



# The California Energy-Conservation Nexus:

*Understanding barriers to land-use change in the San Joaquin Valley affecting solar and conservation goals*



Image Credits: Conservation Land Group

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## Client

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## Objectives

This project aims to help The Nature Conservancy (TNC) understand the barriers to effective land conservation in the San Joaquin Valley (SJV), given existing economic conditions, policy constraints, and stakeholder requirements. The main stakeholders in the SJV include: other NGOs and conservation agencies, landowners, solar developers, energy regulatory agencies, and local policymakers.

The project will focus on three main objectives: What are the barriers preventing landowners from effectively managing the rights associated with their retired land? Are there technical, regulatory or economic constraints preventing solar development on land identified as ideal for that purpose? And how can TNC and other conservation agencies coordinate solar mitigation funds to create wildlife corridors or contiguous parcels when development occurs?

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## Significance

In the next 20 years, land in the San Joaquin Valley will undergo the most extensive change since it was first converted into irrigated farmland. How will the land in this vast region be used in the future? The stakes are high.

Solar developers and state policymakers aim to develop solar power plants on this land, while NGOs and conservation agencies aim to restore habitat for endangered species. Meanwhile, local landowners don't want to retire productive agricultural land, but have no choice due to the Sustainable Groundwater Management Act (SGMA). The implementation of SGMA will effectively retire approximately 535,000 acres of existing farmland by 2040<sup>3</sup>, which accounts for 10-20% of all irrigated farmland in the SJV.

Often, these disparate use-cases do not need to compete. In fact, TNC has already conducted an analysis showing where land might best be used between continued farming, solar development, and habitat restoration. Unfortunately, landowners face difficult land-use decisions and must navigate complicated government incentives and regulations – as a result, change has been slower than expected.

This project can help ease the vast changes in land-use change in the San Joaquin Valley to the benefit of all of the stakeholders. The deliverables can help conservationists harness solar development to help conserve valuable habitat, guide landowners in understanding how best to utilize land fallowed due to water limitations, help solar developers to understand how to avoid regulatory issues and increase renewable energy resources in California, and finally inform policymakers so that they can manage all of these competing stakeholders and needs.

## **Background**

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TNC has long been interested in the interplay between land retired from irrigation, solar development, and conservation in the SJV. In 2013, TNC identified the best places in the SJV to site solar development in order to avoid converting high-value cropland or destroying valuable potential habitat restoration sites<sup>1</sup>; subsequent work in the same area then identified the optimal habitat restoration locations.<sup>2</sup>

Meanwhile, in the past decade, California has introduced a variety of policies that seek to protect valuable natural resources and build the state's clean energy portfolio. In 2014, California passed the Sustainable Groundwater Management Act; and in 2018, passed SB-100 – a law requiring 100% clean energy by 2045. These trends add incentives for landowners to consider solar development and conservation efforts as an alternative use for their assets.

To better understand how the state can reach its goals with a minimum impact on the environment, TNC identified key renewable energy placement areas both in California and the rest of the western United States.<sup>4</sup> This report showed that the San Joaquin Valley is a key location to site solar resources, and that current solar development rates in the area must drastically increase for California to meet its decarbonization goals, approaching 236,000 – 273,000 acres of new solar development by 2050<sup>4</sup>.

As of 2021, there has been little development or conservation taking place in the SJV, even though there are interested stakeholders seeking to engage with one another. TNC would like help identifying the sources of this gridlock and the barriers preventing this unique conservation opportunity. TNC would also like to look into the future and determine how to best use mitigation funds attached to solar development. The goal would be to successfully coordinate

land retirement efforts and create wide-ranging wildlife corridors in the SJV when such solar development is finally able to occur.

## Equity

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The San Joaquin Valley is home to a staggering 29 percent of the communities considered “disadvantaged” in California’s CalEnviroScreen<sup>5</sup>. These communities are disproportionately affected by socio-economic, environmental and health factors, and often face unemployment challenges. Unfortunately, the adoption of SGMA will impact these regions by further reducing employment opportunities and introducing dust pollution from fallowed farmland.

While this issue is complex, solar development and land conservation efforts have great potential to both provide employment during the restoration process, and improve environmental quality metrics in these regions. Analyzing the magnitude of these developments could help local non-profit organizations and governments understand the potential economic opportunities for its community members; and, in turn, inform what kind of labor programs need to be in place to successfully train a local workforce for stable future careers.

## Available Data

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The team will have access to internal TNC data about the San Joaquin Valley, as well as these public resources:

- [\*“Western SJV Least Conflict Solar Energy Assessment Data”\*](#) : Regional conservation data identifying land value and use to create an initial vision for mission compatibility.
- [\*“Power of place, Integrating conservation values into pathways to 100% clean energy in California”\*](#) : [Maps](#) identifying renewable resource and environmental exclusion spatial data to limit the impact of energy development on high value natural/agricultural lands.
- [\*“Groundwater Dependent Ecosystems in California Data”\*](#) : Geospatial database covering species that rely on CA’s freshwater resources to survive
- [\*“Identification of potentially suitable habitat for strategic land retirement and restoration in the San Joaquin Desert”\*](#): Habitat suitability model layers for upland species
- [\*“Shaping land use change and ecosystem restoration in a water-stressed ag landscape”\*](#) : Predicted agricultural retirement modeling layers including agricultural suitability, land impairment, and water availability; identifies strategic restoration areas
- [SAGBI recharge potential](#) (public) & [SGMA subbasins and GSAs](#) (public)

