

# Renewable Energy Ordinance Update Technical Study

*Prepared for*

**Los Angeles County  
Department of Regional Planning**



*Submitted by*



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## Chapter 1 Introduction

The County of Los Angeles (County) adopted a Renewable Energy Ordinance (REO) in 2016 that established permitting requirements and development standards for small-scale solar energy systems, utility-scale solar facilities, and small-scale wind energy systems. In December 2023, the County of Los Angeles Department of Regional Planning (LA County Planning) was directed by the County Board of Supervisors to regulate Battery Energy Storage Systems (BESS), with definitions, permitting structure, and development and operational standards. In April 2024, LA County Planning was directed by the County Board of Supervisors to consider revisions to the REO's current planning and zoning requirements that would facilitate the development of utility-scale renewable energy and energy storage projects.

Aspen has prepared this technical study for LA County Planning to inform the REO update. The purpose of this technical study is to explore best siting and regulation practices for renewable energy generation and storage, specifically within unincorporated Los Angeles County and with consideration to both rural and urban areas. The Technical Study is meant to serve as a resource on current renewable energy and storage technologies, including advantages, limitations, and County-specific considerations for each technology.

This Technical Study:

- Describes State and County planning efforts to guide renewable energy development;
- Discusses the County's current renewable energy mix and opportunities for developing future renewable energy generation and storage;
- Identifies regulatory strategies and best practices for siting and development of renewable energy technologies;
- Evaluates the costs and benefits of developing new renewable energy and storage projects within unincorporated Los Angeles County; and
- Provides recommendations on the technologies and regulatory strategies that best support the County's goal of transitioning to 100% renewable energy procurement.

The recommendations in this study are presented solely for the County's consideration. This technical study is neither a decision-making document nor an implementation plan. Nothing in this study is meant to bind the County or require the County to take any particular action with respect to the REO update or any other related activity.

## Chapter 2 Renewable Energy Policy Context

### 2.1 Current Context

#### 2.1.1 Current Renewable Energy Ordinance

##### History

The REO was officially adopted by the County of Los Angeles Board of Supervisors in December 2016, following an extensive public consultation process and comprehensive environmental analysis. The County's adoption of the REO was prompted by legislative developments at both federal and State levels that reflected an increased urgency toward renewable energy expansion.

At the federal level, the Energy Policy Act of 2005 mandated the U.S. Department of Energy to assess and document natural resources available for renewable energy production (Los Angeles County, 2015a). Concurrently, California enacted aggressive renewable energy targets through the Renewables Portfolio Standard (RPS), initially requiring utility providers to source at least 20% of their retail sales from renewable sources by 2020, later elevated to 33% by 2020. In 2006, the adoption of Assembly Bill 32 (Global Warming Solutions Act) established specific targets for reducing greenhouse gas emissions to 1990 levels by the year 2020. In addition to these efforts, California's Senate Bill 100 (SB 100), passed in 2018, further accelerated the State's renewable energy ambitions by setting a target of achieving 100% renewable energy by 2045.

The County's REO is a direct response to these evolving legislative mandates. The REO sets forth regulations to guide and manage renewable energy development in unincorporated Los Angeles County.

##### Key Existing Provisions

In developing the 2016 REO, the County recognized growing local concerns regarding renewable energy development impacts. To address these concerns comprehensively, the REO includes standards and zoning regulations specifically tailored to renewable energy projects. These regulations include the following:

- Mandatory setbacks from agricultural zones;
- Mandate to underground electric transmission lines associated with utility-scale renewable energy projects;
- Prohibition on utility-scale solar projects in Economic Opportunity Areas (EOAs) and Significant Ecological Areas (SEAs);
- Conditional Use Permit (CUP) requirement for all ground-mounted utility-scale solar projects; and
- Ban on utility-scale wind energy development.

##### Implementation Outcomes

Since the adoption of the REO in December 2016, the number of utility-scale renewable energy projects proposed in unincorporated LA County and subsequently approved by the County has markedly decreased. Prior to the REO, the County approved approximately 12 projects totaling 660 megawatts (MW) of renewable energy capacity in unincorporated County areas. However, post-adoption of the REO, only five utility-scale renewable energy projects (a total capacity of approximately 132 MW) have secured County approval and three of those have been built and are in operation.

The reduction in approval of renewable energy projects coincides with the adoption of the REO. While a reduction in project approvals aligns with the ordinance's intent to safeguard community and environmental interests, the resulting decline in project approvals may suggest that the economic and logistical barriers, including some introduced by the REO, have affected the feasibility and attractiveness of developing large-scale renewable energy infrastructure in unincorporated Los Angeles County.

### **2.1.2 Board of Supervisors Motions**

To address siting and permitting of new renewable energy generation and storage projects, the County Board of Supervisors issued two motions described below.

In December 2023, the Board of Supervisors issued a motion, titled “Developing a Los Angeles County Ordinance for Renewable Energy Zoning, Standards, and Requirements,” to develop a permitting structure and development standards for BESS. In its motion, the Board of Supervisors recognizes the important role of BESS to meet renewable energy procurement targets, and the need to establish guidelines for siting and safe operation of this technology. The motion directs LA County Planning to update the code with the following considerations:

- Discretionary process for BESS projects depending on their size and if they are primary or accessory uses.
- Appropriate siting criteria, including proximity to critical infrastructure and sensitive land uses, such as residences and schools.
- Differentiation of primary use projects by size, such as storage capacity or project acreage, and consideration of scale in relation to the surrounding area.
- Overconcentration of larger, primary use BESS projects as evaluated by existing infrastructure and the number of grid interconnection points in a particular area.
- Potential hazards, such as Very High Fire Hazard Severity Zones, and safety measures for BESS installations, including emergency response protocols, technologies and chemistries proposed, and proper storage and disposal of battery components.
- Noise impacts measures, such as perimeter wall/fencing requirements and maximum decibel ratings.
- Emerging technologies.
- Decommissioning protocols to facilitate the recycling and disposal of batteries at the end of the project life and to restore the property.
- Any amendments to related energy storage systems and renewable energy facilities provisions in Title 22.

In April 2024, the Board of Supervisors introduced a second motion, titled “Accelerating Renewable Energy Development and Promoting Community Resiliency in Los Angeles County,” mandating a comprehensive update to the REO. The Board of Supervisors provided the following considerations aimed at revising the ordinance, with a focus on utility-scale renewable energy facilities:

- Identify certain areas in the County as renewable energy development zones.
- Establish a size threshold to determine whether a ministerial or discretionary permit is required for these projects.
- Develop an approach to ensuring community benefits for renewable energy projects that promotes community resiliency in impacted areas.

- Evaluate the ban on utility-scale wind energy and make a recommendation based on market and environmental factors on whether it should be allowed on a discretionary basis in certain zones.
- Apply relevant best practices and development standards from other California jurisdictions.

### 2.1.3 LA County's Renewable Energy Planning Goals

The REO operates within a framework of the County planning documents described below. Although interconnected, each of the County's planning documents contain unique objectives and policies that may either support or hinder renewable energy development. The following section highlights the County's planning guidance specific to renewable energy development.

#### Los Angeles County 2035 General Plan

The Los Angeles County 2035 General Plan (General Plan) provides a foundational framework guiding renewable energy policy and infrastructure development throughout the unincorporated areas of the County. Recognizing the urgent need to support State and regional sustainability initiatives, the General Plan emphasizes local solar power generation and advancing zero-carbon electricity. Additionally, it advocates for studies on optimizing solar integration into future developments. These strategies contributed to the development and subsequent adoption of the REO in 2016 (Los Angeles County, 2025a). Multiple elements within the General Plan emphasize the importance of renewable energy:

- **Land Use Element:** This element promotes sustainable development practices, and includes the following policy that addresses energy efficiency:
  - Policy LU 11.1: Encourage new development to employ sustainable energy practices, such as utilizing passive solar techniques and/or active solar technologies.
- **Conservation and Natural Resources Element:** This element highlights the importance of encouraging renewable energy production and emphasizes the sustainable management of energy. The following policies address renewable energy resources:
  - Policy C/NR 12.1: Encourage the production and use of renewable energy resources.
  - Policy C/NR 12.2: Encourage the effective management of energy resources, such as ensuring adequate reserves to meet peak demands.
  - Policy C/NR 12.3: Encourage distributed systems that use existing infrastructure and reduce environmental impacts.
- **Parks and Recreation Element:** Recognizing the importance of a sustainable parks and recreation system, the Parks and Recreation Element including the following policy:
  - Policy P/R 6.2: Support the use of alternative sources of energy, such as wind and solar sources to reduce the use of energy at existing parks.
- **Safety Element:** Recognizing the increased vulnerability of energy systems to disruptions, the Safety Element addresses climate adaptation and resiliency through the following policy:
  - Policy S 2.1: Explore the feasibility of community microgrids that are driven by renewable energy sources to increase local energy resilience during grid power outages, reduce reliance on long-distance transmission lines, and reduce strain on the grid when demand for electricity is high.
- **Public Services and Facilities Element:** This element recognizes renewable energy sources as a component of providing adequate public utilities through the following policy:

- Policy PS/F 6.5: Encourage the use of renewable energy sources in utility and telecommunications networks.
- **Economic Development Element:** The element describes renewable energy development as a key economic driver, with the following policy addressing the renewable energy industry:
  - Policy ED 1.2: Encourage and foster the development of the renewable energy economic sectors.

### **2045 Los Angeles County Climate Action Plan**

The 2045 County of Los Angeles Climate Action Plan (CAP) is a sub-element of the General Plan Air Quality Element and has a robust commitment to combating climate change through an aspirational goal of achieving carbon neutrality by 2045 (Los Angeles County, 2024a). The CAP aligns with California's broader State climate initiatives, reinforcing the County's dedication to significant reductions in greenhouse gas emissions and sustainable energy use (Los Angeles County, 2024a).

The CAP functions as an update and extension to the Air Quality Element of the General Plan, integrating long-term climate goals with air quality objectives (Los Angeles County, 2024b). By aligning closely with the General Plan, the CAP ensures consistency in long-term strategic planning and policy implementation across the County, ensuring effective and cohesive management of environmental resources (Los Angeles County, 2024b).

Central to the CAP's objectives are renewable energy targets, strategies, and timelines designed to significantly expand renewable energy infrastructure. In particular, the CAP prioritizes distributed energy generation and microgrids to enhance energy resilience and reduce vulnerability. Distributed generation produces renewable energy near energy consumption sites (e.g., businesses, homes, etc.), while microgrids offer localized energy generation and storage capabilities to ensure continuous power during transmission grid disruptions (Los Angeles County, 2024a). The following strategy and measures are specific to energy supply:

- **Strategy 1: Decarbonize the Energy Supply**
  - Measure ES2: Procure Zero-Carbon Electricity. Supply unincorporated Los Angeles County's power demand with zero-carbon electricity through a community choice energy (e.g., Clean Power Alliance).
  - Measure ES3: Increase Renewable Energy Production. Expand local solar power generation on existing and new development and for County projects.
  - Measure ES4: Increase Energy Resilience. Expand energy storage and microgrids throughout the community and for County operations.

Through the adoption of the Sustainability Plan and the CAP, the Board of Supervisors established both a goal and a roadmap for achieving carbon neutrality by 2045 in LA County. To achieve that goal, Los Angeles County must have adequate renewable energy resources to equitably and reliably transition to a fossil fuel-free economy.

### **Area Plans**

The General Plan identifies 11 Planning Areas. Area plans are components of the General Plan that focus on land use and policy issues that are specific to the Planning Area. Area Plans provide opportunities to update community-based plans, as well as implementation tools of the General Plan, such as specific plans and community standards districts. Area Plans specifically relevant to the REO update include the Antelope Valley Area Plan and Santa Clarita Valley Area Plan.

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### ***Antelope Valley Area Plan***

The Antelope Valley Area Plan (AVAP) provides strategic guidance for renewable energy planning, aligning closely with the County's broader sustainability and energy objectives. Recognizing the unique geographic and climatic advantages of the Antelope Valley, the AVAP emphasizes harnessing solar and wind resources effectively while preserving critical environmental and community assets (Los Angeles County, 2015b). Key objectives within the AVAP include promoting sustainable and strategic siting of renewable energy facilities, prioritizing locations that minimize ecological and community impacts. Although the AVAP explicitly supports renewable energy development, it also includes policies restricting certain renewable energy technologies and establishes development exclusion areas. Renewable energy is highlighted in Goal COS 10, "Diverse energy systems that utilize existing renewable or waste resources to meet future energy demands," as well as Goal COS 11, "Energy systems for use in public facilities that reduce consumption of non-renewable resources while maintaining public safety." Policies related to renewables in the AVAP include:

- Policy COS 12.1: Promote the use of individual renewable energy systems throughout the County to complement and reduce dependence upon utility-scale renewable energy facilities.
- Policy COS 12.2: Require appropriate development standards for individual renewable energy systems to minimize potential impacts to surrounding properties. Simplify the permitting process for individual renewable energy systems that meet these development standards.
- Policy COS 13.1: Direct utility-scale renewable energy production facilities, such as solar facilities, to locations where environmental, noise, and visual impacts will be minimized.
- Policy COS 13.2: Restrict development of utility-scale wind energy production facilities within the vicinity of Edwards Air Force Base to limit interference with military operations.
- Policy COS 13.3: Require all utility-scale renewable energy production facilities to develop and implement a decommissioning plan, with full and appropriate financial guarantee instruments that will restore the full site to its natural state upon complete discontinuance of operations and will restore non-operational portions of the site while the remainder continues operating.
- Policy COS 13.4: Promote the use of recycled water in utility-scale renewable energy production facilities to limit impacts on the available fresh water supply.
- Policy COS 13.5: Where development of utility-scale renewable energy production facilities cannot avoid sensitive biotic communities, require open space dedication within Significant Ecological Areas as a mitigation measure.
- Policy COS 13.6: Ensure that all utility-scale renewable energy production facilities, such as solar facilities, do not create land use conflicts with adjacent agricultural lands or existing residential areas in the vicinity. Require buffering and appropriate development standards to minimize potential conflicts.
- Policy COS 13.7: Limit the aesthetic impacts of utility-scale renewable energy production facilities to preserve rural character.
- Policy COS 13.8: Coordinate with other jurisdictions to plan for utility-scale renewable energy production facilities in order to minimize impacts to sensitive biotic communities and existing residential areas.
- Policy COS 13.9: Prohibit ground-mounted utility-scale renewable energy production facilities within Significant Ecological Areas and Economic Opportunity Areas.

