



**Build It  
Green**

IN  
PARTNERSHIP  
WITH



**Pacific Gas and  
Electric Company**

# 10 Building Code Opportunities for California Local Governments

*Go beyond Title 24 codes by instituting local ordinances that help you reach your climate goals sooner and reap rewards earlier.*

The California Codes and Standards program is working in partnership with the California Energy Commission (CEC) toward achieving the state's Zero Net Energy (ZNE) policy goals. Build It Green (BIG) and the PG&E Codes and Standards team want to help cities or counties in PG&E territory\* evaluate different ordinances to:

- advance your energy efficiency and climate action goals.
- assist with template language.
- coordinate implementation training.
- provide technical assistance.

Measures that are adopted now will persist through the 2016 code cycle and prepare jurisdictions for 2019. Many local jurisdictions throughout California, including Fremont, Suisun City, San Francisco, and Sonoma, are already evaluating or have adopted policies to improve the energy efficiency of new and existing building stock.

The Codes and Standards Program is evaluating 10 residential and non-residential local ordinance opportunities. Please let us know which one(s) interest you so that we can help you reach your goals. We can also support your CALGreen Tier 1 and Zero Net Energy objectives.

**Adopting new ordinances need not be difficult or burdensome.  
Build It Green can help walk you through the process.  
Call us at 510.590.3360 x123 or email [amy@builditgreen.org](mailto:amy@builditgreen.org).**

\* Technical services are free to any city or county located in PG&E territory (2016).  
Build It Green is an Oakland-based nonprofit that works with building professionals to make homes healthy and efficient. This initiative is funded by California utility customers and administered by Pacific Gas and Electric Company (PG&E) under the auspices of the California Public Utilities Commission.

# Code Opportunities

(Choose what interests you, then call Build It Green to discuss next steps)

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## LIGHTING

### Outdoor Lighting

Non-Residential New Construction: A prescriptive ordinance for non-residential lighting has the potential to address some gaps for hardscape areas in 2016 code. LED technology has expanded significantly— offering higher efficacy products for outdoor lighting. In both the 2013 and 2016 code, Table 140.7-B Additional Lighting Power Allowances for Specific Applications, provides the allowable wattage for specific applications. A prescriptive outdoor lighting ordinance would replace Table 140.7- B with an alternative table containing lower lighting power allowances.

Specific applications can prove cost-effective to go beyond code, including the following:

- building drive-up windows
- vehicle service station uncovered fuel dispenser
- outdoor sales frontage
- hardscape ornamental lighting
- building façade
- outdoor sales lots
- vehicle service station hardscape
- vehicle service station canopies
- sales canopies
- non-sales canopies and tunnels
- guard stations
- student drop-off / pick-up zone
- outdoor dining
- special security lighting for retail parking and pedestrian hardscape

Each application will have specific lighting power allowance that would be referenced in the ordinance.

A cost-effectiveness study is required (and it is already underway) to be filed with the CEC and Building Standards Commission.

Non-Residential Retrofit: An ordinance can set an energy code trigger for projects replacing 50% or more of the existing luminaires (if five or more). The project must meet the same new construction lighting power allowances as noted above. Currently, there is a proceeding to define the energy code standards, including controls and LPA for outdoor lighting for additions and alterations. While there is great opportunity to improve lighting in existing building stock, it is complicated to evaluate the cost effectiveness.

A cost-effectiveness study is required to be filed with the CEC and Building Standards Commission. With the interest from local governments, we will work with the CEC staff to do a cost-effectiveness study that covers the project scenarios of interest.

### Indoor Lighting

The CEC anticipates reducing the allowed Lighting Power Density (LPD) for indoor lighting for the 2019 code cycle using LED technology as the basis.

Non-Residential New Construction: Require hardwired indoor lighting to meet a specific threshold below the allowed LPD.

A cost-effectiveness study is required to be filed with the CEC and Building Standards Commission.

## □ HOT WATER DISTRIBUTION

Reducing hot water distribution energy inefficiency is voluntary under the energy code, and it is an opportunity to save both energy and water.

