

DOCKETED

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2016 Building Energy Efficiency Standards



Model Solar PV Ordinance

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April 20, 2017

Local Action



Cities leading high-impact renewable energy and energy efficiency efforts in CA

- **PACE Financing for solar and efficiency**
- **Local solar incentive programs**
- **Local energy ordinances above state Energy standards**
 - Powerful tool to move toward state & local goals

Reach Codes Above State Standards



- **Cities can adopt local energy standards beyond statewide standards**
 - For new construction, additions, major alterations and/or repairs
- **Example local energy ordinances include:**
 - Increased energy efficiency
 - Cool roof mandates
 - Solar requirements for new construction
- **Energy Commission must find that the ordinance will result in a reduction of energy consumption and is cost effective before it can be enforced**

Help Achieve Local and State Goals



Local Targets

- City Climate Action Plans
- Renewable Energy Goals
- Community Choice Aggregation

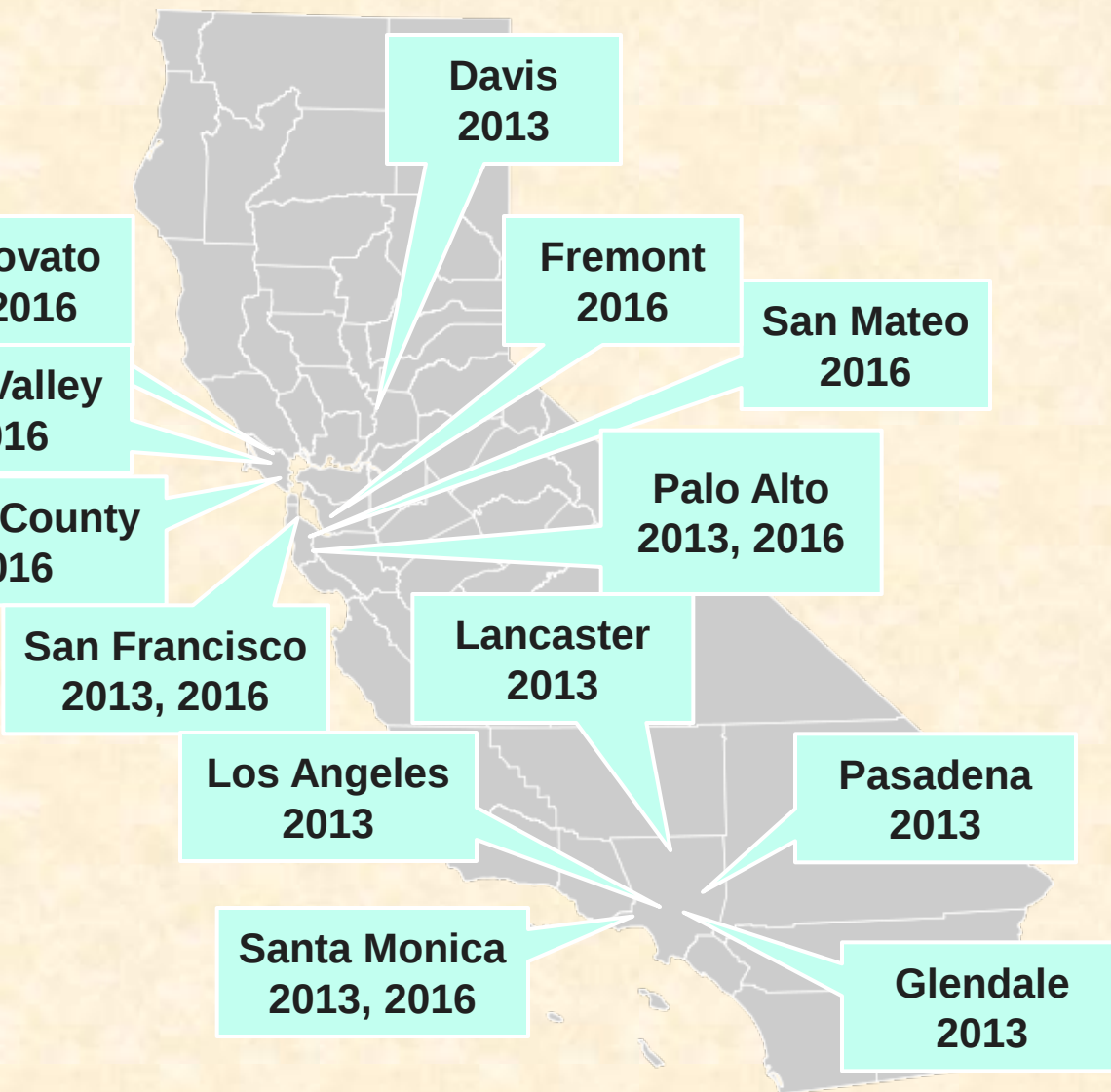
State Goals

- Solar on 50% new homes by 2019
- “Zero Net Energy” new homes 2020
- Governor’s goal of 12 GW Distributed Generation by 2020



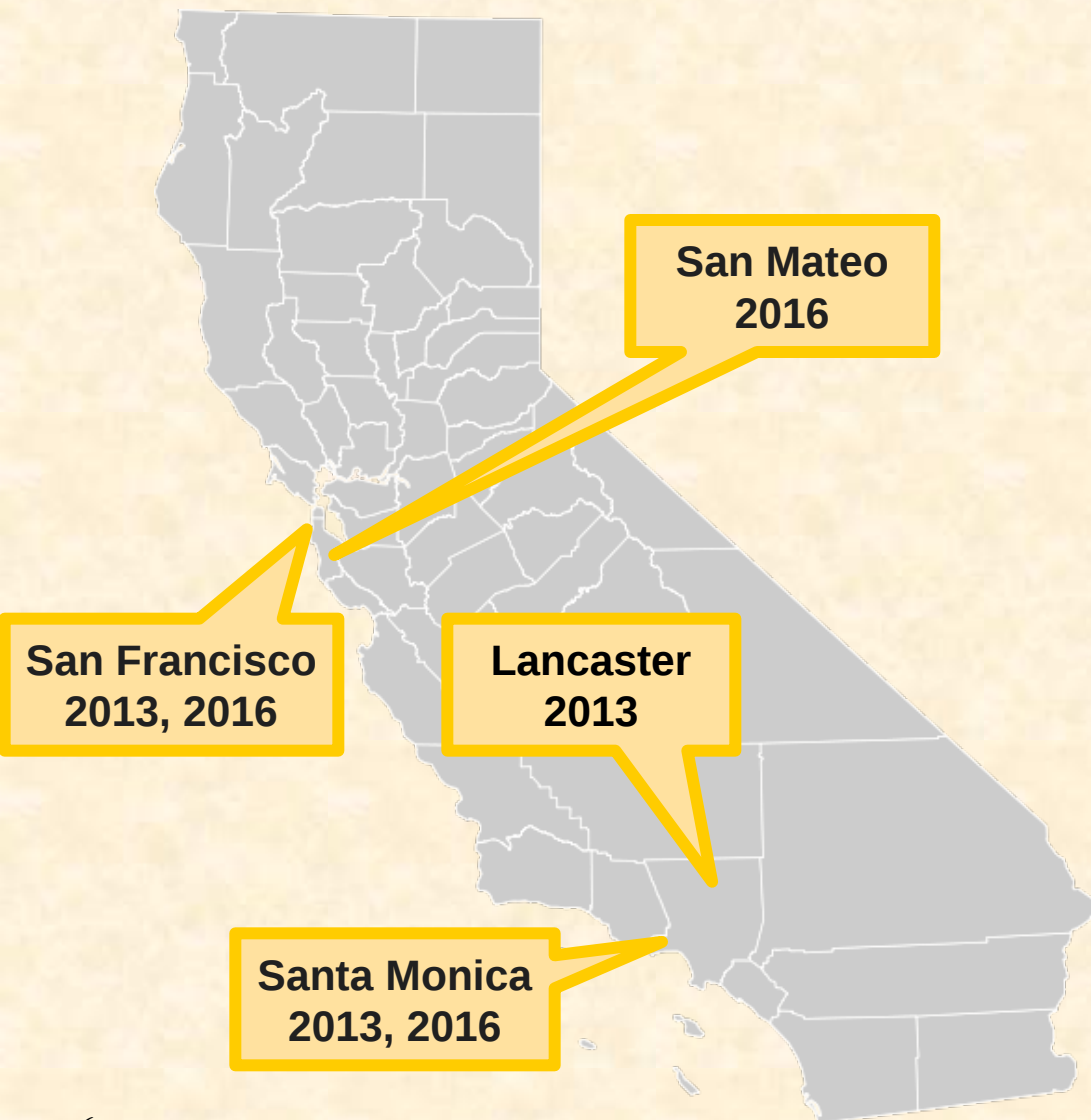
2016: Estimated approximately 17% of new CA homes built with solar (increase of 7% over 2015)

