Residential Electric Readiness

What Is Electrification and What Are Its Benefits?

Electrification is the process of replacing technologies that use fossil fuels (such as natural gas and propane) with technologies that use electricity.

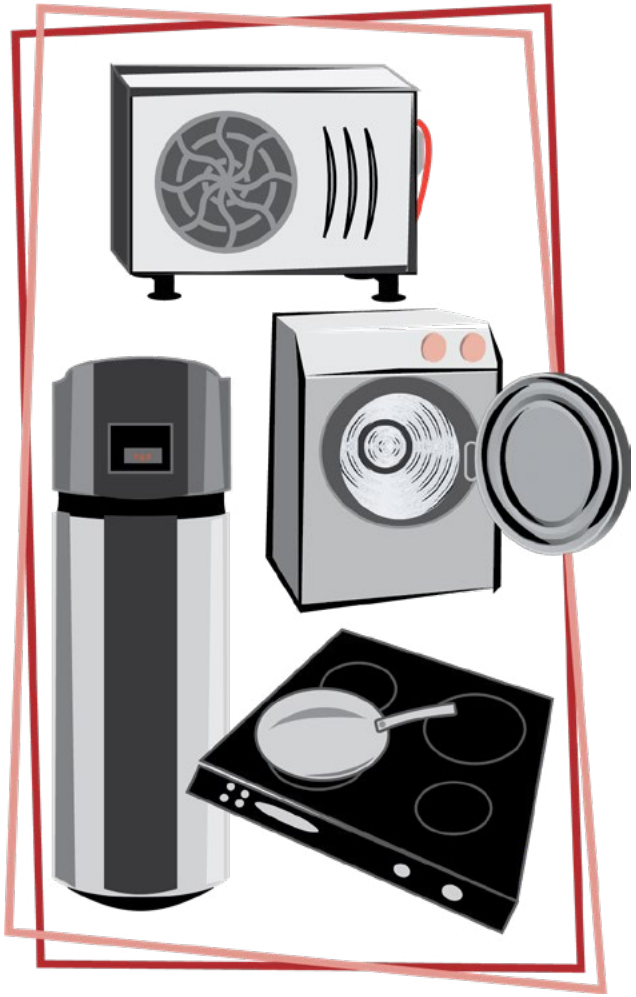
California is committed to reducing its greenhouse gas (GHG) emissions, while creating an energy system that is resilient to climate risks. Because the California electric grid is clean and will get cleaner over time, building electrification can reduce GHG emissions, while improving air quality. The 2022 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) encourages electrification through electric readiness measures, while continuing its long-standing focus on energy efficiency. Efficiency and electrification have symbiotic benefits and are both critical for decarbonization of buildings.

Efficient electric technologies are commercially available, such as electric heat pump space heaters, heat pump water heaters, induction cooktops and electric (or heat pump) clothes dryers.

What Is Included in this Fact Sheet?

The 2022 Energy Code requires most newly constructed single-family and multifamily buildings with gas-fired appliances, furnaces and water heaters to be ready for the future installation of electric appliances and equipment.

Compliance measures discussed in this fact sheet apply to newly constructed single-family buildings and multifamily dwelling units and common use areas.



How Does this Fact Sheet Apply to Your Project?

Use this fact sheet to get an overview of Energy Code compliance requirements to make a newly constructed single-family or multifamily building electric ready.

1. What requirements does your project need to meet to comply with the Energy Code?
2. Is testing or verification required in the compliance process?
3. How should you document your project's compliance?

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What Makes a Project Electric Ready?

Electric readiness requirements are triggered when gas appliances and equipment are installed in most newly constructed single-family and multifamily buildings.

A combination of several things ready a building for the future installation of electric systems and appliances:

- Sufficient capacity in the installed utility service
- Dedicated wiring
- Reserved electrical breaker space
- Space large enough for the electric appliance or equipment
- Plumbing for a condensate drain and hot and cold water when buildings must prepare for future installation of a heat pump hot water heater

Single-family Buildings

Single-family buildings have electric readiness requirements as shown in Figure 1:

- Heat pump space heater
- Heat pump water heater
- Electric cooktop
- Electric clothes dryer

For future installation, these require:

- Dedicated wiring installed within 3 ft of the gas-fired appliance
- Reserved electrical breaker space provided for the future installation of these systems and appliances
- A heat pump water heater also requires space large enough to install it and plumbing for a condensate drain and hot and cold water.

