



What's Included in this Fact Sheet?

The 2022 Title 24, Part 6 Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) update the 2019 Energy Code.

The 2022 Energy Code is effective as of January 1, 2023. Any projects that apply for a permit on or after this date will be subject to the 2022 Energy Code. Information and documents are available at:

<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency>

This fact sheet highlights the key changes to the Energy Code that apply to single-family buildings. In the 2022 Energy Code, single-family buildings include single-family homes, accessory dwelling units (ADUs), duplexes and townhomes of any height.

In the 2019 Energy Code, low-rise multifamily buildings (\leq 3-stories) were grouped in the same code sections as single-family buildings (subchapters 7-9). The 2022 Energy Code reorganizes low-rise and high-rise multifamily buildings into one building type and moves requirements for multifamily buildings to their own subchapters (subchapters 10-12).

2022 Energy Code

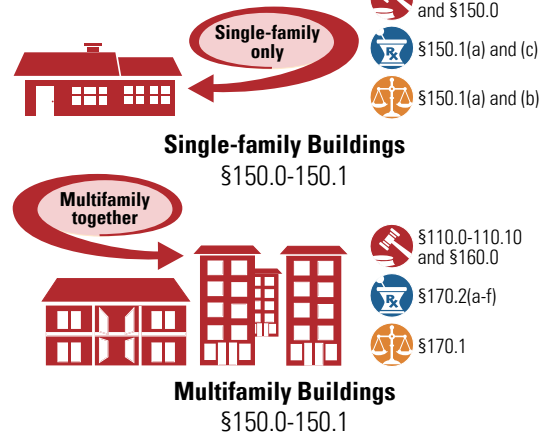


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How to Use this Fact Sheet

Use this fact sheet for highlights on the ways in which the Energy Code has changed in 2022 for single-family buildings. For detail about the code changes, refer to the Single-family Buildings: What's Changed in 2022 Fact Sheet.

Highlights and details about the code changes for other building types are given in the following fact sheets:

- [Multifamily Buildings: What's New in 2022?](#)
- [Multifamily Buildings: What's Changed in 2022?](#)
- [Nonresidential Buildings: What's New in 2022?](#)
- [Nonresidential Buildings: What's Changed in 2022?](#)



Why Did the Energy Code Change?

The 2022 Energy Code is an important part of California's work to reduce carbon emissions and fight climate change. The Energy Code is updated every three years with the mandate to increase building energy efficiency while staying cost-effective for building owners over the lifespan of a building.

Increases in energy efficiency and on-site generation:

- Reduce utility bills
- Improve indoor comfort and air quality
- Increase market value
- Reduce greenhouse gas emissions (GHG)

The California Energy Commission (CEC) estimates that over 30 years the 2022 Energy Code will provide \$1.5 billion in consumer benefits and reduce 10 million metric tons of GHGs – equivalent to taking nearly 2.2 million cars off the road for a year.

For single-family homes, the CEC estimates that the 2022 Energy Code change from using natural gas furnaces to electric heat pumps to heat new homes for most climate zones reduce net CO₂ emissions by 16,230 mTon/yr compared to the 2019 Energy Code, the equivalent of taking 3,641 gas cars off the road each year.

BENEFITS OF THE 2022 ENERGY CODE ACROSS ALL BUILDING TYPES

- Increases on-site renewable energy generation from solar
- Increases electric load flexibility to support grid reliability
- Reduces emissions from newly constructed buildings
- Reduces air pollution for improved public health
- Encourages adoption of environmentally beneficial efficient electric technologies

DECARBONIZATION GOALS

California is aiming to reduce its greenhouse gas emissions (GHG) while creating an energy system that is resilient to climate risks, spurring innovation and a low-carbon transition nationally and internationally.

California's climate goals are among the most ambitious in the country.

GHG Emission Reduction Goals

- Assembly Bill 32: 1990 levels by 2020
- Senate Bill 32: 40% below 1990 levels by 2030
- Executive Order S-3-05: 80% below 1990 levels by 2050

This can be achieved through a variety of measures, such as incremental steps toward "carbon neutral" buildings, and timely balancing of onsite energy production and consumption in support of a healthy, stable grid. The Energy Code is designed to support reaching these goals.

Learn more here: <https://www.energy.ca.gov/data-reports/reports/building-decarbonization-assessment>



Evolving Compliance Metrics

The 2022 Energy Code continues improvements in energy efficiency ratings in order to pivot new residential buildings toward cleaner, low-carbon technologies that will help the state meet its critical long-term climate and carbon neutrality goals.

