

A New Solar Landscape

Improving County-Level Landscape Planning for
Utility-Scale Solar PV Facilities

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THE EMMETT INSTITUTE
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About this Report

This policy report is the nineteenth in a series on how climate change will create opportunities for specific sectors of the business community and how policy makers can facilitate those opportunities. Each report results from workshop convenings that include representatives from key business, academic, and policy sectors of the targeted industries. The convenings and resulting policy reports are sponsored by Bank of America and produced by a partnership of UCLA School of Law's Emmett Institute on Climate Change and the Environment and the UC Berkeley School of Law's Center for Law, Energy & the Environment.

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This report and its recommendations are solely a product of the UCLA and UC Berkeley Schools of Law and do not necessarily reflect the views of all individual convening participants, reviewers, or Bank of America.

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Glossary of Terms

Assembly Bill 32 (Nuñez, 2006): California law that sets out the state's initial goal of reducing greenhouse gas emissions to 1990 levels by 2020.

Assembly Bill 617 (C. Garcia, 2016): California law that improves community air quality by increasing air monitoring and penalties imposed on polluters.

Assembly Bill 1451 (Leno, 2008): State law that creates property tax exemptions for certain solar energy systems.

Brownfield: A former industrial or commercial site that has been contaminated by past activities, leading to cleanup requirements and/or restrictions on future development.

California Air Resources Board: An entity within the California Environmental Protection Agency responsible for maintaining clean air and combating climate change, including enforcement of the state's greenhouse gas reduction laws.

California Energy Commission: The state's primary energy policy and planning agency, with roles including developing and enforcing energy efficiency standards, administering an energy research and development program, and supporting the development of alternative and renewable fuel sources.

California Environmental Quality Act: California law requiring state and local governments to identify and mitigate the environmental impacts of projects they undertake, fund, or approve.

California Independent System Operator: An independent, non-profit grid operator responsible for maintaining the reliability and accessibility of much of California's power grid.

California Public Utilities Commission: California's agency in charge of regulating investor-owned electrical and natural gas utilities. The agency also regulates telecommunications, water and sewer utilities, railroads, and steam and petroleum pipeline investor-owned utilities.

Community Choice Aggregation: A program that allows cities, counties, or groups of cities and/or counties in California to purchase and supply electricity to customers within their boundaries.

Community Benefit Program/Agreement: A plan or contract by which a project developer commits to deliver certain benefits to the community in which the project is located, such as job training or development fee payments.

Desert Renewable Energy Conservation Plan: A landscape-level plan that sought to facilitate the development of renewable energy resources while protecting biological, cultural, and recreational values over 22.5 million acres of California desert.

Distributed Generation: Electricity generation that is on-site or in close proximity to the power-consuming facility and is interconnected to the utility distribution system.

General Plan: A local government's comprehensive guidance document for future development and land-use planning.

Governor's Office of Planning and Research: A state body within the office of the Governor that serves as long-range planning staff, with a focus on environmental and land-use policies.

Investor-Owned Utility: A privately owned electric company that in California is regulated by the Public Utilities Commission.

Megawatt: A unit of power that is equivalent to one million watts, generally considered as able to provide sufficient power in any given moment to serve approximately 750 households.

Metropolitan Planning Organization/Regional Transportation Planning Agency: A regional organization that allows local governments to collaboratively plan infrastructure projects that cross multiple jurisdictions.

Power Purchase Agreement: The primary instrument by which utilities acquire power from third-party providers.

Publicly Owned Utility: A non-profit electric utility that is owned by a local government or customers of the utility and is subject to local public control and regulation.

Renewable Energy Transmission Initiative: A California interagency process to identify renewable energy zones that can be developed cost effectively and with the least environmental impacts.

Renewables Portfolio Standard: The legal requirement that a specific percentage of California's retail electrical power comes from eligible renewable energy resources

Senate Bill 32 (Pavley, 2016): California law requiring statewide greenhouse gas emissions to be reduced 40% below 1990 levels by 2030.

Senate Bill 100 (De León, 2018): California climate and clean energy legislation that increases the Renewables Portfolio Standard to 60% by 2030 and calls for 100% greenhouse gas-free electricity by 2045.

Senate Bill 350 (De León, 2015): California climate and clean energy legislation that sets the Renewables Portfolio Standard at 50% by 2030.

Senate Bill 535 (De León, 2012): California law requiring at least 25% of cap-and-trade proceeds to be directed to projects that benefit disadvantaged communities, and at least 10% to projects located in those communities.

Utility-Scale Solar PV: Electricity generation facilities that generate power by means of solar photovoltaic panels for sale into the general electrical grid.

Transmission Planning Process: The California Independent System Operator's analysis of state electricity transmission grid upgrades and expansions needed in order to meet projected demand.

Williamson Act: California law allowing local governments to grant property tax abatements to private landowners in exchange for restricting parcels to agricultural or open use.



Executive Summary

California is committed to achieving a greenhouse gas-free electricity grid by 2045. This landmark goal will require the deployment of a significant amount of new renewable energy facilities in the state in coming decades. In particular, the state will likely need to incorporate thousands of megawatts of new solar photovoltaic (solar PV) generation capacity into its electrical grid, given that analysts project solar PV to continue its recent dominance as the most cost-effective renewable energy technology to achieve the state's renewable energy targets.

The increase in solar PV generation will entail large, new facilities to be located throughout California, bringing both benefits and potential attendant conflicts over their location. In addition, these new facilities will require construction of associated infrastructure, such as transmission grid connections and substations, in order to serve electricity consumers throughout the state. As a result, county governments, which have primary land use authority over many of these decisions, along with the cities located within their boundaries, will need tools to help improve siting processes and outcomes. The state government also has an incentive to assist these local processes, given the obligation to achieve state climate and energy goals in a cost-effective and timely manner.

Focus: Why Utility-Scale Solar PV?

California's renewable energy requirements (discussed in greater detail in the next section) qualify a wide range of non-fossil fuel sources of energy:

[B]iomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current.¹

According to recent analyses, utility-scale solar PV is the most cost-efficient form of renewable generation other than wind, and some utilities are already selecting these two sources over natural gas and coal plants based on cost alone.² Some participants at the convenings underscored the importance of continued investment in distributed (i.e., rooftop and small-scale) generation for solar penetration and system resiliency. But due

Senate Bill 100

In September 2018, Governor Brown signed SB 100 (De León, Chapter 312, Statutes of 2018), which increased the Renewables Portfolio Standard to 60% by 2030 and set a target of 100% zero-carbon energy by 2045. The landmark law makes California the largest jurisdiction in the world to enact a 100% target and ensures that the need for new utility-scale solar PV will increase and continue in the coming decades.

Utility-Scale Solar PV Defined

Solar PV technology uses panels or films composed of materials such as silicon to convert sunlight directly into energy. Utility-scale solar PV facilities generate energy that is sold to a retail distributor of electricity, typically an investor- or publicly owned utility, which resells the energy to multiple commercial and residential customers via the electrical grid (although there is debate over the minimum generating capacity needed to qualify as a “utility-scale” development). These two elements differentiate solar PV from solar thermal technology (which uses mirrors to concentrate sunlight into heat energy) and from distributed generation (which uses PV technology to generate energy at and for a specific location, such as rooftop panels on a residential property).

to its ability to achieve significant land coverage in optimal locations and the continually falling price of panel technology to date, utility-scale solar PV has economies-of-scale benefits over distributed and solar thermal generation.³ Due to California’s particularly strong solar resources (“insolation”) and anticipated further decreases in panel costs in coming years, analysts expect utility-scale solar PV to become the state’s predominant renewable energy source and the key means for achieving state targets, potentially constituting up to 95% of new renewable capacity through 2030.⁴

To address the challenge, UCLA and UC Berkeley Schools of Law convened solar PV industry representatives, state and county officials, environmental advocates, agricultural leaders, and other land use experts on June 13 and December 13, 2017 for two separate discussions on ways to facilitate improved siting and permitting for optimally located solar PV facilities.

Among many avenues for promoting the identification and development of optimal solar PV sites, the groups focused in particular on the potential opportunities for improving “landscape-level planning” at the county level for solar PV development in California. This advanced planning process may present benefits for local governments, solar PV developers, and stakeholders such as environmental and agricultural groups. As the California Department of Fish and Wildlife defines it, landscape planning:

takes a proactive approach, identifying priority mitigation and conservation areas in advance of impacts, with the goal of preserving larger areas of higher habitat quality and connectivity. This type of advance planning also results in a more efficient and streamlined permitting approach for development projects.⁵

Focus: Why County-Level Landscape Planning?

The first step in the development of a new utility-scale solar PV facility requires a solar developer to identify a site where the facility can be constructed that will a) meet a known or anticipated electricity demand; b) be economical to acquire and develop; c) have access to necessary infrastructure including transmission and roads; and d) be acceptable to both local residents and state authorities. While there is no single regulator or analysis to comprehensively assess these factors, participants identified the county-level landscape planning process—which is conducted throughout the state and involves assessment of land uses and population growth, public participation and deliberation, and environmental concerns—as a key gatekeeper for large-scale development of any sort, including utility-scale solar PV. This process is especially important in the large, often unincorporated areas where solar PV may be best suited. Some utility-scale solar PV projects are located on public lands, while others are located on aggregated private property. Stakeholders have developed a range of views on the benefits of landscape-level planning for solar development, with some arguing that, as currently practiced, it can detrimentally restrict solar development in favor of conservation goals. Others see it as the best existing venue to balance the needs and concerns of involved parties. Stakeholders generally agree that improving the structure and balancing the priorities of county-level planning could play a major part in the furtherance of state renewable energy goals.

With the state in need of more utility-scale solar PV deployment to meet long-term energy and climate goals, improved landscape-level planning has the potential to help expedite deployment and ensure that new facilities and associated transmission are located on lands that are not agriculturally or environmentally sensitive. These sites may entail less land-use conflict, which can ensure faster deployment and reduced costs (although, conversely, they may be more remote from existing and planned transmission infrastructure, which presents similar challenges). Stakeholders in the process must ultimately shape it to ensure that conservation and renewable energy priorities are properly balanced, allowing California to meet both its ambitious climate targets and its long-standing environmental goals.

This report encapsulates the discussions and the participant recommendations. It begins with a group-suggested vision of landscape-level planning that is optimized for solar PV and the principles to undergird that planning. It then focuses on the top four priority barriers to achieve ideal landscape-level planning and implementation. Those barriers, discussed in detail later in this report, include:

1. **Lack of local buy-in, trust, incentives, and perceived benefits;**
2. **Lack of coordination among utilities, regulators and land-use and grid planners across federal, state, and local levels;**
3. **Mismatch between ideal lands, viable economics, and transmission infrastructure; and**
4. **Lack of data and information that are reliable, relevant, commonly agreed and accessible.**

In connection with each barrier, the report describes recommended solutions to overcome each barrier. Among the wide range of solutions, the following set of high-priority solutions can serve as focus points for efforts by policymakers, planners and industry:

High-Priority Solutions

- Encourage development of local landscape-level plans by linking them to incentives like expedited review under the California Environmental Quality Act.
- Ensure that project benefits flow first to communities most immediately affected by development.
- Increase support for transmission infrastructure located in areas appropriate for solar development.
- Create a consolidated, statewide zoning and planning data resource.

The resulting set of barriers and solutions is a broad assessment of the actions that leaders and stakeholders at all levels can take to further state and local goals for solar PV development:

“What is the appropriate level of planning for renewable energy? Regardless of whether it is generation or transmission, there is always an interplay between local and regional planning considerations.”

– Scott Castro,
NextEra Energy

Challenge 1: Lack of Local Buy-In, Trust, Incentives, and Perceived Benefits

SOLUTIONS:

State leaders could:

- *Help communities define a sufficient quantity of local land needed for solar facilities in order to meet the state's climate goals.*
- *Assist local governments in educating their constituents about the value of optimal solar PV deployment through the provision of data and maps.*
- *Identify, craft and publicize the community benefits that can accompany solar facilities, including priority and direct benefits for environmental justice communities.*
- *Conduct communication training and guidance for officials responsible for interfacing with the public on solar PV projects.*
- *Clarify the harm of not taking action by quantifying short-term risks and benefits.*
- *Modify state guidance regarding preferences for agricultural and farmland uses with respect to solar uses.*
- *Encourage development of local landscape-level plans by linking them to incentives like expedited review under the California Environmental Quality Act and establish a greater nexus between project benefits and environmental mitigation requirements.*
- *Prepare more consistent requirements and distribute statewide guidance for solar developments.*
- *Procure and disseminate information on property value impacts of solar siting.*
- *Create a work group to assess options for reform of the current tax assessment process for solar PV and associated energy storage, including the tax exemption and tax reassessment process.*

County leaders could:

- *Raise sales tax revenue from new projects.*
- *Conduct communication training and guidance for officials responsible for interfacing with the public on solar PV projects.*
- *Identify appropriate parties to communicate accurate, locally appropriate messages and counter misinformation*
- *Increase transparency in planning and permitting processes.*
- *Build community-based, collaborative, and inclusive decision-making processes.*
- *Integrate solar planning and groundwater planning processes.*
- *Encourage development of local landscape-level plans by linking them to incentives like expedited review under the California Environmental Quality Act and establish a greater nexus between project benefits and environmental mitigation requirements.*

Solar developers could:

- *Ensure that project benefits flow first to communities most immediately affected by development.*
- *Assist local governments by providing job training funds for high school and college students and vocational training for solar installation and maintenance training programs.*
- *Conduct communication training and guidance.*
- *Establish a greater nexus between project benefits and environmental mitigation requirements under the California Environmental Quality Act.*

Challenge 2: Lack of Coordination among Utilities, Regulators and Land-Use and Grid Planners Across the Local, State and Federal Levels

SOLUTIONS:

State leaders could:

- *Direct transmission planners to better incorporate county-level land-use planning objectives.*
- *Provide grants to counties for solar project planning.*
- *Encourage and help fund local general plan elements on climate action or renewable energy specifically to ensure local leaders identify how their county or city will contribute to the state's renewable energy goals.*
- *Direct the California Department of Fish and Wildlife to improve coordination of endangered species permitting and data-sharing with federal and local governments.*

County leaders could:

- Identify government representatives at all levels (e.g., state, city, and local) to include in the planning process.
- Prepare solar-focused permitting guidebooks.
- Form and use existing councils of governments to coordinate planning.

Challenge 3: Mismatch between Ideal Lands, Viable Economics, and Transmission Infrastructure**SOLUTIONS:****State leaders could:**

- Increase support for transmission infrastructure located in areas appropriate for solar development.
- “Right-size” transmission proposals and planning timelines and improve internal processes at the California Independent System Operator.
- Accelerate permitting processes and incentives for brownfield sites.
- Explore options to increase the use of general mitigation fund banking under the California Environmental Quality Act.
- Compile and distribute a best practices solar PV planning compendium for local governments through the Office of Planning and Research.
- Conduct comprehensive comparisons of the development costs for brownfields and greenfields in order to identify more economical sites.

County leaders could:

- Employ standard-based identification of suitable lands as an alternative or in addition to mapping lands for solar PV development.
- Implement interim use plans or shorten general plan timelines to facilitate solar PV development.
- Analyze and create a system for addressing planning process risks.

Solar developers could:

- Conduct comprehensive comparisons of the development costs for brownfields and greenfields in order to identify more economical sites.
- Analyze and create a system for addressing planning process risks.
- Increase onsite battery storage at solar PV facilities to help reduce the need for transmission upgrades.

Challenge 4: Lack of Data and Information that Are Reliable, Relevant, Commonly Agreed, and Accessible:**SOLUTIONS:****State leaders could:**

- Engage in joint fact-finding to identify consensus data addressing the most contentious topics.
- Identify statewide and county-by-county solar acreage needed in order to achieve state climate goals.
- Collaborate with county leaders to create a consolidated, statewide zoning and planning data resource.
- Appoint the Governor’s Office of Planning and Research as a trusted keeper and distributor of key data in coordination with other state agencies, and identify gaps in data for further research.

County leaders could:

- Conduct scenario planning to align solar development with related considerations.
- Collaborate with state leaders to create a consolidated, statewide zoning and planning data resource.

Industry leaders could:

- Identify and publicize success stories on agricultural co-location, compatible uses, and pilot projects.



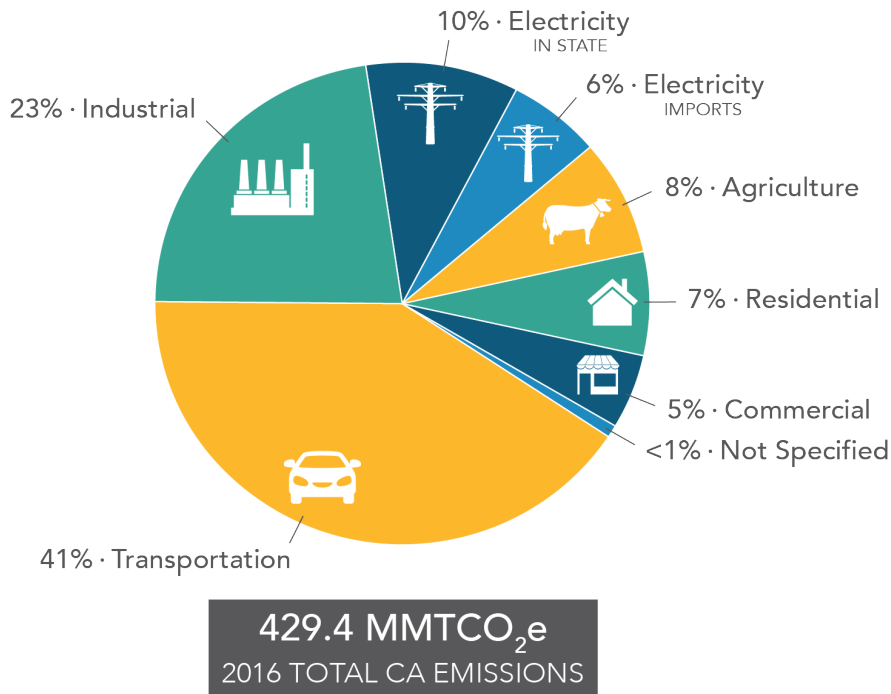
Introduction: California can meet its ambitious climate change and renewable energy goals with solar PV, but improved planning processes are needed

California's Climate Change and Renewable Energy Goals

California passed groundbreaking legislation in 2018 to secure 100% of its electricity generation from greenhouse gas-free sources by 2045. SB 100 (De León, Chapter 312, Statutes of 2018) also increases California's Renewables Portfolio Standard, a program administered by the California Energy Commission and the California Public Utilities Commission that requires all electricity retailers and utilities in the state to obtain a minimum amount of the power they sell from renewable sources such as solar, wind, geothermal, biomass and small hydropower. The Renewables Portfolio Standard was established in 2002 legislation that required 20% renewable electricity by 2017; in 2008 and 2009, then-Governor Schwarzenegger issued executive orders increasing this requirement to 33% by 2020.⁶ In 2015, the state legislature passed, and Governor Brown signed, SB 350 (De León, Chapter 547, Statutes of 2015), which accelerated the Renewables Portfolio Standard to require at least 50% of California's electricity to be generated by renewable sources by 2030.⁷ SB 100 increased that standard to 60% by 2030, with the aforementioned 2045 carbon-free goal.

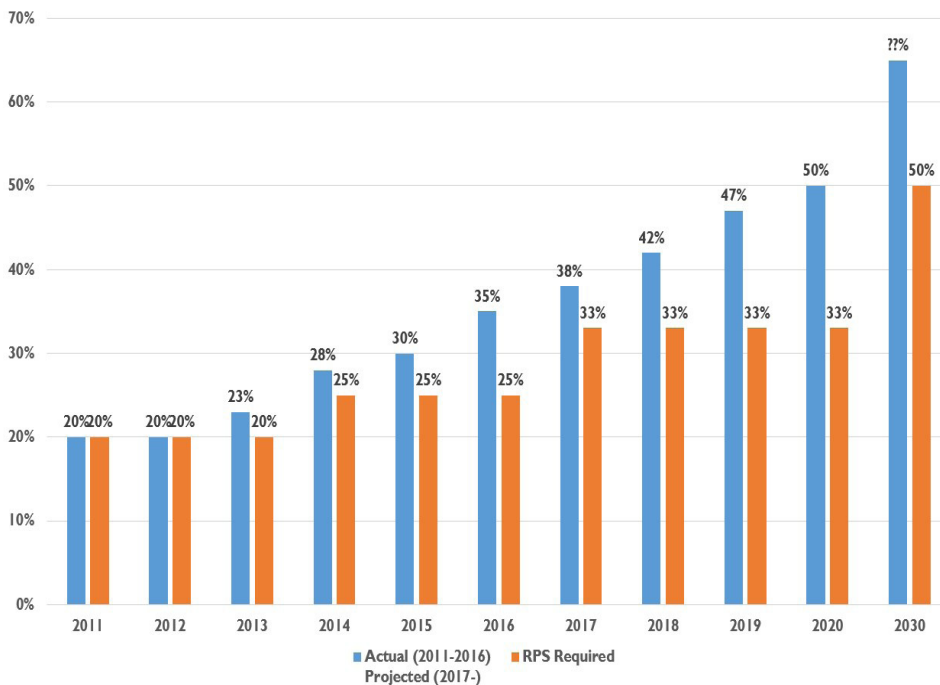
This renewable energy deployment will be critical to achieving California's greenhouse gas emission reduction goals, which lead the United States. State leaders initially targeted emissions reductions to 1990 levels by 2020 under AB 32 (Nuñez, Chapter 488, Statutes of 2006), a goal which the state achieved four years early. A more recent commitment requires reducing emissions to 40% below 1990 levels by 2030 under SB 32 (Pavley, Chapter 249, Statutes of 2016).⁸ Approximately 20% of California's total greenhouse gas emissions are caused by the generation of electricity used in the state, meaning that significant reductions in the carbon intensity of California's electricity supply will be necessary in order to meet these targets.⁹

To date, California has consistently met and exceeded the renewable energy targets, with the state's three large investor-owned utilities collectively serving 34.76% of



California Greenhouse Gas Emissions by Sector

Source: California Air Resources Board, California GHG Emission Inventory – 2018 Edition.



Renewables Portfolio Standard Achievement 2016-2030 (Large Utilities)

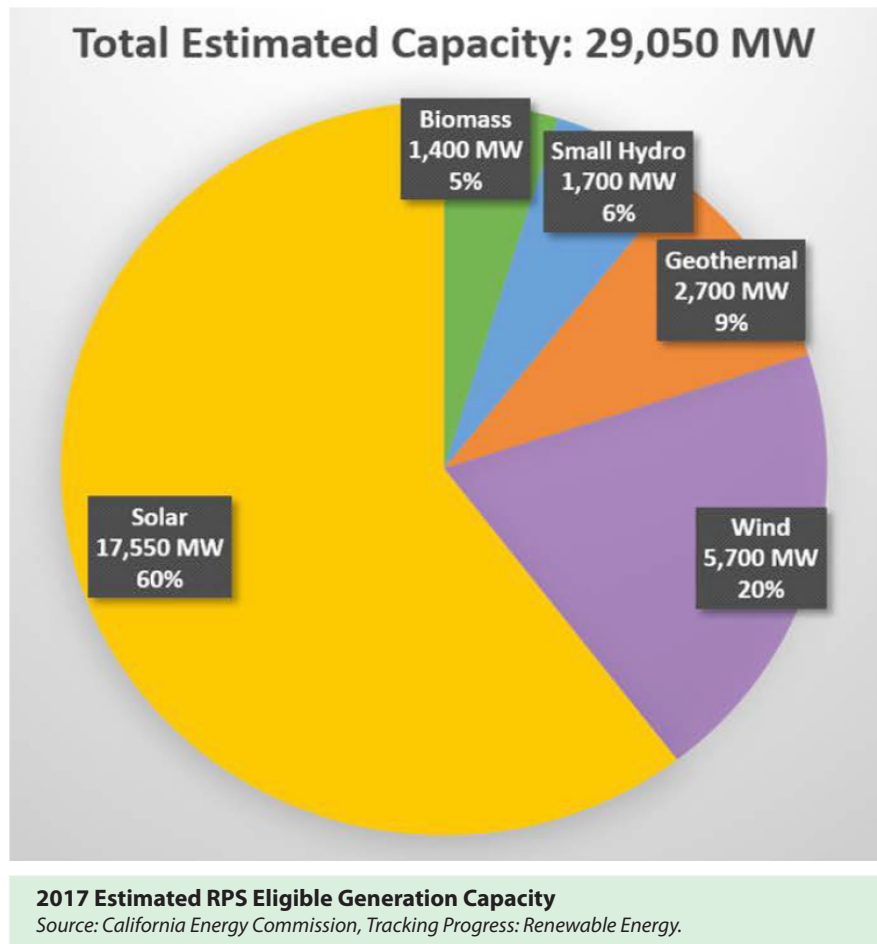
Source: Authors (data from California Public Utilities Commission, RPS Homepage)

their 2016 retail electricity sales with renewable power.¹⁰ For reference, the California Public Utilities Commission has estimated that in order to achieve the 42 million metric ton greenhouse gas emission level required to meet the requirements of SB 32, the state will likely need to obtain 53-57% of its electricity from renewable sources.¹¹

Solar PV in California

Solar PV is the leading component of California's renewable energy mix. The state's utilities have achieved approximately 30% overall renewable electricity generation, and nearly one half of this renewable electricity comes from solar PV facilities, the largest single source.¹² California is the leading producer of solar energy in the United States, providing approximately 10% of the state's electricity in 2016 (nearly 15% when non-utility, distributed generation assets are included), and accounting for almost one-half of all solar generation in the country.¹³ This generation consists of a total installed capacity sufficient to power over 5 million homes, and can be linked to over 100,000 jobs in the state.¹⁴

However, in order to meet the emission reduction and renewable generation targets for 2030 set by SB 32 and SB 100 the state will need to significantly expand this capacity.¹⁵ As of 2017, California achieved its 30% renewable generation with approximately

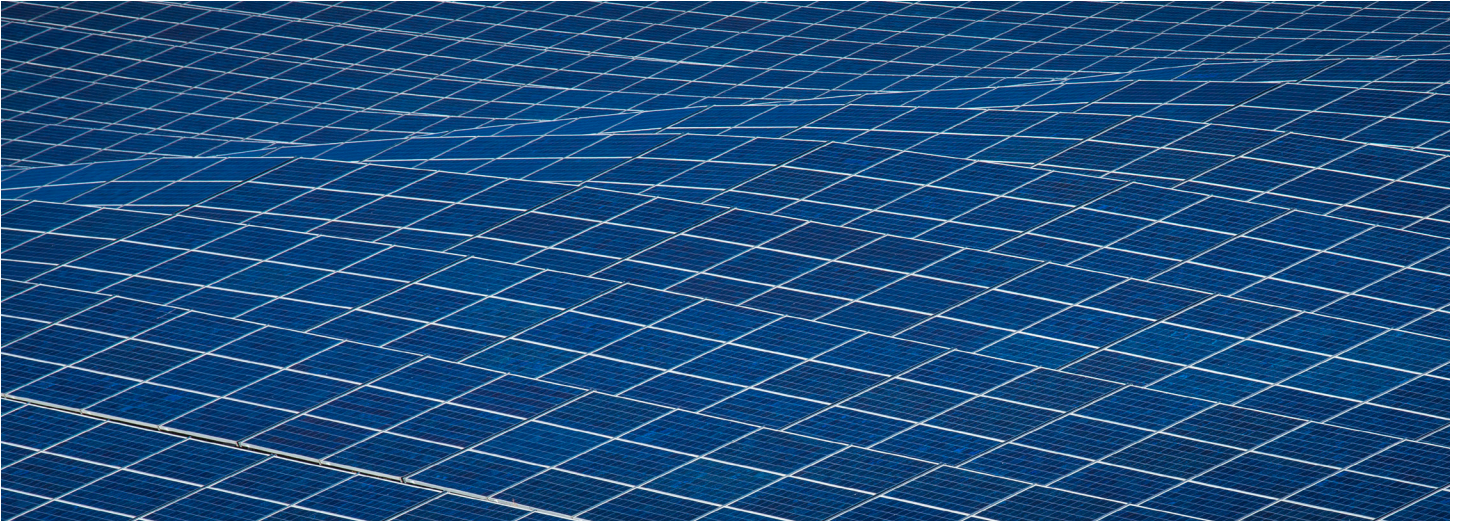


29,000 megawatts of renewable energy capacity, of which approximately 17,000 megawatts come from solar generation.¹⁶ According to California Public Utilities Commission data and projections, in order to meet the 50% Renewables Portfolio Standard and state climate goals, California will need to add approximately 10,000 megawatts of utility-scale solar PV generation capacity by 2030.¹⁷ The passage of SB 100 and its 60% renewable requirement only increases this need.