Multifamily Central Systems Retrofit: For a domestic hot water retrofit, require installation of demand controls for central domestic hot water systems with a recirculation system.<sup>1</sup> For new construction with central domestic hot water systems, demand control is the prescriptive requirement and the basis of the Standard Budget when using the Performance Method of compliance.

A cost-effectiveness study is required to be filed with the CEC and Building Standards Commission. A CPUC-approved utility documentation of the measure savings can be leveraged to support the cost-effectiveness evaluation.

Multifamily or Single Family with Systems Serving Individual Units: The following measures can apply to new and existing, although the performance threshold for option 2 would be more challenging in existing without a significant retrofit. There are two options:

1. Require installation of an on-demand recirculation pump as defined in the CEC Reference Appendices (RA) Section 4.4.13.
2. Require projects to engineer the plumbing system to meet EPA WaterSense standards for the volume limit for hot water distribution. The water temperature at the farthest fixture from the hot water source must increase a minimum of 10° F. within 0.6 gallons (9.6 cups) of flow, resulting in a wait time of approximately 15-30 seconds.

This measure is specific to storage water heaters.

No cost-effectiveness study is required for new construction as it is a prescriptive assumption in code.

A cost-effectiveness study is required for retrofits to be filed with the CEC and Building Standards Commission. A CPUC-approved utility documentation of the measure savings can be leveraged to support the cost effectiveness evaluation for retrofits.

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## □ WATER EFFICIENCY

For the first time in state history, the Governor has directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent from 2013 levels. This mandate has increased the viability of offsetting potable water use.

### Indoor Water Use

Non-Residential and Multifamily or Single Family New Construction: Require compliance with voluntary measures of CALGreen. There are two options:

1. Dual plumb to support alternative water supply: Dual plumb building for recycled water/ gray water and potable water meeting or exceeding CALGreen voluntary section A4.305 for residential or Section A5.303.5 for non-residential.
2. Provide alternative water supply: Plumb indoor water use for non-potable water supply (rainwater, graywater or recycled water) for water closets, urinal, and other allowed uses. CALGreen Section A5.303.2.3.4 for non-residential and Section A4.303.2 for residential reference indoor water use to offset or eliminate potable water use for these applications. In the case of rainwater as the supply, it is advisable that the ordinance include a minimum volume of storage in order to ensure a meaningful contribution.

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<sup>1</sup> Workpaper Disposition for On-Demand Pump Control for Central Domestic Hot Water Systems, California Public Utilities Commission, Energy Division, SoCalGas Program [www.energydataweb.com/ode](http://www.energydataweb.com/ode), Feb. 28, 2013

## Outdoor Water Use

**Non-Residential and Multifamily or Single Family New Construction:** Provide alternative water supply: Plumb outdoor water use for non-potable water supply (rainwater, graywater or recycled water) for irrigation. For non-residential CALGreen Section A5.304.4.3 for non-residential and Section A4.304.4 or A4.304.5 for residential reference outdoor water use to offset or eliminate potable water use. The threshold can be defined as a reduction in potable water use for any building type. For multifamily or non-residential, it may be appropriate to define a minimum supply volume requirement, especially in the case of rainwater as supply.

A cost-effectiveness study is not required for indoor or outdoor water use measures. However, a justification is required to be filed with the Building Standards Commission. Additional evaluations can be provided to support feasibility of implementation.

## Commercial Kitchens

**New Construction and Retrofit:** Adopt voluntary measures of 2016 CALGreen, which address cubed ice makers, food steamers, food waste disposers, dishwashers and commercial pre-rinse spray valves. Commercial kitchen water use is primarily associated with dishwashing.

A cost-effectiveness study is not required. However, a justification must be filed with the Building Standards Commission. Additional evaluations can be provided to support feasibility of implementation.

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## COOL ROOFS

The use of cool roofs as an Urban Heat Island mitigation strategy brings many benefits, including reduced energy use, reduced air pollution, reduced greenhouse gas emissions, and improved human health and comfort. In addition, there are no additional installation costs for cool roof products.

