California Solar Permitting Guidebook
Improving Permit Review and Approval for Small Solar Systems

State of California
Gavin Newsom, Governor

Governor’s Office of Planning and Research
Kate Gordon, Director

Project Managers
Trelynd Bradley Bowles, Governor’s Office of Planning & Research
Leah Fisher, Governor’s Office of Planning & Research

Lead Contributors
California Building Standards Commission
California Department of Housing and Community Development
California Office of the State Fire Marshal
California Solar & Storage Association
City of Los Angeles
Mar Structural Design
Center for Sustainable Energy
Sustainable Energy Action Committee

Published Winter 2019
Fourth Edition (updated)
# TABLE OF CONTENTS

PREFACE .............................................................................................................................................................. 4
ACKNOWLEDGMENTS ......................................................................................................................................... 5
PURPOSE AND USE OF THIS GUIDE .................................................................................................................. 6

## Part 1

CURRENT LAWS, REGULATIONS AND CODES ............................................................................. 8
- State Code Requirements................................................................................................................................. 8
- Limits on Local Modifications.......................................................................................................................... 8
- Permit Fees.................................................................................................................................................... 11

## Part 2

THE PROJECT APPROVAL PROCESS .......................................................................................... 12
- Permit Application and Plan Review ............................................................................................................ 12
- Site Inspection.................................................................................................................................................. 15
- Local Utility Approval (Solar PV systems only)............................................................................................. 16

## Part 3

RECOMMENDATIONS FOR EXPEDITED PERMITTING FOR SMALL PV SYSTEMS ..................... 18
- PV Toolkit for Local Governments.................................................................................................................. 21
  1) Submittal Requirements Bulletin — Solar Photovoltaic Installations 10 kW or Less............................... 22
  2) Eligibility Checklist for Expedited Solar Photovoltaic Permitting .......................................................... 25
  3) Solar PV Standard Plan — Simplified Central/String Inverter Systems ............................................... 26
  4) Solar PV Standard Plan — Simplified Microinverter and ACM Systems ............................................... 38
  5) Structural Criteria for Residential Rooftop Solar Energy Installations .................................................. 45
  6) MOU Regarding Solar Photovoltaic Plan Review and Inspection Services ......................................... 55
  7) Inspection Guide for PV Systems.............................................................................................................. 57

## Part 4

RECOMMENDATIONS FOR EXPEDITED SOLAR WATER HEATING INSTALLATIONS .............. 65
- SWH Toolkit for Local Governments............................................................................................................ 68
  1A) Submittal Requirements Bulletin — Solar Domestic Water Heating Installations 30 kWth or Less .... 69
  1B) Submittal Requirements Bulletin — Solar Pool Heating Installations 30 kWth or Less .................... 71
  2A) Eligibility Checklist for Expedited Solar Domestic Water Heating Permitting ............................... 73
  2B) Eligibility Checklist for Expedited Solar Pool Heating Permitting .................................................. 74
  3A) Solar Domestic Water Heating Standard Plan ....................................................................................... 75
  3B) Solar Pool Heating Standard Plan ......................................................................................................... 76
  4) Structural Criteria for Residential Rooftop Solar Energy Installations .................................................. 79
  5A) Inspection Guide for SDWH Systems ..................................................................................................... 89
  5B) Inspection Guide for Solar Pool Heating Systems ................................................................................ 92

## Part 5

RESOURCES AND INFORMATION ............................................................................................................ 93
- Understanding the Code ................................................................................................................................. 93
- Code Requirements for Solar Photovoltaic (PV) Systems ......................................................................... 93
- Code Requirements for PV on Buildings other than One- and Two-Family Dwellings ........................... 98
- Code Requirements for Solar Water Heating (SWH) Systems ................................................................. 106
- Glossary ....................................................................................................................................................... 109
- Additional Resources ................................................................................................................................... 111
PREFACE

California is a world leader in renewable energy generation. Solar and wind power, as well as emerging technologies such as biomass and fuel cells, are transforming California. Renewable energy is helping to power the state’s economy, reducing our state’s reliance on imported energy sources and decreasing air pollution.

