DOCKETED	
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Project Title:	Land Use and Environmental Information for Energy Planning
TN #:	270502
Document Title:	2026 Land Use Screens 20 Workshop presentations
Description:	Presentations for the "2026 Land Use Screens 2.0 Workshop"
Filer:	Kristy Chew
Organization:	California Energy Commission
Submitter Role:	Commission Staff
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Docketed Date:	6/10/2026

2026 Land Use Screens 2.0 Workshop

Presenters: Raechel Damiani, Saffia Hossainzadeh, Paul Deaver, and Scott Flint
Land Use Planning Unit; Siting, Transmission, and Environmental Protection Division
June 11, 2026

Workshop Logistics

- Workshop is being conducted and recorded remotely via Zoom.us

  Webinar ID: 838 8986 0804 Passcode: 707026

- Presentation slides are posted in Docket 26-LUEP-01

- Questions can be entered in the Q&A function of the Zoom application or may be asked by raising hand during the Q&A sessions

- Attendees may also participate in the workshop by:
  - Making comments during today's public comment period
  - Submitting written comments by **July 13, 2026 to Docket 26-LUEP-01 by 5:00 p.m.**

Workshop Purpose

- Introduce updates to CEC Land Use Screens
- Initiate public engagement on methodology for:
  - Existing Project Footprints
  - Out-of-State Screens
  - Cropland Index Model
  - Enhanced Geothermal System Screens
  - Suitability Model

Workshop Schedule

Workshop Topic	Time
Welcome	1:00 p.m.
Overview of CEC Land Use Screens	1:10 p.m.
Existing Project Footprints	1:25 p.m.
Out-of-State Screens	1:30 p.m.
Cropland Index Model	1:50 p.m.
Questions and Answers	2:10 p.m.
Break	2:30 p.m.
Enhanced Geothermal Systems Screens	2:40 p.m.
Suitability Model	2:55 p.m.
Questions and Answers	3:10 p.m.
Requested Feedback & Public Comments	3:25 p.m.
Closing Remarks	3:55 p.m.

Welcome

Jessica Eckdish, Climate Initiatives Branch Manager

Overview of CEC Land Use Screens

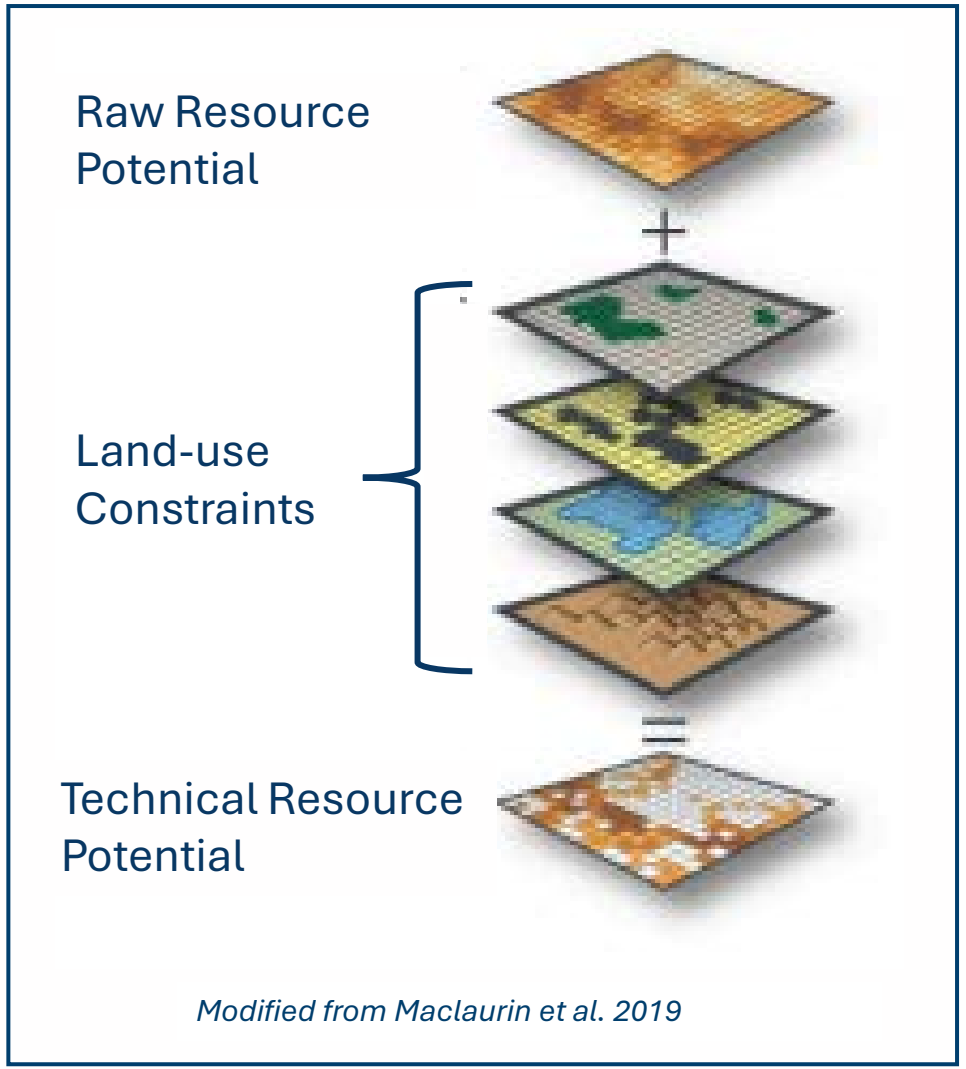
Raechel Damiani

Land Use Screens for Electric System Planning

- Achieving climate goals requires significant clean and renewable energy development (e.g., solar, wind) and rapid build rates

- Environmental and land use "screens"
  - Identify at a high level where build is feasible (technical resource potential)
  - Highlight areas that may face possible constraints and conflicts, including areas of environmental sensitivity, conservation, and other land uses
  - Inform state planning efforts, including Integrated Resource Planning / Transmission Planning Process (IRP/TPP) and Senate Bill 100 (SB 100)

- Screens are landscape-level planning information: intended to inform high-level estimates of renewable build, not specific project locations



Modified from Maclaurin et al. 2019

Core Land Use Screen Components

	Core Land-Use Screen
Base Exclusions	Techno-economic exclusion layer (CPUC)
	Protected Area Layer
Land Use and Environmental Constraints	Cropland Index Model* (Threshold: Mean, 7.7**)
	Terrestrial Intactness Model (Threshold: Mean, 0.3**)
	Biological Planning Priorities: • Areas of Conservation Emphasis (ACE) Biodiversity (Rank 5) • ACE Connectivity (Ranks 4 & 5) • ACE Irreplaceability (Ranks 4 & 5) • Wetlands from CA Nature Habitat and Land Cover CALFIRE Fire and Resource Assessment Program Vegetation (FVEG) Derived) • U.S. Fish and Wildlife Service (USFWS) Critical Habitat
	2025 Results (Statewide Resource Potential):
	Utility-Scale Solar: 6.1 Million acres
	Land-Based Wind: 380 Thousand acres

*Not applied to wind resources

**Areas above the threshold not included in technical resource potential estimates

Power densities of 7 acres/MW and 40 acres/MW are used to convert area to electrical power generation for solar and wind, respectively.

Terrestrial Climate Resilience Screen Components

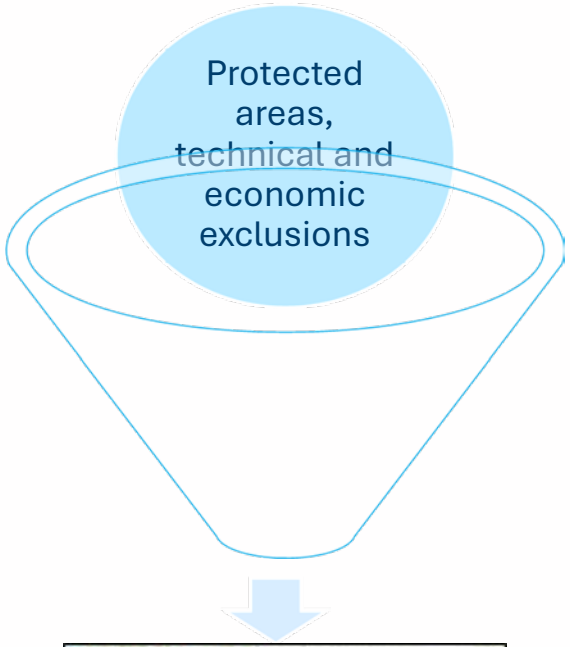
	Terrestrial Climate Resilience Screen
Base Exclusions	Techno-economic exclusion layer (CPUC)
	Protected Area Layer
Land Use and Environmental Constraints	Cropland Index Model* (Threshold: Mean, 7.7**)
	Terrestrial Intactness Model (Threshold: Mean, 0.3**)
	Biological Planning Priorities: • Areas of Conservation Emphasis (ACE) Biodiversity (Rank 5) • ACE Connectivity (Ranks 4 & 5) • ACE Irreplaceability (Ranks 4 & 5) • Wetlands from CA Nature Habitat and Land Cover CALFIRE Fire and Resource Assessment Program Vegetation (FVEG) Derived) • U.S. Fish and Wildlife Service (USFWS) Critical Habitat
	ACE Terrestrial Climate Resilience (Ranks 4 & 5)
	2025 Results (Statewide Resource Potential):
	Utility-Scale Solar: 3.9 Million acres
	Land-Based Wind: 250 Thousand acres

