



## CITY ATTORNEY'S OFFICE

CITY HALL  
10300 TORRE AVENUE • CUPERTINO, CA 95014-3255  
TELEPHONE: (408) 777-3403 • FAX: (408) 777-3366  
CUPERTINO.ORG

## CITY COUNCIL STAFF REPORT

Meeting: September 17, 2024

### Subject

Adoption of local amendments to the California Energy Code and repeal of Municipal Code Chapter 16.32 (Local Sustainability Requirements for Newly Adopted Buildings)

### Recommended Action

Conduct a first reading of and introduce Ordinance No. 24-\_\_\_\_, entitled "AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CUPERTINO REPEALING MUNICIPAL CODE CHAPTER 16.32: LOCAL SUSTAINABILITY REQUIREMENTS FOR NEWLY CONSTRUCTED BUILDINGS, AND ADOPTING LOCAL AMENDMENTS TO CALIFORNIA ENERGY CODE"

### Reasons for Recommendation

In August 2022, the City Council adopted the City's "Climate Action Plan 2.0." The updated Climate Action Plan set the goals of reducing community-wide emissions by 50% below 2010 levels by 2030 and achieving community-wide carbon neutrality no later than 2040. As part of the City's efforts to meet these goals, the Climate Action Plan includes policies to address greenhouse gas emissions (GHG) from residential and commercial buildings, which are responsible approximately 25% of GHG emissions in California. Specifically, the Climate Action Plan includes a policy to "[r]equire new residential and commercial development to be all-electric at time of construction." (CAP 2.0, Table ES-2, Policy BE-4; see also CAP 2.0 Table 12, Measure BE-4.1 [stating that the City should "[a]dopt an electrification ordinance for new residential and commercial development which requires developers to build all-electric at time of construction"].)

On November 1, 2022, the Cupertino City Council adopted Ordinance No. 22-2245 to implement the building decarbonization policies in Climate Action Plan 2.0. The ordinance amended the Municipal Code to Chapter 16.32 (Local Sustainability Requirements for Newly Constructed Buildings), which, subject to certain exemptions, required all-electric construction in newly constructed buildings.

While the implementation of the City's all-electric code has been successful, a legal challenge to the City of Berkeley's natural gas infrastructure ordinance has led the City to

reconsider its approach to building decarbonization. The Ninth Circuit Court of Appeal's ruling in that case, *California Restaurant Association v. City of Berkeley* (2024) 89 F.4th 1094, held that restrictions on new natural gas infrastructure enacted by the City of Berkeley in 2019 were preempted by Subchapter III of the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6291 *et seq.*, a federal statute that establishes uniform federal standards regulating the energy efficiency for commercial and residential appliances.

The *California Restaurant Association v. City of Berkeley* case raised concerns that all-electric codes adopted in Cupertino and other jurisdictions fell within the scope of EPCA's preemption clause. In response, in May 2024, the City Manager announced that the City would join other jurisdictions in the region and state and suspend enforcement of its all-electric code. Following the City Manager's decision, staff began work to develop a replacement for the all-electric code that is consistent with the Ninth Circuit panel's interpretation of federal law in the *California Restaurant Association* case.

Staff have identified increased building energy performance requirements via local amendments to the California Energy Code as the preferred alternative to the current all-electric code, given the limits imposed by the Ninth Circuit's decision. The California Energy Code establishes whole-building efficiency requirements, which account for a building's water heater, HVAC (heating, ventilation, and air conditioning) system, solar generating system, and insulation, among other design elements. The California Energy Code includes both a prescriptive option and performance option based on building type.

Under the Energy Code, local jurisdictions may adopt amendments to statewide energy efficiency standards provided that the amendments are shown to be cost effective and use less energy than the standard requirements contained in the state Code (commonly referred to as "reach codes"). (24 Cal. Code Regs., Title 6, § 10-106.) In collaboration with Silicon Valley Clean Energy (SVCE), staff has proposed local amendments to the Energy Code that increase energy efficiency, encourage building electrification, and meet the requirements of state and federal law ([Attachment A](#)). The proposed reach code primarily amends the performance pathway of the California Energy Code. The proposed code amendments do not regulate cooking equipment, laundry dryers, or other energy uses not addressed by the performance pathway of the California Energy Code.

The proposed local amendments to the Energy Code include the following:

- **Proposed Energy Performance Enhancements:** The proposed ordinance would adopt local Energy Code amendments that increase the required Energy Design Rating (EDR) score for single-family residences and the required Source Energy<sup>1</sup> scores for all other buildings.

---

<sup>1</sup> The Source Energy Score, a new metric added to the 2022 Energy Code to support building electrification goals, is a standard that combines the value and cost of energy

- **Electric Ready Requirements:** The proposed reach code would add to the current 2022 California Energy Code requirements for “electric ready” components in buildings, including electric outlets near natural gas appliances, appropriate ventilation for future heat pump appliances, and reserved and labelled breakers in the electrical panel for future electric appliances.

The proposed local Energy Code amendments are largely consistent with amendments to the statewide Energy Code that are being considered by the Energy Commission for adoption in the 2025 building standards code cycle. The local amendments would have the effect of implementing these proposed statewide code amendments approximately one year early in Cupertino.

TRC, a consultant retained by SCVE that provides technical support for member jurisdictions, has prepared a memorandum to support the required findings under the Energy Code ([Attachment B](#)). The memorandum concludes that the proposed local code amendments would be cost effective and would result in the use of less energy than the standards in the state Energy Code.

The proposed ordinance would repeal existing Municipal Code Chapter 16.32 and add the local Energy Code amendments outlined above to Chapter 16.54. The ordinance includes the required findings under the Energy Code, as well as required findings regarding local conditions for the adoption of local amendments to statewide building standards.

Staff recommends adopting the proposed local Energy Code amendments to advance the City’s climate action goals to the greatest extent possible within the legal constraints imposed by the Ninth Circuit panel’s interpretation of federal law. If the City Council approves the introduction of the proposed ordinance, the ordinance will be presented to Council for a second reading and adoption on October 1. The adopted ordinance would then be submitted to the California Energy Commission for review and approval.

#### Sustainability Impact

The proposed ordinance advances the policy of requiring all-electric construction in newly constructed buildings set forth in Climate Action Plan 2.0.

#### Fiscal Impact

No fiscal impact.

