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SB100 Modeling Inputs and Assumptions Workshop

Presentation by The Nature Conservancy

Power of Place: Land Conservation and Clean Energy Pathways for California

February 24, 2020

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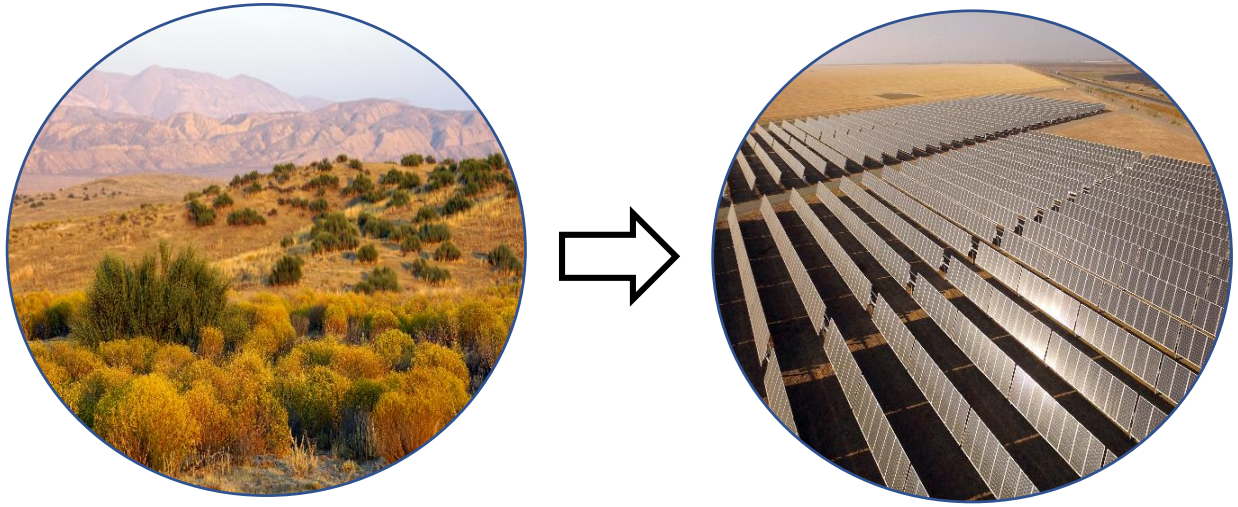
Decarbonizing California through clean power and electrification will require significant land area for new electricity infrastructure

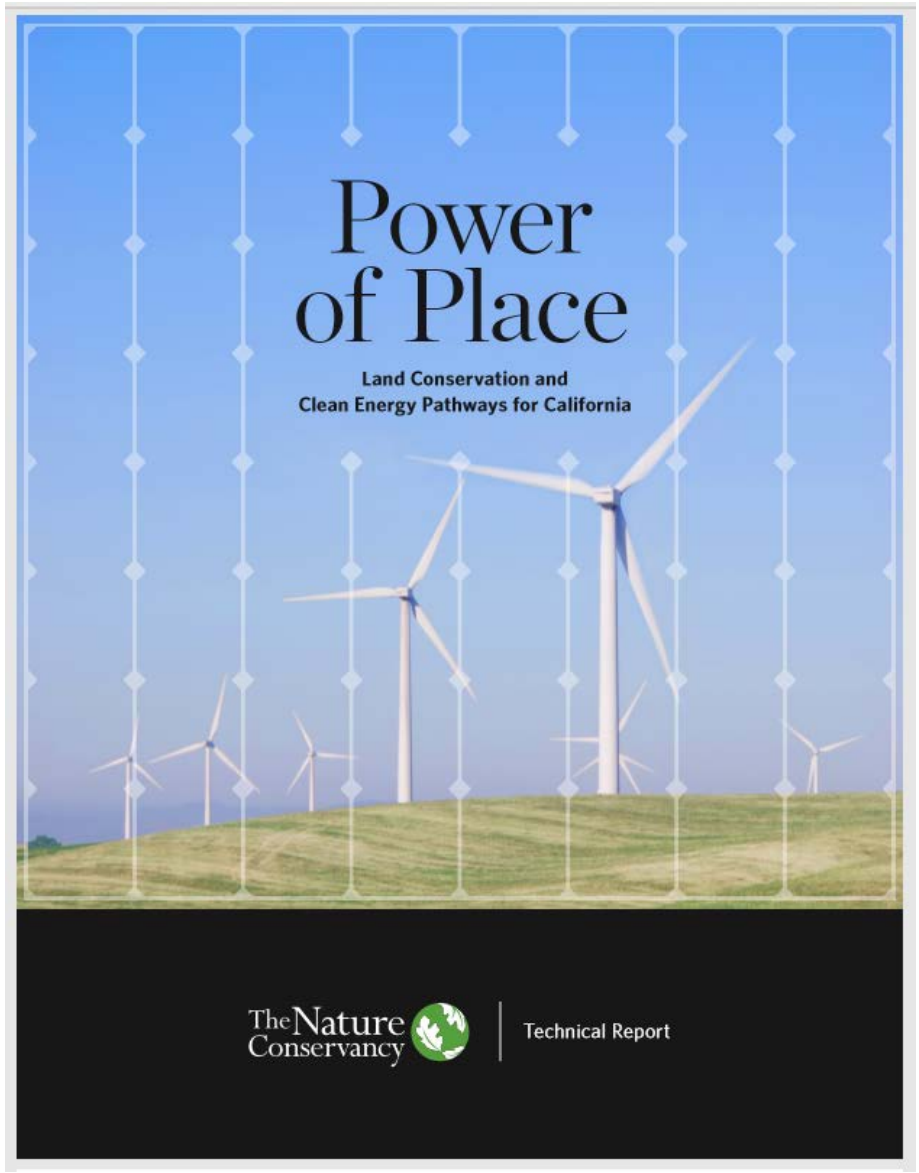
Integrating environmental and land use data *as a first step in* long term energy models yields multiple benefits