For more details, see pages 4-6 of this fact sheet.

Single-family buildings also have requirements to be energy storage system (ESS) ready, which are covered in the Single-family and Low-rise Multifamily Solar and Battery Systems Fact Sheet available from the Energy Code Ace™ Resources landing page at bit.ly/ECA-building-fact-sheets.

Electric Retrofit Ready Single-family Buildings

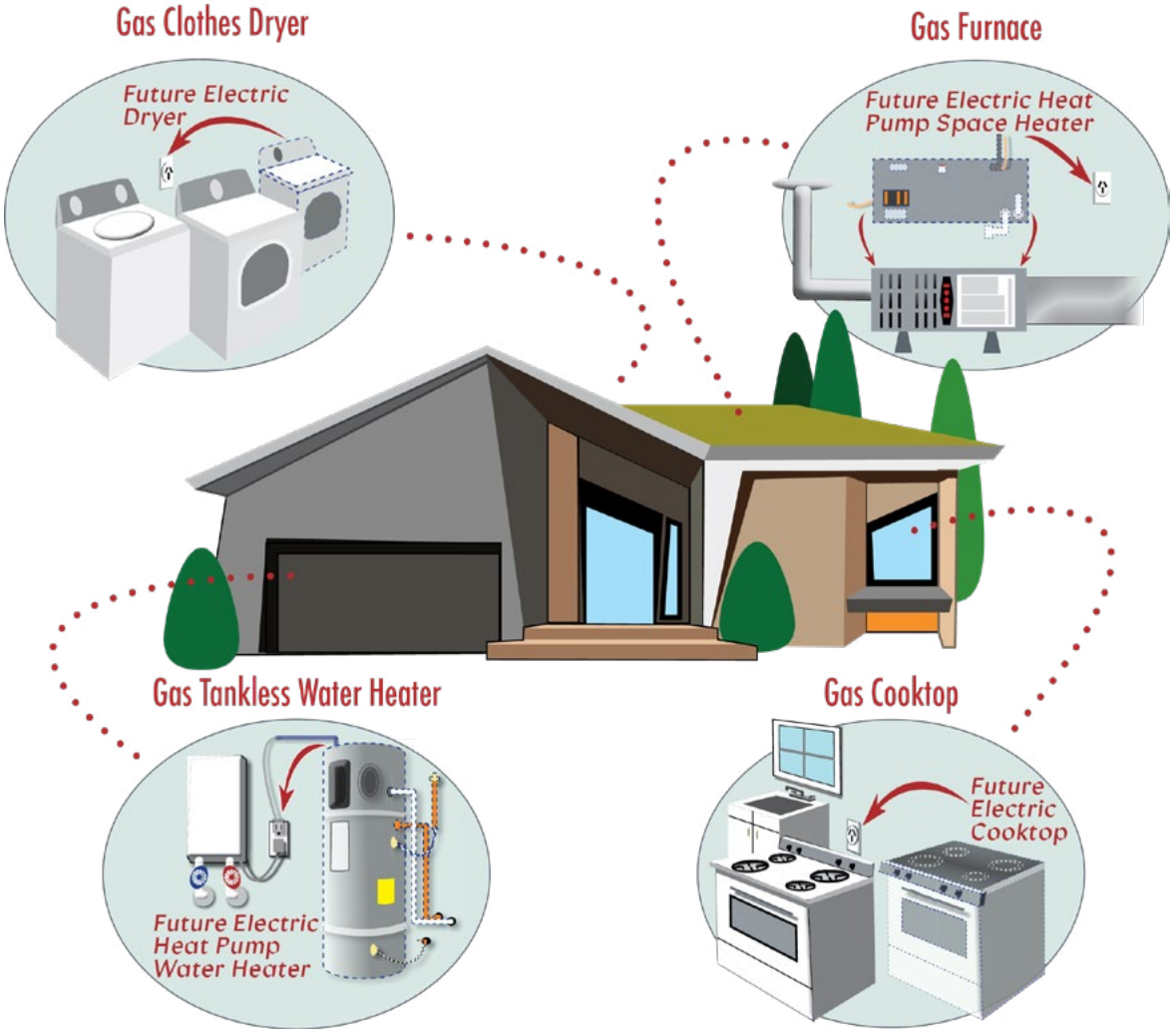

Figure 1. *Electric Retrofit Ready Equipment and Appliances for Single-family Buildings*

Multifamily Buildings

Multifamily buildings have electric readiness requirements as shown in Figure 2:

- Heat pump space heater
- Electric cooktop
- Electric clothes dryer
- Electric heat pump water heater with plumbing for a condensate drain (This requirement is not applicable for a central water-heating system.)

