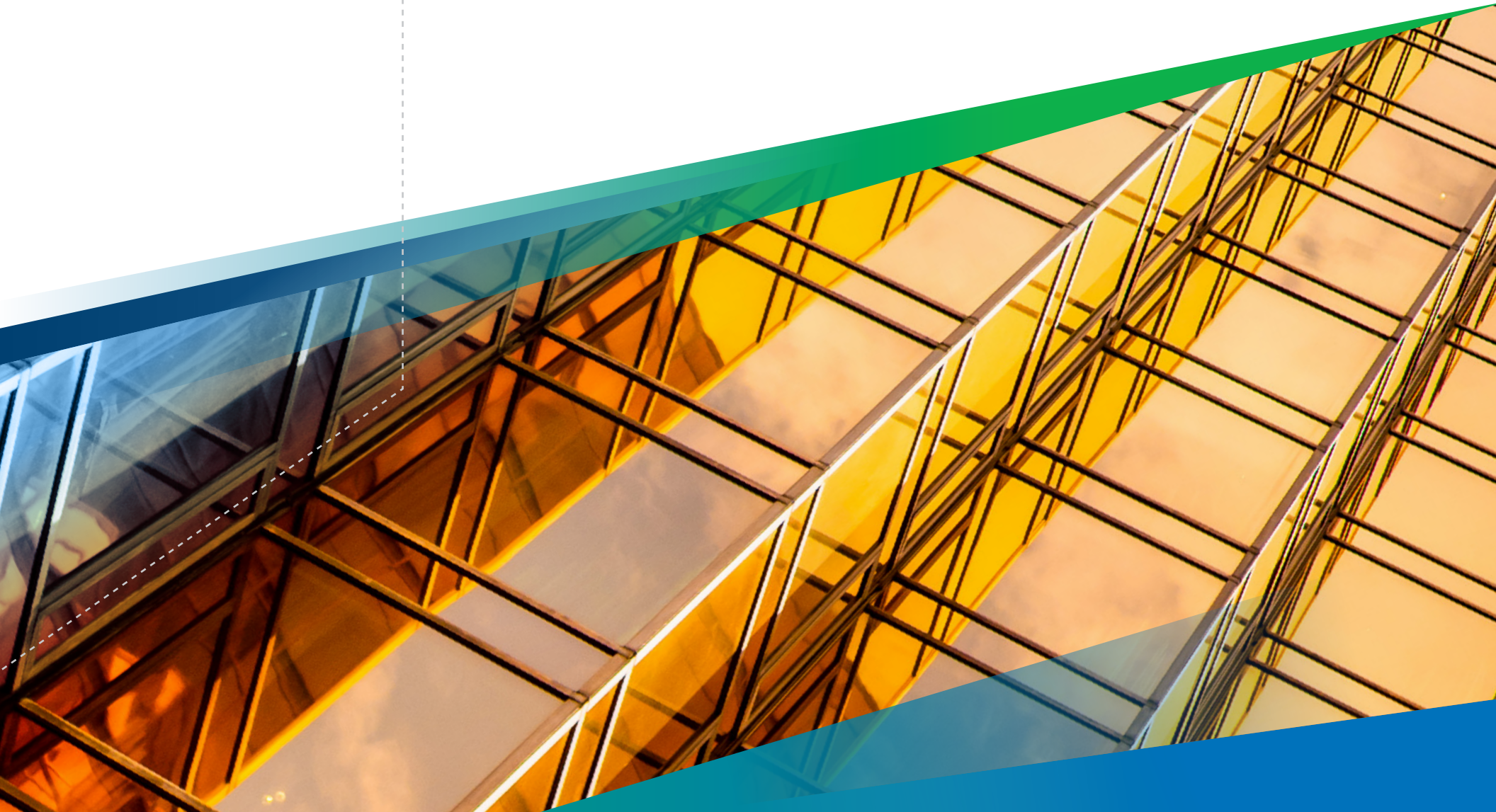




2022

BUILDING ENERGY EFFICIENCY STANDARDS SUMMARY



Executive Summary

The California Energy Commission (CEC) is the state's primary energy policy and planning agency with a mission to lead the state to a 100 percent clean energy future. The CEC develops policy to reduce energy usage and costs, limit the environmental impacts of energy generation and use, and ensure a safe, resilient, and reliable supply of energy.