GEOSPATIAL ENVIRONMENTAL AND LAND DATA

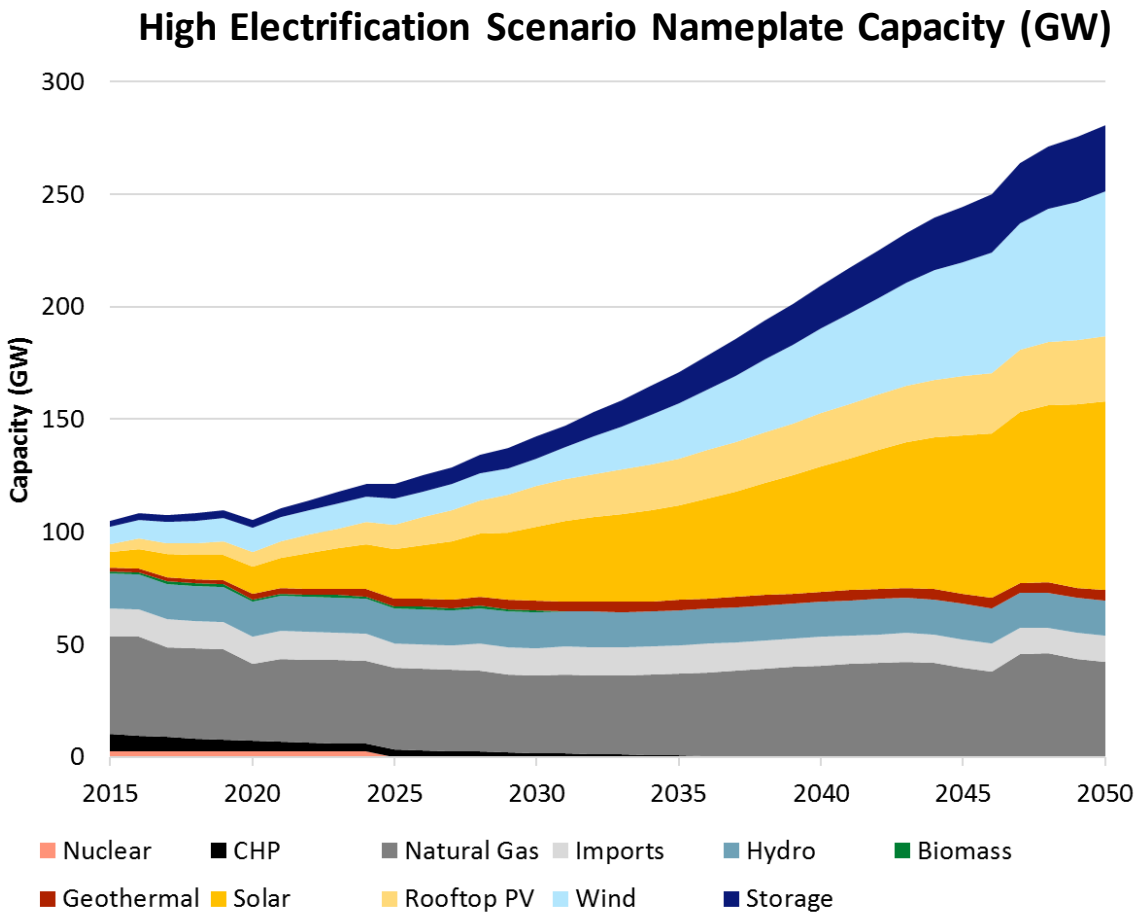
ENERGY RESOURCE PORTFOLIOS

Development opportunity areas and constraint areas become visible much earlier in resource and transmission planning, improving projections and the policy decisions that flow from them.