- Policy COS 14.1: Require that new transmission lines be placed underground whenever physically feasible.
- Policy COS 14.2: If new transmission lines cannot feasibly be placed underground due to physical constraints, require that they be co-located with existing transmission lines, or along existing transmission corridors, whenever physically feasible.
- Policy COS 14.3: If new transmission lines cannot be feasibly placed underground or feasibly collocated with existing transmission lines or along existing transmission corridors due to Antelope Valley Area Plan COS-10 June 2015 physical constraints, direct new transmission lines to locations where environmental and visual impacts will be minimized.
- Policy COS 14.4: Discourage the placement of new transmission lines on undisturbed lands containing sensitive biotic communities.
- Policy COS 14.5: Discourage the placement of new transmission lines through existing communities or through properties with existing residential uses.
- Policy COS 14.7: Require that electrical power lines in new residential developments be placed underground.
- Policy COS 17.4: Promote the use of individual renewable energy systems and require appropriate development standards for such systems to minimize potential impacts to surrounding properties. Simplify the permitting process for individual renewable energy systems that meet these development standards.
- Policy ED 1.10: Promote small-scale, household based renewable energy systems to enable Antelope Valley residents to become energy independent.
- Policy ED 1.11: Encourage the development of utility-scale renewable energy projects at appropriate locations and with appropriate standards to ensure that any negative impacts to local residents are sufficiently mitigated.
- Policy ED 1.12: Adopt regulations that ensure that local residents receive a fair share of the benefits of utility-scale renewable energy projects that are commensurate to their impacts.
- Policy ED 1.13: Ensure early discussions with Edwards Air Force Base and U.S. Air Force Plant 42 regarding new industries, such as utility-scale renewable energy production facilities, to limit potential impacts on mission capabilities.

### ***Santa Clarita Valley Area Plan***

The Santa Clarita Valley Area Plan (SCVAP) references the importance of environmental sustainability in planning, including renewable resource systems (Los Angeles County, 2012). The plan addressed environmental sustainability throughout the goals and policies. For example, the SCVAP includes a goal of, “environmentally responsible development through site planning, building design, waste reduction, and responsible stewardship of resources.” Policies related to renewable energy in the SCVAP include:

- Policy LU-7.1.2: Promote the use of solar panels and renewable energy sources in all projects.
- Policy LU-8.1.11: Work with existing utilities, agencies and renewable energy companies to remove barriers to renewable energy production.
- Policy CO-1.2.1: Improve the community’s understanding of renewable resource systems that occur naturally in the Santa Clarita Valley, including systems related to hydrology, energy, ecosystems, and habitats, and the interrelationships between these systems, through the following measures...

- Policy CO-1.2.2: Working with other agencies as appropriate, develop and apply models and other tools for decision-making to support the sustainability of renewable systems.
- Policy CO-1.3.1: Explore, evaluate, and implement methods to shift from using non-renewable resources to use of renewable resources in all aspects of land use planning and development.
- Policy CO-1.3.3: Provide informational material to the public about programs to conserve non-renewable resources and recover materials from the waste stream.
- Policy CO-8.2.3: Support purchase of renewable energy for public buildings, which may include installing solar photovoltaic systems to generate electricity for County buildings and operations and other methods as deemed appropriate and feasible, in concert with significant energy conservation efforts.
- Policy CO-8.2.5: Support installation of photovoltaic and other renewable energy equipment on public facilities, in concert with significant energy conservation efforts.

### **Los Angeles Countywide Sustainability Plan**

OurCounty, the Los Angeles Countywide Sustainability Plan, establishes a comprehensive, integrated approach guiding the County toward achieving long-term sustainability, equity, and resilience objectives (Los Angeles County, 2025b). Key targets of the Sustainability Plan include increasing LA County’s renewable electrical generation to at least 9,500 GWh by 2045 and achieving Countywide carbon neutrality by 2045 (Los Angeles County, 2025b). The Sustainability Plan clearly delineates renewable energy targets and encourages acceleration of renewable energy infrastructure deployment. Goal 7 – *A fossil fuel-free LA County* – is supported by the following strategy and actions:

- Strategy 7A: Transition to a zero-carbon energy system that reduces air and climate pollution and minimizes the dangers of a changing climate to our communities and economy.
  - Action 90: Develop a publicly accessible community energy map that identifies opportunities for deploying distributed energy resources and microgrids to improve energy resiliency in climate vulnerable communities.
  - Action 91: Maximize the installation of solar and energy storage systems on County property, including requiring solar on new facilities, whenever cost-effective.
  - Action 92: Develop and adopt an updated renewable energy ordinance that advances renewable energy and storage technologies in ways that prioritize community safety, energy resilience, and environmental justice.
  - Action 93: Identify suitable areas and incentives for the development of renewable energy technology that also address community concerns.
  - Action 94: Advocate at the state and local level for an equitable transition away from natural gas utilities and infrastructure.
  - Action 95: Transition all County facilities to a renewable energy supply, including those in incorporated LA County.
  - Action 96: Develop policy recommendations to ensure that environmental and community concerns are addressed in emerging energy sectors, such as green hydrogen and offshore wind.
  - Action 97: Identify the sustainability impacts of AI data centers on LA County and policy levers for addressing water and energy demand.
- Strategy 7B: Create a zero-emission transportation system.

- Action 98: Install 5,000 electric vehicle (EV) chargers at County facilities and properties for public, employee, and fleet use, prioritizing locations in disadvantaged communities.
- Action 99: Partner with equipment manufacturers to pilot zero-emission public safety vehicles, including a Sheriff pursuit vehicle and transport bus and LA County Fire Department (LACoFD) fire engine.
- Action 100: Update the circulation element of the General Plan to incorporate a Truck Route Master Plan to identify and establish specific truck travel routes for safe and efficient transport and prioritize the reduction of emissions exposure for vulnerable populations, including avoiding residential areas and sensitive receptors.
- Action 101: Partner with local and regional agencies, private freight movers, community-based organizations (CBOs), and community members along key freight corridors to implement green goods movement technologies, such as medium-and heavy-duty zero-emission vehicle infrastructure at County facilities, through initiatives like Metro's I-710 Corridor Project or use of County properties for refueling.
- Action 102: Incentivize the transition to zero-emission cargo handling equipment at the San Pedro Bay Port Complex in partnership with the Ports of Los Angeles and Long Beach, labor organizations, and community stakeholders.
- Action 103: Support the transition to a zero-emission rail system for goods movement by coordinating with regional, state, and federal agencies to invest in electrified rail infrastructure, prioritize zero-emission technology upgrades at railyards, and reduce emissions in communities disproportionately impacted by freight corridors.
- Action 104: Implement the Zero-Emission Vehicle (ZEV) Master Plan, including ZEV infrastructure deployment; partnerships with relevant private, government, and nongovernment entities; workforce training opportunities; and advancing the County's zero-emission fleet goals.

### 2.1.4 Other CA County Renewable Energy Guidance

A few counties in California have made notable strides in the development of renewable energy policies and guidance. Table 2-1 provides a list of California counties with a renewable energy policy framework, and the corresponding renewable generation capacity of each county.<sup>1</sup> This information illustrates the differences in renewable energy technology mix, project approvals, and generation capacity relative to the County of Los Angeles (CEC, 2024a).

**Table 2-1 Renewable Energy Capacity and Policy Framework**

RE Capacity Breakdown <sup>1</sup>	County Overview
<b>Riverside County</b>	
RE Capacity: 4,965 MW <ul style="list-style-type: none"> <li>■ 3,968 MW Solar PV</li> <li>■ 642 MW Wind</li> <li>■ 250 MW Solar Thermal</li> <li>■ 56 MW Biomass</li> <li>■ 50 MW Small Hydro</li> </ul>	Riverside County received funding from the California Energy Commission (CEC) Renewable Energy and Conservation Planning Grant (RECPG) Program to support the County's <b>Eligible Renewable Energy Resource Development (eRED)</b> program. The County's eRED program goals are intended to support development of geothermal resources in the Salton Sea region, and to coordinate solar development in the eastern desert portion of the County (where solar potential is highest). Under the eRED program, the County mapped areas suitable for eligible renewable energy

<sup>1</sup> The renewable generation capacity presented for each county in Table 2-1 represents the total installed electric generation nameplate capacity for that technology type, without differentiating its location from county unincorporated vs. incorporated. Nameplate capacity is defined as the maximum amount of electricity a generator can produce under specific conditions, as determined by the manufacturer.

RE Capacity Breakdown <sup>1</sup>	County Overview
	<p>development, and updated its <b>General Plan- Multipurpose Open Space Element</b> and <b>Eastern Coachella Valley Area Plan</b> to develop policies intended to streamline the permitting process for eligible projects. The updated Multipurpose Open Space Element includes policies that encourage the integration of solar energy generation facilities in new building design and the concentration of wind energy facilities within wind resource areas. The updated Eastern Coachella Valley Area Plan allows for renewable energy development within a Rural Desert land use designation, which encompasses 3,878 acres of County unincorporated lands.</p> <p>The County coordinated its eRED program with U.S. Bureau of Land Management’s (BLM) planning efforts under the Desert Renewable Energy Conservation Plan (DRECP). Although the County has seen extensive solar generation development in the last 10 years, over 85% of these projects are constructed on federal lands of the BLM, and are within renewable energy Development Focus Areas (DFAs) designated by the DRECP. DFAs are a renewable energy siting designation for federal lands in the California desert that were developed through a joint planning effort of the BLM and CEC (of which the RECPG Program is a component).</p> <p>Federal projects in Riverside County include approximately 3,400 MW of solar PV and 250 MW of solar thermal generation. Siting and construction of these projects is guided by Conservation and Management Actions (CMAs), which are prescriptions set forth in the DRECP designed to avoid or minimize the effects to natural resources within the 22 million acres of land in the California desert.</p>
<b>Imperial County</b>	
<p>RE Capacity: 3,139 MW</p> <ul style="list-style-type: none"> <li>■ 2,058 MW Solar PV</li> <li>■ 723 MW Geothermal</li> <li>■ 265 MW Wind</li> <li>■ 93 MW Small Hydro</li> </ul>	<p>Prior to its participation in the RECPG Program, Imperial County was inundated with solar development applications and had approved 32 solar projects by 2015, although not all of these projects were constructed.</p> <p>In 2015, the County approved an update to its <b>General Plan- Renewable Energy and Transmission Element</b>, which was developed under the RECPG Program. To support this update, the County identified eligible renewable resource areas with the goal of avoiding cultivated agricultural lands. Ultimately the County developed a <b>Renewable Energy Overlay</b> and a <b>Geothermal Resource Area Overlay</b>. The Element updates include implementation measures for renewable energy development and more stringent permitting requirements (i.e., General Plan Amendment and Change of Zone) for renewable energy projects located outside of these overlay areas.</p> <p>Since the adoption of the Renewable Energy and Transmission Element, the County has approved 21 solar projects on unincorporated County lands. On December 9, 2025, the County Board of Supervisors approved a one-year development cap on permitting new solar projects within agricultural zones.</p>
<b>San Bernardino County</b>	
<p>RE Capacity: 2,360 MW</p> <ul style="list-style-type: none"> <li>■ 1,578 MW Solar PV</li> <li>■ 734 MW Solar Thermal</li> <li>■ 38 MW Small Hydro</li> <li>■ 7 MW Wind</li> <li>■ 3 MW Biomass</li> </ul>	<p>San Bernardino County has received 2 rounds of funding from the RECPG Program funds to develop a <b>Renewable Energy and Conservation Element (RECE)</b>. Under Phase 1, the County undertook a <b>Renewable Energy Mapping Project</b> to identify unincorporated areas suitable for renewable energy siting. This data informed the Element’s existing conditions, including opportunities and constraints for renewable energy development. Under Phase 2, the County prepared a cost-benefit analysis (<b>Renewable Energy Value Evaluation and Augmentation Leadership Initiative Report</b>) that identifies the costs and benefits of various renewable energy scenarios. The report recommends policies, tools, and performance measures to increase the economic, social, and environmental benefits of renewable energy development, which were incorporated into the Element as policies and implementation strategies. The RECE was adopted by the County in 2017.</p> <p>Similar to Riverside County, much of the utility-scale solar generation development in San Bernardino County has occurred within the last 10 years. Approximately 30% of these solar projects are constructed on federal lands of the BLM, under the siting regulations set forth in the DRECP. These federal projects include approximately 300</p>