---

consumed at different times of the day and year (referred to as Time Dependent Valuation of energy, or TDV), and the emissions from the building’s energy source.

California Environmental Quality Act

The proposed ordinance is categorically exempt from review under the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, § 15308 (Actions Taken by Regulatory Agencies for Protection of the Environment) and § 15061(b)(3) (“common sense” exemption).

---

Prepared by:

Christopher D. Jensen, City Attorney  
Ursula Syrova, Environmental Programs and  
Sustainability Manager  
Sean Hatch, Building Official

Approved for Submission by:

Pamela Wu, City Manager

Attachments:

A – Proposed Ordinance

B – Memorandum Re: Reach Code Energy Performance Approach

ORDINANCE NO. 24 - \_\_\_\_

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CUPERTINO  
REPEALING MUNICIPAL CODE CHAPTER 16.32: LOCAL SUSTAINABILITY  
REQUIREMENTS FOR NEWLY CONSTRUCTED BUILDINGS, AND ADOPTING  
LOCAL AMENDMENTS TO CALIFORNIA ENERGY CODE**

The City Council of the City of Cupertino finds that:

1. On November 1, 2022, the Cupertino City Council adopted Ordinance No. 22-2245, including Municipal Code Chapter 16.32: Local Sustainability Requirements for Newly Constructed Buildings, which, subject to certain exemptions, required all-electric construction in newly constructed buildings.
2. On January 2, 2024, following denial of *en banc* review, a panel of the U.S. Court of Appeals for the Ninth Circuit issued an amended opinion in *California Restaurant Association v. City of Berkeley* (2024) 89 F.4th 1094, holding that restrictions on new natural gas infrastructure enacted by the City of Berkeley in 2019 were preempted by Subchapter III of the federal Energy Policy and Conservation Act, 42 U.S.C. § 6291 *et seq.*
3. Notwithstanding the court's ruling in *California Restaurant Association v. City of Berkeley*, the Cupertino City Council reaffirms the policy stated in the City's Climate Action Plan 2.0, which states the City's goal to "[r]equire new residential and commercial development to be all-electric at time of construction." (CAP 2.0, Table ES-2, Policy BE-4.) The City Council wishes to amend the Municipal Code to advance the policy commitments stated in the Climate Action Plan, while maintaining consistency with federal law as interpreted by a Ninth Circuit Court of Appeals panel in *California Restaurant Association v. City of Berkeley*.
4. To that end, the City Council wishes to adopt local amendments to the California Building Energy Efficiency Standards, 2022 Edition, Title 24, Part 6 of the California Code of Regulations ("Energy Code").
5. The Energy Code, a part of the California Building Standards Code, implements minimum energy efficiency standards in buildings through mandatory requirements, prescriptive standards, and performances standards.

6. California Health and Safety Code section 17958 requires that local jurisdictions adopt building standards that are substantially the same as those adopted by the California Building Standards Commission and contained in the California Building Standards Code, subject to the ability to adopt local building standard amendments as described below.
7. California Health and Safety Code sections 17958.5, 17958.7, and 18941.5 provide that jurisdictions may make changes or modifications to the building standards contained in the California Building Standards based upon express findings that such changes or modifications are reasonably necessary because of local climatic, geological, or topographical conditions.
8. The Cupertino City Council finds that each of the amendments, additions, and deletions to the California Energy Code contained in this ordinance are reasonably necessary because of the local climatic, geological, or topographical conditions described in Section 1 of the Ordinance.
9. The Energy Code provides that local governmental agencies may adopt and enforce energy standards for newly constructed buildings and additions, alterations, and repairs to existing buildings provided the following two requirements are met prior to any enforcement of the standards: (1) “[a] determination that the standards are cost effective is adopted by the local agency at a public meeting and subsequently filed with the Energy Commission; and (2) “the Energy Commission finds that the standards will require buildings to be designed to consume less energy than permitted by Title 24, Part 6.” (24 Cal. Code Regs., Title 6, § 10-106.)

**NOW, THEREFORE, THE CITY COUNCIL OF THE OF CITY OF CUPERTINO  
DOES ORDAIN AS FOLLOWS:**

**SECTION 1: Findings.**

(a) Local Conditions. The City of Cupertino is located in Climate Zone 4 as established in the 2022 California Energy Code. Climate Zone 4 is inland of the coast but has some ocean influence which keeps temperatures from hitting more extreme highs and lows. The zone covers many microclimates from northern to southern parts of the state. The City experiences an annual average precipitation of approximately 26 inches per year. Ninety-five percent of precipitation falls during the months of November through April, leaving a dry period of approximately six months each year. Relative humidity remains moderate most of the time. The climate in Cupertino is characterized

by warm summer temperatures (average highs above 80 degrees Fahrenheit) and moderate winters (average highs of approximately 60 degrees Fahrenheit). Prevailing winds in the area come from the west. In August 2022, the City Council adopted the City's "Climate Action Plan 2.0," which, in addition to setting goals of reducing community-wide emissions by 50% below 2010 levels by 2030 and achieving community-wide carbon neutrality no later than 2040, includes a description of the impacts of anthropogenic climate change on the City of Cupertino. As documented in the City's Climate Action Plan 2.0, the continued emissions of greenhouse gases into the atmosphere subjects Cupertino to (1) adverse air quality impacts, exacerbated by local features such as a major highways; (2) extreme heat; (3) flooding from severe storms, particularly in the areas around Stevens Creek and Calabazas Creek; (4) wildfires and smoke, owing to the City's proximity to the Santa Cruz Mountains and the urban-wildland interface; (5) drought; and (6) sea level rise. The Climate Action Plan includes policies and regulations to increase the energy efficiency of newly constructed buildings because the City is vulnerable to the increase in global temperatures caused by the emission of greenhouse gases to the atmosphere. Local climatic geologic, and topographic conditions along with the greenhouse emissions generated from residential and nonresidential structures require exceeding the energy standards for building construction established in the 2022 California Buildings Standards Code. The local Energy Code Amendments adopted in this Ordinance will ensure that new buildings reduce their consumption of energy and avoid exacerbating the hazards posed by local climatic, geological, and topographical conditions.

(b) Cost Effectiveness and Energy Efficiency. The Cupertino City Council finds, based on evidence presented before the City Council and the recitals set forth above, which are incorporated by reference herein, that the local amendments to the Energy Code contained in this Ordinance are cost effective and will require buildings to be designed to consume less energy than permitted by the Energy Code.