What Does the CEC Have to Do With the Building Code?

Homes and businesses use nearly 70 percent of California's electricity and are responsible for a quarter of California's greenhouse gas (GHG) emissions. As California's energy policy agency, the CEC was mandated by the Warren-Alquist Act to periodically update and adopt building standards to increase energy efficiency of buildings and reduce GHGs. Part 6 of Title 24 implemented this mandate so that every three years the CEC presents Building Energy Efficiency Standards (Energy Code) updates for new construction and renovations to existing buildings.

After the CEC adopts these standards, they are submitted to the California Building Standards Commission for approval and inclusion with other changes to the building code. The Energy Code is designed to be cost-effective so that implementation is affordable while helping California manage energy demand and advance the state's climate and clean air goals.

HOMES AND BUSINESSES USE NEARLY 70 PERCENT OF CALIFORNIA'S ELECTRICITY AND ARE RESPONSIBLE FOR A QUARTER OF CALIFORNIA'S GREENHOUSE GAS (GHG) EMISSIONS.



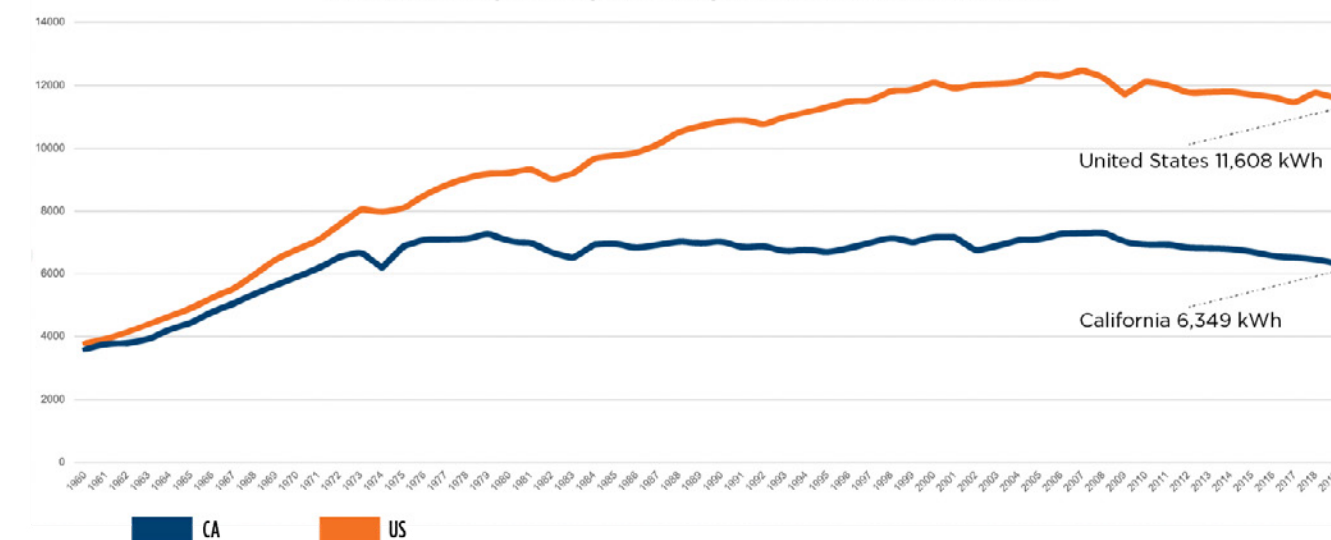
How Do Standards Affect Me?