California’s state and local governments have set aggressive goals to expand renewable energy. In 2011, California adopted a Renewable Portfolio Standard (RPS) requiring that at least one-third of the state’s electricity come from clean energy sources by 2020. The California RPS program was established in 2002 by Senate Bill (SB) 107 (Sher, 2002) with the initial requirement that 20% of electricity retail sales must be served by renewable resources by 2017. The program was accelerated in 2006 under SB 107 (Simitian, 2006), which required that the 20% mandate be met by 2010. In April 2011, SB 2 (1X) (Simitian, 2006) was signed into law, which codified a 33% RPS requirement to be achieved by 2020. In 2015, SB 350 (de León, 2015) was signed into law, which mandated a 50% RPS by December 31, 2030. SB 350 includes interim annual RPS targets with three-year compliance periods. In addition, SB 350 requires 65% of RPS procurement must be derived from long-term contracts of 10 or more years. In 2018, SB 100 (de León, 2018) was signed into law, which again increases the RPS to 60% by 2030 and requires all state’s electricity to come from carbon-free resources by 2045. SB 100 took effect on January 1, 2019, reinforcing California’s role as a clean energy leader with an aggressive RPS.

Small-scale renewable energy benefits California communities. It increases energy reliability for residents and businesses by generating electricity near where it is consumed. This type of energy can also provide stable electricity prices for consumers and creates thousands of jobs across California.

In order to expand small-scale renewable energy across California, the Governor’s Office of Planning and Research (OPR) was instructed to help remove barriers to its development. One such barrier is the patchwork of permitting requirements for small solar installations throughout the state. Solar energy systems have been installed in California for decades, and their technology, as well as the methods to install and maintain them, is well established. As a result, permitting for these small and simple solar projects should be as simple and standardized as possible.

The first California Solar Guidebook was published in 2012. It was the result of a collective effort of stakeholders from local government, the building industry, professional associations, solar companies, utility providers and state regulatory agencies. Many local permitting agencies adopted practices and standard documents outlined in the Guidebook. These practices made installing solar less expensive and increased expansion of this technology in California.

Despite these improvements, however, costs to permit solar are still higher than necessary. Increased solar adoption has inundated many jurisdictions with permit applications and inspection requests. Solar technologies have changed; new laws have been passed; and codes have been revised. This second edition of the Guidebook addresses those changes, improves upon the recommended process for expedited permitting of solar PV systems, and adds information about solar water heating systems.
ACKNOWLEDGMENTS

Updates to this Guidebook were developed in collaboration with the following individuals and organizations.

Ken Alex, Jeff Mankey, Carolyn Angius, Jake Buffenbarger, Samuel Diaz, Sandy Goldberg
Jennifer Allsen
Greg Andersen
George Apple
Mark Baldassari, Leo Patnode
Alan Fields
Bill Brooks
Larry Brugger
Steve Burger
Kelly M. Sherley
Emilio Camacho, Eli Harland
Kyle Krause, Beth Maynard, Richard Weinert, Emily Withers
Nicholas Chaset
Val Anderson, Daniel Chia, Michael Galvez, Hilary Wall, Rick Hanson
Sachy Constantine, Claudia Eyzaguirre, Tamara Gishri, Sarah Smith, Skip Fralick
Jason Crapo
Wade Crowfoot
Andy Davidson
Bernadette Del Chiaro, Kelly Knutsen
Tom Enslow
Adams Broadwell
Gary Gerber
Sharon Goei
Mark Goodman
Petec Guisasola
Daniel Hamilton
Alison Healy
Don Hughes
Peter Jackson
Steve Jones
Mostafa Kashe
Janice Kluth
Sheila Lee
Brian Leong
Greg Magofna and Sarah Moore
Jeff Mathias
Tom McCalmont
Ed Murray
Jim McGowan, Michael Nearman, Enrique Rodriguez
Les Nelson
Kimberly Martin, Stephanie Nicholas, Vince Nicoletti
Susan Oto
Matthew Patti
Rhonda Parkhurst
Vance Phillips
Michael Quirroz
Bob Raymer
Patrick Redgate
Kevin Reinerton
Rick Renfro
Glenn Schainblatt
Bill Stewart
John Taecker
Brandon Treloar, Walker Wright
Scott Wetch
Larry Williams
John Wolfe
Osama Younan, Behzad Eghtesady
Thomas Yurysta
Robert Woods
Eddie Bernacchi
Brandon Carlson
Adam Gerza
Shawn Martin
Patrick Healy
Nancy Springer
Martin Redmond
Jose Macias
Governor’s Office of Planning and Research
Solar Nexus
Office of the State Fire Marshal
CSD Solar
Enphase Energy
Sungevity
Brooks Engineering
City of Folsom
California Building Officials (CALBO)
California Building Officials (CALBO)
Department of Housing and Community Development
California Public Utility Commission
SolarCity
Center for Sustainable Energy
Contra Costa County
Governor’s Office
Unirac
California Solar & Storage Association
Sun Light & Power
City of Santa Clara
CEE
Bureau Veritas
ABAG
City of San Francisco
Santa Clara County
City of Bakersfield
City of Oceanside
Los Angeles County
City of Chula Vista
City of Santa Clara
City of Fresno
City of Berkeley
Synergy Solar
McCalmont Engineering
Aztec Solar
Building Standards Commission
IAPMO
San Diego County
Sacramento Municipal Utility District
San Jose Fire Department
City of Palo Alto
City of San Ramon
3rd Wave Consulting
California Building Industry Association
AMECO Solar
Riverside County Fire Department
City of Elk Grove
City of Sebastapol
SolarCraft
Underwriters Laboratories
Sunrun
Carter, Wetch and Associates
Steel Framing Industry Association
Mar Structural Design
City of Los Angeles
Optony
City of Concord
National Electrical Contractors Association
New Day Solar
Sullivan Solar
International Code Council
County of San Diego
County of Butte
City of Palo Alto
UC Davis Policy Intern
**PURPOSE AND USE OF THIS GUIDE**