Solar PV and Land Use

Utility-scale solar PV facilities, which consist of arrays of thousands of photovoltaic panels, currently require approximately 8.9 total acres (including panels, ancillary equipment and access roads) per megawatt of generation capacity on average.¹⁸ According to some estimates, in total over 13 million acres of California land are “potentially compatible” (i.e., subject to favorable topography, near transmission, and not within protected habitats) for siting of solar PV facilities of one megawatt capacity or greater.¹⁹ The vast majority of California utility-scale solar installations, by both generating capacity and total land area, are located in cropland or scrubland—that is, in minimally developed or rural regions that may be low in population but potentially high in habitat value.²⁰ (This report does not use a numerical threshold, but considers “utility-scale” those projects that are constructed for the purpose of selling electricity to a utility or other retailer). Based on the estimated need of 10,000 additional megawatts of generation capacity by 2030 to meet a 50% RPS (now increased to 60%) and the average usage of 8.9 acres per megawatt, approximately 89,000 acres or more may be needed for new solar developments by 2030. More land would be needed should market demand drive solar procurement above the levels required by the RPS. Independently, participants generally estimated that 70,000 to 100,000 acres of new solar developments would be needed in order to meet the state’s statutory targets. Of note, the amount of this solar PV needed in California versus out of state remains uncertain and will be influenced by future policy decisions. Furthermore, this number does not account for the land needed to house major transmission or other support infrastructure, which may be significant.





Vision

“Landscape-level planning is taking a holistic view of a landscape: its social and community, environmental, agricultural, and renewable resources values. There are three tenets: 1) Where are the areas that we want to avoid development in order to protect those four values? 2) Beyond that, how do we minimize the impacts of development? 3) How do we mitigate any remaining impacts?”

– Erica Brand,
The Nature Conservancy

Participants at both convenings identified a vision of a county-level solar PV landscape planning system that aligns incentives and processes across jurisdictions, includes and earns the support of all stakeholders but is sufficiently tailored to ensure adequate and cost-effective PV resources, and develops and disseminates accurate information on renewable energy benefits and needs. Specifically, they described a system defined by the following characteristics:

County-level implementation	Counties would develop incentive-based landscape-level planning for solar PV, across multiple jurisdictions if necessary, specifying distributed versus utility-scale and reflecting equity, groundwater, and agricultural goals; the plans would be incorporated and enforced via county and city general plans and zoning codes, and be consistent with California Environmental Quality Act (CEQA) implementation.
State support	The state would provide funding to help counties develop the plans, as well as supportive planning tools and guidance.
Clear, consistent and coordinated state policies and procedures	The state would provide clear goals for counties on landscape-level planning, such as on how much renewable energy might be needed; aligned processes at key state energy agencies and in deployment of transmission infrastructure to encourage solar siting on lands consistent with county-level plans; and integration with energy storage planning and subsurface mineral policies.
Benefits for counties, communities, and project developers	Appropriate solar PV projects consistent with the plans would receive faster permitting on more available land, while counties and cities would save local government costs, protect agricultural and biological resources, generate local jobs and revenues for government and industry, protect residents from unwanted projects in inappropriate areas, and ensure greater climate change mitigation.
Environmental and cultural resource protection	Landscape-level plans would be designed to facilitate solar PV development but also ensure protection of key cultural and natural resources and vulnerable species and ecosystems.
Complete stakeholder engagement	Project developers, electrical utilities, local communities, farmers and ranchers, energy and transmission planners, environmental advocates, and commercial power consumers would all have a seat at the table in preparing long-term landscape plans; the resulting plans would better channel system-wide savings created by increased use of solar energy to local communities and conservation opportunities.
Transparent, online planning resources	State and local planners would collaborate to create statewide, publicly available planning tools to allow developers and communities alike to evaluate best-fit lands and to directly compare local zoning and development codes.
Comprehensive energy system consideration	Planners would take into account existing transmission and grid usage, energy storage capacity and potential, distributed generation, and community choice aggregation (CCA) when identifying priority development sites.



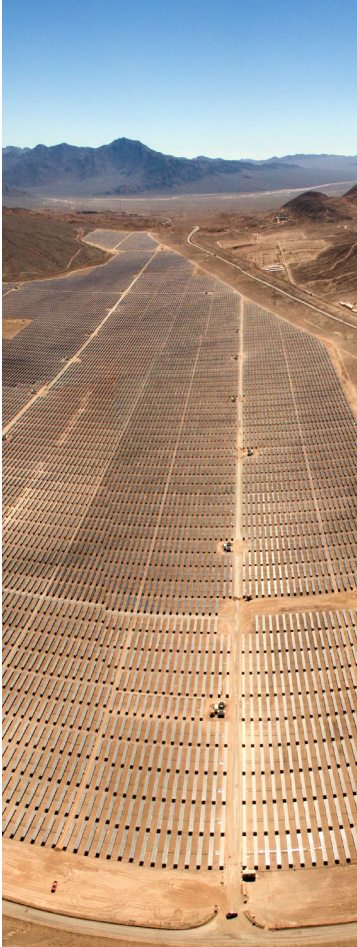
Top Challenges and Solutions for Improving Solar PV Landscape Planning

At the June 13, 2017 convening, participants identified a number of top barriers to achieving this vision and solutions to overcome those barriers. The common theme that developed was the need for greater integration of solar needs into county-level landscape planning and coordination across all relevant state and local planning processes. At the December 13, 2017 convening, participants then focused on specific solutions to improve the county-level planning process and align the actions and incentives of state actors, county planners, solar developers and local communities. The following report section discusses the recommendations from both convenings in detail.

Challenge 1: Lack of Local Buy-In, Trust, Incentives, and Perceived Benefits

Participants from county governments, solar developers and advocacy groups agreed that a lack of public buy-in to utility-scale solar facilities presents one of the most significant barriers to the development of the quantity and scale of projects necessary in order to meet California's renewable energy targets. In particular, local communities—which can have the ultimate say in whether a project is approved via the political process—often do not trust project developers or the county government officials they work with to obtain necessary approvals, due to a combination of factors. These include a failure of developers and governments to deliver project-related benefits to communities, or to communicate the measure of those benefits; a lack of public knowledge about the health benefits of renewable energy; a lack of clarity about the scale of the state's renewable energy needs; concerns about aesthetic impacts and negative effects on property values; and exclusive or opaque planning processes that may fail to fully address community needs. Participants uniformly emphasized the first-level importance of improving the relationships between communities, developers, and governments in order to earn public support for further development.

In addition, participants described how local governments typically lack funds and



staff time to engage in landscape-level planning processes. Even if they do develop these plans, they may then lack incentives to implement them. Implementation then involves a complex balancing of agricultural, environmental, community, and economic development priorities and goals. Local governments are also discouraged from siting solar PV more generally due to public opposition to some proposed projects. At the same time, local elected officials do not want to lose authority over land use, particularly to the state or to environmental advocates. The end result is that local governments may fail to plan for solar PV deployment in the most optimal places.

SOLUTIONS

State and local leaders could help communities define a sufficient quantity of local land needed for solar facilities in order to meet the state’s climate goals.

Participants noted that there exists a significant gap between the actual amount of land needed for solar development in order to meet state climate and renewable energy goals and the public’s understanding of both the scale and distribution of this need. Local government representatives noted, for example, that county planners often produce maps showing all possible locations within a county where utility-scale solar projects may be sited—technical documents used by officials and developers to identify potential sites based solely on legal and engineering limitations—which may lead to the public impression that the entire landscape will be covered with solar panels.

As discussed above, 90,000 acres of land may be needed to support the approximately 10,000 megawatts of solar generation capacity necessary to meet the state’s RPS goal of 50% renewable electricity by 2030. While this is a significant land area, it represents a tiny fraction of the total land mass of California (and the required number of acres would be smaller if more solar PV or other renewables are built out of state to supply California). A significant portion of this acreage may continue be located in high-sun counties with large open spaces such as Kern, Riverside, and San Bernardino counties. The Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendments, which cover public lands managed by the U.S. Bureau of Land Management, identified 388,000 acres of renewable energy “Development Focus Areas” in these and four neighboring desert counties.²¹ Those areas, which represent greater solar capacity potential than is needed to meet the state’s renewable energy generation goals, cover a relatively small portion of the total subject landmass.

By clarifying how many acres of solar coverage will be necessary statewide to meet the 50% RPS, as well as any future, higher state renewables standards (as well as RPS-independent corporate climate goals or community choice aggregation plans) that will require increased renewable generation, California Energy Commission leaders could demonstrate how relatively minimal total land coverage might be for local governments under even the most aggressive scenarios. And by helping communities translate this analysis into county-by-county estimates of land needed for development shown in clearly drawn examples, state and county officials could potentially reduce uncertainty and public opposition to further development. To be sure, neither state energy agencies nor solar developers can

predict with absolute certainty either the total land that will be needed to meet state climate goals or where that land will be situated. State climate and energy policies will continue to evolve, as they have since 2006. Most recently, for example, SB 100 (De León, Chapter 312, Statutes of 2018) set a 100% RPS by 2045. Meanwhile, proper locations for utility-scale solar depend not only on insolation, but also on more mutable factors such as transmission and storage, distributed generation, and local demand—not to mention political support. But state leaders could help increase certainty and minimize some opposition by providing communities with more detailed depictions of future scenarios and more data to inform those scenarios.

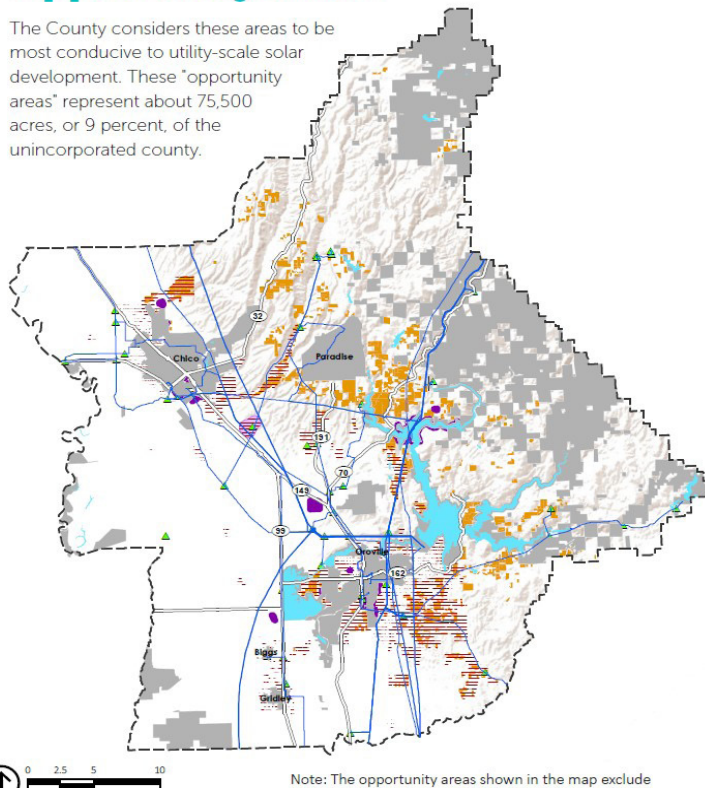
For example, the Butte County Utility-Scale Solar Guide (discussed in further detail in the next section) includes a series of easy-to-read, publicly available maps that illustrate the distribution of land appropriate for solar development within the county, taking into account transmission, land use, agricultural and other constraints in a manner that clearly demonstrates the extent to which land will remain undeveloped even in a maximum development scenario.²² These mapping tools are created primarily for use by planners and developers, but if overlaid with data showing the county land area commitment needed in order to meet state goals, as well as the potential of energy storage technology and distributed generation to reduce that commitment, they could provide communities with valuable understanding of the overall scale of development.

“Producing energy equitably is an issue. People ask: why is all the energy produced in certain areas, but consumed in others?”

Susan Tae,
Los Angeles County
Department of
Regional Planning

Opportunity Areas

The County considers these areas to be most conducive to utility-scale solar development. These “opportunity areas” represent about 75,500 acres, or 9 percent, of the unincorporated county.



AREAS WITH LIMITED OPPORTUNITIES FOR OTHER USES

- **Solid Waste Management Facility Sites**
Sites within Butte County’s Solid Waste Management Facility Overlay Zone allow compatible uses such as those that do not involve the ongoing occupation by people and are not bothered by visual, noise, odor, and traffic issues.
- **Contaminated Sites**
Contaminated sites as identified by the **California Department of Toxic Substances Control (DTSC)** include land contaminated from past uses, such as mines, recycling plants, and auto wrecking.
- ▬ **Urban Permit Areas (UPA)**
Sites within the UPA boundaries indicate areas of potential urban growth from the **Draft Butte Regional Conservation Plan (BRCP)**.

AREAS PROXIMATE TO UTILITIES

Proximity to existing transmission lines and substations allows co-location of new electrical generation tie lines and the use of existing utility rights-of-way, and reduces the need for ground disturbance and above-ground infrastructure.

- **Existing Transmission Lines**
- ▲ **Existing Substations**

LARGE PARCELS

- **Non-Urban Residential Parcels More than 20 Acres**
Large rural residential parcels can be appropriate for solar facility development, but any solar facility should be sited more than 100 feet away from other parcels with a residential designation by the General Plan.

Sample Solar Planning Map

Source: Butte County (California), Butte County Solar Guide.

State and industry leaders could assist local governments in educating their constituents about the value of optimal solar PV deployment through the provision of data and maps.

State data and analytical tools can also help county landscape-level planners develop maps and talking points showing constituents different regions and landscapes and the percentage of renewable energy that could potentially come from each area, as well as the relative environmental value of more distributed versus utility-scale deployment. Local leaders could discuss options for repowering existing sites, in order to convey how much more power is needed to achieve the 60% and eventually 100% renewables goals and how communities can contribute. Ultimately, local governments need to improve the framing of solar PV issues and data on how every region is “doing their part” to reduce greenhouse gas emissions and generate renewables, within their unique geographic and land use constraints, in order to secure more public buy-in of renewable deployment.

State data assistance for this effort could come from:

- The California Energy Commission, which can provide local governments with studies and fact sheets (in visually appealing and readily accessible formats) that explain the benefits of state goals for renewable energy generation, particularly those showing the location-specific needs for utility-scale solar PV;
- The California Department of Conservation, which has a new website with landscape databases and maps that could be useful for local leaders;
- The California Department of Fish and Wildlife, which hosts key GIS-based and other data on landscape and species conservation; and
- Other state energy-related agencies that could create more data, infographics and fact sheets, for use by local governments to communicate the benefit of solar to their community.

State, local, and solar industry leaders could identify, craft and publicize the community benefits that can accompany solar facilities, including priority and direct benefits for environmental justice communities.

While solar generation provides a global benefit in terms of reduced emission of climate change-inducing greenhouse gases, and a statewide benefit in terms of access to increasingly cheap, locally generated electricity, the communities where solar facilities are sited do not always experience direct, discernible benefits from the development of those facilities. While projects can and do create many local benefits—for example, on-site power generation for agricultural facilities, or local jobs in facility construction and maintenance—participants agreed that developers and local governments sometimes fail to deliver sufficient benefits to local communities and often fail to adequately publicize benefits or link them to their projects.

Many counties and localities require developers to enter into community benefit agreements or packages that require delivery of certain minimum benefits (e.g., local employment requirements and job training) as a part of the approval process. While some benefits may be too costly for developers to guarantee,

“Many communities still see development as a threat to community character. You won’t get everyone to agree, but if you make people know their concerns have been heard—provide helpful data, provide financial assurances that enforcement will be sufficient—you can earn community buy-in.”

Renée Robin
Allen Matkins

others may be relatively affordable for developers and significant to communities. For example, developers and California Public Utilities Commission leaders could work with local utilities to explore options or incentives for the utilities to provide electrical rate stabilization for local retail customers, ensuring that communities see a direct benefit on their electrical bills. Or developers can make legally binding commitments to communities to provide assurance on negative impacts surrounding solar projects: to install state-of-the-art dust control measures; to include landscape screening and other visual improvements; to fully restore and beautify landscapes upon decommissioning. Such commitments may be low-cost for developers, create an alternate avenue for enforcement beyond state permits, and provide key guarantees that communities are benefiting in a manner distinct from the rest of the state.

A number of counties have created community benefit programs, which assess uniform fees on solar developments, a portion of which must be spent on community benefits. For example, Riverside County requires developers of facilities larger than 20 megawatts to pay \$150 per acre per year for each acre developed, with 25% of all fees collected going to benefit local communities; Imperial County set voluntary guidelines of \$150-200 per acre in community benefit charges for infrastructure improvement and quality of life enhancements.²³ While these requirements may be seen as a disincentive to solar development, they can also reassure wary communities that secure, tangible benefits will flow from a project.

Alternatively, state lawmakers could develop an energy assessment fee to fund local community benefit programs. The money could help establish community benefit funds for communities affected by renewable energy development, as described above, as well as for local planning purposes. The state could structure the program so that only communities that are directly affected by renewables development and have city or county support could apply for funds. Fund amounts could be provided on a sliding scale based on the amount of renewable deployment in the community, so communities that permit more renewable development locally can apply for more money. As an example, the California Department of Housing and Community Development issues community development block grants that support community economic development programs.²⁴

State-assessed funds could also be used to provide local governments with a renewable energy community block grant via an energy assessment on renewables, including solar PV. Money would then go to communities for grants to build renewable energy on locally owned property, such as solar panels on community centers. Such a fee across all renewable energy statewide (including rooftop distributed solar), with funds returned to local communities based on need, would give counties incentives to conduct landscape-level planning for optimal solar PV deployment.

Local governments could raise sales tax revenue from new projects.

Increased revenue could ensure that local communities benefit from new solar developments and are able to link those benefits to specific projects. While developers can provide certain benefits directly such as job training, and

“Demonstrating public benefits up front will engender trust from the beginning. It builds a larger stakeholder support group. These are benefits like providing power at lower cost to disadvantaged communities or providing power for use by the agricultural sector.”

John Gioia
Contra Costa
County Board of
Supervisors

“It’s easier said than done to show that benefits will actually flow to a community. The state should provide resources to local governments to do intensive community engagement, so communities can trust that they will see benefits.”

Matthew Marshall,
Redwood Coast Energy Authority

Community Choice Aggregation and other similar programs may reduce electrical rates, local jurisdictions must ultimately be able to generate revenue from these projects in order to fund infrastructure and ongoing government operations. One strategy to ensure appropriate revenue from new developments is the use of sales taxes on solar hardware to generate revenue for community benefits. Imperial County’s Public Benefit Program Guidelines include a sales tax benefit whereby the county may require a developer to apply to the California Board of Equalization for a permit allowing allocation of tax payments to the county (rather than the state) to the maximum extent permitted by law.²⁵ Such tax allocations can ensure additional public benefits from a given project (without increasing overall tax burdens on developers), which could increase public buy-in to the project.

Solar developers could ensure that project benefits flow first to communities most immediately affected by development.

Beyond the existing requirements that projects generate sufficient revenue and benefits to mitigate construction noise, visual disruptions, increased traffic, dust impacts and other potential negative local effects of project development, developers can greatly improve public buy-in to projects by ensuring that benefits flow first to those communities that are immediately affected. Communities that neighbor development sites or lie along major transportation routes are most likely to experience the impacts of increased activity and exploratory and preparatory work and may be most likely to present early opposition to a proposal. Developers can work with counties and the affected local communities to explore how to improve directing mitigation and structuring benefits up front to assist those communities that are directly affected. While this may involve a case-by-case assessment of project implications and local needs, items such as job training, local employment requirements, and new community facilities are examples of typical measures sought by local communities.

State and industry leaders could assist local governments by providing job training funds for high school and college students and vocational training for solar installation and maintenance training programs.

As discussed earlier in this section, the creation of local jobs is an incentive for local governments to encourage more solar PV deployment. The need for support from the state for local job training programs is now particularly acute as the federal government may stop funding these programs. As an example, participants cited Kern County’s academy to train residents in these skills. As a result of the program, Kern County was able to successfully require utility-scale project developers to hire 50% local labor, from people trained locally (within 50 miles). Ultimately, according to participants, the actual rate was closer to 80%, pointing to the value of this academy. Kern required the local labor provision as an agricultural mitigation requirement, given that the solar company was building on a site that would take agricultural land out of production and therefore reduce agriculture jobs.

The state could encourage local governments to include a similar local labor requirement for utility-scale projects or require developers to host job fairs to

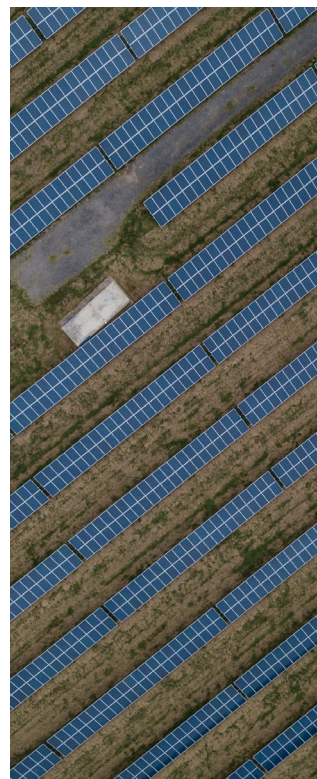
ensure local access to project work. Since project construction typically lasts for approximately three years, according to participants, and trained workers can transition into rooftop installation from utility-scale solar work after a project is complete, this type of job training offers high return on investment for local and state governments. State leaders could also create a solar job training program in community colleges or the California State University system, to incorporate project management and similar roles into the training apparatus.

State, local and solar industry leaders could identify appropriate parties to communicate accurate, locally appropriate messages and counter misinformation.

Participants described local approval processes that can be confused, delayed or even derailed by a lack of accurate information regarding a proposed project. Community members, wary of large developers or conscious of past projects that failed to deliver sufficient benefits, may mistrust data and information presented by developers and local governments, who in turn may fail to present information in forums and formats appealing to the general public. In this climate of mistrust and poor communication, participants agreed that misinformation can fill the vacuum that remains.

Participants noted that many communities trust neither the messenger nor the message when solar developers and planners propose a new project. Thus, they may discount project benefits and overestimate potential risks. Building trust is ultimately a long-term effort based on promises kept and benefits realized in connection with multiple projects, but in the near term new projects will require better methods of communication. One means to address this issue would be for policy makers and industry to identify a trusted, neutral third party that could serve as a conduit for accurate and appropriate information regarding solar developments in general and the specifics of a given proposal. In particular, in the context of a local planning process in which communities may perceive both county planners and solar developers as pursuing their own financial interests first, this information source should be affiliated with neither. Participants cited two potential choices—the Governor’s Office of Planning and Research, and the Lawrence Berkeley National Laboratory—as ideal messengers to connect communities to project planners. While neither entity would have the capacity to become involved in the details of individual projects absent additional state funding, each could potentially serve as a common resource for developers and planners to provide communities with trusted assessments of risks and benefits. Solar developers and local governments could also partner directly with community groups to ensure that proposals and mitigation plans focus properly on the individual issues each community cares about.

In addition to identifying trusted messengers to deliver accurate information, governments and developers could assist one another by actively countering misinformation. Local communities may oppose projects in part based on inaccurate information, regarding issues like the risk of negative health impacts related to the “heat island” effect of solar arrays, that can be extremely difficult to combat. State leaders could prepare a compendium of common false arguments,



together with sample best responses and supporting science, providing planners with a “playbook” to combat misinformation, similar to the website that the Office of Planning and Research has prepared to fight inaccurate objections to climate change science.²⁶ Such a resource could assist communities in distinguishing misinformation and increase understanding of project benefits.

“People talk about valley fever, but nobody talks about deaths due to air pollution-related illnesses. People talk about water usage for renewables and “extraordinary” impacts on property values, but they don’t have any actual numbers or facts. We need more relevant, reliable information and performance measures.”