**SECTION 2: Repeal and Adoption.**

(a) The Cupertino City Council hereby repeals Chapter 16.32 of the Cupertino Municipal Code (Local Sustainability Requirements for Newly Constructed Buildings) in its entirety

(b) The Cupertino City Council hereby amends Chapter 16.54 of the Municipal Code (Energy Code), as set forth in Attachment A, to adopt local amendments to the California Building Energy Efficiency Standards, 2022 Edition, Title 24, Part 6 of the California Code of Regulations.

**SECTION 3: Severability and Continuity.**

The City Council declares that each section, sub-section, paragraph, sub-paragraph, sentence, clause and phrase of this ordinance is severable and independent of every other section, sub-section, paragraph, sub-paragraph, sentence, clause and phrase of this ordinance. If any section, sub-section, paragraph, sub-paragraph, sentence, clause or phrase of this ordinance is held invalid, or its application to any person or circumstance, be determined by a court of competent jurisdiction to be unlawful, unenforceable or otherwise void, the City Council declares that it would have adopted the remaining provisions of this ordinance irrespective of such portion, and further declares its express intent that the remaining portions of this ordinance should remain in effect after the invalid portion has been eliminated. To the extent the provisions of this Ordinance are substantially the same as previous provisions of the Cupertino Municipal Code, these provisions shall be construed as continuations of those provisions and not as an amendment to or readoption of the earlier provisions.

**SECTION 4: Effective Date.**

This Ordinance shall take effect thirty days after adoption as provided by Government Code Section 36937.

**SECTION 5: Publication.**

The City Clerk shall give notice of adoption of this Ordinance as required by law. Pursuant to Government Code Section 36933, a summary of this Ordinance may be prepared by the City Clerk and published in lieu of publication of the entire text. The City Clerk shall post in the office of the City Clerk a certified copy of the full text of the Ordinance listing the names of the City Council members voting for and against the ordinance.

**INTRODUCED** at a regular meeting of the Cupertino City Council on September 17, 2024 and **ENACTED** at a regular meeting of the Cupertino City Council on October 1, 2024 by the following vote:

Members of the City Council

AYES:

NOES:

ABSENT:

ABSTAIN:



SIGNED:  _____ Sheila Mohan, Mayor City of Cupertino	_____ Date
ATTEST:  _____ Kirsten Squarcia, City Clerk	_____ Date
APPROVED AS TO FORM:  _____ Christopher D. Jensen, City Attorney	_____ Date

## Attachment A – Energy Code; Local Energy Code Amendments

### CHAPTER 16.54: ENERGY CODE

#### Section 16.54.010. Adoption of 2022 California Energy Code.

A. The provisions of the 2022 California Energy Code and each and all of the regulations, provisions, conditions and terms of the code are referred to as if fully set forth in this chapter, and are by such reference adopted.

B. One (1) copy of the code therefor is on file in the office of the Building Official pursuant to Health and Safety Code Section 18942 and is made available for public inspection.

#### Section 16.54.020. Local Energy Code Amendments.

##### A. Amendments to Subchapter 1 (All Occupancies – General Provisions)

*Amend Section 100.1(b) of the 2022 California Energy Code to add the following definitions:*

ELECTRIC HEATING APPLIANCE is a device that produces heat energy to create a warm environment by the application of electric power to resistance elements, refrigerant compressors, or dissimilar material junctions, as defined in the California Mechanical Code.

KITCHEN, INSTITUTIONAL COMMERCIAL is a kitchen dedicated to a foodservice establishment that provides meals at institutions including schools, colleges and universities, hospitals, correctional facilities, private cafeterias, nursing homes, and other buildings or structures in which care or supervision is provided to occupants.

KITCHEN, QUICK-SERVICE COMMERCIAL is a kitchen dedicated to an establishment primarily engaged in providing fast food, fast casual, or limited services. Food and drink may be consumed on premises, taken out, or delivered to the customer's location.

NET FREE AREA (NFA) is the total unobstructed area of the air gaps between louver and grille slats in a vent through which air can pass. The narrowest distance between two slats, perpendicular to the surface of both slats is the air gap height. The narrowest width of the gap is the air gap width. The NFA is the air gap height multiplied by the air gap width multiplied by the total number of air gaps between slats in the vent.

##### B. Amendments to Subchapter 3 (Nonresidential, Hotel/Motel Occupancies, and Covered Processes – Mandatory Requirements)

*Amend Section 120.2 of the 2022 California Energy Code to read as follows:*

## SECTION 120.2

### REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS

(a) – (k): Subsections 120.2(a) – (k) are adopted without modification.

(l) HVAC Hot Water Temperature. Zones that use hot water for space heating shall be designed for a hot water supply temperature of no greater than 130 °F.

*Amend Section 120.6 of the 2022 California Energy Code to read as follows:*

## SECTION 120.6

### REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS

(a) – (j): Subsections 120.6(a) – (j) are adopted without modification.

(k) Mandatory requirements for commercial kitchens. Electric Readiness for Newly Constructed Commercial Kitchens shall meet the following requirements:

1. Each quick-service commercial kitchens and institutional commercial kitchens shall include a dedicated branch circuit wiring and outlet that would be accessible to cookline appliances and shall meet all of the following requirements:

a. The branch circuit conductors shall be rated at 50 amps minimum.

b. The electrical service shall have a minimum capacity of 800 connected amps.

2. The electrical service panel shall be sized to accommodate an additional either 208v or 240v 50-amp breaker.

EXCEPTION 1 to Section 120.6(k): healthcare facilities.

EXCEPTION 2 to Section 120.6(k): all-electric commercial kitchens.

### **C. Amendments to Subchapter 4 (Nonresidential and Hotel/Motel Occupancies—Mandatory Requirements for Lighting Systems and Equipment, and Electrical Power Distribution Systems)**

*Amend Section 130.0 of the 2022 California Energy Code to read as follows:*

## SECTION 130.0

### LIGHTING SYSTEMS AND EQUIPMENT, AND ELECTRICAL POWER DISTRIBUTIONS SYSTEMS—GENERAL

(a) The design and installation of all lighting systems and equipment in nonresidential and hotel/motel buildings, outdoor lighting, and electrical power distribution systems

within the scope of Section 100.0(a), shall comply with the applicable provisions of Sections 130.0 through ~~130.5~~130.6.