*Not applied to wind resources

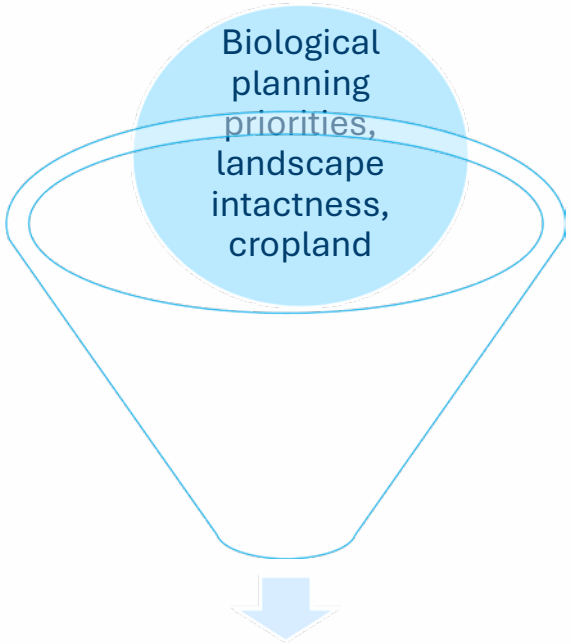
**Areas above the threshold not included in technical resource potential estimates

Power densities of 7 acres/MW and 40 acres/MW are used to convert area to electrical power generation for solar and wind, respectively.

Core Land Use Screen Example: Identifying Technical Resource Potential (Solar)

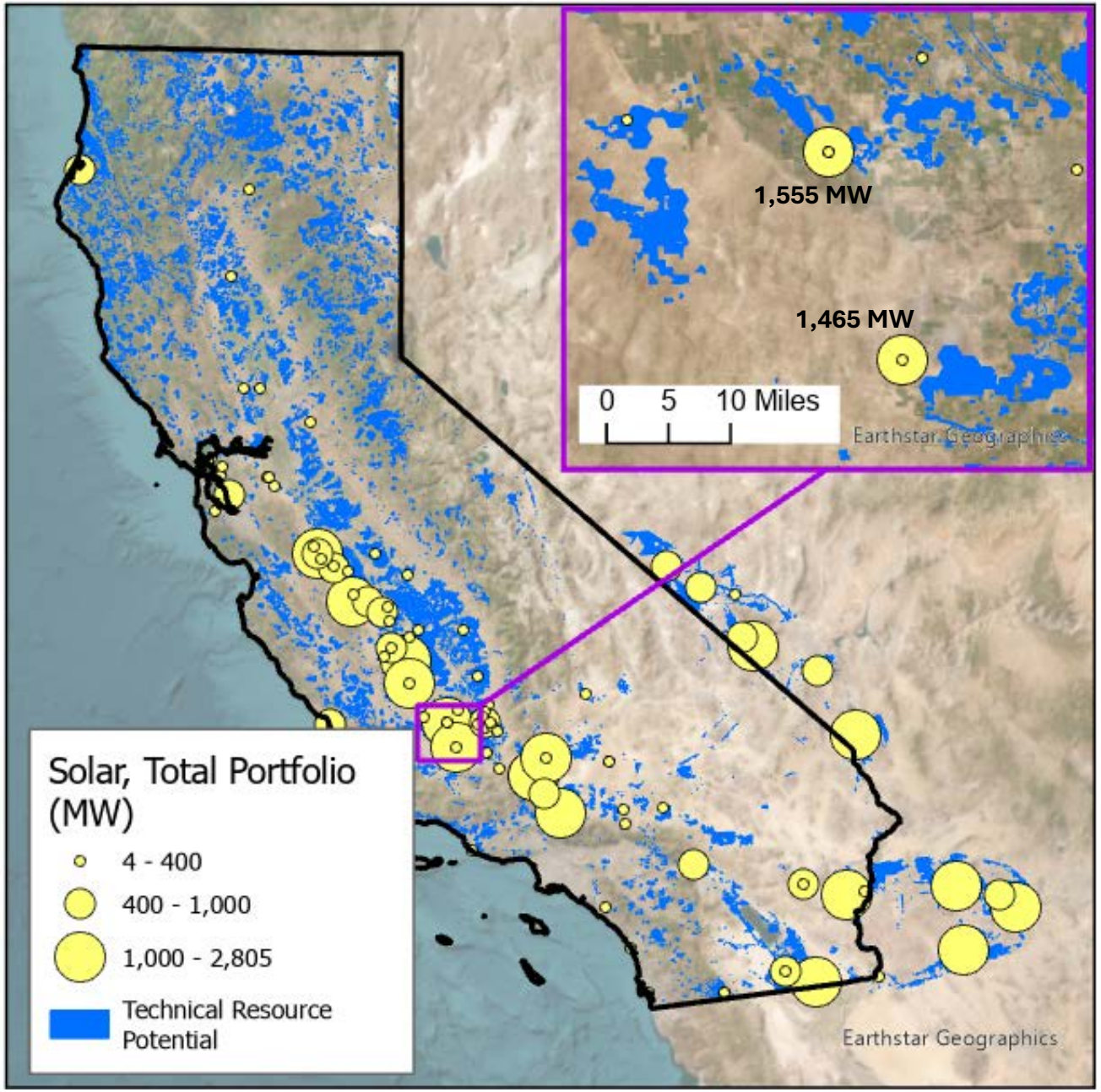


Solar technical resource potential after applying these “base” exclusions



Solar technical resource potential after applying additional environmental constraints

Example Land Use Data in State Resource Planning: 2026-2027 TPP 2036 Base Case Portfolio, Solar Resources



- Technical resource potential guides identification of new resources at busbar level in Integrated Resource Planning process[1]
- Core Land Use Screen determines the technical resource potential in MW at each substation
- Informs the CAISO Transmission Planning Process

1. See slide 4 of this deck onwards for more information on how land use data and other factors are used to determine mapping. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/assumptions-for-the-2026-2027-tpp/cec_nov12_slidedeckbusbar_20251110.pdf

History of Screens Development

- **2018-2021:** Developed new methods for land-use screening and resource mapping
- **August 2021:** Land-use screening and resource mapping methodology (Workshop)
- **February 2022:** Land use screens and SB 100 resource portfolios (Workshop)
- **April 2022:** Integrating screens into the California Energy Planning Library (Workshop)
- **October 2022:** Draft staff report on the land-use screens
- **March 2023:** Revised screens based on public comments
- **September 2023:** Final Staff report

Recent Updates to the 2023 Land Use Screen

Implemented in the most recent 2026-2027 IRP cycle[1]

- Extended PAL to out-of-state (OOS) areas.
- Updated data sources:
  - Global Wind Atlas Data (previously NREL)
  - Terrestrial Intactness Layer: 2025 Conservation Biology Institute (CBI) version (previously 2018)
  - Critical Habitat: 2025 version from US Fish and Wildlife Service (previously 2022)
  - 2024 Greater Sage Grouse Habitat Management Plan
  - 2024 BLM PEIS (aka Western Solar Plan)

[1]See CEC slides here for more information (8/19/2025 webinar and 11/12/2025 workshop), available at: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2024-26-irp-cycle-events-and-materials/assumptions-for-the-2026-2027-tpp. Supporting Datasets for Busbar Mapping also available at Data sets and Busbar links and Datasets and Busbar links

Updates to Existing Solar Footprints Dataset

Raechel Damiani

What is the Existing Solar Footprints Dataset?

Source: Solar Footprints in California

- Inventory of solar projects throughout CA, created in 2023
- GIS dataset consisting of polygons representing boundaries of existing solar projects
- Captures total land use rather than direct land use[1]
- Will identify remaining technical resource potential available for new resource build in CA, NV, AZ

1. Definitions per NREL: The total area corresponds to all land enclosed by the site boundary. The direct area comprises land directly occupied by solar arrays, access roads, substations, service buildings, and other infrastructure. Available at: https://docs.nlr.gov/docs/fy13osti/56290.pdf

Updates to the Existing Solar Footprints Dataset

- Goals:
  - Represent all existing project footprints within California and CAISO regions in NV and AZ
  - Document project details (e.g., capacity, project name, year, project technology, acres, location)
  - Add solar project footprints to CAISO Arizona and Nevada regions
- Proposed datasets:
  - U.S. Energy Information Administration (EIA) Power Plants in the U.S.
  - United States Large-Scale Solar Photovoltaic Database (USPVDB)
  - EIA-860 Year 2024
  - Ground-Mounted Solar Energy in the United States (GM-SEUS v2.0) 2025
- Next steps:
  - Create and release updates to Existing Solar Footprints Dataset
  - Staff will update a project footprints database for wind

Out-of-State Land Use Screens

Saffia Hossainzadeh

What are the Out-of-State Land Use Screens?

