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TNC of California Comments - Accelerating Bulk Grid Connection

May 31, 2023

California Energy Commission
Docket No. 23-IEPR-04
Clean Energy Interconnection - Bulk Grid

Dear Commissioner Monahan, Commissioner Gunda, and Commission Staff:

The Nature Conservancy (TNC) of California appreciates the opportunity to comment on the proposed focus for the 2023 Integrated Energy Policy Report. TNC applauds the energy agencies on joint efforts through the Memorandum of Understanding to meet this moment as the state faces growing challenges to deliver clean energy resources and ensure reliability, affordability, and protection for the state's most important lands, biodiversity, and cultural resources. Focus on interconnection of clean energy resources is vital to both upholding these priorities and unlocking resources.

TNC strongly supports new and expanded efforts among the energy agencies that support this vision. Land use screens and busbar mapping are critical inputs into transmission and resource planning, and the energy agencies should continue to integrate updates to both resources into statewide assumptions, planning, and prioritization to inform least-regrets decision-making. The CAISO's proactive approach reflected in the 2022-2023 Transmission Plan is also a valuable framework to transform California's electric grid and address the challenges referenced above.

TNC applauds how the above efforts are informing statewide planning, and urges the energy agencies to continue to identify opportunities to prioritize near-term, least-regrets upgrades to accelerate deployment of new resources, while also planning the transmission system of the future. The agencies should also more closely consider the role of land transition, including Sustainable Groundwater Management Act (SGMA) related transition, in assumptions about transmission needs and resource planning.

TNC, in consultation with E3 and Montara Mountain Energy, recently performed a related analysis focused on the San Joaquin Valley to demonstrate a study approach in support of least-regrets prioritization and investments and to identify specific upgrade opportunities in the San Joaquin Valley. TNC has included the study as an attachment to this comment for your consideration.

Sincerely,

Marybeth Benton
Energy Project Director

Additional submitted attachment is included below.

San Joaquin Valley Solar and Transmission Analysis

This report was prepared in partnership with E3 and Montara Mountain Energy. E3 utilized publicly available results from analysis E3 carried out for the CPUC as part of the 2023-2024 TPP Busbar Mapping Analysis (R 20-05-003) in preparation of this report. This report is unrelated to and separate from any work E3 is doing for the California Public Utilities Commission.

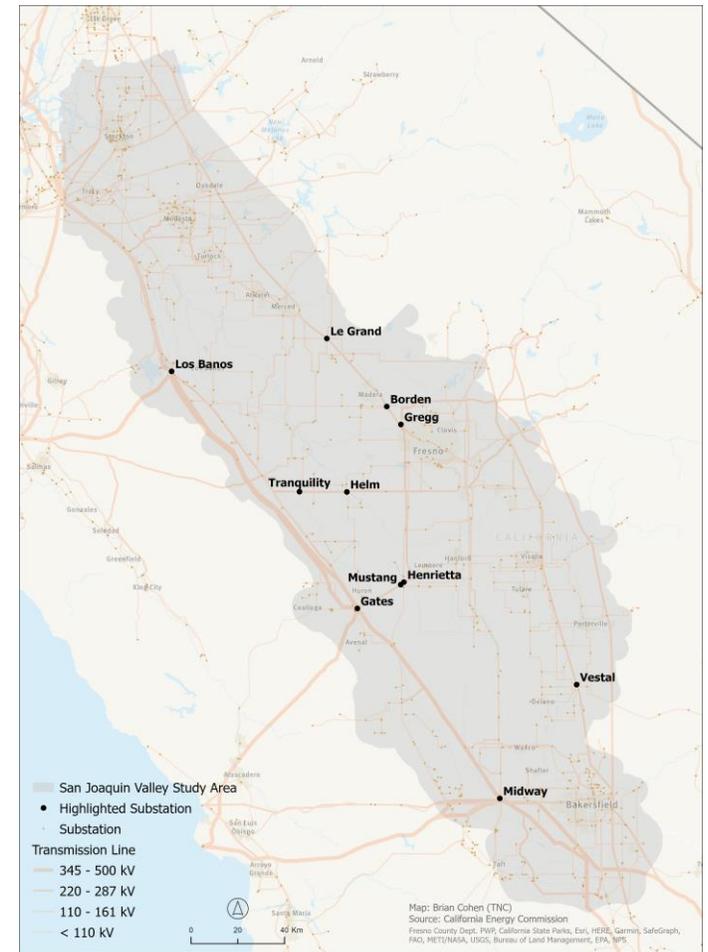
While E3 and Montara Mountain Energy provided technical support to The Nature Conservancy in preparation of this report, E3 does not endorse any specific policy or regulatory measures as a result of this analysis. The California Public Utilities Commission did not participate in this project and does not endorse the conclusions presented in this report.