Tom Hudson,
San Bernardino
County Land Use
Services Department

The Arguments and Responses			
<p>“Temperatures are not actually increasing – they’re even dropping in some places.”</p> <p>CLICK FOR RESPONSE</p>	<p>“There was a drop in global temperatures around the middle of the last century. Therefore, climate change is not happening.”</p> <p>CLICK FOR RESPONSE</p>	<p>“There isn’t a correlation between rising temperatures and CO2 emissions – therefore, humans can’t be causing climate change.”</p> <p>CLICK FOR RESPONSE</p>	<p>“Greenhouse gases aren’t causing climate change – it’s actually the sun, volcanoes, or some other source.”</p> <p>CLICK FOR RESPONSE</p>
<p>“Global temperatures have been high in the past. The current temperature increase is nothing new or unique, but just natural variation.”</p> <p>CLICK FOR RESPONSE</p>	<p>“Climate models are unreliable.”</p> <p>CLICK FOR RESPONSE</p>	<p>“We can’t even predict next week’s weather. How can future climate predictions be accurate?”</p> <p>CLICK FOR RESPONSE</p>	<p>“There isn’t a scientific consensus on climate change. Lots of scientists have signed a petition against it.”</p> <p>CLICK FOR RESPONSE</p>

Sample ‘Response Playbook’ Resource

Source: California Governor’s Office of Planning and Research.

Solar developers and local planners could conduct communication training and guidance for officials responsible for interfacing with the public on solar PV projects.

While neutral, trusted third parties may be an ideal solution to present project information to communities, developers and local planners will ultimately need to be able to make their own case in order to generate sufficient public buy-in. This can be a significant challenge: in often highly-charged contexts, tensions between community character, environmental and revenue interests can render community outreach nearly impossible task, with local governments pressed to demonstrate that they are adequately representing constituent interests while also seeking to solicit investment. Communications training for employees and staff responsible for interfacing with community members during the planning process could address this challenge. While numerous privately administered programs exist, the California Department of Human Resources also offers courses in effective communication and communication with data which local governments could use as models for improving public officials’ ability to interact with and present data to the general public.²⁷ By engaging communications professionals to develop the community outreach skills of these staff members, local agencies (with funding support from the state or from developers) and solar developers could ensure that their message to communities is presented in the most agreeable manner.

Another valuable set of tools that solar developers and planners could model are messaging guidebooks, such as the “Let’s Talk Climate” guide prepared by

a group of public engagement, communications and environmental groups. The guide presents research-backed messaging recommendations and specific concepts and phrases that motivate positive thinking around climate-progressive actions.²⁸ For example, focusing on cost reduction, jobs, health benefits and reliability can prove more effective than references to large-scale projects and statewide planning. Preparing a similar communications guidebook specifically for solar developers seeking to engage local communities could be hugely beneficial.

NEW MESSAGE

*Of all the things we'd love to leave our children and future generations, **a healthy place for them to raise children of their own may be the most important.** But today, we use fuels that pollute the air in our kids' lungs and the water in their cups. We are changing our climate and, with it, many things we depend upon for the future. What do we want to work for and be remembered for? We can leave our children and future generations **an America where the air is clean and the water is safe.** By increasing the use and production of the safe sources of sustainable energy we have now, like wind and solar, we can be proud of what we have created for generations to come and a happy surprise when we open our energy bills – the choice is ours to make for a clean energy future.*

LESSONS LEARNED

REPLACE	EMBRACE	BECAUSE
Children (by itself)	Our children and future generations	Not everyone has children, so the topic can seem narrow, causing the audience to be skeptical: "What's in it for me?" or "Why do I owe it to someone else?"
We rely on fuels	We use fuels	Empowers choice and control of behaviors. Avoids blaming the audience for today's problems.
Impacts of climate change	Future generations	Embraces a moral responsibility to protect and avoids visuals of scary scenarios.
A destabilized world	A healthy place	Health is a concrete personal concern and removes direct mention of the problem.
Renewable energy	Safe sources of energy like wind and solar	Concrete and descriptive language is more familiar than technical terms.

- "New high-paying jobs" was mentioned in an earlier iteration, but rated low because of concern that people's skillset would not be applicable due to describing jobs as "new."
- It's very hard for an audience to be against cleaner air and water.
- Future as a value for future generations evokes strong moral resonance; future as a timeline delays action.

Let's Talk Climate Message Analysis

Source: EcoAmerica, *Let's Talk Climate*.

Government and solar industry leaders could clarify the harm of not taking action by quantifying short-term risks and benefits.

When utility-scale solar projects are proposed, their local environmental, construction, noise, and traffic impacts are typically compared (both in formal impact analyses and in the general public mind) to a status quo, “no-action” baseline. In this context, it can appear that if the proposal is not approved, then no harm or negative impact will accrue to the community. However, as the California Air Resources Board and others have consistently emphasized, air pollutants generated by burning fossil fuels, such as sulfur dioxide, nitrous oxides, and particulate matter, cause significant negative health effects including asthma and decreased lung development in children.²⁹



While carbon dioxide is a global pollutant and thus the climate change-related benefits of increased utilization of renewable energy are not specially experienced by the communities in which facilities are located, reduced production of fossil fuel-generated electricity can provide immediate and direct benefits to local communities by reducing the risk of asthma and other negative health effects. This deployment can be especially important for disadvantaged and environmental justice communities, a link between climate and health goals that the state legislature has amply recognized through landmark legislation such as SB 535 (De León, Chapter 830, Statutes of 2012) which requires 25% of all state cap-and-trade proceeds to be committed to benefits for disadvantaged communities, and AB 617 (C. Garcia, Chapter 136, Statutes of 2017), which ties greenhouse gas emission reduction to local air quality improvement in vulnerable areas.³⁰ Planners and project developers could emphasize, when proposing new projects, that addition of new solar facilities can reduce utilization of older natural gas plants, improving human health by removing harmful pollutants from the air. Further, producing and burning fossil fuels can be linked to extensive water pollution and other ecosystem harms, as well as the increased drought that the state has experienced in recent years—risks that most Californians take seriously. Such efforts, by demonstrating that there is immediate harm to accepting the status quo, would both be entirely consistent with state-level efforts and increase community support for projects in some of the most vulnerable communities.

State leaders could modify state guidance regarding preferences for agricultural and farmland uses with respect to solar uses.

California is the leading agricultural state in the nation, with over 77,600 farms producing over \$46 billion in receipts in 2016 (the most recent year for which complete state data are available), including over 70 crop and livestock commodities for which California is the leading producer in the nation (and over ten for which California is the sole producer), comprising approximately 13% of all U.S. agricultural production.³¹ The agricultural sector represents a significant driver of the state’s economy and a crucial element of its history and culture. As a result, the state government has protected and supported local agriculture, in particular via the California Land Conservation Act of 1965 (commonly known as the Williamson Act), a law that allows local governments to enter into contracts with landowners to preserve agricultural uses of land in exchange for reduced property tax assessments.³² While SB 618 (Wolk, Chapter 596, Statutes of 2011)

allows rescission of Williamson Act contracts in order to site solar facilities, developers and local governments have sought further tools to promote solar development to the fullest extent possible.³³

Alongside the Williamson Act, the state has undertaken a series of policies intended to preserve farmland. Examples include state law specifically requiring county-level general plans to include agricultural/open space uses, state law listing protection of environmental and agricultural resources as a planning priority (and not listing renewable energy development), and the Department of Conservation's California Farmland Conservancy Program, which provides state funding for permanent agricultural conservation easements.³⁴ When the state's policies promoting renewable energy and solar development potentially conflict with agriculture-favoring land-use policies, state and local policy makers face a delicate and complex balancing act. Preservation of the maximum amount of productive agricultural land, in order to protect both adequate food supplies and the agricultural workforce, is a long-established state priority.³⁵ Local economies in agricultural areas of the state such as the Central Valley, as well as the state and national economies and food supplies, depend to some extent on these policies. However, this priority has traditionally stood in the context of the rapid urbanization of rural and agricultural areas, whereas increased promotion of solar uses can potentially be accomplished while still preserving existing urban and rural boundaries (particularly as Sustainable Communities Strategies are implemented under Senate Bill 375). The conservation and energy agencies that implement existing law could co-author guidelines, to reconcile policies and ensure that solar projects (but not urban development) can be sited where appropriate—balancing social values, economic needs, and the best available biological information based on input from stakeholders—while still preserving natural habitats, farmland, and employment in traditionally agricultural areas. Alternatively, the legislature could consider legislation to similar effect, such as expansion of AB 2087 (discussed later in the report) to facilitate greater coordination of preservation and development goals.

Government and solar industry leaders could increase transparency in planning and permitting processes.

Participants uniformly agreed on the need for greater inclusivity and transparency in planning processes as a means to increase public support and buy-in for new solar proposals. While all new projects are subject to local land-use approval by county planning commissions, transmission approval by the California Public Utilities Commission, and California Environmental Quality Act review, community members may not have the time or be comfortable appearing at formal proceedings or may not have the resources to retain lawyers or other advisors to assist them.

By preparing streamlined public resources and planning guidebooks, counties may be able to better educate local citizens on the basics of planning and permitting processes, increasing the public's ability to participate (see discussion of the Butte County Solar Guide in the following section for an example). However, county planners and solar developers could consider increasing the use of informal methods such as information sessions, listening sessions, and

“Some counties may lose hundreds of thousands of acres of farmland to loss of water in the coming years. There should be a streamlined process to convert those lands to solar use.”

Lorelei Oviatt,
Kern County
Planning and
Natural Resources
Department

Fact Sheet | Solar Star Projects

The 579-megawatt Solar Star Projects are co-located solar installations in Kern and Los Angeles counties in California. The projects deliver enough electricity to power the equivalent of approximately 255,000 homes, according to BHE Solar, a subsidiary of BHE Renewables, and owner of the projects. The projects are creating more than \$500 million in regional economic impact, including the approximately 650 construction jobs created over their three-year construction period.

SunPower designed, constructed and performs operations and maintenance at Solar Star, which was built with SunPower® Oasis® Power Plant Technology on privately owned, previously disturbed land. With more than three gigawatts of power plant projects installed or under contract worldwide, SunPower is a proven leader in the design and construction of these significant projects. SunPower ensures that its projects are sensitive to the local land and surrounding uses, and its proven technology maximizes energy output over the long term. The Solar Star Projects will operate emissions-free for 20 years or more, while helping California achieve its renewable energy goals.

Economic and Environmental Benefits

- More than \$500 million in regional economic impact
- Approximately 650 construction jobs over a three-year construction period
- 15 full-time operations and maintenance positions created on-site
- High-efficiency SunPower solar panels and Oasis Power Plant Technology reduce land use
- BHE Solar cites an avoidance of more than 570,000 tons of carbon dioxide emissions per year—the equivalent of removing over 2 million cars from the road over 20 years
- Generation of clean electricity to power the equivalent of approximately 255,000 homes

Quick Facts

Location:	Rosamond, California
Capacity:	579 MW
Owner:	BHE Solar, a subsidiary of BHE Renewables
Design/Construction:	SunPower
Power Purchaser:	Southern California Edison
Technology:	SunPower® Oasis® Power Plant
No. of Modules:	Approx. 1,720,000
Equivalent No. of Homes Powered:	Approx. 255,000
Acres:	Approx. 3,200
Completion:	March 2015
Construction Jobs Created:	Approx. 650 over a three-year construction period

Project Location



Sample Project Fact Sheet

Source: SunPower.

site tours. Most developers already produce fact sheets and other resources describing proposed projects, but these may provide only basic information or be designed primarily for investors. Greater production and dissemination of community-oriented resources, highlighting information on local job creation potential, environmental impacts and protections, and other issues and benefits, could foster greater public engagement and support.

In addition, counties typically hold planning meetings on regular schedules (rather than project-by-project), but these meetings can be highly technical. However, by embracing new methods of communication and community involvement—for example, the monthly public meetings held by the California Air Resources Board to review progress and solicit general input—planners could facilitate an ongoing dialogue with communities about current and future developments, outside the complex and contentious context of permitting and approval processes for a specific project.

Another key method to promote transparency is public access to information about existing and planned power generation projects—solar and non-solar—as a means to provide context regarding the statewide and local energy systems. The California Energy Commission maintains a database of all operational, in-development and proposed energy facilities, which includes project status, location, capacity and links to public documents and proceedings.³⁶ Many counties maintain similar databases, but they are not always up-to-date or readily accessible or digestible by the public.³⁷ Counties and localities could use the state database to prepare current, easily accessible local energy project lists, or as a model to develop proprietary data to share directly with communities.

State and local leaders could build community-based, collaborative, and inclusive decision-making processes.

In addition to greater transparency in planning processes, participants emphasized the importance of building community buy-in by designing processes that involve communities at the earliest possible stage, with access to the data, funding, and other tools necessary to make their voices heard.

As an example of upfront, collaborative, and funded community involvement, many participants cited the National Forest Foundation, a nonprofit chartered by Congress with a broad mandate to foster connections between community groups and the U.S. Forest Service, including grant-making and educational programs.³⁸ The Foundation provides neutral facilitation for collaborative efforts dealing with Forest Service lands, such as the San Gabriel Mountains Community Collaborative, an organization designed to represent the general public by providing a forum for communication with the Forest Service, regular meetings, and informational resources directed toward preservation of the mountains' natural resources and community benefits.³⁹ The Collaborative and its equivalents around the country may provide a potential model for coordinated involvement and education of community members interested in solar resources and local lands protection. They could also potentially serve as an example for collaboration across multiple renewable generation technologies or emission reduction efforts more broadly. State leaders could consider creating and funding a state-level organization similar to the National Forest Foundation for solar development, or petitioning Congress to create a federal equivalent, in order to build community capacity and collaboration.

“Community choice aggregation can contribute directly to cleaner energy within a community. Microgrids contribute to resiliency. These benefits can be tied into new projects as a way to promote community buy-in.”

Kate Meis,
Local Government
Commission

Other Issues: Community Choice Aggregation

Initiated under AB 117 (Migden, Chapter 838, Statutes of 2002) and expanded by SB 790 (Leno, Chapter 590, Statutes of 2011), community choice aggregation (CCA) allows local electricity consumers to group together (on an opt-out basis) into a single municipal purchasing entity, by collecting and pooling their electricity rate payments and acting as a single customer for the local utility.⁴² Individual community members pay their bills directly to the aggregator, which then uses its enhanced, market-scale purchasing power to obtain favorable service rates from the local utility and, in many cases, negotiate with the utility to procure a minimum percentage of its power from renewable sources. (Customers typically have the option to select basic or renewable service, with the aggregator’s total power purchase mix reflective of the overall selections of its customers. For example, Marin Clean Energy offers 50% renewable service, 100% renewable service, 100% locally generated renewable service, and standard service that purchases PG&E’s baseline 33% renewable service.⁴³) Community choice aggregation is currently available in nine California counties and under exploration or development in an additional twenty, including solar-optimal counties such as Inyo, Riverside, and San Bernardino.⁴⁴

Some participants raised the possibility that community choice aggregators could promote optimal solar siting.

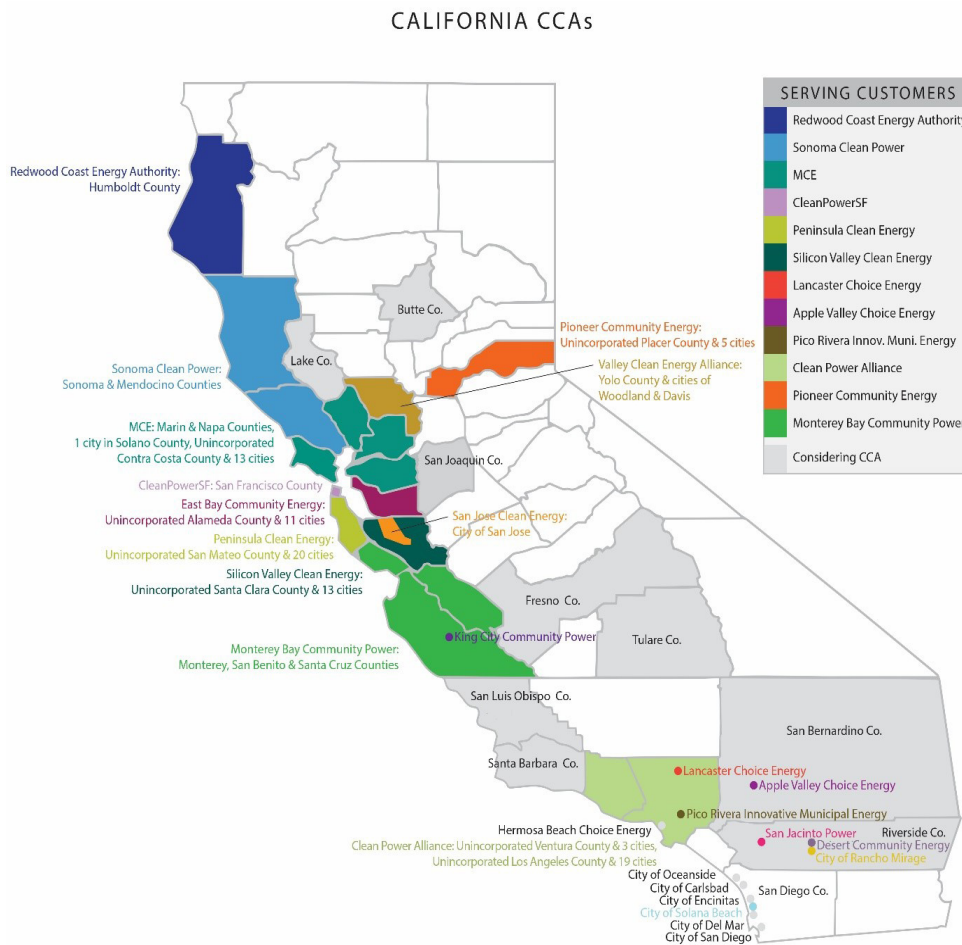
State and local leaders could integrate solar planning and groundwater planning processes.

Under the Sustainable Groundwater Management Act of 2014, which requires local governments to adopt management plans that limit groundwater usage, certain lands currently used for agricultural purposes may not be viable for those purposes in the coming decades.⁴⁰ As local groundwater planning agencies determine sustainable, long-term pumping levels and set limits for individual pumpers, they may reduce allocations below current levels in a manner that alters agricultural economics.⁴¹ These lands—large, rural open spaces—may become optimal for solar development, which has significantly reduced groundwater needs. By integrating their solar land-use planning processes with their preparation of Groundwater Sustainability Plans, local and county governments could potentially streamline the changeover of these lands, helping property owners to retain maximum value and communities to envision just transitions with regard to solar development.

State and local leaders could encourage development of local landscape-level plans by linking them to incentives like expedited review under the California Environmental Quality Act and establish a greater nexus between project benefits and environmental mitigation requirements.

The California Environmental Quality Act (CEQA) requires government agencies to analyze and (to the extent feasible) mitigate the environmental impacts of projects they undertake, fund or approve.⁴⁵ Since every utility-scale solar project involves permits and approvals from multiple governments and subsidiary agencies, and the use and transformation of significant quantities of land, CEQA review is a central component of any solar project planning process. (Under SB 226 [Simitian, Chapter 469, Statutes of 2011] most small-scale, rooftop solar projects are exempted from CEQA review requirements.)

Under CEQA, the lead agency in charge of a project approval process, in consultation with trustee and responsible agencies and the developer, must conduct an analysis of potential environmental impacts. If this initial review indicates that a project is likely to cause significant impacts, CEQA requires the most detailed level of review: preparation of an environmental impact report (EIR) that identifies all potential environmental impacts of a project and outlines measures that will be taken to mitigate those impacts or project alternatives to avoid impacts altogether (if the initial review does not identify significant impacts, then the agency issues a negative declaration or mitigated negative declaration—a determination of no impact contingent upon certain mitigation measures—which can conclude environmental review). The EIR is subject to public review and comment. All CEQA final decisions including EIRs and negative declarations are potentially subject to litigation if project opponents or community members feel that the lead agency erred in its scientific analysis, its choice of mitigation strategies, or its adherence to CEQA procedures such as public hearing and review requirements. In practice, CEQA litigation often serves as the focal point for conflict between statewide renewable energy goals, local environmental preservation efforts, and other community concerns, and can significantly increase project costs, permitting timeframes and overall uncertainty.



Community Choice Aggregation in California (as of mid-2018)

Source: CalCCA.

CEQA review conducted on a project-by-project basis can present a significant barrier to utility-scale solar development, but local jurisdictions that prepare comprehensive, solar development-inclusive programmatic EIRs when developing and approving general plans may allow individual projects to “tier” off the findings of the programmatic EIR. This can enable local leaders to grant a negative declaration or mitigated negative declaration for a solar PV project that complies with the terms laid out in the general plan, without having to undertake a costly new EIR, which could be subject to a higher risk of litigation. Such a CEQA process can essentially guarantee that with an appropriate depth of landscape-level planning, and projects that subsequently are designed to achieve minimum standards, a local government could substantially expedite CEQA review. The Governor’s Office of Planning and Research, which oversees state CEQA implementation, could promote the benefits of tiered review as a means to incentivize solar landscape plan development. OPR could also prepare legal guidance to inform local governments’ decisions in preparing solar PV-appropriate programmatic EIRs.

The opportunity to streamline the development process would be highly attractive to planners and to private developers and would likely encourage more local governments to conduct landscape-level planning in order to qualify.

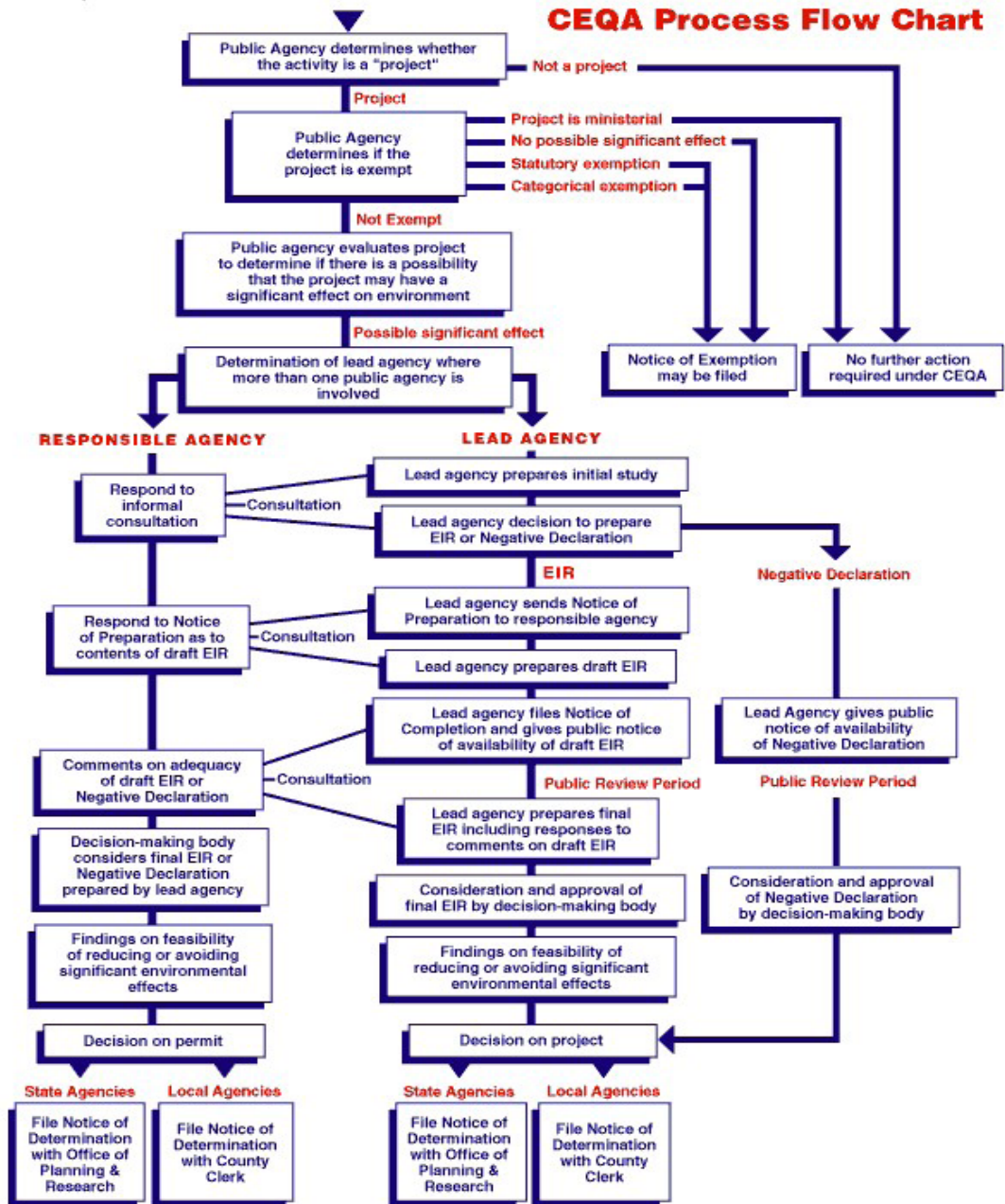
Other Issues: Community Choice Aggregation, continued

incentives by increasing statewide renewable energy demand and increasing local interest in renewable energy in prime solar generation areas. While the ability of CCAs to drive solar development in general and landscape planning processes in particular is not universally agreed among all participants, they could represent another tool in California’s suite of options to address its climate and energy needs and may be well positioned to drive substantial demand in the future.

By allowing communities to play an active role in their electricity purchasing, increase their consumption of renewable energy, and reduce their electrical bills, community choice aggregation could represent a promising mechanism to bridge the gap between solar development and wary local communities. While CCAs do not guarantee cheaper electricity, and statewide adoption of CCA-provided 100% renewable energy is currently infeasible, communities that can directly purchase the power that local renewable facilities produce, at reduced rates, may be more likely to support those projects. County governments in areas with significant development potential that support CCA development could potentially increase public buy-in to new projects by strengthening community ties to those projects. In particular, these governments could focus on structuring CCAs to ensure that low-income and environmental justice communities receive the greatest retail rate reductions, thus tying project benefits to project siting.

In addition, CCAs can serve as a platform for communities to incentivize distributed solar generation, with the ability to preference locally generated energy (and, in the case of some CCAs such as Marin Clean Energy, to allow customers to commit to 100% locally generated renewable energy). By allowing customers to elect to purchase local distributed generation, CCAs can generate market signals that will increase the value of distributed generation and thus increase its integration into the electrical grid. This enhanced deployment, in turn, can increase siting flexibility for all projects.

One example of this type of CEQA streamlining is the proposal by the Governor’s Office of Planning and Research for implementation of SB 743 (Steinberg, Chapter 386, Statutes of 2013), which requires lead agencies to evaluate and mitigate project impacts on total vehicle miles traveled (rather than on local congestion, which has historically been the traffic assessment required under CEQA). Under the proposal, projects that are immediately near major transit stops or transit corridors would be presumed to have no significant impact, in large part as a means to incentivize these developments.⁴⁶



CEQA Process Flow Chart
 Source: California Natural Resources Agency.