RE Capacity Breakdown <sup>1</sup>	County Overview
	<p>MW of solar PV and 350 MW of solar thermal generation. The remaining 1,278 MW of solar PV and 384 MW of solar thermal generation is located on incorporated and unincorporated San Bernardino County lands.</p> <p>San Bernardino County has also experienced opposition from its residents to the rapid development of utility-scale solar. In response to this opposition, San Bernardino County adopted <b>Policy RE-4.10</b> in February 2019, which prohibits utility-scale renewable energy development within community plan areas and within Rural Living land use districts.</p>
<b>The County of Los Angeles</b>	
<p>RE Capacity: 1,940 MW</p> <ul style="list-style-type: none"> <li>■ 1,537 MW Solar PV</li> <li>■ 215 MW Small Hydro</li> <li>■ 187 MW Biomass</li> <li>■ 2 MW Wind</li> </ul>	<p>Los Angeles County received RECPG Program funds to develop its <b>Renewable Energy Ordinance (REO)</b>, which was adopted by the Board of Supervisors in 2016. Prior to the REO adoption, the County had approved 12 utility-scale solar PV projects (totaling 660 MW) on unincorporated County lands. All 12 projects are located in the Antelope Valley. Since the REO adoption in 2016, the County has approved five solar PV projects (totaling 132 MW) that are also located in the Antelope Valley.</p> <p>Currently, LA County Planning is reviewing eight projects with a combined solar generation capacity of 375 MW. This includes a proposed hydrogen production facility in the Antelope Valley that would be co-located with a 250 MW solar PV facility. This is the first application for a hydrogen facility that has been submitted to the County.</p>
<b>San Luis Obispo County</b>	
<p>RE Capacity: 968 MW</p> <ul style="list-style-type: none"> <li>■ 962 MW Solar PV</li> <li>■ 4 MW Small Hydro</li> <li>■ 2 MW Biomass</li> </ul>	<p>Under the RECPG Program, San Luis Obispo County developed its <b>Renewable Energy Streamlining Program (RESP)</b> intended to streamline the permitting process for renewable energy project permitting based on location, environmental factors, and scale of development. The RESP is focused on unincorporated inland areas and excludes coastal lands in the Coastal Zone. The RESP was informed by an <b>Opportunities and Constraints Technical Study</b> that identifies renewable energy resource areas (i.e., solar and wind) and locations suitable for development. Using this process, the County developed a zoning overlay including <b>Renewable Energy Development Areas (REDAs)</b>. REDAs are areas in San Luis Obispo County where renewable energy projects can be constructed with minimal environmental impacts, while still proximate to the transmission grid. As an outcome of the Renewable Energy Streamlining Program, San Luis Obispo County approved the following:</p> <ul style="list-style-type: none"> <li>■ <b>General Plan Amendments</b> (Land Use and Circulation Element and Conservation and Open Space Element) to include a definition of the REDAs and their locations;</li> <li>■ <b>Renewable Energy (RE) Combining Designation</b> that streamlines permitting of certain renewable energy projects through Site Plan Review in lieu of Minor Use Permits. The RE Combining Designation only applies to REDAs located in unincorporated inland areas;</li> <li>■ Performance standards for new renewable energy projects; and</li> <li>■ Revised Rules of Procedures for implementing the Land Conservation Act of 1965 (i.e., Williamson Act) to allow certain renewable energy projects on contracted land.</li> </ul> <p>The majority of San Luis Obispo County’s solar energy capacity is attributable to two projects (California Valley Solar Ranch: 250 MW; Topaz Solar Farms LLC: 550 MW) that were constructed prior to the RESP process. Since the adoption of the RE Combining Designation and associated General Plan Amendments, San Luis Obispo County has approved one 150 MW utility-scale solar project in 2019 (California Flats 150: 150 MW).</p>
<b>Ventura County</b>	
<p>RE Capacity: 9 MW</p> <ul style="list-style-type: none"> <li>■ 4 MW Solar PV</li> <li>■ 3 MW Small Hydro</li> </ul>	<p>Ventura County did not participate in the RECPG Program, and has had minimal development of utility-scale renewable energy generation compared to neighboring counties. In 2020, the County adopted a comprehensive update to its General Plan, which includes a requirement for a <b>Renewable Energy Assessment</b> to identify</p>

RE Capacity Breakdown <sup>1</sup>	County Overview
<ul style="list-style-type: none"> <li>■ 2 MW Biomass</li> </ul>	<p>suitable lands and priority areas for siting renewable energy generation and storage projects. Ventura County’s renewable energy planning efforts include the following:</p> <ul style="list-style-type: none"> <li>■ Established a cumulative 100-acre limitation for energy storage facilities in specific resource zones (open space, agriculture) with no acreage limitation in industrial zones.</li> <li>■ Currently developing development standards for BESS and solar PV.</li> <li>■ Future development of a Renewable Energy Restriction Overlay Zone.</li> </ul>

1 – The renewable generation capacity presented for each county represents the total installed electric generation nameplate capacity for that technology type. Nameplate capacity is defined as the maximum amount of electricity a generator can produce under specific conditions, as determined by the manufacturer.

Sources: BLM, 2022; CEC, 2024a, 2025a; Imperial County, 2023, 2025; Los Angeles County, 2023a, 2025c; Riverside County, 2015, 2021; Roth, 2019; San Bernardino County, 2019; San Luis Obispo County, 2015; Ventura County, 2025a, 2025b

Five of the six counties listed in Table 2-1 have received funding from the CEC’s RECPG program to develop policies that facilitate the development of renewable energy generation. However, two of the counties with extensive development of renewable energy capacity in the last 10 years (i.e., Riverside and San Bernardino) also contain large areas of federal lands within the Desert Renewable Energy Conservation Plan (DRECP) area where many of these utility-scale renewable energy projects have been sited and constructed. As stated in Table 2-1, 85% of Riverside County’s solar development and 30% of San Bernardino County’s solar development are located on the federal lands of the BLM, which are not within the counties’ jurisdictions. These projects have been implemented in designated DFAs, which is a federal land designation for renewable energy development in the California desert under the DRECP.

Imperial County saw substantial solar development from 2011 to 2015 when it permitted photovoltaic (PV) projects in agricultural zones (Imperial County, 2023). Solar developers prefer agricultural areas due to their large parcel sizes, relatively flat terrain, proximity to transmission lines, and remoteness from sensitive populations (Imperial County, 2023). Prior to Imperial County’s adoption of its Renewable Energy Overlay, the County had approved and constructed 538 MW of solar PV. Since the 2015 adoption of the Renewable Energy Overlay that excludes agricultural zones, Imperial County approved 620 MW of solar PV within the overlay. However, Imperial County has continued to approve solar PV development outside of the Renewable Energy Overlay, and the County reported that 5.1% (27,532 acres) of the County’s solar and/or BESS development (operational, approved, or in entitlement) is located within agricultural zones (Imperial County, 2025). In December 2025, the Imperial County Board of Supervisors approved a one-year moratorium that would limit the total conversion of agricultural zoned land for solar and/or BESS development to a 7% cap (Imperial County, 2025). During the moratorium, the County will conduct a study of agricultural demand, market forces, water availability, and economic impacts to determine whether a permanent cap or moratorium is warranted to protect the County’s agricultural resources from further conversion (Imperial County, 2025).

As shown in Table 2-1, San Luis Obispo County and Ventura County currently have the least renewable energy capacity of the six counties. San Luis Obispo and Ventura Counties face limitations on utility-scale development due to limited resource potential for solar and wind. While San Luis Obispo County has developed a “RE Combining Designation” as part of its Renewable Energy Streamlining Program, only one 150 MW utility-scale solar project has been approved since the County’s adoption of this RE Combining Designation. Ventura County is currently developing its siting requirements and standards for solar PV and BESS and has adopted an ordinance to restrict the total acreage of BESS projects to 100 acres within agricultural and open space zones. To date, Ventura County approved one 20-acre BESS project within an agricultural zone. Per the County’s BESS zoning restrictions, only an additional 80 acres of BESS facilities could be permitted by the County within an open space or agricultural zone.

There are a number of key takeaways from this overview of installed renewable generation capacity in other counties. Five of the six counties listed in Table 2-1 developed a renewable energy policy framework during their participation in the RECPG Program from 2013 to 2016, yet much of the renewable energy capacity was developed prior to the adoption of a new or updated renewable energy policy framework. This shift in development patterns may be due to fewer viable renewable energy sites alongside the new economic and/or logistical barriers created by the renewable energy policy. In all instances, it appears that the development of renewable energy policies aligned with a shift in renewable energy development patterns. While local ordinances that restrict renewable energy development may have introduced new economic and logistical barriers, development appears to have been facilitated, and therefore preferred, in the federal Development Focus Areas designated by the U.S. Bureau of Land Management's Desert Renewable Energy Conservation Plan. Overall, it appears that specific renewable energy policies are one of multiple contributing factors to the total renewable energy capacity currently developed within each county.

Several factors influence development of renewable energy generation in the southern California region, including:

- Resource Potential and Suitable Land – Utility-scale renewable energy development requires abundant land with sufficient solar radiation or mean wind speed conducive to large-scale generation, and requires suitable terrain (i.e., less than 5-degree slope for solar technologies).
- Federal Jurisdiction – The vast majority of southern California's wind and solar resource potential is located on lands under federal jurisdiction in the California desert. The DRECP was adopted by the BLM in 2016 and currently provides a regulatory mechanism for siting and permitting utility-scale renewable energy on BLM lands within the California desert.
- Compatibility with State Planning – State agencies (i.e., California Independent System Operator [CAISO], California Public Utilities Commission [CPUC], and CEC) are responsible for energy resource planning Statewide, as well as transmission planning to identify needed system upgrades and expansions. CAISO also regulates the transmission interconnection process for new generation.
- Power Purchase Agreements – In order for any new energy project (including energy storage) to be financially viable, the developer must secure a power purchase agreement (PPA) that provides for a long-term source of revenue for the project's electricity generation. The developer must show proof of this PPA as part of CAISO's interconnection application process to be connected to the Statewide transmission grid.

Counties with the largest renewable energy capacity can attribute this development to suitable resource potential, particularly on federal lands, and the compatibility of utility-scale projects with Statewide transmission planning efforts that allow developers to secure needed PPAs for their generation.

## 2.2 Policy Analysis

A key aspect of the REO Update, per the Board motions, is to consider revisions to current planning and zoning requirements to guide the development of utility-scale renewable energy and energy storage projects. The following sections provide an overview of the current renewable energy generation mix and capacity in the County of Los Angeles, State agency projections of future renewable energy capacity for the Los Angeles County region, and the alignment of the County of Los Angeles's planning goals with the State's regional projections.

### 2.2.1 Current Renewable Energy Mix

A first step in planning for future renewable energy development is to evaluate the status of existing renewable energy generation. In 2023, the renewable energy generation mix for Los Angeles County (incorporated and unincorporated) included a total capacity of 1,940 megawatts (MW) from utility-scale renewable energy resources, with a total generation of 4,117.6 gigawatt-hours (GWh). The breakdown of these renewable energy resources is listed in Table 2-2.

**Table 2-2 Los Angeles County Utility-Scale Renewable Energy Resources, 2023**

Utility-Scale Renewable Resource <sup>1,2</sup>	Generation (MWh) <sup>3</sup>	Percent of Total RE Generation in County	Capacity (MW) <sup>3</sup>	Percent of Total RE Capacity in County
Solar Photovoltaic	2,914,493	70.8%	1,537	79.2%
Biomass	699,325	17%	187	9.6%
Small Hydroelectric	499,571	12.1%	215	11.1%
Wind	4,222	0.1%	2	0.1%

Notes:

- 1 – The California Energy Commission (CEC) data presented in this table includes utility-scale power plants only (defined by CEC as 1 MW and above). Any generating facilities that are below 1 MW are not included in the CEC’s calculations.
  - 2 – The renewable energy technologies included in the table are consistent with the definition of a “Renewable Electrical Generation Facility” per California Public Resources Code (PRC) Section 25741(a)(1). Per PRC Section 25741(a)(1), small hydroelectric generation is defined as 30 MW or less. While geothermal and solar thermal are also included in the CEC’s list of renewable energy technologies, they do not appear in the table as neither technology has been developed at a utility-scale in Los Angeles County.
  - 3 – Data includes all energy generation and capacity data within unincorporated and incorporated areas of Los Angeles County.
- Source: CEC, 2024a, 2024b

As shown in Table 2-2, solar PV energy accounts for the majority of utility-scale renewable generation in Los Angeles County. Biomass and small hydroelectric energy account for moderate percentages of renewable generation (17% and 12.1%, respectively), while wind energy accounts for a negligible amount of renewable generation (less than 1%).

Table 2-3 shows the capacity of BESS currently installed throughout Los Angeles County (incorporated and unincorporated), as reported by each of the electric utilities listed in the table. As of July 2025, there was nearly 1,254 MW of BESS capacity installed in the County.

**Table 2-3 Los Angeles County BESS Capacity, 2025 1,2**

Utility	Residential Capacity	Commercial Capacity	Industrial Capacity	Total Capacity
Southern California Edison (SCE)	211 MW	119 MW	811 MW	1,141 MW
City of Los Angeles Department of Water and Power (LADWP)	92 MW	14 MW	none reported	106 MW
City of Burbank Water and Power	0.7 MW	none reported	none reported	0.7 MW
City of Glendale Water and Power	2 MW	2 MW	none reported	4 MW
City of Pasadena Water and Power	2 MW	0.01 MW	none reported	2 MW
<b>Countywide Capacity</b>				<b>1,253.7 MW</b>

Notes:

- 1 – BESS capacity data was obtained from CEC’s survey of all utilities in California. Data represents capacity of installed energy storage systems within unincorporated and incorporated areas of Los Angeles County.
  - 2 – BESS capacity data is provided for 3 customer sectors: (1) Residential sector is defined as single- and multi-family residences; (2) Commercial sector is defined as businesses and organizations that provide a good or service such as office buildings, retail stores, restaurants, hotels, and warehouses; (3) Industrial sector is defined as facilities and equipment used for manufacturing, mining, construction, and utilities.
- Source: CEC, 2025a

## 2.2.2 Future Renewable Energy Mix

The extent to which future renewable energy generation is developed in the County of Los Angeles will be largely determined by the resource potential and limitations for specific renewable energy technologies, as well as the availability of developable areas that are within the County’s jurisdiction. For example, it is not likely that the County will see an expansion of biomass energy, small hydroelectric generation, and wind generation due to the following considerations that limit the development of these technologies:

- **Biomass** – Biomass energy is created through combustion of biofuel (e.g., plant material) or biogas (e.g., methane produced from landfills or sewage treatment plants) which produces carbon dioxide. Biomass energy is not a zero-carbon source of electricity. However, the County’s 2045 CAP has identified biogas collection as an opportunity to improve waste conversion at existing County wastewater treatment plants and solid waste facilities (Los Angeles County, 2024a). 2045 CAP Implementing Measure W2.3 instructs the County to utilize any available anaerobic digestion capacity at existing County waste treatment facilities to maximize their collection of biogas for use as a vehicle fuel, to produce biomethane, or to generate electricity (through combustion). While implementation of CAP Measure W2.3 may contribute to a small increase in captured biogas, collection equipment has already been installed at seven waste treatment facilities within the County (CEC, 2025b). Maximizing the capacity of this existing collection equipment would not likely contribute a notable increase in renewable energy generation from biogas. Furthermore, as a source of carbon dioxide emissions, any increase in biomass energy would not serve to meet the County’s zero carbon energy goals.
- **Small Hydroelectric** – Small hydroelectric power is site specific as it must be constructed along a canal, river, or dam. Annual hydroelectric generation is also susceptible to changes in water supply, with periods of drought contributing to a decrease in generation. While the U.S. Department of Energy recently approved funding for 39 hydroelectric projects in California, this funding was specific to improving dam safety and grid resiliency for existing facilities (DOE, 2025a). There are currently 17 small hydroelectric generation sites within Los Angeles County (i.e., unincorporated and incorporated areas) that are operated by the California Department of Water Resources (DWR), Metropolitan Water District of Southern California (Metropolitan), Los Angeles County Flood Control District, San Gabriel Valley Municipal Water District, LADWP, and City of Pasadena Water and Power Department (CEC, 2025b). The development of new hydroelectric power facilities in Los Angeles County is unlikely given numerous hurdles such as a lengthy permitting and licensing approval process with the Federal Energy Regulatory Commission (i.e., minimum six years), as well as the uncertainty of future drought (Levine et al. 2021).
- **Wind** – The siting and development of a wind energy facility relies on wind speed, meteorological patterns and terrain. California’s Wind Resource Areas represent regions containing many operational commercial wind generation facilities, which are located in areas with favorable conditions for wind turbines.<sup>2</sup> There are no Wind Resource Areas located within unincorporated Los Angeles County (CEC, 2023b). The nearest Wind Resource Areas are located north of Los Angeles County in the upper Tehachapi region, and east of Los Angeles County in the San Gorgonio region (CEC, 2023b) Unincorporated Los Angeles County contains a single wind facility located at the California Department of Corrections and Rehabilitation (CDCR) Correctional Training Facility, which accounts for the wind

<sup>2</sup> Wind Resource Areas in California represent regions with many operational commercial wind electric generation plants. Wind Resource Areas were identified by the California Energy Commission using Geographic Information Systems (GIS) technology to find concentrations of operational wind electric generation plants with a generation capacity of 2 MW or larger and within 15 miles of each other. These regions were further expanded 5 additional miles to account for possible future projects in the same areas (CEC, 2023b).

generation identified in Table 2-2. Wind resource potential in Los Angeles County is further discussed in Section 4.1.2.