Existing Reach Codes



- Eight cities submitted local ordinances exceeding the 2013 Standards
- Eight local jurisdictions submitted ordinances exceeding the 2016 Standards
- Efficiency standards include cool roofs, lighting power reduction and targets based on TDV energy savings

Existing Local Solar Ordinances



- Several local ordinances establish solar requirements for new construction
- Additional cities considering or developing similar policies
- The model solar ordinance aims to enhance and replicate these efforts

Solar Ordinance Benefits



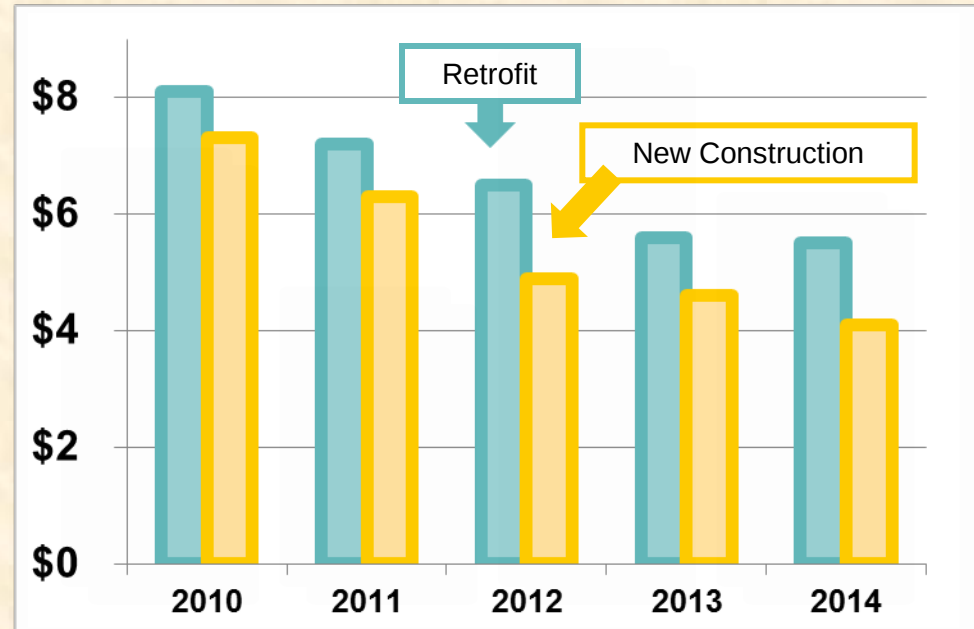
- **Increased solar access**
 - Reduce barriers to solar
 - Satisfy growing demand for clean energy
- **Energy savings for homeowners/tenants**
- **Stimulate local economy, create local jobs**



Cost- Effective in Local Jurisdictions



- **Price of solar fallen nearly 50% since 2010**
- **25% lower installation cost in new buildings ¹**
 - Economies of scale in developments
 - Shared labor/materials costs
- **Current incentive programs**
 - New Solar Homes Partnership
 - 30% Federal Investment Tax Credit (ITC)



2016 Cost Effectiveness Studies Available



➤ **Low-Rise Residential New Construction:**

- CALGreen Tiers 1 and 2 new single and low-rise multifamily projects
- Analysis of several options for requiring to meet CALGreen Tier 1 and Tier 2 specifications using either energy efficiency measures only, or a combination of energy efficiency and photovoltaic systems.