The standards help everyone! As standards require upgrades such as better insulation and more effective climate control in buildings, the increases in energy efficiency reduce utility bills. This also improves comfort inside buildings. The standards increase the market value of properties by making them more affordable to operate. They reduce GHGs by using less energy from fossil fuel-burning power plants that emit harmful smog-forming pollutants and climate-changing gases. Some of the

water-saving measures in the standards lead to more efficient appliances and building fixtures that buoy California's water supply and save energy by using and moving less water.

Thanks in part to California's efficiency standards, the state's per capita energy use has stayed nearly flat since the early 1970s, even as the state's economy grew by 80 percent.

Annual Electricity Consumption Per Capita in United States and California



CALIFORNIANS USE 31 PERCENT LESS ENERGY COMPARED TO THE AVERAGE AMERICAN



WHAT'S NEW FOR 2022?

The proposed 2022 Energy Code update focuses on four key areas in new construction of homes and businesses:

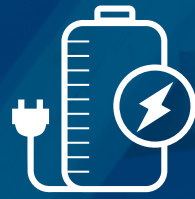
- Encouraging electric heat pump technology and use
- Establishing electric-ready requirements when natural gas is installed
- Expanding solar photovoltaic (PV) system and battery storage standards
- Strengthening ventilation standards to improve indoor air quality



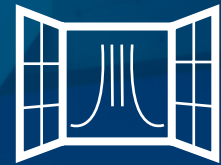
2022 Energy Code: Better for the Environment and You

Heat pumps use less energy and produce fewer emissions than traditional HVACs and water heaters.

Electric-ready building sets up owners to use cleaner electric heating, cooking, and electric vehicle (EV) charging when they're ready to invest in those technologies.



Using battery storage allows onsite energy to be available when needed and reduces the grid's reliance on fossil fuel power plants.



Better ventilation can reduce illness from poor air quality and reduce disease transmission.

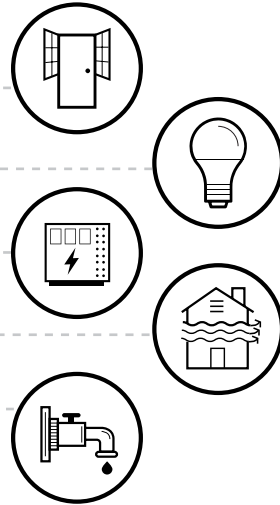


The Energy Code in Action

Since 1978, energy standards have supported California's long-term strategy to meet energy demand, conserve resources, and act as an environmental steward. All building standards under consideration must be cost-effective and technically feasible to be adopted.

The Energy Code governs:

- Window and door materials
- Lighting
- Electrical panels
- Insulation
- Faucets
- And more



**40 YEARS
OF ENERGY EFFICIENCY
STANDARDS FOR
BUILDINGS AND
APPLIANCES HAVE
SAVED CALIFORNIANS
MORE THAN
\$100 BILLION**

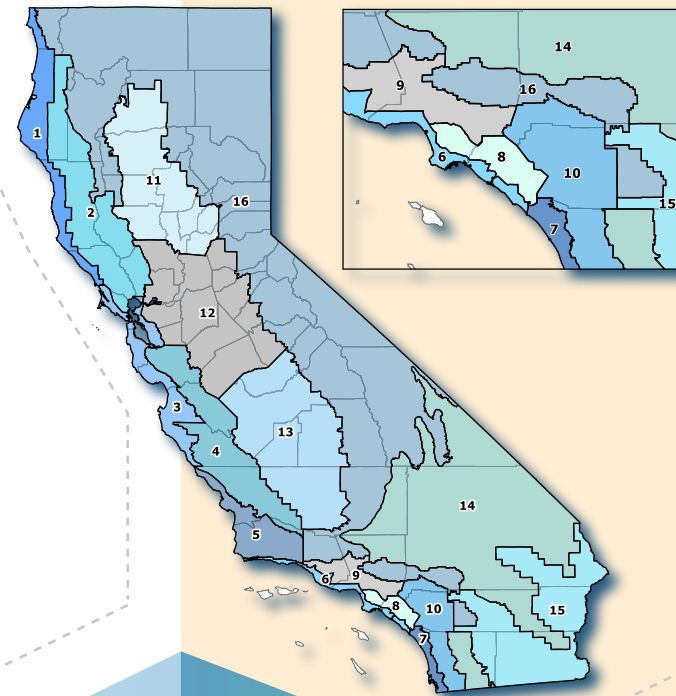
These requirements vary between home and business buildings, as well as among climate zones in which they are implemented. The Energy Code applies to new construction and renovations to existing buildings.