To forecast the future of other technologies in the County of Los Angeles (i.e., solar PV, energy storage, green hydrogen), it is important to understand the State's role in planning and facilitating renewable energy generation and storage development throughout California. Under Senate Bill (SB) 100,<sup>3</sup> there are three State agencies (CEC, CPUC, and California Air Resources Board) that are required to report to the State Legislature every four years on the various pathways to achieve the State's zero-carbon electricity procurement goals, and to document the progress made in reaching those goals. SB 100 also mandates that State agencies such as CAISO must incorporate the SB 100 procurement goals into all relevant transmission planning.

As part of the Statewide planning effort to meet SB 100 targets, the CEC, CPUC, and CAISO have conducted extensive analyses of the opportunities and constraints of renewable energy development and transmission needs for specific renewable resource areas throughout California. These Statewide studies include load assumptions (i.e., amount of electricity on the transmission grid at a given time) and technology assumptions to forecast future renewable development scenarios and the subsequent long-term transmission grid requirements. Based on resource modeling, which incorporates maximum potential for renewable energy development in specific resources areas, the Statewide studies provide future projections on total capacity of each renewable resource needed to meet the SB 100 targets. The projections of future renewable generation capacity are grouped into study areas based on transmission constraints and renewable energy resource regions. Energy developers need to consider these transmission planning projections when identifying locations to propose a new generation or storage project.

Of particular relevance to the County of Los Angeles's renewable energy planning is CAISO's 20-Year Transmission Outlook. The 20-Year Transmission Outlook evaluates renewable energy and storage capacity data for specific transmission zones and uses a model to forecast new capacity required to meet the SB 100 target by 2045. This CAISO study separates Los Angeles County<sup>4</sup> into three distinct renewable energy resource regions: (1) "Greater Tehachapi," which includes the Antelope Valley and portions of Kern County and Tulare County; (2) "Greater Kramer," which includes the northeastern corner of Los Angeles County, with the majority of the region extending across San Bernardino County, Kern County, Tulare County, Inyo County, and Mono County; and (3) "Greater LA," which includes Los Angeles County areas south of Antelope Valley, and portions of Orange County and northwestern San Diego County. Figure 2-1 illustrates the portions of Los Angeles County contained within these resource regions.

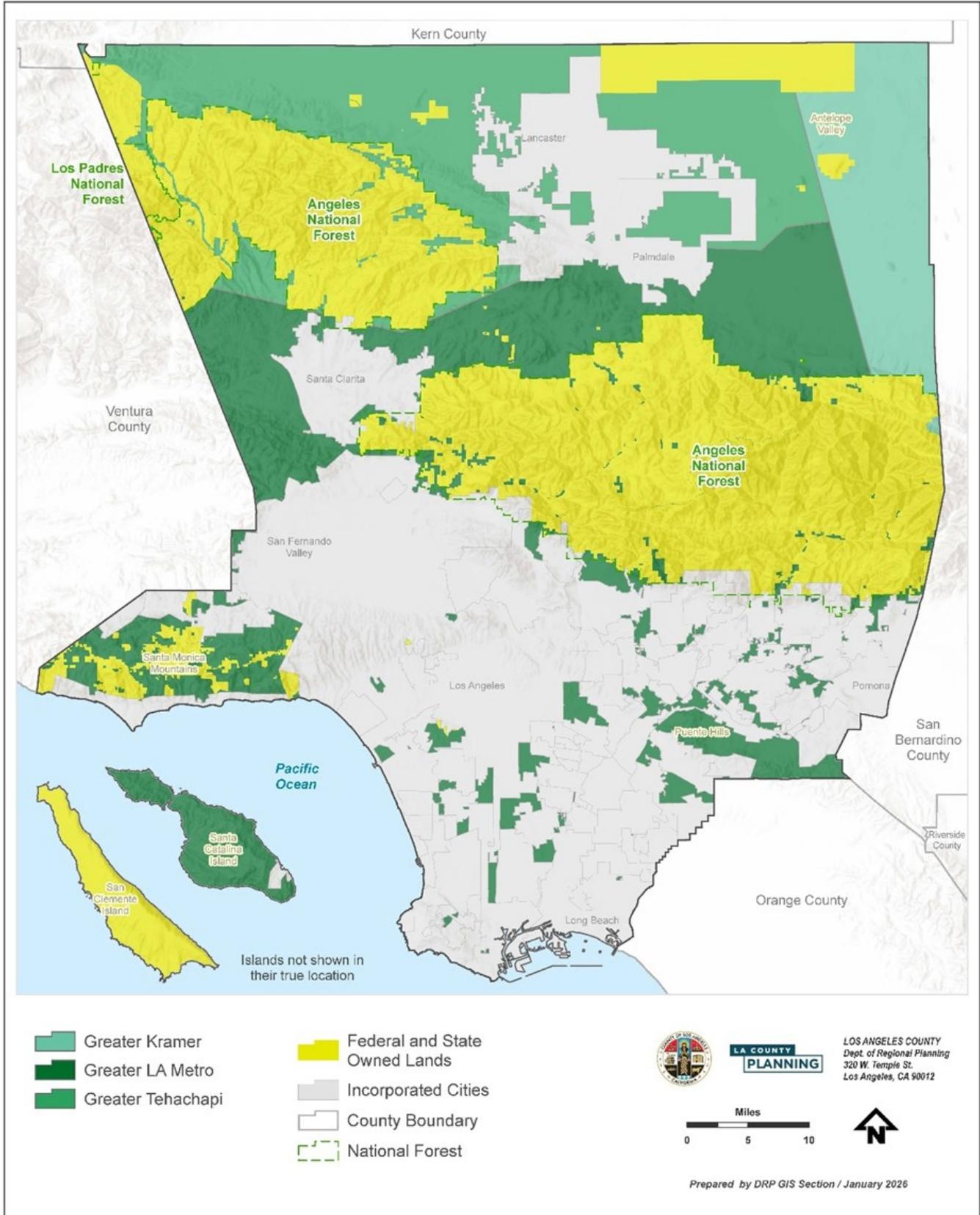
The 20-Year Transmission Outlook uses resource modeling to calculate the new resource capacity for renewable energy and storage technologies within each of the renewable resource regions for the year 2045. Table 2-4 provides this data for the three renewable resource regions that contain Los Angeles County (i.e., Greater Tehachapi, Greater Kramer, and Greater LA). It should be noted that all three regions contain portions of other counties. The Greater LA region contains the majority of unincorporated Los Angeles County, while the Greater Tehachapi region contains the majority of the Antelope Valley (see Figure 2-1). The Greater Kramer region contains the smallest acreage of unincorporated Los Angeles County. Refer to the table notes in Table 2-4 for further information on the substations that are included within each of the renewable resource regions.

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<sup>3</sup> SB 100 (Senate Bill 100, De León, Chapter 312, Statutes of 2018) establishes a policy that renewable and zero-carbon resources supply 60% of California's retail sales and electricity procured to serve all state agencies by 2030, and 100% by 2045.

<sup>4</sup> The CAISO 20-Year Transmission Outlook does not distinguish between unincorporated and incorporated areas. Data presented for the Greater Tehachapi and Greater LA transmission zones include unincorporated and incorporated areas.

Figure 2-1: Renewable Energy Resource Regions



**Table 2-4 CAISO’s Projected Energy Technology Capacity to meet SB 100 Targets (Year 2045)**

Renewable Resource Region <sup>1</sup>	Technology <sup>2</sup>	New capacity to be developed
Greater Tehachapi (Includes approximately 582,680.13 acres of unincorporated LA County)	Utility-Scale Solar	8,978 MW
	Utility-Scale Wind	345 MW
	Lithium-ion BESS	6,339 MW
	Long Duration Energy Storage (LDES)	1,000 MW
Greater Kramer (Includes approximately 165,547.11 acres of unincorporated LA County)	Utility-Scale Solar	3,460 MW
	Utility-Scale Wind	0 MW
	Lithium-ion BESS	1,884 MW
	LDES	0 MW
Greater LA Metro (Includes approximately 925,362.02 acres of unincorporated LA County)	Utility-Scale Solar	0
	Utility-Scale Wind	0
	Lithium-ion BESS	2,527 MW
	LDES	0

Notes:

1 – The renewable resource regions have been defined in the CAISO 20-Year Transmission Outlook to include the following substations:

*Greater Tehachapi Substations-* Antelope, Bailey, Highwind, Pardee, Pastoria, Saugus, Vincent, Whirlwind, Windhub

*Greater Kramer Substations-* Calcite, Control, Coolwater, Inyo, Inyokern, Kramer, Lugo, Pisgah, Ransburg, Roadway, Victor

*Greater LA Substations-* Alamos, Arcogen, Barre, Capistrano, Center, Chevmain, Chino, Del Amo, Eagle Rock, El Nido, El Segundo, Ellis, Etiwanda, Goodrich, Gould, Harboren, Hinson, Huntington Beach, Johanna, La Cienega, La Fresa, Laguna Bell, Lewis, Lighthipe, Long Beach, Mesa, Mira Loma, Olinda, Padua, Rancho Vista, Redondo, Rio Hondo, San Onofre, Santiago, Serrano, Sylmar, Talega, Trabuco, Viejo, Villa Park, Walnut

2 – Table 2-4 only lists the technology types that were selected by the CAISO’s study model to have capacity in the Greater Tehachapi, Greater Kramer, and Greater LA renewable resource regions for 2045.

Source: CAISO, 2024; CEC, 2023a; CPUC, 2023

As shown in Table 2-4, CAISO’s 2045 capacity projections for new renewable energy technologies indicate that each of the renewable resource regions containing a portion of the County of Los Angeles are suited for different renewable technology types and generation capacity. The Greater Tehachapi region, which includes the Antelope Valley as well as portions of Kern County and Tulare County, could contribute toward the following renewable energy generation and storage capacity need:

- Extensive development of utility-scale solar (close to 9,000 MW)
- Extensive development of lithium-ion BESS (over 6,000 MW)
- Substantial development of LDES<sup>5</sup> (1,000 MW)
- Modest development of utility-scale wind (less than 400 MW)

The Greater Kramer region, which includes only a small area of unincorporated Los Angeles County (northeastern corner) with the remaining region extending into San Bernardino, Kern, Tulare, Inyo, and Mono counties, could contribute toward the following renewable energy generation and storage capacity need:

- Substantial development of utility-scale solar (close to 3,500 MW)
- Substantial development of lithium-ion BESS (close to 1,900 MW)

<sup>5</sup> Long-duration energy storage (LDES) is defined as an energy storage technology with eight hours or longer of energy generation at maximum output. Lithium-ion BESS typically have a discharge duration of up to 4 hours (CEC, 2024h).

The Greater LA region, which includes the majority of unincorporated County areas south of the Antelope Valley, as well as portions of Orange County and San Diego County, could contribute toward the following renewable energy and storage capacity needs:

- Substantial development of lithium-ion BESS (over 2,500 MW)

According to CAISO’s 20-Year Transmission Outlook, future utility-scale solar development is projected to occur in the high desert regions north and east of Los Angeles County. There is no projected new capacity for utility-scale solar or utility-scale wind in the Greater LA resource region. This is due to insufficient resource potential in this region to support these technologies at a utility scale. While Los Angeles County could accommodate substantial development of new lithium-ion BESS, the 20-Year Transmission Outlook does not forecast any LDES in the Greater LA region. When selecting suitable sites for LDES, CAISO’s resource modeling avoids sites in populated areas and selects sites in unpopulated areas near a renewable generation resource (CAISO, 2024). According to CAISO’s resource modeling, suitable sites for LDES would be located near utility-scale solar and wind resource areas in the upper Tehachapi region and in the California desert region (CAISO, 2024).

### Current Project Applications

Consistent with CAISO’s 20-Year Transmission Outlook, there are a few energy storage projects that are proposed in unincorporated Los Angeles County that are still in the initial planning stages. There is also a proposal for a hydrogen production facility, which is not a traditional energy technology studied under the CAISO’s 20-Year Transmission Outlook. Below is information currently available for these projects.

**Solar PV.** Prior to the 2016 adoption of the REO, LA County Planning received applications for 29 utility-scale solar PV projects and approved 12 projects, totaling approximately 660 MW. Since the REO adoption in 2016, LA County Planning has received 16 applications for utility-scale solar PV projects and approved five projects, totaling approximately 132 MW. Eight applications for utility-scale solar PV projects, totaling approximately 375 MW, are currently under review. All projects, approved and proposed, are in the Antelope Valley.

