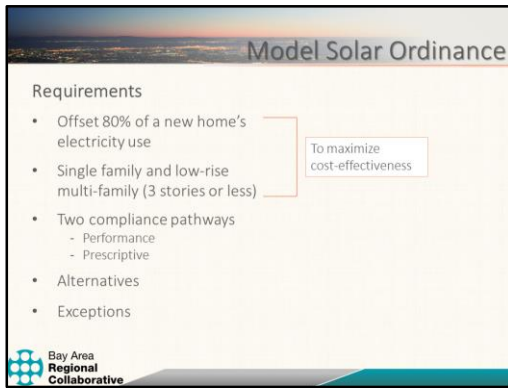


Bay Area Solar Photovoltaic Ordinance



September 22, 2017



The ordinance applies to solar photovoltaic (or PV) in new construction of single-family and low-rise (that is 3 stories or less) multifamily buildings and is designed to offset 80% of the electric load.

It offers both performance and prescriptive pathways and provides for alternatives and exceptions.

Before going into the details, let's look at the cost-effectiveness study that informed these requirements.


Cost-Effectiveness

Satisfies State requirement for cost-effectiveness

Ratepayer-funded study defines the scope of the requirements

Demonstrates 15-year payback in all climate zones

- Costs range from \$4,800 – \$12,300 per dwelling unit
- First year savings from \$361 to \$757

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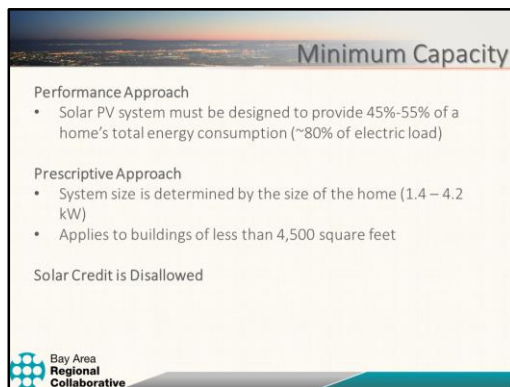
Like all local amendments to the State Energy Code, the ordinance must be approved by the CA Energy Commission. That approval is dependent upon, among others things, findings of cost effectiveness.

To expedite adoption and approval, California Statewide Codes & Standards Program completed a cost-effectiveness study that defines the scope of the requirements.

The study modeled typical new construction, then included solar PV sized to cover 80% of the electricity load. The 80% cap helps ensure that homes won't be overproducing.

The requirements are specific to each climate zone.

That quantity of solar proves to be cost-effective for all housing types affected.



The cost-effectiveness study established the solar requirement as a percentage of the home's total energy consumption, that is electricity and natural gas, which ranges from 45-55%, depending upon the climate zone. That is, the solar should cover about half of the home's total energy requirements. In order to combine electricity and natural gas demand, energy use is normalized as a time-dependent valuation (TDV) which is higher during periods of low-production and high demand.

That may be a little confusing. So let me state it another way. The ordinance requires that PV be sized to cover about ½ of the **total** projected energy requirements, including natural gas loads, which is equivalent to approximately 80% of the electricity requirements.

Consistent with the compliance pathways for the existing energy code, applicants may comply using the a performance or prescriptive method.

Under the performance compliance pathway, the applicant must demonstrate that the PV system is sized to offset 45-55% of the home's total energy use, depending upon the climate zone. This approach allows the applicant to optimize a balance of energy efficiency and PV.

It is important to note that applicants may not use the PV credit of the Energy Code to achieve compliance. The PV credit normally allows some building types to trade off efficiency with PV.

Alternatively, applicants may use a prescriptive approach for smaller buildings, and simply include a specific quantity of PV based on the size of the building. The values for each climate zone are specified in the cost-effectiveness study.

The slide features a header with a sunset cityscape and the title "Other Considerations". Below the title is a bulleted list of requirements. At the bottom left is the logo for the Bay Area Regional Collaborative, and at the bottom right is a small number "5".

Other Considerations

- Minimum shading requirement
 - No obstructions, on site or adjacent
 - Not oriented to the north
- Maintains interconnection pathway for 100% of solar zone
- Developer must offer prospective buyer larger system, sized for 100% of electric load

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The ordinance has several other requirements.