**NOTE:** The requirements of Sections 130.0 through ~~130.5~~130.6 apply to newly constructed buildings. Section 141.0 specifies which requirements of Sections 130.0 through ~~130.5~~130.6 also apply to additions and alterations to existing buildings.

(b) – (c): Subsections 130.0(b) – (c) are adopted without modification.

*Amend Subchapter 4 of the 2022 California Energy Code to add **Section 130.6** to be numbered, entitled, and to read as follows:*

**SECTION 130.6**

**ELECTRIC READINESS REQUIREMENTS FOR SYSTEMS USING GAS OR PROPANE**

Where nonresidential systems using gas or propane are installed, the construction drawings shall indicate electrical infrastructure and physical space accommodating the future installation of an electric heating appliance in the following ways, as certified by a registered design professional or licensed electrical contractor.

(a) Branch circuit wiring, electrically isolated and designed to serve all electric heating appliances in accordance with manufacturer requirements and the California Electrical Code, including the appropriate voltage, phase, minimum amperage, and an electrical receptacle or junction box within five feet of the appliance that is accessible with no obstructions. Appropriately sized conduit may be installed in lieu of conductors; and

(b) Labeling of both ends of the unused conductors or conduit shall be with “For Future Electrical Appliance”; and

(c) Reserved circuit breakers in the electrical panel for each branch circuit, appropriately labeled (e.g. “Reserved for Future Electric Range”), and positioned on the opposite end of the panel supply conductor connection; and

(d) Connected subpanels, panelboards, switchboards, busbars, and transformers shall be sized to serve the future electric heating appliances. The electrical capacity requirements shall be adjusted for demand factors in accordance with the California Electric Code; and

(e) Physical space for future electric heating appliances, including equipment footprint, and if needed a pathway reserved for routing of ductwork to heat pump evaporator(s), shall be depicted on the construction drawings. The footprint necessary for future electric heating appliances may overlap with non-structural partitions and with the location of currently designed combustion equipment.

**D. Amendments to Subchapter 5 (Nonresidential and Hotel/Motel Occupancies—Performance and Prescriptive Approaches for Achieving Energy Efficiency)**

*Amend Section 140.0 of the 2022 California Energy Code to read as follows:*

**SECTION 140.0**

**PERFORMANCE AND PERSCRIPTIVE COMPLIANCE APPROACHES**

Nonresidential and hotel/motel buildings shall comply with all of the following:

- (a) The requirements of Sections 100.0 through 110.12 applicable to the building project (mandatory measures for all buildings).
- (b) The requirements of Sections 120.0 through 130.56 (mandatory measures for nonresidential and high-rise residential and hotel/motel buildings).
- (c) Either the performance compliance approach (energy budgets) specified in Section 140.1 or the prescriptive compliance approach specified in Section 140.2 for the Climate Zone in which the building will be located. Climate zones are shown in FIGURE 100.1-A.

**NOTE to Section 140.0(c):** The Commission periodically updates, publishes and makes available to interested persons and local enforcement agencies precise descriptions of the Climate Zones, which is available by zip code boundaries depicted in the Reference Joint Appendices along with a list of the communities in each zone.

**NOTE to Section 140.0:** The requirements of Sections 140.1 through 140.10 apply to newly constructed buildings. Section 141.0 specifies which requirements of Section 140.1 through 140.10 also apply to additions or alterations to existing buildings.

*Amend Section 140.1 of the 2022 California Energy Code to read as follows:*

**SECTION 140.1**

**PERFORMANCE APPROACH: ENERGY BUDGETS**

A building complies with the performance approach ~~if provided that~~ (1) the time-dependent valuation (TDV) energy budget calculated for the Proposed Design Building under Subsection (b) is no greater than the TDV energy budget calculated for the Standard Design Building under Subsection (a), and (2) the source energy budget calculated for the proposed design building under Subsection (b) has a source energy compliance margin, relative to the energy budget calculated for the standard design building under Subsection (a), of at least 10 percent for all nonresidential occupancies.

**EXCEPTION 1 to 140.1 item (2).** A source energy compliance margin of 0 percent or greater is required when nonresidential occupancies are designed with single zone space-conditioning systems complying with Section 140.4(a)2.

(a) – (c) Subsections 140.1 (a) – (c) are adopted without modification.

**E. Amendments to Subchapter 7 (Single-Family Residential Buildings – Mandatory Features and Devices)**

*Amend Section 150.0 of the 2022 California Energy Code to read as follows:*

**SECTION 150.0  
MANDATORY DEVICES AND FEATURES**

Single-family residential buildings shall comply with the applicable requirements of Sections 150(a) through 150.0(v).

**NOTE:** The requirements of Sections 150.0 (a) through (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(r) also apply to additions or alterations. The amendments to section 150.0(t) do not apply to additions or alterations.

(a) – (s): Subsections 150.0(a) – (s) are adopted without modification.

(t) **Heat pump space heater ready.** Systems using gas or propane furnace to serve individual dwelling units shall include the following:

1. A dedicated 240 volt branch circuit wiring shall be installed within 3 feet from the furnace and accessible to the furnace with no obstructions. The branch circuit conductors shall be rated at 30 amps minimum. The blank cover shall be identified as “240V ready.” All electrical components shall be installed in accordance with the California Electrical Code.

2. The main electrical service panel shall have a reserved space to allow for the installation of a double pole circuit breaker for a future heat pump space heater installation. The reserved space shall be permanently marked as “For Future 240V use.”

3. A designated exterior location for a future heat pump compressor unit with either a drain or natural drainage for condensate.

(u) – (v): Subsections 150.0(u) – (v) are adopted without modification.

**F. Amendments to Subchapter 8 (Performance and Prescriptive Compliance for Single-Family Residential Buildings)**

*Amend Section 150.1 of the 2022 California Energy Code to read as follows:*

## SECTION 150.1

### PERFORMANCE AND PERSCRIPTIVE COMPLIANCE APPROACHES FOR SINGLE-FAMILY RESIDENTIAL BUILDINGS

(a): Subsection 150.1(a) is adopted without modification

(b) **Performance Standards.** A building complies with the performance standards if the energy consumption calculated for the proposed design building is no greater than the energy budget calculated for the standard design building using Commission-certified compliance software as specified by the Alternative Calculation Methods Approval Manual, as specified in sub-sections 1, 2 and 3 below.