- Environmental and techno-economic land use screens are applied to western states to estimate available resource potential for candidate resources in future electric system modeling
- In CPUC IRP, geographically out-of-state (OOS) areas that are part of CAISO are modeled and busbar mapped (similar to in-state)
- OOS screens consist of:
  - Techno-economic site suitability and exclusions thresholds[1]
  - Western Electricity Coordinating Council (WECC) Environmental Data Task Force Risk Classification Data Layer (~2016):
    - Category 4: Areas Presently Precluded by Law or Regulation
    - Category 3: High Risk of Environmental or Cultural Resource Sensitivities and Constraints

1. 2024-2026 Integrated Resource Planning (IRP) Inputs and Assumptions, available at https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/2025_inputs_and_assumptions_report_20260210.pdf

Current OOS Screen Composition

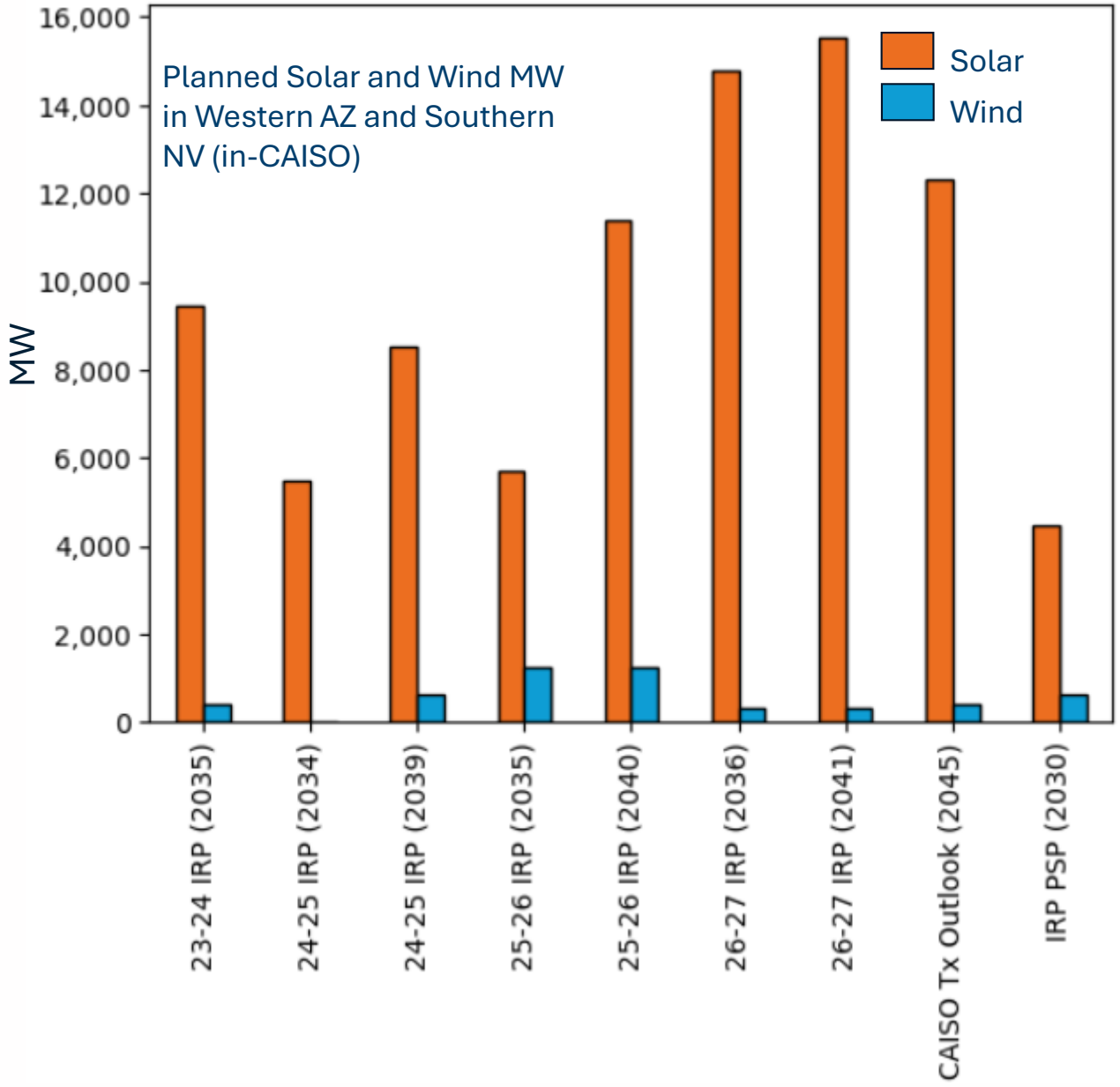
	Datasets used For CA	Datasets used for Out-of-State areas (NV, AZ, WY, UT, NM, OR)
Base Exclusions	Protected Area Layer and Techno-Economic Exclusions	WECC Risk Class 4 (replaced by CEC Protected Area Layer in 2025) and Techno-Economic Exclusions
Core Land Use Screen	Biological Planning Priorities	WECC Risk Class 3
	Intactness	
	Cropland	
Terrestrial Climate Resilience Land Use Screen	Terrestrial Climate Resilience (areas that will serve as refugia)	None

Why Update the OOS Screens?

Background and Purpose

- WECC environmental screens do not provide equivalent level of screening for environmental characteristics of in-state and out-of-state land
- Interested participants have been advocating for new out of state screens that are at a similar level to in-state
- Large quantities of solar resources are being planned in the southern Nevada and western Arizona areas
- CPUC Decision 25-02-026 acknowledged need for out of state screens update

Note: Screens are for estimation of available resource potential and long-term planning purposes for California energy needs; <u>not</u> planning or policy guidance for AZ and NV



Refresher: 2023 Land Use Screens for California

Components of the **Core** and **Climate Resilience** Land Use Screens for Solar and Wind

- Biological planning priorities:
  - Terrestrial Biodiversity: native species richness, rare species richness, and irreplaceability (top 20% of values)
  - Terrestrial Connectivity: linkages and essential corridors for wildlife movement (ranks 4 and 5)
  - Terrestrial Irreplaceability: uniqueness of habitat areas for rare endemic species (top 40% of values)
  - Threatened and Endangered Species Proposed and Final Mapped Critical Habitat (per US Fish and Wildlife Service)
  - Wetlands
- Terrestrial Landscape Intactness: degree of human disturbance (above the mean)
- Croplands (Solar only): lands above the mean index value of land and soil quality suitability scores
- Terrestrial Climate Change Resilience: likelihood an area will remain suitable for the current array of plant and animal life (top 40% of values)

Explore all screening components at 2023 Land Use Screens Data Viewer, available at https://www.energy.ca.gov/data-reports/california-energy-planning-library/land-use-screens/cec-2023-land-use-screens-electric

Possible Datasets for OOS Biological Planning Priorities (1/2)

Protection of natural lands that support biodiversity: Wetlands and Critical Habitat

	Dataset Name	Year	What does it measure?	Purpose	Resolution
1	USFWS Critical Habitat[1]	2024	Legally designated area essential for the conservation of a Threatened or Endangered Species (TES); include final designated or proposed areas that are digitized	Identify areas that may require special management considerations	Vector-type map
2	USFWS National Wetlands Inventory[2]	2025	Aerial imagery derived wetlands based on vegetation, visible hydrology and geography; Biological definition of wetlands	Provides information on distribution and type of wetlands – for conservation efforts not regulatory use	Vector-type map
3	USGS 3D Hydrography Program[3]	2025	Elevation derived mapping of hydrographic features including stream gradients, channel conditions, and surface waterbodies.	Newest effort to create a national hydrography map based on consistent high-quality data	Vector-type map
4	LANDFIRE Wetlands Class[4]	2023	Vegetation and ecosystem class using satellite remote sensing imagery, field surveys, and modeling	Map the vegetation structure, type, and fuel conditions for wildfires. Used to support natural resource management and fire/fuel planning.	30 meters

Citations available on slide 27

Possible Datasets for OOS Biological Planning Priorities (2/2)

Protection of natural lands that support biodiversity: Biodiversity and Connectivity Conservation

