

The Pace of Solar Progress

HOW PREEXISTING LAND USE
SHAPES PERMITTING TIMELINES FOR
UTILITY-SCALE SOLAR IN CALIFORNIA

EXECUTIVE SUMMARY | JULY 2026

The Nature
Conservancy



Introduction

California's future hinges on its ability to rapidly and responsibly develop significant amounts of utility-scale solar. Yet the pace of deployment is increasingly constrained by permitting complexity. In a first-of-its-kind analysis, this study examines 15 years of permitting data and includes interviews with county officials, a state agency, and solar developers to understand the drivers of permitting timelines and to identify how California can accelerate clean energy deployment while protecting important landscapes.

The findings are clear

Location is the strongest determinant of permitting speed. Projects on previously modified lands move through permitting far faster than those on undisturbed natural lands, and projects on Williamson Act lands face notably longer review timelines than projects on comparable, non-contracted lands.

These insights point to a powerful opportunity

Aligning the state's goals for clean energy, land use, groundwater sustainability, and conservation can reduce permitting barriers and accelerate deployment of the affordable, new clean energy the state needs to achieve its goals and ensure reliability.



California's Clean Energy Imperative

California must build new solar projects at unprecedented speed to meet Senate Bill (SB) 100's requirement of 100% clean electricity by 2045. Permitting challenges directly affect California's ability to achieve SB 100, given the need to double or even triple the state's current build rate.¹ A recent California Public Utility Commission Integrated Resource Plan ruling cautions that the scale of solar needed "calls into question whether it can feasibly be built in the quantities and timing identified."²



Study Background and Purpose

California's transition to a clean, reliable, and affordable electricity system requires a rapid expansion of utility-scale solar development. Permitting and environmental review for solar projects are often cited as major sources of uncertainty and delay that can challenge speed to generation and drive increased project costs.

This study examines factors affecting permitting timelines for utility-scale solar projects within the epicenter of California's past and future utility-scale solar development, the San Joaquin Valley and part of the West Mojave.

1 Recent build rates of 1–3 GW per year fall far short of the 4–7 GW per year needed to achieve SB 100. Source: Order Instituting Rulemaking to Continue Electric Integrated Resource Planning, Cal. P.U.C. ALJ Ruling, Rulemaking (R.) 20-05-003 / R.24-01-017 (January 16, 2026). <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M582/K082/582082526.PDF>

2 CPUC ALJ Ruling, R.24-01-017

Research questions:

- *How does prior land modification influence permitting speed?*
- *Have solar permitting timelines changed over time?*
- *How does land use shape where developers seek permits?*

The study integrates:

- **15 years of solar permitting data** across the study area:
 - 274 utility-scale solar Conditional Use Permit applications
 - 18 Incidental Take Permits and 39 Lake and Streambed Alteration Agreements
- **Spatial analysis** of prior land modification and regulatory designations
- **Interviews** with county permitting directors and planners, state agency staff, developers, and permitting experts
- **Analysis of developer site selection patterns** compared to regional land availability

Permitting Solar in California

To study how permitting can impact project timelines, it is essential to understand the sometimes-overlapping permitting frameworks governing solar development. California's permitting requirements for utility-scale solar make up a multiagency process that includes local land use authority, state environmental review, and, when relevant, federal oversight. While designed to ensure environmental protection, land use compatibility, and community transparency, the system's complexity also creates variability in timelines.

Local Land Use Authority

Counties retain primary control over siting through Conditional Use Permits (CUPs), zoning ordinances, and general plans. Counties determine when a CUP application is complete, a critical early step that can take months of back and forth, depending on staff capacity and the quality of the developer's application. Developers often begin site surveys and pre-application meetings months and sometimes years prior to submitting a CUP application. Once a CUP application is deemed complete, counties initiate California Environmental Quality Act (CEQA) review.