Energy Code	New Construction	Additions	Alterations
2016	TDV	TDV	TDV
2019	EDRe, EDRT	TDV	TDV
2022	EDRs*, EDRe, EDRT	TDV	TDV

EDRs = source energy design; **EDRe** = efficiency energy design rating; **EDRT** = total energy design rating; **TDV** = time dependent valuation.

The source EDR metric is new for 2022 and enables measure of emissions in some form.

Table 1. Evolving Building Energy Efficiency Ratings for Residential Construction

The 2016 Energy Code used time dependent valuation (TDV) energy as a compliance metric in the Performance Approach for New Construction, Additions and Alterations. TDV energy is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

The 2019 Energy Code replaced TDV with energy design rating (EDR) metrics for New Construction to express the energy performance of a home. In the EDR scoring system 100 represents the energy performance of a reference design building meeting the envelope requirements of the 2006 International Energy Conservation Code (IECC). A score of 0 represents the energy consumption of a building that has zero net energy consumption. The lower the score, the better. For a new construction project to comply using the performance approach, the proposed Efficiency EDR and Total EDR must be \leq the standard Efficiency EDR and Total EDR.

The 2022 Energy Code adds a third metric to EDR for New Construction: source energy design rating (EDRs). EDRs is a separate EDR metric based on hourly source energy which establishes a carbon-proxy analysis of the building in kBtu/sf-yr units to support decarbonization and electrification policy goals.

Source Energy Design Rating (EDRs)	Efficiency Energy Design Rating (EDRe)	Total Energy Design Rating (EDRT)
A score representing the building energy efficiency expressed in terms of an	A score representing the building energy efficiency expressed in terms of a	A score representing the building's
hourly source carbon-based metric	TDV energy-based metric	total TDV energy while also factoring in photovoltaics (PV) and flexibility
EDRs includes energy used by: <ul style="list-style-type: none"> • Envelope • IAQ • HVAC • DHW • Unregulated loads 	EDRe includes energy used by: <ul style="list-style-type: none"> • Envelope • IAQ • HVAC • DHW • Unregulated loads 	EDRT includes energy used by: <ul style="list-style-type: none"> • Efficiency measures • Photovoltaics • Batteries • Precooling
DHW = domestic hot water; HVAC = heating, ventilation and air conditioning; IAQ = indoor air quality; TDV = time dependent valuation.		

Table 2. Energy Design Rating (EDR) as a Compliance Metric

A building complies only if all three compliance scores are met, which means that each proposed design score is lower than or equal to the standard design score.



Envelope Highlights

New Construction

Roof Deck, Ceiling and Rafter Roof Insulation [§150.0\(a\)](#)

Mandatory Requirements

This is a new Mandatory requirement that applies to New Construction and Additions over 700 ft². New mandatory U-factor requirements apply to the roof deck of new attics in addition to the Mandatory ceiling insulation requirements already in place.

In Climate Zones 4 and 8-16, if the air handler and ducts are located anywhere outside of the conditioned space, the roof deck separating attic spaces from ambient air must meet an area weighted U-factor of 0.184 or less. This may be achieved by installing R-4 continuous insulation or greater above the roof deck, or R-3 cavity insulation below the roof deck.

There are two exceptions to installing mandatory roof deck insulation. It is not required if a project uses either ducts in conditioned space (DCS) or less than 12 linear feet of supply duct in unconditioned space. Both exceptions would require a HERS verification.

Other exceptions may apply.

Additions and Alterations

Altered Ceiling Insulation [§150.2\(b\)1J](#)

Prescriptive Requirements

In Climate Zones 1-4, 6 and 8-16, ceiling Alterations to vented attics must have an overall weighted U-factor of maximum 0.20 or R-49 insulation at the ceiling. However, in Climate Zones 1, 3 and 6, ceiling Alterations do not need to meet this requirement if there is existing R-19 or more insulation at the ceiling.

A project may have additional requirements to meet, based on its Climate Zone. See Table 3 for these additional requirements and exceptions to them.

Projects in these Climate Zones	Must Meet these Additional Requirements	Unless these Exceptions Apply
2, 4 and 8-16	§150.2(b)1Jii: Air seal all accessible areas of the ceiling plane between the attic and the conditioned space in accordance with §110.7.	Existing R-19 insulation at the ceiling level Atmospherically vented space-heating or water-heating combustion appliances located inside the dwelling
1-4 and 8-16	§150.2(b)1Jiii: Cover recessed downlight luminaires in the ceiling with insulation to the same depth as the rest of the ceiling. Replace or retrofit luminaires not rated for insulation contact with a fire-proof cover that allows for insulation to be installed directly over the cover.	R-19 or greater insulation at the ceiling level
1-16	§150.2(b)1Jiv: Ensure that attic ventilation complies with California Building Code requirements.	Existing R-19 or greater insulation at the ceiling level Asbestos disturbance risk Knob and tube wiring in the vented attic Accessible attic space too small to insulate to required R-value without violating Section 806.3 of Title 24, Part 2.5. Attic space shared with other dwelling units that are not triggered for §150.2(b)1J

