



 OCTOBER 8 & 9  DOWNEY, CA

ET Summit Fall 2018

COMMERCIAL + RESIDENTIAL BUILDINGS

2019 Building Energy Efficiency Standards

Pathways to California's Clean Energy Goals

Christopher Meyer
Manager, Building Standards Office
California Energy Commission



Policy Drivers For Building Standards

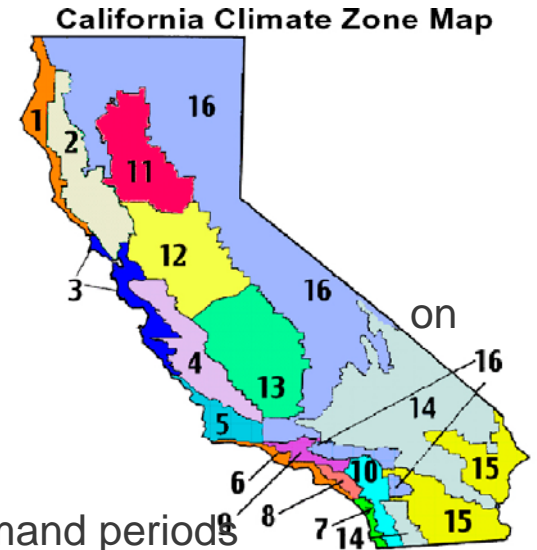
The following helped establish the goals for new building standards to either achieve zero net energy levels or reduce building-related GHG emissions:

- 2008 CPUC/CEC Energy Action Plan – ZNE for Residential buildings by 2020 and nonresidential buildings by 2030
- 2008 CARB Climate Change Scoping Plan
- 2007 (and later) CEC Integrated Energy Policy Report (IEPR)
- Governor's “Clean Energy Jobs Plan”
- 2018 AB 3232 Zero-emissions buildings and sources of heat energy

How Standards Are Updated: Life Cycle Costing

Standards measures must be cost effective!

1. Using Life Cycle Costing Methodology (LCC)
2. Time Dependent Valuation (TDV)
 - i. Value of gas and electricity changes depending the season and the time of day
 - ii. 8,760 TDV multipliers, one for each hour of the year
 - iii. Favors measures that reduce energy use during high demand periods



2019 Standards Nonresidential Measures

2019 Standards – Lighting Devices & Controls

1. Updated/Clarified and Added New Measures
 - Indoor and outdoor lighting requirements
2. Moved maximum wattage allowance to LED baseline



2019 Residential Standards – Mandatory Measures

- Updated insulation requirement for walls
- Fan efficacy for new gas furnaces updated to 0.45 w/cfm
- Small Duct High Velocity Systems now have their own fan efficacy and airflow requirements
- Air Filtration Updated:
 - MERV 13 starting filter
 - 2-inch minimum depth air filters, **OR**
 - 1-inch depth air filters if sized properly



2019 Residential Standards – Prescriptive Measures

- **Photovoltaic Systems Requirements**
- **Envelope:**
 - More efficient fenestration requirement
 - Door Insulation requirements (U-factor 0.20)
 - Quality insulation installation now a Prescriptive requirement
 - Roof Deck - Increased R-value of below deck insulation to 19
 - Wall Assembly - U-factor for framed walls now 0.048
- **Water Heating:**
 - New prescriptive options for heat pump water heaters in newly constructed buildings, additions and alterations

2019 Benefits – Path to the Future

1. Increases building energy efficiency cost effectively
2. Contributes to the State's GHG reduction goals
3. Substantially reduces the home's impact on the grid through efficiency and PV.
4. Promotes demand flexibility and self-utilization of PV generation
5. Provides independent compliance paths for both mixed-fuel and all-electric homes
6. Provides tools for Part 11 Reach Codes and other beyond code practices

Here Comes the Sun...