**Energy Storage Facilities.** To date, LA County Planning has received 18 applications for battery energy storage projects that would be either co-located with renewable energy generation, or would be a stand-alone energy storage system. Eight BESS projects totaling approximately 670 MW have been approved, of which three projects totaling approximately 220 MW have been built and are in operation. Eight BESS applications are currently under review by LA County Planning. Additionally, one stand-alone BESS project with a proposed 1,150 MW capacity is proposed in unincorporated LA County (i.e., Antelope Valley), but is subject to the licensing authority of the California Energy Commission under the AB 205 opt-in process.<sup>6</sup>

**Hydrogen Facilities.** In December 2023, LA County Planning received its first application for a hydrogen production facility in the Antelope Valley (i.e., Antelope Valley Hydrogen 1) (Los Angeles County, 2025c). Future proposals for hydrogen production facilities may occur as part of the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), which is a private-public partnership (i.e., a limited liability company or LLC) that was awarded funding from the U.S. Department of Energy (DOE) to build a hydrogen hub<sup>7</sup> in California (Mitchell, 2024). ARCHES intends to use this funding to support the construction of 10 hydrogen production sites and 60 hydrogen fueling stations (ARCHES, 2024). ARCHES anticipates that future hydrogen production facilities would be sited primarily in California’s Central Valley, which has access to utility-scale solar generation necessary to support green hydrogen production (ARCHES, 2023). However,

<sup>6</sup> AB 205 allows developers to opt in to a streamlined environmental review and authorization process, which is under exclusive State jurisdiction. Under AB 205, licensing authority for eligible projects has been granted to the CEC.

<sup>7</sup> A hydrogen hub is a network of hydrogen production plants, distribution pipelines, and end use customers (e.g., fueling stations, power plants).

there have been proposed federal cuts to DOE’s Hydrogen Hubs Program, which would specifically include funding cuts to ARCHES (Smith, 2025). Currently there is uncertainty as to the future of hydrogen projects under ARCHES given the potential loss of federal funding.

LA County Planning is currently reviewing one application for a green hydrogen production facility that would be co-located with a solar PV project. In thinking about County of Los Angeles REO, renewable energy projects are defined to include small and utility scale solar energy systems, meteorological towers and small-scale wind energy systems. For a hydrogen production facility to be considered a renewable energy project, the energy demand necessary to produce hydrogen must be met by renewable energy sources. As such, not all hydrogen production from renewable sources as discussed in California Senate Bill 1505, would qualify for review under the REO.

### 2.2.3 Alignment of LA County Planning Goals

Given the available studies and Statewide planning efforts to move California toward its 100% renewable energy goals by 2045, the County should consider whether its renewable energy implementation goals align with regional data projections. To provide context of the County’s renewable energy measures recently adopted in its CAP, Table 2-5 lists these measures and implementing actions relevant to renewable energy supply.

**Table 2-5 2045 Los Angeles County Climate Action Plan: Renewable Energy Measures**

Measure	Implementing Action
ES2: Procure Zero-Carbon Electricity	ES2.1: Transition all County facilities within unincorporated areas to Clean Power Alliance’s (CPA) 100% Green Power option, Southern California Edison’s (SCE) 100% Green Rate option, or other available 100% renewable electricity service.
	ES2.2: Complete enrollment of the community in CPA’s 100% Green Power option or SCE’s Green Rate option
ES3: Increase Renewable Energy Production	ES3.1: Require rooftop solar PV for all new development
	ES3.2: Install rooftop solar PV at existing buildings
	ES3.3: Identify and install solar PV systems at existing viable County facilities and properties
	ES3.4: Explore the feasibility to install community-shared solar facilities on County properties where opportunities exist
	ES3.5: Require and incentivize renewable energy for affordable housing developments for both new development and existing buildings
	ES3.6: Streamline and prioritize permitting for solar and battery storage projects

Source: Los Angeles County, 2024a

As shown in Table 2-5, the CAP implementing actions for reaching a zero-carbon energy supply are centered on three themes:

- **Green Power Programs.** CAP Implementing Actions ES2.1 and ES2.2 discuss participation in green power programs through the Clean Power Alliance (CPA) and Southern California Edison’s (SCE) Green Rate program. CPA currently offers three tiers of renewable or zero carbon electricity for its residential and commercial customers: 40% renewable, 50% renewable, or 100% renewable (CPA, 2025a). SCE is no longer accepting new enrollment in its Green Rate program due to a lack of capacity to meet enrollment demand (SCE, 2025).

- **Distributed Generation.** CAP Implementing Actions ES3.1 through ES3.5 require extensive rooftop solar or community solar/microgrid development. Implementation of ES3.1 through ES3.5 would result in the installation of rooftop solar PV on all existing and new single-family and multi-family residences, and all existing and new commercial buildings.
- **Solar Generation and Battery Storage.** CAP Implementing Actions ES3.1 through ES3.6 are focused entirely on solar PV power generation and battery storage as the recommended tools to meet the County’s zero carbon energy procurement goals. Implementation of ES3.3 would also result in the installation of 20 MW of new solar PV at County facilities by 2030. Solar PV facilities are typically considered small-scale (e.g., community solar) if they are 20 MW or less, while utility-scale solar facilities are generally larger than 20 MW (NREL, 2013).<sup>8</sup>

The County’s renewable energy development strategies and measures, as documented in its CAP, are primarily focused on solar PV generation and battery storage technologies, as well as participation in green power programs. Because green power programs procure renewable electricity from generation sources outside of Los Angeles County, they provide the County with flexibility in meeting its 100% renewable electricity procurement targets. Furthermore, the CAP’s focus on developing solar generation and battery storage within the County is generally consistent with the recent Statewide and regional studies that have been prepared by CAISO, CEC, and CPUC.

#### 2.2.4 Additional Planning Considerations for the County of Los Angeles

While the County’s REO Update will guide the development (i.e., siting and permitting) of new renewable energy generation and storage projects, there are a number of variables that are outside of the County’s control and can affect implementation of local renewable energy policies. The following is a list of additional planning considerations for the County of Los Angeles.

**Infrastructure Constraints.** Renewable energy projects have been challenged by a lack of existing infrastructure, in particular electric transmission (at high voltages), distribution, or substations. Future projects may require upgrades to the transmission system depending on the size, generation output, or energy storage capacity of a facility, and depending on the location of interconnection to the electric grid. The energy grid within Los Angeles County consists of a high-voltage transmission network (70 kV or higher) that is operated by SCE (as regulated by the CPUC) or LADWP, and guided by the CAISO (i.e., the State’s power balancing agency). SCE’s subtransmission network of 115 kV to 230 kV transmits electricity from the major high-voltage transmission system to regional distribution substations. The distribution network (up to 33 kV) includes the remainder of the system that transmits electricity to the end user. It should be noted that while the County can plan for and facilitate electric system interconnection, it cannot mandate its development given that SCE is an investor-owned utility (IOU) under the jurisdiction of the CPUC, and LADWP is a self-governed municipal utility.

**Lengthy Interconnection Processes.** A project developer must navigate CAISO’s generation interconnection planning process to connect to the transmission grid. Utilities have a similar process for connecting a new generation project to their distribution grid. Proposed generation projects often experience long wait times within the interconnection queue. For example, projects that were constructed in 2023 spent an average of five years in CAISO’s interconnection planning process. Currently there is approximately 523 GW of proposed generation (conventional and renewable) and energy storage capacity seeking CAISO interconnection approval (LBNL, 2024).

<sup>8</sup> One megawatt of electricity generally provides enough power to meet the demand of approximately 750 homes. The amount of electricity consumed by a typical residential household can vary due to home size and the number and types of appliances.

**Availability of Green Power Programs.** While CPA continues to enroll new customers in its green power programs, it must also continue to solicit new projects to meet its portfolio needs. CPA accepted new proposals for renewable generation contracts in mid-2025 and is expected to enter into power purchase agreements in the first quarter of 2026 (CPA, 2025b). CPA’s eligible renewable generation projects must meet various CPUC Procurement Orders that include requirements for mid-term reliability (i.e., minimum annual capacity factor of 80%)<sup>9</sup> and resource adequacy (i.e., minimum generation size of 5 MW) (CPA, 2025b). As discussed earlier, SCE has currently halted enrollment in its Green Rate program due to the lack of available generation capacity. While SCE is soliciting new renewable energy procurement offers to support its Green Rate program, eligible projects must meet minimum generation size requirements (i.e., 100 MW) and interconnection status (i.e., CAISO Phase 1 study or equivalent)<sup>10</sup> to facilitate SCE with meeting its large procurement target (SCE, 2024).<sup>11</sup>

**State Programs and Requirements.** These are state requirements and are therefore outside the scope of the REO and the County’s permitting process.

- **Energy Code.** The California Energy Commission’s Building Energy Efficiency Standards (Energy Code) include requirements for solar photovoltaic (PV) systems, solar-ready design, BESS, and BESS-ready infrastructure. The Energy Code requires a solar PV system for all newly constructed buildings apart from certain exceptions. The Energy Code requires BESS for newly constructed non-residential and high-rise multifamily buildings, and newly constructed single-family homes must meet BESS-ready requirements to allow for a more cost-effective installation of BESS in the future.
- **AB 205 Opt-In Projects.** Under the State’s AB 205 Opt-In program, developers with an eligible clean energy project can choose to bypass the local jurisdictional permitting process to submit an application for a streamlined environmental review and permitting process through the CEC. The Opt-In program includes specific application requirements, including a community benefits agreement, project labor agreements, and a determination of economic benefits to the local community.<sup>12</sup> Since the Opt-in program began in 2022, a number of developers who faced opposition to an eligible clean energy project at the local planning level have withdrawn those applications to resubmit through the CEC’s Opt-In process. Local jurisdictions are able to submit comments to the CEC on a proposed Opt-In project, but they do not retain discretionary permitting authority over the project’s approval. Currently, there are eight active opt-in applications under CEC review (CEC, 2025c), one of those applications being in unincorporated Los Angeles County.

Chapter 4, Renewable Energy Development Considerations, will further address these variables, and discuss strategies and best practices that can be implemented by the County to better plan for new renewable energy and storage development.

<sup>9</sup> Annual capacity factor is the ratio of a power plant’s actual energy production to its maximum possible energy production in one year. An 80% annual capacity factor indicates that a power plant produced 80% of its maximum possible electrical energy over the course of a year.

<sup>10</sup> New generation and storage projects interested in interconnecting to the CAISO controlled grid must complete an interconnection study with CAISO. The interconnection study evaluates Interconnection Request Applications and identifies generation and storage projects that meet CAISO requirements for commercial interest, project viability, and system need (CAISO, 2025a). This initial study process is referred to as the Phase 1 study.

<sup>11</sup> As an investor-owned utility (IOU), SCE is subject to California’s Renewables Portfolio Standard (RPS) program requirements for renewable energy procurement. Per SB 100, 60% of electricity retail sales must be served by renewable resources by 2030, and 100% of electricity retail sales must come from carbon-free resources by 2045.

<sup>12</sup> SB 254, which was approved on September 19, 2025, modified the AB 205 Opt-In program requirement that an applicant must demonstrate a project’s net positive economic benefit to the local government. Under SB 254, an eligible project is assumed to have an overall net positive economic benefit to the local government.

## CHAPTER 3 Current Conditions

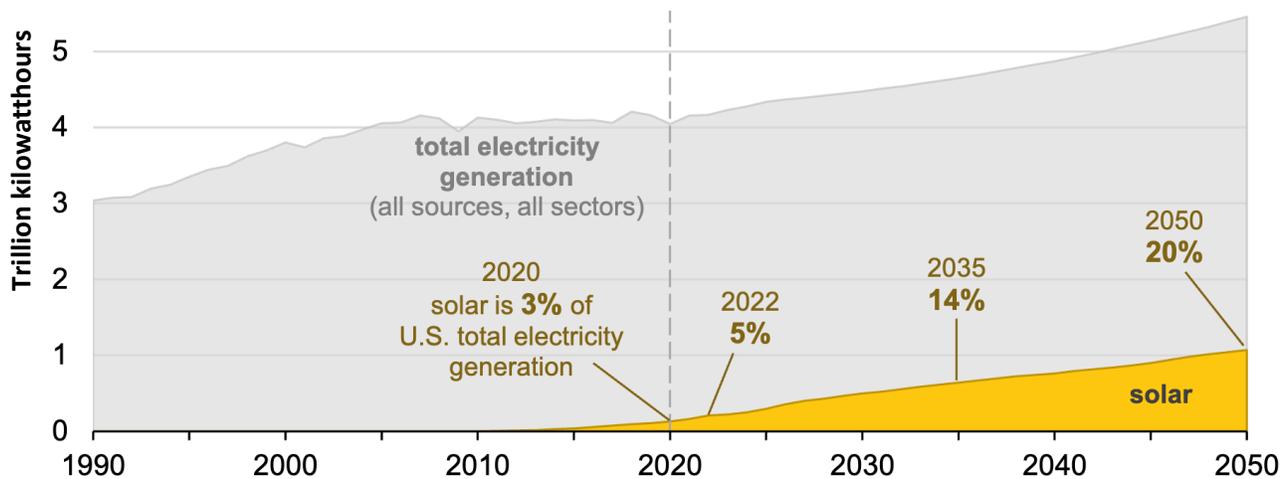
The extent to which new renewable energy development in Los Angeles County would occur under the REO update would be shaped by current market factors that affect the cost and demand for renewable energy technologies, which is addressed in this chapter. Section 3.1 describes the market demand for renewable energy technologies. Section 3.2 summarizes the anticipated economic effects of developing new renewable energy and storage projects in Los Angeles County. Section 3.3 addresses the current state of funding opportunities for renewable energy development and the implications of future financial markets.

### 3.1 Market Trends

#### 3.1.1 Utility-Scale Solar PV

The market for utility-scale solar PV in the United States is experiencing rapid growth. California is a leader in solar energy adoption, owing to its ambitious clean energy goals and abundant solar resources. Across the United States, solar generation accounted for 3% of electricity production in 2020 and is projected to account for 20% of electricity production by 2050, as shown in Figure 3-1 (EIA, 2021).