The Energy Code has not only revolutionized building construction in California, but influenced efficiency goals and practices in countries around the globe. Every update helps the state meet its energy and environmental goals while directly benefiting building owners and occupants through more comfortable buildings that save money on energy costs and, not incidentally, increase market value.

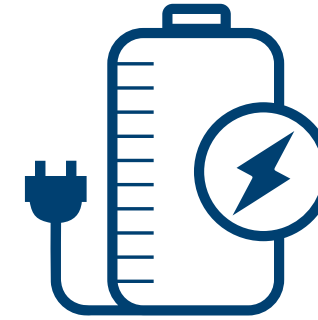
With climate change impacts accelerating, there is an even greater need for homes that are comfortable, efficient, and resilient. Each updated code guides the construction of buildings to keep energy use down, better withstand extreme weather, and reduce climate and air pollution.

It's an Area We Call the "Climate Zone"

California is so vast and varied in landscape and weather that there is no one building design that can be the most energy-efficient everywhere. To accommodate those differences, the state is divided into 16 climate zones. Each climate zone represents a geographic area based on such factors as temperature, weather, and typical energy use. Each zone has an assigned energy budget, based on the maximum amount of energy that a building (or portion of a building) can be designed to consume per year. Minimum efficiency requirements are created from that energy budget.



The Energy-Efficient Revolution Continues



The CEC was born of the energy crisis that affected the United States in the early 1970s. To address energy demand that outstripped supply, California created the CEC to design energy policy that reduced use through better efficiencies. The core focus of the building standards has been efficiency, but the 2019 Energy Code ventured into onsite generation by requiring solar PV on new homes, providing significant GHG savings. The 2022 update builds off this progress with expanded solar standards and the move to onsite energy storage that will help Californians save on utility bills while bolstering the grid.



UPDATES FOR 2022

New and more efficient technologies are being developed all the time, with many supported by funding from state programs that bring these energy innovations to markets and consumers. The 2022 Energy Code builds on California's technology innovations, encouraging inclusion of market-ready electric products in new construction, such as heat pumps for climate control and water heating.

The update also requires all new homes be electric-ready. That means buildings with gas stoves have the electrical panels and wiring to support a switch to electric stoves. Further advancements and cost reductions will continue to expand electric options for heating, cooking, laundering, and EV charging to meet all Californians' needs. These are crucial steps in the state's progress toward 100 percent clean electricity and carbon neutrality by midcentury, or earlier.

Proposed Standards

The 2022 Energy Code update revises energy efficiency standards for newly constructed buildings, as well as additions and alterations to existing buildings. The CEC engaged in a lengthy public process leading up to adoption of the proposed 2022 standards.

2022 Energy Code Benefits



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.

How Does the 2022 Energy Code Affect Homes?

- Establishes energy budgets based on efficient heat pumps for space or water heating to encourage builders to install heat pumps over gas-fueled HVAC units.
- Requires homes to be electric-ready, with dedicated 240-volt outlets and space (with plumbing for water heaters) so electric appliances can eventually replace installed gas appliances.
- Increases minimum kitchen ventilation requirements so that fans over cooktops have higher airflow or capture efficiency to better exhaust pollution from gas cooking and improve indoor air quality.
- Allows exceptions to existing solar PV standards when roof area is not available (such as for smaller homes).

