table 180.2–F. [Add reference to table(s) for additional climate zones, if applicable]. Measures shall be installed in accordance with the specifications in Table 180.2-G. Measure verification shall be explicitly included as an addendum to the Certificate of Compliance to be filed pursuant to 2022 Title 24 Section 10-103.

Building vintage is the year in which the original construction permit for the building was submitted, as documented by building department records.

Unless otherwise specified, the requirements shall apply to the entire dwelling unit, not just the additional or altered portion.

Where these requirements conflict with other Energy Code requirements, the stricter requirements shall prevail.

Where a package is specified as required in Table 180.2-F, all the individual measures in the package shall be installed unless any individual measure in the package is either not applicable or excepted, in which event only the individual measures specified as required in Table 180.2-F need to be installed.

**Exception 1 to Section 180.2(d)**: If the applicant demonstrates that the Energy Budget of the building under the proposed project would be less than or equal to the Energy Budget of the building under the project if it included the required measures.

**Exception 2 to Section 180.2(d)**: Due to conditions specific to the project, it is technically or economically infeasible to install a measure.

**Exception 3 to Section 180.2(d)**: A measure is beyond the authority of the homeowner because of an HOA covenant.

Table 180.2-F: Required Measures

[Designate measures from table downloaded from the Cost-Effectiveness Explorer. Delete unused measures, including redundant (lower order) packages, and renumber as needed.]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure/Package** | **Table 180.2-G ID** | **Building Vintage** | | |
| **Pre-1978** | **1978-1991** | **1992-2010** |
| **Packages** |  |  |  |  |
| R-49 Attic Insulation and Air Sealing measures | MF1 |  |  |  |
| R-49 Attic Insulation and Duct Sealing measures | MF2 |  |  |  |
| R-49 Attic Insulation, Air Sealing and Duct Sealing measures | MF3 |  |  |  |
| R-49 Attic Insulation, Air Sealing and New Duct measures | MF4 |  |  |  |
| R-49 Attic Insulation, Air Sealing, Duct Sealing, Windows and R-13 Wall Insulation measures | MF5 |  |  |  |
| **Measures** |  |  |  |  |
| Lighting | MF6 |  |  |  |
| Water Heating Package | MF7 |  |  |  |
| Air Sealing | MF8 |  |  |  |
| R-49 Attic Insulation | MF9 |  |  |  |
| Duct Sealing | MF10 |  |  |  |
| New Ducts | MF11 |  |  |  |
| Windows | MF12 |  |  |  |
| R-13 Wall Insulation | MF13 |  |  |  |
| Floor Insulation | MF14 |  |  |  |
| PV [Alternate: PV + Electric Ready Pre-Wire] | MF15 |  |  |  |
| Electric Readiness [Optional] | MF16 |  |  |  |

Table 180.2-G: Measure/Package Specifications [Delete measures from the table that are not in the Required Measures table and renumber accordingly].

