

Proposal Summary



Solar Heating for an Existing Pool and Spa

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Measure Description

Title 24 Part 6 sets requirements for pool heating systems. The current requirements are triggered when a new pool is built with a heating system or when an existing pool adds a heating system for the first time. The code currently requires the use of one of the following compliance options:

- solar thermal systems for pool and spa heating (excluding portable electric spas)
- heat pump pool heaters (HPPH) meeting specified coefficient of performance (COP), sizing, and controls criteria
- on-site renewable energy or site-recovered energy systems
- a combination of a solar pool heating system and heat pump pool heater without any additional supplementary heater
- or a pool heating system determined by the California Energy Commission (CEC) Executive Director to use no more energy than the previous system.

The proposed code change would expand the scope of the swimming pool and spa heating requirements to include existing nonresidential pools that are replacing an existing pool heating system. Single-family residential pools, multifamily pools, and hotel/motel pools with an existing pool heater, however, would remain exempt from these requirements and may replace their heating system with the same technology.

The proposal would also introduce a new compliance pathway: a condensing gas pool heater with a minimum efficiency of 94%. In addition, the solar sizing requirements for nonresidential existing pool heaters would be reduced to 40% of the pool surface area, compared to the 65% sizing requirement for nonresidential new construction.

The proposal would add an exception for permanent spas that lack adequate solar access roof area (SARA).

Table 1 summarizes the scope of the proposed code change.

Table 1: Scope of Proposed Code Change

An “X” indicates the proposed code change is relevant.

Building Type(s)		single family
		multifamily
	X	nonresidential
Type of Change	X	mandatory
		prescriptive
		performance
Third Party Verification	X	no changes to third party verification
		update existing verification requirements
		add new verification requirements
Construction Type(s)		new construction
	X	additions
	X	alterations
Updates to Compliance Software	X	no updates
		update existing feature
		add new feature

Justification for Proposed Change

California is home to one of the largest pool markets in the nation, and pool heating represents a major energy use—especially in nonresidential and multifamily settings where pools are often heated year-round. Expanding heating source system requirements to include alterations where the pool heater must be replaced at existing commercial pools would save pool owners significant costs and support California’s long-term decarbonization goals.

The existing code provides flexibility through compliance pathways that include solar thermal systems, heat pump pool heaters, and on-site renewable energy or energy recovery. Solar thermal systems are commercially available and reliable technology. The installation of solar thermal collectors in existing buildings with pools or spas can become the primary source of heating while enabling existing heating systems to serve as a supplementary heating source.

The proposed change would further expand compliance flexibility by adding condensing gas heating as a new pathway. Condensing gas pool heaters are high-efficiency systems that capture heat normally lost in the exhaust of a non-condensing gas pool

heaters. By cooling the exhaust gases enough to condense the water vapor back into liquid, these systems recover additional heat and use it to warm the pool water. This process is what makes condensing heaters significantly more efficient—often exceeding 90% efficiency—compared to the typical 82 or 84%-efficient non-condensing gas heater. This option is particularly beneficial for pool owners with limited roof space for solar thermal installation.

The proposed measure would build on the foundational work from the 2025 code cycle and would take a strategic step toward transforming the market.

Data Needs / Information Requests

The Statewide CASE Team is seeking the following information to inform the code change proposal. Data may be provided anonymously. To participate or provide information, please email Melissa Schellinger Gutiérrez, mgutierrez@energy-solution.com directly and copy info@title24stakeholders.com.

Energy Savings

- Estimated number of nonresidential and multifamily pools without sufficient solar access (e.g., due to shading or orientation).
- Data on space requirements for natural gas pool heaters, heat pump pool heaters (HPPHs), and typical equipment area dimensions at existing pools.

First Costs

- Detailed installation and maintenance cost data for:
 - Solar thermal pool heating systems
 - HPPH units
 - Condensing and Non-Condensing Gas Heaters
- Data to support or refine incremental costs assumptions for solar pool heating systems, including:
 - \$19,640 for pools with a 60,000-gallon capacity
 - \$113,940 for Olympic-sized pools (660,000 gallons)
- Costs associated with retrofitting existing gas pool heaters to solar thermal heating systems, HPPHs, or condensing gas heaters

Technical Feasibility

- Information on space constraints when retrofitting from gas to solar thermal systems, HPPHs or condensing gas heaters

- Minimum space requirements for installing solar thermal heating systems and HPPHs at existing pools.
- Description performance, cost, and other considerations for built systems for heat pump pool heating of large commercial pools.

Market Readiness

- The CASE Team already has sufficient data on market readiness, but stakeholders are encouraged to share any emerging market trends or relevant experience.

Non-energy Benefits

N/A

Expected Useful Life and Maintenance Costs

- Manufacturer-verified or industry-sourced data on the expected useful life of both solar thermal collectors and HPPHs
- Validation of assumed 25-year life for solar thermal heating system, consistent with assumptions reported in National Renewable Energy Laboratory's report: <https://www.nrel.gov/docs/fy16osti/66215.pdf>
- Statewide CASE Team requests information on specific experience for solar collector product lifetime

Draft Code Language

1.1 Guide to Marked Up Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2025 documents are marked with [blue underlining](#) (new language) and ~~strikethroughs~~ (deletions).