From a practical perspective, mitigation measures must be affordable, agreeable to the local community and feasible in the context of a project. In addition, under long-standing Supreme Court interpretation of the federal Constitution, there must exist a “nexus” between mitigation measures and the impacts of the project (that is, a requirement to address local environmental concerns not caused by the proposed project is unenforceable).⁴⁷ Thus, participants noted that identifying appropriate mitigation measures can be the most challenging aspect of the CEQA process, and inadequacy of mitigation is a frequent basis for litigation. In particular, developers and counties must ensure that mitigation measures sufficiently address the concerns of disadvantaged and environmental justice communities, which often suffer disproportionately from environmental harms.

State and local governments could potentially facilitate successful CEQA review and earn community buy-in for proposals by working to broaden the acceptable mitigation nexus. In particular, participants identified an opportunity to more concretely establish an appropriate nexus between benefits provided to environmental justice communities and project impacts. For example, developers might be eager to provide job training to disadvantaged community members or fund new community facilities in connection with a project, although such benefits may not satisfy CEQA requirements. Local and county governments could prepare general plans and zoning plans that accept a nexus for such benefits, and the state agencies that oversee CEQA, such as the California Natural Resources Agency and the Governor’s Office of Planning and Research, could issue guidance to similar effect. By doing so, they could both streamline CEQA review for many solar projects and ensure that CEQA mitigation measures address the immediate needs of local environmental justice communities.

State leaders could prepare more consistent requirements and distribute statewide guidance for solar developments.

Utility-scale solar facilities are developed on both the state and local scale, subject to approval processes that span state-level energy and utility regulators and local land-use, environmental and other permitting. Notably, while numerous state entities have oversight roles in approving solar PV projects—including for transmission, endangered species, and environmental review purposes—no federal or state authority issues construction or operating permits to solar PV developers. In addition, solar projects must satisfy both state climate and energy goals and local political and community needs. In this context, participants from both the developer and local government communities expressed a desire for more consistent state-level guidance and requirements, not as a means to override local concerns but as a clear blueprint to simplify and minimize conflict with the local processes that ultimately shape a project.

The Governor’s Office of Planning and Research has issued a Solar Permitting



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
4Part
5**RESOURCES AND INFORMATION:** This section provides informational materials that can help local governments clarify current state requirements for all solar installations.**Solar Permitting Guidebook Structure***Source: Governor's Office of Planning and Research, California Solar Permitting Guidebook.*

Guidebook that helps local governments and property owners navigate the permitting process for small solar energy systems, providing resources and recommendations on state law, project approval and expediting development.⁴⁸ The guidebook is not a complete reference, but it can stand as a uniform starting point for governments and developers as they initiate a planning process and public involvement. No equivalent guidebook exists for utility-scale solar developments, and it would necessarily be a more complex project involving a greater number of regulators and permitting concerns. But if the Office of Planning and Research spearheaded a similar project among state and local authorities to outline resources and recommendations for utility-scale projects, akin to the California County Planning Directors Association's 2012 Solar Energy Facility Permit Streamlining Guide, it could provide a baseline reference to help speed development across the state and ensure processes align with the state's goals.

Government and industry leaders could procure and disseminate information on property value impacts of solar siting.

According to participants, one of the most common community concerns surrounding the approval of solar sites is that local property values would fall due to the presence of a new development. Local residents, based on anticipated visual impacts and experience with other industrial-scale projects, often strongly believe that homes situated near proposed development sites will suffer decreases in value,

harming their owners and the communities in general. While governments and developers are confident that these negative effects do not generally occur—that the sight of new solar PV panels on previously undeveloped land is a substantive concern but does not actually harm property values—participants noted that they lack reliable, statistically significant data to combat the concern. A Lawrence Berkeley National Laboratory assessment of property values near wind energy facilities, conducted across thousands of homes in multiple states, found no statistical evidence of negative effects.⁴⁹ An equivalent analysis for solar facilities, prepared or supported by an appropriate combination of local and state leaders and developers or an industry party such as the National Association of Realtors, could potentially address public opposition to new solar projects.

State leaders could create a work group to assess options for reform of the current tax assessment process for solar PV and associated energy storage, including the tax exemption and tax reassessment process.

Assembly Bill 1451 (Leno, Chapter 538, Statutes of 2008) created a property tax exemption for a range of solar energy systems, including newly constructed solar PV projects. However, battery storage for solar PV is not exempt under the law. Some energy storage proponents argue that the AB 1451 exemption should extend to storage assets built on-site at solar PV facilities, while others believe that storing solar energy should entail a tax, particularly since batteries can occupy significant land space and present visual impacts. Some counties now make up for the lack of property tax revenue from solar projects by adding fees to the cost of a building permit. The County Tax Assessors Association could potentially conduct a study and present options to the legislature for clean-up or clarifying legislation regarding property tax exemptions for energy storage associated with solar PV. Ultimately, after sufficient study the state Legislature could amend the law to grant exemptions for battery storage facilities at solar PV sites, possibly at a partial rate to account for the potential of these facilities to store energy other than solar generated on-site.

In addition, counties are often unable to reassess solar properties for tax purposes when facilities change ownership, because the developers typically retain some ownership to avoid the tax liability. The result is that counties, which rely heavily on property tax revenues, are left with flat tax revenue even as property values increase. To make up for the lack of increased property tax revenue, some counties require solar PV companies to pay county sales taxes. Other counties like Riverside County simply charge acreage fees or public safety fees of hundreds of dollars per acre (described in the prior discussion of community benefits programs) instead, but approaches vary significantly. Industry, meanwhile, may prefer a stable tax regime rather than experience these inconsistent fees and could be willing to pay more in taxes for increased certainty. In addition to providing an exemption for battery storage, the legislature could therefore consider reforms to allow counties to reassess properties more regularly, which could promote certainty and development on both sides (although it is important to note that such reforms could require a constitutional amendment under Proposition 13).



Challenge 2: Lack of Coordination among Utilities, Regulators and Land-Use and Grid Planners

“Perhaps the best role for the state is to provide incentives, technical information, transmission plans and other tools to identify preferred sites. Then local governments can take these into account when making final siting decisions.”

David Bunn,
California
Department of
Conservation

A large and diverse set of government and private entities have a hand in the solar planning process, including (but not limited to) the California Public Utilities Commission, which reviews and approves power purchase agreements for new facilities and sets goals for renewable energy procurement; local planning departments, which provide necessary land-use authorizations; and the state’s electrical utilities, which purchase electricity for distribution to retail customers. Shepherding a project through the planning and development process to approval and operation requires coordination among each of these disparate actors, many of which operate on different timelines and with varying organizational mandates and priorities. A failure to coordinate among them—such as by aligning process timelines and incorporating each other’s considerations into approval decisions—can increase costs for developers and lead to extensive litigation.

Participants agreed that the misalignment of local land-use planning, on one hand, and statewide electrical grid planning, on the other, is an obstacle to optimal solar PV development. Prime solar generation locations—high-sun, low-population areas—are not always in prime transmission locations, which link to and from dense population centers. They can also overlap with vital ecosystems and species habitats that are highly sensitive to development impacts. Participants emphasized that in order to be most effective, an ideal planning system for solar PV development would include robust processes to bring together decision-makers at multiple levels.

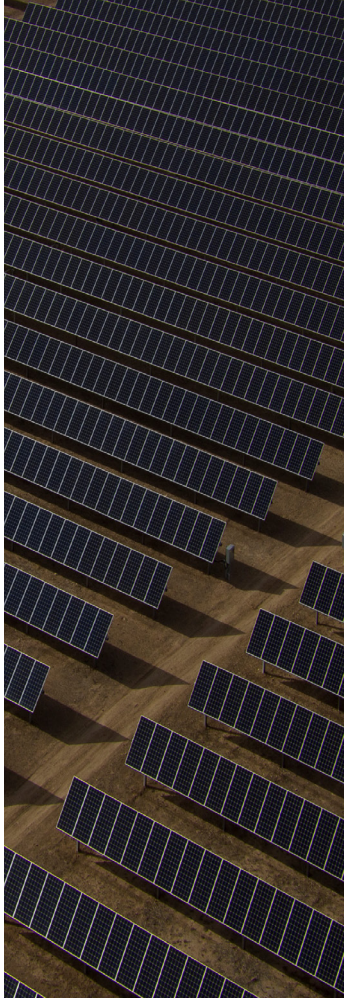
SOLUTIONS

County planners could identify government representatives at all levels (e.g., state, city, and local) to include in the planning process.

The first step to increase coordination among all public and private parties to the planning process is to identify government entities at all levels of the state that may have a hand in the process and ensure that a representative from each is involved in or informed from the outset. While no state or federal agency has authority to directly approve a given solar PV project, many play a role in shaping projects or have responsibility for approving essential, related components.

Government Authorities Potentially Involved in Planning Process

Local Authority	Responsibilities
County Planning Department	Approval of facility's land-use permit and compliance with zoning and general plan requirements and, typically, preparation of California Environmental Quality Act analysis as "lead agency".
County Board of Supervisors	General county-level executive governance and management.
County Economic Development Department	Implementation of community investment and economic incentive programs.
County Agricultural Department/ Planning Department	Protection of agricultural lands.
County Fire Department	Regulation and inspection of facilities for fire and wildfire safety.
City Council/Planning Department	Approval of new uses within an incorporated city.
State Authority	Responsibilities
California Energy Commission	The state's primary energy policy agency, including efficiency, renewables, and research and development. ⁵⁰
California Public Utilities Commission	Regulation of investor-owned electrical utilities and transmission infrastructure, including renewable energy power purchase agreements and procurement plans and retail energy rates, and limited oversight of Community Choice Aggregation programs. ⁵¹
California Independent System Operator	Operation of the state's electrical transmission grid, including approving the connection of a new electrical generating facility (including renewables) to the grid. ⁵²
California Air Resources Board	Achievement of state air quality and greenhouse gas emission reduction targets, including the cap-and-trade program, ambient air quality standards, and community air quality protection. ⁵³
California Environmental Protection Agency	Coordination of state environmental law enforcement, including environmental justice programs. ⁵⁴
Governor's Office of Planning and Research	Coordination of state-level California Environmental Quality Act review and land use and planning guidance for local governments. ⁵⁵
California Department of Fish and Wildlife	Implementation of state species management and habitat conservation policies, including the California Endangered Species Act and California Environmental Quality Act. ⁵⁶
California Department of Conservation	Protection of state farmland and open spaces, including Williamson Act programs. ⁵⁷
Federal Authority	Responsibilities
U.S. Bureau of Land Management	Approval of right-of-way permits for projects located on most federally owned lands (i.e., excluding military and national park sites). ⁵⁸
U.S. Federal Energy Regulatory Commission	Regulation and oversight of interstate electrical transmission and wholesale sales of electricity across state lines. ⁵⁹
U.S. Fish & Wildlife Service	Federal wildlife and habitat protection and land conservation planning, including administration of the Endangered Species Act. ⁶⁰



The specific authorities involved at each level will vary depending on the particular design and location of a project; for example, a project may require approval from the city council or planning department if located within the limits of an incorporated city, or Bureau of Land Management approval if located on federal BLM land, or neither, if simply located in an unincorporated area of a county. Regardless, the authority in charge of approving solar PV projects—such as a county planning department—could convene a working group that brings together all potentially involved agencies, utilities, and project developers, in order to determine whose involvement and input is essential (similar processes are used in some jurisdictions for highly complex residential commercial and industrial projects). When individual projects are later under consideration, this process would increase efficiency in the initial review stages, as well as if a project is later modified in a manner that necessitates new involvement. These agencies, whether ultimately providing key approvals or playing advisory roles, could in turn help to identify all key public constituencies that ought to offer input in the planning process.

In particular, participants emphasized the importance of county planners' solicitation of input from city managers and officials, who often represent the first line of political contact for local communities and businesses and whose support for a project may be necessary even when permitting is ultimately housed at the county level. As an example of strong county-city coordination in regional planning, participants cited the state's 35 regional Air Pollution Control Districts and Air Quality Management Districts, which hold the statutory mandate to manage compliance with federal (including Clean Air Act) and state air quality regimes. Under the enabling legislation, districts are generally required to include city officials (such as city council members) in their management structures, which helps to ensure consensus decision-making and reduce conflict and costly delays.⁶¹ County planners could use the districts' involvement of city governments as a model for improved coordination in solar planning processes.

State legislators could encourage and help fund local general plan elements on climate action or renewable energy specifically to ensure local leaders identify how their county or city will contribute to the state's renewable energy goals.

State law governing the content of county general plans, which largely dates to the 1960s and 1970s, requires consideration of land use, housing, conservation and other traditional planning topics—but, understandably, does not involve any consideration of renewable energy uses.⁶² In part as a result, few counties have included renewable energy or solar-focused elements in their plans, even with codification of the state's renewable energy targets and legislative priority on par with other long-term planning priorities, such as adequate housing and transportation.

In 2011, Assembly Bill X1-13 (V. Manuel Perez, Chapter 10, Statutes of 2011) authorized the Energy Commission to award up to \$7 million in grants for certain counties to develop rules and policies that facilitate the development of eligible renewable energy resources, associated transmission facilities, and the processing of permits. The Energy Commission granted more than \$5 million to eligible

counties, but further funding (potentially with an increased emphasis or oversight on promoting appropriate development) is needed for more progress statewide.⁶³

The state legislature could address this imbalance by providing similar planning grants or other funding for counties to develop these elements, which could be a vehicle for landscape-level planning to identify the quantity and optimal locations for these facilities and coordinate additional processes. These elements could complement the strategies developed pursuant to the Regional Conservation Investment Strategies Program, described later in this report. The state could also assist by providing data and analytical tools, for use by all stakeholders, for better decision making. Ultimately, these planning elements could become landscape-level plans that pre-designate zones where transmission and solar PV generation would be appropriate.

County planners could prepare solar-focused permitting guidebooks.

In addition to increased guidance at the state level, participants discussed the value of formal, publicly available county-level guidance in helping developers, governments and communities coordinate effectively throughout the planning process. Specifically, county-level guidance in the form of a permitting guidebook or handbook could assist developers in understanding a particular county's approval process prior to initiating a project; provide communities with context regarding the full scope and complexity of permitting and the agencies involved; facilitate state review and analysis of county processes; and allow counties to more easily exchange information and best practices.

As mentioned, Butte County has prepared such a guidebook in the form of its Utility-Scale Solar Guide, which participants cited as a potential model for other counties around the state.⁶⁴ The guide includes key information on development and design, local and federal permitting processes, community benefits and outreach, and future innovations to consider, with process diagrams, maps and links to additional resources and key regulators' websites. County officials around the state could facilitate streamlined permitting processes and increased public acceptance by preparing similar guidebooks.



COUNTY APPLICATION PROCESS

Step 0

Predevelopment Review

Prior to the formal submittal of a development application, applicants and property owners can choose to participate in a pre-application conference, which is an interdepartmental review meeting with County staff from the Development Services Department, Environmental Health Division, Public Works Department, Fire Department, and any other agency that has jurisdiction over the site. While not required, a pre-application conference can be helpful, especially when there are challenges or constraints specific to the site.

At this meeting, you'll learn about local, State, and/or federal requirements that may apply to your project; hear an overview of the County review process; discuss possible changes if appropriate; and find out what information and materials are required for the formal application, including any necessary technical studies.

Any direction from the County will be preliminary and may be refined or changed as the application progresses through the formal process. You must submit a pre-application packet prior to scheduling the meeting.

In addition, outreach to establish a good neighbor policy with adjacent property owners is helpful and encouraged, although not required by the County. Adjacent property owners within 300 feet of the property boundaries will receive notice of the proposal and are encouraged to provide input and attend the public hearing.

The **application**, with more details, including a checklist of pre-application materials, can be found on the Butte County Development Services website (see Documents/Planning/Project Application Forms).

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Step 1

Submit Application

Materials

Required materials for application submittal are provided on the CUP application form available from the Department of Development Services, Planning Division. In addition to those required items, consider including the following recommended items on the drawings for utility-scale solar projects.

Site Plans

Existing features to include:

- Structures, access roads, powerlines, and other utilities
- Trees or other landscape features
- Any significant ridgelines

Proposed features to include:

- Solar array footprint and layout
- Access roads, fencing, and utility infrastructure (e.g., poles and powerlines)
- Area and amount of grading and site disturbance

Access Road Drawings

- Sections showing slope, subgrade material, and surface material
- Geometry plans

Elevations

- Perimeter elevation showing fencing, landscaping, and solar panels beyond
- Solar array front-facing elevation (if tracking array, include elevation shown at maximum height configuration)
- Solar array side elevation (if tracking array, elevation should show rotating capabilities)

Specifications

- Solar product manufacturer specifications (e.g., solar modules, inverters, racking and/or tracking array, transformer)
- Proposed lighting manufacturer specifications

Photos

- Image or photo of proposed signage
- Visual simulations

Note: Wherever applicable, include existing and proposed dimensions, colors, and materials on any drawings. The **application** with more details and a checklist of application packet materials can be found on the Butte County Development Services website (see Documents/Planning/Project Application Forms).

BUTTE UTILITY-SCALE SOLAR GUIDE

Step 2

County Staff Reviews

The County has 30 days to determine if the application is complete. If the application is incomplete, County staff will work with you to refine and complete it.

Is the application complete?

NO
YES

Step 3

Environmental Review

Once the application is complete, County staff will consider potential environmental impacts of the proposed project, as required by CEQA. The type of CEQA document (e.g., Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) will be determined through the environmental review process. County staff will prepare a staff report that presents staff's evaluation, including the CEQA review document, and recommended actions to the Planning Commission.

More information about the CEQA process can be found on the next page.

Step 4

County Staff Provides Public Notice of Hearing

Notices are mailed or delivered at least ten days before the scheduled Planning Commission hearing to project site owners, the applicant, local agencies, affected property owners, and those requesting a notice.

Step 5

Planning Commission Hearing

Required Findings and Potential Conditions of Approval

The Planning Commission may approve an application for a CUP only if the proposed project complies with applicable standards in the **Zoning Ordinance**, other County ordinances, the **General Plan** and any other applicable land use plans, and the County Improvement Standards. The Planning Commission must also be able to make the five findings specified in **Section 24-222 of the Zoning Ordinance**. The Planning Commission may attach conditions to the approval of a CUP as needed to ensure compliance with ordinances, plans, and standards.

Step 6

Permit is issued and approval goes into effect!

Appeal/Review Process

YES

Is the approval appealed or called up for review within 10 days of approval?

NO

APPROVAL

BUTTE UTILITY-SCALE SOLAR GUIDE

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Butte County Solar Guide

Source: Butte County (California), Butte County Solar Guide.

County leaders could form and use existing councils of governments to coordinate planning.

Participants noted that councils of governments (COGs) or metropolitan planning organizations (MPOs)—regional or county-level organizations that allow local governments to collaboratively plan projects that cross multiple jurisdictions and require long-term planning and dedicated sources of funding—present a potentially useful venue for local jurisdictions engaged in solar planning to coordinate their planning and approval processes and ensure the most streamlined, uniform procedures and requirements possible. Councils of governments and similar planning entities offer a regional venue for management of key public assets, providing representation of all member communities and consideration of long-term development needs and trends.⁶⁵ Given the state-level need for increased renewable generation, county-level needs to ensure adequate energy supplies and promote economic development, and community-level needs to protect community character and public health, councils of governments could provide optimal planning expertise and resources for solar development around the state. Many councils of governments are already involved in small-scale energy planning via the administration of Property Assessed Clean Energy programs, such as the Western Riverside Council of Governments’ CaliforniaFirst, HERO and SAMAS programs which have facilitated access to energy efficiency and solar panel installations for millions of residential and commercial customers.⁶⁶

FIGURE 6.5 CORE REVENUES (IN NOMINAL DOLLARS)

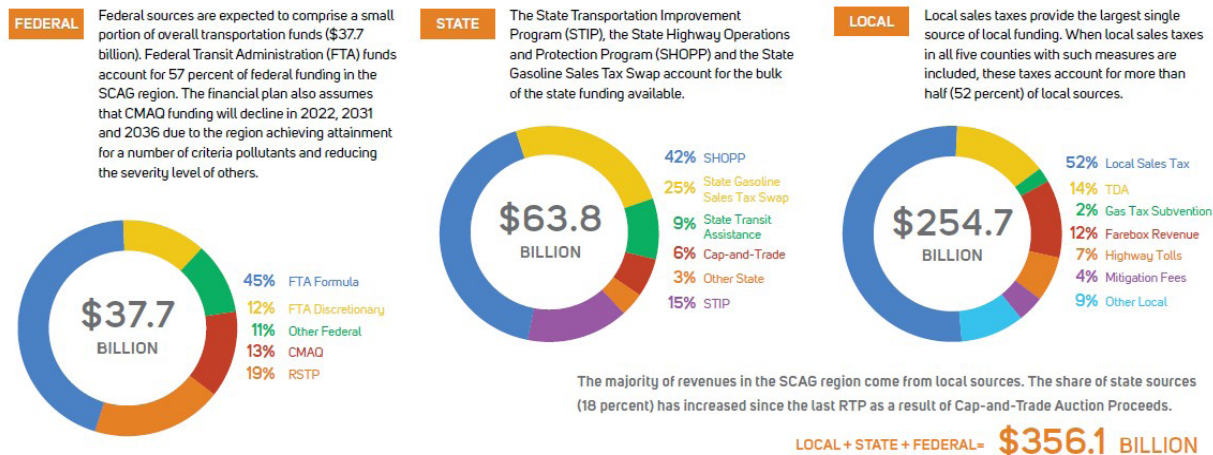


TABLE 6.1 CORE REVENUE FORECAST FY 2016–2040

(in Nominal Dollars, Billions)

COUNTY	FY 2016–2020	FY 2021–2025	FY 2026–2030	FY 2031–2035	FY 2036–2040	TOTAL
Imperial	\$0.5	\$0.5	\$0.6	\$0.7	\$0.8	\$3.2
Los Angeles	\$34.3	\$38.0	\$45.4	\$53.1	\$55.0	\$225.8
Orange	\$8.5	\$8.5	\$10.1	\$12.1	\$14.2	\$53.4
Riverside	\$5.4	\$6.3	\$7.6	\$9.3	\$10.0	\$38.6
San Bernardino	\$4.2	\$4.8	\$5.6	\$6.5	\$7.5	\$28.6
Ventura	\$1.0	\$1.1	\$1.3	\$1.5	\$1.7	\$6.5
TOTAL	\$53.9	\$59.2	\$70.6	\$83.1	\$89.3	\$356.1

Source: SCAG Revenue Model 2015. Note: Numbers may not sum to total due to rounding.

Sample SCS Analysis (Southern California Association of Governments)

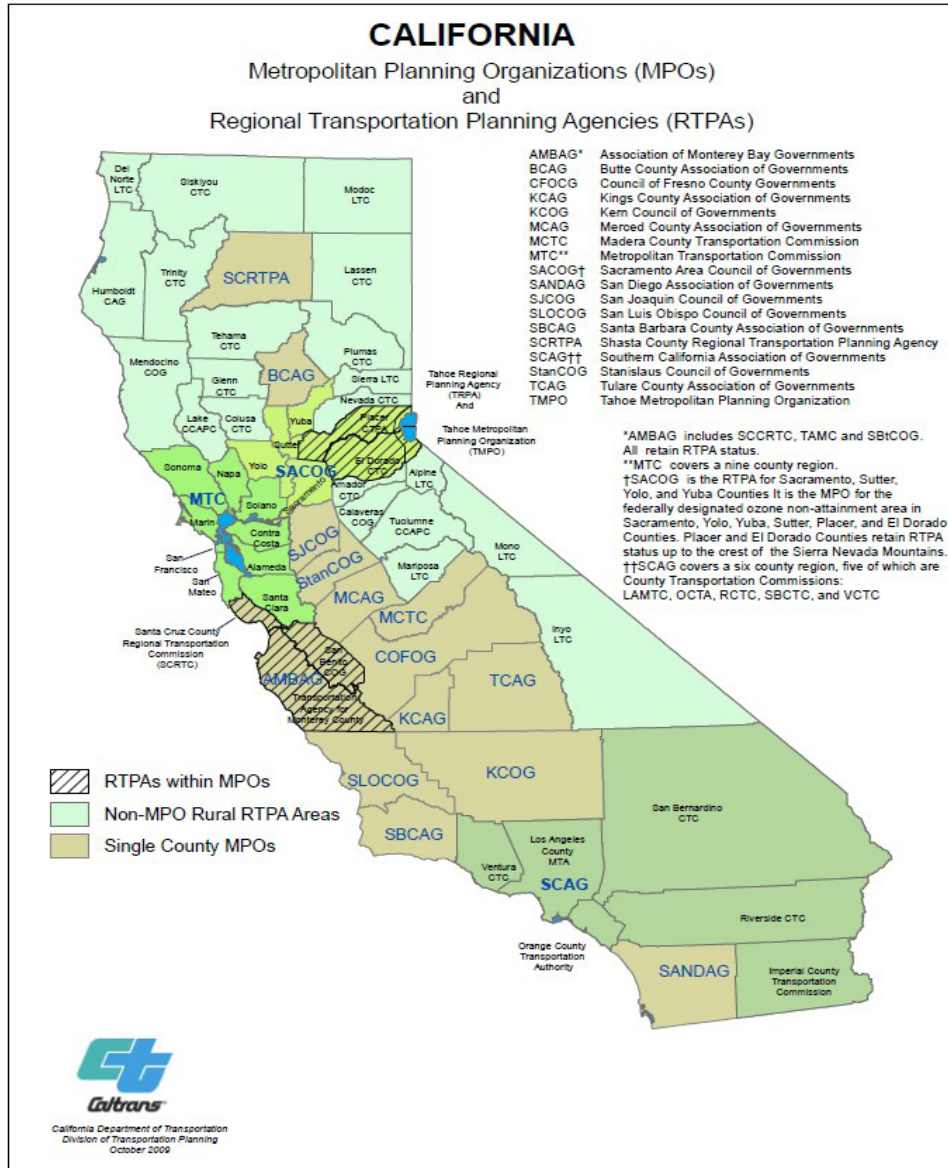
Source: Southern California Association of Governments, The 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy.