1. Newly Constructed Buildings. The Energy Budget for newly constructed buildings is expressed in terms of the Energy Design Ratings, which are based on source energy and time-dependent valuation (TDV) energy. The Energy Design Rating 1 (EDR1) is based on source energy. The Energy Design Rating 2 (EDR2) is based on TDV energy and has two components, the Energy Efficiency Design Rating, and the Solar Electric Generation and Demand Flexibility Design Rating. The total Energy Design Rating shall account for both the Energy Efficiency Design Rating and the Solar Electric Generation and Demand Flexibility Design Rating. The proposed building shall separately comply with the Source Energy Design Rating, Energy Efficiency Design Rating and the Total Energy Design Rating. A building complies with the performance approach if the TDV energy budget calculated for the proposed design building is no greater than the TDV energy budget calculated for the Standard Design Building AND Source Energy compliance margin of at least nine, relative to the Source Energy Design Rating 1 calculated for the Standard Design building.

**EXCEPTION 1 to Section 150.1(b)1.** A community shared solar electric generation system, or other renewable electric generation system, and/or community shared battery storage system, which provides dedicated power, utility energy reduction credits, or payments for energy bill reductions, to the permitted building and is approved by the Energy Commission as specified in Title 24, Part 1, Section 10-115, may offset part or all of the solar electric generation system Energy Design Rating required to comply with the Standards, as calculated according to methods established by the Commission in the Residential ACM Reference Manual.

**EXCEPTION 2 to Section 150.1(b)1.** A newly constructed building with a conditioned floor area less than 1,500 square feet shall achieve a Source Energy compliance margin of four or greater, relative to the Source Energy Design Rating 1 calculated for the Standard Design building.

**EXCEPTION 3 to Section 150.1(b)1.** If a newly constructed building with a conditioned floor area less than 625 square feet demonstrates that due to conditions specific to the project it is technically infeasible to achieve compliance, the Building Official may reduce the compliance margin to between 0 and 4.

(b)(2) – (3): Subsections 150.1(b)2 and (b)3 are adopted without modification.

(c): Subsection 150.1(c) is adopted without modification

**G. Amendments to Subchapter 10 (Multifamily Buildings—Mandatory Requirements)**

*Amend Section 160.4 of the 2022 California Energy Code to read as follows:*

**SECTION 160.4**

**MANDATORY REQUIREMENTS FOR WATER-HEATING SYSTEMS**

~~(a) Reserved. Systems using gas or propane water heaters to serve individual dwelling units shall include the following components:~~

~~1.— A dedicated 125-volt, 20-amp electrical receptacle that is connected to the electric panel with a 120/240-volt 3-conductor, 10-AWG copper branch circuit, within 3 feet from the water heater and accessible to the water heater with no obstructions. In addition, all of the following:~~

~~A.— Both ends of the unused conductor shall be labeled with the word “spare” and be electrically isolated; and~~

~~B.— A reserved single pole circuit breaker space in the electrical panel adjacent to the circuit breaker for the branch circuit in A above and labeled with the words “Future 240V Use”; and~~

~~2.— A Category III or IV vent, or a Type B vent with straight pipe between the outside termination and the space where the water heater is installed; and~~

~~3.— A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance; and~~

~~4.— A gas supply line with a capacity of at least 200,000 Btu/hr.~~

(b) – (f): Subsections 160.4(b) – (f) are adopted without modification.

*Amend Section 160.9 of the 2022 California Energy Code to read as follows:*

**SECTION 160.9**

**MANDATORY REQUIREMENTS FOR ELECTRIC READY BUILDINGS**



(a) – (c): Subsections 160.9(a) – (c) are adopted without modification.

**(d) Individual Heat Pump Water Heater Ready.** Systems using gas or propane water heaters to serve individual dwelling units shall include the following components and shall meet the requirements of Section 160.9(f):

1. A dedicated 125 volt, 20 amp electrical receptacle that is connected to the electric panel with a 120/240 volt 3 conductor, copper branch circuit rated to 30 amps, within 3 feet from the water heater and accessible to the water heater with no obstructions. In addition, all of the following:

A. Both ends of the unused conductor shall be labeled with the word “spare” and be electrically isolated; and

B. A reserved single pole circuit breaker space in the electrical panel adjacent to the circuit breaker for the branch circuit in A above and labeled with the words “Future 240V Use”.

2. A condensate drain that is no more than 2 inches higher than the base of the installed water heater, and allows natural draining without pump assistance.

3. The construction drawings shall indicate the location of the future heat pump water heater. The reserved location shall have minimum interior dimensions of 39”x39”x96”.

4. A ventilation method meeting one of the following:

A. The designed space reserved for the future heat pump water heater shall have a minimum volume of 700 cubic feet; or

B. The designed space reserved for the future heat pump water heater shall vent to a communicating space in the same pressure boundary via permanent openings with a minimum total net free area of 250 square inches so that the total combined volume connected via permanent openings is 700 cu. ft. or larger. The permanent openings shall be:

- i. Fully louvered doors with fixed louvers consisting of a single layer of fixed flat slats; or
- ii. Two permanent fixed openings, consisting of a single layer of fixed flat slat louvers or grilles, one commencing within 12 inches from the top of the enclosure and one commencing within 12 inches from the bottom of the enclosure.

C. The designed space reserved for the future heat pump water heater shall include two 8" capped ducts, venting to the building exterior:

- i. All ducts, connections and building penetrations shall be sealed.
- ii. Exhaust air ducts and all ducts which cross pressure boundaries shall be insulated to a minimum insulation level of R-6.
- iii. Airflow from termination points shall be diverted away from each other.

(e) Central Heat Pump Water Heater Electric Ready. Central water heating systems using gas or propane to serve multiple dwelling units shall include the following:

1. The system input capacity of the gas or propane water heating system shall be determined as the sum of the input gas or propane capacity of all water heating devices associated with each gas or propane water heating system.

2. Space reserved shall include:

A. Heat Pump. The minimum space reserved shall include space for service clearances and air flow clearances and shall meet one of the following:

- i. If the system input capacity of the gas water heating system is less than 200,000 BTU per hour, the minimum space reserved for the heat pump shall be 2.0 square feet per input 10,000 BTU per hour of the gas or propane water heating system, and the minimum linear dimension of the space reserved shall be 48 linear inches.
- ii. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, the minimum space reserved for the heat pump shall be 3.6 square feet per input 10,000 BTU per hour of the gas or propane water heating system, and the minimum linear dimension of the space reserved shall be 84 linear inches.
- iii. The space reserved shall be the space required for a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project.