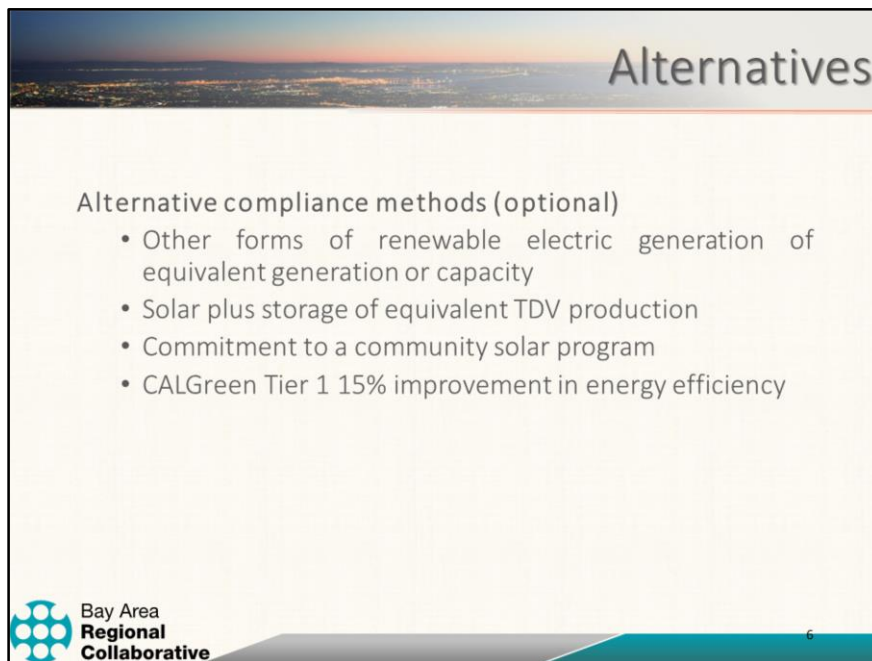
The array must not be oriented to the north.

And it must be unobstructed and unshaded.

Both of these requirements are very specifically defined in the text.

The pathway for interconnection must be sized for the full capacity of the solar zone. The solar zone is a provision of the existing State energy code that specifies a minimum amount of unshaded roof space for future solar installations and an interconnection pathway. The ordinance requires that if the solar requirement is less than the capacity of the solar zone, the pathway be sufficient to carry the full capacity of the solar zone.

Finally, the developer must offer buyers the option of expanding the system so that it will cover 100% of the electricity requirements. This is important to accommodate electric vehicle charging.



The model ordinance includes alternative compliance methods. These alternatives are optional. Cities may wish to consider whether they are consistent with local policy and priorities.

If included in the ordinance, the applicant may use these alternative methods to satisfy the requirements (there is an important caveat for the last alternative which I will get to in a moment).

The first alternative specifies that other on-site forms of renewables with equivalent capacity or output may satisfy the requirements. This specifically includes ground-mounted solar structures and wind turbines. If this is inconsistent with local policy, it should be deleted or edited appropriately.

The second enables a PV system to be downsized if storage is included. The storage and PV must be sized to deliver the equivalent production, in terms of time-dependent-valued energy.

The third alternative allows for participation in a City-approved community solar program. This option may be worth considering if shading is a big concern in the

community and if the community, or CCA, is planning to develop a community solar program.

Alternatives, continued

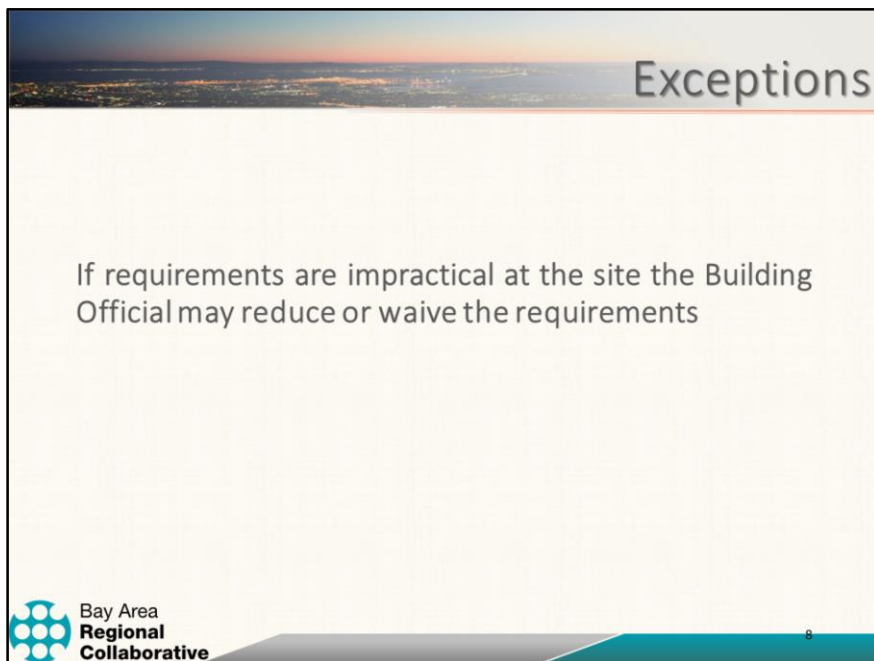
CALGreen Tier 1 15% energy efficiency improvement