Study Motivation

- Zero carbon resources need to increase 4x by 2030 and 6x by 2035 for California to achieve the targets identified in Senate Bill 100.
- California's energy agencies are working closely to enhance coordination of resource planning and transmission planning to achieve state reliability and policy needs in response to this challenge (December Memorandum of Understanding).
- The CEC, CAISO, and CPUC are acting on the important role that land-use constraints play in successful development of the energy system California's future depends on.

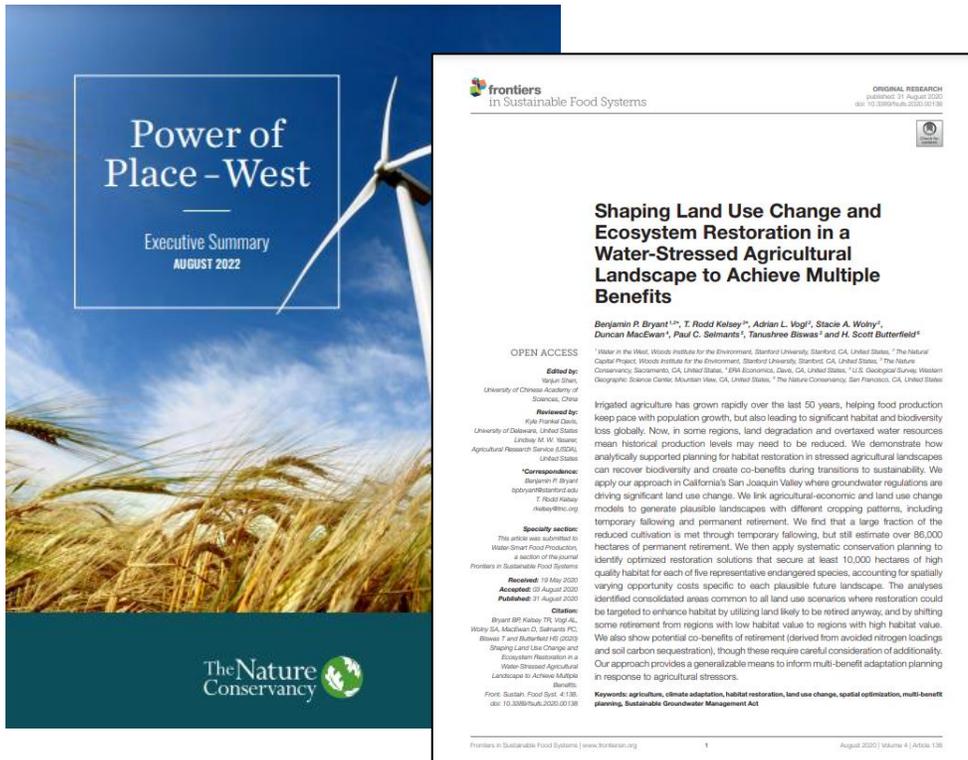
Study Context

- Several recent studies and stakeholder processes have highlighted that more than 500,000 acres of agricultural land in the San Joaquin Valley could move out of production due to the Sustainable Management Groundwater Act (SGMA).
- Drawing on the previous studies and stakeholder processes that highlight solar development as a pathway for agricultural land that may go out of production, this study identifies specific transmission upgrades that would unlock solar resource potential in these areas.
- This report is interested to explore potential land use transition within the San Joaquin Valley and how achievement of the state’s clean energy goals is possible, while still accounting for the needs of communities, biodiversity, climate resilience, and other areas of conservation value.