|  |  |
| --- | --- |
| **ID** | **Measure/Package Description** |
| **Packages:** If a package is designated as required in Table 180.2-F, install all measures in that package.  Exception: If any individual measure in the package is not applicable, infeasible or specifically excepted as an individual measure, install all individual measures designated as required in Table 180.2-F. | |
| MF1 | Package: R-49 Attic Insulation and Air Sealing measures [Option: the R-value for attic insulation in each of the packages and the stand-alone attic insulation measure may be reduced in milder climates; update measure names in Table 180.2-F accordingly] |
| MF2 | Package: R-49 Attic Insulation and Duct Sealing measures |
| MF3 | Package: R-49 Attic Insulation, Air Sealing, and Duct Sealing measures |
| MF4 | Package: R-49 Attic Insulation, Air Sealing, and New Ducts + Duct Sealing measures |
| MF5 | Package: R-49 Attic Insulation, Air Sealing, New Ducts + Duct Sealing, R-13 Wall Insulation, and Windows measures |
| **Measures** | |
| MF6 | Lighting Measures: Replace all interior and exterior screw-in incandescent, halogen, and compact fluorescent lamps with LED lamps. Install photocell controls on all exterior lighting luminaires. |
| MF7 | Water Heating Package: Add exterior insulation meeting a minimum of R-6 to existing storage water heaters.  Insulate all accessible hot water pipes with pipe insulation a minimum of ¾ inch thick. This includes insulating the supply pipe leaving the water heater, piping to faucets underneath sinks, and accessible pipes in attic spaces or crawlspaces. Upgrade fittings in sinks and showers to meet current California Green Building Standards Code (Title 24, Part 11) Section 4.303 water efficiency requirements.  Exception 1: Water heater blanket is not required on water heaters less than 20 gallons.  Exception 2: Water heater blanket not required if application of a water heater blanket voids the warranty on the water heater.  Exception 3: Upgraded fixtures are not required if existing fixtures have rated or measured flow rates of no more than ten percent greater than current California Green Building Standards Code (Title 24, Part 11) Section 4.303 water efficiency requirements.  Exception 4: Water heaters with factory installed insulation of R-24 or greater. |
| MF8 | Air Sealing: Seal all accessible cracks, holes, and gaps in the building envelope at walls, floors, and ceilings. Pay special attention to penetrations including plumbing, electrical, and mechanical vents, recessed can light luminaires, and windows. Weather-strip doors if not already present. Verification shall be conducted following a prescriptive checklist[[3]](#footnote-4) that outlines which building aspects need to be addressed by the permit applicant and verified by an inspector. Compliance can also be demonstrated with blower door testing conducted by a certified HERS Rater no more than three years prior to the permit application date that either: a) shows at least a 30 percent reduction from pre-retrofit conditions; or b) shows that the number of air changes per hour at 50 Pascals pressure difference (ACH50) does not exceed ten for Pre-1978 vintage buildings, seven for 1978 to 1991 vintage buildings and five for 1992-2010 vintage buildings. If combustion appliances are located within the pressure boundary of t10he building, conduct a combustion safety test by a professional certified by the Building Performance Institute in accordance with the ANSI/BPI-10-S-2017 Standard Practice for Basic Analysis of Buildings, the Whole House Combustion Appliance Safety Test Procedure for the Comfortable Home Rebates Program 20204 or the California Community Services and Development Combustion Appliance Safety Testing Protocol. |
| MF9 | R-49 Attic Insulation: Attic insulation shall be installed to achieve a weighted assembly U-factor of 0.020 or insulation installed at the ceiling level shall have a thermal resistance of R-49 or greater for the insulation alone. Recessed downlight luminaires in the ceiling shall be covered with insulation to the same depth as the rest of the ceiling. Luminaires not rated for insulation contact must be replaced or fitted with a fire-proof cover that allows for insulation to be installed directly over the cover. [Option: the R-value may be reduced in milder climates; update measure names in Table 180.2-F accordingly]  Exception 1: Buildings with at least R-38 existing insulation installed at the ceiling level.  Exception 2: Buildings where the alteration would directly cause the disturbance of asbestos unless the alteration is made in conjunction with asbestos abatement.  Exception 3: Buildings with knob and tube wiring located in the vented attic.  Exception 4: Where the accessible space in the attic is not large enough to accommodate the required R- value, the entire accessible space shall be filled with insulation provided such installation does not violate roof ventilation clearance requirements in Section 806.3 of Title 24, Part 2.5.  Exception 5: Where the attic space above the altered dwelling unit is shared with other dwelling units and the attic insulation requirement is not triggered for the other dwelling units. |
