

In 2018, California enacted legislation that sets a goal of 100% zero-carbon electricity retail sales by 2045 (Senate Bill 100 [SB 100]), reinforcing and complementing an earlier commitment to reduce greenhouse gas (GHG) emissions by 80% below 1990s levels. Recognizing that these policies will require the development of significant amounts of new zero-carbon energy resources, the *Power of Place* study modeled California's 2050 electric sector to determine optimal pathways to meet the state's clean energy goals in alignment with economy-wide decarbonization targets, while also factoring in ecological considerations.

### Key Takeaways

#### CALIFORNIA CAN ACHIEVE ITS CLIMATE GOALS AND LIMIT IMPACTS TO NATURAL AND WORKING LANDS

The *Power of Place* study shows that with appropriate planning, California can achieve its energy goals, limit impacts to natural lands, and create a streamlined process for energy development.

# REGIONAL ENERGY PLANNING CAN YIELD ECONOMIC AND CONSERVATION BENEFITS

The study demonstrates that planning for conservation and clean energy resource sharing at a regional level results in the lower-cost, lower-impact pathway to a cleaner electricity system in 2050 for California.

### DECISIONS ABOUT IN-STATE VS. REGIONAL ENERGY DEVELOPMENT DRIVE DIFFERENT APPROACHES TO COMPLEMENTING SOLAR

California development scenarios rely heavily on battery storage to shift solar generation, whereas regional scenarios integrate more wind resources.

# DISTRIBUTED ENERGY RESOURCES CAN PLAY AN IMPORTANT ROLE IN DECARBONIZATION

The high rooftop solar scenarios reduced the amount of land needed for utility-scale generation by 49,000-110,000 acres.

### Renewable Energy 2050: By the Numbers

Total acres of **wind** across the scenarios:

Approximately 480,000 to 2.6 million acres

Total acres of utility-scale **solar** across the scenarios:

Approximately 430,000 to 1.6 million acres



Total acres of **wind** and **solar** across the scenarios:

Approximately **1.6 million** to **3.1 million** acres

#### What Factors Might Shape California's Clean Electricity System in 2050?

The Power of Place study developed 61 scenarios that explore pathways to land conservation and clean energy in 2050. Five cases and sensitivities were applied in different combinations to create scenarios that achieved a variety of balanced energy and land protection outcomes for California.\*



### Recommendations

As part of SB 100 implementation, California needs a longterm plan to build clean energy and reduce conservation impact. The *Power of Place* study underscores the need to pursue the following recommendations on the path to decarbonization.

## INCORPORATE CONSERVATION DATA INTO LONG-TERM ENERGY PLANNING

Establish the protection of natural lands and conservation values as an objective in long-term energy planning to improve longterm energy decisions, limit future development conflict, and avoid loss of habitat and ecosystem services.

### PROMOTE INTER-STATE AND INTER-AGENCY COORDINATION

Expand collaboration between states and state energy and natural resource agencies in energy planning. Cooperation will be essential to achieve the goals of building renewable energy infrastructure at scale and protecting natural resources.

### INVEST IN NEW WEST-WIDE PLANNING TO IMPROVE OUTCOMES

A science-based vision for balancing renewable energy and land conservation in the Western Interconnection is needed. The land use data that inform state and local energy planning can be improved if there is a common set of assumptions across the West. These data could minimize conflict and bring certainty to state or regional efforts to build renewables to meet clean energy targets.

#### \* Wu, G.C.; Leslie, E.; Allen, D.; Sawyerr, O.; Cameron, D.; Brand, E.; Cohen, B.; Ochoa, M.; Olson, A. Power of Place: Land Conservation and Clean Energy Pathways for California, 2019.

## STRENGTHEN LINKS BETWEEN RESOURCE PLANNING AND PROCUREMENT

Resource planning should inform generation procurement and transmission expansion to ensure that the cumulative procured mix of low-carbon resources optimally achieves multiple benefits and services, such as cost, low pollution and emissions, grid reliability, and land protection.

#### PURSUE POLICIES AND PROGRAMS TO INCREASE ENERGY EFFICIENCY, DEMAND RESPONSE, AND DISTRIBUTED ENERGY RESOURCES

To reduce the amounts of natural and agricultural lands needed to achieve clean energy policies, increase incentives and investments in energy efficiency, demand response, and rooftop solar.

#### PROMOTE SITING OF CLEAN ENERGY TECHNOLOGIES ON ALREADY DISTURBED OR DEGRADED LAND, INCLUDING BROWNFIELDS

Given the large scale of solar deployment and its land use requirements, invest in new strategies to remove barriers and incentivize deployment of utility-scale solar in already disturbed or degraded lands, especially in areas where solar is an economically beneficial alternative land use (e.g., former mine lands, brownfields, impaired former agricultural lands).

For a full list of recommendations, please see the *Power of Place* technical report<sup>\*</sup> and executive summary.

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