TABLE 2. 2016 STANDARDS FOR COOL ROOFS

All Building Types, All Climate Zones	≤ 2:12 (low-slope)		> 2:12 (steep-slope)	
	SR	TE	SR	TE
Minimum Ordinance Requirement	≥ 0.63	≥ 0.75	≥ 0.20	≥ 0.75
TIER 1	≥ 0.68	≥ 0.85	≥ 0.28	≥ 0.85
TIER 2	≥ 0.70	≥ 0.85	≥ 0.34	≥ 0.85

**Non-Residential New Construction:** For new nonresidential buildings, the standards already include prescriptive requirements. Cool roofs are generally not cost-effective in the cooler coastal climate zones (3 and 4). In the more moderate Climate Zones 2-5, the cool roof requirements above are cost-effective in medium office and strip mall prototype buildings. All new non-residential buildings in the cooling-dominated climate zones (6-16) demonstrate that cool roofs are cost effective for both steep and low slope roofs.

**Non-Residential Existing Construction:** Projects in a jurisdiction with a cool roof reach code that specifies cool roof when a roof is replaced on an existing building would be required to meet either Tier 1 or 2, depending on what is adopted. Cool roofs are cost effective on existing buildings because they lack energy efficiency features such as insulation, high efficiency lighting, and HVAC equipment.

**Multifamily Low-Rise New Construction:** Steep slope cool roofs meeting either Tier 1 or Tier 2 specifications are cost effective in Climate Zones 2, 4, and 6-16. Low slope cool roofs for both tiers are cost effective in Climate zones 2-16.

**Multifamily High-Rise New Construction:** Steep and low slope cool roofs in Climate Zones 9-11, 13, and 15 do not show energy savings. Cool roofs in Climate Zones 14 (which has prescriptive requirements), 2-8, 12, and 16 may be cost effective achieving reduced annual energy consumption.

Single Family New Construction: Cool roofs, both steep and low slope, in Climate Zones 10-15 meeting either Tier 1 or Tier 2 specifications are cost effective, despite already having prescriptive requirements equivalent to the minimum ordinance level.

Non-Residential and Single Family or Multifamily New Construction: For low cooling load areas, there is an option to look at roofs more broadly and consider “better roof.” For buildings up to 10 stories, better roof requires solar-ready and for the roof to be occupied by a combination of PV, solar DHW, or living roof.

A cost-effectiveness study is required and has already been prepared by the Codes and Standards program for multiple building types and all 16 climate zones that can be used for filing with the CEC and Building Standards Commission (*Cost-Effectiveness Study for Cool Roof Draft Report for All Climate Zones* prepared for PG&E by TRC Solution, June 4, 2015).

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## ELEVATORS

Changes to the American Disability Act requirements for accessibility will likely result in elevators being installed in a higher percentage of buildings, including two-story buildings. Specifications for elevators are voluntary in CALGreen Section A5.212.1.1 for traction elevators and A5.212.1.4 for controls. An energy efficiency ordinance for elevators could include both elevator equipment type and controls.

Non-Residential and Multifamily New Construction:

1. Require installation of traction or gearless elevators, which use less energy and do not require an elevator room/penthouse in place of hydraulic elevators.
2. Require networked/destination controls to be configured to reduce “un-loaded” trips based on usage patterns.

No cost-effectiveness study is required. However, a justification must be filed with the Building Standards Commission. Additional evaluation can be provided to support feasibility of implementation.

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## ENERGY RATING AUDITS – TIME OF SALE

Non-Residential Multifamily or Single Family Existing: Require existing buildings and homes to complete an audit to evaluate opportunities for energy upgrades. For example, the City of Berkeley adopted the Energy Savings Ordinance (BESO) in Fall 2016.

A cost-effectiveness study is not required to be filed with the CEC and Building Standards Commission.

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## EXISTING RENTAL PROPERTY

For jurisdictions with a high percentage of rental properties, there is an opportunity to develop an ordinance requiring energy efficiency improvements by a date certain or other triggering activities. This ordinance should be supported by technical assistance. The energy efficiency threshold can be defined through a performance pathway or a prescriptive pathway. For example, the City of Boulder, CO, adopted SMARTRegs in 2010 with a date certain of improvement by 2019.

Multifamily or Single Family Existing: Require all rental properties to improve properties to a specified level of performance by a date certain.