➤ **Nonresidential New Construction:**

In progress

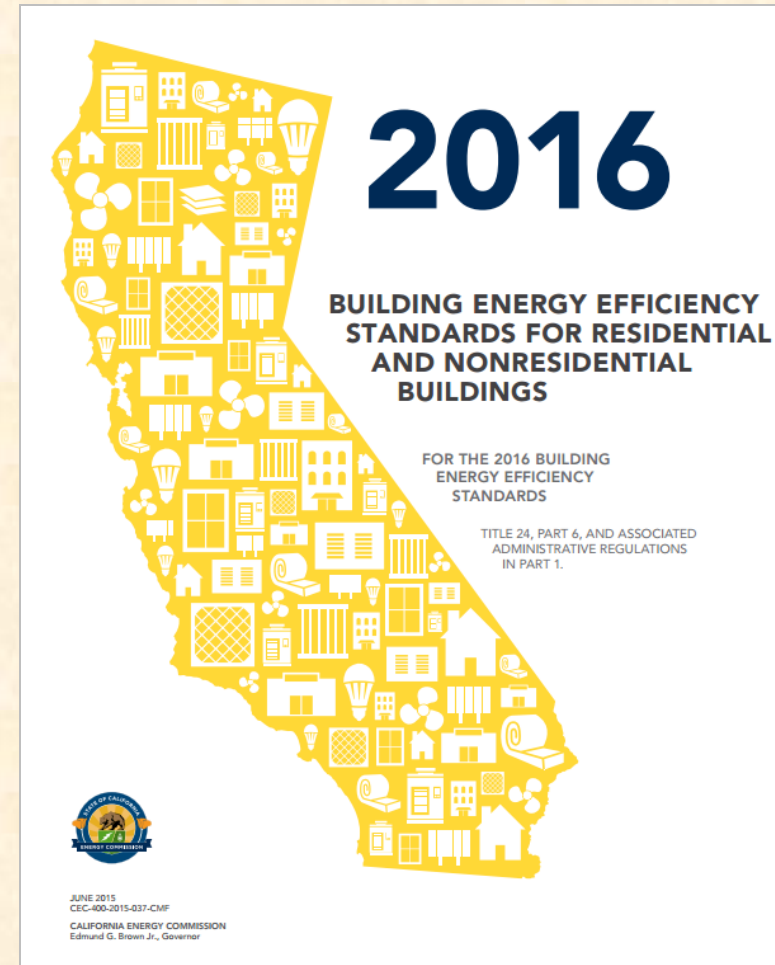
➤ **Prescriptive / Single Measure Ordinances:**

- Outdoor Lighting in Nonresidential New Construction and Retrofits
- Cool Roofs for Residential and Nonresidential New Construction and Retrofits

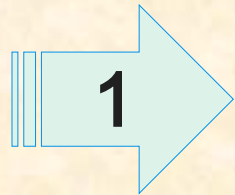
CEC Reach Code Requirements



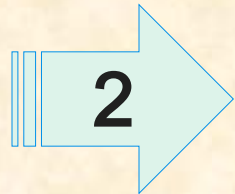
1. Proposed energy standard (ordinance)
2. Cost-effectiveness findings and analysis
3. Statement that standard will not increase energy consumption above code (should reduce it)
4. Any findings or documents required pursuant to CEQA



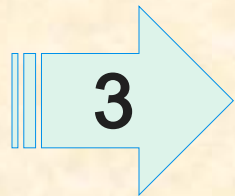
Process



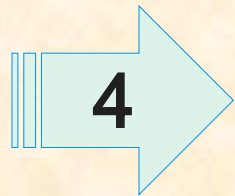
Energy Commission outreach to municipalities, introduce model ordinance, explain process