**Figure 3-1 Annual U.S. Electricity Net Generation from All Sources, 1990-2050**



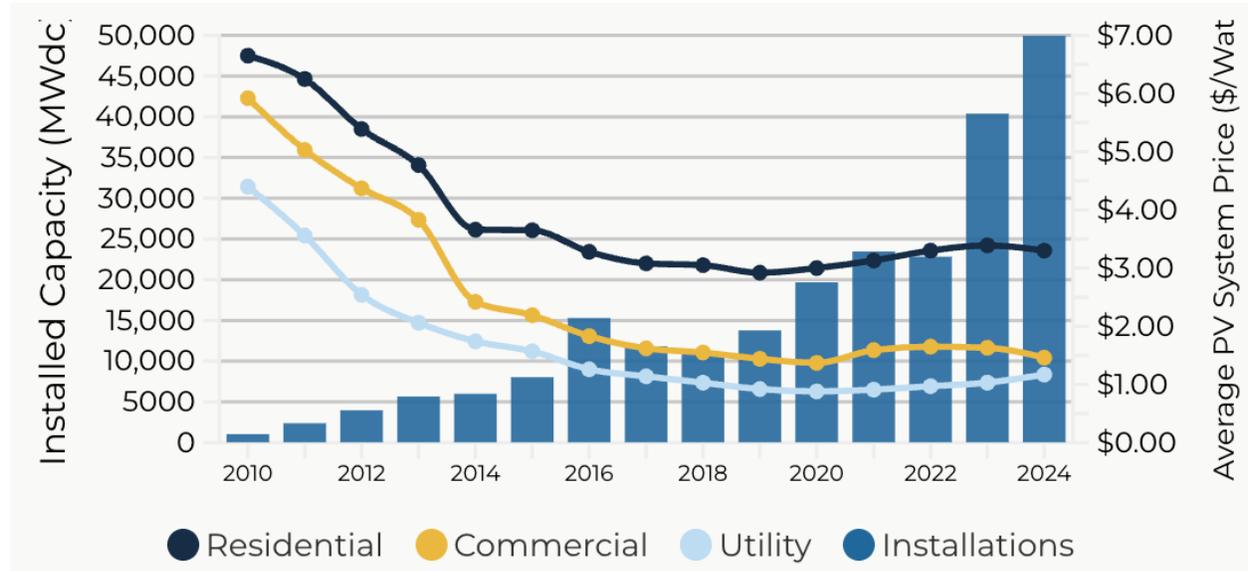
Source: EIA, 2021

Ongoing demand for utility-scale solar PV is driven by state policies, such as Renewables Portfolio Standards (RPS) or Clean Electricity Standards. A total of 29 states, as well as the District of Columbia, have adopted an RPS that mandates a range of renewable energy procurement targets from a minimum of 50% up to 100% (Barbose, 2024). A total of 16 states have also adopted Clean Electricity Standards that often strengthen or supplement existing RPS targets (Barbose, 2024). As discussed earlier in Section 2.1.1, California's RPS targets have been expanded since its initial enactment in 2002 to currently require 100% of retail electricity sales to be generated from eligible renewable energy sources by 2045.

Demand for utility-scale solar PV is also driven by the increasing cost competitiveness of solar (EIA, 2022). The cost to install solar PV has dropped by nearly 40% over the last decade (see Figure 3-2), which has allowed solar PV to be price competitive with other forms of generation (SEIA, 2024). As shown in Figure 3-2, utility-scale solar PV has dropped in price from an average of \$4.40/watt in 2010 to \$1.17/watt in 2024. This reduced cost in solar energy has been driven by declining production costs (e.g., cheaper

panels), advances in technology, and economies of scale that have made solar PV increasingly attractive for utilities. The trend is further supported by the increased co-location of BESS systems at utility-scale solar PV facilities, which supports the full capture of energy produced from PV systems.

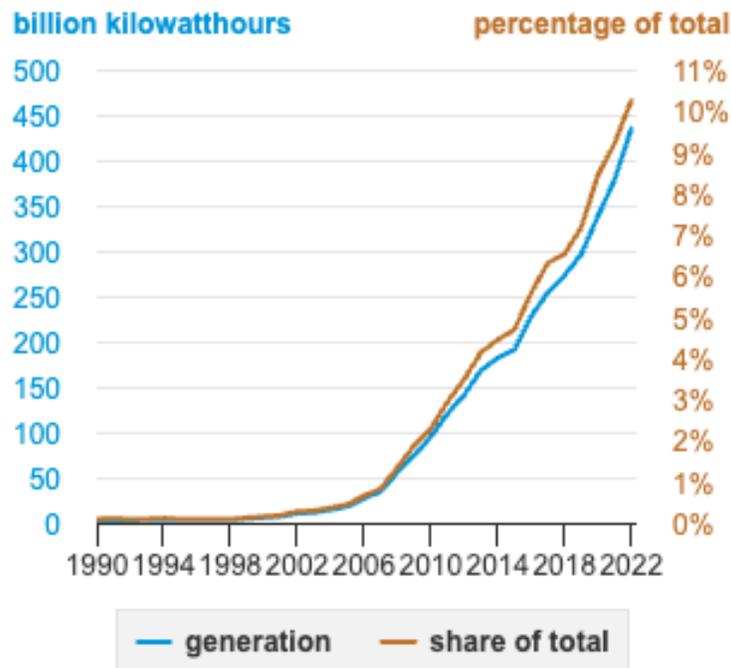
**Figure 3-2 U.S. Solar PV Pricing Trends and Deployment Growth, 2010-2024**



Source: SEIA, 2024

### 3.1.2 Utility-Scale Wind

The market for onshore wind energy in the United States has grown significantly in recent years, driven by technological advancements, lower costs, and increasing demand for clean energy driven by policy. Figure 3-3 demonstrates how wind energy production has increased since 1990, accounting for 10.25% of total U.S. energy generation in 2022 (EIA, 2023b).

**Figure 3-3 Wind Electricity Generation and Share of Total U.S. Electricity Generation, 1990-2022**

Source: EIA, 2023b

Unlike solar PV, California is not the leader in utility-scale wind energy production and is currently ranked 8<sup>th</sup> in production of wind electricity among states (Gearino, 2024). Substantial growth in onshore wind capacity has been observed in Texas, Iowa, Oklahoma, and Kansas where wind resources are abundant. The Levelized Cost of Energy<sup>13</sup> for onshore wind has fallen significantly since 2009 and is forecasted to continue falling due to savings in capital, manufacturing improvements, and operational economies of scale (NREL, 2024).

The state policies discussed under utility-scale solar PV have also driven the development of onshore wind energy. In California, the renewable energy credits produced by eligible facilities (e.g., wind energy) can be purchased by utilities to assist with meeting their RPS procurement requirements.

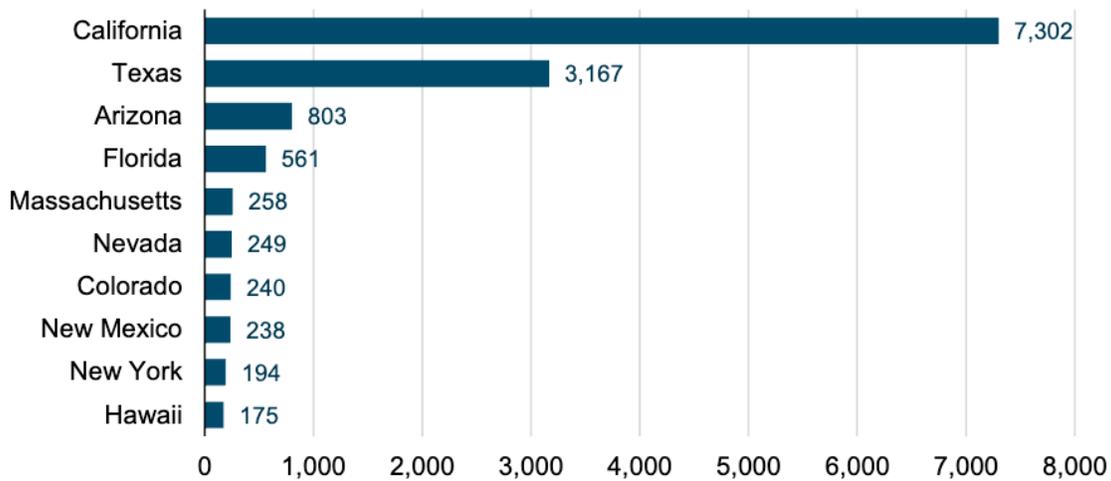
### 3.1.3 Energy Storage Systems

California is the leader in BESS deployment nationwide (see Figure 3-4). This development in energy storage has been driven by the State's renewable energy targets discussed above, as well as recent energy storage procurement policies that require investor-owned utilities to procure 1,325 MW of energy storage by 2020 (CPUC, 2025c).<sup>14</sup>

<sup>13</sup> Levelized Cost of Energy is a metric used to assess the cost of electricity generation and the total power-plant-level impact from technology design changes. It can be used to compare costs of all types of generation (NREL, 2024).

<sup>14</sup> Assembly Bill 2514 (Skinner, Stats. 2010 – Ch 469) authorized the California Public Utilities Commission to set energy storage targets for the three California investor-owned utilities (Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric).

**Figure 3-4 States Ranked by Installed Battery Capacity in Megawatts, November 2023**

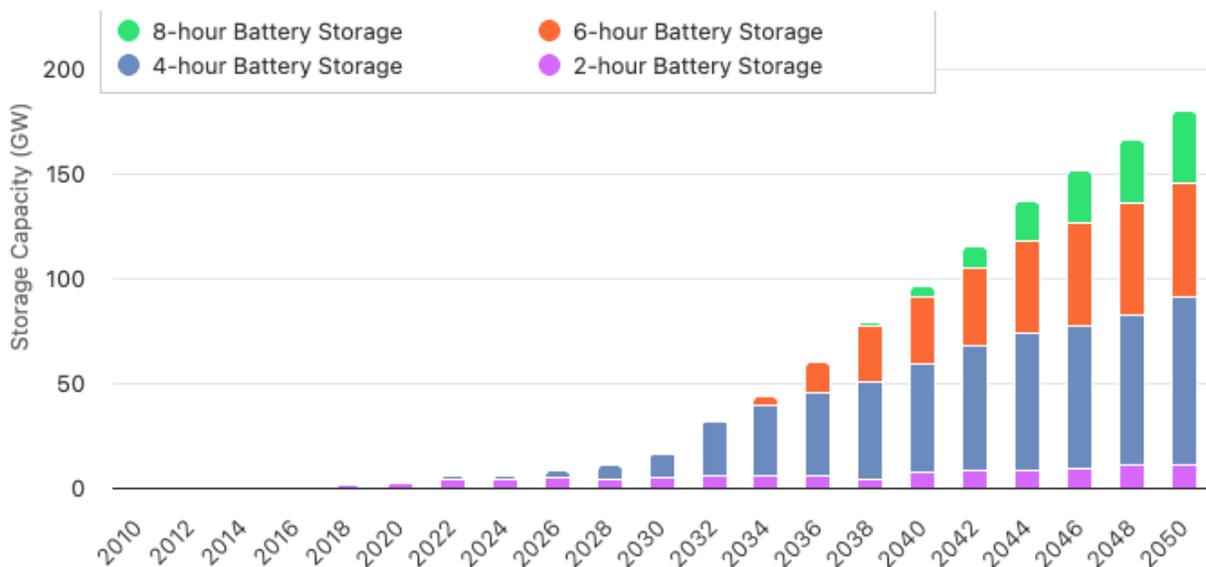


Source: EIA, 2024a

Approximately 9 GW of energy storage was added to the U.S. grid between 2010 and 2022, and the adoption of BESS is expected to grow significantly through 2050, as shown in Figure 3-5. This anticipated growth would be supported by declining battery prices, grid modernization efforts, and increases in renewable energy projects (NREL, 2022).

Currently, lithium-ion batteries are the (nearly) exclusive stationary energy storage technology being deployed for grid-scale BESS and are anticipated to remain so for the next decade. In the last few years, lithium-ion batteries have provided about 99% of new capacity (NREL, 2023a). Recently, the industry has seen an overall shift from lithium nickel manganese cobalt oxide (NMC) batteries to lithium iron phosphate (LFP) batteries due to safety concerns with NMC batteries. As discussed in Section 3.1.1, NMC batteries are not as thermally stable as LFP batteries, leading to a greater risk of thermal runaway and battery fires.

**Figure 3-5 U.S. BESS Capacity Forecasted Growth through 2050**



Source: NREL, 2022

Emerging technologies may increase their share of BESS in the United States, particularly as utilities search for storage systems that can deliver more than the current four hours of energy storage that is standard with lithium-ion batteries. There are many storage technologies under various stages of development and deployment, and it is difficult to estimate which of these technologies will achieve cost reductions at scale. For example, redox flow batteries remain a viable and emerging technology that are suitable for individual industrial uses (e.g., business or hospital). However, they are not yet comparable to lithium-ion batteries for energy density and production.

### 3.1.4 Hydrogen Production

The CEC’s Clean Hydrogen Program defines clean hydrogen as “hydrogen produced from water using eligible renewable energy resources, as defined in Section 399.12 of the California Public Utilities Code, or produced from these renewable energy resources” (CCI, 2025). California Senate Bill 1505 (SB 1505), enacted in 2006, established regulations aimed at promoting the production and use of hydrogen fuel from renewable energy sources. One of the key provisions of the bill is the requirement that at least 33.3% of hydrogen used for vehicles in California must be produced using eligible renewable energy resources (i.e., renewable feedstock),<sup>15</sup> which is shown in green outline in Figure 3-6. For a hydrogen fueling station to qualify for the Low Carbon Fuel Standard Hydrogen Infrastructure program,<sup>16</sup> the feedstock used to produce the hydrogen fuel must be 40% renewable (CARB, 2023).

Although the term “green hydrogen” has not been defined in adopted State legislation, it is often used to refer to hydrogen production that does not generate any carbon dioxide emissions (i.e., produced with water electrolysis using electricity from 100% renewable energy sources) (Rincon et al., 2025).

Many types of hydrogen production facilities could potentially be built in the County of Los Angeles depending on methods of hydrogen production. Methods of hydrogen production are selected based on the cost of feedstock and production technology as well as incentives for low carbon production. The primary production methods include water, electrolysis, reforming of methane or cracking of methane, or the gasification of solid materials (DOE, 2025b). The feedstock determines whether the hydrogen fuel qualifies as renewable in California per SB 1505. Hydrogen production is often classified by the following colors, which are associated with the feedstock types (Rincon et al., 2024):

- Green – Produced with water electrolysis using electricity from renewable energy sources.
- Grey – Produced from steam methane reforming, partial oxidation, or autothermal reforming.
- Blue – Produced from fossil fuels, but with a carbon capture, utilization, and storage system.
- Aqua – Extracted from oil sands and conventional oil fields.
- Black and Brown – Produced from coal.
- Yellow – Produced with electrolysis using electricity from the energy grid.
- Turquoise – Produced by using methane as a feedstock.
- Purple, Pink, and Red – Produced through the use of nuclear power.
- White – Produced from naturally occurring hydrogen.