B. Tanks. The minimum space reserved shall include space for service clearances and shall meet one of the following:

- i. If the system input capacity of the gas water heating system is less

than 200,000 BTU per hour, the minimum space reserved for the storage and temperature maintenance tanks shall be 4.4 square feet per input 10,000 BTU per hour of the gas or propane water heating system.

- ii. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, the minimum physical space reserved for the storage and temperature maintenance tanks shall be 3.1 square feet per input 10,000 BTU per hour of the gas or propane water heating system.
- iii. The space reserved shall be the space required for a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project.

3. Ventilation shall be provided by meeting one of the following:

A. Physical space reserved for the heat pump shall be located outside, or  
B. A pathway shall be reserved for future routing of supply and exhaust air via ductwork from the reserved heat pump location to an appropriate outdoor location. Penetrations through the building envelope for louvers and ducts shall be planned and identified for future use. The reserved pathway and penetrations through the building envelope shall be sized to meet one of the following:

- i. If the system input capacity of the gas water heating system is less than 200,000 BTU per hour, the minimum air flow rate shall be 70 CFM per input 10,000 BTU per hour of the gas or propane water heating system and the total external static pressure drop of ductwork and louvers shall not exceed 0.17 inch when the future heat pump water heater is installed.
- ii. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, the minimum air flow rate shall be 420 CFM per input 10,000 BTU per hour of the gas or propane water heating system and the total external static pressure drop of ductwork and louvers shall not exceed 0.17 inch when the future heat pump water heater is installed.
- iii. The reserved pathway and penetrations shall be sized to serve a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible

person associated with the project.

4. Condensate drainage piping. An approved receptacle that is sized in accordance with the California Plumbing Code to receive the condensate drainage shall be installed within 3 feet of the reserved heat pump location, or piping shall be installed from within 3 feet of the reserved heat pump location to an approved discharge location that is sized in accordance with the California Plumbing Code, and meets one of the following:

A. If the system input capacity of the gas water heating system is less than 200,000 BTU per hour, condensate drainage shall be sized for 0.2 tons of refrigeration capacity per input 10,000 BTU per hour.

B. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, condensate drainage shall be sized for 0.7 tons of refrigeration capacity per input 10,000 BTU per hour.

C. Condensate drainage shall be sized to serve a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project.

5. Electrical.

A. Physical space shall be reserved on the bus system of the main switchboard or on the bus system of a distribution board to serve the future heat pump water heater system including the heat pump and temperature maintenance tanks. In addition, the physical space reserved shall be capable of providing adequate power to the future heat pump water heater as follows:

i. Heat Pump. For the Heat Pump, the physical space reserved shall comply with one of the following:

A. If the system input capacity of the gas water heating system is less than 200,000 BTU per hour, provide 0.1 kVA per input 10,000 BTU per hour.

B. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, provide 1.1 kVA per input 10,000 BTU per hour.

C. The physical space reserved supplies sufficient electrical power required to power a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with

the project.

- ii. Temperature Maintenance Tank. For the Temperature Maintenance Tank, the physical space reserved shall comply with one of the following:
  - A. If the system input capacity of the gas water heating system is less than 200,000 BTU per hour, provide 1.0 kVA per input 10,000 BTU per hour.
  - B. If the system input capacity of the gas water heating system is greater than or equal to 200,000 BTU per hour, provide 0.6 kVA per input 10,000 BTU per hour.
- iii. The physical space reserved supplies sufficient electrical power required to power a heat pump water heater system that meets the total building hot water demand as calculated and documented by the responsible person associated with the project.

(f) The building electrical system shall be sized to meet the future electric requirements of the electric ready equipment specified in sections 160.9 a – e. To meet this requirement the building main service conduit, the electrical system to the point specified in each subsection, and any on-site distribution transformers shall have sufficient capacity to supply full rated amperage at each electric ready appliance in accordance with the California Electric Code.

#### **H. Amendments to Subchapter 11 (Multifamily Buildings – Performance and Prescriptive Compliance Approaches)**

*Amend Section 170.1 of the 2022 California Energy Code to read as follows:*

##### **SECTION 170.1**

##### **PERFORMANCE APPROACH**

A building complies with the performance approach if the TDV energy budget calculated for the proposed design building under Subsection (b) is no greater than the TDV energy budget calculated for the standard design building under Subsection (a). Additionally, (1) the energy budget, expressed in terms of source energy, of a newly constructed low-rise multifamily building (three habitable stories or less) shall be at least 9 percent lower than that of the standard design building.

(a) – (d): Subsections 170.1(a) – (d) are adopted without modification.

## EXECUTIVE SUMMARY

The purpose of this document is to summarize how the Energy Performance approach reach code ordinance provides [Hourly Source Energy](#) compliance margins that are achievable for new construction buildings in Cupertino (Climate Zone 4) while meeting two criteria:

- 1) Cost-effective, for approval by the California Energy Commission (CEC).
- 2) Technically feasible, using appliances with efficiencies set at the minimum federal requirements.

The Energy Performance approach encourages new construction buildings to reduce their emissions, and improve outdoor and indoor air quality. This is achieved by requiring new construction buildings utilizing the performance pathway to meet an Hourly Source Energy compliance margin which is stricter than that set by the state in the [2022 Energy Code, Title 24, Part 6](#). The reach codes mitigates legal risk with the Energy Policy and Conservation Act (EPCA) as a result of the [California Restaurant Association vs. City of Berkeley](#) ruling by remaining fuel neutral through providing cost-effective pathways to compliance for both mixed-fuel and all-electric buildings utilizing appliances with efficiencies set at the minimum federal requirements.