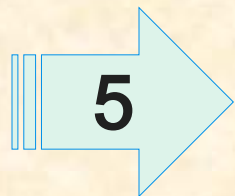
Cities modify ordinance as desired



Ordinance adoption by City Council



City submits application to Energy Commission to amend the 2016 Standards



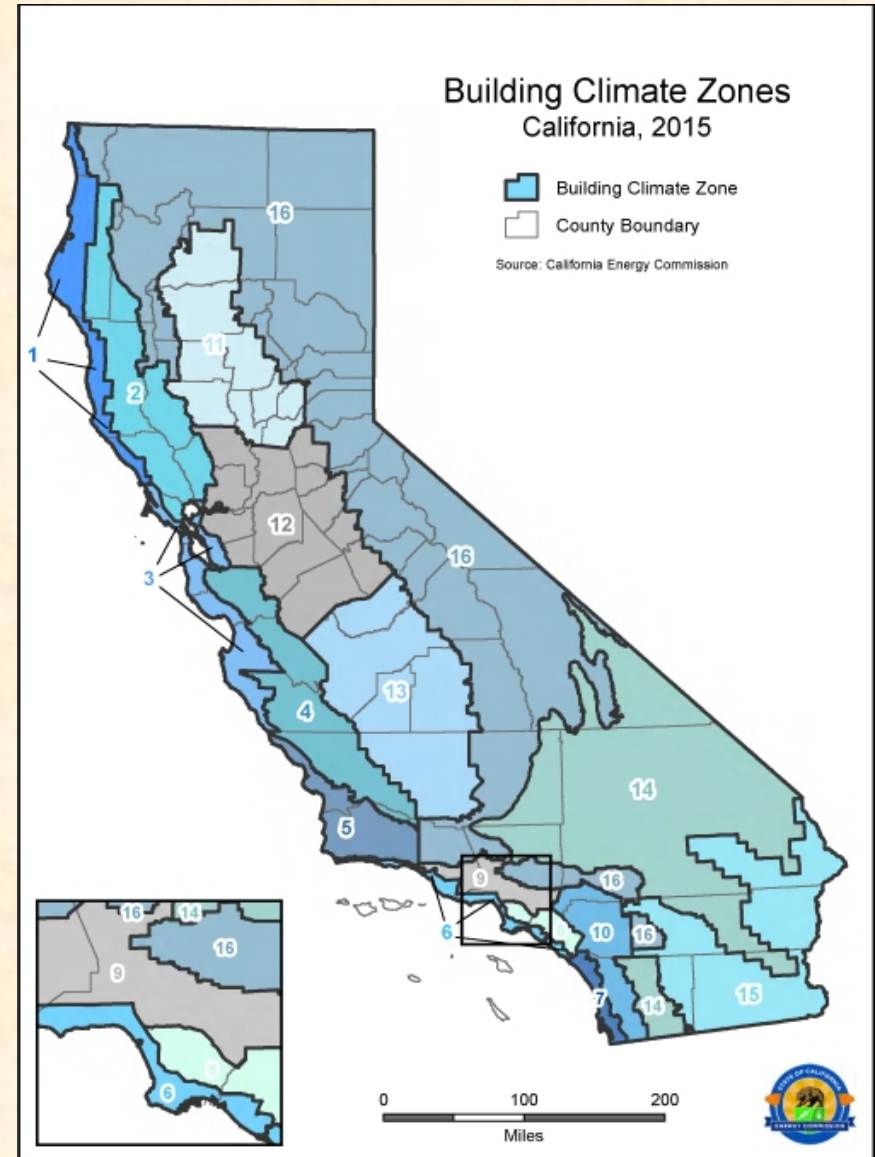
Energy Commission finding of reduction in energy consumption allows the ordinance to be enforced

Model Ordinance



Ordinance proposal includes:

- Sizing requirements tailored to city's climate zone(s)
- Exemptions and alternative compliance option
- System shading specifications
- **Basic energy efficiency requirement**