	Dataset Name	Year	What does it measure?	Purpose	Resolution
5	Protection-Weighted Rarity of Imperiled Species[5]	2024	Identifies novel patterns of biodiversity importance based on a taxonomically diverse set of species distribution models	Informs conservation priorities by identifying areas of unprotected biodiversity importance	330 meters
6	Recognized Biodiversity Value[6]	2020	Compilation of state-planning efforts and in-house conservation planning assessments, supplemented by Gap Analysis Project (GAP) 1 and 2 status lands. Includes abiotic features to ensure biodiversity can be sustained in the future.	Map of conservation opportunity areas that emphasize current footprint of biodiversity as well as areas needed to sustain resilient networks.	30 meters, categorized
7	Connectivity and Climate Flow[7]	2020	Permeability of species through connectivity corridors integrated with areas that will be utilized more under climate change	Identifies levels of and types of permeable connections in the landscape enhanced to highlight connections that provide climatic relief	30 meters

Citations available on slide 27

Possible Datasets for OOS Intactness

Extent to which Human Impacts have Disrupted the Landscape

	Dataset Name	Year	What does it measure and how?	Purpose	Resolution
2	TNC Local Connectedness[1]	2022	The amount and configuration of human-created barriers like major roads, energy infrastructure, industrial farming, etc.	Identifies one aspect of a resilient landscape: the degree of fragmentation that creates resistance to movement of species.	30 meters
1	USGS Terrestrial Development Index[2]	2020	Quantifies the level of development (urban, agriculture, energy and mineral extraction and transmission and transportation) based on a surface disturbance footprint.	A broad-scale indicator of naturalness based on the cumulative effects of anthropogenic influence.	90 meters

Citations available on slide 28

Possible Approaches for OOS Cropland Value (Solar Only)

Identify lands not suitable for solar development based on importance for crop production

1. Create Cropland Index Model for NV and AZ
   - Soil quality: Extract National Resources Conservation Services (NRCS) Gridded Soil Survey Geographic Database (gSSURGO) data for NV and AZ, calculate CA Storie Index
   - Farmland: Use similar Important Farmland data (Farmland Mapping and Monitoring Program [FMMP]) Classifications from NRCS SSURGO

2. Use existing remote sensing data and soil quality classifications to derive the important areas for cropland screen:
   - Use "Prime Farmland" Category from gSSURGO/NRCS data for NV and AZ (Prime Farmland Class from USA SSURGO (NRCS))
   - Reduce it to those areas identified as Cropland in Cropland Data Layer (CDL) land cover data (USA Cropland – Overview)
     - Perform minor data smoothing processing on CDL data

Possible Datasets for OOS Terrestrial Climate Resilience

Areas likely to remain within current climate conditions to support current ecological function

	Dataset Name	Year	What does it measure and how?	Purpose	Resolution
1	Connectivity and Climate Flow[1]	2019	Permeability of species through connectivity corridors integrated with areas that will be utilized more under climate change.	Highlights connections that provide climatic relief to species.	30 meters
2	Climate Change Vulnerability Index for Ecosystem and Habitats[2]	2019	Index of climate change vulnerability of major vegetation types in the Western US by measuring climate exposure and ecosystem resilience.	Provide input for adaptation management decisions, including early warning of elevated risk for species in all or part of their distribution.	18 km^2 hexagon

Citations available on slide 28

OOS Biological Planning Priorities Options

Citations

1. U.S. Fish& Wildlife Service Critical Habitat. “Critical Habitat.” https://www.fws.gov/project/critical-habitat. Data Available at: https://ecos.fws.gov/ecp/report/critical-habitat

2. U.S. Fish & Wildlife Service National Wetlands Inventory. “National Wetlands Inventory.” https://www.fws.gov/program/national-wetlands-inventory. Data Available at: https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

3. Anderson, R., Lukas, V., and Aichele, S.S., 2024, The 3D National Topography Model Call for Action—Part 1. The 3D Hydrography Program (ver. 1.1, July 2024): U.S. Geological Survey Circular 1519, 12 p., https://doi.org/10.3133/cir1519. Data Available at: https://www.sciencebase.gov/catalog/item/6798da21d34ea8c18376e77f

4. La Puma, I.P., ed., 2023, LANDFIRE technical documentation: U.S. Geological Survey Open-File Report 2023–1045, 103 p., https://doi.org/10.3133/ofr20231045. Data Available at: https://lfps.usgs.gov/arcgis/rest/services/Landfire_LF230/US_230EVT/ImageServer

5. Hamilton, H., Smyth, R.L., Young, B.E., Howard, T.G., Tracey, C., Breyer, S., Cameron, D.R., Chazal, A., Conley, A.K., Frye, C. and Schloss, C. (2022), Increasing taxonomic diversity and spatial resolution clarifies opportunities for protecting imperiled species in the U.S.. Ecological Applications. Accepted Author Manuscript e2534. https://doi.org/10.1002/eap.2534. Data Available at: ArcGIS.com

6. Anderson, M.G., M. M. Clark, A. Olivero, and J. Prince. 2019. Resilient Sites and Connected Landscapes for Terrestrial Conservation in the Rocky Mountain and Southwest Desert Region. The Nature Conservancy, Eastern Conservation Science. Recognized Biodiversity Value. Data Available at: https://geospatial.tnc.org/maps/9286c38c567d4dde956087ca7af9d4b2/about

7. Anderson, M.G., M. M. Clark, A. Olivero, and J. Prince. 2019. Resilient Sites and Connected Landscapes for Terrestrial Conservation in the Rocky Mountain and Southwest Desert Region. The Nature Conservancy, Eastern Conservation Science. Connectivity and Climate Flow (Continuous). Data Available at https://geospatial.tnc.org/maps/0f24561686f042b782be3ead109263e3/about

OOS Landscape Intactness Options

Citations

1. Anderson, M.G., M. M. Clark, A. Olivero, and J. Prince. 2019. Resilient Sites and Connected Landscapes for Terrestrial Conservation in the Rocky Mountain and Southwest Desert Region. The Nature Conservancy, Eastern Conservation Science. Recognized Biodiversity Value. Data Available at: https://geospatial.tnc.org/maps/TNC::local-connectedness-1/about
2. Carr, N.B., and Leinwand, I.I.F. 2020. Terrestrial Development Index for the western United States:1-kilometer moving window: U.S. Geological Survey data release. https://doi.org/10.5066/P93ZU0R9.

OOS Climate Resilience Options

Citations

1. Anderson, M.G., M. M. Clark, A. Olivero, and J. Prince. 2019. Resilient Sites and Connected Landscapes for Terrestrial Conservation in the Rocky Mountain and Southwest Desert Region. The Nature Conservancy, Eastern Conservation Science. Connectivity and Climate Flow (Continuous). Data Available at https://geospatial.tnc.org/maps/0f24561686f042b782be3ead109263e3/about

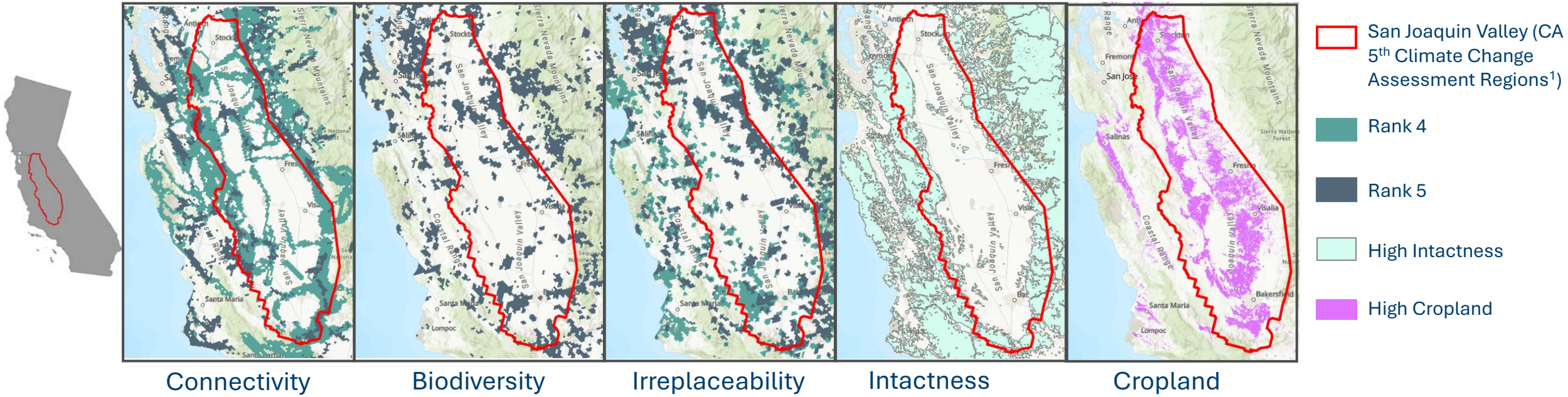
2. Comer, J. Patrick, Hack, Jon C., et al. 2019. Habitat Climate Change Vulnerability Index Applied to Major Vegetation Types of the Western Interior United States. Land, 8, 108. https://doi.org/10.3390/land8070108. Data available at Data Link

CA Cropland Index Model Update

Saffia Hossainzadeh

What is the Cropland Index Model?