Table 3. Additional Requirements for Altered Ceiling Insulation



Additions and Alterations (*continued*)

Reroofing Products and Insulation

[§150.2\(b\)11](#)

Prescriptive Requirements

When more than 50% of a roof is being replaced, products used to reroof the building must meet minimum requirements for aged solar reflection and thermal emittance or meet solar reflectance index (SRI) requirements. In the 2022 Energy Code, the Climate Zone triggers and exceptions have changed for both steep-sloped and low-sloped roofs. See Table 4 for a summary of reroofing product requirements.

Roof Slope	Climate Zone	Aged Solar Reflectance	and Thermal Emittance	or SRI
Steep-sloped	4, 8-15	≥0.20	≥0.75	≥16
Low-sloped	4, 6-15	≥0.63	≥0.75	≥75

Low-sloped = rise-to-run ratio of <2:12 (lower than 9.5 degrees); **steep-sloped** = rise-to-run ratio ≥2:12 (9.5 degrees or more); **SRI** = solar reflective index.

Table 4. Reroofing Product Requirements

In addition to meeting the Prescriptive roofing product requirements, the 2022 Energy Code now also requires that low-sloped roofs have insulation above or below the roof deck. In Climate Zones 1, 2, 4 and 8-16, one of the following is required:

- R-14 continuous insulation above the roof deck
- Overall assembly U-factor ≤0.039 (R-11 cavity insulation below the roof deck, wood framing at 24" o.c.)

Exceptions may apply.



Mechanical Systems Highlights

Mandatory Requirements

Kitchen Range Hood Airflow

[§150.0\(o\)1G](#)

Mandatory Requirements

New airflow, controls and HERS verification requirements for kitchen range hoods dependent upon the kitchen configuration (enclosed or nonenclosed), area of the dwelling unit (ft²) and whether a range is electric or natural gas. Nonenclosed kitchens must have demand-controlled ventilation; enclosed kitchens may have either demand-controlled or continuous ventilation.

Capture efficiency for demand-controlled kitchen hoods may be used to show compliance or to provide a minimum airflow. Capture efficiency and airflow requirements differ based on the area of the dwelling unit (ft²) and whether the hood is over an electric or natural gas range. See Table 5.

Either airflow or capture efficiency must be verified by a HERS Rater using an approved airflow measuring device or visual inspection to verify the installed system is HVI or AHAM rated and conforms to the requirements of Table 150.0-H.

These requirements apply to New Construction, Additions and Alterations.

Dwelling Unit Floor Area (ft ²)	Hood Over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 CFM	70% CE or 180 CFM
>1000 - 1500	50% CE or 110 CFM	80% CE or 250 CFM
750 - 1000	55% CE or 130 CFM	85% CE or 280 CFM
<750	65% CE or 160 CFM	85% CE or 280 CFM

Table 5. Table 150.0-G—Kitchen Range Hood Airflow Rates (CFM) and ASTM E3087 Capture Efficiency (CE) Ratings According to Dwelling Unit Floor Area and Kitchen Range Fuel Type

Whole-dwelling Unit Ventilation

[§150.2\(a\)1C](#)

Mandatory Requirements

Junior accessory dwelling units (JADUs), which are classified as Additions to existing buildings ≤500 ft², are not required to meet the whole-dwelling unit ventilation requirements of §150.0(o).



Mandatory Requirements (continued)

Federal Minimum Efficiency Requirements for Split System Heat Pump and Air-conditioning Units

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Mandatory Requirements

Department of Energy (DOE) minimum efficiencies for central air conditioners and heat pumps will increase on January 1, 2023. HVAC manufacturers will also be required to comply with a new testing procedure and efficiency ratings for SEER2, EER2 and HSPF2. Minimum central heat pump efficiency ratings will change to HSPF2 and SEER2 based on when the equipment was manufactured. Minimum central air-conditioner efficiency ratings will change to SEER2 and EER2 based on when the equipment was installed.

Configuration	Manufactured BEFORE 1/1/2023		Manufactured AFTER 1/1/2023*	
	HSPF	SEER	HSPF2	SEER2
Packaged	8.0	14.0	6.7	13.4
Split (including ductless)	8.2	14.0	7.5	14.3
Space-constrained	7.4	12.0	6.3	11.9
Small Duct, High-velocity	7.2	12.0	6.1	12.0

HSPF = heating season performance factor; **SEER** = seasonal energy efficiency ratio.