Under Senate Bill 375 (Steinberg, Chapter 728, Statutes of 2008), each of the state's metropolitan planning organizations and regional transportation planning agencies (including many councils of governments) is required to develop an integrated transportation, land use and housing plan designed to allow the region to meet its greenhouse gas emission reduction targets under the California Air Resources Board's statewide program, known as a Sustainable Communities Strategy.⁶⁷ The strategies, which are reviewed and approved by the Air Resources Board, are prepared by committees of local elected officials and include detailed analyses of existing and expected housing and transportation demand, proposals for new policies and investments to ensure sustainable growth, and financing options and opportunities.⁶⁸ As such, they represent a model of county-scale engagement of local and regional representatives to conduct long-range resource planning. Participants highlighted the Sustainable Communities Strategies as an example of a coordinated planning process that might serve county leaders engaged in solar PV development, and as a highlight of the benefits of councils of governments in planning processes.

State transmission planners could better incorporate county-level land-use planning objectives.

Access to transmission infrastructure sufficient to carry peak generating capacity to dense markets is essential to any utility-scale solar PV development project.⁶⁹ As counties and developers plan new projects in order to meet the requirements of SB 350 and the Renewables Portfolio Standard, the state will need to ensure that sufficient transmission infrastructure is in place to support these facilities. Primary responsibility for statewide planning of new transmission in California rests with the California Independent System Operator, which manages the majority of the state's electrical grid by conducting power supply assessments and by identifying system upgrades necessary to meet market demand and state policy goals. In its planning capacity, the California Independent System Operator conducts an annual Transmission Planning Process, which includes coordination with the California Energy Commission and the California Public Utilities Commission to accurately assess system-wide electricity supply and demand and renewable energy requirements.⁷⁰ The CAISO process does not create any binding obligations for locating or building transmission but helps create a state roadmap of anticipated needs. Meanwhile, siting of specific transmission lines is the responsibility of individual transmission owners (typically the state's electric utilities), with California Public Utilities Commission approval required for all large transmission facilities.

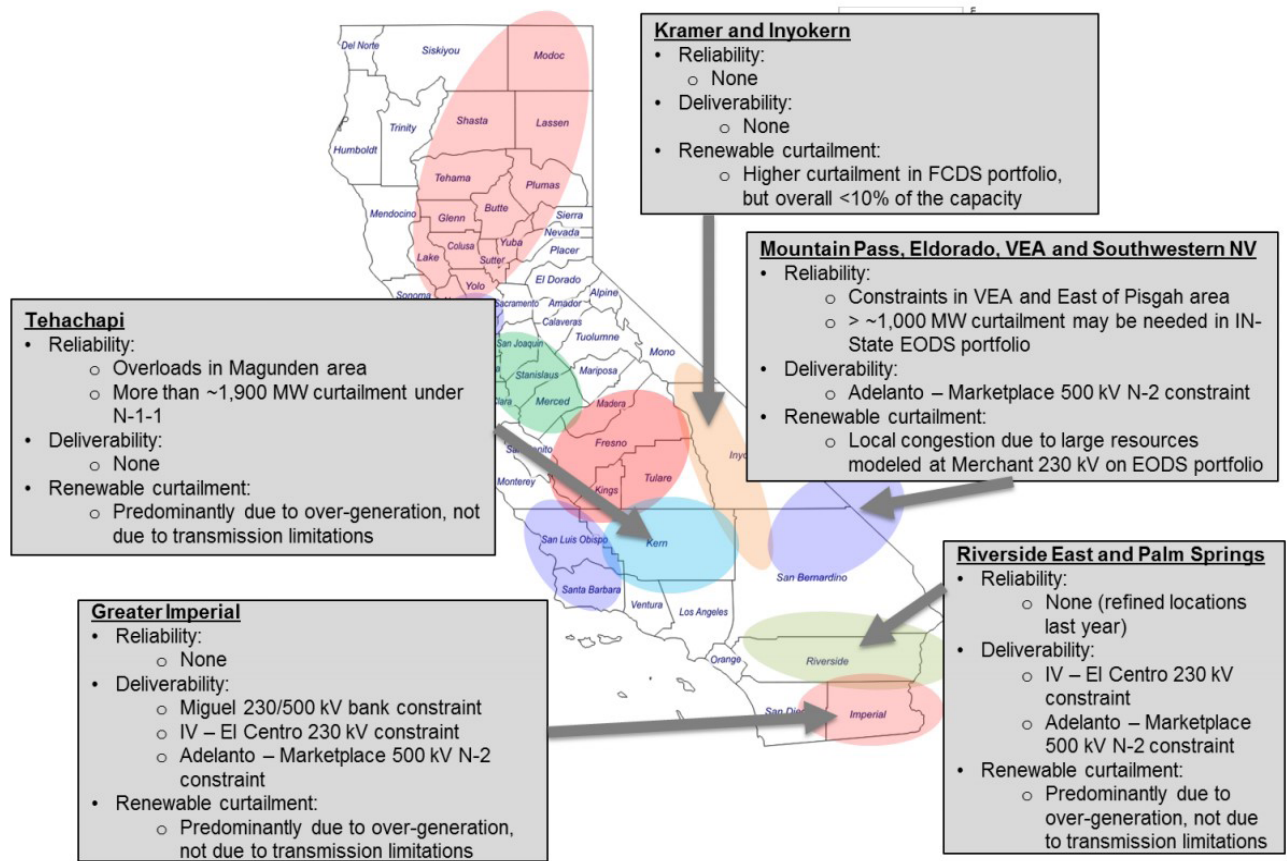
The CAISO transmission planning process is limited to consideration of reliability, public policy, and economic needs—i.e., function, rather than location or other factors—in identifying transmission needs and solutions.⁷¹ As a result, statewide transmission plans can fully address system supply and demand needs but fail to account for the local land-use, environmental and political context in which proposed lines may be placed. Public Utilities Commission review of siting plans, meanwhile, involves a reliability and feasibility analysis, followed by a CEQA analysis, which may include some, but not all, of the land-use concerns relevant at the county level. To address this discrepancy, participants emphasized the need for state transmission



California MPOs and RTPAs

Source: California Department of Transportation.

planners to directly incorporate county-level land-use planning concepts in their grid-wide planning process. By explicitly adding location and land-use considerations to the core group of factors analyzed in the transmission planning process, CAISO leaders could ensure that plans developed at the local level are adequately reflected in state priorities. Similarly, while CPUC leaders may not be able to add landscape planning considerations as a formal factor for transmission approval,⁷² they could work to involve county planning officials in the proposal review process to increase the likelihood that landscape-optimal sites are selected. Each measure, in turn, could promote further local-level planning for solar development by providing a valuable forum to disseminate and build on local objectives.



CAISO 50% RPS Portfolio Evaluation Map (Southern California Zones)

Source: California Independent System Operator, 2016-2017 Transmission Plan.

The state began to address this issue when it convened the Renewable Energy Transmission Initiative 2.0.⁷⁴ As part of the process, the California Energy Commission conducted extensive outreach to county governments and land-use planners via webinars, information sessions and a public meeting that solicited and information on county-level concerns.⁷⁵ Through this process, counties were able to communicate details of their land use planning processes and efforts to streamline permitting for renewable energy, providing resources and data that could be used to shape future transmission planning processes and recommendations. Participants lauded the integration of iterative, local and state planning processes as a model for state planners pursuing ambitious renewable generation goals and encouraged the development of follow-up initiatives in the future.

Participants also discussed the Desert Renewable Energy Conservation Plan, which similarly aimed to integrate local and statewide concerns into one planning process. After convening a stakeholder group of county governments, industry representatives, utilities, and community and environmental groups, the federal and state authorities preparing the plan produced both a conservation framework and an amendment to the land-use plan for Bureau of Land Management lands.⁷⁶ The result was a comprehensive plan for renewable energy development and conservation in the California desert.

Focus: The Renewable Energy Transmission Initiative (RETI)

In order to support the state's goal to achieve 33% renewable energy, in 2007 the state initiated the Renewable Energy Transmission Initiative, a multi-agency effort to identify priority "Competitive Renewable Energy Zones" and develop a conceptual transmission plan to reach those zones. In order to address the significant transmission challenges posed by the expected introduction of new renewable energy into the state's electrical grid pursuant to the 50% Renewables Portfolio Standard codified in SB 350, in 2015 the California Energy Commission, California Natural Resources Agency, California Public Utilities Commission, and the California Independent System Operator convened the Renewable Energy Transmission Initiative 2.0. This effort was a second cross-agency process that compared projected electricity demand and renewable energy production needs with existing and potential new transmission infrastructure. The effort drew experts from all state energy-related agencies together with transmission planning entities, environmental stakeholders, tribes, county officials, and land-use planners to identify technically optimal and least-conflict areas for new transmission development, for consideration by state and local planners over the course of SB 350 implementation.⁷³ These initiatives are a prime example of the benefits of integrating planning processes across substantive mandates and levels of government, providing relevant stakeholders with an agreed framework for and experience in assessing generation and transmission needs and opportunities.

While the plan's outcome is viewed quite differently by various stakeholder groups—with some believing that it heavily prioritized conservation over energy development—if conducted in a manner that addresses all stakeholders' concerns, the process could be an example for transmission planners for incorporating local land-use concerns into long-term, statewide processes.

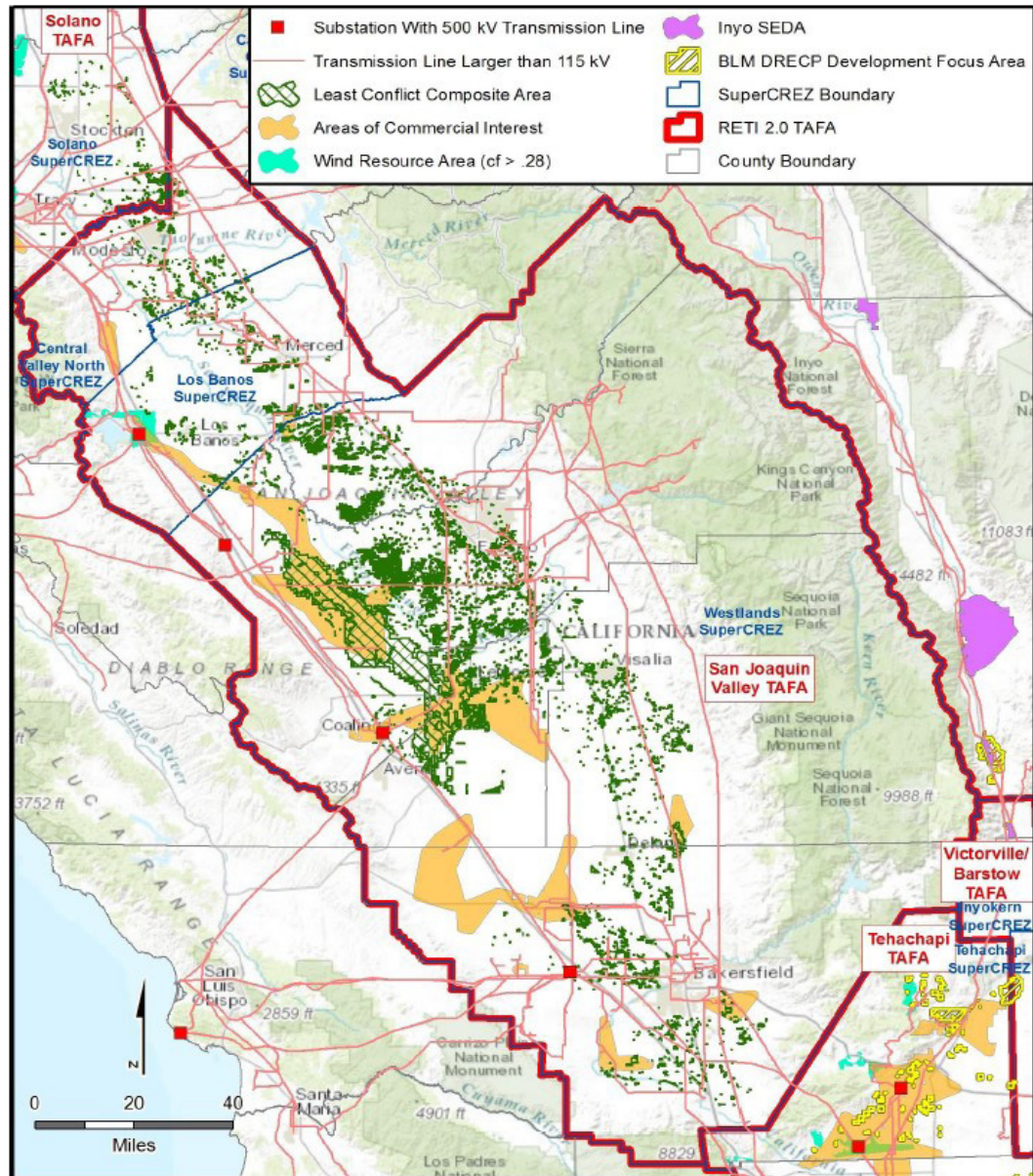
Finally, participants cited the example of airport land use commissions as model local agencies designed to collectively achieve statewide planning objectives. Under state law, every county that includes a public airport must create an airport land use commission, comprised of city and county representatives, aviation experts and members of the public, tasked with adopting land use plans that promote airport expansion while protecting public health and limiting noise and safety hazards.⁷⁸ These airport land use compatibility plans must cover at least 20 years, and may include building height restrictions, special building code requirements land use specifications.⁷⁹ In turn, the California Department of Transportation has produced and periodically updates an Airport Land Use Planning Handbook, which includes detailed policy development recommendations, a general plan compliance checklist, and sample implementation documents.⁸⁰ The creation of equivalent county-level transmission and land use planning commissions could help counties place appropriate emphasis on integrating transmission and land-use planning.

State leaders could provide grants to counties for solar project planning.

While the enhanced and expanded planning processes discussed earlier ranked high on participants' list of solutions to improve coordination and community buy-in, the county governments that spearhead these processes often face limited budgets and financial pressures. In order to facilitate better involvement of stakeholders and collection and dissemination of more detailed data, state leaders could provide grant funding to county governments for solar planning process enhancement.

"If all counties did solar planning, you could get a picture of where the best fit is for a project state-wide. The state could bring counties, utilities, CPUC, CAISO and other stakeholders to the table with this information so that the cost, capacity and location of new transmission upgrades could be optimized not just for the individual project but for all stakeholders."

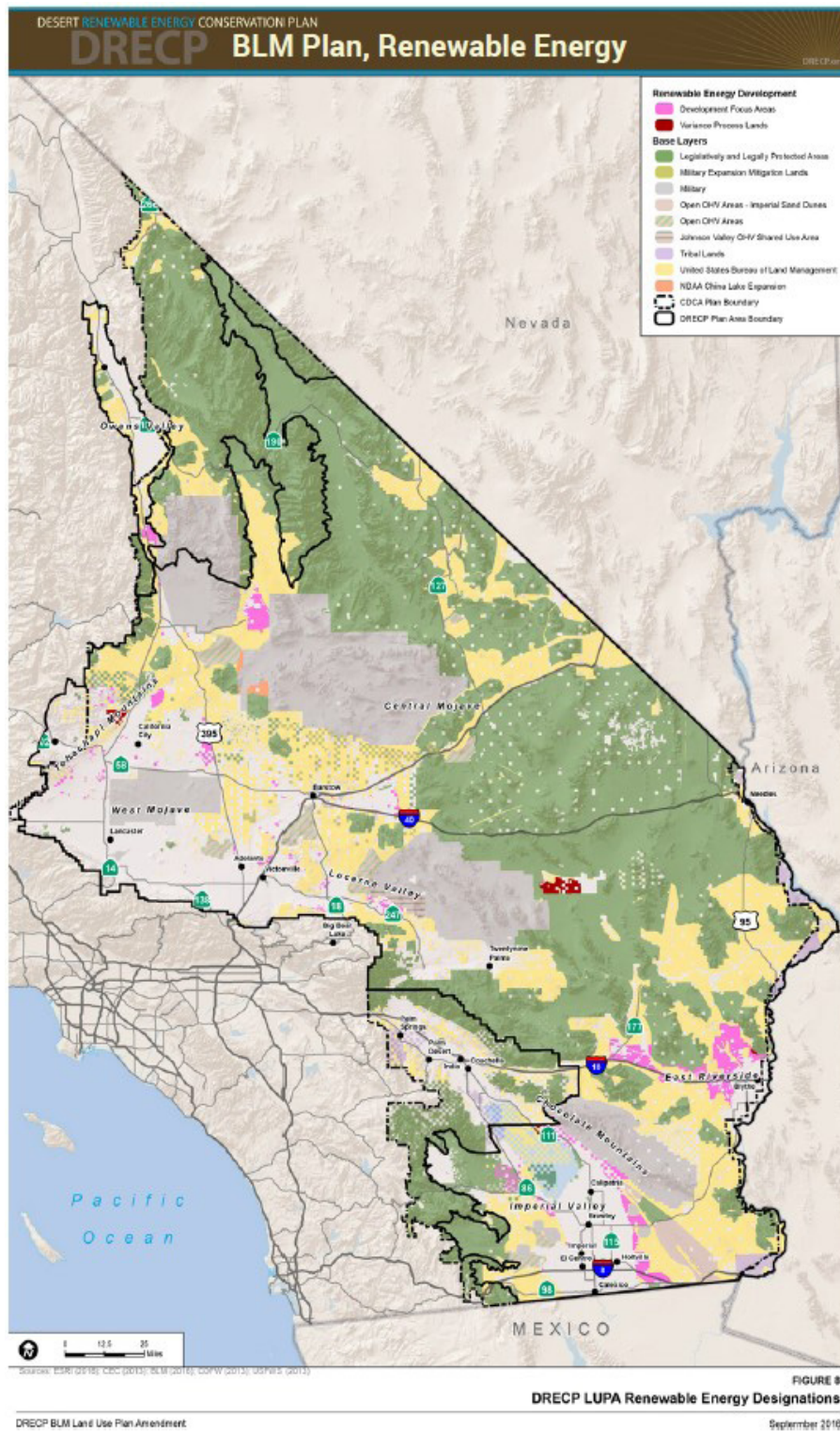
Michelle Nuttall,
Southern California
Edison



Sample RETI 2.0 Transmission Assessment Focus Area Map

Source: California Energy Commission, Renewable Energy Transmission Initiative 2.0 Plenary Report Appendix A.

As discussed earlier, the legislature authorized the California Energy Commission to award up to \$7 million in grants to qualified counties to update their general plans and zoning codes, complete environmental studies and mitigation plans, and engage the public. Grants could also help ensure that county land use plans are consistent with federal and state goals for renewable resource development and natural resource conservation. The commission held competitive solicitations in 2013 and 2014, and approved grant awards to Imperial, Inyo, Los Angeles, Riverside, San Bernardino, and San Luis Obispo counties. Under this program, Imperial and San Bernardino counties have received awards for creating or updating renewable energy elements in their general plans.⁸¹ By allotting more funding for plan and process improvement grants, state renewable energy leaders could ensure that counties are encouraged to optimize their solar facility approvals.



Focus: The Desert Renewable Energy Conservation Plan

In September 2016 the U.S. Department of the Interior, U.S. Bureau of Land Management, and U.S. Fish & Wildlife Service, together with the California Energy Commission and Department of Fish and Wildlife, finalized the Desert Renewable Energy Conservation Plan Land Use Plan Amendments. This landscape-level plan is “designed to provide a blueprint across 22 million acres of public and private land in California’s desert region for streamlining renewable energy development while conserving unique and valuable ecosystems and providing outdoor recreation opportunities.”⁷⁷ The plan attempts to balance local, state and federal conservation and renewable energy production goals. While the plan is currently subject to revision or even rescission by the federal government—creating significant uncertainty as to the priority of the various protected and best-fit lands it identifies and the options for mitigation on public lands covered by the plan—it still serves as an example of collaborative planning across the federal, state and local levels.

Sample DRECP Comprehensive Planning Map
Source: US Bureau of Land Management.

Other Issues: Power Purchase Agreements

The California Public Utilities Commission has the authority to approve the utility generation auction process and resulting power purchase agreements (PPAs), which govern the terms by which a private solar developer sells the power it produces, and which represent the purchase commitment necessary to secure the economic viability of project development.⁸² Because of its approval authority, the Public Utilities Commission has the power to shape the structure of the auction and the content of these agreements in order to adequately account for and support key state energy policy goals.

The Public Utilities Commission could consider using these approval powers to reward developers and power purchasers that engage with local jurisdictions in improved landscape-level planning up front. Incorporating project siting and landscape planning considerations in PPA approvals is a highly controversial measure and would likely require increasing staff capacity at the CPUC, but it has gained traction among certain stakeholders. By providing expedited or streamlined review for projects located in jurisdictions that employ the right planning processes, the CPUC could promote greater collaboration over these processes and ensure plan implementation through the administration of the agreements.

The California Department of Fish and Wildlife could improve coordination of endangered species permitting and data-sharing with federal and local governments.

Since utility-scale solar projects are often located in underpopulated and undeveloped lands, they can pose particularly challenging risks to endangered species populations and habitats, and as a result can require substantial review under both the federal and California Endangered Species Act.⁸³ This process can entail separate but potentially duplicative processes involving the California Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and, if federal lands are involved, the U.S. Bureau of Land Management, U.S. Forest Service or Department of Defense. Improved coordination to avoid duplication should be prioritized, particularly for projects that are consistent with landscape-level plans. The state legislature could provide the Department of Fish and Wildlife with funding for increased staff capacity to coordinate with other state and federal agencies, and/or to invest in more data monitoring and analysis to increase understanding of the impacts of solar PV on key species across all levels of government and provide better recommendations for mitigation measures. Further, planning coordination, including landscape level planning, may maximize mitigation investments by directing them to the lands identified as high value and quality to achieve the “fully mitigated” requirement of the California Endangered Species Act.⁸⁴ The Energy Development Companion Plan, a component of the California State Wildlife Action Plan that identifies key goals for planning, collaboration, and communication around energy development planning and wildlife conservation, is a model for the increased coordination that the Department of Fish and Wildlife could promote with increased resources.

Participants also noted that mitigation land values may begin to change as climate change progresses, and different lands may soon become relevant or eligible for offsite habitat mitigation; greater capacity to study this potential development may be essential to adequate mitigation in the future. As discussed in the next section, the AB 2087 Regional Conservation Investment Strategies Program incentivizes local jurisdictions to develop regional plans for conservation and compensatory mitigation investment strategies. As these strategies proliferate and mature statewide, they may provide counties with tools to increase the efficiency and sufficiency of mitigation strategies in a changing landscape.

Challenge 3: Mismatch between Ideal Lands, Viable Economics, and Transmission Infrastructure

In addition to the disparities between solar planning entities and processes, participants identified the simple economic challenge of matching profitable locations with appropriate lands as a key barrier to optimal utility-scale solar development. Simply put, an energy project will not come to fruition unless it is economically viable for a private developer to construct and operate, and (typically) for a utility to sell the generated power to retail customers. Economic viability thus relies on land that is plentiful, affordable to develop for acquisition, and appropriately located near customers and/or transmission. Community

residents, however, may oppose construction of new projects that border homes or disrupt visual resources. Environmental concerns, meanwhile, may motivate industry actors to seek projects on developed or development-adjacent land that have limited need for new transmission, but may be more expensive to acquire. Furthermore, the state's transmission and support infrastructure often struggle to accommodate normal growth in electric capacity and demand, let alone the special challenges posed by new utility-scale solar PV facilities. In addition, participants noted that transmission planning and deployment in California is often opaque, time-consuming, expensive, and uncoordinated with the ideal lands for solar deployment. As a result, existing transmission lines may encourage development in less-optimal locations, while preferred areas may be economically infeasible for solar developers due to the high cost of extending transmission tie-ins to project sites.

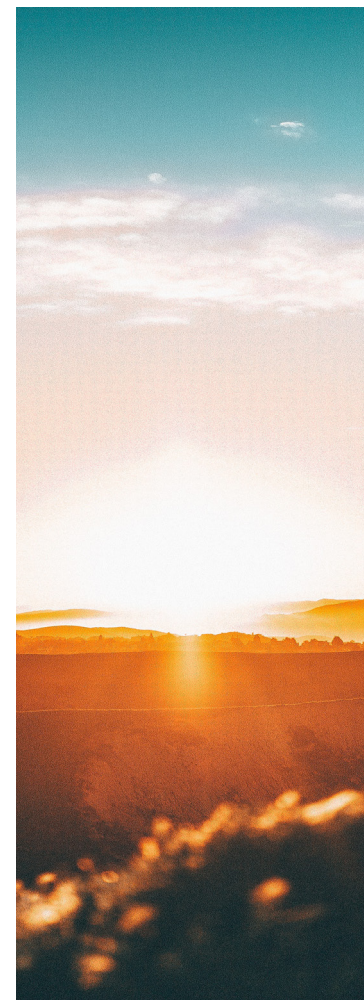
SOLUTIONS

State and local leaders could increase support for transmission infrastructure located in areas appropriate for solar development.

Participants uniformly agreed that lack of access to transmission infrastructure is a top barrier to the introduction of more solar facilities on technically optimal, least-conflict lands. Existing transmission lines are clustered between population centers and existing, primarily fossil-fuel generation facilities; while prime solar development locations are located in high-sun, low-population, low-natural and cultural resource value areas. Transmission development typically relies on committed generation projects and utility power purchase agreements, and yet it is typically planned and financed in decade-long timescales, while generation development is shorter.⁸⁵ Transmission projects can also implicate significant environmental review and land-use concerns, as they are often placed on undeveloped land. As a result, there is often a significant mismatch between planning of solar facilities and the existence, or development, of transmission lines needed to take the power they generate to power consumers around the state.