- Suitability model that identifies relative quality of croplands
- High category of the Cropland Index Model is the main screening component affecting technical resource potential in the San Joaquin Valley (see maps below)



1. Regional, Topical, & Statewide Synthesis Reports - Office of Land Use and Climate Innovation, available at https://lci.ca.gov/climate/icarp/climate-assessment/regional-synthesis.html

Existing Variables in Cropland Index Model

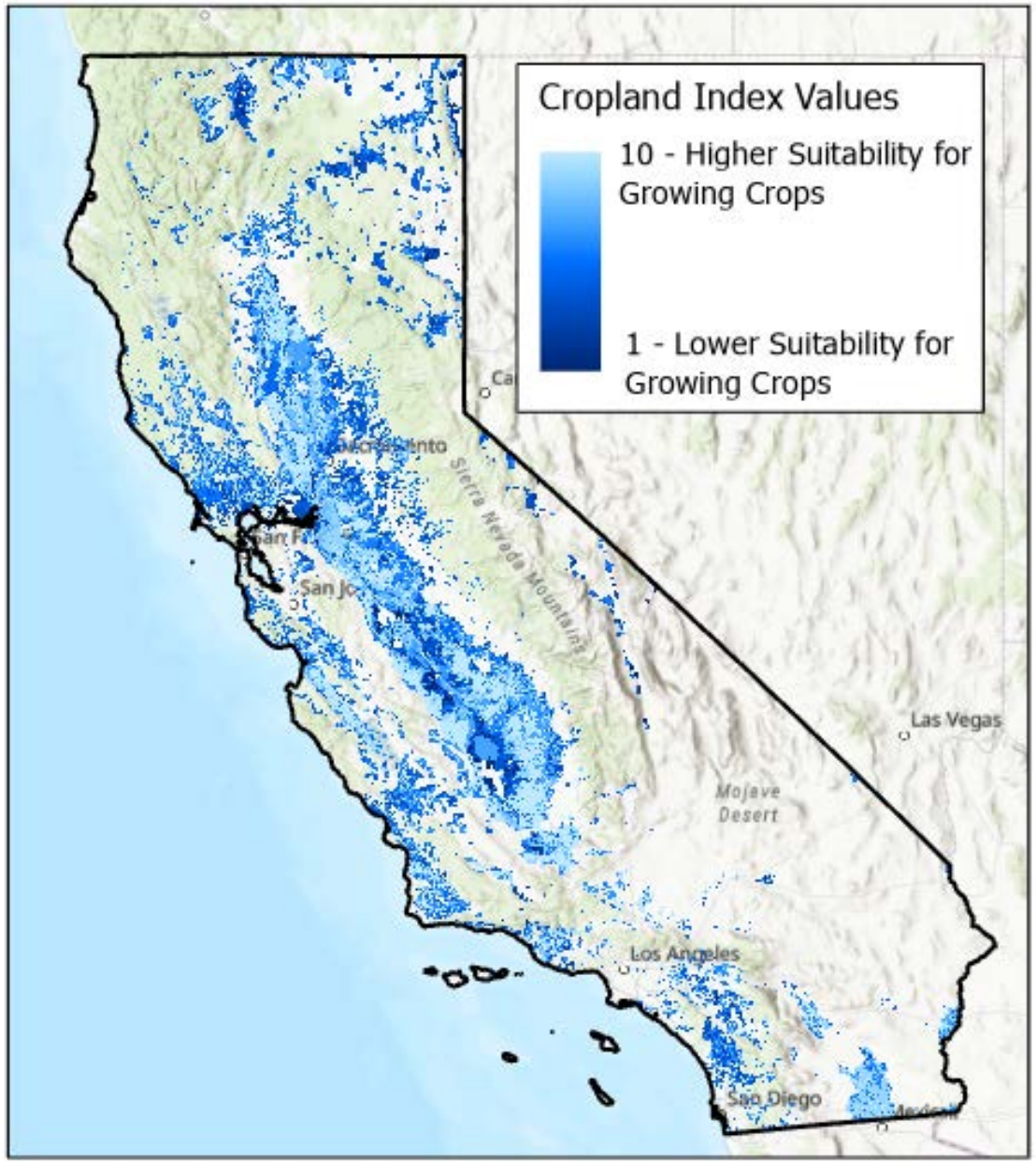
Factor	Description	Data Source
Important Farmland Rank	Agricultural land is ranked according to soil quality and irrigation status. Also used to define the domain in the CEC Cropland Index Model.	California Important Farmland Data (Farmland Mapping and Monitoring Program, Department of Conservation [DOC])
Electrical Conductivity	A measure of the concentration of water-soluble salts in soils and indicates saline soils.	Soil Survey Geographic Database (Natural Resources Conservation Service, US Department of Agriculture)
Sodium Adsorption Ratio	Measure of the amount of sodium relative to the amount of calcium and magnesium. High sodium can lead to soil compaction and reduced water infiltration. This is a degradation in soil structure and results in negative impacts on plant growth and productivity.	Soil Survey Geographic Database (Natural Resources Conservation Service, US Department of Agriculture)
CA Revised Storie Index	Soil rating assessing the productivity of the soil based on the degree of (1) soil profile development, (2) texture of the surface layer, (3) slope and (4) manageable features, including drainage, microrelief, fertility, acidity, erosion and salt content.	Soil Survey Geographic Database (Natural Resources Conservation Service, US Department of Agriculture)
Crop Mapping	Non-urban areas used as an input to determine the domain in the CEC Cropland Index Model.	Statewide Crop Mapping (Department of Water Resources)

Cropland Index Model

Results

Cropland Index Model is categorized into high and low classes, using a mean threshold

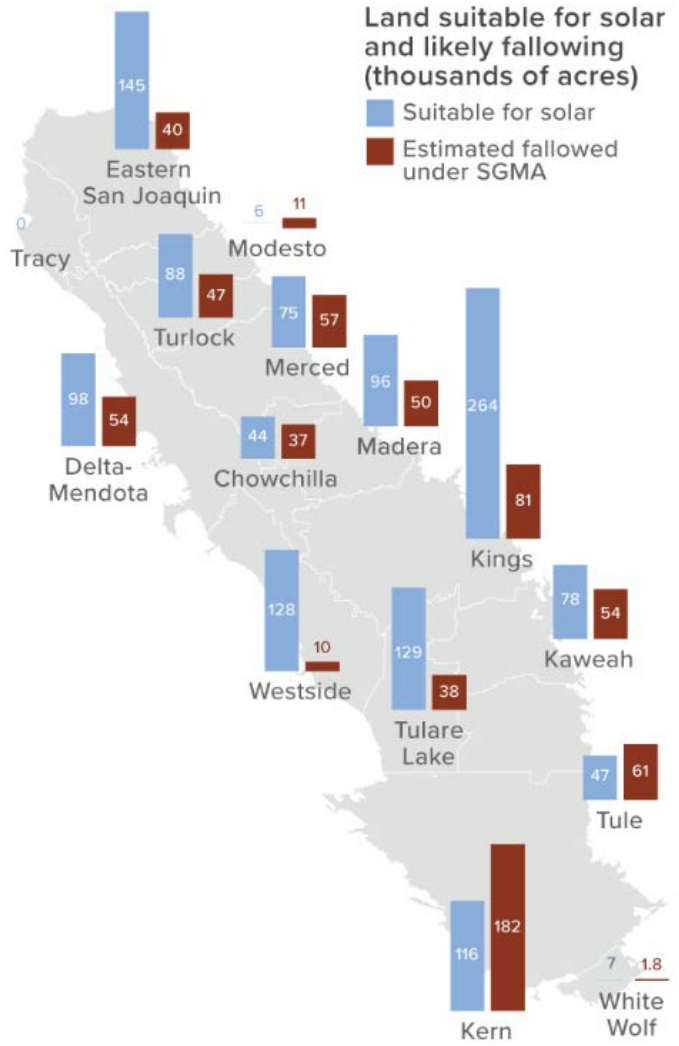
- High Category is used as an additional screening component for solar only
- Currently, 4.5 million acres (48%) is below the mean



Land Repurposing under SGMA

Sustainable Groundwater Management Act (SGMA)

- Large amount of farmland repurposing is expected due to decreasing availability of water for irrigation
- Local, regional and state plans are already capturing the expected solar generation in the San Joaquin Valley
  - CPUC IRP Busbar Mapping Process
  - CAISO Transmission Planning Process
  - Valley Clean Infrastructure Plan
  - Sierra San Joaquin Jobs Initiative
- Water is not currently a variable in the CEC Cropland Index Model



Ayres, et al. 2022. Solar Energy and Groundwater in the San Joaquin Valley. Available at https://www.ppic.org/publication/solar-energy-and-groundwater-in-the-san-joaquin-valley/

Potential New Factors

1. Water stress:[1]
   - Local surface water, imported surface water, and groundwater availability based on historical use
     - Percentage of each of the total agricultural water use
     - Year-to-year variability in the supply of these sources
   - Trend of groundwater levels over time
2. Retirement/permanent fallowing of farmland
3. Aquifer recharge potential

1. Water Stress is explored in the following study San Joaquin Valley Agricultural Land Quality/Water Resource Combination (Conservation Biology Institute, 2018), available at https://databasin.org/datasets/470c61a60ecf4b9bbbf42d364925cc6a/

Considerations for Changes to Cropland Index Model

- For successful integration into the CEC Land Use Screens, data should be:
  - Statewide (or within the crop producing areas of the state)
  - High-resolution (sub-groundwater basin, irrigation or water district)

- Caveats:
  - Cropland Index Model is used for high-level estimates of renewable energy resource potential
  - An individual land owner will decide whether to retire land how that land may be repurposed

Questions & Answers

Break

Enhanced Geothermal Systems (EGS) Land Use Screens

Paul Deaver

Why Create Screens for EGS?