Applicable Buildings



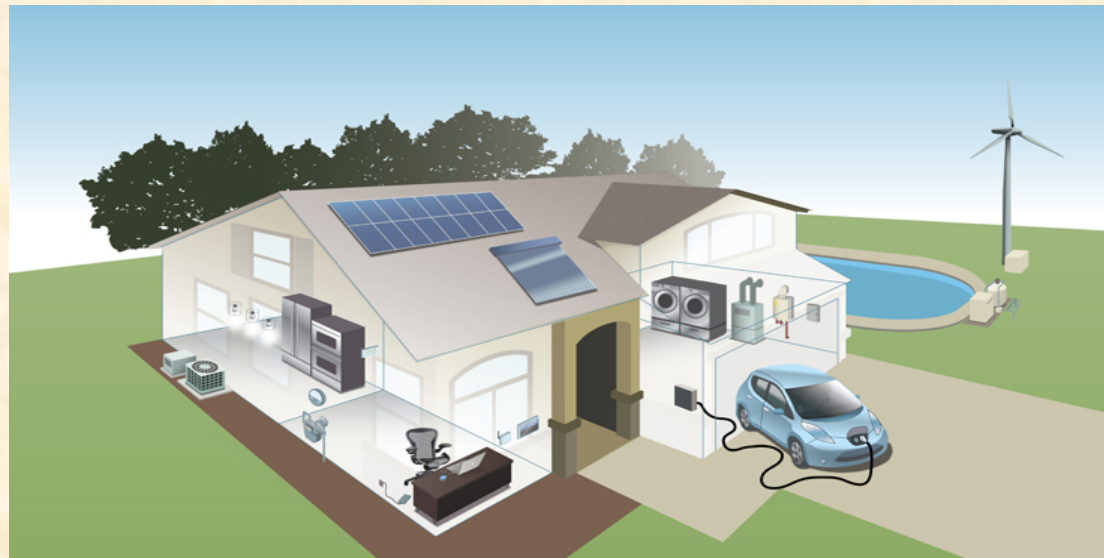
- **Applies only to new residential construction**
 - Single-family & low-rise (up to 3 stories)
 - Cities may choose to include commercial buildings, as covered in San Francisco and San Mateo's mandates
- **Building Official may provide exemption when:**
 - Sufficient practical challenges exist
 - An alternative on-site renewable energy system is installed (e.g. wind turbine)

Lessons Learned in 2019 BEES



➤ Challenges to behind-the-meter PV:

- Future of NEM compensation?
- Lack of coincidence of load and generation.
- Increasing curtailment of installed renewable generation.
- Capacity of electrical circuits.
- Cost and timing of distribution system upgrades.
- Energy Design Rating (EDR) could simplify the development future local ordinances.
- Need for Demand Response and load-following strategies.



Proposed System Sizing



- Sizing requirement tailored to city based on climate zone and energy demand
- **Prescriptive sizing 'bins'** based on square footage of home
- **Performance-based alternative** based on % TDV energy use
- Only performance-based past 4,500 ft², due to limited data for larger homes

Example Sizing Requirement:

Conditioned Space (ft2)	kW Requirement (DC)
Less than 1000	1.5
1000 - 1499	1.9
1500 - 1999	2.3
2000 - 2499	2.7
2500 - 2999	3.1
3000 - 3499	3.4
3500 - 3999	3.8
4000 - 4499	4.2

OR

Climate Zone	PV % Total TDV
CZs 14, 16	35%
CZs 1, 2, 4, 9-13, 15	45%
CZs 3, 5-8	55%

Net Energy Metering (NEM) and Rule 21



Offsetting electrical kWh (2700 sf home):

- NEM rules limit compensation based on annual electrical consumption
- Rule 21 currently allows interconnection up to 2 watts/ft²
- **Sizing to 80% of electrical load and performance-based modeling provides protection against oversizing risks.**

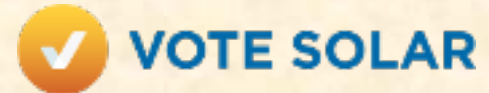
CZ	PV kW
1	2.89
2	2.46
3	2.38
4	2.36
5	2.22
6	2.38
7	2.26
8	2.46
9	2.51
10	2.58
11	3.10
12	2.58
13	3.28
14	2.73
15	4.83
16	2.37

Roles and Partners



- Energy Commission provides model ordinance with supporting cost-effectiveness analysis
- Partners with local government associations to support outreach efforts

Example Partnerships:



Ordinance Development

Outreach

Energy Commission Resources



➤ **Model Ordinance**

- Customizable by jurisdiction climate
- Incorporates key features from existing ordinances

➤ **Cost Effectiveness Analysis:**

- Cost effective in every climate zone
- Improved energy savings over baseline code

➤ **Application Guide**

- Explains how to use the resources
- Explains Energy Commission process and how to successfully navigate it

➤ Draft Documents (April 2017)

- Provide comment and vetting process for interesting stakeholders including local jurisdictions and builders.
- Draft documents can be used to start local processes and outreach.

➤ Updated Version and website (June/July 2017)

- Findings of the cost-effectiveness and savings are finalized and accepted.
- Incorporates feedback
- Links to other key local ordinance resources and pages.
- <http://www.energy.ca.gov/title24/2016standards/ordinances/>



Questions?