* Systems manufactured after 1/1/2023 must meet the newer HSPF2/SEER2 requirements and cannot use HSPF or SEER.

Adapted from Table 4-3 of the 2022 Residential Compliance Manual (based on Title 20).

Table 6. Minimum Heating and Cooling Efficiencies – Single-phase, Air-source Heat Pumps with Cooling Capacity <65,000 Btuh

Configuration	Rated Cooling Capacity (Btuh)	Installed BEFORE 1/1/2023		Installed AFTER 1/1/2023*	
		SEER	EER	SEER2	EER2
Split System	<45,000	14.0	12.2	14.3	11.7/9.8**
	≥45,000	14.0	11.7	13.8	11.2/9.8**
Single Package	<65,000	14.0	11.0	13.4	10.6
Space-constrained	<30,000	12.0***	No minimum	11.7***	No minimum

SEER = seasonal energy efficiency ratio; **EER** = energy efficiency ratio.

* Systems installed after 1/1/2023 must meet the newer SEER2/EER2 requirements regardless of manufacture date. They cannot use SEER or EER.

** For systems with 15.2 SEER2 or greater, the minimum EER2 requirement is 9.8.

*** Use manufacture date, not installation date for space-constrained units.

Adapted from Table 4-6 of the 2022 Residential Compliance Manual (based on Title 20 and Table C-3 and federal appliance standards).

Table 7. Minimum Cooling Efficiencies – Central Air Conditioners (not Heat Pumps) with Cooling Capacity <65,000 Btuh



Mandatory Requirements (*continued*)

Altered Duct Systems: Duct Sealing [§150.2\(b\)1C](#)

Mandatory Requirements

The 2022 Energy Code changed the extended duct length triggering duct sealing from >40' to >25'. Additionally, extended ducts >25' added to an existing system have new HERS duct testing leakage rate requirements. HERS field verification and diagnostic testing must confirm that measured duct leakage is 10% or less of system handler airflow or that measured duct leakage to the outside is 7% or less of system handler airflow. In the 2019 Energy Code, the maximum leakage rates were 15% and 10%, respectively.

When any length of ductwork is extended from an existing duct system to serve an Addition, the entire duct system must be sealed and tested to meet the same requirements above.

Entirely New or Complete Replacement Duct System

[§150.2\(b\)1Diia](#)

Mandatory Requirements

For an entirely new or complete replacement duct system that has the air handler and ducts located within a vented attic, a project must meet the requirements of Section 150.2(b)1J. These requirements include ceiling insulation, air sealing, covering recessed light fixtures and attic ventilation. For more information, see Table 3 above.

Prescriptive Requirements

Heating System Type [§150.1\(c\)6](#)

Prescriptive Requirements

For New Construction heating systems in Climate Zones 3, 4, 13 and 14, heat pump space heating is required Prescriptively. A gas furnace may be used Prescriptively in all other Climate Zones.

Domestic Water-heating Systems [§150.1\(c\)8](#)

Prescriptive Requirements

In New Construction, domestic water-heating system must meet the Performance requirements of Section 150.1(b)1 or the water-heating system must meet one of the following Prescriptive requirements:

- A single 240-volt heat pump water heater (HPWH) with a storage tank in the garage or conditioned space and the following:
 - o In Climate Zones 1 and 16: a compact hot water distribution system as specified in the Reference Appendix RA4.4.6
 - o In Climate Zone 16: a drain water heat recovery system that is field verified as specified in the Reference Appendix RA3.6.9 and has the storage tank located in the garage or conditioned space
- A single 240-volt HPWH meeting the requirements of NEEA Advanced Water Heater Specification Tier 3 or higher with a storage tank in the garage or conditioned space and the following:
 - o In Climate Zone 1: a drain water heat recovery system that is field verified as specified in the Reference Appendix RA3.6.9
- New in the 2022 Energy Code, a solar water-heating system with electric backup and a minimum 70% solar savings fraction (SSF)

Exceptions:

- Single-family buildings in Climate Zones 3, 4, 13 and 14 may use gas or propane tankless water heaters if the space-conditioning system is a heat pump that complies with Section 150.1(c)6.
- New dwelling units ≤500 ft² conditioned floor area (CFA) with point-of-use distribution may use an instantaneous electric water heater.
- New dwelling units with 1 bedroom or less may use a 120-volt HPWH.