| MF10 | Duct Sealing: Air seal all space conditioning ductwork to meet the requirements of 2022 Title 24 Section 180.2(b)2Aiii. The duct system must be tested by a HERS Rater no more than three years prior to the Low-Rise Multifamily Covered Project permit application date to verify the duct sealing and confirm that the requirements have been met.    Exception 1: All exceptions as stated in the 2022 Title 24, Part 6 Section 180.2(b)2Aiii are allowed.  Exception 2: Buildings without ductwork or where the ducts are in conditioned space. |
| MF11 | New Ducts + Duct Sealing: Replace existing space conditioning ductwork with new R-8 ducts that meet the requirements of 2022 Title 24, Part 6 Section 160.3(b)5.K, with the exception that the maximum duct leakage be reduced from the current code requirement of 12 percent to five percent. To qualify, a preexisting measure must have been installed no more than three years before the Low-Rise Multifamily Covered Project permit application date. |
| MF12 | Windows: Replace at least 50% of existing windows with high performance windows with an area-weighted average U-factor no greater than 0.32.  Exception 1: All exceptions as stated in the 2022 Title 24, Part 6 Section 170.2(c)3A are allowed.  Exception 2: Buildings where it is not feasible to meet the performance requirements as a result of historic preservation design guidelines or other reasons as determined by the jurisdiction. |
| MF13 | R-13 Wall Insulation: Install wall insulation in all exterior walls to achieve a weighted U-factor of 0.102 or install wall insulation in all exterior wall cavities that shall result in an installed thermal resistance of R-13 or greater for the insulation alone. |
| MF14 | Floor Insulation: Install floor insulation in the floor cavity of all exterior raised floors to achieve a weighted U-factor of 0.037 or an installed thermal resistance of R-19 or greater for the insulation alone. |
| MF15 | PV: Install a solar PV system that meets the prescriptive requirements in Section 170.2(f). The system shall be sized such that the estimated annual kWh production shall not exceed the projected annual kWh demand.  [Alternate]: PV+ Electric Ready Pre-Wire   1. Install a solar PV system that meets the requirements of 2022 Title 24 Reference Appendix JA11. The system shall be sized such that the estimated annual kWh production shall not exceed the projected annual kWh demand.   Exception 1: Covered Low-Rise Multifamily Projects with permit valuations of $100,000 [or other amount] or less.  Exception 2: All of the exceptions in Section 170.2(f) apply, except Exception 2 to Section 170.2(f).  Exception 3: Where installation would require access to other dwelling units that are not subject to the PV requirement.   1. Upgrade the panelboard serving the individual dwelling to provide circuit breaker spaces for a heat pump water heater, heat pump space heater, electric cooktop and electric clothes dryer with the capacities specified in California Energy Code Section 150.0 (n), (t), (u) and (v); or, provide electrical load calculations and appliance specifications for serving all of these end-uses with a minimum 100-amp panel. 2. Install any one [or two] of the measures below: 3. Heat Pump Water Heater Ready, as specified in Section 150.0(n)1. 4. Heat Pump Space Heater Ready, as specified in Section 150.0(t). 5. Electric Clothes Dryer Ready, as specified in Section 150.0(v). 6. Electric Cooktop Ready, as specified in Section 150.0(u). 7. Energy Storage Systems (ESS) Ready, as specified in Section 150.0(s). 8. EV Charger Ready. Install a dedicated 208/240-volt branch circuit as specified in the California Green Building Code, Title 24, Part 11, Section A4.106.8.1,which otherwise applies to new construction. |
| MF16 | [Optional] Electric Readiness  If the project includes a kitchen or laundry room remodel, upgrade the panelboard serving the individual dwelling to provide circuit breaker spaces for a heat pump water heater, heat pump space heater, electric cooktop and electric clothes dryer with the capacities specified in California Energy Code Section 150.0 (n), (t), (u) and (v); or, provide electrical load calculations and appliance specifications for serving all of these end-uses with a minimum 100-amp panel.  In addition, if the project includes a kitchen remodel comply with the Electric Cooktop Ready requirement, as specified in Section 150.0(u) and if the project includes a laundry room remodel comply with the Electric Clothes Dryer Ready requirement, as specified in Section 150.0(v).  Exception 1: If an electrical permit is not otherwise required for the project other than compliance with this measure.  Exception 2: Where installation would require access to other dwelling units that are not subject to the Electric Readiness requirements. |