Counties determine:

- Whether a project requires an Environmental Impact Report (EIR), Mitigated Negative Declaration (MND), or Negative Declaration (ND)
- How to integrate technical studies (biological, cultural, hydrological, traffic)
- Whether the project is consistent with local land use policies, agricultural protections, and community priorities

CEQA: Environmental Review and Public Disclosure

CEQA functions as the backbone of environmental review. CEQA also serves as a venue for tribal consultation under AB 52, community engagement, and coordination with state and federal resource agencies. Once a CUP application is deemed complete, the CEQA process begins, requiring agencies to:

- Identify potential environmental impacts
- Propose mitigation measures
- Conduct public review and respond to comments
- Certify the final environmental document

State Resource Agency Permits

Many projects require additional permits from state agencies, such as the California Department of Fish and Wildlife (CDFW). Two of the key permits are:

- Incidental Take Permits (ITPs)
- Lake and Streambed Alteration Agreements (LSAAs)

An ITP³ allows a permittee to take a California Endangered Species Act (CESA)-listed species if such taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Permittees must implement species-specific minimization and avoidance measures and fully mitigate the impacts of the project. An LSAA is required when a project activity may substantially adversely affect fish and wildlife resources.⁴ While formally “post CEQA,” these permits are intertwined with CEQA mitigation measures.

Federal Permitting: Triggered by Species, Jurisdictional Waters or Federal Lands

Projects that affect federally listed species or jurisdictional waters may require U.S. Fish and Wildlife Service Biological Opinions, Army Corps of Engineers Section 404 permits, or North America Environmental Policy Act (NEPA) review for projects on federal land.

3 <https://wildlife.ca.gov/Conservation/CESA/Permitting/Incidental-Take-Permits>

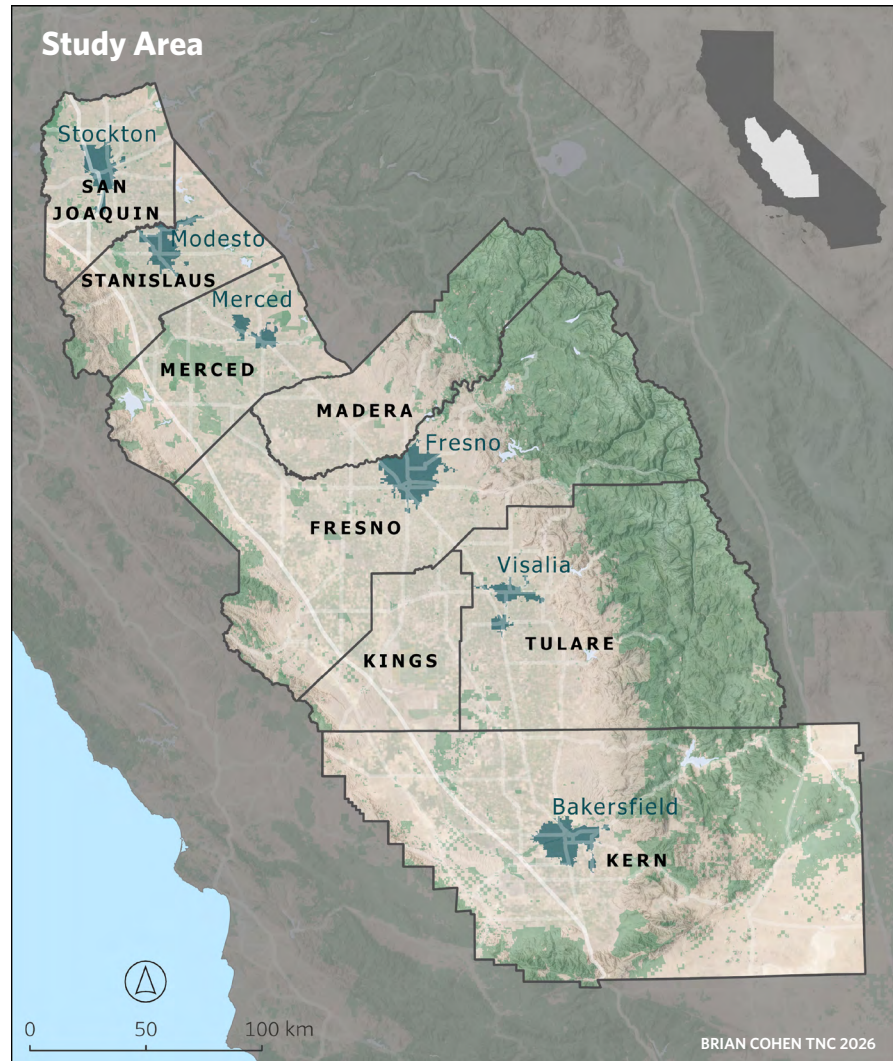
4 <https://wildlife.ca.gov/Conservation/Environmental-Review/LSA>

AB 205: Opt-In Certification: The AB 205 Opt-In Certification Program allows eligible renewable energy and storage projects to shift permitting authority from counties to the California Energy Commission (CEC). Two projects have been approved through AB 205 as of July 2026.