For future installation, these require:

- Dedicated wiring installed within 3 ft of the gas-fired appliance
- Reserved electrical breaker space provided for the future installation of these systems and appliances

For more details, see pages 4-6 of this fact sheet.

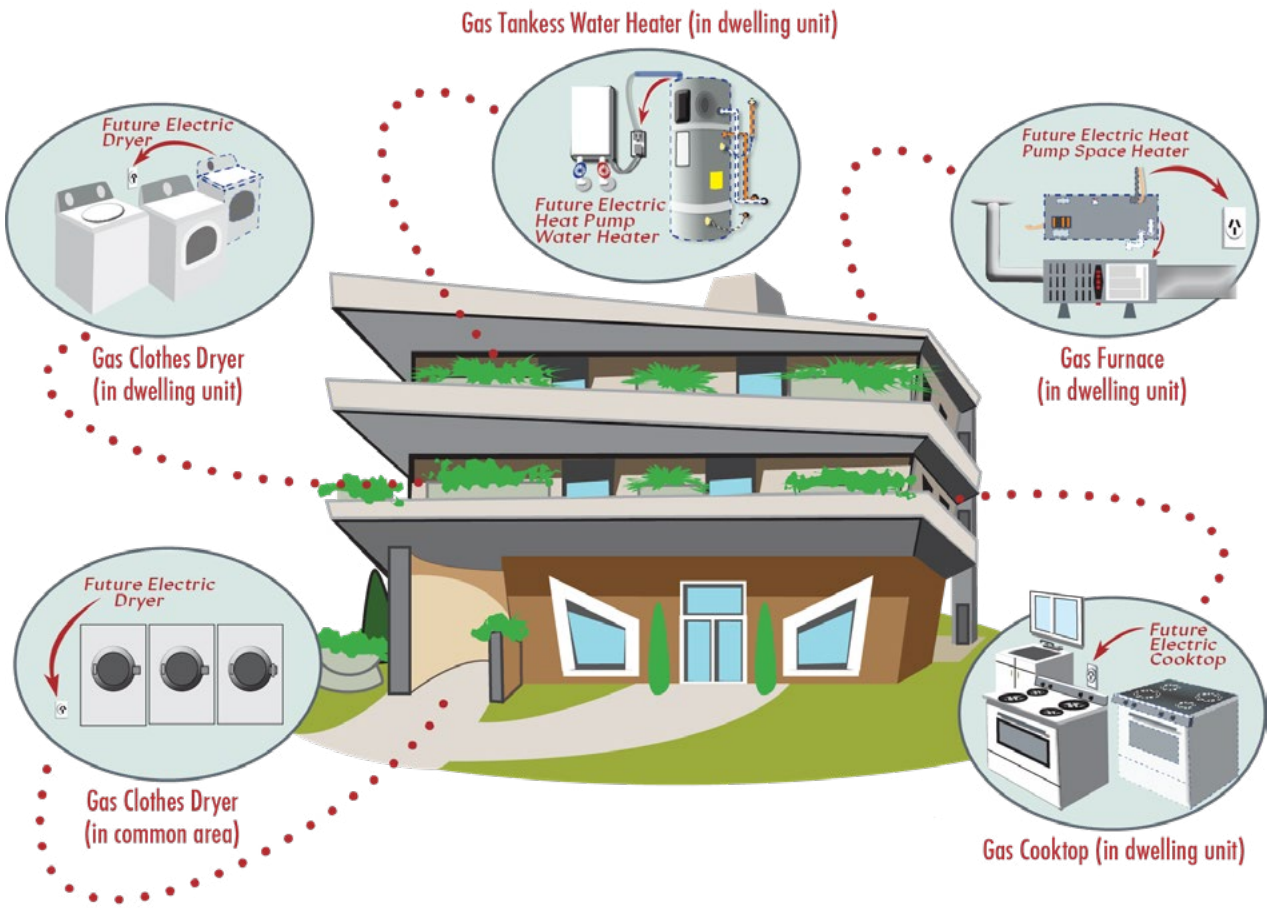

Figure 2. *Electric Retrofit Ready Equipment and Appliances for Multifamily Buildings*