Can the high renewable build needed to achieve deep decarbonization in 2050 be done while limiting impacts to natural and agricultural lands across the West?

Statewide Modeling of California Goals



- The Power of Place study builds upon the California Energy Commission EPIC project "Deep Decarbonization in a High Renewables Future", which considered multiple scenarios for achieving statewide emissions targets
- All scenarios incorporated high levels of vehicle and building electrification
- All scenarios met SB 100 targets of 100% of retail electricity sales with zero-carbon resources and 80 percent reduction in GHGs by 2050

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.*

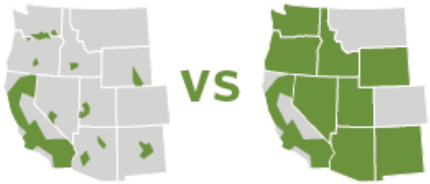
Geographies

Three geographic areas within which renewable energy resources are assumed to be available for development

California =
Part West = +
Full West = + +

Resource Availability

California agency assumptions that limit renewable resource availability for planning vs. expanded resource availability

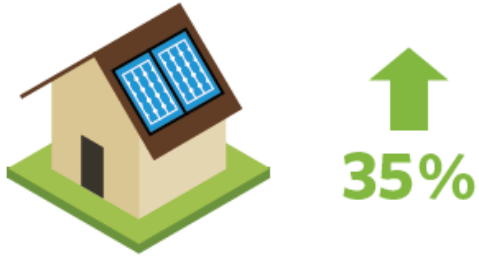


Levels of Land Protection

Four environmental siting levels (SL) with increasing emphasis on land protection to reduce impacts to natural and agricultural lands

Rooftop Solar Capacity

California agency rooftop solar forecast vs. a **35%** increase



Battery Cost

California agency assumptions vs. a **25%** reduction

The *Power of Place* study developed

61 Scenarios

All scenarios achieve **80%** greenhouse gas emissions reduction below **1990** levels by 2050.

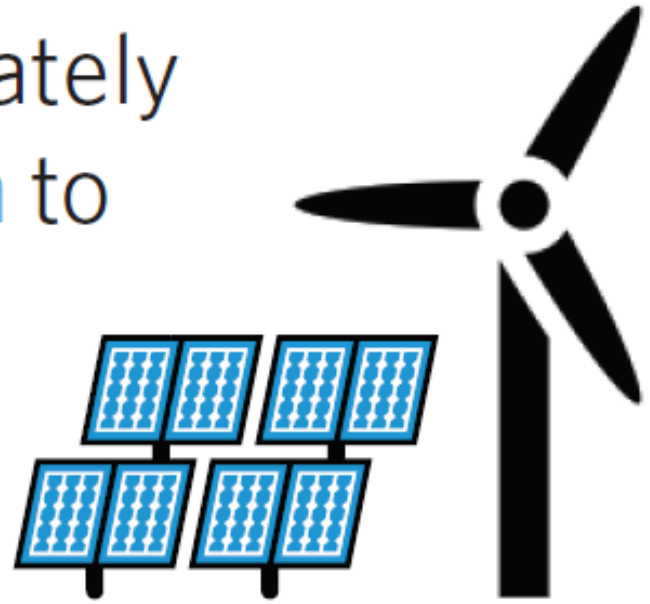
The scenarios generate **102–110%** zero carbon electricity in 2050 (of retail sales).

* See the technical report for an in-depth discussion of choices, trade-offs, and implications.