**Table 1. Summary of EDR/Source Energy Compliance Margins and Cost-Effectiveness Data for Climate Zone 4**

Building Type	Metric	Reach Code Compliance Margin	Package	Package Details	Achieves Compliance Margin?	Is it Cost-Effective?	Links
Single Family	EDR1	9 or greater	All-electric	Both major appliances are heat pumps (water heating and space heating & cooling).	Yes	Yes	<a href="#">Report SFNC Study Data</a>
			Mixed-fuel	Combustion equipment is used with building efficiency measures, additional PV, and a battery.	Yes	Yes	
Multifamily (3-stories and less)	Source Energy	9% or greater	All-electric	Both major appliances are heat pumps (water heating and space heating & cooling).	Yes	Yes	<a href="#">Report MFNC Study Data</a>
			Mixed-fuel	Combustion equipment is used with building efficiency measures, additional PV, and a battery.	Yes	Yes	
Multifamily (4-stories and more)	Source Energy	1% or greater	All-electric	Both major appliances are heat pumps (water heating and space heating & cooling).	Yes	Yes	
			Mixed-fuel	Combusting equipment is used with building efficiency measures and additional PV.	Yes	Yes	
Nonresidential	Source Energy	10% or greater	All-electric	Both major appliances are heat pumps (water heating and space heating & cooling).	Yes*	Yes*	<a href="#">Report NRNC Study Data</a>
			Mixed-fuel	Combustion equipment is used with building efficiency measures.	Yes*	Yes*	

\*Source Energy compliance margins and cost-effectiveness results vary by prototype building, see the nonresidential report for the full set of results in more detail.



# MEMORANDUM

September 9, 2024

To: Christopher Jensen (Cupertino)  
From: Taylor Taylor, Farhad Farahmand (TRC)  
Re: **Energy Performance Approach for Cupertino Reach Code**

## OVERVIEW

TRC provides this memo to direct readers to the references of the Hourly Source Energy margins used in the reach code ordinance. Hourly Source Energy is a compliance metric introduced in 2022 California Building Energy Efficiency Standards representing, among other things, transmission, delivery and production losses from the underlying fuel sources used to power building systems and equipment. A more thorough description of Hourly Source Energy compliance metric and relationship with other metrics is included in this [Energy Code Ace document](#), excerpted at the end of this memo.

Cost-effectiveness studies produced by the [California Investor-Owned Utilities Codes and Standards Program](#) serve as the primary source of information. For various measure packages, these studies demonstrate Hourly Source Energy compliance margins that are achievable for new construction in Cupertino (Climate Zone 4) while meeting two criteria:

- 3) Cost-effective, for approval by the California Energy Commission (CEC).
- 4) Technically feasible, using appliances with efficiencies set at the minimum federal requirements.

## Single Family

In single family only, the Hourly Source Energy metric is instead referred to as Energy Design Rating 1 (EDR1). EDR1 margins meeting the two criteria listed above are contained in the 2022 Cost-Effectiveness Study: Single Family New Construction Study ([Report](#)) and workbook ([SFNC Study Data](#)) for a 2,400 square foot single family building. Per Figure 1 below:

- ◆ The All-Electric Code Minimum package achieves an EDR1 margin equal to 8.8 (cell S230).
- ◆ The All-Electric Efficiency package that includes efficiency measures as well as the market baseline heat pump water heater, achieves 10.4 (cell S337).
- ◆ The All-Electric Efficiency + Equipment package that includes efficiency measures as well as the market baseline heat pump water heater (which performs well above federal minimum efficiency requirements), achieves 11.9 (cell S339).
- ◆ The Mixed Fuel Efficiency, PV, + Battery package achieves 13.2 (cell S347).

An **EDR1 compliance margin of 9** reflects a cost-effective baseline achievable by an all-electric code minimum new construction single family building, that is also technically feasible by a mixed-fuel building with appliances efficiencies at minimum federal requirements.

MEMORANDUM (continued)  
 To: Christopher Jensen (Cupertino)

	F	H	I	S
6	measure	fuel_type	baseline_fuel_type	EDR1total_margin
230	All-Electric Code Minimum	All Electric	Mixed-fuel	8.8
337	All-Electric Efficiency	All Electric	Mixed-fuel	10.4
339	All-Electric Efficiency + High Efficiency Equipment	All Electric	Mixed-fuel	11.9
347	Mixed Fuel Efficiency, PV, + Battery (Basic)	Mixed-fuel	Mixed-fuel	13.2

Figure 1. Single Family (2400 square foot prototype) source energy margin results

### Small Homes

Information on small new construction single family homes, such as ADUs, can also be found in the single-family home sources listed above by filtering for the 625 square foot single family building. Single family homes that are less than 1,500 square feet can have difficulties meeting the margins listed above for single family homes. This is because smaller homes use less energy overall and therefore the amount of energy savings potential is diminished. In order to prevent frequent cases of technical infeasibility, an exception is offered for homes less than 1,500 square foot, set at the target where a 625 square foot home can achieve it. Per Figure 2 below:

- ◆ The All-Electric Code Minimum package achieves an EDR1 margin equal to 2.4 (cell S56).
- ◆ The All-Electric Efficiency package that includes efficiency measures, achieves 3.9 (cell S58).
- ◆ The All-Electric Efficiency + High Efficiency Equipment package that includes efficiency measures as well as the market baseline heat pump water heater (which performs well above federal minimum efficiency requirements), achieves 5.5 (cell S60).
- ◆ The All-Electric Efficiency + PV package achieves 6.8 (cell S62).
- ◆ The Mixed Fuel Efficiency + High Efficiency Equipment package achieves 3.7 (cell S66).
- ◆ The Mixed Fuel Efficiency, PV, + Battery package achieves 13.3 (cell S215).

The all-electric efficiency + PV package is cost-effective and achieves an EDR1 of 6.8. Therefore, a small homes reach code compliance margin could be set as high as 6.8. The margin can be set lower, **such as at a compliance margin of 4**, to align with an all-electric building with a market baseline water heater, and also with the all-electric efficiency package. This encourages emissions reductions while reducing construction cost burden on smaller sized homes.