Electric Readiness Requirements

Heat Pump Space Heater Readiness

§§150.0(t), 160.9(a)

Mandatory Requirements

Commonly Applicable Project Scopes

This measure applies when a gas or propane furnace is installed:

- In a newly constructed single-family home
- In an individual dwelling unit in a newly constructed multifamily building

Non-applicable Projects and Exceptions

- Additions
- Alterations
- New residential buildings (R-type occupancies): when an electric heat pump space heater is installed and there is no gas hook-up for this appliance type

What Buildings Are R Occupancies?

R-1: Hotels, motels and similar businesses

R-2: Apartment buildings, dormitories and multi-user residences with more than two dwelling units

R-3: Single-family homes and duplexes, as well as other permanent dwellings

R-4: Care facilities and similar businesses

Energy Code Requirements

- A dedicated, 240-volt branch circuit wiring must be installed:
  - Within 3 ft from the furnace and accessible to the furnace without obstructions
  - With branch circuit conductors rated at 30 amps minimum
  - With the blank cover labeled *"240V ready"*
- A space must be reserved in the main electrical service panel for a double pole circuit breaker for future installation of a heat pump space heater. The reserved space must be labeled *"For Future 240V use."*
- All electrical components must be installed in accordance with the *California Electrical Code.*

What Is Accessible?

Areas for future electric appliances and equipment must be accessible.

The Energy Code defines *accessible* as "having access thereto, but which first may require removal or opening of access panels, doors, or similar obstructions."

Readily accessible is defined as "capable of being reached quickly for operation, repair or inspection, without requiring climbing or removing obstacles, or resorting to access equipment."

Electric Cooktop Readiness

§§150.0(u), 160.9(b)

Mandatory Requirements

Commonly Applicable Project Scopes

This measure applies when a gas or propane cooktop is installed:

- In a newly constructed single-family home
- In a newly constructed individual dwelling unit of a multifamily building

Non-applicable Projects and Exceptions

- Additions
- Alterations
- New residential buildings: when an electric cooktop is installed and there is no gas hook-up for this appliance type

Energy Code Requirements

- A dedicated, 240-volt branch circuit wiring must be installed:
  - Within 3 ft from the cooktop accessible to the cooktop without obstructions
  - With branch circuit conductors rated at 50 amps minimum
  - With the blank cover labeled as *"240V ready"*
- A space must be reserved in the main electrical service panel for a double pole circuit breaker for the future installation of an electric cooktop. The reserved space must be labeled *"For Future 240V use."*
- All electrical components must be installed in accordance with the *California Electrical Code.*

Electric Clothes Dryer Readiness

§§150.0(v), 160.9(c)

Mandatory Requirements

Commonly Applicable Project Scopes

This measure applies when a gas or propane dryer is installed:

- In a newly constructed single-family home
- In a newly constructed individual dwelling unit or common use area of a multifamily building

Non-applicable Projects and Exceptions

- Additions
- Alterations
- New residential buildings: when an electric clothes dryer is installed and there is no gas hook-up for this appliance type

Energy Code Requirements

See Table 1 for requirements.