Study Area - San Joaquin Valley

This study considers the intersection of low impact land that may transition use with indicators for successful clean energy resource deployment.



Using data from two prior analyses with public CPUC and CAISO data, this study created a geospatial dataset to overlay the following information:

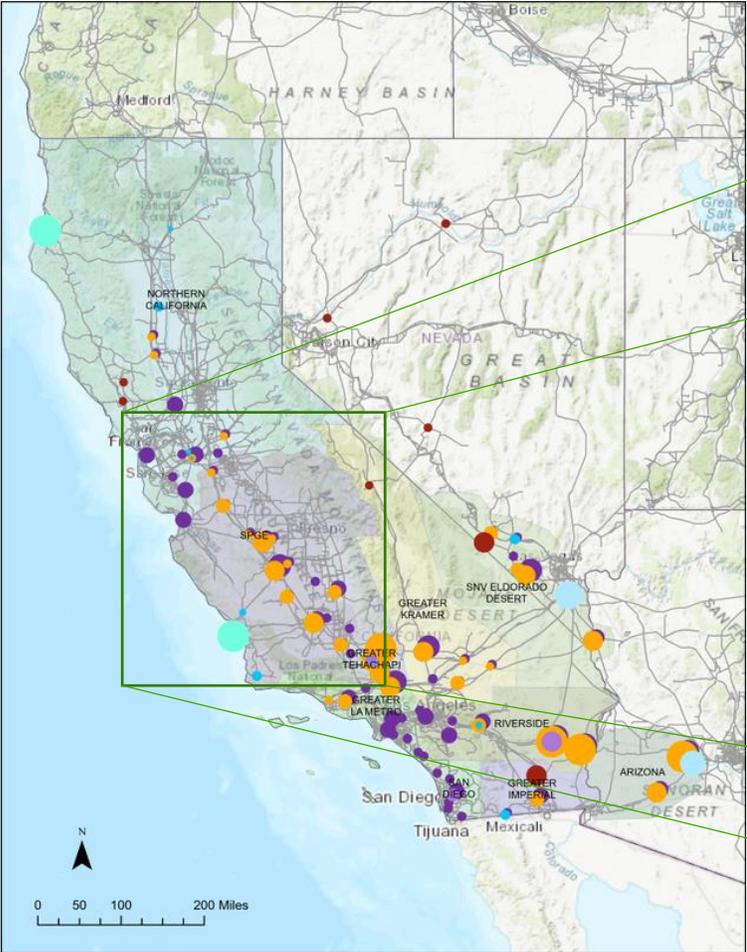
- Low environmental and habitat value land
- Farmland that may be more likely to transition out of agricultural production
- Solar PV resource potential
- High-confidence commercial interest
- Existing and planned transmission capacity
- Existing online solar PV resources

TNC Power of Place West study – A 2022 study, which analyzed energy, economic, environmental, and geospatial data to demonstrate how the Western states can decarbonize by 2050 while minimizing impact to important land and habitat, forms the basis of the environmental protection layers applied in this study.

Bryant et al study – A 2020 study on land-use change and ecosystem restoration in the San Joaquin Valley, particularly in water-stressed agricultural landscapes, forms the basis for the set of assumptions this study applies about potential land retirement scenarios.