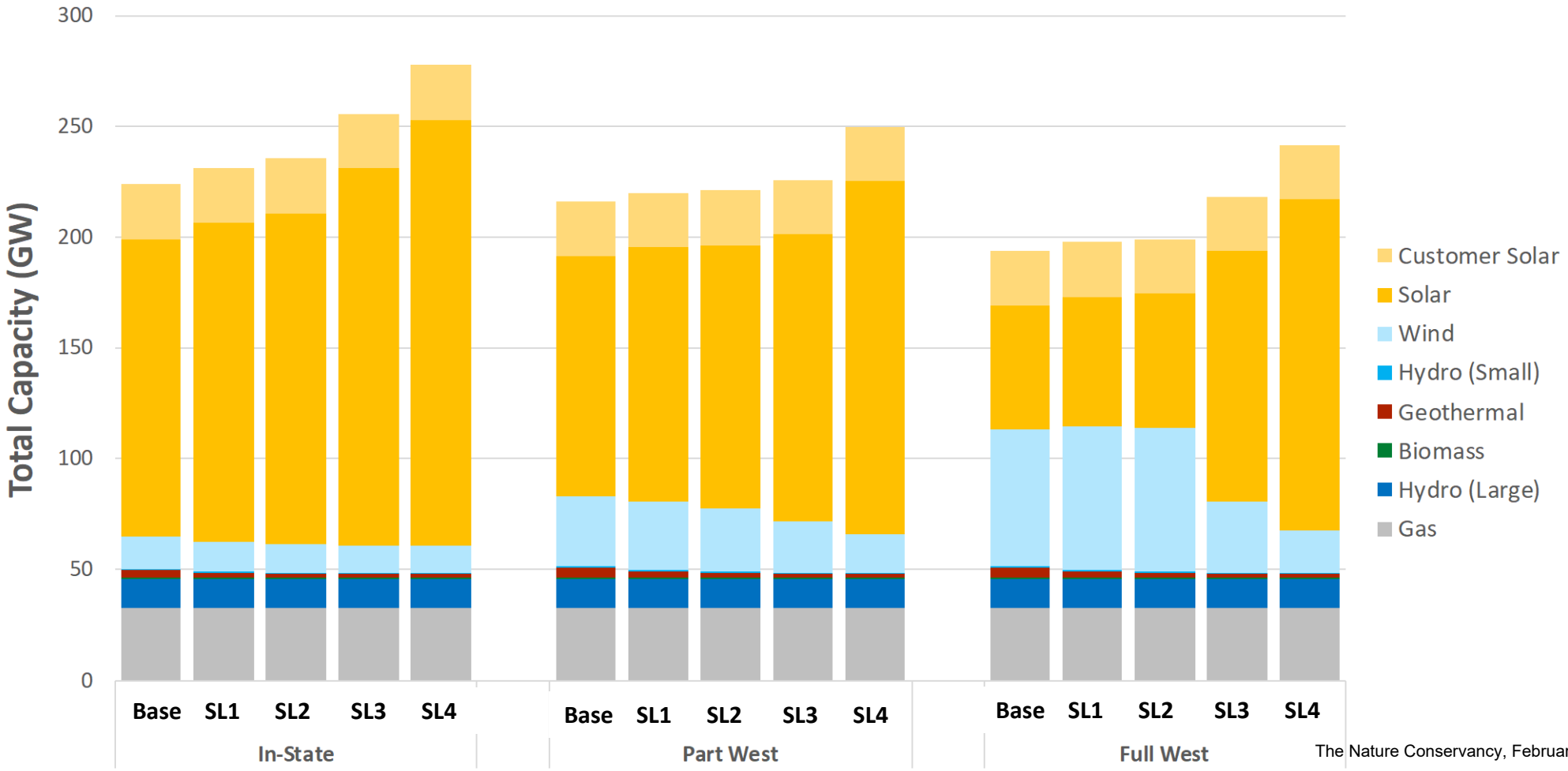
2050 scale of wind and solar across scenarios