Measure	Installed Equipment or Appliance	Electric-ready Requirements
Electric Clothes Dryer Ready §150.0(v) §160.9(c)	Clothes dryer location with gas or propane plumbing to serve a **single-family building or an individual dwelling unit** in a multifamily building	✦ A dedicated, 240-volt branch circuit wiring must be installed: ◊ Within 3 ft from the clothes dryer location and accessible to the clothes dryer location with no obstructions ◊ With branch circuit conductors rated at 30 amps minimum ◊ With a blank cover labeled as *"240V ready"* ✦ A space must be reserved in the main electrical service panel for a double pole circuit breaker for the future installation of an electric cooktop. The reserved space must be labeled *"For Future 240V use."*
	Clothes dryer locations with gas or propane plumbing to serve **a common use area** in a multifamily building	✦ Conductors or a raceway must be installed: ◊ With termination points at the main electrical panel, via subpanels if applicable, to a location no more than 3 ft from each gas outlet or the location of the future electric clothes dryer ◊ With the ends of the conductors or raceway labeled *"Future 240V Use"* ✦ The conductors or a raceway and any intervening subpanels, panelboards, switchboards and busbars must be sized to meet the future electric power requirements, at the service voltage to the point at which the conductors serving the building connect to the utility distribution system. ✦ The capacity requirements may be adjusted for demand factors in accordance with the *California Electrical Code.* ✦ Gas flow rates must be determined in accordance with the *California Plumbing Code.* ✦ The capacity must be one of the following: ◊ 24 amps at 208/240 volts per clothes dryer ◊ 2.6 kVA for each 10,000 Btu per hour of rated gas input or gas pipe capacity ◊ The electrical power required to provide equivalent functionality of the gas-powered equipment

All electrical components must be installed in accordance with the *California Electrical Code.*

Table 1. *Electric Clothes Dryer Ready Requirements*

Heat Pump Water Heater Readiness

§§150.0(n), 160.4(a)

Mandatory Requirements

Commonly Applicable Project Scopes

This measure applies when a gas or propane water heater is installed:

- In a newly constructed single-family home
- In a newly constructed multifamily building in which each dwelling unit has a separate water heater
- As an added water heater to serve a new Addition to a single-family home or **multifamily building**

Non-applicable Projects and Exceptions

- Alterations
- New residential buildings: when a heat pump water heater is installed and there is no gas hook-up for this appliance type
- Centralized water-heating systems for multifamily buildings in which dwelling units do not have separate water heaters

Energy Code Requirements

Designated Space: There must be a space large enough to accommodate a heat pump water heater:

- This can be the same space used for the installed water heater or a space adjacent to the installed water heater.
- The space must be a minimum of 2.5' x 2.5' x 7' tall.

Condensate Drain: A condensate drain must be plumbed:

- The drain must be no more than 2 inches higher than the base of the installed water heater.
- The drain must drain without pump assistance.
- See Table 2 for additional requirements based on the distance of the designated future installation space from the current water heater.

Other Requirements: Additional requirements may apply:

- For single-family buildings, see §150.0(n).
- For multifamily buildings, see §160.4(a).

Heat Pump Water Heater Ready Requirements

All Multifamily Buildings Single-family Buildings with the Designated Space within 3 ft of the Current Water Heater	Only Single-family Buildings with the Designated Space > 3 ft from the Current Water Heater
Power Requirements ✦ A dedicated **125-volt, 20-amp** electrical receptacle must be installed: ◊ With connection to the electric panel via a **120/240-volt** 3 conductor with a **10 AWG** copper branch circuit ◊ Accessible to the water heater with no obstructions ◊ With both ends of the unused conductor labeled *"Spare"* and electrically isolated ✦ A space must be reserved for a **single pole** circuit breaker in the electrical panel and labeled *"Future 240V Use."*	**Power Requirements** ✦ A dedicated **240-volt** branch circuit must be installed **within 3 feet** from the designated space: ◊ With a **30 amps** minimum rating ◊ With the blank cover labeled *"240V ready"* ✦ A space must be reserved on the main electrical service panel to allow for the installation of a double pole circuit breaker for a future heat pump water heater (HPWH) installation and permanently labeled *"For Future 240V use."* **Plumbing Configuration** ✦ Either a dedicated **cold water supply** must be installed or the cold water supply must be routed through the designated HPWH location just before reaching the gas or propane water heater. ✦ The **hot water supply** pipe coming out of the gas or propane water heater must be routed through the designated HPWH location before serving any fixtures. ✦ **Hot and cold water piping** must be **exposed and readily accessible** at the designated HPWH location for future installation of a HPWH.