1.2 Title 24, Part 1

There are no proposed changes to Title 24, Part 1

1.3 Title 24, Part 6

SECTION 100.1– DEFINITIONS AND RULES OF CONSTRUCTION

[Nonresidential Building Occupancy Group Only - As defined by the California Building Code](#)

Group R Occupancy, and Common or Public Use Areas serving that Occupancy – Group R as defined by the California Building Code and spaces ancillary to the occupancy that are not part of the individual dwelling or sleeping units and are intended for shared common or public use including areas that support occupant use or building operations

SECTION 110.4 – MANDATORY REQUIREMENTS FOR POOL AND SPA SYSTEMS AND EQUIPMENT

(c) **Heating Source Sizing.** Heating systems or equipment for pool and/or spa shall meet one of the sizing requirements of 1 through 5 below:

1. A solar pool heating system with a solar collector surface area that is equivalent to the following:
 - A. For nonresidential and multifamily buildings, 65 percent or greater of the pool and/or spa surface area.
 - B. For single family buildings, 60 percent or greater of the pool and/or spa surface area.
2. An [electric](#) heat pump pool heater as the primary heating system that meets the sizing requirements of Reference Joint Appendix JA16.3. The supplementary heater can be of any energy source; or
3. A heating system that derives at least 60 percent of the annual heating energy from onsite renewable energy or on-site recovered energy.
4. A combination of a solar pool heating system and heat pump pool heater without any additional supplementary heater; or
5. A pool heating system determined by the Executive Director to use no more energy than the systems specified in Items 1, 2, 3, or 4 above.

Exception 1 to Section 110.4(c): Portable electric spas compliant with 20 CCR § 1605.3(g)(7) of the Appliance Efficiency Regulations.

Exception 2 to Section 110.4(c): Alterations to existing pools and/or spas with existing heating systems or equipment in Group R Occupancy Buildings and Common or Public Use Areas serving that Occupancy.

Exception 3 to Section 110.4(c): A pool and/or spa that is heated solely by a solar pool heating system without any backup heater.

Exception 4 to Section 110.4(c): Heating systems which are used exclusively for permanent spa applications in existing buildings with [natural](#) gas availability.

Exception 5 to Section 110.4(c): Heating systems which are used exclusively for permanent spa applications where there is inadequate Solar Access Roof Area (SARA) as specified in Section 150.1(c)14 for a solar pool heating system to be installed.

SECTION 141.0 – ADDITIONS, ALTERATIONS, AND REPAIRS TO EXISTING NONRESIDENTIAL, AND HOTEL/MOTEL BUILDINGS, TO EXISTING OUTDOOR LIGHTING, AND TO INTERNALLY AND EXTERNALLY ILLUMINATED SIGNS

....

(b) Alterations. Alterations to components of existing nonresidential, hotel/motel, or relocatable public school buildings, including alterations made in conjunction with a change in building occupancy to a nonresidential, high-rise residential, or hotel/motel occupancy shall meet item 1, and either Item 2 or 3 below:

1. **Mandatory Requirements.** Altered components in a nonresidential, or hotel/motel building shall meet the minimum requirements in this Section.

...

F. Pool and Spa Systems and Equipment. Existing heating systems in Nonresidential Building Occupancy Group Only shall meet the:

- i. Mandatory requirements in 110.4(a), (b) and (d); and
- ii. One of the requirements of a through f below:
 - a. A solar pool heating system with a solar collector surface area that is equivalent to 40 percent or greater of the pool and/or spa surface area;
or
 - b. An electric heat pump pool heater as the primary heating system that meets the sizing requirements of Reference Joint Appendix JA16.3. The supplementary heater can be of any energy source; or
 - c. A heating system that derives at least 60 percent of the annual heating energy from onsite renewable energy or on-site recovered energy; or
 - d. A pool heating system that relies solely on a gas pool heater(s) with a thermal efficiency equivalent to 94 percent or greater; or
 - e. A combination of a solar pool heating system, gas pool heater(s) with a thermal efficiency equivalent to 94 percent or greater, or heat pump pool heater without any additional supplementary heater; or
 - f. A pool heating system determined by the Executive Director to use no more energy than the systems specified in Items a, b, c, d or e above.

Exception 1 to Section 141.0(b)1Fii: Portable electric spas compliant with 20 CCR § 1605.3(g)(7) of the Appliance Efficiency Regulations.

Exception 2 to Section 141.0(b)1Fii: A pool and/or spa that is heated solely by a solar pool heating system without any backup heater.

Exception 3 to Section 141.0(b)1Fii: Heating systems which are used exclusively for permanent spa applications in existing buildings with natural gas availability.

Exception 4 to Section 141.0(b)1Fii: Heating systems which are used exclusively for permanent spa applications where there is inadequate SARA as specified in Section 140.10(a) for a solar pool heating system to be installed.

1.4 Reference Appendices

There are no proposed changes to the reference appendices.