Participants emphasized the importance of state leadership in promoting the development of new transmission infrastructure in appropriate locations, particularly select parts of the San Joaquin Valley and portions of southeastern California that have both optimal solar resources and lower natural resources and cultural values. They highlighted the Renewable Energy Transmission Initiative as an effort to coalesce state transmission, environmental and renewable energy expertise in support of optimal transmission siting. In order to further this work, the state legislature could direct dedicated funding or incentives to support the proposed projects identified in the initiative report as having the potential to address key system restraints in solar-optimal counties like San Bernardino, Riverside and Imperial. The California Independent System Operator, California Energy Commission, California Public Utilities Commission and other transmission-concerned entities could then help fast-track these projects.⁸⁶

However, participants noted that county and local governments could provide





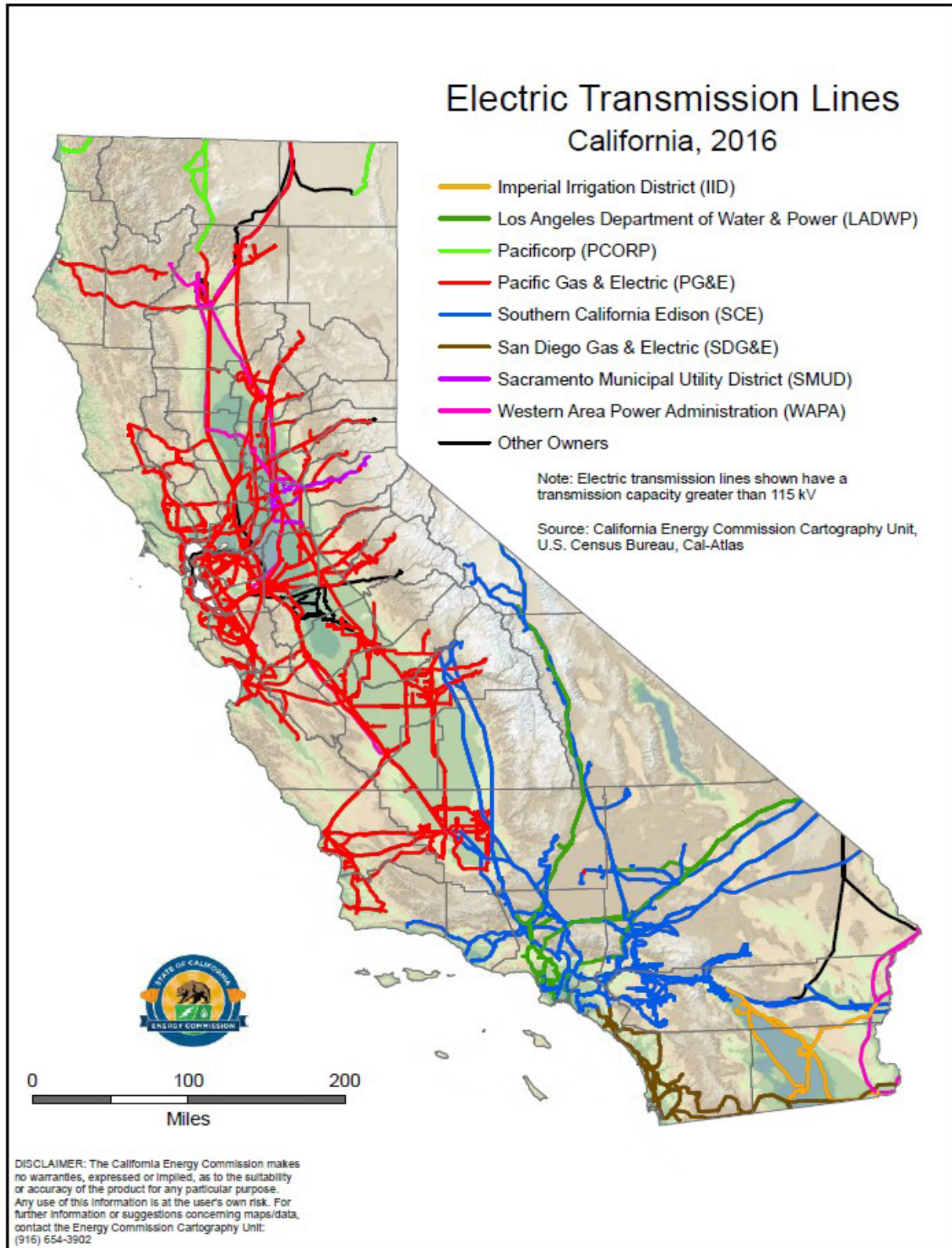
more support for transmission projects in their planning processes. While local governments do not have direct control over transmission plans, they do have the power to limit or promote them in their general plans and zoning codes. To that end, county governments could consider including electrical transmission corridors in future general plans or creating new zones that can include future transmission infrastructure. At the state level, the legislature could expand the statewide transmission corridor planning process initiated under SB 1059 (Escutia, Chapter 638, Statutes of 2006), which was the state's initial effort to integrate state, local, tribal, developer, and utility planners' input into a single process. As part of this effort, the state legislature could authorize grant funds for local governments to initiate transmission planning programs.

The state legislature could also intervene more directly by providing direct financing for new transmission infrastructure projects located in solar-optimal areas. For example, the legislature could create a revolving fund to finance these projects, using funds from the Greenhouse Gas Reduction Fund, which has provided billions of dollars of cap-and-trade auction proceeds for a full suite of emissions reduction-related investments, including a range of renewable energy programs.⁸⁷ The legislature could consider adding a transmission element to this group of programs in future budgets.

Alternatively, the legislature could consider authorizing new state bond issuances to fund appropriate transmission projects. The California Infrastructure and Economic Development Bank, the state's general-purpose financing authority, could also provide financing: the bank currently operates programs directed toward financing general infrastructure (the Infrastructure State Revolving Fund) and meeting the state's greenhouse gas emission reduction goals (California Lending for Energy and Environmental Needs), and its statutory mandate expressly includes electrical transmission infrastructure.⁸⁸ While the bank has not financed many transmission projects to date (one financed project covered transmission capital improvements in Trinity County), solar energy-linked transmission infrastructure could represent an ideal match between the state's policy goals and the bank's funds and statewide experience.

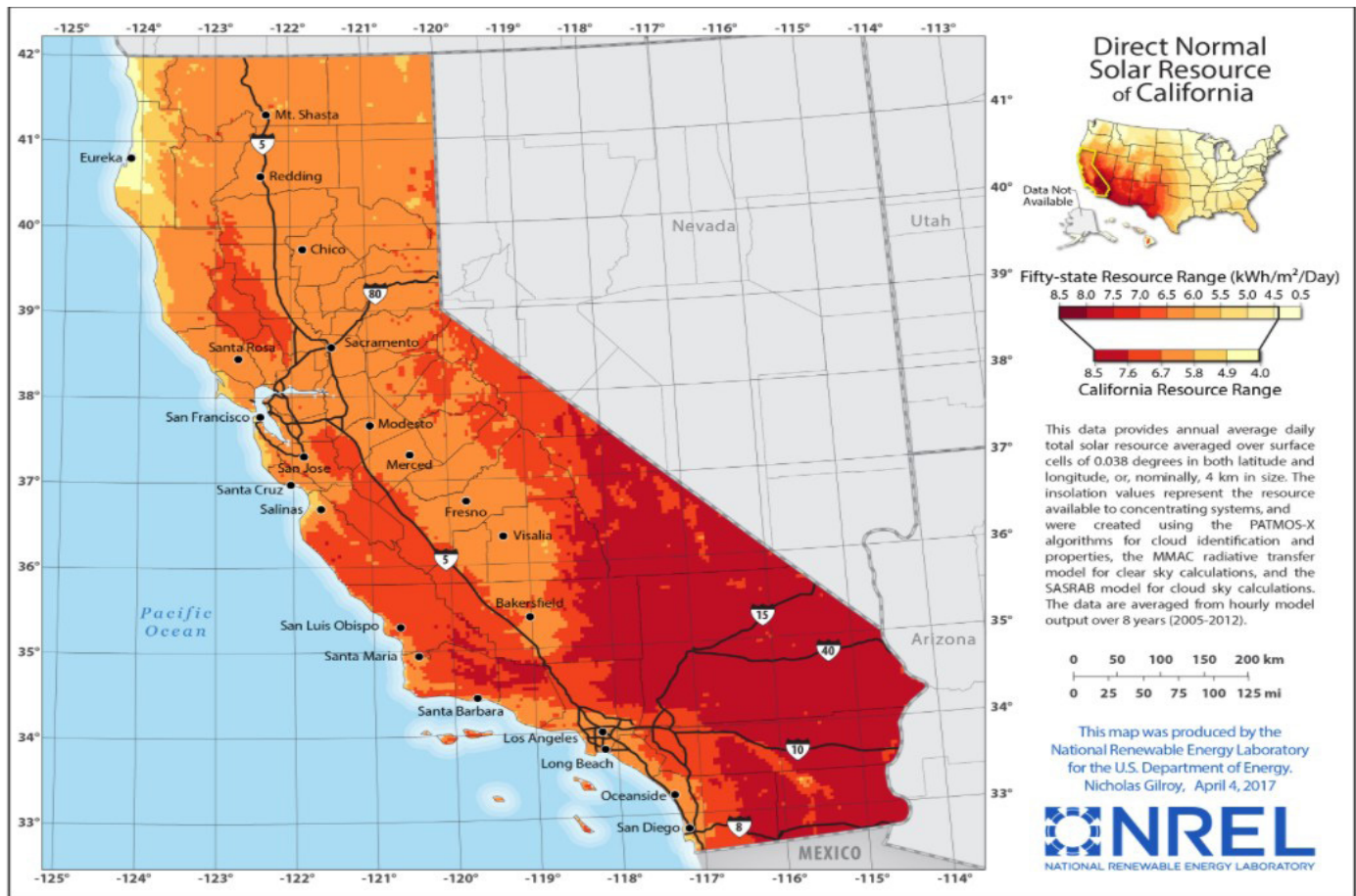
The California Independent System Operator could “right-size” transmission proposals and planning timelines and improve internal processes.

The CAISO transmission planning process is generally designed to integrate known future generation projects into the broader grid. The process also considers “policy-driven” transmission, such as transmission to interconnect potential renewable generation in locations where currently proposed facilities are insufficient on their own to support development of the transmission lines. In this instance, CAISO will first deem a facility “necessary” for policy reasons, then request private proposals to construct the facilities. While this process can help to promote renewables-oriented transmission development, participants emphasized that increased state and local support for transmission projects in optimal areas could only be fully effective if state transmission planners work to accommodate the particular demands of solar development into their processes.



California's Transmission Network

Source: California Energy Commission.



California's Solar Resources

Source: National Renewable Energy Laboratory.

In particular, participants highlighted two key “right-sizing” needs for transmission planners:

- **Timelines:** Transmission planning typically operates on 10-year time horizons, as a means to account for projections in supply and demand and population distribution. However, the state’s long-term renewable energy goals require planning on longer timelines, beginning with the Renewables Portfolio Standard of 60% by 2030 and continuing to the target of 100% by 2045 under SB 100 (De León, Chapter 312, Statutes of 2018), as well as the increased demand for electricity that will result from further electrification of the state’s motor vehicle fleet.⁸⁹ The California Independent System Operator, California Public Utilities Commission and other state entities with roles in transmission planning could help the state achieve these goals by accounting for longer timelines in their own processes.
- **Project Scale:** Even when a discrete new solar development is not identified, transmission projects could be planned with capacity for expansion to accommodate future solar power in areas where long-term energy forecasts

and state plans indicate it will necessarily be located. By right-sizing new transmission to account for the state's solar development needs, transmission planners could ultimately increase the viability of achieving the Renewables Portfolio Standard and ensure that development occurs in priority and best-fit locations.

Administering Agency	Program	Appropriations (\$M) ¹	
		FY 2016-2017	Cumulative Total
California Environmental Protection Agency  Air Resources Board	Low Carbon Transportation	\$369	\$695
 Caltrans	Active Transportation Program	\$10	\$10
	Low Carbon Transit Operations Program*	\$19	\$135
 CALIFORNIA High-Speed Rail Authority ²	High-Speed Rail Project*	\$93	\$800
 CalSTA CALIFORNIA STATE TRANSPORTATION AGENCY	Transit and Intercity Rail Capital Program*	\$172	\$381
 CALIFORNIA STRATEGIC GROWTH COUNCIL	Affordable Housing and Sustainable Communities*	\$75	\$570
	Technical Assistance to Disadvantaged Communities	\$2	\$2
	Transformative Climate Communities	\$140	\$140
California Environmental Protection Agency  Air Resources Board	Woodsmoke Reduction Program	\$5	\$5
 CSD	Low-Income Weatherization Program	\$20	\$174
 cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE	Biofuels	\$0	\$3
	State Water Efficiency and Enhancement Program	\$8	\$68
	State Water Project Turbines	\$0	\$20
	Water-Energy Grant Program	\$0	\$50
	Wetlands and Watershed Restoration	\$2	\$30
 cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE	Dairy Digester Research and Development Program	\$50	\$62
	Healthy Soils	\$8	\$8
	Forest Health	\$25	\$49
	Urban and Community Forestry	\$15	\$33
 CalRecycle	Waste Diversion	\$41	\$71
 CALIFORNIA natural resources AGENCY	Urban Greening Program	\$80	\$80
TOTAL		\$1,133	\$3,385

Appropriations for California Climate Investments: FY 2016-17 and Cumulative

Source: California Air Resources Board, 2017 California Climate Investments Annual Report.

Furthermore, participants felt that CAISO could modify its own policies and practices to better align with the needs of local governments and solar developers. For one, participants suggested that increased transparency around transmission planning—including more thorough and open explanation of the basis for transmission decisions, and more public access to maps and clear explanations of proposed lines—could increase understanding and buy-in from stakeholders who are otherwise unaware of CAISO’s policies and the basis for its decisions, and how to influence them. Participants also suggested that the CAISO Transmission Planning Process business practice manual could be reviewed and revised to encourage staff to follow streamlined procedures for projects that meet minimum capacity, transmission, environmental and other criteria.

Solar developers could increase onsite battery storage at solar PV facilities to help reduce the need for transmission upgrades.



In addition to transmission planning that better accounts for solar PV facilities’ needs, increased installation of battery storage at the facilities could help reconcile the gap between grid capacity and electricity production. On-site storage can serve as a buffer between capacity and production by easing peak demands on substations and transmission lines, rather than feeding all electricity produced immediately into the grid (which can place stress on existing grid resources during midday solar energy generation peak periods). This in turn can reduce the need for new transmission capacity or upgrades in order to operate a facility. While battery storage costs historically have been high, they are beginning to reach parity with electricity generation costs, thus becoming more economically viable investments for producers.⁹⁰ While full-scale displacement of new transmission is unlikely, improvements in availability and capacity of batteries could allow current transmission to handle more utility-scale developments. As storage technology becomes more efficient and affordable (and if on-site storage is granted the same tax treatment as solar PV generation, as discussed earlier), solar developers could include more of it in their projects in order to decrease demands placed on the existing grid and the need for new grid infrastructure.

County leaders could employ standard-based identification of suitable lands as an alternative or in addition to mapping lands for solar PV development.

In discussing the challenging economics of site selection, participants emphasized the interconnected difficulties of county-level identification of appropriate sites and private land acquisition. Local authorities actively seek to identify sites that are appropriately sized, located near necessary infrastructure, and not subject to land use restrictions or conflicts. However, by publicly sharing those sites explicitly or via mapping in order to attract development, these authorities can communicate market signals to land speculators and competing developers, which may raise land prices and decrease solar development prospects.

Zoning and Land-Use Solar Development Analysis Methods	
Zone-Based (Map-Based)	Standard-Based
This method identifies specific, limited zones that are open for solar development, and typically displays the zones on a publicly available map.	This method identifies characteristics of solar-appropriate sites and describes them in narrative fashion, for interpretation and implementation by local planners.

Participants described these deleterious effects particularly in the context of zone-based analysis, which has the potential to harm site selection economics even as it can promote mapping tools that are extremely valuable for community education and general planning processes. By contrast, standard-based analysis, which involves the narrative description of characteristics of solar-appropriate sites, can be insufficiently definite for developers. One possible resolution described by participants is a hybrid system such as that employed by San Bernardino County, which supplements standards with listing of priority site types, to incorporate a rule-based approach into the inherently discretionary process of applying narrative standards.⁹¹ By clearly identifying airports, former mines, cleanup sites and other locations as available for development, counties can send clearer signals to prospective developers without unintentionally increasing the cost of the underlying land. For counties that experience or are concerned about speculative activity linked to mapping, this hybrid approach could be a solution.

RE Policy 5.2: Utility-oriented RE generation projects on private land in the unincorporated County will be limited to the site-types below, in addition to meeting criteria established herein and in the Development Code:

- i. Private lands adjacent to the federal Development Focus Areas supported by the Board of Supervisors that meet siting criteria and development standards
- ii. Waste Disposal Sites
- iii. Mining Sites (operating and reclaimed)
- iv. Fallow, degraded and unviable agricultural lands
- v. Airports (existing and abandoned or adaptively re-used)
- vi. Brownfields
- vii. California Department of Toxic Substance Control Cleanup Program Sites
- viii. Resource Conservation and Recovery Act Sites
- ix. Sites within or adjacent to electric transmission and utility distribution corridors
- x. Industrial zones proven to not conflict with economic development needs
- xi. Other sites proven by a detailed suitability analysis to reflect the significantly disturbed nature or conditions of those listed above

San Bernardino Hybrid Development Analysis

Source: County of San Bernardino (California) Land Use Services Department, County of San Bernardino General Plan: Renewable Energy and Conservation Element.

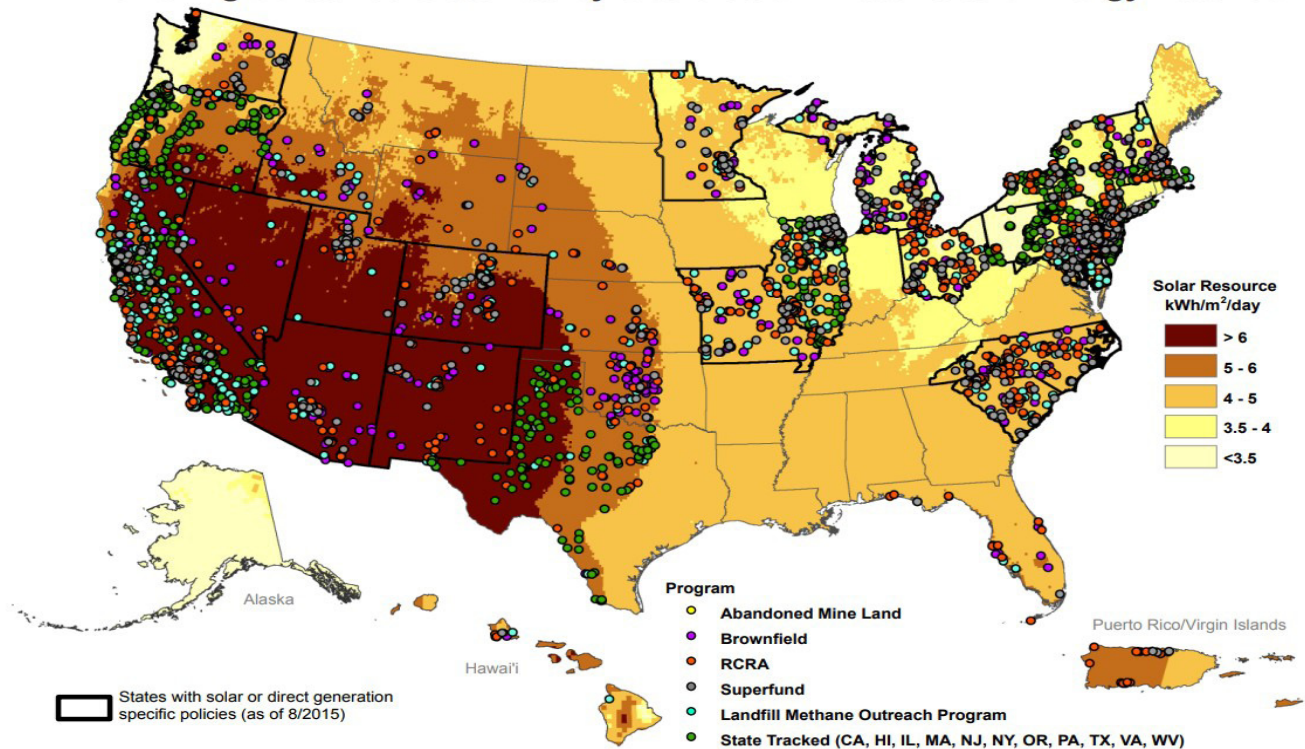
State leaders could accelerate permitting processes and incentives for brownfield sites.

Brownfields, which are former industrial and manufacturing sites that have been contaminated due to their prior uses, are typically undeveloped due to the potentially high costs of remediation and limited scope of future uses. Brownfield sites generally cannot be returned to agricultural uses or used in a manner that relies on groundwater extraction, and under state and federal laws, expensive cleanups are required before development and in order to avoid liability.⁹² As a result of these costs and risks, brownfields are often valued below market rates for comparable sites. More importantly, they can be ideally situated for utility-scale solar developments: they are often located near electrical infrastructure and other major electricity consuming facilities; they consist of relatively large, flat spaces; and solar facility installation, with its limited human maintenance and operation, represents a minimum of health risk compared to residential or other commercial uses.⁹³

“We need to look at brownfields. Former factories, power plants and refineries are perfect places to site solar projects.”

**Jody London,
Contra Costa
County**

RE-Powering Screened Sites: Utility-Scale Solar Photovoltaic Energy Potential



This map is for informational purposes only. The U.S. Environmental Protection Agency's (EPA) RE-Powering America's Land Initiative developed this map using site information, screening criteria and GIS data provided by EPA and the National Renewable Energy Laboratory. State agencies in California, Hawai'i, Illinois, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Texas, Virginia, and West Virginia provided additional information for sites in their respective states. Supplemental site-specific technical and economic analysis is required to determine the renewable energy development potential for specific sites. For further information, please see the associated document entitled, "Data Documentation for Mapping & Screening Criteria" at www.epa.gov/renewableenergyland or contact cleanenergy@epa.gov.

Solar Potential and Brownfields

Source: US Environmental Protection Agency.

Participants emphasized the value of brownfields for the utility-scale solar landscape planning process as relatively low-cost lands presenting minimal land-use conflicts. However, the same remediation requirements that render brownfields affordable and available for solar development also significantly increase the cost and length of the permitting and site preparation process. Participants felt that, given the importance of these solar facilities to attaining the state's energy and climate change goals, and the relative feasibility of solar uses on brownfield sites, state and local leaders could work to ease or streamline permitting and remediation requirements for proposed solar developments. The state legislature could amend the California Land Reuse and Revitalization Act to reduce site investigation and remediation requirements for solar facilities, or the California Department of Toxic Substances Control, which administers the voluntary cleanup program under the Act, could fast-track approval of solar sites.

The state could also increase incentives to develop brownfields for solar use. For example, the California Department of Toxic Substances Control operates a small Brownfields Revolving Loan Fund Program that provides low-interest loans for assessment and cleanup costs. The state legislature could expand the program to increase funding or include specific incentives for solar developers

in order to increase the appeal of brownfield sites.⁹⁴ Alternatively, the legislature could amend the statute to provide facilities sited on brownfields preferential treatment under the Renewables Portfolio Standard, as Massachusetts has done.⁹⁵ Whether through reduced regulatory burdens or increased incentives, streamlined development of brownfield properties would reduce developers' costs and conflicts with other land uses, improving solar project reach statewide.

The California Energy Commission or Governor's Office of Planning and Research and solar developers could conduct comprehensive comparisons of the development costs for brownfields and greenfields in order to identify more economical sites.

As noted above, due to their remediation requirements, former industrial uses and general unsuitability for residential development, brownfields are typically available at substantial discounts compared to market value of similarly situated lands. However, exactly how much savings might be generated over a greenfield (previously undeveloped) site is impossible to assess unless a developer is able to identify comparable brownfield and greenfield sites that are similarly suitable to a given project and proximately located. Such case-by-case analysis may result in a developer's selecting an appropriate brownfield site, but it does not facilitate analysis of brownfield availability statewide, which is the only method on which the state could base a substantial incentive program or solar companies could develop a systematic approach to developing brownfields first. To ensure maximum utilization of brownfields, the Energy Commission or the Governor's Office of Planning and Research (possibly supported by cap-and-trade auction proceeds) could partner with the solar industry to undertake such an analysis of appropriately sized and located brownfield sites, taking into account increased transaction costs from permitting and remediation burdens as well as legal indemnities and insurance. In addition, through developer involvement, the analysis could account for the potential identity of the buyer up front, increasing certainty around how revenues will be generated.

County planners could implement interim use plans or shorten general plan update timelines to facilitate solar PV development.

County general plans are long-term documents, as required by state law, typically operating on a 20-year horizon.⁹⁶ This long-term perspective is logical in the context of managing land-use decisions that affect housing, utility, infrastructure and capital improvement planning, and generally serves the interests of communities as they grow and evolve over time. However, participants noted that it also presents challenges for solar developments, which are a less mature use category than many of the traditional categories such as housing, business, industrial, or open space, and which may face longer and more uncertain planning processes due to regulatory, financing and energy market complexity—allowing competing uses to take precedence. Participants discussed the potential of interim use plans to address this discrepancy. Counties could, for example, adopt interim plans in order to provide more frequent opportunities for review and revision, ensuring maximum accommodation for solar developments, although political and cost barriers may prevent many jurisdictions from undertaking the effort. Legislation

"We need to be able to send market signals to developers that they will be able to develop land for solar use over 25-plus years."

John Lundgren,
Sacramento County

akin to Assembly Bill X1-13 (V. Manuel Perez, Chapter 10, Statutes of 2011), discussed in the prior section, could provide additional grant funding for counties to prepare general plan updates that include renewable energy elements, which might provide the incentive needed to accelerate update timelines. Alternatively, the state legislature could adapt the existing concept of the interim zoning ordinance (which can be used to temporarily prohibit uses that may conflict with a general plan in order to protect public safety or welfare) to create a mechanism for counties to proactively and temporarily set aside appropriate areas for solar development.⁹⁷

Solar industry leaders could analyze and create a system for addressing planning process risks.



The solar planning process is subject to significant risk of derailment, ranging from environmental challenges to dramatic shifts in the underlying long-term economics of solar energy.⁹⁸ Participants described the diffuse set of risks, any of which can delay or block a project, as integral to assessing the economics of a proposal and yet, due to their often site-specific nature, broadly unpredictable. While the levers to minimize these risks are limited, participants agreed that a process to identify, quantify and assess them could introduce much-needed clarity and a measure of predictability for new projects in the future (as opposed to the current ad-hoc risk assessment system).

One possible model of a risk assessment framework is being developed by insurance providers and financial entities in the face of global climate change risks, which encompass a wide range from more frequent and severe natural catastrophes, to litigation against polluters and financial institutions, to the development of new technologies and devaluation of carbon-intensive asset classes.⁹⁹ While the industries are far from perfecting their analysis, participants are beginning to develop and share the data necessary to fully assess this complex and evolving set of risks. For example, the Sustainability Accounting Standards Board, a nonprofit organized to set standards by which public companies can incorporate sustainability risks and opportunities into their accounting practices, operates the Materiality Map, an interactive tool that provides a snapshot of material sustainability issues.¹⁰⁰ A similar tool describing and quantifying the full range of past and potential risks to project development could assist planners in determining economic viability as early as possible.