A new Section, (e), is added to Section 180.2 as follows:

1. [Exclude this section if cool roofs are not cost-effective in the local climate zone.] Any reroof of a multifamily building that includes 50% or more of the contiguous roof area shall install a cool roof.  Only areas of the roof that are to be re-roofed are subject to this requirement. For steep-sloped roofs (ratio of rise to run greater than 2:12) install a roofing product rated by the Cool Roof Rating Council to have an aged solar reflectance equal to or greater than 0.25, and a thermal emittance equal to or greater than 0.75. For low-sloped roofs, install a roofing product meeting the requirements in Section 180.2(b)1Ai, with the exception that these requirements apply to all climate zones, and insulate the roof in accordance with Section 180.2(b)1Aiii.

**Exception to 180.2(e):** All exceptions as stated in the 2022 Title 24, Part 6 Section 180.2(b)1Ai for low-sloped roofs and 180.2(b)1Aii for steep-sloped roofs are allowed.

## Optional Exceptions

The exceptions below are optional and may be included at the discretion of the jurisdiction. Modify the reference to the sections and “Covered Project” as needed. Insert these after the exceptions in the Single Family and Multifamily sections.

**Exception** x **to Section 150.0(w) and 180.2(d)**: The Building Official may reclassify the vintage of the building based on existing conditions.

**Exception** x **to Section 150.0(w)**: A Covered Single Family Project that is limited solely to a newly created attached Accessory Dwelling Unit (ADU) or Junior Accessory Dwelling Unit (JADU). A newly created ADU and JADU shall include either additions or conversions of existing space. Note, this exception does not apply to a Covered Single Family Project of an existing ADU or JADU.

**Exception** x **to Section 150.0(w) and 180.2(d)**: A Covered Single Family Project or Covered Low-Rise Multifamily Project, other than an addition, that would not otherwise be subject to this section 150.0(w) but for installation of solar PV, solar water heating, EV charging, electrical upgrades for solar PV or EV charging, or energy storage.

**Exception** x **to Section 150.0(w) and 180.2(d)**: A Covered Single Family Project or Covered Low-Rise Multifamily Project that consists solely of medically necessary improvements or solely of seismic safety improvements.

**Exception** x **to Section 150.0(w) and 180.2(d)**: Expenditures of more than 20% [or other amount] of the project valuation. If the cost of the required would exceed 20% [or other amount] of the total project valuation, the set of required measures may be reduced. [This exception is recommended if the definition of Covered Single Family Project does not include a valuation.]

**Exception** x **to Section 150.0(w) and 180.2(d):**

[Option 1] Expenditures of more than 10% [or other amount] of the project valuation for a resident owner(s) or owner(s) of a residence occupied by a dependent that can demonstrate that they qualify as a low-income utility customer by being eligible for the California Alternative Rates for Energy (CARE) [or other criterion]. If the cost of the required would exceed 10% [or other amount] of the total project valuation, the set of required measures may be reduced. [This exception is recommended if the definition of Covered Project does not include a valuation.]

[Option 2] A resident owner(s) or occupant of residence or owner(s) of a residence occupied by a dependent who can demonstrate that they qualify as a low-income utility customer by being eligible for the California Alternative Rates for Energy (CARE) or Family Electric Rate Assistance Program (FERA) program [or other criterion] may comply by installing [specify limited set of cost-effective measures].

## Other Sample Ordinance Sections

Section 2: CEQA

This ordinance is exempt from CEQA under 15061(b)(3) on the grounds that these standards are more stringent than the State energy standards, there are no reasonably foreseeable adverse impacts and there is no possibility that the activity in question may have a significant effect on the environment.

Section 3: Severability

If any word, phrase sentence part, section, subsection or other portion of this amendment or any application thereof to any person or circumstance is declared void, unconstitutional, or invalid for any reason, then such word, phrase, sentence, part, section, subsection, or other portion, or the prescribed application thereof, shall be severable, and the remaining provisions of this amendment, and all applications thereof, not having been declared void, unconstitutional or invalid, shall remain in full force and effect.  The [name of governing body] hereby declares that it would have passed this amendment and each section, subsection sentence, clause and phrase of this amendment, irrespective of the fact that any one or more sections, subsection, sentences, clauses or phrases is declared invalid or unconstitutional.

Section 4: Violations

Violation of the requirements of this Chapter shall be considered an infraction of the [jurisdiction Municipal/County Code], punishable by all the sanctions prescribed in [cite local reference to infractions].

Section 5: Effective Date

This ordinance shall become effective as of ***[DATE]***, upon approval of the California Energy Commission or upon the date the California Building Standards Commission (CBSC) accepts the ordinance for filing, whichever is later.

1. Carlsbad = $60,000. Piedmont: $25,000 requires 1 measure; $100,000 requires 2 measures. [↑](#footnote-ref-2)
2. Template available at [localenergycodes.com](https://localenergycodes.com/download/1228/file_path/fieldList/SF%20Retrofits-AirSeal%20Checklist.docx) [↑](#footnote-ref-3)
3. Template available at [localenergycodes.com](https://localenergycodes.com/download/1228/file_path/fieldList/SF%20Retrofits-AirSeal%20Checklist.docx) [↑](#footnote-ref-4)