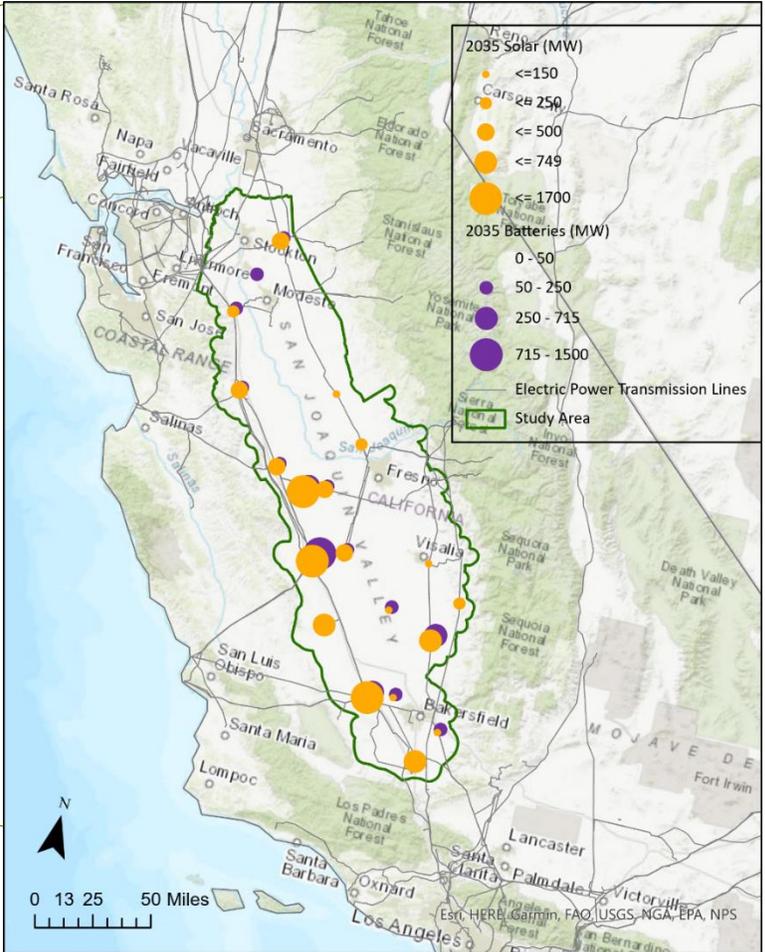
25%+ of new solar PV resources needed by 2035 are located in the San Joaquin Valley study area.

Busbar Mapping of 2035 Resources for 2023-2034 TPP



The CPUC's latest Busbar Mapping Analysis for the 2023-2024 TPP allocates about 10,100 MW of the ~39,000 MW of new solar PV resources needed by 2035 to substations within the SJV study area.

Busbar Mapping of 2035 Resources for 2023-2024 TPP Located Within the SJV Study Area