State leaders could explore options to increase the use of general mitigation fund banking under the California Environmental Quality Act.

Another challenge facing solar developers in their identification of viable sites is the California Environmental Quality Act's environmental impact mitigation requirement. As discussed, under CEQA any project that is implemented, funded or approved by government agency (which includes all utility-scale solar projects) must undergo an extensive review and analysis of the anticipated environmental impacts of its construction and continued operation.¹⁰¹ Where a project is anticipated to have significant environmental impacts, appropriate mitigation measures can be difficult to design and costly to implement, and their sufficiency can be a focal point of CEQA litigation.

Participants discussed the benefits of allowing developers to “bank” mitigation funds in advance, by determining the dollar value of the anticipated project impacts and paying that amount into a statewide or countywide fund devoted to large-scale, pre-planned mitigation projects that create an equivalent amount of public and ecosystem benefit. This can relieve developers of the difficulty of identifying appropriate mitigation projects in advance, while potentially limiting the fragmented nature of some project-by-project mitigation measures (by aggregating funds for larger projects that fit their ecosystems, rather than the specific scale of the project in question). Participants also noted that mitigation banking can streamline permitting processes by reducing the review burden and decrease protracted litigation. While CEQA does not prohibit mitigation fund banking, developers may lack clear opportunities, systems, and guidance for utilizing it.

The California Department of Fish and Wildlife operates a Conservation and Mitigation Banking Program, pursuant to Senate Bill 1148 (Pavley, Chapter 565, Statutes of 2012) that facilitates the aggregation of mitigation sites, including for projects under CEQA review.¹⁰² While this program relies on contributions to discrete, identified sites (which participants described as a core challenge for solar development), the program and the state’s Official Policy on Conservation Banks explicitly recognize the value and validity of banking concepts—specifically, that environmental benefits can be aggregated in beneficial ways.¹⁰³ The Governor’s Office of Planning and Research could consider updating its CEQA guidelines to expand the banking concept to specifically include more general, fund-based mitigation banking. Alternatively, if this and other currently available mechanisms prove inadequate, the state legislature could explore whether revisions to the CEQA statute itself are necessary to increase the use of mitigation banks. However, while indirect mitigation can ease burdens, it can also prove challenging to achieve adequately in practice. For example, participants described a recent Kern County plan involving a developer’s grant of funds to the county to purchase bird habitat mitigation lands, only for those funds to go unused after the target property was sold to another buyer. As a result, any fund-based mitigation banking must be based on a robust set of available, certain projects to finance.¹⁰⁴

Participants cited the Regional Conservation Investment Strategies Program as an example of advanced mitigation that could serve as a model for solar developers. Created by AB 2087 (Levine, Chapter 455, Statutes of 2016), the program promotes the development of regional conservation planning documents, which are public plans designed to guide investments in conservation and compensatory mitigation in order to generate the most beneficial outcomes for local species and landscapes.¹⁰⁵ The program encourages local public agencies to undertake regional conservation assessments of important species and ecosystems based on the best available science and regional priorities; develop regional conservation investment strategies (RCIS) that set biological goals for these priority areas and the conservation and mitigation actions necessary to achieve them; and enter into mitigation credit agreements that allow developers to generate transferable mitigation credits, which can be used to fund the investment strategies identified in the regional plan.¹⁰⁶ These credits may be used to fulfill mitigation requirements



under CEQA.¹⁰⁷ Importantly, the California Department of Fish and Wildlife, which oversees the program, must review and approve an RCIS before the local government may enter into any credit agreements, ensuring that the strategy and associated agreements advance the statute's species and habitat conservation goals. Thus, the program allows local governments to comprehensively assess their top environmental protection and conservation priorities and developers to commit project mitigation funds to advancing these priorities, rather than the current piecemeal approach. Should the program's initial pilots prove successful from the perspective of developers, county officials, and local communities, it could offer a mitigation approach that satisfies both renewable energy and ecological conservation needs under state law. Statewide expansion and application of this program to CEQA mitigation requirements could accelerate both conservation and solar development goals. Additionally, the legislature and the Governor's Office of Planning and Research could consider innovative approaches to mitigation banking, such as including infill development programs that avoid new development of greenfields, to increase the scope and applicability of the bank.

State leaders could consider developing new methods to resolve visual impact concerns under CEQA.

Among the significant environmental impacts that a development project can cause, and which must be mitigated to a feasible extent, are visual impacts to the project site—changes in the physical appearance and scenery caused by new development.¹⁰⁸ Participants noted that due to the physical scale of utility-scale solar projects and their associated transmission infrastructure, which can cover hundreds to thousands of acres of undeveloped land, mitigation of visual impacts is often the most difficult CEQA requirement to satisfy. In some cases, it can be impossible to mitigate visual impacts in a manner that is cost-effective and agreeable to local residents, leading either to uneconomical requirements or to project-threatening litigation. In many areas of the state, such as those adjacent to state or national parks, protection of visual resources can be particularly important and yet difficult to accomplish.

Developing new methods to satisfy visual impact mitigation requirements for utility-scale solar projects and their associated transmission line upgrades could be instrumental to increasing optimally located solar development. CEQA includes an extensive set of statutory and categorical exemptions from its review processes, for projects that the state has determined do not merit full review or provide an overriding public benefit—including, for example, wilderness area designations, infill development projects, and issuance of air quality permits.¹⁰⁹ Conservation groups and local communities likely would not accept a similar categorical exemption for visual impacts of solar developments. But leaders at the Governor's Office of Planning and Research, for example, could develop guidance on visual impact-specific processes that allow local communities and governments and solar developers to identify the widest possible range of agreeable mitigation solutions, using the overriding public benefits mentioned above as a framework. Such a process could afford local residents the opportunity to lay out the visual or non-visual project features they would prefer in order to

integrate an unavoidable visual impact, while including safeguards to ensure that feasible mitigation measures are taken and/or that equivalent mitigation is undertaken at appropriate sites under a Regional Conservation Investment Strategy. Alternatively, state agencies such as the California Natural Resources Agency could prepare more detailed guidance with regard to visual impact mitigation for solar projects, providing developers and county governments with clear instructions on how to design and assess proposed measures. Given the importance of visual disruptions in many solar-optimal areas, it will be essential that any easing of mitigation requirements adequately accounts for community concerns and does not increase overall burdens.

The Governor's Office of Planning and Research could compile and distribute a best practices solar PV planning compendium for local governments.

As already discussed, participants emphasized the value of local jurisdictions' preparation of planning guidebooks, in part because they facilitate comparison of methods and sharing of innovative ideas. Participants also indicated that a statewide best practices compendium, compiled and maintained by a neutral party such as the Governor's Office of Planning and Research, could serve as an invaluable resource for counties around the state seeking to resolve particular recurring issues or simply to improve their attractiveness to developers. The Office of Planning and Research already operates the Best Practices Pilot Program, "a suite of programs and partnerships that produce replicable case studies of best practices being adopted and implemented at the local and regional level around the state" including climate action plans, high speed rail plans, and general plan updates.¹¹⁰ Preparing an equivalent resource for solar development planning could allow counties to improve their practices and increase helpful planning process uniformity around the state. The California County Planning Directors Association's Solar Energy Facility Permit Streamlining Guide, which offers policy options and guidance for local jurisdictions including a model ordinance, could serve as an example.¹¹¹

Challenge 4: Lack of Data and Information that Are Reliable, Relevant, Commonly Agreed, and Accessible

Central to every challenge that participants identified—whether increasing community buy-in, strengthening stakeholder coordination, or maximizing viable development sites—is a need for sound, shared data and information. Participants consistently described the barriers posed by difficulties in data collection and aggregation, distrust due to misinformation or information gaps, differing local approaches to displaying planning and resource-related data, and more. An optimal planning system would include a process for generating and disseminating data and information that all participants, experts and community members alike, can readily access and rely upon.

The state's many energy- and planning-related agencies each possess extensive data collection and dissemination capacities, serving as invaluable resources for local governments, industry, and the general public as they navigate their

Other Issues: Enhanced Infrastructure Financing Districts

Another possible solution to unfavorable site economics is to expand the transmission network to serve areas identified as having lower conflict solar resources (such as the southern San Joaquin Valley), thereby increasing the number and variety of viable development locations. Some participants suggested that local jurisdictions could employ innovative public financing mechanisms as a means to build the capacity to publicly agree to and construct this transmission infrastructure.

Enhanced Infrastructure Financing Districts, created under Senate Bill 628 (Beall, Chapter 785, Statutes of 2014), are local government agencies that are authorized by local resolution to borrow money and issue bonds to finance public projects that provide a community-wide benefit.¹¹² The district, which must be approved by 55% majority vote of local residents, ultimately owns the infrastructure it finances, and is repaid via property tax assessments. Enhanced Infrastructure Financing Districts can generate significant savings due to their potential tax-exempt status and can inherently generate public buy-in via the approval process. While districts are typically used for more traditionally local facilities like water treatment plants and libraries, local governments could consider creating districts in order to finance new transmission infrastructure. An amendment to the statute by the state legislature may not be necessary to permit this novel application, but express authorization could facilitate it (as well as manage some of the complexities of CPUC and CAISO approvals). This innovative use of public financing could increase the number of viable sites while maximizing public support.



respective regulatory niches. The California Air Resources Board, for example, includes a research division that has produced hundreds of topical fact sheets and in-depth reports on every air quality topic within its purview, which inform casual readers on health risks of different consumer products and provide local air quality regulators with detailed science to guide their own decisions.¹¹³ The California Energy Commission's research and development division, meanwhile, administers the Electric Program Investment Charge (EPIC) Fund, which issues over \$100 million in clean energy research grants each year, channeling the capacities of top private and public institutions into commonly accessible work products.¹¹⁴ Since solar development planning is not housed within one state agency, no individual program of this scale would be feasible—but state, local and industry leaders can look to these highly successful programs for examples of what is needed.

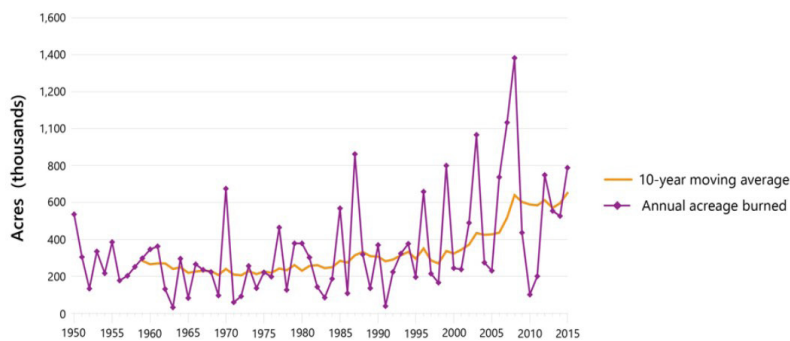
SOLUTIONS

Government, industry and community leaders could engage in joint fact-finding to identify consensus data addressing the most contentious topics.

Participants noted that while each project is distinct and raises its own set of community-specific issues and questions, a group of most contentious topics—such as effects on local property values, compatibility of solar and other uses, or dust impacts—is common to all solar developments. While the details of each issue will necessarily reflect the unique local context in which it arises, a common set of facts and data can be responsive to these core community concerns. Participants discussed a joint effort in which local governments and developers could collectively identify the top 10 to 20 most commonly raised community issues; state energy and environmental agency staff could work with them to develop an agreed set of science-based responses that are accessible to the general public; and community leaders could then review the responses and provide feedback on content and presentation. The result would be an invaluable, statewide resource containing a trusted and broadly endorsed set of baseline data.

One example of a similar resource that could serve as a model for such a joint fact-finding enterprise is the Governor’s Office of Planning and Research’s “CA@50 Million” website, which is designed to provide the public with basic information about population-growth related trends in energy usage, transportation, natural resources, climate change and community health in order to bolster the state’s long-term planning goals in each of these areas.¹¹⁵ The website presents succinct, graphically accessible information that is fully sourced and concisely linked to community-level concerns. A similar website, focused on the main local concerns facing solar developments and built with input and endorsements from local governments and advocates, could assist planners and developers alike.

Acres Burned by Wildfires Statewide (1950–2015)



Data Source: CalFIRE. Historical Wildfire Activity Statistics (Redbooks)

Why it Matters

- The number and size of wildfires varies over time as a result of weather conditions. However, over the long-run, the area burned by wildfire is increasing.
- As the climate warms, the frequency, size, and behavior of wildfires is projected to change, including an increase in the number of large wildfires.
- Over the past several decades, the number of acres burned has continued to increase, which is the result of a combination of factors, including overgrown forests, drought, and warming temperatures.
- As a result of the drought and an increase in pests, California is in the middle of a tree mortality emergency. Dead and dying trees increase the amount of fuel available to feed wildfires.

Sample CA@50 Million Graphic

Source: Governor’s Office of Planning and Research.

Local and industry leaders could identify statewide and county-by-county solar acreage needed in order to achieve state climate goals.

As described earlier, participants felt that increasing local communities’ understanding of the total number of acres of solar coverage needed—to satisfy both the SB 350 requirement of 50% renewable electricity generation by 2030 and the state’s projected increase in electricity demand of 11% to 21% over the same period—is essential to build public buy-in to solar developments in general.¹¹⁶ Participants also emphasized the importance of collecting and disseminating solar acreage needs for developers’ and planners’ own purposes. Specifically, guidance regarding statewide and countywide expectations could help counties engage in long-term land-use planning, alerting planners to the development they can anticipate beyond proposals currently under discussion, both in high-solar areas and in areas identified as having minimal viability for utility-scale solar PV. While the California Energy Commission, California Public Utilities Commission or other state agencies may be hesitant or unable to take such a market-driving action as prescribing a desired quantity of new developments, they could prepare multiple

“Assessing and assessing zoning information county-by-county is a significant hurdle. It’s necessary to aggregate zoning data at a statewide level across all cities and counties.”

Dustin Pearce,
Conservation Biology
Institute

scenario analyses. Local agencies—for example, the seven counties involved in the Desert Renewable Energy Conservation Plan—could also leverage existing state and federal resources to prepare their own evaluations. Alternatively, private developers could create a collective data-sharing forum to match anticipated future needs to best-located lands.

State and county leaders could collaborate to create a consolidated, statewide zoning and planning data resource.

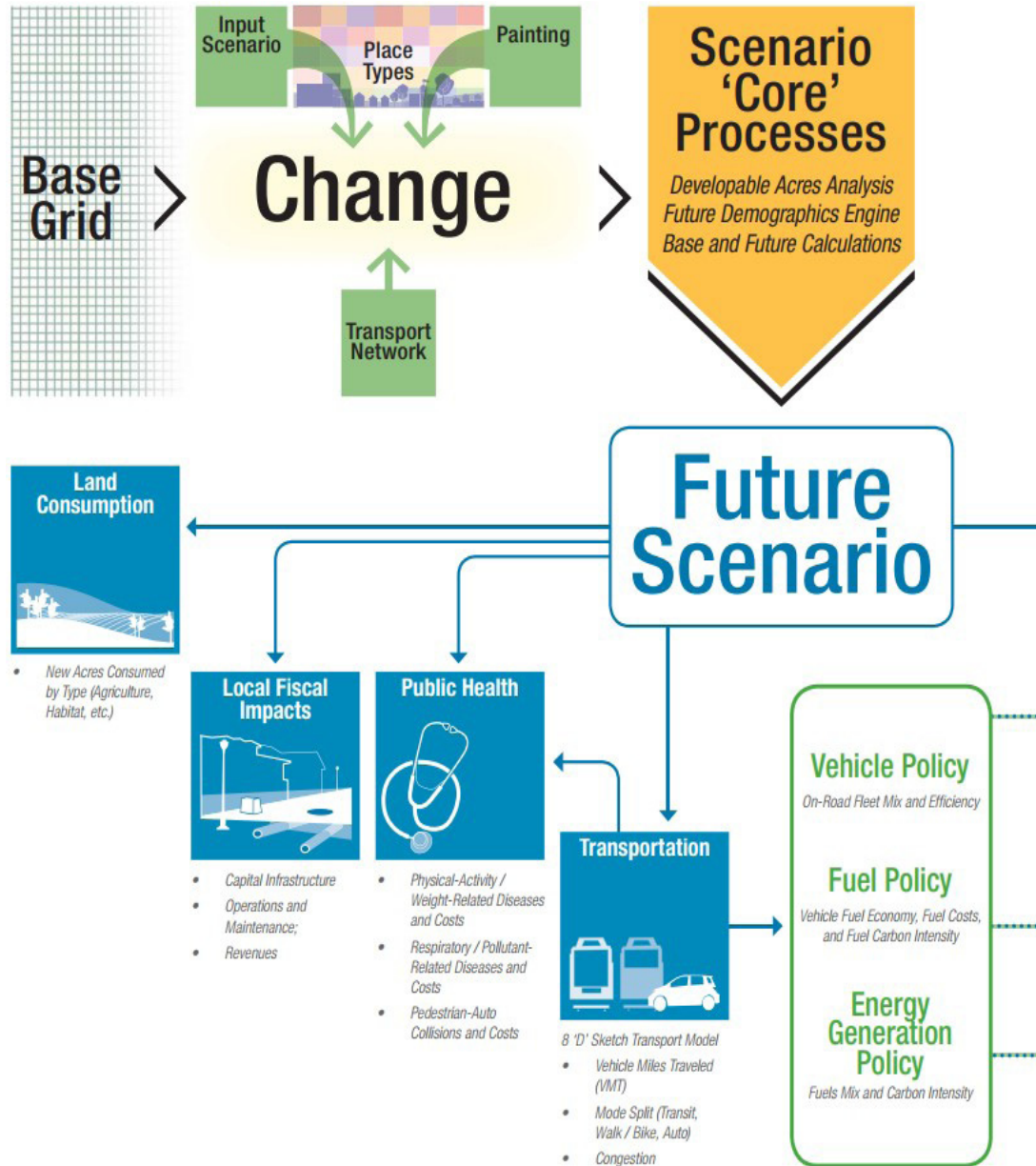
All county-level solar planning occurs in the context of local general plans and zoning ordinances, which dictate what areas in a given jurisdiction may be developed for particular uses, to what extent and subject to what rules. However, while every local jurisdiction has enacted such rules that will govern the location, size and ultimately feasibility of any proposed development, these rules are maintained in different formats and with different levels of accessibility by each jurisdiction. Some larger jurisdictions provide online interactive mapping tools while others offer only zoning code text; some counties are able to build websites that guide readers through their general plans, while others can only share the formal document.

“Consistency in data and information is essential, as is county-to-county sharing of data and information. The state can play a role in developing the data and promoting these goals.”

Diane Ross-Leech,
PG&E

Furthermore, while all general plans and zoning ordinances include the same basics—land use, transportation, housing, open space, conservation, noise, safety, and environmental justice elements; and residential, commercial, industrial and special uses; respectively—they can differ significantly between jurisdictions with respect to not only the different rules for various uses and development areas, but also the underlying concepts and definitions that outline these rules.¹¹⁷ For example, the Riverside County Zoning Ordinance includes a definition of “Solar Power Plant” that includes both solar thermal and photovoltaic systems and requires at least 50% of the power generated to be used at off-site locations, while the Inyo County Zoning Ordinance includes no such definition.¹¹⁸ The San Bernardino County Development Code includes a set of specific findings required for the approval of a commercial solar facility; the Riverside County Zoning Ordinance does not.¹¹⁹ Every county uses a different terminology to describe the zones, uses, conditions and limitations that constitute the substance of its plan, code or ordinance.

As a result, private developers and state energy agency staff can face substantial challenges in conducting side-by-side comparisons of local zoning and planning documents, which in turn renders statewide assessment of limitations and opportunities difficult and expensive. Participants discussed the value of a statewide zoning and planning data resource that consolidates the disparate local information in a readily viewable and comparable format—a “one-stop shop” to determine appropriate development sites based on permitted uses, present and future planning priorities, and solar optimality. By working with county planners, councils of governments, and metropolitan planning organizations, state leaders at the Governor’s Office of Planning and Research or the California Energy Commission could develop such a resource to support the achievement of state energy goals as well as to help local governments compare their own rules to those of other jurisdictions.



UrbanFootprint Scenario Planning Process Diagram

Source: Calthorpe Associates, *UrbanFootprint Technical Summary*.

County planners could conduct scenario planning to align solar development with related considerations.

Participants emphasized the value of county-level scenario planning—the development of analyses of alternative future outcomes that are plausible, comprehensive and quantitatively supported—for both identifying essential data and evaluating that data.¹²⁰ County general plans outline targets and limitations for housing, transportation, open space and other development considerations; scenario planning can identify the likely outcomes to result from these plans

“We should advertise more success stories around solar co-location: with agricultural uses such as cattle and sheep grazing, other climate-serving uses like biosequestration, and facilities like almond and dairy processing.”

Obadiah
Bartholomy,
Sacramento
Municipal Utility
District

and factors such as population growth and technological development in order to frame strategic management choices. By engaging in scenario planning for solar development, county planners could evaluate the different ways in which increasing solar generation might interact with factors such as anti-sprawl initiatives, water demand, and new transportation infrastructure. Development of these scenarios would help counties and developers identify least regret/best-fit sites and help state leaders assess the viability of renewable generation goals.

For a potential model of scenario planning, counties could look to the scenario analysis that metropolitan planning organizations have undertaken as part of the process of identifying regional greenhouse gas emission target recommendations under SB 375. Metropolitan planning organizations prepared joint analyses of the impact that changes in demographics, transportation and land use policies, implementation of new technologies and more might have on their development and their capacity to meet SB 375’s emission reduction goals, and identified actions and programs best suited to these changes.¹²¹ For example, the four largest metropolitan planning organizations submitted a scenario analysis to the California Air Resources Board that identified key state policies (such as discouraging growth in vehicle miles traveled, and dedicating funding to support public transit and ridesharing) and regional commitments (such as incentivizing infill and transit-oriented development and prioritizing infrastructure repairs) necessary to meet emissions targets.¹²²

Participants also described the value of tools like UrbanFootprint, a land use planning model developed in California with support from the California High Speed Rail Authority, the California Strategic Growth Council, and the UC Davis Institute of Transportation Studies. UrbanFootprint is a scenario planning tool that incorporates existing data and plans into comprehensive scenarios involving energy use, land consumption, transportation, public health and other outcomes.¹²³ Increased access to and use of this and similar planning tools could help counties engage in detailed scenario planning for solar development, improving site selection processes and streamlining state-level analyses.

Industry leaders could identify and publicize success stories on agricultural co-location, compatible uses, and pilot projects.

Participants noted that the solar industry could do more to publicize stories of successful solar development projects that demonstrate innovative approaches to siting. By sharing these success stories with communities, developers could increase local government awareness of novel approaches to integrate agricultural and solar uses that may be more locally appropriate and publicly accepted. For example, solar developers have been able to co-locate some facilities with sheep grazing areas, allowing a traditional and beneficial agricultural use to continue while generating valuable electricity.¹²⁴ The Sacramento Municipal Utility District and Recurrent Energy have contracted for solar generation co-located with sheep grazing in a project that provides enough energy to power over 17,000 homes, while the U.S. Department of Agriculture has estimated that nearly 2,000 California farms also house solar generation facilities.¹²⁵ Increased publicity of the successful integration of solar and agricultural uses could advance governments’ interest in researching and expanding compatibility.

The Governor’s Office of Planning and Research could serve as a neutral, trusted keeper and distributor of key data in coordination with other state agencies.

As discussed throughout this report with respect to needs such as quantifying acreage requirements, identifying community benefits, communicating state climate and energy goals, distributing sound science, and comparing zoning and land use rules, planners and developers alike seek a neutral, state-level authority to compile and publicize trusted and relevant data for all stakeholders. Participants consistently emphasized the value that such a resource would have, by leveling the informational playing field and increasing trust both between governments and industry, and between community members and those proposing developments. The Governor’s Office of Planning and Research, as the state’s environmental and land use planning agency and with its extensive background in data preparation and analysis, could be the ideal entity to serve as this neutral, trusted purveyor of key solar development-related information.¹²⁶

Participants described a number of areas in which the Office of Planning and Research is ideally positioned to provide high-value, transparent information to California’s local governments and communities, including:

- Building consensus among the broadest possible range of stakeholders and experts regarding information contents, vetting of data, and identification of sources;
- Ratifying scientific information with fellow state agencies and with the U.S. Department of Energy’s National Laboratories where appropriate;
- Providing an online portal for streamlined data access, such as its CEQAnet database of environmental review documents;¹²⁷ and
- Preparing FAQ-type presentations responsive to key questions, such as the CA@50 Million website or the climate change “Common Denier Arguments” webpage.

Preparing and distributing such information is directly in line with the Governor’s Office of Planning and Research’s statutory mandate and the capacities of its legal, policy and planning experts and would help bring all parties to the table on the same terms.

The Governor’s Office of Planning and Research could lead an effort to identify gaps in data for further research.

In addition to the primary benefits of increased collaboration among state and local governments in the information collection and dissemination process, by compiling statewide data, zoning and planning resources and responses to community concerns, leaders will also be able to identify where data gaps exist and further research is needed. Participants emphasized the importance of identifying these gaps at all levels, in order to inform current planning processes as well as funding needs for future research. The creation of a centralized information source, such as the role for the Office of Planning and Research described above, could promote this beneficial outcome.





Conclusion: Developing County-Level Plans for Solar PV

As California strives to attain its nation-leading climate change and renewable energy targets, the state will need to promote a significant increase in the amount of solar PV throughout the state, especially in optimal high-insolation, low-impact areas. This deployment will best result from a suite of supportive policies and incentives, including landscape planning that puts solar PV development at the forefront. This system would be based on:

- County-level implementation;
- State funding support;
- Clear, consistent and coordinated state policies and procedures;
- Benefits for counties, communities and project developers;
- Environmental and cultural resource protection;
- Complete stakeholder engagement;
- Transparent, online planning resources; and
- Comprehensive energy system consideration.