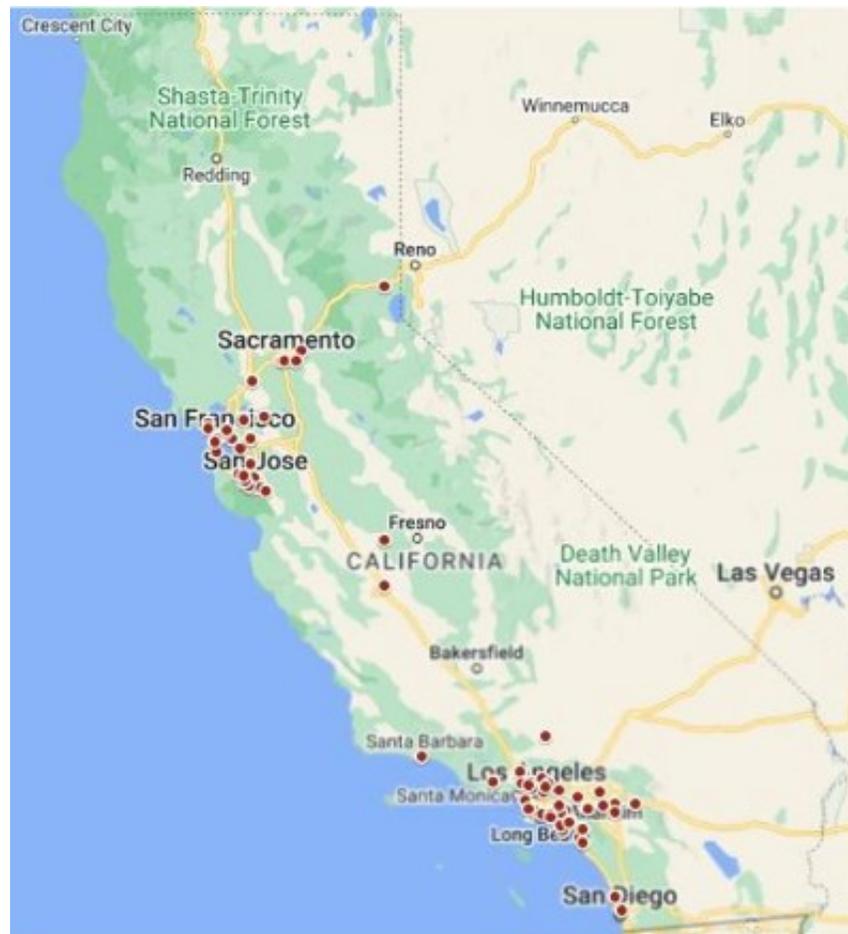
Fuel cell vehicles are anticipated to be one of the primary end uses of hydrogen production in California. Therefore, for the uptake of the technology to be successful, hydrogen fueling stations must be developed

<sup>15</sup> Feedstock is defined as the raw materials used to produce fuel.

<sup>16</sup> The Low Carbon Fuel Standard (LCFS) Program is managed by the California Air Resources Board and is intended to diversify and decarbonize energy used in the transportation sector.

throughout the State. Figure 3-6 illustrates the anticipated location of hydrogen fueling stations in California with a notable presence in Los Angeles County (CARB, 2025a).

**Figure 3-6 California Hydrogen Refueling Infrastructure Approved H2 Refueling Stations**



Source: CARB, 2025a

### 3.1.5 Distributed Generation

The market for distributed generation has grown steadily in both California and the United States. This is particularly evident in the solar energy market, for which the cost of solar panels has decreased dramatically over the past decade, making these systems more accessible to homeowners and businesses. In California, policies such as the California Solar Initiative and the Self-Generation Incentive Program have driven the adoption of distributed solar generation. These initiatives offer financial incentives to residents and businesses to install solar energy systems, and have included programs for low-income residents, new home construction, and incentives for solar thermal (CA DGStats, 2025). The introduction of Community Solar Programs and virtual net metering has also expanded access to distributed generation to customers who may not have suitable rooftops or financial resources to install systems directly (CPUC, 2025a). While some of the distributed generation interconnection programs offered through the California Solar Initiative have expired, other incentive programs are still ongoing. See Chapter 5 (Funding Opportunities) for further discussion on current distributed generation incentive programs in California.

## 3.2 Cost-Benefit Analysis

To evaluate the economic effects of developing new renewable energy and storage projects in Los Angeles County, Life Cycle Associates (LCA) conducted a cost-benefit study that focused on four technologies: utility-scale solar PV, utility-scale wind, BESS, and green hydrogen. Each renewable energy technology has unique economic impacts within the County over the lifetime of a project. These impacts are accumulated during the permitting and construction phase of the project, as well as the ongoing operations and maintenance required to maintain peak facility operation. To capture these direct impacts, LCA created a direct impacts module that considers the number of renewable energy projects, cost of inputs, and the net present value of the projects.

The direct impacts module is derived from a methodology applied in a previous renewable cost-benefit study for San Bernardino County, where the module was combined with macroeconomic multipliers from the IMPLAN<sup>17</sup> Input/Output models to determine the indirect and induced impacts. Direct impacts are the economic activities occurring from a renewable energy project. Examples of direct impacts include the purchase of capital equipment and operations maintenance. Indirect impacts occur in other sectors of the economy that experience changes in output because of renewable energy production. Induced impacts occur when the direct and indirect expenditures trigger a chain reaction of spending through the economy. Any of these impacts may occur within or outside of the County.

LCA developed a Renewable Energy (RE) Model for Los Angeles County that combines the direct impacts with the indirect and induced economic multipliers (IMPLAN, 2025) and an estimate of the share of economic activity in the County. The location of economic activity is categorized to determine regional economic output and tax revenues. These impacts are reported on an aggregate basis with economic activity broken out by sector within the County. The results of the RE Model are not specific to the unincorporated portions of the County as they are highly disparate. Additionally, some areas in the County contain significant portions of federally owned land, which impact the level of benefits (e.g., property taxes) accrued to a local community.<sup>18</sup>

With the total economic output, the RE Model identifies key economic indicators including local tax revenue, consumer savings, County sales tax and permitting fees, and employment. These metrics are compared with a base case to assess the fiscal and economic impacts of renewable energy projects.

### 3.2.1 Scope of Analysis

The costs and benefits of renewable energy projects were evaluated for utility-scale solar PV, utility-scale wind, BESS, and green hydrogen. For purposes of the study, each new renewable energy project is assumed to have a capacity of 100 MW. For each configuration, the RE Model calculates the following:

- Capital costs
- Tax credits
- Operating costs
- County tax income and permitting fees

<sup>17</sup> IMPLAN is commonly used in the industry to perform basic input/output economic modeling, and can provide geographic specificity at the county, regional, state, and national levels.

<sup>18</sup> Results can be refined to more specific regions based on local population, portion of federal land, local municipality rates, or other factors; however, that granularity is beyond the scope of this analysis.

### 3.2.2 Approach

Costs, cost savings, and revenues are calculated over the life of a project. The RE Model provides the basis to evaluate the economic costs and benefits of renewable energy projects in Los Angeles County. The goal of the RE Model is to examine the following:

- The costs and benefits of existing and future renewable energy development to the County government with potential policy initiatives;
- Comparisons of the net lifetime costs and benefits utility-scale renewable energy; and
- Evaluation of economic metrics including local expenditures, employment, and revenue to the County.

The costs for each renewable energy technology, which are presented in 2024 Dollars (\$2024), are examined on a life cycle basis, as shown in the BESS example in Table 3-1. These costs are then grouped according to economic sectors where the in-County economic activity as well as indirect and induced effects are calculated. County revenue from property taxes is included in Table 3-1 under the “Operating Revenue to County” cost factor, which reflects the net present value (NPV) of the annual property taxes over the lifetime of the project.

**Table 3-1 Cost factors for renewable energy (BESS example)**

<b>Cost Factor</b>	<b>Year 1</b>
Capital Cost (\$2024)	
Modules	\$74,504,597
Other Hardware	\$17,476,387
Total Installed	\$91,980,984
Federal Tax Credit	\$27,594,295
Net Cap Cost	\$64,386,689
Operating Cost	\$1,197,585
Operating Cost Net Present Value (NPV)	\$28,658,150
Generation, MWh	794,094
Power Purchase Agreement (PPA) Payments	\$23,822,820
NPV PPA Payments	\$352,707,659
Net Costs	\$41,761,453
Cumulative Net Costs	\$41,761,453
NPV of Investment	\$230,280,499
Revenue to County (permit fees)	\$294,300
Revenue to County (sales tax)	\$4,207,700
Operating Revenue to County	\$24,880,321

Source: LCA, 2025

Table 3-2 details the various economic sector categories for the cost factors associated with renewable power at NPV. The economic value is localized to the County through percentage estimates of local share of each sector to derive the County-level economic benefit.

**Table 3-2 Economic sectors for cost factors associated with renewable energy**

Economic Sector	Activity NPV	Activity in LA County	
		%	\$
Plant Investment Hardware	\$100,770,610	50%	\$50,385,305
Plant Installation	\$10,966,592	100%	\$10,966,592
Fleet Investment	\$0	0%	\$0
Processing Materials	\$0	0%	\$0
Maintenance	\$102,898,828	100%	\$102,898,828
Feedstock Collection	\$0	0%	\$0
Feedstock Transport	\$0	0%	\$0
Plant Earnings	\$441,096,625	30%	\$132,328,987
Household Savings	\$0	100%	\$0
Government Revenue	\$2,371,576	100%	\$2,371,576
Utility Generation	-\$406,867,262	47.8%	-\$194,482,551
<b>Total</b>			<b>\$104,468,737</b>

Sources: Localized activity based on San Bernardino County Partnership for Renewable Energy & Conservation (SPARC Phase II) REVEAL (Renewable Energy Value Evaluation and Augmentation Leadership) Initiative Report

These localized results are combined with economic multipliers and in-County activity factors as illustrated in Table 3-3. Economic multipliers are used to estimate the impact of a change in economic activity, such as the installation of a renewable energy facility, on the overall economy. The multipliers quantify the impacts of spending in one sector across other impacted sectors of the local economy, through multipliers of stimulated demand. Each unique multiplier is applied to the activity sector to estimate the direct, indirect, and induced impacts of the new renewable energy project for the local community. These multipliers are based on California Energy Commission (CEC) renewable energy project databases and derived from the IMPLAN model. The economic multipliers generate the total output, employment, personal income, and value added from a new project.

**Table 3-3 Macroeconomic multipliers for direct, indirect, and induced impacts**

Economic Activity	Macroeconomic Multipliers		
	Direct	Indirect	Induced
Plant Hardware less taxes	1.00	0.35	0.38
Plant Installation	1.00	0.35	0.38
Fleet Investment	1.00	0.3	0.41
Processing Materials	1.00	0.28	0.32
Maintenance	1.00	0.3	0.59
Feedstock Collection	1.00	0.21	0.27
Feedstock Transport	1.00	0.63	0.46
Plant Earnings	1.00	0.21	0.27
Community Expenditure	1.00	0.325	0.395
Government Revenue	1.00	0.325	0.395
Sales tax on non-Construction	1.00	0.325	0.395
Utility Generation	1.00	0.07	0.19

Source: San Bernardino County Partnership for Renewable Energy & Conservation (SPARC Phase II) REVEAL (Renewable Energy Value Evaluation and Augmentation Leadership) Initiative Report

### 3.2.3 Quantification of Direct Costs

**General Methodology.** The general methodology to quantify economic impacts relies on inputs of installed cost, incentives, operating costs, and revenue streams from avoided power purchases or power sales. These values are calculated on a \$/MW basis so that facilities of various sizes can be estimated. While there are improvements in cost efficiency that are realized at scale, these estimates are meant to encompass the utility market. The NPV of the projects are estimated over a 35-year lifetime as applied to all costs and revenues using a discount rate of five percent. Once categorized within the respective economic sector, these values are localized to the County, and the economic benefits are derived through the multipliers.

#### BESS

For economic benefit analysis for BESS projects, publicly available data from ongoing CEC projects are used to create an industry average. Table 3-4 includes the various categories for capacity, system efficiency, and \$/MW of various system components and operations. The projects highlighted in Table 3-4 are three recent BESS projects that have applied for certification through the CEC AB 205 Opt-In process, which include Compass Energy Storage Project, Corby Battery Energy Storage System Project, and Darden Clean Energy Project.

**Table 3-4 Summary of utility-scale BESS projects and average inputs in \$2024**

Category	Compass	Corby	Darden	Average
Capacity(MW)	400	300	1,150	-
Efficiency	87.30%	-	94.00%	90.65%
Degradation	1.27%	-	-	1.27%
System Total (\$/MW)	\$750,000	\$1,283,333	\$726,096	\$919,810
Hardware (\$/MW)	\$607,500	\$1,039,500	\$588,138	\$745,046
Installation (\$/MW)	\$142,500	\$243,833	\$137,958	\$174,764
Operation & Maintenance (O&M)	\$5,000	\$29,667	\$1,261	\$11,976

Sources: CEC, 2024c, 2024d, 2024e.

For the RE Model, the costs and other input values were averaged across the three BESS projects as shown in Table 3-5. The federal tax credit is 30% and assumes each project meets the prevailing wage and labor requirements of the regulation. NPV operating costs are subject to a 2.5% escalation factor over the 35-year lifetime of each project. Depending on the operator of the facility, more comprehensive maintenance at ten-year increments may occur to switch out battery units to maintain a certain facility capacity factor. These incremental upgrades increase operations and maintenance costs, which raises NPV of operating costs, and are required to generate system profits. BESS systems typically store energy at peak production, coinciding with the lowest energy prices (e.g., \$50/MWh), and can sell back to the grid at peak demand at \$110/MWh. The NPV of the power purchase agreement is the difference between those values (i.e., \$60/MWh). For a 100-MW facility, the NPV is \$4.4 million.

**Table 3-5 Summary of utility-scale BESS costs and project NPV for 100 MW facility**

Category	BESS Average
Capital Cost	
Hardware	\$74,504,597
Installation Costs	\$17,476,387
Total Installed Cost	\$91,980,984
Federal Tax Credit	\$27,594,295
NPV of Operating Costs	\$32,027,592
NPV of PPA	\$130,158,757
Project NPV	\$4,362,155

Source: LCA, 2025

**Utility-Scale PV Solar**

Table 3-6 shows the average costs in 2024 Dollars (\$2024) associated with fixed and single tracking PV solar facilities at utility scale. The values are derived from Solar Reviews (Solar Reviews, 2025), Coldwell Solar (Coldwell Solar, 2025), and National Renewable Energy Laboratory (NREL, 2023b) and are based on a 100-MW facility. The table compares fixed panels with single axis tracking panels that can adjust to optimize electricity production. Tracking panels are slightly more expensive on the front end as well as in maintenance cost but are offset by greater production capacity.