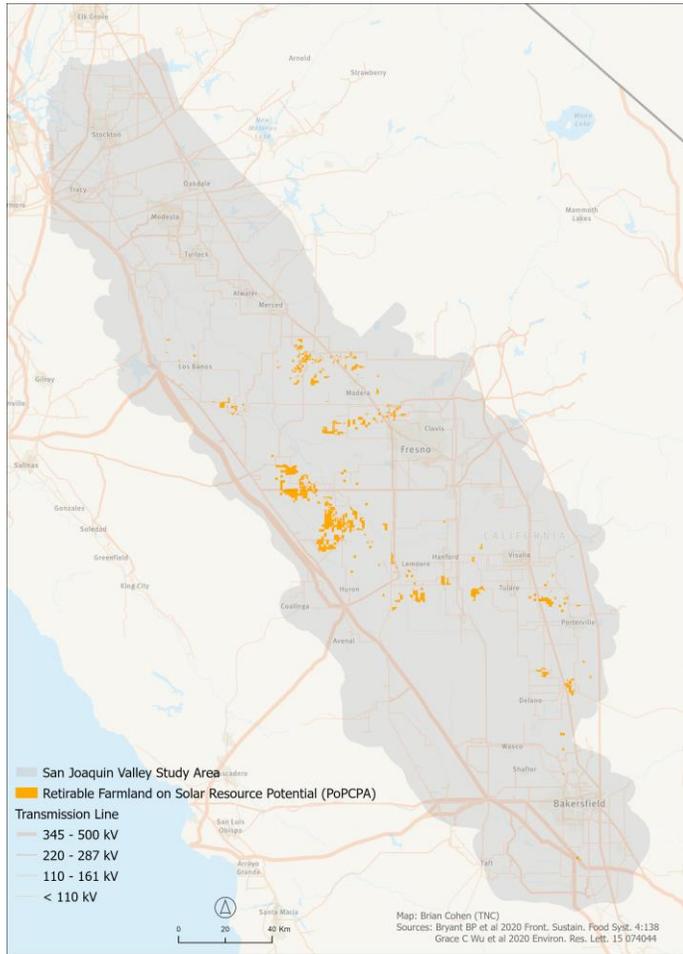


Source: CPUC IRP Modeling Assumptions for 2023-24 CAISO Transmission Planning

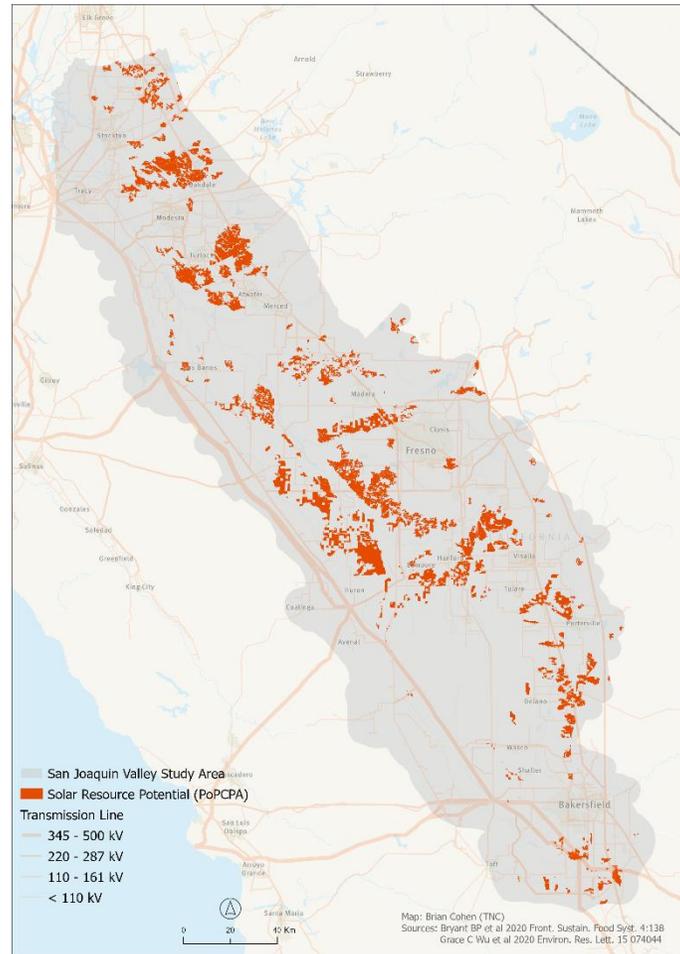
Solar resource potential on low-impact lands within the San Joaquin Valley Study Area based on TNC's Power of Place West Analysis

The following maps reflect estimates and assumptions about potential land transition to display an illustrative example, and should not be used on their own as a basis for siting or project decisions.

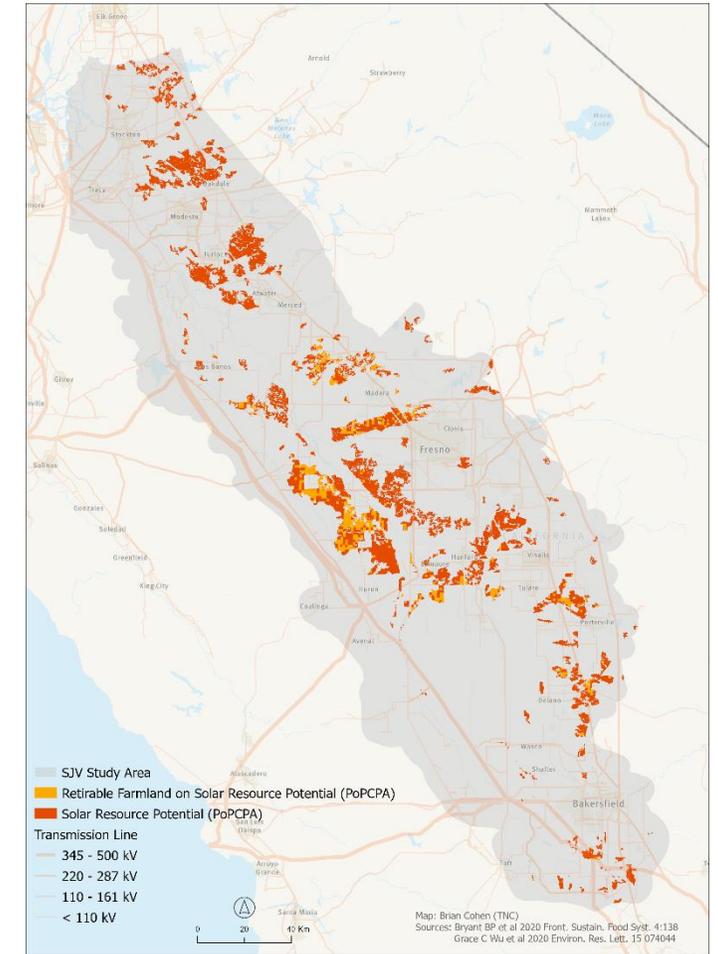
Solar Resource Potential Within Areas That May be More Likely to Transition Use