- EGS is being considered in more state planning processes
  - CPUC now considering EGS a candidate resource
  - CEC is considering EGS in its California Energy Resource and Reliability Outlook (CERRO) report

- Stakeholder comments from CPUC August 2025 Modeling Advisory Group and other workshops asked for more study of next generation geothermal systems

See: 2026 Inputs and Assumptions page 67, and Feb 2026 Inputs and Assumptions Workshop, slides 64-67. Available at: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2024-26-irp-cycle-events-and-materials

Definitions

- **Conventional Geothermal:** Leverages naturally occurring heat, along with groundwater and rock characteristics for the recovery of heat energy, usually through produced hot water or steam.

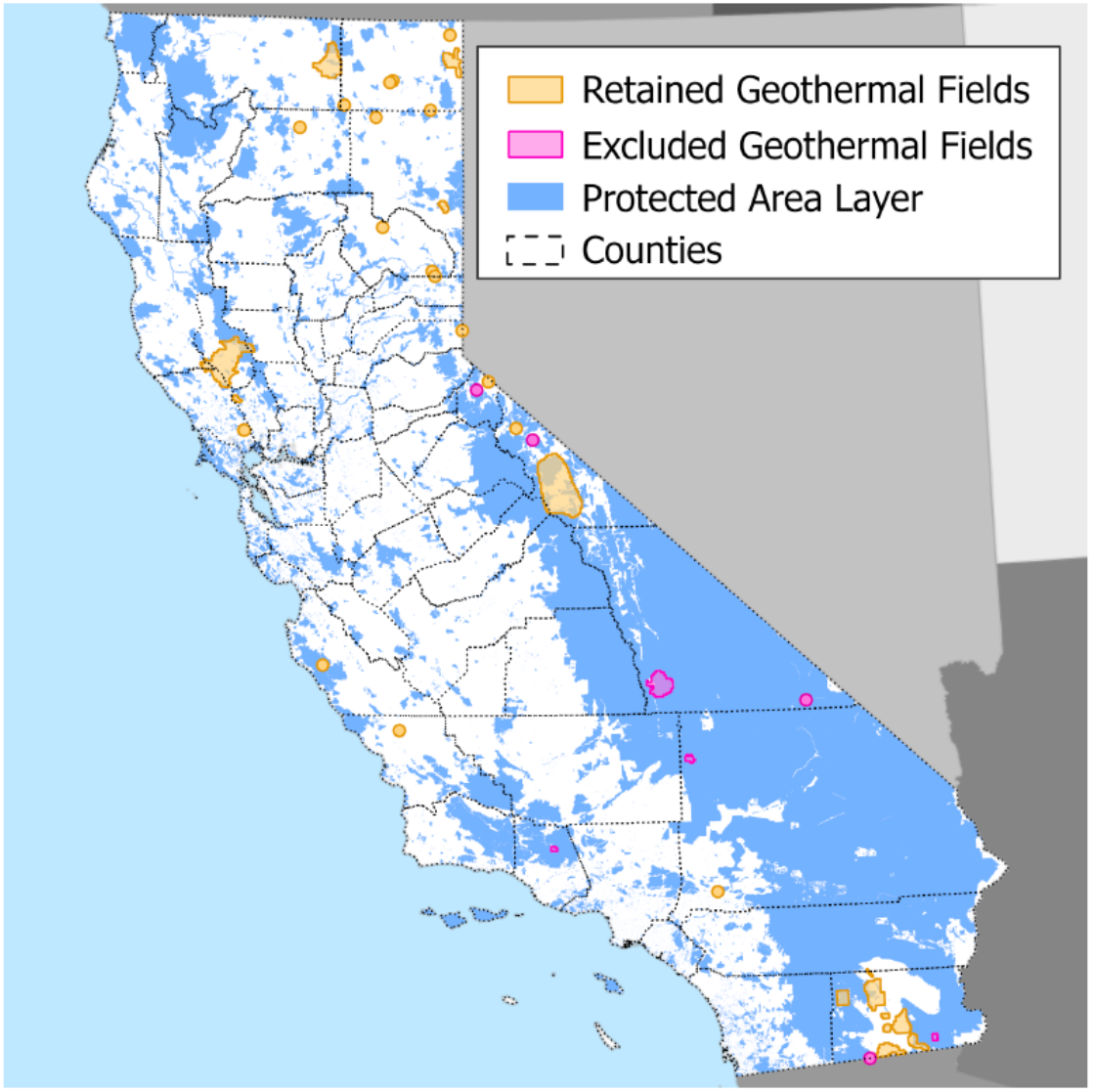
- **EGS** uses engineered reservoirs drilled to depths of 3 to 7 kilometers, utilizing advanced hydraulic stimulation to create fractures in hot, impermeable rock.
  - Near-Field EGS: Leverages existing infrastructure near conventional geothermal sites.
  - Deep-Field EGS: These sites can be anywhere; do not have to be near existing geothermal reservoirs.

Focus for today

Sources: DOE Geovision, CPUC Feb 2026 Inputs and Assumptions Report, available at: https://www.energy.gov/sites/prod/files/2019/05/f63/2-GeoVision-Chap2.pdf, and https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/2025_inputs_and_assumptions_report_20260210.pdf

Proposed EGS Screen: Near-Field EGS

- Assume near-field EGS potential is equal to conventional geothermal potential
  - Conventional geothermal resource potential equals:
    - Known Geothermal Resource Areas (KGRA), **plus** other areas with geothermal potential, **minus** existing and in-development projects
    - If any field is approximately fully covered by the Protected Area Layer (PAL), remove its resource potential from consideration;
    - However, if any part of the field is not covered by PAL, the generating potential of that field is added to the statewide estimate
  - E.g., if a field has 500 MW of conventional potential, it is assumed to also have 500 MW of near-field EGS potential, for a total of 1,000 MW of potential

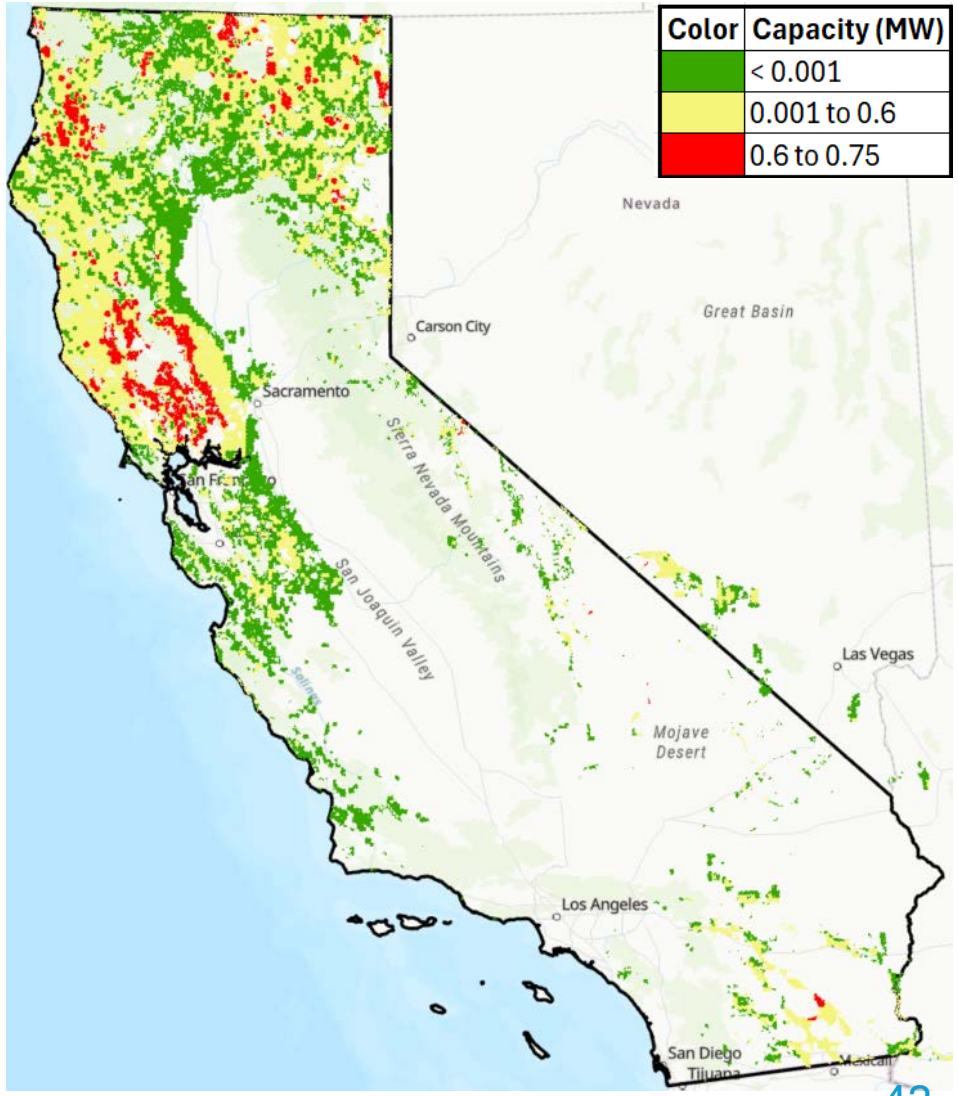


Proposed EGS Screen: Deep-Field EGS

- Begin with temperature at depth data (Stanford)[1]
  - Convert temperature data to raw resource potential
  - Based on conversion factors from NREL[2]