In order to create this system, state, local and solar industry leaders will need to embrace a significant realignment of their current programs and processes, including increased production and sharing of information with communities, greater sharing of data and planning rules among jurisdictions, development of clear-cut local benefit programs, and increased coordination across state energy planning agencies. While some of these changes will necessarily involve long-term planning and investment, others may be more readily achieved in the near term. For example, policymakers, planners and industry leaders can collaborate to:

- Quantify the total amount of land needed for solar PV in order to meet the state's climate goals and communicate this information to local communities.
- Create a consolidated, statewide zoning and planning data resource.
- Prepare local land-use permitting guidebooks that lay out the step-by-step approval and permitting process for utility-scale solar PV developments and provide developers and communities with a comprehensive set of resources.
- Procure and disseminate information on the property value impacts (or lack thereof) of solar PV siting.

Ultimately, the goal for state and local actors will be to develop a county-level landscape planning system that accounts for and promotes state renewable energy targets, environmental conservation and land preservation goals, and community development needs. Creating and implementing that system will allow California to pursue its energy and climate policies in the most equitable and efficient manner possible and serve as yet another example of the state's leadership in addressing climate change.

Participant Biographies

Glenn Alers

SoliCulture

Dr. Glenn Alers is currently President of Soliculture Inc. Prior to Soliculture, Dr. Alers was president of APV Research and provided photovoltaic reliability characterization services to the solar industry for 4 years. In 2009, Alers was a visiting scientist at the National Renewable Energy Laboratory (NREL) photovoltaic module reliability group. He has been an organizer and has given numerous tutorials on photovoltaics reliability for IEEE Reliability Physics Symposium, IEEE Integrated Reliability Workshop, SPIE Optics and Photonics and NREL PV Reliability Workshop. Prior to working on photovoltaic reliability, he was a principal engineer and senior process manager at Novellus Systems working on integration and reliability issues associated with copper / low k interconnects. Prior to Novellus Systems, he was a member of the technical staff at Bell Laboratories, Murray Hill for seven years. He received his PhD in 1991 from the University of Illinois, Urbana-Champaign and was a Research Associate in the Physics Department of Michigan State University for two years. He has published over 60 papers in refereed journals and has received 22 US patents.

Ken Alex

Governor's Office of Planning and Research

Ken is the Director of the Governor's Office of Planning and Research and serves as Senior Policy Advisor to Governor Jerry Brown and the Chair of the Strategic Growth Council. As the longest tenured OPR Director, Ken has led a broad effort to modernize land use planning through greater transparency; easier access and local application through mapping tools, templates, and streamlined permits; reduced barriers to in-fill development; promotion of transit-oriented development; protection of agricultural land and open space; recognition of water constraints; and updated general plan and CEQA guidelines. Before joining the Governor's Office, Ken was the Assistant Attorney General heading the environment section of the California Attorney General's Office, and the co-head of the Office's global warming unit. From 2000 to 2006, Ken led the California Attorney General's energy task force, investigating price and supply issues related to California's energy crisis. Ken is a graduate of

Harvard Law School and holds a B.A. in political theory from the University of California at Santa Cruz.

Caitlin Barns

Ecology and Environment, Inc.

Caitlin Barns is a biologist and senior planner at Ecology and Environment, Inc., where she leads preparation of CEQA and NEPA documents on behalf of state and federal energy and land management agencies and manages environmental permitting for commercial-scale solar projects. Most recently, Ms. Barns managed permit compliance during construction for the 579-MW Solar Star I and II Projects in Kern and Los Angeles Counties. Ms. Barns specializes in developing successful management programs for sensitive ecological resources, examining their feasibility, and providing feedback for their improvement. Examples of her research include impacts of solar "lake effect" on migratory waterfowl and nesting bird management plans as effective adaptive management tools during construction.

Obadiah Bartholomy

Sacramento Municipal Utility District

Obadiah Bartholomy is Manager of Distributed Energy Resources for the Sacramento Municipal Utility District, where he develops enterprise strategies including distributed generation, demand response, electric vehicles, energy efficiency, and distributed storage. Obadiah works to integrate DER's into the resource planning process and improve robustness of that process, and into the distribution planning process; develop pilot programs to demonstrate emerging DER business models and technology combinations. Prior to his current role, Obadiah spent over 10 years at SMUD, in engineering, project management and technology strategy capacities. He earned his M.S. in transportation policy from the University of California, Davis and his B.S. in mechanical engineering from Cal Poly San Luis Obispo.

Lisa Belenky

Center for Biological Diversity

Lisa T. Belenky is a senior attorney at the Center for Biological Diversity, working out of the Oakland,

California office. Her work focuses on the protection of rare and endangered species and their habitats under state and federal law on public and private lands throughout California and the southwest. Her work includes litigation and policy advocacy regarding: endangered species listing petitions and critical habitat designation; recovery plan development and implementation; site specific project development; and land use planning. Ms. Belenky received her J.D. from the University of California, Boalt Hall School of Law in 1999, and her B.A. in philosophy from University of California at Santa Cruz.

Erica Brand

The Nature Conservancy

Erica Brand serves as Director of the California Energy Program at The Nature Conservancy. In her role, she leads a team that works to integrate protection of nature into planning for California's clean energy future. Prior to joining The Nature Conservancy, she served as a Senior Environmental Policy Specialist at Pacific Gas & Electric Company and has spent 14 years in the energy and environmental sector. She holds a Master of Science degree in Environmental Management from the University of San Francisco and a Bachelor of Science degree in Biological Sciences from Cal Poly, San Luis Obispo.

David Bunn

California Department of Conservation

David Bunn was appointed Director of the California Department of Conservation on June 18, 2015. Prior to his appointment, David was Associate Director of the International Programs Office of the College of Agricultural and Environmental Sciences at the University of California, Davis. David served as Deputy Director of Legislation for the Department of Fish and Game (now the Department of Fish and Wildlife) and he was Principal Consultant and Legislative Director in the office of California State Assemblymember Fred Keeley. He also served as Associate Consultant for the California State Senate Natural Resources and Wildlife Committee. David was a Project Director and researcher at the One Health Institute in the School of Veterinary Medicine, where his work included directing international research projects and training programs in West and East Africa and in Nepal. David earned a PhD in Conservation

Ecology, a Masters of Science in International Agricultural Development, and a Bachelor of Science in Wildlife Biology from the University of California, Davis.

Lauren Casey

Regional Climate Protection Authority

Lauren Casey is the Director of Climate Programs and manages climate change mitigation and adaptation initiatives on behalf of Sonoma County local jurisdictions and agency partners. She is passionate about public sector innovation to deploy climate solutions that work for everyone. Ms. Casey joined the RCPA in 2012 and brings a decade of experience in planning and implementing climate and energy programs on behalf of local, state, and regional governments. This includes bringing diverse stakeholders together around large and technical planning efforts. Lauren has a Masters in Civil Engineering with an emphasis on Energy and Atmosphere from Stanford University.

Scott Castro

NextEra Energy Resources

Scott Castro is Senior Counsel for NextEra Energy Resources, working on environmental and land use matters in the Western United States. Prior to working at NextEra, Scott was a partner at Jeffer Mangels Butler & Mitchell. He has extensive experience in renewable energy and natural resources law.

Kim Delfino

Defenders of Wildlife

Kim Delfino oversees the work of Defenders' California program team in protecting and restoring California's imperiled wildlife and the places in which they live. Since joining Defenders in 2000, Kim has worked on legislation involving the California Natural Community Conservation Planning Act, California Endangered Species Act, and the phase out of the use of lead ammunition in hunting. Kim has spent the last several years working on renewable energy siting issues in the California Desert and Central Valley, including the California Desert Renewable Energy Conservation Plan. Kim began her career as an associate attorney in Washington, D.C. with the public interest law firm of Meyer & Glitzenstein, where she specialized in cases involving the Endangered Species Act, Clean Water Act and other environmental laws. She holds a B.A. from

UC Davis and a J.D. from McGeorge School of Law at the University of the Pacific.

Karen Douglas

California Energy Commission

Karen Douglas was originally appointed to the California Energy Commission by Governor Arnold Schwarzenegger in February 2008 and re-appointed by Governor Edmund G. Brown Jr. in December 2012. She served as Chair from February 2009 to February 2011. She fills the Attorney position on the five-member Commission where four of the five members by law are required to have professional training in specific areas - engineering or physical science, environmental protection, economics, and law. Commissioner Douglas is the lead commissioner on power plant siting. From 2005 to 2008, Ms. Douglas served as Director of the California Climate Initiative at the Environmental Defense Fund. Prior to going to the Environmental Defense Fund, Ms. Douglas spent four years at the Planning and Conservation League. Commissioner Douglas is a 2001 graduate of the Stanford Law School and holds a Master's Degree in public policy from the University of Colorado, Boulder.

Shannon Eddy

Conscious Ventures Group

Shannon Eddy is the founder of Conscious Ventures Group, a consulting firm providing progressive policy advancement solutions and strategic advice to businesses, philanthropies and non-profits. She also serves as founding Executive Director of the Large-Scale Solar Association, a trade association of the world's leading developers and owners of utility-scale solar projects who support increased deployment of solar technologies through smart policy mechanisms. In 2012, Shannon was appointed by Governor Brown to the California Workforce Investment Board, where she served until 2016. Prior to 2004, Shannon spent a decade working with the California environmental community on air quality and energy matters. In addition to working for the Sierra Club California, she also represented the Natural Resources Defense Council, the Center for Energy Efficiency and Renewable Technologies, and the Clean Power Campaign.

Sarah Friedman

Sierra Club

Sarah Friedman is a Senior Campaign Representative with the Sierra Club's Beyond Coal Campaign. Since joining the Sierra Club in 2011, Sarah has worked on a range of issues related to renewable energy and natural resources in California and beyond, including landscape scale planning efforts such as the Desert Renewable Energy Conservation Plan, county planning efforts and the San Joaquin Solar Convening, and work at the California Public Utilities Commission. Sarah leads Sierra Club's efforts to achieve conservation outcomes for numerous individual renewable energy projects. She developed and leads Sierra Club's Salton Sea campaign. Prior to joining the Sierra Club, Sarah focused her practice on renewable energy project development and finance. Sarah holds a B.A. in History from the University of Oregon and a J.D. from the University of Pennsylvania Law School.

John Gioia

Contra Costa County Board of Supervisors

John Gioia was first elected to the Contra Costa Board of Supervisors in 1998 and has been re-elected four times and represents 210,000 residents in the western most urban and diverse area of the county. He previously served for 10 years on the East Bay Municipal Utility District Board, serving as President in 1995 and 1996. John is a recognized leader in Bay Area regional government and on air quality and climate change issues. He was appointed by Governor Brown in 2013 to the California Air Resources Board and has served on the Bay Area Air Quality Management District Board since 2006, serving as Chair in 2012. John has served as President of the California State Association of Counties and the California Cities Counties Schools Partnership. He has been a leader on environmental issues and serves on the San Francisco Bay Conservation and Development Commission and as Vice-Chair of the San Francisco Bay Restoration Authority where he helped lead an effort to pass an historic measure to raise \$500 million for S.F. Bay. John is also Co-Chair of Rise Together, a regional effort to reduce poverty in the Bay Area. John grew up in Richmond, graduated from El Cerrito High School and the University of California, Berkeley with a B.A. in Political Science and also earned his law degree at U.C. Berkeley. He completed the Program for Senior Executives in State

and Local Government at Harvard University's Kennedy School of Government. John practiced law until his election to the Board of Supervisors.

Amrith Gunasekara

California Department of Food and Agriculture

Dr. Gunasekara is Science Advisor to Secretary Karen Ross at the California Department of Food and Agriculture. He works on agricultural issues as they relate to the environment and seeks to find proactive, creative, flexible and practical solutions. His focus areas include plant nutrient management, climate change and environmental stewardship. He is the CDFA liaison to the Environmental Farming Act Science Advisory Panel which is looking at highlighting the many benefits afforded by agriculture beyond food, fiber, and economic benefits. Dr. Gunasekara received his undergraduate and master's degrees from the University of Massachusetts, Amherst, and completed his PhD from the University of California, Davis, in Agricultural and Environmental Chemistry.

Amanda Hamilton

Recurrent Energy

Amanda Hamilton is the director of site acquisition for Recurrent Energy, where she focuses on site acquisition for Recurrent Energy's real estate portfolio. For nearly eight years, she has been responsible for land diligence, title resolution, transaction management, and structuring real estate agreements for land and asset acquisitions and dispositions for utility-scale solar development projects. Prior to joining Recurrent Energy, Amanda was responsible for acquiring and creating highest and best use site solutions for residential and commercial real estate development opportunities. Amanda has 16 years of real estate experience in acquisitions, development and market analysis since graduating from the University of California at Davis with a Bachelor of Arts. Amanda is a Bay Area native, lives in San Francisco with her husband, and loves to travel and spend time in Lake Tahoe.

Arthur Haubenstock

8minutenergy

Arthur Haubenstock is General Counsel and Vice President, Government & Regulatory with 8minutenergy Renewables, one of the largest developers of utility-scale solar and energy storage in the United States. He negotiates power purchase and storage contracts, obtains project financing and permitting, and addresses

strategic and project-specific environmental matters. Arthur has worked for independent power producers, technology innovators, major utilities, and governmental agencies. He has also served on the boards of several renewable energy-related organizations, including the Center for Energy Efficiency and Renewable Technologies ("CEERT"), the Large-scale Solar Association, the Solar Energy Industries Association, and the advisory board of The Vote Solar Initiative.

Tom Hudson

San Bernardino County Land Use Services Department

Tom Hudson is the Director of the Land Use Services Department for San Bernardino County, the largest county in the US. His organization includes 165 team members in 6 divisions: Planning (Current & Advance); Building & Safety; Code Enforcement; Fire Hazard Abatement; Land Development; Customer Service Unit/Administration. Key initiatives he is leading, with an annual budget of \$22.5-27 million. Tom leads numerous major special projects including a web-based general plan update; 27 community plans; renewable energy element for the general plan; health and wellness-oriented specific plan; strategic habitat conservation system development; one-stop shop front counter program; mining regulatory system refinement; and culture and arts strategic plan. This county is larger than 9 states and is the twelfth largest in population. Since 2013, his department has received five Achievement Awards from the National Association of Counties, a Merit Award from California State Association of Counties and a Red Carpet Award for International Customer Service from the Inland Empire Economic Partnership. Tom has studied at the University of Sydney, the Thunderbird School of Global Management, and the University of Washington.

Kevin Hunting

California Department of Fish and Wildlife

Kevin Hunting is the chief deputy director for the California Department of Fish and Wildlife. He is responsible for overall department operations, administration of department divisions and functions and assisting the director with strategic program and policy development. He was appointed to this position in 2010 by Governor Arnold Schwarzenegger and again by Governor Jerry Brown. Mr. Hunting is currently the co-chair of the National Fish, Wildlife, and Plant Climate Adaptation Strategy Implementation team and chair of the

national Association of Fish and Wildlife Climate Change Committee. He was instrumental in the development and implementation of the recent (2016) legislation that created the Regional Conservation Investment Strategy Program that provides for a statewide advance mitigation mechanism and landscape-scale approaches to climate change resilience and wildlife connectivity. He holds a Bachelor of Science degree in wildlife biology from Humboldt State University.

Aarty Joshi NRG

Aarty Joshi is Senior Manager, Environmental Permitting for NRG. Ms. Joshi brings more than 15 years of land use and permitting experience in the energy sector to NRG's utility-scale and distributed generation wind and solar group. Prior to joining NRG, Aarty managed permitting and environmental review processes for 1,600 MW of utility-scale renewable energy projects at CH2M. Aarty has extensive experience with managing complicated field surveys, including wetlands, wildlife, rare plants, and cultural resources, and preparation of technical reports in support of first- and third-party environmental documents pursuant to the federal National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). Aarty holds a MS in Planning from the University of Toronto and a BS in Environmental Science from the University of Guelph, Canada.

Daniel Kolta 8minutenergy

Daniel Kolta is entitlement counsel at 8minutenergy, where he supports utility-scale solar and energy storage permitting efforts throughout the country and advocates for the adoption of laws, regulations, and policies that advance renewable energy in 8minutenergy's priority markets. He previously worked at two other Bay Area law firms practicing environmental and land use law and served as a law clerk for the Supreme Court of Washington State. He received his BA and JD degrees from UC Berkeley.

Jody London Contra Costa County

Jody London is the sustainability coordinator for Contra Costa County. Since 1990, she has held various roles in California's energy and sustainability industries, starting with various roles at the California Public Utilities Commission, including Advisor to a Commissioner during

the 1996 restructuring of the electricity industry. Since 2009, she has served on Oakland's School Board.

John Lundgren

Sacramento County Office of Planning and Environmental Review

John Lundgren is a Senior Planner/Environmental Analyst with Sacramento County's Office of Planning and Environmental Review. John has been with the County for 22 years and currently serves as a manager in the Long-Range Planning Section where he manages the development of the County's Phase 2B Climate Action Plan as well as the County's Environmental Justice Element. John earned his Bachelor's Degree in Range and Wildlands Science from U.C. Davis in 1993 and utilizes his education as the County's Swainson's hawk subject matter expert and program manager for the Swainson's Hawk Mitigation Fee Program. John has managed the preparation of CEQA documents for numerous utility-scale solar energy facilities in the County and is part of the team that meets with prospective solar developers on land use and policy considerations for solar energy permitting in Sacramento County.

Matthew Marshall

Redwood Coast Energy Authority

Matthew Marshall is the Executive Director of the Redwood Coast Energy Authority, a Joint Powers Agency of Humboldt County local governments whose purpose is to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region for the benefit of the Member agencies and their constituents. In this role, he leads RCEA's long-term, regional efforts related to Residential Energy Efficiency Loan (REEL) program and CHEEF financing eligibility and access, commercial LED retrofits, electric vehicle charging station installation, and more. Matt has previously worked as a greenhouse gas reduction program administrator for the City and County of Denver, an energy and sustainability consultant, and a teacher. He received his undergraduate degree from Humboldt State University.

Kate Meis

Local Government Commission

Kate Meis is the Executive Director of the Local Government Commission (LGC), a nationally recognized

nonprofit connecting local leaders, implementing innovative solutions and advancing smart-growth policies. Kate launched many of LGC's pioneering programs, including CivicSpark (a program that places 70 fellows per year in communities across California to address climate change and water management issues), the California Adaptation Forum, the Alliance of Regional Collaboratives for Climate Adaptation, and the Statewide Energy Efficiency Collaborative. Prior to joining Local Government Commission in 2006, Meis conducted research for the UC Davis Department of Environmental Science and Policy, Transportation Alternatives of Marin, 4-H Center for Youth Development, and the University of California Cooperative Extension. Kate is a Senior Fellow of the American Leadership Forum and has been recognized for her climate-change work by the Chronicle of Philanthropy as one of the nation's "40 under 40 Young Leaders Who Are Solving the Problems of Today – and Tomorrow". She earned a M.S. degree in community and regional development from UC Davis and received a bachelor's degree in sociology from CSU-Sonoma.

Karen Norene Mills

California Farm Bureau Federation

Karen Norene Mills is the Director of the Public Utilities Department for the California Farm Bureau Federation and is an associate counsel on their legal staff. She has worked at Farm Bureau since 1988, representing its members' interests during that time on myriad energy issues, which arise in the course of proceedings at the California Public Utilities Commission and the California Energy Commission, as well as the Legislature. The current focus on renewable energy has created impacts to and opportunities for farmers and ranchers in California. Karen has and continues to participate in a variety of collaborative initiatives and boards that consider issues impacting energy in California. Karen is also an active participant in her family's walnut, rice and cattle ranch in Northern California.

Marisa Mitchell

Intersect Power

Marisa is Principal at Intersect Power, a clean energy infrastructure development company, where she leads environmental permitting and policy matters for the company. She has spent the last four years on a development team siting, permitting, and ensuring compliance for large-scale solar photovoltaic and energy

storage projects, and she spent the prior ten years as a CEQA and NEPA consultant serving public agencies in their roles entitling solar, wind, and transmission projects. She recently served on the Avian Solar Working Group, and she participated in both the DRECP process and the San Joaquin Valley Least Conflict process. Marisa is currently a student in the Executive MBA program at UC Berkeley's Haas School of Business.

Michelle Nuttall

Southern California Edison

Michelle Nuttall is a Senior Project Manager in the Environmental Policy & Sustainability group at Southern California Edison, one of our nation's largest electric utilities. An environmental biologist by training, Michelle has worked in a wide variety of roles, including as an environmental consultant, environmental auditor, regulatory specialist, and development project manager. Over the course of her career she has managed numerous air quality, feasibility assessment, permitting, and compliance projects.

Susan Oto

Sacramento Municipal Utility District

Susan Oto is a Regional & Local Government Affairs Representative in SMUD's Legislative & Regulatory Affairs Department. She works on policy and planning issues involving the regional and local governments that influence SMUD's operations and goals. Susan participated in the discussion group for development of the OPR California Solar Permitting Guidebook in 2012. Susan earned a Bachelor of Science degree in Journalism at Cal Poly San Luis Obispo.

Lorelei Oviatt

Kern County Planning and Natural Resources Department

Lorelei Oviatt, AICP, is Director for the Kern County Planning and Natural Resources Department in California and has worked in both the public and private sector of land development. Among her other accomplishments, she has provided leadership to expedite projects permitting over 12,000 MW of renewable energy in Kern County for wind, solar, and alternative fuels that provide power for Los Angeles Department of Water and Power (LADWP) Southern California Public Power Authority (SCPPA), Southern California Edison and Pacific Gas and

Electric among others. She is President of the California County Planning Directors Association (CCPDA). She has a Bachelor of Arts Degree from Baldwin Wallace University in Ohio and a Masters of Public Administration from California State University, Bakersfield where she is lecturer on public policy topics.

Dustin Pearce

Conservation Biology Institute

Dustin Pearce joined the Conservation Biology Institute in December of 2015. His background in geospatial sciences has focused on the interplay of working agricultural lands, natural lands, and renewable energy development in the San Joaquin Valley of California. His work with the Conservation Biology Institute is focused on stakeholder engagement and smart planning for renewable energy development throughout California. Dustin holds a M.E.S.M. in Economics and Politics of the Environment from the Bren School of Environmental Science & Management, and a B.S. in Conservation Biology from Arizona State University.

Renée Robin

Allen Matkins LLP

Renée Robin is a senior counsel in the Land Use and Environmental & Natural Resources Practice Groups at Allen Matkins. Her practice focuses on renewable energy law, environmental, land use, natural resources, and agriculture, representing private and public clients in permitting, development and transactional matters. Most recently Renée was the director of permitting and senior counsel for a global solar energy development and manufacturing corporation where she directed its land use and environmental permitting operations and provided in-house legal counsel services on a wide range of regulatory, land use, land management, environmental and natural resources matters for its utility & commercial business unit. Renée also has extensive experience in public policy as the Executive Director of the Program on Public Space Partnerships at the Kennedy School of Government at Harvard University. She acted as California Director of the Children's Environmental Health Network and has been visiting faculty in land use and natural resources law at the University of California at Berkeley, College of Environmental Design. Renée received her J.D. from the University of California Hastings College of the Law. She received her B.A. in political science from Brandeis University.

Diane Ross-Leech

Pacific Gas and Electric Company

Diane Ross-Leech is the director of environmental policy at Pacific Gas and Electric Company. She has over 30 years of professional experience in complex environmental and natural resource policy, interdisciplinary project management, and agency and stakeholder relations. She has a degree in Landscape Architecture from the University of California at Berkeley and Land Use and Environmental Planning from the University of California at Davis, CA. Diane is currently the Director of PG&E's Environmental Policy Department. Diane is responsible for enhancing working relationships with federal and state agencies such as the U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Forest Service, U.S. Army Corps of Engineers and the California Department of Fish and Wildlife. Diane is currently on the Board of the California Audubon and the San Francisco Bay Joint Venture Management Board.

Tim Snellings

Butte County

Tim is the Director of Development Services for Butte County. In that capacity, he oversees the Planning & Building Divisions, and has focused on preparing a Utility- Scale Solar Guide, finalizing a Climate Action Plan, updating the County's General Plan and Zoning Ordinance, implementing a Sustainable Agriculture Land Conservation Grant, and providing quality and timely services to our customers regarding development proposals and property information as well as processing building permits and planning projects. Tim is a commissioner of the California Statewide Communities Development Authority and a member of the California Planning Roundtable, and a former President of the California County Planning Directors Association. He received his B.A. in environmental studies from California State University, Sacramento

David Sterner

First Solar

David (Dave) Sterner has an educational background in Environmental (primarily biological) Science included undergraduate work at UCSB and a graduate work at UC Berkeley. Over the last 30 years, his employment has spanned working for NGO's such as The Nature Conservancy, government agencies such the CEC and

CDFW, and private industry. His professional experience has ranged from habitat management, conservation and restoration, and evaluating the impacts of renewable energy (wind and solar) on wildlife. He is currently manager of siting and permitting for First Solar, assisting with site selection and Federal, state and local permitting of large utility scale solar power plants.

Susan Tae

Los Angeles County Department of Regional Planning

Ms. Tae is a Supervising Regional Planner with the Los Angeles County Department of Regional Planning. She currently oversees the Community Studies North Section, which conducts long-range planning and land use policy efforts primarily in unincorporated Santa Clarita Valley and Antelope Valley. Recent projects include the Antelope Valley Area Plan Update, the Renewable Energy Ordinance, the Hillside Management Areas Ordinance Update, and the Significant Ecological Areas Program Update. She is also an appointed Hearing Officer and Hearing Examiner and hold public hearings on land development projects. A native of southern California, she received her Bachelor of Arts in Geography from University of California Los Angeles and Masters in Public Administration from California State University Northridge. She is also a member of the American Institute of Certified Planners (AICP).

Dawn Weisz

Marin Clean Energy

As Chief Executive Officer of Marin Clean Energy, Dawn is responsible for the vision, strategy, and leadership of MCE. Dawn began coordinating efforts to explore and launch MCE in 2004. Under her watch, MCE has launched service to more than 250,000 customers in 24 communities and entered into power purchase agreements that have more than doubled the amount of renewable energy procured for customers, exceeded State Renewable Portfolio Standards, and achieved substantial greenhouse gas reductions to help local communities reach State Assembly Bill 32 targets. Dawn has 20 years of experience developing and managing renewable energy and energy efficiency programs and projects while working for leading public agencies in the field. Previously, she was a Principal Planner with the County of Marin, where she managed energy and sustainability initiatives and served as the Executive

Director for Sustainable North Bay. Dawn is a highly sought-after speaker at energy-related conferences and has been a guest lecturer for UC Berkeley, the National American Planning Association, and the U.S. Environmental Protection Agency. Dawn has also received awards from the U.S. Environmental Protection Agency, the U.S. Department of Energy, and the Power Association of Northern California.

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