## Approaches

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1. Combine all internal and external data around land-use changes; identify all regulatory and tax considerations around fallowing, solar development, and conservation in selected San Joaquin Valley (SJV) counties; and review all relevant regional studies.
2. In consultation with TNC partners, determine the barriers to land retirement and solar development in the SJV. Some examples include:
  - a. What are the list of permits, tax incentives or burdens, and regulations that govern the conversion of land to solar? What rights may be retained and sold, and at what price?

- b. What are the technical, economic, or regulatory challenges for SJV solar development?
3. Analyze land retirement, solar development, and geographical limitations of solar mitigation funding to highlight the regions in which mitigation funds can most likely create valuable and contiguous wildlife corridors.

### **Deliverables**

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- An internal TNC economic and policy analysis report identifying the main barriers preventing stakeholders from transferring assets and engaging in optimal management of their land amongst competing uses.
- A recommendation to TNC management identifying ways to coordinate the retirement of high value conservation land using solar mitigation funds, including an emphasis on how to facilitate wildlife corridors or contiguous parcels.
- Potential extension: A guide of options for landowners with retired land looking to maximize its economic value. This would include information on land-use restrictions, different configurations of land rights amongst users, and information about how other landowners in the SJV have managed land-use transitions.

### **Internships**

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The Nature Conservancy will commit to funding one remote summer internship for \$8,000 to enable a student to advance the group project objectives of the project over the summer.

### **Budget**

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The budget for this project is not expected to exceed the \$1,300 provided by the Bren School of Environmental Science & Management. Most resources are either already available at the Bren School (e.g. mapping software) or via TNC (e.g. data sources).

### **Citations**

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1. Butterfield, H. S. (2013). *Western San Joaquin Valley Least Conflict Solar Energy Assessment data*. Science for Conservation.  
<https://www.scienceforconservation.org/products/western-san-joaquin-solar-data>.
2. Kelsey, R. (2017). *Identification of potentially suitable habitat for strategic land retirement and restoration in the San Joaquin Desert*. The Nature Conservancy  
<https://www.scienceforconservation.org/products/strategic-land-retirement>.
3. Hanak, E. (2020, May 29). *Water and the Future of the San Joaquin Valley*. Public Policy Institute of California.  
<https://www.pplic.org/publication/water-and-the-future-of-the-san-joaquin-valley/>.
4. Wu, G. C. (2019). *Low-impact land use pathways to deep decarbonization of electricity*. The Nature Conservancy .  
<https://www.scienceforconservation.org/products/power-of-place-ca>.
5. EPA. (2017, April). *DESIGNATION OF DISADVANTAGED COMMUNITIES PURSUANT TO SENATE BILL 535*. OEHA. <https://oehha.ca.gov/calenviroscreen/sb535>.



Group Project Selection Committee  
Bren School of Environmental Science and Management  
2400 Bren Hall  
UC Santa Barbara, CA 93106

21 January 2021

To: Group Project Selection Committee  
Re: Letter of Support for Bren Group Project: "The California Energy-Conservation Nexus: Understanding how solar development can support upland habitat conservation goals in the San Joaquin Valley"

I am writing on behalf of The Nature Conservancy in California to express our support for the proposed student group project "The California Energy-Conservation Nexus: Understanding how solar development can support upland habitat conservation goals in the San Joaquin Valley." The work, to be completed by Bren School graduate students, is critical to advancing our goals of habitat restoration, renewable energy deployment, and sustainable groundwater management in the San Joaquin Valley.

The student work will support of Strategic Restoration and Renewable Energy bodies of work by calculating how much habitat could be restored on retired farmlands via mitigation for future solar development projects. The project would help to advance the Conservancy's work to integrate and incentive alternative uses for retired farmlands that provide multiple benefits for San Joaquin Valley communities. The project could also provide important insight into barriers to and potential pathways for expanding solar deployment and habitat restoration through county level planning and permitting processes. Achieving California's energy and water management goals is going to require significant land use changes in the San Joaquin Valley. This project would help clarify the opportunity for two beneficial land uses and how energy and conservation stakeholders could work together to accelerate implementation.

The Conservancy commits to providing all necessary guidance, available data, coordination, and technical review to the students, as well as supporting the technical and professional development of the group members. The Nature Conservancy commits to providing up to \$8,000 to the advancement of the Group Project objectives which could include temporary, short-term summer employment with The Nature Conservancy. Due to COVID-19, currently we can only commit to a remote internship. As conditions change, we may be able to offer the intern a workspace in one of our main offices, located in San Francisco, Los Angeles, or Sacramento.

We are excited to work with Bren School students on this project and look forward to your review of the proposal. Please don't hesitate to contact us for further information about our support for this project.

Sincerely,

A handwritten signature in black ink that reads "Abigail Hart".

Abigail Hart  
Agriculture Project Director  
The Nature Conservancy