	F	H	I	S
6	measure	fuel_type	baseline_fuel_type	EDR1total_margin
56	All-Electric Code Minimum	All Electric	Mixed-fuel	2.4
58	All-Electric Efficiency	All Electric	Mixed-fuel	3.9
60	All-Electric Efficiency + High Efficiency Equipment	All Electric	Mixed-fuel	5.5
62	All-Electric Efficiency + PV	All Electric	Mixed-fuel	6.8
66	Mixed Fuel Efficiency + High Efficiency Equipment	Mixed-fuel	Mixed-fuel	3.7
215	Mixed Fuel Efficiency, PV, + Battery (Basic)	Mixed-fuel	Mixed-fuel	13.3

Figure 2. Single Family (625 square foot prototype) source energy margin results



MEMORANDUM (continued)  
To: Christopher Jensen (Cupertino)

## Multifamily

Hourly Source Energy margins meeting the two criteria listed above are contained in the 2022 Cost-Effectiveness Study:

Multifamily New Construction ([Report](#)) and workbook ([MFNC Study Data](#)) for two multifamily family buildings (3-story, 39,372 ft<sup>2</sup> and 5-story, 140,925 ft<sup>2</sup>). Per Figure 3 below:

- ◆ For the 3-story prototype
  - ◆ The All-Electric Code Minimum package achieves an Hourly Source Energy margin equal to 9% (cell AI30).
  - ◆ The Mixed Fuel Efficiency, PV, + Battery package achieves 17% (cell AI36)
- ◆ For the 5-story prototype
  - ◆ The All-Electric Code Minimum package achieves an Hourly Source Energy margin of 6% (cell AI51).
  - ◆ The Mixed Fuel Efficiency + PV package achieves 1% (cell AI156)

An **Hourly Source Energy compliance margin of 9% for 3-stories and less, and 1% for 4-stories and more**, reflects a cost-effective baseline achievable by an all-electric code minimum new construction multifamily building, that is also technically feasible by a mixed-fuel building with appliances efficiencies at minimum federal requirements.

	A	E	F	H	I	AI
row index/lookup/unique identifier	prototype	measure	fuel_type	baseline_fuel_type	Total Source Energy Margin	
30	ae-code2.0	39372	all-electric prescriptive	All Electric	Mixed-fuel	9%
32	ae-pv2.0	39372	all-electric prescriptive & PV	All Electric	Mixed-fuel	18%
36	mf-effpvb2.0	39372	mixed fuel efficiency & PV & battery	Mixed-fuel	Mixed-fuel	17%
51	ae-codenew2.0	140925	all-electric prescriptive	All Electric	Mixed-fuel	6%
72	ae-newpv2.0	140925	all-electric prescriptive & PV	All Electric	Mixed-fuel	13%
156	mf-effpv2.0	140925	mixed fuel efficiency & PV	Mixed-fuel	Mixed-fuel	1%

Figure 3. Multifamily source energy results. Under the “prototype” column, the 3-story building is 39,372 ft<sup>2</sup> and the 5-story building is 140,925 ft<sup>2</sup>.

## Nonresidential

Hourly Source Energy margins meeting the two criteria listed above are contained in the 2022 Nonresidential New Construction Reach Code Cost-effectiveness Study ([Report](#)) and workbook ([NRNC Study Data](#)) for four nonresidential prototypes (Medium Office, Retail, Quick-Service Restaurant, and Small Hotel). Per Figure 4 below:

- ◆ For the Medium Office (‘MO’ tab in the workbook)
  - ◆ The All-Electric Code Minimum package achieves an Hourly Source Energy margin equal to 5% (cell T29).
  - ◆ The Mixed Fuel + Efficiency package achieves 10% (cell T6).
- ◆ For the Medium Retail (‘RE’ tab in the workbook)
  - ◆ The Mixed Fuel Code Minimum package achieves -29% (cell T6).
  - ◆ The All-Electric + Efficiency package achieves 12% (cell T52).
- ◆ For the Quick Service Restaurant (‘QSR’ tab in the workbook)
  - ◆ The All-Electric Code Minimum package achieves 42% (cell T121).
  - ◆ The Mixed Fuel + Efficiency package achieves 12% (cell T6).
- ◆ For the Small Hotel (‘SH’ tab in the workbook)

MEMORANDUM (continued)  
 To: Christopher Jensen (Cupertino)

- ◆ The All-Electric Code Minimum package achieves 29% (cell T29).
- ◆ The Mixed Fuel + Efficiency package achieves 7% (cell T6).

For nonresidential buildings, an **Hourly Source Energy compliance margin of 10%** reflects the average performance of mixed-fuel buildings with appliances efficiencies at minimum federal requirements and additional non-preemptive efficiency measures. Nonresidential buildings with all-electric heat pumps at minimum federal requirements will achieve this target without any additional efficiency measures.

A subset of nonresidential buildings which utilize small rooftop HVAC, like Retail, already have heat pump as the prescriptive code minimum, which achieves the same objective as the reach code applied to the nonresidential buildings. To account for this, an exception is included for nonresidential buildings that reduces the Hourly Source Energy compliance margin to 0% (the state minimum requirement) when nonresidential occupancies are designed with single zone space-conditioning systems complying with Section 140.4(a)2.

	B	T		B	T		B	T
2	Package	Source kBtu Margin (CBECC)	2	Package	Source kBtu Margin (CBECC)	2	Package	Source kBtu Margin (CBECC)
6	mo-mf-eff	10%	6	re-mf-code	-29%	6	sh-mf-eff	7%
29	mo-ae-code	5%	29	re-mf-eff	-15%	29	sh-ae-code	29%
52	mo-ae-eff	10%	52	re-ae-eff	12%	52	sh-ae-eff	14%
75	mo-ae-efflf	18%				75	sh-ae-effpv	23%
						98	sh-ae-codept	31%
			2					
			6					
			29					
			52					
			75					
			98					
			121					
			144					

Figure 4. Source energy margin results for Medium Office (MO), Retail (RE), Quick Service Restaurant (QSR), and Small Hotel (SH)

MEMORANDUM (continued)  
To: Christopher Jensen (Cupertino)

August 28, 2024

## Appendix: Single Family Building Summary of Source Energy and Other Metrics

### Evolving Compliance Metrics

The 2022 Energy Code continues improvements in energy efficiency ratings in order to pivot new residential buildings toward 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 lower than or equal to the standard Efficiency EDR and Total EDR.

The 2022 Energy Code adds a third metric to EDR for New Construction: source energy design rating ERD1 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 (EDR1)	Efficiency Energy Design Rating (EDR2)	Total Energy Design Rating (EDR Total)
A score representing the building energy efficiency expressed in terms of an <b>hourly source carbon-based metric</b>	A score representing the building energy efficiency expressed in terms of a <b>TDV energy-based metric</b>	A score representing the building's <b>total TDV energy while also factoring in photovoltaics (PV) and flexibility</b>
EDR1 includes: + Envelope + IAQ + HVAC + DHW + Unregulated loads	EDR2 includes: + Envelope + IAQ + HVAC + DHW + Unregulated loads	EDR Total includes: + 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.

Source: [Energy Code Ace – Single Family Buildings: What’s New in 2022?](#)