- Remove areas that overlap with:
  - The techno-economic exclusions
  - The protected area layer
  - Together these two exclusions are the “base exclusions”

- Remaining area is technical resource potential



1. See: temperature at depth data, available at: https://gdr.openei.org/submissions/1592
2. See: conversion factors from NREL, available at: https://docs.nlr.gov/docs/fy17osti/66428.pdf

Techno-Economic Exclusions (TE): Deep-Field EGS

- Identifies regions where resource potential is excluded based on technical or economic criteria
  - i.e., low economic feasibility

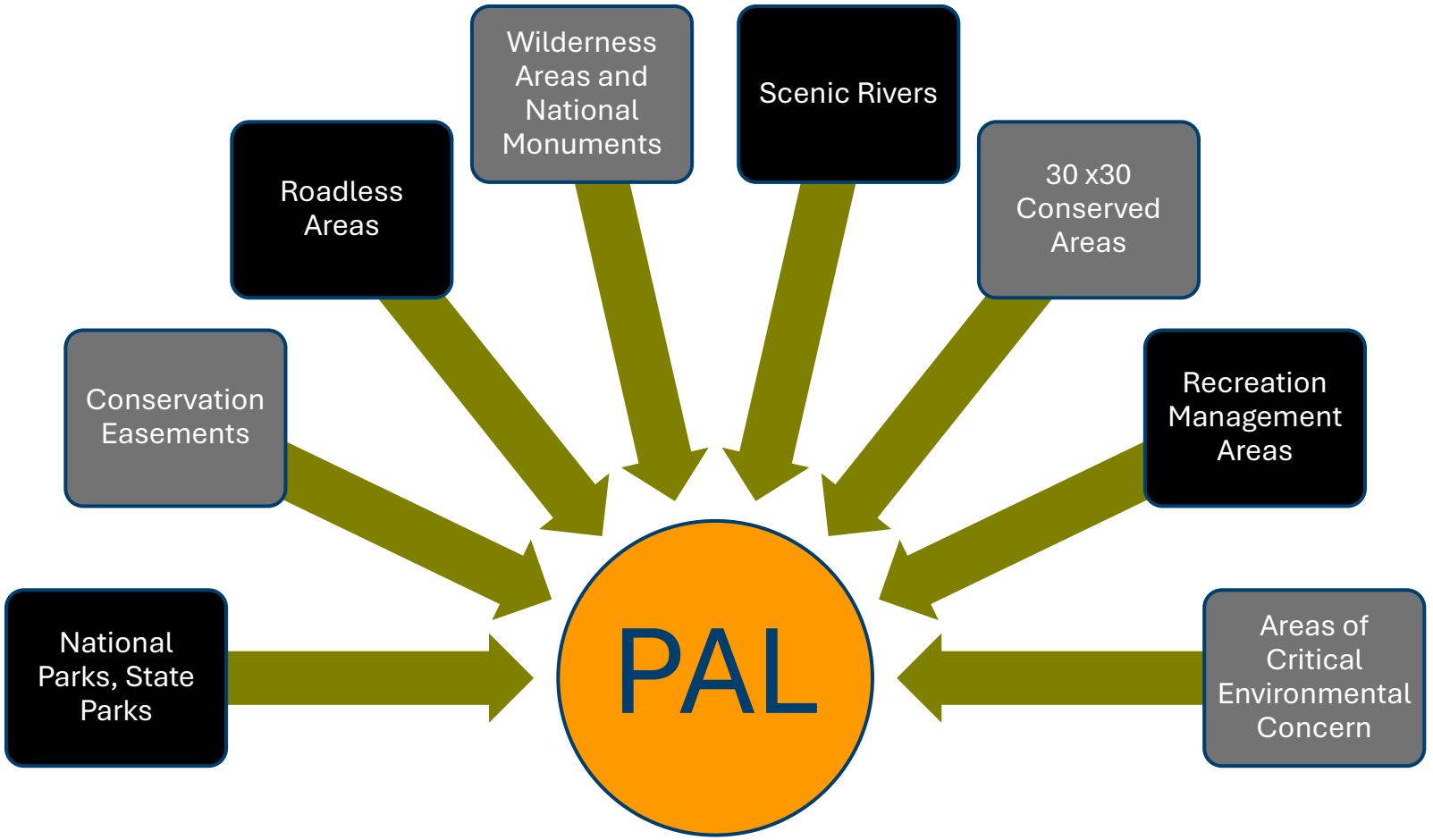
- For Deep-Field EGS, the TE exclusions remove areas that are:
  - Population densities greater than 100 persons per square kilometer
  - Less than the 80th percentile of extractable energy (MW/km^3), based on Stanford temperature at depth data[1]
  - Less than 1,000 meters from urban areas
  - Less than 250 meters from water bodies
  - Less than 1,000 meters from airports
  - Less than 1,000 meters from active mines
  - Less than 1,000 meters away from military lands

1. See: temperature at depth data, available at: https://gdr.openei.org/submissions/1592

See also: CPUC Feb 2026 Inputs and Assumptions Report, available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/2025_inputs_and_assumptions_report_20260210.pdf

Protected Area Layer (PAL): Deep-Field EGS

- Designed to encompass areas where large-scale renewable energy is precluded by state/federal law, policy, or regulation
- Combines several protected area datasets, including lands that are designated for other uses
- PAL for geothermal allows development around greater sage grouse habitats while it does not for solar and wind



Possible Factors to Consider for EGS Screens

- Excluding areas near earthquake faults and folds or earthquake zones
  - Addresses potential risk of triggering earthquakes from water injection for EGS
  - Based on US Department of Energy study[1]

- Other sensitive or important areas to consider?

- The following slide presents a possible dataset/approach to address these items—feedback welcome.

1. See:Environmental Analysis of GeothermalEnvironmental Analysis of Geothermal, available at: https://www.energy.gov/hgeo/geothermal/environmental-analysis

Possible Factor: Earthquake Faults and Folds

- U.S. Geological Survey (USGS) publishes Earthquake Faults and Folds data:[1]
  - Areas that showed evidence of surface deformation in large earthquakes during last 1.6 million years
  - Comments suggested exploring fault lines

- Seeking comment on earthquake and fault zones
  - Should this information be considered in land use screens for EGS?