Table 2. *Heat Pump Water Heater (HPWH) Ready Requirements for Multifamily and Single-family Buildings*

2022 Electric Readiness Compliance Forms

Energy Code Residential Electric Readiness Compliance Forms			
Building Type	**Certificates of Compliance**	**Certificates of Installation**	**Certificates of Verification**
Single-family Buildings	CF1R-NCB-01-E This Prescriptive form must be filled out via a HERS provider for a registered document. CF1R-PRF-01-E This Performance form must be filled out with CEC-certified software (bit.ly/CEC-2022-Compliance-Software) and then registered via a HERS provider.	CF2R-ELC-01-E This form must be completed by the installer and must be registered via a HERS provider.	N/A
Multifamily Buildings ≤ 3 Habitable Stories	LMCC-ELC-01-E This form is available only from a HERS provider and must be registered with a HERS provider.	LMCI-ELC-01-E This form is available only from a HERS provider and must be registered with a HERS provider.	N/A
Multifamily Buildings ≥ 4 Habitable Stories	NRCC-ELC-E This form is available through the VCA, and it does not need to be registered via a HERS provider.	NRCI-ELC-E This form is available through the VCA and must be completed by the installer. It does not need to be registered via a HERS provider.	N/A

For **single-family buildings**, forms are supported on the Energy Code Ace Get Forms landing page: https://energycodeace.com/content/get-forms.

- The CF1R form defines Energy Code requirements for a whole project, including any electric readiness requirements. Currently nothing is being reported on CF1R form for the electric readiness requirements. (Tip: Provide a Mandatory note block including these requirements within the design documents.) Instead, the electric readiness requirements are documented on the CF2R-ELC-01. If there are HERS requirements, the form must be registered via a HERS provider. Find a HERS Provider at bit.ly/CEC-HERS-Providers.
- The CF2R form must be provided by installers to match the CF1R form electric readiness requirements and registered via a HERS provider.

For **multifamily buildings with 3 or fewer habitable stories,** LMCC and LMCI Prescriptive forms are generated by using a HERS provider website. Find a HERS Provider at bit.ly/CEC-HERS-Providers.

For **multifamily buildings with 4 or more habitable stories,** NRCC and NRCI Prescriptive forms are available through the VCA at https://energycodeace.com/content/project-tool. NRCC Performance forms are available by using CEC-approved Performance compliance software. See more about this software at bit.ly/CEC-2022-Compliance-Software. No HERS verification is required for these forms (although it is required for NRCV forms).

HERS = Home Energy Rating System; ***VCA*** = Virtual Compliance Assistant.

Table 3. *Energy Code Residential Electric Readiness Compliance Forms*

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.

2022 Single-family Residential Compliance Manual, Chapter 10
bit.ly/single-family-compliance-manual

2022 Nonresidential and Multifamily Compliance Manual, Chapter 11, Section 10
bit.ly/nonresidential-multifamily-compliance-manual

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.

Modernized Appliance Efficiency Database System (MAEDbS)
bit.ly/MAEDbS

Search this database to find products that comply with the Energy Code.

ADDITIONAL RESOURCES

HERS Providers

Check the CEC website to see if new providers have been approved bit.ly/CEC-HERS-Providers.

CalCERTS (HERS Provider)

www.calcerts.com

CHEERS (HERS Provider)

www.cheers.org

Reach Codes
LocalEnergyCodes.com

Collaborating with cities, counties and stakeholders to drive reach code development and adoption for long-term climate and energy efficiency benefits. View a list of adopted ordinances at www.LocalEnergyCodes.com

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For More Information (continued)

EnergyCodeAce™

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 24, Part 6 and Title 20.

Tools

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-reference-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.

Get Forms
www.energycodeace.com/content/get-forms

Find the CF1R forms you need.

Virtual Compliance Assistant
www.energycodeace.com/content/project-tool

Get interactive help to fill in NRCC or LMCC Forms.

Training

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
  bit.ly/ECA-training-2022-res-whats-new
- 2022 Title 24, Part 6 Essentials — Single-family Standards: Solar and Battery Storage
  bit.ly/ECA-training-2022-sf-solar-battery
- 2022 Title 24, Part 6 Essentials — Single-family Standards for Architects and Designers
  bit.ly/ECA-training-2022-sf-architect-designer
- Check the Energy Code Ace YouTube channel for videos on appliances regulated under Title 20:
  bit.ly/ECA-YouTube-channel

Resources

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 Sheets for Buildings

- Single-family Buildings: Just the Basics: HERS Verification

Fact Sheets for Appliances

- MAEDbS 101
- T20 Basics - Retailers, Distributors & Installers

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SCAN ME

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