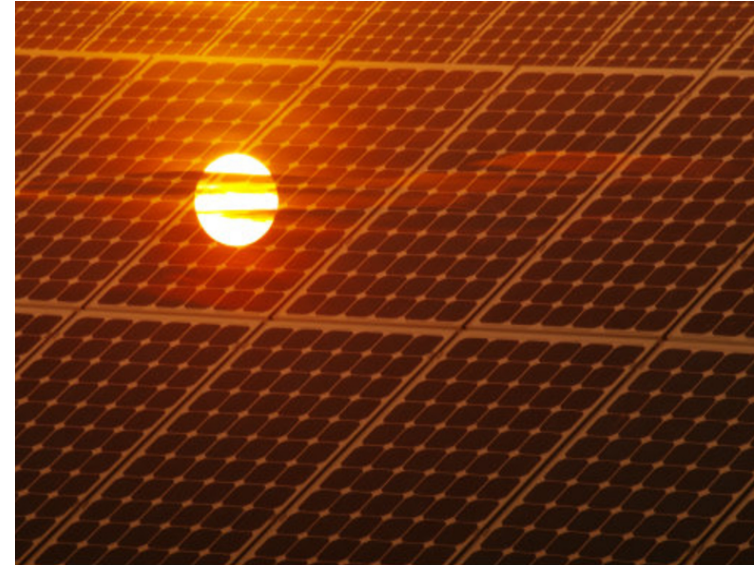
For the first time, 2019 Standards are proposed to have prescriptive solar PV systems, sized to displace the annual kWhs of a mixed-fuel home

There are several Exceptions, including:

- Shading due to external barriers
- Multi-story buildings with limited roof space

Community Solar:

Homes can instead be served by Commission approved community solar projects that provide equivalent benefits (energy savings, bill reductions, durability) to the homes as onsite PV systems.



Cool Tools

2019 CBECC-Res a powerful state-of-the art building simulation tool

Includes new tabs to evaluate real time CO2 impacts of building features, EE options, PV, and demand responsive choices:

2019_CZ12_2100ft2_Std_NGAS-2016 Features - CZ12 STD2100 EGLASS20 NGAS

2019_CZ12_2100ft2_Std_NGAS-2016 Features - CZ12 STD2100 EGLASS20 NGAS								
Compliance Summary	CO2 Emissions			Energy Design Rating	Energy Use Details	CO2 Design Rating		CO2 Details
End Use	Std Design Electric CO2 Emis. (kg)	Std Design Fuel CO2 Emis. (kg)	Std Design Total CO2 Emis. (kg)	Prop Design Electric CO2 Emis. (kg)	Prop Design Fuel CO2 Emis. (kg)	Prop Design Total CO2 Emis. (kg)	Design Rating CO2 Emissions Margin (kg)	
Space Heating	26	992	1,018	30	1,161	1,191	-173	
Space Cooling	265		265	319		319	-54	
IAQ Ventilation	33		33	33		33	0	
Other HVAC			0			0	0	
Water Heating	16	521	537	16	521	537	0	
Self Utilization Credit						0	0	

Electrified Buildings Have Lowest CO2 Emission Levels

2700 sf prototype, CZ12		
CO2 Impact of Housing Choices		Metric Tons of CO2 Emitted/yr
Mixed Fuel	2000 Compliant Building, No PV	6.5
Mixed Fuel	2016 Compliant Building, No PV	3.26
Mixed Fuel	2019 Standard Design, with 3.1 kW PV	2.29
All-Elect	2019, 3.1 kW PV	1.12
All-Elect	2019, 6 kW PV	0.46

Implication of Future Standards

Although the 2019 Standards project is a major success on many fronts, attention will be needed on the followings going moving forward:

- Move to a more GHG-based metric that promotes electrification
- Move away from equal hourly “netting” to support grid flexibility
- Maintain an energy efficiency as first priority
- Maintain PV self-utilization and demand response measures

Participate in 2022 Standards Update

Process starts with stakeholder-hosted workshops in Q4 2019 and ends with CBSC approval hearing in Q4 2021.

Main conduit for communicating with stakeholders is Building Standards List
- Sign up at: <http://www.energy.ca.gov/listservers/>

Christopher Meyer

Manager, Building Standards Office
California Energy Commission
Christopher.Meyer@energy.ca.gov
energy.ca.gov