Solar Resource Potential on Other Low Environmental or Habit Value Land



Solar Resource Potential on ALL Low-Impact Land

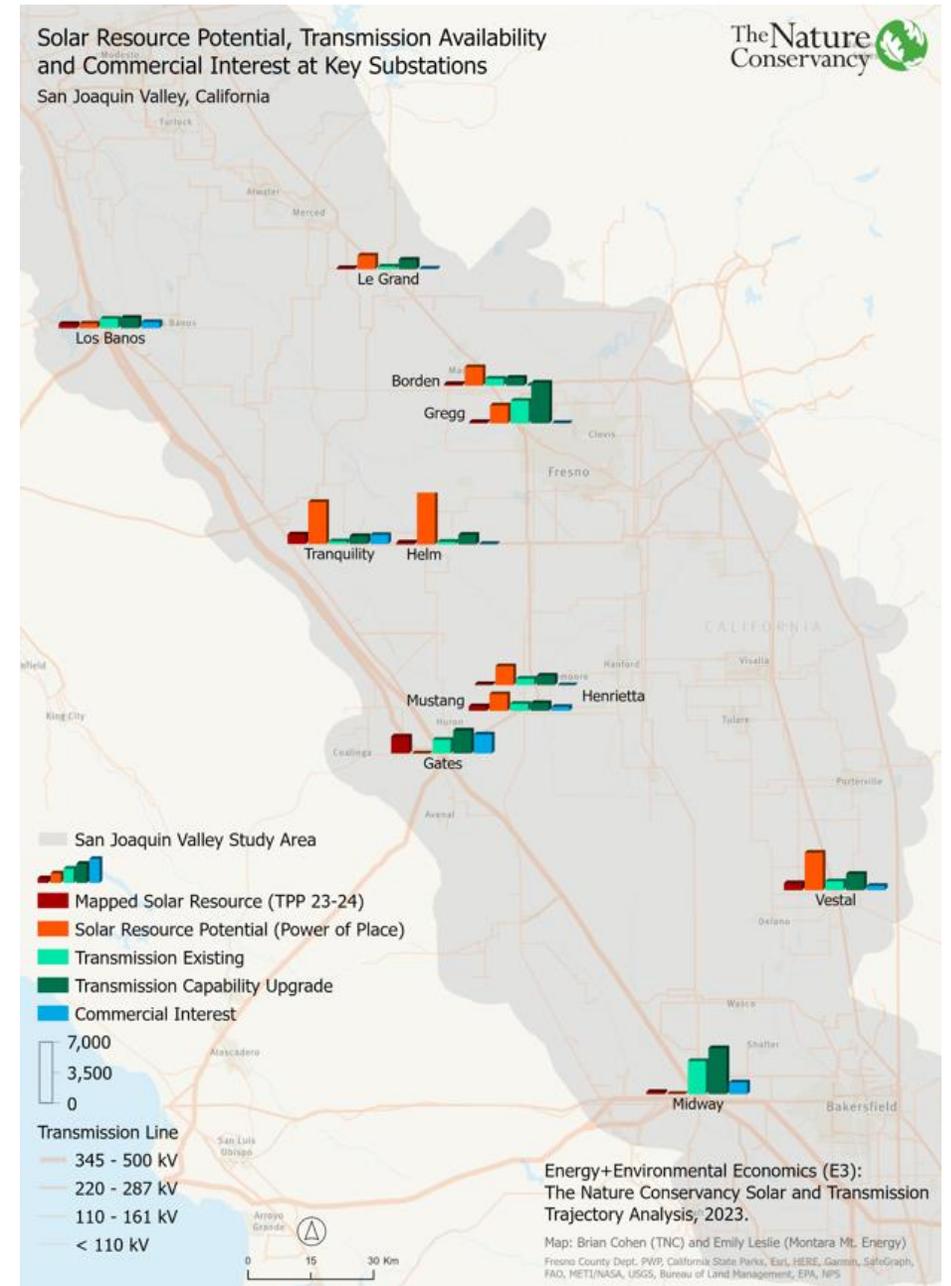


A significant portion of the resources needed to meet system needs by 2035 can be developed on low environmental impact land that may be more likely to transition out of agricultural production.

Solar PV Resource Potential Categories	All Substations Within the SJV Study Area	Substations Within CAISO TPP (potential within 10-mile radius)
All Low-Impact Land	101,864 MW	33,155 MW
Low Impact Land More Likely to Transition out of Production	14,934 MW	7,521 MW
Other Low-Impact Lands	86,930 MW	25,633 MW
High-Intent Commercial Interest <i>(Phase I & II Studies Completed; Interconnection Agreement Executed)</i>	8,907 MW	8,510 MW

- There is strong alignment between the solar resource potential on farmland that may be more likely to transition out of production and commercial interest and transmission capability.
- Additional transmission infrastructure beyond what the CAISO has identified in the TPP analysis is necessary to fully develop the solar resource potential in the San Joaquin Valley.

Several substations in the study area represent examples where solar resource potential exceeds the available transmission (*even after planned upgrades*) on low impact land where there is high-confidence commercial interest.



While for most of the substations within the study area there is strong alignment between the solar resource potential on farmland that may be more likely to retire transmission capability (present and planned):

Substations where solar resource potential exceeds current and planned transmission capability on low impact land that may be more likely to transition out of production:

Helm, Le Grand, Tranquility

Substations where solar resource potential exceeds current and planned transmission capability on other low impact land:

Borden, Henrietta, Mustang,
Storey, Vestal, and Warnerville

TNC Recommendations

- Prioritize near-term upgrades to unlock resources in least-regrets areas while planning for future transmission.