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

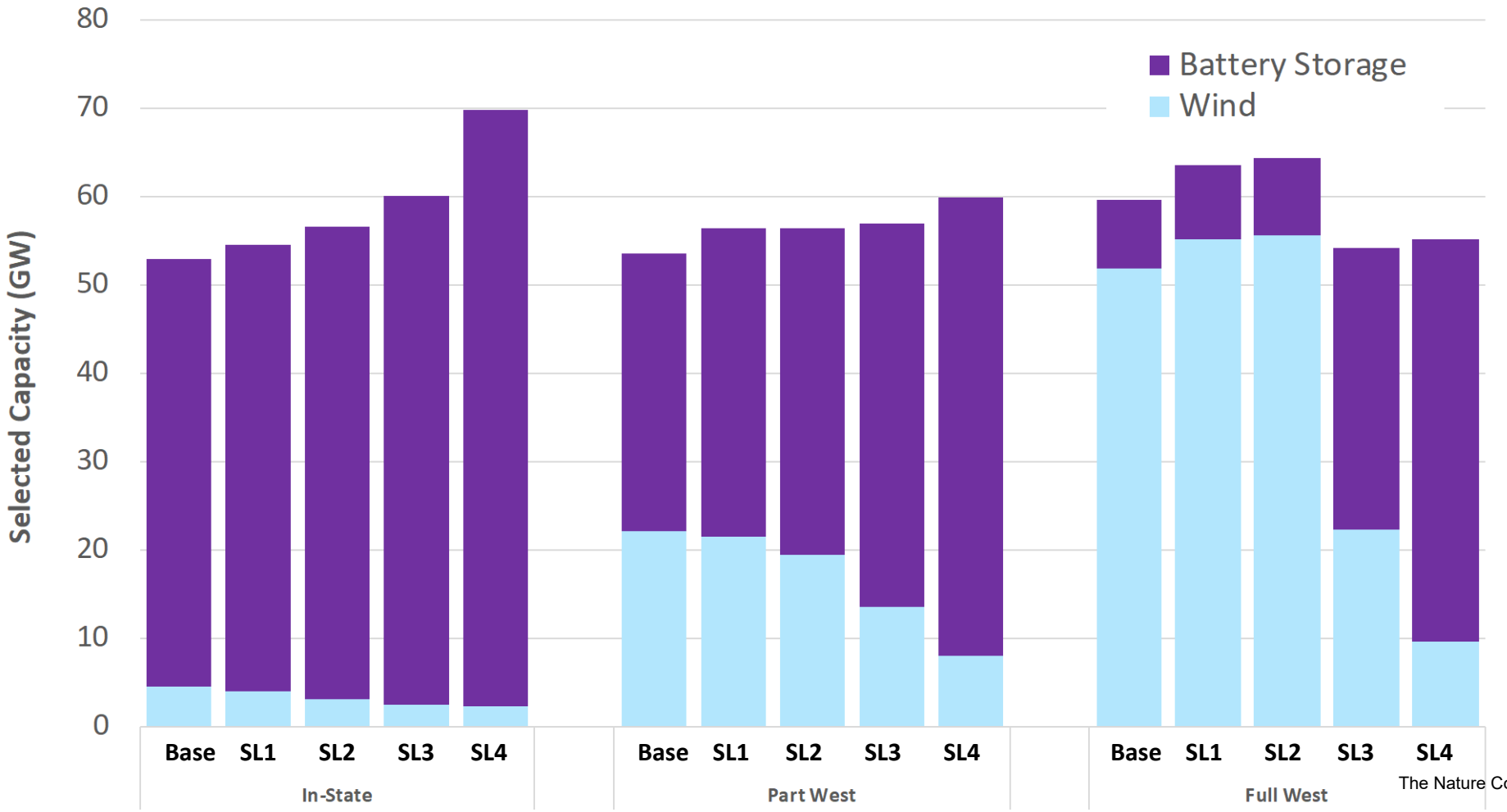
Approximately
1.6 million to
3.1 million
acres