Study Area: A Region at the Crossroads

The San Joaquin Valley and part of the West Mojave are the epicenter of California’s past and planned future solar development. The study area includes eight counties—Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare.

The San Joaquin Valley is undergoing profound land use change driven by groundwater overdraft and agricultural transition. As land owners look to repurpose fallowed land, solar development is widely identified by the state, local governments, nongovernmental organizations, and the solar industry as a promising opportunity for impacted lands, given the flat, sunny, nature of the region, amount of private lands, and expected economic returns.



Key Findings

1 Prior land modification is the strongest predictor of permitting speed

Solar projects on modified lands are permitted significantly faster than those on natural lands.⁵

Similarly, projects on previously cultivated crop lands⁶ experience faster approval timelines than projects on undisturbed natural lands, at 245 and 641 median approval days respectively.⁷

Implication | California can dramatically accelerate solar deployment by steering projects towards modified lands.

2 Projects on Williamson Act lands face longer permitting timelines

Projects on Williamson Act⁸ lands experience longer permitting timelines than other agricultural lands due to complex compatibility determinations and contract cancellation requirements.

Implication | California has a timely opportunity to achieve its clean energy goals and support counties by establishing clear, voluntary pathways that align Williamson Act guidelines with groundwater-driven land retirement under the Sustainable Groundwater Management Act (SGMA).⁹

5 This study uses The Human Modification Index to represent the level of land modification and finds that projects sited on lands above the median modification level are permitted in 160 (median) days versus 566 (median) days for those sited on lands below the median level of modification.

6 This study uses National Land Cover Database (NLCD) data to represent land cover type.

7 Median days are calculated using only projects for which the study's authors have approval dates. Median days for undisturbed natural lands and cultivated crops are 621 and 338, respectively, when projects with estimated approval dates are included, as in the full report.

8 The Department of Conservation, that oversees the Williamson Act program, defines it as: "[A program that] enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value." <https://www.conservation.ca.gov/dlrp/lca>

9 <https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management>



3 Developers already prefer and seek permits on modified lands

Developers largely avoid undisturbed natural lands—only 21% of applications occur there—and they also avoid Williamson Act lands.

Implication | Developers are aware of the permitting risks that come with siting projects on ecologically sensitive lands, but will need barriers removed in the future to increase solar development on degraded lands.

4 Project size, distance to communities, and permit application year do not meaningfully affect permitting timelines

It is possible, given the 15-year time horizon of the study, that some of these factors identified by interviewees are just starting to shape permitting timelines.

Implication | The clearest way to increase permitting speed is to improve policies and incentives to site projects on degraded and former agricultural lands.

5

State-level permits offer important environmental protections; however, the related review processes can add variability and uncertainty.

ITPs and LSAAAs add an additional 6-12 months to the project permitting timeline.¹⁰ Interviews suggested the number of ITPs sought is expected to increase as new species become listed, and, separately, that finding appropriate mitigation is becoming more challenging for certain species, especially on the San Joaquin Valley floor.

Implication | Adequate CDFW staffing, efficient review processes, and new approaches to clarify and facilitate mitigation are critical to the predictability and speed of future projects.

6

Counties have adapted to high levels of solar development, although local policies reflect distinct county priorities and varying staff capacities.

Interviews reveal variability in how counties interpret the compatibility of solar with Williamson Act, how they are responding to SGMA, and staff capacity and experience.

Implication | State investments should offer flexible, customized technical assistance and surge capacity tailored to each county's unique workload.

¹⁰ Median approval days for ITPs: 251 days; median approval days for LSAAAs: 214 days.