How Does It Affect Businesses?

- Establishes combined solar PV and battery standards for select businesses. Systems are sized to maximize onsite use of solar energy and avoid electricity demand during times when the grid must use gas-powered plants.
- Establishes new efficiency standards for commercial greenhouses (primarily cannabis growing).
- Improves efficiency standards for building envelope, various internal systems, and grid integration equipment, such as demand-responsive controls to buoy grid stability.

**OVER 30 YEARS,
THE 2022 ENERGY CODE
IS ESTIMATED TO 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.**

Breaking Down the Updates

Heat Pumps: The New Standard

Heat pumps are an electric technology for water and space heating that increases efficiency, reduces GHGs, and enables load flexibility. Current California market share is less than 6 percent in new home construction.

Standards include:

- Single-family homes — heat pump water or space standard.
- Multifamily homes such as apartment buildings — heat pump space heating standard.
- Businesses — heat pumps standard for schools, offices, banks, libraries, retail, grocery.

New Homes to Be Electric-Ready

The standards require single-family homes to be electric-ready, including:

- Electrical circuits for space heating, water heating, cooking/ovens, and clothes dryers.
- Electrical panel, branch circuits, and transfer switch for battery storage.
- Dedicated circuits and panels to easily convert from natural gas to electric in the future.

Solar and Storage Use Expanded

The 2022 Energy Code extends solar and introduces battery storage standards to the following building types:

- High-rise multifamily (apartments and condos)
- Hotel-motel
- Tenant space
- Office, medical office, and clinics
- Retail and grocery stores
- Restaurants
- Schools
- Civic (theaters, auditoriums, and convention centers)

The Challenge of Existing Buildings

In addition to new buildings, the standards apply to substantial upgrades to existing homes and businesses.



At least 50 percent of single-family homes and nearly 60 percent of California's apartment complexes (about 14 million total residences) were built before the state's first energy standards.

Updating older buildings is critical to achieving the state's climate and clean energy goals.

Communities Ahead of the Curve

California is already an international leader in energy efficiency and clean energy. However, after each update, many cities and counties choose to adopt standards that exceed the state minimum. The California Green Building Standards ("CALGreen" or Part 11 of Title 24) include voluntary reach standards, which offer model building code language for local governments that wish to go beyond the minimum statewide requirements.

Reach standards are an important tool for jurisdictions to meet their own climate goals. It allows them to decide on standards that meet their needs and interests, so long as they also meet or exceed state code requirements.

Historically, such local ordinances have served as a bellwether for statewide standards. They provide a place to test market readiness for new technologies and regulations, drive innovation of new technologies and efficiencies, and bring down the cost of efficient building technologies by creating an installed user base that encourages scale manufacturing.

What's Next?

In developing the standards over the past two years, the CEC met with more than 50 industry stakeholder groups, and 43 public workshops were held.

Under the rulemaking, the standards are vetted over a 45- to 60-day period before they go to the CEC for adoption. Then they are submitted to the California Building Standards Commission for approval as one part of the whole building code. Builders, contractors, and other stakeholders have one year until implementation to gear up for the change.

2022 Energy Code Update Timeline

California Energy Commission Adoption
California Building Standards Commission Approval Hearing
Effective Date

August 2021
December 2021
January 1, 2023



For Further Reading

- The Rulemaking Process: bit.ly/3fPO2H8
- 2019 Building Energy Efficiency Standards Frequently Asked Questions: bit.ly/3fJHOs8
- 2019 California Energy Efficiency Action Plan: (overall webpage) bit.ly/3s4fYMc
- California Building Decarbonization Assessment: bit.ly/3iwpuEM



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