2050 generation capacity differs across geographic scenarios



2050 battery capacity differs across geographic scenarios

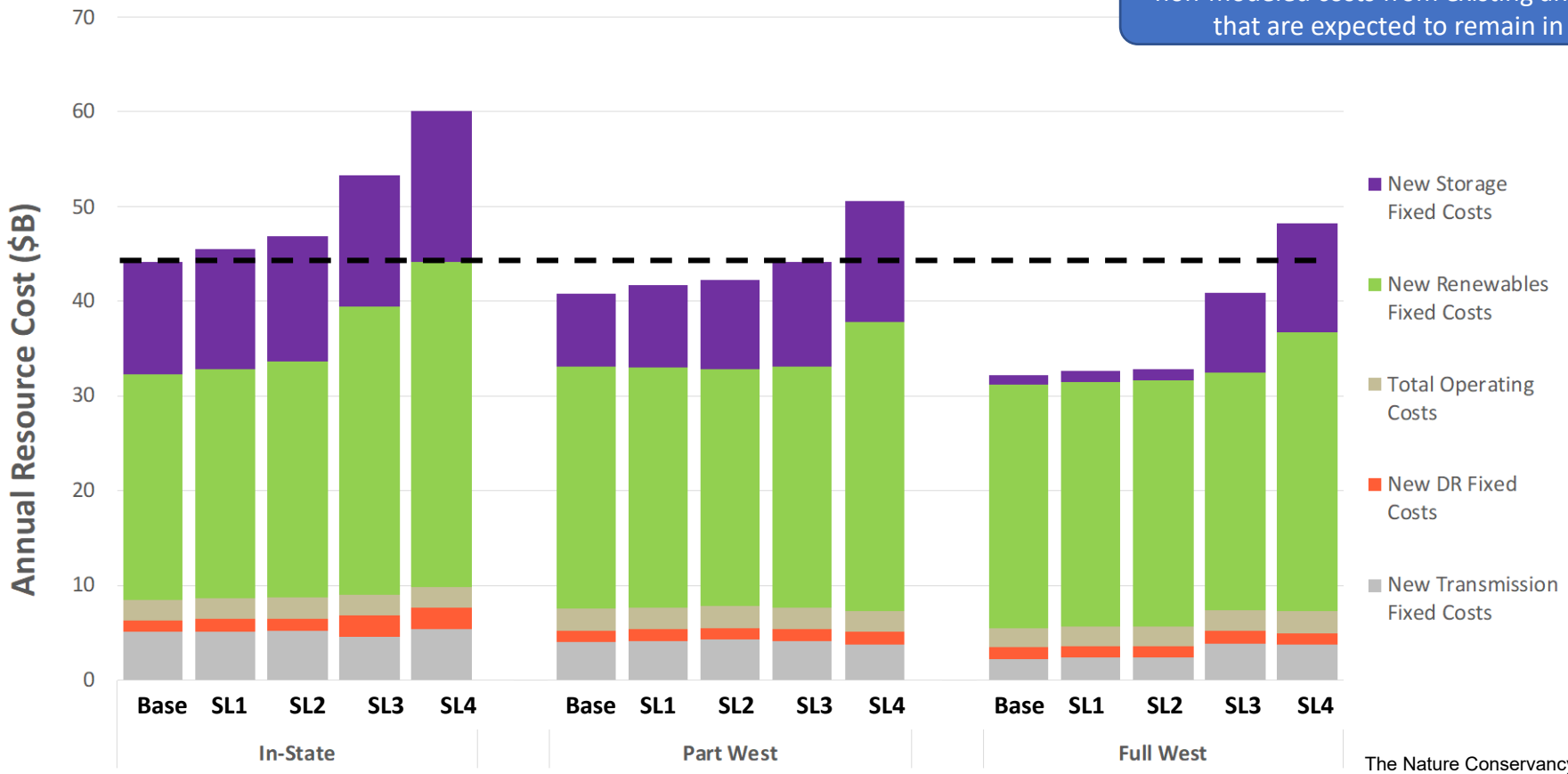


The resource used to balance the solar generation is the primary difference between cases

When the model (RESOLVE) has access to out-of-state wind resources, it generally prefers them to battery storage

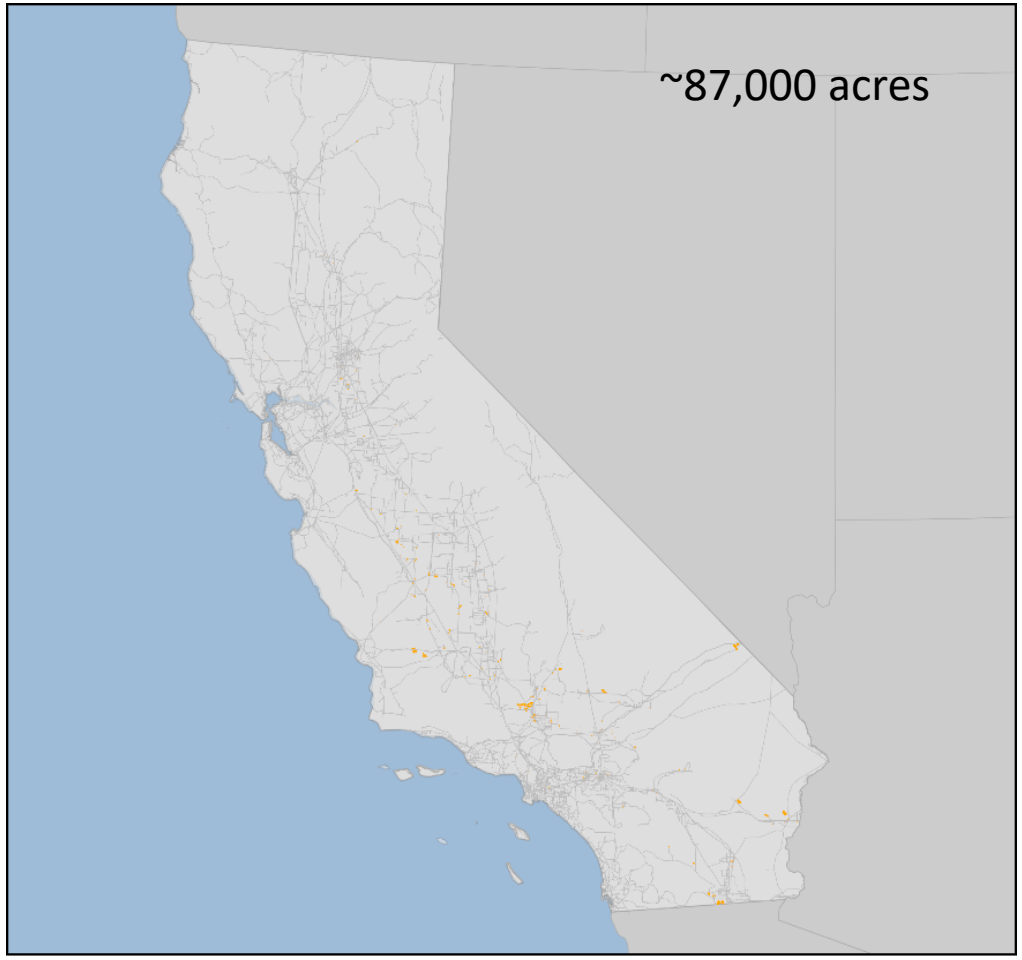
When clean power can be sourced across a larger area, there are more cost-effective opportunities to create balanced solutions for clean power and land conservation.