Policy Recommendations

1 Modernize the Williamson Act to Support Clean Energy and Land Repurposing

Projects on Williamson Act lands face longer timelines due to compatibility determinations and contract cancellation requirements. California should:

- Clarify compatibility pathways for solar on lands facing retirement due to groundwater restriction
- Streamline permitting pathways for solar on retiring irrigated farmland

These updates would reduce friction while preserving the Act's conservation intent.

2 Launch a Programmatic EIR for the San Joaquin Valley

A programmatic Environmental Impact Report (EIR) would provide a shared foundation for counties, reduce duplicative CEQA work, and accelerate project-level review. Prioritizing the San Joaquin Valley would:

- Increase predictability for developers
 - Reduce county workload
 - Standardize mitigation requirements
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3 Create a Cross-Agency Working Group to Align Incentives for Land Repurposing and Clean Energy

California's land use, water, conservation, and energy policies are not yet aligned. A formal working group—spanning CEC, CPUC, CAISO, DWR, CDFA, CDFW,¹¹ and county representatives—could ensure that clean energy deployment supports, rather than competes with, groundwater sustainability and habitat conservation, and would ensure that groundwater planning-related resources and plans can be built into energy planning.

¹¹ California Energy Commission, California Public Utilities Commission, Department of Water Resources, California Department of Food and Agriculture, California Department of Fish and Wildlife.

4 Improve Species Permitting Pathways and Mitigation Availability on Former Farmland

As the list of candidate and listed species evolves over time, the state should:

- Study and pilot new mitigation approaches tailored to former irrigated farmland
- Support research on on-site mitigation (e.g., western burrowing owl, San Joaquin kit fox)

5 Provide Surge Capacity and Technical Assistance for Counties

Counties are the backbone of solar permitting, managing rising application volumes alongside vital local planning duties. The state should establish a dedicated fund or floating resources to support counties with technical resources during peak permitting periods.



Methods

The approach combines three complementary components: (1) a harmonized dataset of county permitting records, (2) spatial analysis of site and landscape characteristics, and (3) a statistical model designed to evaluate how these factors influence permitting duration.

Data Collection and Integration

County planning departments provided project-level records for 274 utility-scale solar projects initiated between 2009 and 2025. These records included CUP application dates, decision dates, project size, and project location.¹²

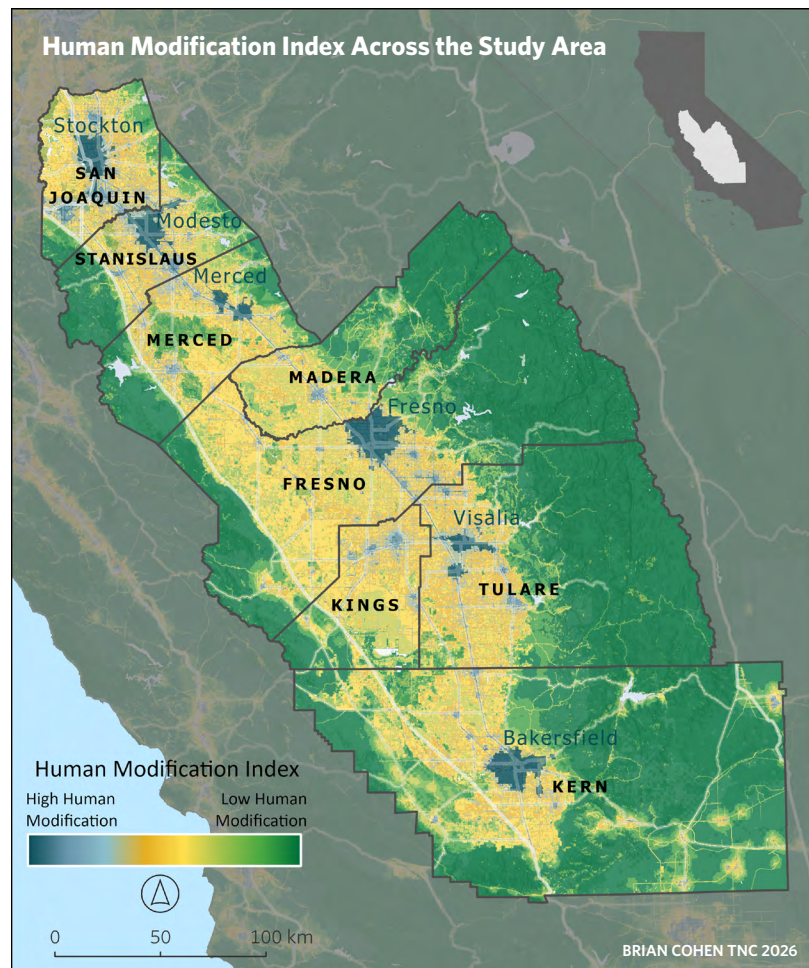
Project locations were linked to spatial datasets describing:

Human Modification Index (HMI) —

a continuous measure of how much a landscape has been altered by human activity

Land use designations,
including Williamson Act enrollment

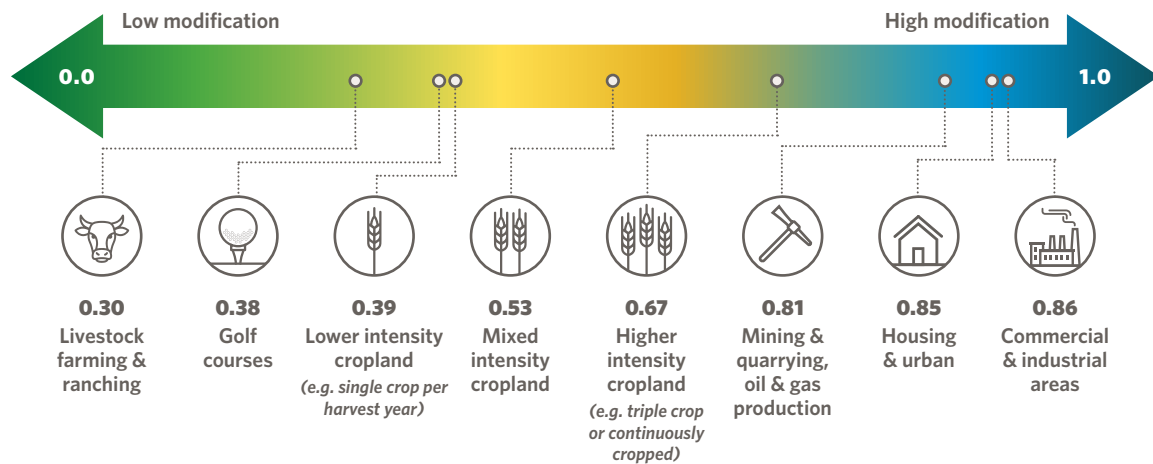
Land cover type,
including developed land, irrigated crop land, and open space¹³



¹² Because no statewide database exists, records were standardized across counties to create a dataset suitable for cross-jurisdictional analysis.

¹³ Otherwise referred to in this executive summary as undisturbed natural lands.

Examples of Land Uses Across the range of the HMI



Statistical Approach

To evaluate how site conditions and project characteristics influence permitting speed, the study used a survival analysis model to assess how different factors affect the likelihood that a project receives a permitting decision at any given point in time. The model identifies which characteristics are associated with faster or slower permitting. Permitting duration was defined as the number of days between CUP application submittal and the final county decision given available data and data quality.¹⁴

Qualitative Interviews

To contextualize the quantitative findings, the study incorporated interviews with county planners, state agency staff, developers, and consultants. These interviews helped to further validate the quantitative findings and provided insight into permitting practices, challenges, and emerging issues such as mitigation availability and battery energy storage system siting.

¹⁴ As the county deeming the application complete can represent additional weeks or months and this step also represents a significant milestone in the CEC's Opt-In certification process, future studies should seek to capture or estimate those dates for further analysis.

Conclusion

California's clean energy goals hinge on making solar development both faster and more predictable. Improving permitting predictability—not just speed—is essential for meeting SB 100, because uncertainty drives risk for individual projects and challenges the state's ability to plan for the future. At the same time, California must modernize how Williamson Act lands are treated in regions facing groundwater-driven fallowing under SGMA, where related restrictions are limiting some of the state's lowest-conflict solar opportunities. Aligning siting incentives, clarifying pathways for solar on fallowed agricultural lands, and reducing permitting uncertainty are essential to unlocking affordable clean energy and delivering a reliable, decarbonized grid.

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