- Required if PV requirement cannot be met due to practical challenges
- Does not apply to multifamily in climate zones 3 and 4
- Based on CALGreen cost effectiveness study

The last alternative is a little more complicated in that it only applies if the required PV cannot be installed for practical reasons, such as shading, and in that case, it is required.


This alternative, which is supported by a separate cost-effectiveness study, requires that the building be designed to meet the Tier 1 energy efficiency requirements of CALGreen, that is 15% more efficient.

This alternative does not apply to multifamily buildings in climate zones 2 and 3 where it was not found to be cost-effective.




And finally, like most local codes, the ordinance also provides the Building Official with broad authority to waive or reduce the requirements based on specific conditions.

All-in-all, the ordinance is quite simple, in-line with existing energy code processes and economically beneficial to the owners.



Why Develop a Toolkit?

- Provide support to city/county staff with variable resources and expertise
- Describes benefits of ordinance to stakeholders
- Offers time-saving, editable templates



Bay Area Solar PV Toolkit

- Chapter 1 -- Toolkit Overview
- Chapter 2 -- User Guide
- Chapter 3 -- Bay Area Solar PV Ordinance
- Chapter 4 -- Cost-effectiveness Study
- Chapter 5 -- Getting the Ordinance Adopted
- Chapter 6 -- Outreach Materials
- Chapter 7 -- Program Support

Chapter 1—Toolkit Overview

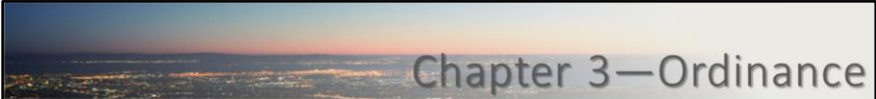
- Overview of the Toolkit!
- Benefits of using a toolkit



Chapter 2—User Guide

- Background on State codes
- Relationship between state energy and building codes and local reach codes
- Examples of solar reach codes
- Emerging renewable energy policies





Chapter 3—Ordinance

- Instructions
- Download template to customize:
 - Findings
 - Jurisdiction Name
 - Climate Zone(s)
 - Dates

Chapter 4 – Cost-Effectiveness

- Using the Cost-Effectiveness Study
- Pacific Gas & Electric Study



Chapter 5—Getting the Ordinance Adopted

- Local Adoption and State Approval Guide
 - Step-by-step guidance
- Staff report template
 - Staff recommendation/Background
 - Ordinance requirements
 - Fiscal impact
 - CEQA statement
- Transmittal letter template to the California Energy Commission



Chapter 6—Outreach Materials

Chapter 6 -- Outreach Materials

- Slide presentation and talking points
- Frequently asked questions



Chapter 7—Program Support

Possible Topic Ideas

1. Detailed Run-Through Cost Effectiveness Study that supports this one 80%; In-Depth Review of Cost Effective Study for Bay Area Solar Ordinance PV
2. State Energy Codes: Other Cost-Effectiveness Studies supporting solar requirements
3. Possible future enhancements to Bay Area Solar PV ordinance
4. Outreach and community engagement strategies
5. Customization of ordinance (for local conditions)
 - Findings
 - Options and alternatives



Chapter 7—Program Support

1. Hands-on Support

- Bi-Monthly Work Sessions
- Collaborate with participating jurisdictions
- Co-host with technical experts

2. Continue to Build Content (and share it!)

- Shape hands-on support and toolkit with jurisdictions' feedback
- Spread word on timely solar-related events and resources

3. Build Community


- Connect jurisdictions via in-person and remote events



Bi-Monthly Work Sessions

Possible Topic Ideas

1. In-Depth Review of Cost Effective Study for Bay Area Solar Ordinance PV
2. State Energy Codes: Review of other Cost-Effectiveness Studies supporting solar requirements
3. Possible future enhancements to Bay Area Solar PV ordinance
4. Outreach and community engagement strategies
5. Customization of ordinance (for local conditions)
 - Findings
 - Options and alternatives




Next Steps

Request for Feedback


- List of topics for work sessions

Bi-Monthly Work Sessions Schedule



Thank You!

<http://www.baaqmd.gov/solartoolkit>



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