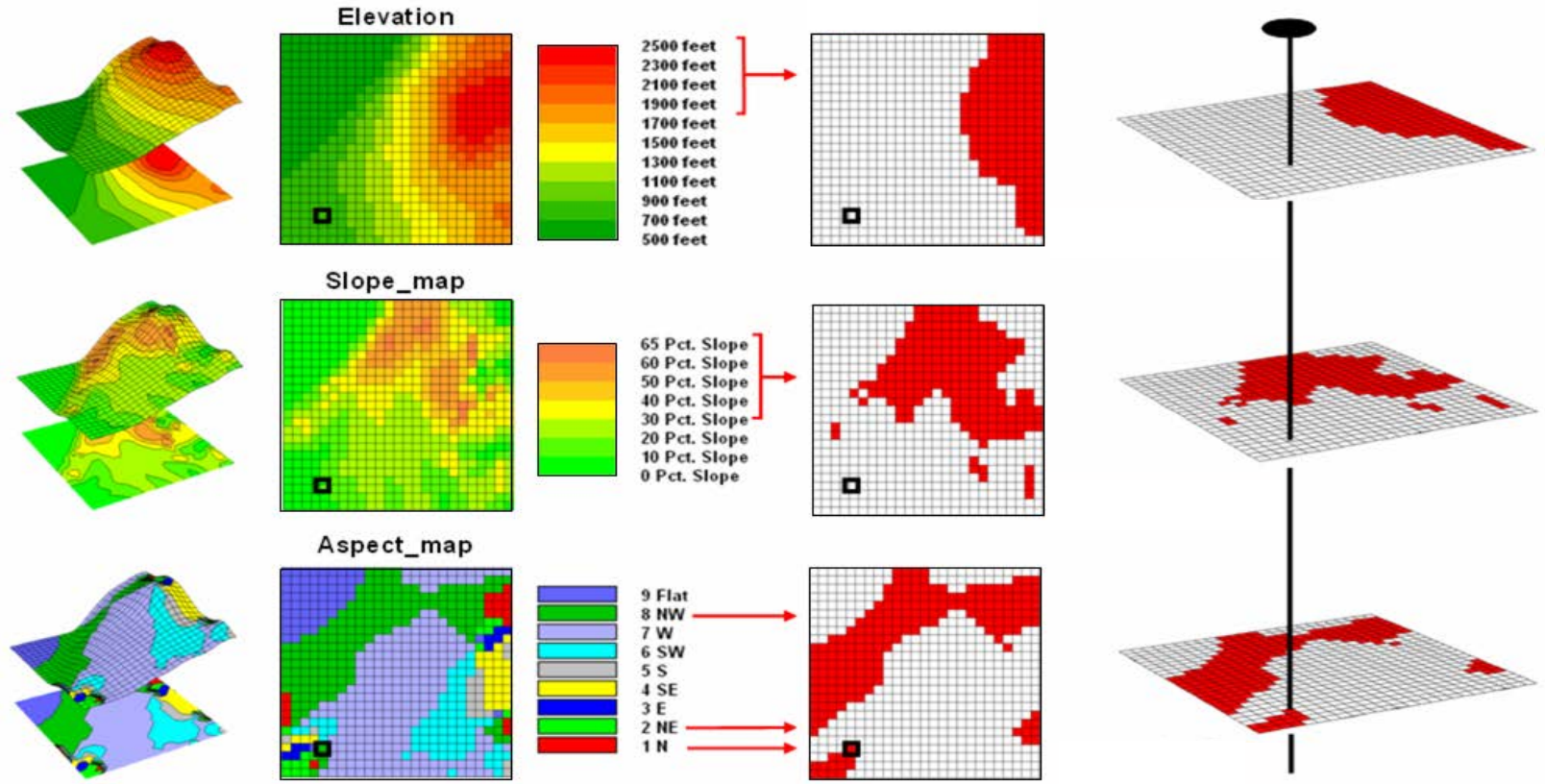
1. See:Earthquake Faults and Folds in the USAEarthquake Faults and Folds in the USA , available at: https://www.arcgis.com/home/item.html?id=7ba828df977745f1a1e4b6cc79d6486a

Potential Suitability Model for CEC Land Use Screens

Scott Flint

What is a Suitability Model?

- Ranks locations by how suitable they are for a given purpose
- Combines multiple environmental criteria into single result
- Results shown as low-to-high suitability maps



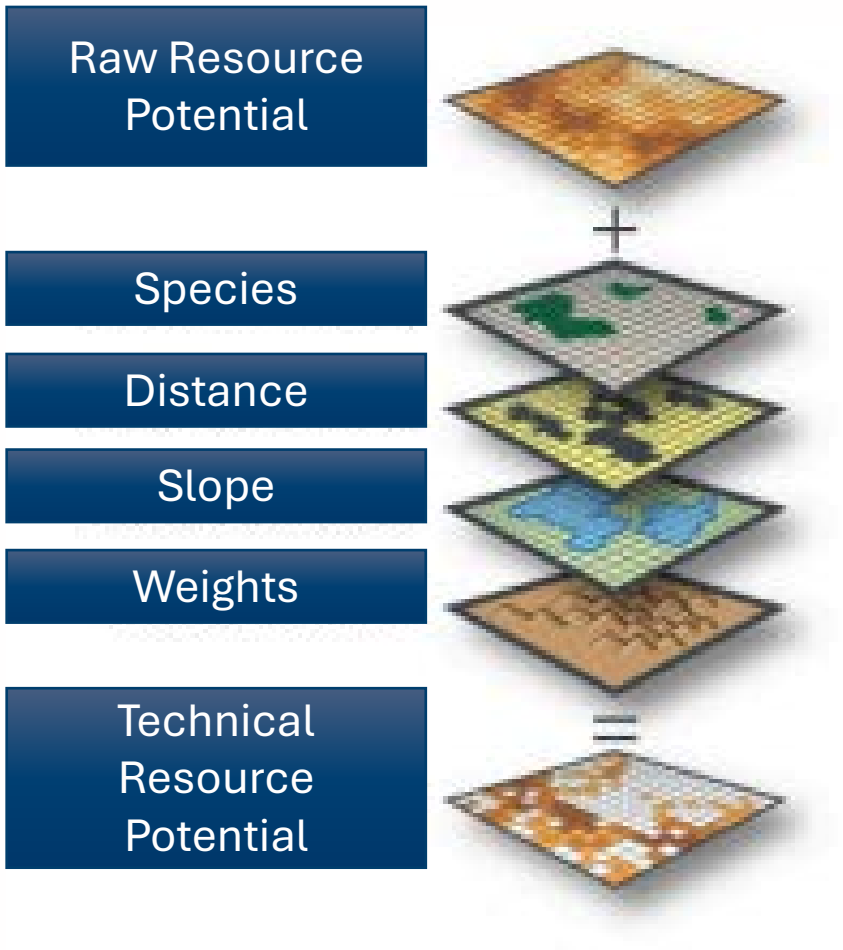
Use of Suitability Models for Energy Planning

- Desert Renewable Energy Conservation Plan[1] (DRECP) and in planning activities for floating offshore wind[2]
- Visualize and communicate complex information
- CEC is considering development of a suitability model approach for identifying areas highly suitable for renewable energy

1. Desert Renewable Energy Conservation Plan, available at https://drecp.databasin.org/
2. California Offshore Wind Modeling Platform, available at https://osw.eemsonline.org/

How Suitability Models are Developed

- Input layers are prepared
- Data is reclassified
  - Grouping data values into categories, such as turning slope values into "gentle," "moderate," and "steep" groups
- Criteria are weighted
  - Combining layers by assigning importance to each criterion
- Layers combined into final map



Common GIS Suitability Model Types

- Overlay models
  - Use spatial overlay operations (such as intersect, union, or raster overlay) to analyze how different environmental layers coincide
- Statistical / regression models
  - Explore relationships between environmental variables and observed outcomes, using methods like regression analysis
- Surface models
  - Depict continuous environmental phenomena (such as elevation, temperature, or rainfall) across an area
- Habitat and Ecological Models
  - Show species distribution or habitat quality based on environmental conditions

Pros and Cons of Suitability Models

Pros

- Clear decision support
- Simplify complex environmental data
- Flexible and customizable

Cons

- Sensitive to data used and assumptions
- Subjective weighting

Questions & Answers

Requested Feedback

Questions on Out-of-State Screens

1. Are there other datasets that we should consider for OOS areas?

2. Are there strengths/limitations to the datasets listed that we should take into account?

3. In lieu of a 1:1 matching of in-state Areas of Conservation Emphasis biodiversity, connectivity and irreplaceability datasets, could a single national dataset represent some or all of those components?

4. What is the best way to incorporate these factors into a single screen?

5. For cropland data specifically:
   - Is crop production a major land use factor that we should include in NV and AZ?
   - Do you have recommendations on which of the two methods we should pursue?

Questions on Cropland Index Model Development

6. What other factors should we include in the Cropland Index Model to account for future land use changes in highly productive agricultural lands?
   - Are there any specific datasets you would recommend?

7. Is bringing in past water import and water source data to indicate water stress/availability to a region valuable, even if it's modeled?

8. How should we account for water stress in the Cropland Index Model?

9. What are the best ways to account for land that has the most opportunity for repurposing?

Questions on Enhanced Geothermal Systems

10. Should near-field and deep-field EGS have additional land use screens applied, beyond the PAL and TE exclusions, to estimate technical resource potential?
    - Should distance from fault lines be considered as a screening component?

11. Do near-field and deep-field EGS have the same siting flexibility (to avoid potential environmental impacts) as conventional geothermal?
    - If so, how (if at all) should screens account for this?

Questions on Suitability Models

12. Should CEC pursue development of a “suitability model” approach to Land Use Screens?

13. How would a suitability model for renewable energy best be used in energy and land use planning processes?

14. What data or other information could be included to help improve identification of areas for renewable resource build that is not reflected in the current land use screens?

15. Is there a role in energy planning processes for both “binary” land use screens and a more nuanced type of suitability model for renewable energy?

Public Comments

Public Comment

Zoom App/Online

- Click “raise hand”

Telephone

- Press *9 to raise hand
- Press *6 to mute/unmute

When called upon

- CEC will open your line
- Unmute on your end
- Spell name and state affiliation, if any
- 3 minutes or less per speaker

Written Comments

- Submit written comments by

July 13, 2026 to Docket 26-LUEP-01 by 5:00 p.m.

3-MINUTE TIMER

Closing