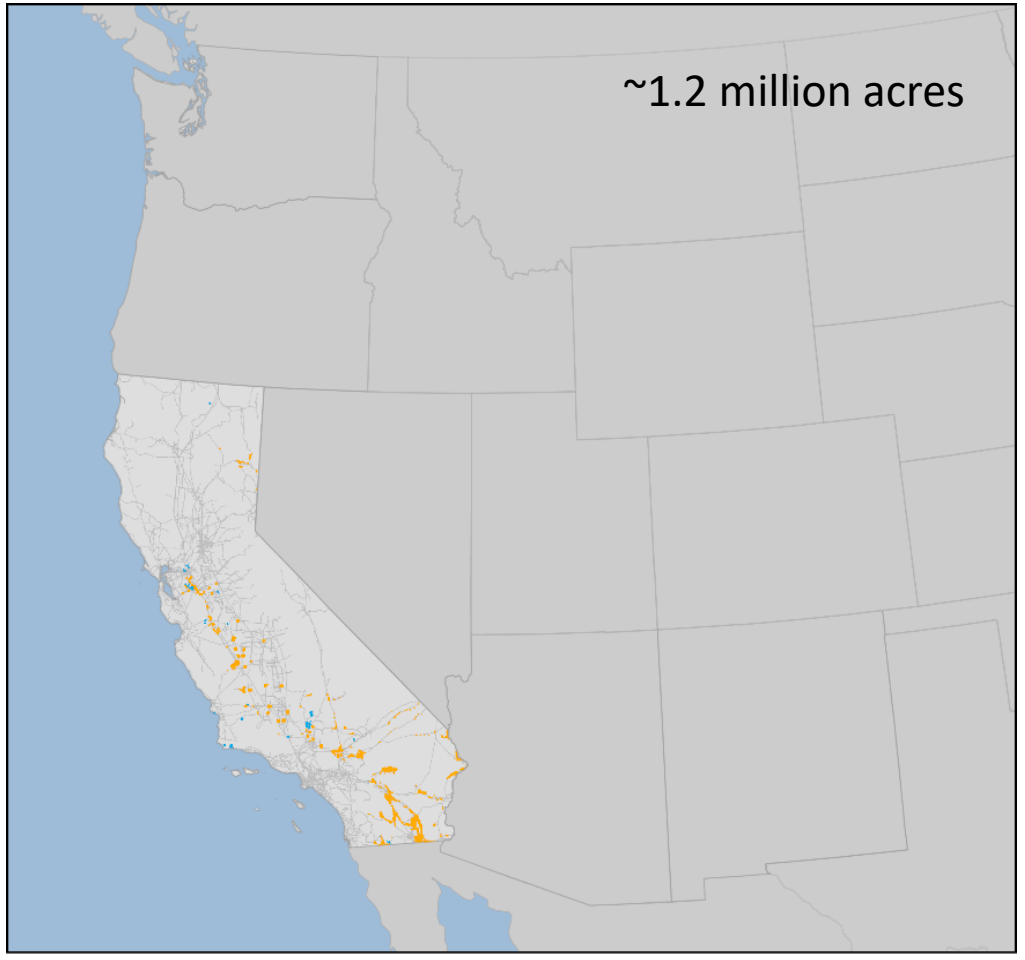
Note: All cases include an additional $64.6 Billion in non-modeled costs from existing and planned resources that are expected to remain in service in 2050