- Incorporate more granular geospatial information into transmission project planning and prioritization, as this study demonstrates where transmission capacity and solar resource potential may not align for a given area (even where zonal and regional-level transmission capacity may be sufficient for system-level modeling.)
- Consider expanding this type of analysis beyond the San Joaquin Valley to other key regions for system-wide planning analyses.
- (CAISO) Pursue further study of specific areas in the SJV to inform system-wide analysis.
- Facilitate and support resources for county-level and local planning for solar, alongside other opportunities for regional, cultural, and economic development.

Appendix

Please contact Marybeth Benton
(marybeth.benton@tnc.org) with questions.

Project Scope

- This analysis is not meant to be used as a substitute for site or project-level analysis.
- This study is constrained to the San Joaquin Valley.
- This study relies on and presents one set of assumptions about potential retirement and is not meant to be a substitute for community-level engagement and feedback on objectives and specific area assumptions.
- This study focuses on solar PV resource.
- It does not consider other generation resource types which might also benefit from land-use transitions.
- It also does not consider battery storage because it does not have as high of a land-use intensity as solar PV and the literature on the land-use intensity of battery storage is not as robust.
- This study utilizes transmission cost and capability information based on the California Independent System Operator (CAISO) [2021 transmission deliverability whitepaper](#) and the [2023-2024 Transmission Planning Process \(TPP\) analyses](#)
- The whitepaper was developed for the California Public Utilities Commission's (CPUC) Integrated Resource Planning (IRP) analyses.
- As such there are limits to some of the insights shared, because there are substations and other transmission infrastructure within the San Joaquin Valley that are not covered by the information in that whitepaper.