A cost-effectiveness study is required to be filed with the CEC and Building Standards Commission.

Non-Residential Existing: Require tenant improvements meeting scope criteria to upgrade to 2016 Title 24 prescriptive requirements with exceptions for unique as-built situations.

A cost-effectiveness study is required to be filed with the CEC and Building Standards Commission.

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## ELECTRIC VEHICLE CHARGING STATIONS

Single Family New Construction: Require installation of a dedicated 208/240 volt branch circuit in raceway for EV charging service.\*

No cost-effectiveness study is required. However, a justification must be filed with the Building Standards Commission. Additional evaluations can be provided to support feasibility of implementation.

\*Note: There are policy issues on this measure that need to be clarified by the CEC and CPUC.

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## ELECTRIC VEHICLE CHARGING READINESS

Executive Order B-16-12, mandates that California's Zero Emission Vehicle (ZEV) infrastructure be able to support 1 million Zero Emission Vehicles by 2020 and that more than 1.5 million ZEV be on the road by 2025. The Air Resources Board has determined that it is critical that buildings are both built and retrofitted to meet this demand to support the zero emission mandate.\*

Non-Residential New Construction: Meet one of the voluntary 2016 CALGreen Tiers or an overall percentage defined in Table 1 below. 2013 CALGreen mandates that a minimum of 3% of parking spaces in new non-residential buildings with greater than 50 parking spaces be ZEV-ready with voluntary tiers set at 4% and 6% for projects with greater than 50 spaces. Projects with less than 50 spaces are exempt.

2016 CALGreen expands the requirement to buildings with 10 or more parking spaces, and requires a higher percentage of ZEV-ready spaces overall.

TABLE 1. 2016 CALGREEN ELECTRIC VEHICLE CHARGING READINESS

Total Number of Parking Spaces	Number of Required Spaces for EV	Tier 1	Tier 2
0-9	0	0	1
10-25	1	2	2
26-50	2	3	4
51-75	4	5	6
76-100	5	7	9
101-150	7	10	12
151-200	10	14	17
201 and over	6% of total	8 % of total	10% of total

Multifamily New Construction: Meet the same EV charging readiness thresholds as defined in the 2016 non-residential voluntary tiers above to align multifamily and nonresidential requirements. 2013 CALGreen requires multifamily projects with 17 or more dwelling units include 3% of parking spaces enabled for future EV installation. This is increased to 5% for prerequisite for Tier 1 and Tier 2. The requirements remain unchanged in 2016. In addition, there is an exception for multifamily projects of less than 17 units, which are not required to provide any EV spaces. If appropriate to building stock, an ordinance could be adopted that applies to multifamily buildings with 3-16 units.

No cost-effectiveness study is required. However, a justification must be filed with the Building Standards Commission. Additional evaluations can be provided to support feasibility of implementation.

\*Note: There are policy issues on this measure that need to be clarified by the CEC and CPUC.

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## SOLAR PHOTOVOLTAICS

Solar photovoltaics are becoming less expensive and can assist in reducing greenhouse gas emissions from electrical generation.\*

Non-Residential Multifamily or Single Family New Construction: Require installation of a minimum size photovoltaic system based on land use type.

A cost effectiveness study is required to be filed with the CEC and Building Standards Commission.

\*Note: There are policy issues on this measure that need to be clarified by the CEC and CPUC.

## Summary of Applications for Single Measure Opportunities

Measure	Cost Effectiveness Study	New Construction	Existing	Single Family	Multifamily	Non-Residential
Lighting	Yes	X	Yes with some exceptions			X
Hot Water Distribution	Yes	X	X	X	X	
Indoor Water Efficiency	No	X	Yes with some exceptions	X	X	X
Outdoor Water Efficiency	No	X	Yes with some exceptions	X	X	X
Commercial Kitchens	No	X	Yes with some exceptions			X
EV Charging Readiness	No	X			X	X
EV Charging Stations	No	X	X	X		
Cool Roofs	Yes	X		X	X	
Elevators	N/A	X			X	X
Solar PV	Yes	X	Yes with some exceptions	X	X	X
Energy Rating Audits	N/A		X	X	X	X
Rental Property	No		X	X	X	



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