This Guidebook is designed to help local governments and their permitting agencies improve permitting of small solar energy systems. It is also designed to help building owners and solar installers navigate permitting as efficiently as possible. Practices recommended in this Guidebook apply to permitting agencies of all sizes. The Guidebook is also written for permit applicants with all levels of expertise.

The Guidebook is organized into five main sections.

**Part 1: CURRENT LAWS, REGULATIONS AND CODES**: This section explains current legal requirements for solar installations in California.

**Part 2: THE PROJECT APPROVAL PROCESS**: This section describes important aspects of permit review and project inspection.

**Part 3: RECOMMENDATIONS FOR EXPEDITED LOCAL SOLAR PERMITTING**: These sections recommend a streamlined local permitting process for small, simple solar PV and solar water heating installations (including both solar domestic water heating [SDWH] and solar pool heating [SPH]) and provide standard forms that can be used to streamline permitting.

**Part 4: RESOURCES AND INFORMATION**: This section provides informational materials that can help local governments clarify current state requirements for all solar installations.

The Guidebook concludes with a glossary of terms and a list of helpful information sources for local governments and permit applicants.

This Guidebook focuses on the permit review and approval to install a rooftop solar system. It does not address zoning, land use approvals or environmental review that may be required for larger solar projects.

This Guidebook addresses both solar photovoltaic (PV) and solar water heating (SWH) technologies. These technologies have many fundamental similarities, as well as several important differences. Where requirements are discussed that apply to only one of these technologies, the text will note this.

In the course of the Guidebook, several types of solar installation are discussed, including systems on residential and commercial building rooftops, in parking lots and on parking structures and mounted on the ground. It is important to note that each installation type has a certain set of installation requirements. In addition, rooftop installations have some differing requirements depending on whether they are installed on a commercial or residential building.

The toolkit sections of this Guidebook recommend an expedited permitting process for simple PV systems 10 kilowatts (kW) or less and a process for SWH systems 30 kilowatts thermal (kWth) or less. An expedited permitting process refers to streamlining the permit process for simple, typical solar installations so that permits can be issued in an “over-the-counter” or similar manner.
This Guidebook uses the terms expedited and streamlined synonymously. These thresholds capture approximately 90% of the solar systems that are currently being installed. Above this size threshold, a system’s design considerations become more complex.

Assembly Bill 2188 (Muratsuchi, 2014) requires jurisdictions to adopt an expedited permitting process that “substantially conforms” with that laid out in Parts 3 and 4 of this Guidebook. Jurisdictions may modify these documents as specified and should review these sections of the Guidebook for a more detailed discussion of this process.

An electronic version of this Guidebook that includes clickable links to Internet resources can be found on the websites of several California entities: The Governor’s Office of Planning and Research, California Building Standards Commission, Office of the State Fire Marshal, California Department of Housing and Community Development and Center for Sustainable Energy.