Photovoltaic and Battery Storage Systems and Solar and Electric Ready Highlights

New Construction

Photovoltaic System Requirements

[§150.1\(c\)14](#)



Prescriptive Requirements

Prescriptive requirements for photovoltaic (PV) systems do not apply if the minimum system size specified by §150.1(c)14 is less than 1.8 kW.



New Construction

In single-family buildings, PV, battery storage and electric- and solar-ready requirements apply only to New Construction.

Energy Storage Systems Ready

[§150.0\(s\)](#)



Mandatory Requirements

New homes have Mandatory requirements for being ready for the future installation of battery storage systems, also called energy storage systems (ESS).

In all new single-family residences that include one or two dwelling units, one of the following is required:

1. Either
 - ESS-ready interconnection equipment with a minimum backed up capacity of 60 amps and a minimum of four ESS-supplied branch circuits
 - Four or more branch circuits from a single panelboard suitable to be supplied by the ESS: At least one circuit must supply the refrigerator, lighting circuit near the primary egress, and a sleeping room receptacle outlet.
2. A main panelboard with a minimum busbar rating of 225 amps
3. Sufficient space reserved to allow future installation of system isolation equipment or a transfer switch within 3 ft of the main panelboard

Electric Ready

[§§150.0\(t\)-\(v\)](#)



Mandatory Requirements

New homes have Mandatory requirements for being ready to install electric heat pump space heaters, cooktops and clothes dryers. For more information, see Table 8 below.



Mandatory Requirements *(continued)*

Electric Ready (continued)

Electric Equipment and Appliances	Triggers	Wiring and Space	Labels
Heat Pump Space Heater Ready §150.0(t)	If a natural gas or propane furnace is installed	Install dedicated 240-volt, 30 amp branch circuit wiring <ul style="list-style-type: none"> • Within 3 ft from the furnace • Accessible to the furnace with no obstructions Reserve space on the main electrical service panel to allow for the installation of a double pole circuit breaker for future furnace installation	Blank cover: "240V ready" Reserved space: "For Future 240V use"
Electric Clothes Dryer Ready §150.0(v)	If a clothes dryer location has gas or propane plumbing	Install dedicated 240-volt, 30 amp branch circuit wiring <ul style="list-style-type: none"> • Within 3 ft from the clothes dryer • Accessible to the clothes dryer with no obstructions Reserve space on the main electrical service panel to allow for the installation of a double pole circuit breaker for future clothes dryer installation	
Electric Cooktop Ready §150.0(u)	If a gas or propane cooktop serves individual dwelling units	Install dedicated 240-volt, 50 amp branch circuit wiring <ul style="list-style-type: none"> • Within 3 ft from the cooktop • Accessible to the cooktop with no obstructions Reserve space on the main electrical service panel to allow for the installation of a double pole circuit breaker for future cooktop installation	

Table 8. Mandatory Wiring, Reserved Space and Labels for New Homes



For More Information

CALIFORNIA ENERGY COMMISSION

www.energy.ca.gov

Learn more about the California Energy Commission (CEC) and its programs on its website.

2022 Building Energy Efficiency Standards

bit.ly/CEC2022Standards

Explore the main CEC web portal for the 2022 Energy Code, including information, documents and historical information.

2022 Building Energy Efficiency Standards Summary

bit.ly/CEC2022Summary

View or download this visual summary of the Energy Code's purpose, current changes and impact.

Energy Code Hotline

Call: 1-800-772-3300 (Free)

Email: Title24@energy.ca.gov

Online Resource Center

bit.ly/CEC-ORC

Use these online resources developed for building and enforcement communities to learn more about the Energy Code.



www.energycodeace.com

Stop by this online “one-stop-shop” for no-cost tools, training and resources designed to help you comply with California’s Title 4, Part 6 and Title 20.



www.energycodeace.com/tools

Explore this suite of interactive tools to understand the compliance process, required forms, installation techniques and energy efficiency regulations in California.

Reference Ace

www.energycodeace.com/content/tools-ace/

Navigate the Title 24, Part 6 Energy Code using an index, keyword search and hyperlinked text.

Q&Ace

www.energycodeace.com/QAndAce

Search our online knowledge base or submit your question to Energy Code Ace experts.



www.energycodeace.com/training

On-demand, live in-person and online training alternatives are tailored to a variety of industry professionals and address key measures.

Of Special Interest:

2022 Title 24, Part 6 Essentials – Residential Standards: What's New

<https://energycodeace.com/content/training-ace/courseId=53698>



www.energycodeace.com/resources

Downloadable materials provide practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards.

Of Special Interest:

Fact Sheet

- Single-family Buildings: What's Changed in 2022?

Create an account on the Energy Code Ace site and select an industry role for your profile in order to receive messages about all our offerings!