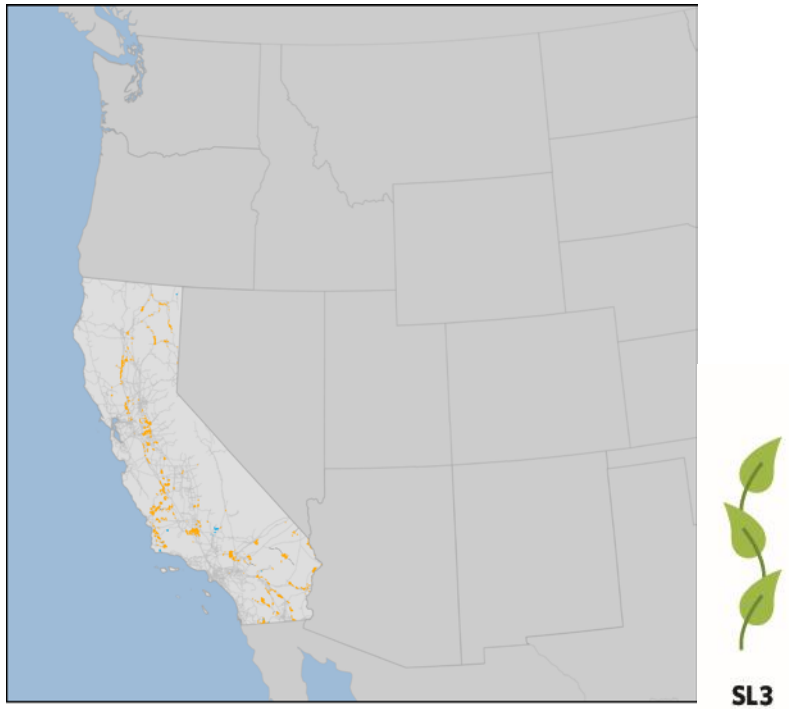


The Nature Conservancy, February 24, 2020

Spatial visualization of a subset of 2050 scenarios


~87,000 acres
Existing Solar Projects 2019
Existing Transmission


~1.2 million acres
In-State Siting Level 1 (Constrained)
Solar Selected Project Area
Wind Selected Project Area
Interconnection
Planned Transmission
Existing Transmission

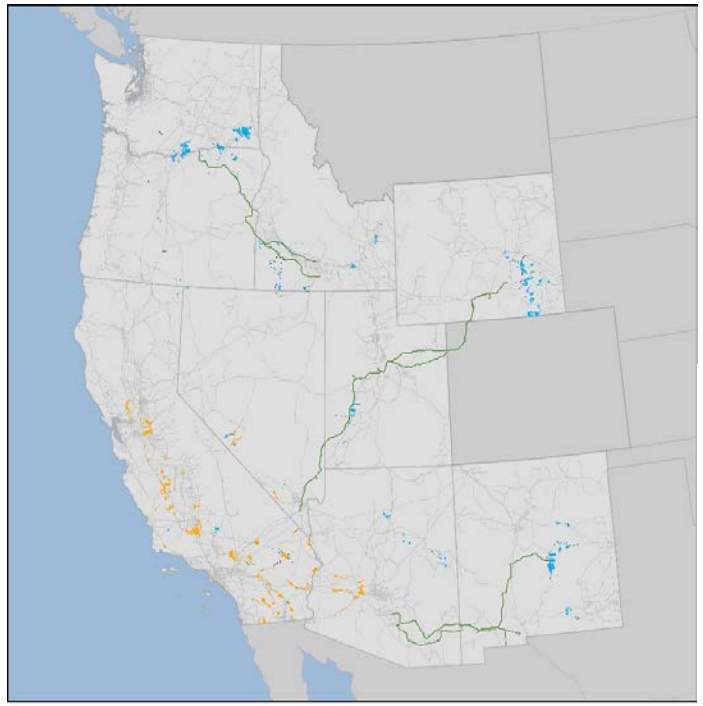


In-State Siting Level 3 (Constrained)
Solar Selected Project Area
Wind Selected Project Area
Interconnection
Planned Transmission
Existing Transmission

SL3

Part West Siting Level 3 (Constrained)
Solar Selected Project Area
Wind Selected Project Area
Interconnection
Planned Transmission
Existing Transmission

SL3



Full West Siting Level 3 (Constrained)
Solar Selected Project Area
Wind Selected Project Area
Interconnection
Planned Transmission
Existing Transmission

SL3

With planning, California can scale up the clean energy infrastructure needed to decarbonize California through clean power and electrification while limiting impacts to natural and agricultural lands across the west.

Recommendations

- **Quantitative:** Incorporate environmental and land use data into the modeling for SB100 report

- **Qualitative:** Include chapter or section on land use in SB100 report.
  - Socialize and plan for land use changes that may be needed to meet climate and energy goals.
  - Prioritize additional policy structures and recommendations that can enable lower impact development pathways.
  - Identify opportunities for acceleration of technology deployment.