External Data Sources

TNC Power of Place West Study – [://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/power-of-place/?vu=powerofplace](https://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/power-of-place/?vu=powerofplace)

For resource potential values on low-impact lands in geospatial analysis

Bryant et al Study – <https://www.frontiersin.org/articles/10.3389/fsufs.2020.00138/full>

For resource potential values on lands that may be more likely to transition out of agricultural use

CAISO 2021 Transmission Deliverability Whitepaper – <http://www.caiso.com/Documents/WhitePaper-2021TransmissionCapabilityEstimates-CPUCResourcePlanningProcess.pdf>

For information on transmission deliverability at substations

CPUC 2023-2024 TPP Busbar Mapping Analysis 2035 Base Case Portfolio Dashboard – https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/busbardashboard2035_30mmt_hebase_vd_02-22-23.xlsx

For updated information on transmission deliverability at substations and information on resources mapped to substations

CPUC 2023-2024 TPP Busbar Mapping Analysis Proposed Decision – https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/2023-2024-tpp-portfolios-and-modeling-assumptions/modeling_assumptions_2023-24tpp_v011723.pdf

For maps on the resources mapped to substations

Analytical Approach – Transmission Capability Analysis

The transmission capability analysis focused primarily on the substations within the CPUC and CAISO TPP analysis because there would be information on the transmission and substation-level availability at Full Capacity Deliverability Status (FCDS) and the Energy Only Deliverability Status (EODS) also known as the on-peak and off-peak deliverable capacity respectively.

The TPP analyses primarily focus on 230 kV and 500 kV substations with only a few 115 kV substations included.

As a result, there are additional substations within the SJV study area for which there is no available transmission capability information.

The 2022-2023 TPP (the latest CAISO analysis) includes over \$9 billion of transmission upgrades capital projects approved as part of the TPP plans.

In addition, the CPUC's 2023-2024 TPP analysis shows that all of the available existing transmission capacity on transmission constraints that are within the SJV study area are exceeded by 2035.

As a result of the transmission capability analysis, this study assumes that the available transmission capability represents existing, planned, and proposed transmission infrastructure.

The results of the analysis are as follows:

- Existing FCDS and EODS on binding transmission constraints* – 11,700 MW
- Incremental FCDS and EODS on binding transmission constraints* – 10,500 MW

*binding transmission constraints represent the most limiting of the transmission constraints associated with a single substation.

Commercial Interest with “High Confidence”

A datapoint that is used for context in this study is “high confidence” commercial interest at each of the substations within the study area. This information on commercial interest is based on the CAISO Interconnection Queue:

- Solar projects with high confidence are projects which have gone through the Phase I and II studies completed and have gotten their interconnection agreement executed.
- The high confidence commercial interest is also the standard of commercial interest incorporated into the CPUC's Busbar Mapping Analysis for the TPP.
- This is likely a conservative estimate, where we know that there are projects awaiting or pursuing execution of interconnection agreements.

Within the SJV study area, the analysis of commercial interest with high confidence are as follows:

Within substations covered by the CPUC and CAISO TPP – 8,500 MW

Within all substations within the SJV study area – 8,900 MW



Busbar Mapping of 2035 Resources for 2023-2034 TPP

Summary of Findings for Key Substations

Substation Name	Mapped Solar Resource (23-24 TPP) (MW)	Solar Resource Potential (PoPCPA) (MW)	Retireable Farmland within PoPCPA (MW)	Transmission Capability (Existing) (MW)	Transmission Capability (Existing and Upgrade) (MW)	Commercial Interest (MW)
BORDEN	200	1,217	918	816	912	51
GATES	1,950	2	-	1,573	2,642	2,190
GREGG	155	1,305	749	2,595	4,671	40
HELM	215	5,327	1,754	316	1,101	51
HENRIETTA	120	1,442	731	737	1,101	-
LE GRAND	119	825	749	316	1,101	71
LOS BANOS	500	520	20	1,098	1,212	716
MIDWAY	250	40	-	3,806	5,284	1,362
MUSTANG	538	1,260	662	816	912	464
TRANQUILITY	1,100	2,047	2,760	316	912	1,034
VESTAL	805	3,630	669	1,024	5,705	503