**Table 3-6 Summary of utility-scale fixed and single tracking PV solar costs in \$2024**

Category	Fixed	Single Tracking
Capital Cost (\$/MW)	\$921,238	\$1,070,803
Modules (\$/MW)	\$239,541	\$343,100
Other Hardware (\$/MW)	\$295,402	\$327,420
Soft costs <sup>19</sup> (\$/MW)	\$386,295	\$400,283
O&M (\$/MW-yr)	\$23,000	\$29,900
O&M Escalation	2.50%	2.50%
Capacity Factor	22%	31%
Degradation (%/yr)	0.4%	0.4%
PPA, \$/MWh	\$50	\$50
Annual Discount Rate	5%	5%

Source: LCA, 2025

Table 3-7 summarizes the direct project economics for a 100-MW utility-scale PV solar facility with a 30% tax credit. Capital and operating costs are higher for the tracking system but yield a 3.8x increase in NPV of investment.

<sup>19</sup> Soft costs for utility-scale PV solar refer to non-hardware expenses that include costs associated with permitting, financing, installation labor, interconnection, legal fees, project management, and overhead.

**Table 3-7 Summary of utility-scale fixed and single tracking PV solar costs in \$2024**

Category	Fixed	Single Tracking
Capital Cost (\$2024)		
Modules	\$23,954,081	\$34,309,953
Other Hardware	\$29,540,210	\$32,742,025
Soft costs	\$38,629,506	\$40,028,278
Total Installed	\$92,123,797	\$107,080,255
Federal Tax Credit	\$27,637,139	\$32,124,077
Net Cap Cost	\$64,486,658	\$74,956,179
Operating Cost NPV	\$55,038,908	\$71,550,581
NPV PPA Payments	\$131,537,339	\$185,348,069
NPV of Investment	\$9,417,044	\$35,827,112

Source: LCA, 2025

### Utility-Scale Wind

There are several recent cost estimates for utility-scale wind generation from the Energy Information Administration (EIA, 2024b) and NREL (NREL, 2024). Table 3-8 summarizes the costs, O&M, and other inputs for a utility-scale wind facility of 1 to 100 MW in \$2024. The PPA price for wind is typically between the BESS and solar rates. This is based on the variability of production of wind throughout the day relative to more peak, midday timing of solar energy production. With BESS, energy is already stored so facilities are designed to optimize sales around peak market demand, coinciding with peak prices (Utility Dive, 2024). Based on these production factors, the wind PPA is set at 65 \$/MWh.

**Table 3-8 Summary of utility-scale wind costs and project NPV for 100 MW facility**

Category	Utility Wind
Capital Cost (\$/MW)	\$1,140,979
Hardware (\$/MW)	\$1,031,313
Soft costs (\$/MW)	\$109,666
O&M (\$/MW-yr)	\$43,000
O&M Escalation	2.50%
Capacity Factor	46.8%
Degradation (%/yr)	1.0%
PPA, \$/MWh	\$65.0
Annual Discount Rate	5%

Source: LCA, 2025

Table 3-9 summarizes the direct project economics for a 100-MW utility-scale wind facility with a 30% tax credit. The degradation factor impacts energy output; however, it is not modeled with 10-year upgrades like the BESS scenario.

**Table 3-9 Summary of utility-scale wind costs and project NPV for 100 MW facility**

Category	Utility Wind
Capital Cost (\$2024)	
Hard Costs	\$103,131,283
Soft costs	\$10,966,592
Total Installed	\$114,097,875
Federal Tax Credit	\$34,229,363
Net Cap Cost	\$79,868,513
Operating Cost NPV	\$102,898,828
NPV PPA Payments	\$406,867,262
NPV of Investment	\$224,059,702

Source: LCA, 2025

### Green Hydrogen

Building a green hydrogen plant includes several key cost components as shown in Table 3-10. The primary hardware cost is for the electrolyzer used to split water into hydrogen and oxygen. As with other renewable energy projects, there are also ongoing operational and maintenance costs for the hydrogen production facility. Grid connection and energy storage solutions may also incur costs, particularly if the plant operates in areas with intermittent energy supply. Regulatory compliance and project development expenses contribute to the total cost of building and running of the facility.

**Table 3-10 Cost summary of 100 MW green hydrogen facility**

Category	Green H <sub>2</sub>
Capital Cost (\$/MW)	\$2,000,000
Hardware (\$/MW)	\$1,600,000
Soft costs (\$/MW)	\$400,000
O&M (\$/MW-yr)	\$40,000
O&M Escalation	2.50%
Capacity Factor	51.0%
Degradation (%/yr)	1.5%
Power Purchase Agreement (PPA), \$/MT	\$6,000
Annual Discount Rate	5%

Source: DOE, 2024

Table 3-11 summarizes the direct project economics for a 100-MW utility-scale green hydrogen facility with a 30% tax credit. The capacity factor includes 100% renewable energy from co-located wind and solar as well as on-site BESS. No overhaul is assumed over the lifetime of the facility

**Table 3-11 Summary of utility-scale green hydrogen and project NPV for 100 MW facility**

Category	Green H <sub>2</sub>
Capital Cost (\$2024)	
Hard Costs	\$160,000,000
Soft costs	\$40,000,000
Total Installed	\$200,000,000
Federal Tax Credit	\$60,000,000
Net Cap Cost	\$140,000,000
Operating Cost NPV	\$95,719,840
NPV PPA Payments	\$773,520,189
NPV of Investment	\$537,760,129

Source: LCA, 2025

### 3.2.4 Economic Results

The RE Model applies economic multipliers to generate County level results (shown in Table 3-12) for each of the renewable technologies. These benefits are demonstrated through new jobs and County revenues through permitting and taxation. Overall economic benefits accrue to the County as well indirect and induced benefits. Each facility type has a direct cost of nearly \$1 million per megawatt in direct construction costs, which contributes to permitting and sales and use tax revenues. Ongoing operations and maintenance costs incur \$11,000 to \$34,000 per megawatt each year.

**Table 3-12 Local economic impact on LA County of utility-scale renewable energy projects**

Economic Intensity (per MW)	BESS	Utility PV Solar, Fixed	Utility PV Solar, Single Tracking	Utility Wind	Green Hydrogen
<b>Construction</b>					
Total Employment	32.8	44.2	56.3	86.6	119.2
Indirect and Induced Employment	1.0	4.1	4.5	5.3	10.2
Total Local Spending	\$86,701	\$351,101	\$378,830	\$447,869	\$862,713
<b>County Revenue (Benefits)</b>					
Taxes to County	\$42,077	\$2,303	\$2,677	\$23,205	\$36,000
Fees	\$2,943	\$2,807	\$3,263	\$402	\$402
City Sales Tax	\$0	\$20,728	\$24,093	\$23,205	\$36,000
Total County Revenue	\$45,020	\$25,838	\$30,033	\$46,811	\$72,402
<b>Operation</b>					
Total Employment	24.3	29.6	39.1	64.1	87.0
Indirect and Induced Employment	6.6	6.8	8.8	12.6	13.1
Total Local Spending	\$1,533,275	\$1,431,487	\$1,773,649	\$1,924,736	\$710,820
<b>County Revenue (Benefits)</b>					
Taxes	\$27,735	\$4,683	\$5,500	\$40,791	\$62,799
Fees	\$0	\$0	\$0	\$0	\$0
Other	\$0	\$0	\$0	\$0	\$0
Total County Revenue	\$27,735	\$4,683	\$5,500	\$40,791	\$62,799
<b>Total County Revenue (Benefits)/MW</b>	<b>\$72,755</b>	<b>\$9,793</b>	<b>\$11,440</b>	<b>\$64,398</b>	<b>\$99,201</b>
<b>Direct Costs</b>					
Construction Cost (\$/MW)	\$919,810	\$921,238	\$1,070,803	\$1,140,979	\$921,238
Operation Cost (\$/MW/y)	\$10,530	\$18,095	\$23,523	\$33,830	\$31,469.5

Source: LCA, 2025

Table 3-12 demonstrates that the development of utility-scale renewable energy projects would provide positive economic benefits to the County. Large-scale utility projects result in economic activity from construction and ongoing maintenance of the facilities. Property taxes are included within the County Revenue (Benefits) data under “Taxes.” While equipment such as PV panels, inverters, electrolyzers, and other specialty items may be manufactured outside of the County, it is possible for the County to capture some of the benefits through sales taxation if purchases are made using a local address. This purchasing structure can support the project developer in making a case that the facility contributes to a net positive economic impact for the local community.

Construction components such as structures, concrete work, and other forms of capital investment can originate in the County, furthering local economic benefits. Construction labor also creates additional direct, indirect, and induced benefits to the County. Additional direct County benefits include permit fee generation and sales tax revenues that vary depending on the location of the project.

### **3.3 Funding Considerations**

Uncertainty in renewable energy policy, federal funding opportunities, and supply and demand imbalance in recent months have led to challenges for renewable energy developers and manufacturers. While the federal government has essentially halted funding to support renewable energy development, there are several state and local programs that continue to incentivize the installation of renewable energy and storage projects. However, federal tariffs may continue to present barriers to the viability of developing new renewable energy generation. Section 3.3.1 identifies funding opportunities for utility-scale and distributed generation, while Section 3.3.2 discusses the effects of financial markets on future renewable energy development.

#### **3.3.1 Incentives and Funding Opportunities**

##### **Utility-Scale Generation and Storage**

A wide range of regulations and policies at both the federal and State levels have historically supported the growth of utility-scale renewable energy projects. Below is a discussion of the programs, policies, and funding opportunities that are still in effect.

##### **Federal Program and Policies**

Federal tax credits can lower the overall cost of renewable energy, encouraging greater reinvestment and faster deployment of clean energy technologies. The Inflation Reduction Act of 2022 (IRA) extended existing tax provisions and created new tax provisions for eligible renewable energy facilities (USEPA, 2025a; IRS, 2024). Key financial tax incentives include the following (CRS, 2025):

- Investment Tax Credit (ITC) reduces federal income tax liability for a percentage of the renewable energy project’s installed cost. The ITC is technology specific and eligible projects must have begun construction before January 1, 2025.
- Production Tax Credit (PTC) is a per kilowatt-hour tax credit for the first 10 years of a renewable energy facility’s operation. The PTC is technology specific and eligible projects must have begun construction before January 1, 2025.
- Clean Electricity Investment Tax Credit (CEITC) is available to taxpayers with a qualified facility and energy storage technology (i.e., greater than 5 MW) placed in service after December 31, 2024. The CEITC was adopted to replace the ITC. The tax incentive is emissions based and is neutral and flexible between different energy technologies (IRS, 2025a). The base credit is 6%, but has additional

percentage incentives based on criteria such as wage and apprenticeships, domestic content, energy community, and low-income areas (Stockton, 2025).

- Clean Electricity Production Tax Credit (CEPTC) is a per kilowatt-hour tax credit that replaces the PTC and is available to projects that are placed in service after December 31, 2024. Unlike the PTC, the CEPTC is technology neutral.
- Clean Hydrogen Production Credit (CHPC) provides incentives to promote the national production of clean hydrogen (IRS, 2025b). It offers a tax credit for each kilogram of hydrogen produced, depending on its carbon intensity, with higher credits given to hydrogen with lower carbon emissions. The types of hydrogen that qualify for the credit are differentiated based on their carbon intensity, including green hydrogen, blue hydrogen, and turquoise hydrogen produced from methane pyrolysis. The credit can range from \$0.60 to \$3.00 per kilogram, with the highest value awarded to hydrogen produced with near-zero emissions (e.g., green hydrogen).

### California Programs and Policies

Beginning in 2002, with the passage of Senate Bill 1078 that established the California Renewables Portfolio Standard program, California has enacted additional programs and policies both incentivizing and mandating renewable energy development. Below is a summary of current programs.

**Renewables Portfolio Standard (RPS).** Since its passage in 2002, the California RPS targets for investor-owned utilities (IOUs) have been accelerated through subsequent legislation. The current procurement targets established by Senate Bill 100 (SB 100) require IOUs to procure 60% renewable electricity by 2030, with a statewide goal of 100% procurement from carbon-free resources by 2045 (CEC, 2025e). Utilities can meet the RPS requirements through their own production of renewable energy as well as through the purchase of Renewable Energy Credits (RECs) as the infrastructure is built out. Power purchase agreements (PPAs) are long-term contracts (typically 10-20 years) that guarantee a fixed price for renewable power and include several projects in the County (CALCCA, 2024). PPAs are usually necessary to access tax equity and other financing.

**Energy Storage Systems.** To meet the renewable electricity procurement targets established under SB 100, California has established the Energy Storage Mandate that requires utilities to procure 1,325 MW of energy storage by 2020 (CPUC, 2025c). Programs such as the Self-Generation Incentive Program offer financial incentives for businesses and residential customers to install energy storage systems.

**Green Hydrogen.** In California, the California Air Resources Board (CARB) has set aggressive emission reduction targets supporting the uptake of low-carbon fuels under California's Low Carbon Fuel Standard (LCFS). The program provides financial incentives for the production of low-carbon hydrogen, including green hydrogen, by allowing producers to earn credits for reducing the carbon intensity of fuels (CARB, 2025b). The California Hydrogen Action Plan provides clear pathways for scaling hydrogen production and infrastructure, including incentives for green hydrogen production and the establishment of a hydrogen fueling network (CEC, 2025f).

### California Distributed Generation Programs

At the household level, the California Solar Initiative (CSI), which has been succeeded by the Self-Generation Incentive Program (SGIP), incentivizes the installation of solar energy systems through cash incentives and rebates, providing market signals to increase solar infrastructure investment (CPUC, 2025a and 2025b). Other programs in California, like the Active Solar Energy System Exclusion, utilize financial tools such as excluding solar development from property value reassessment (BOE, 2025). The following

is a list of California’s recent and current distributed generation incentive programs (California DGStats, 2025).

**Solar on Multifamily Affordable Housing (SOMAH).** The SOMAH program provides up to \$100 million in financial incentives annually for installing PV energy systems on multifamily affordable housing in California. SOMAH is funded through the proceeds from CARB’s Greenhouse Gas Allowance Auction. SOMAH aims to install 300 MW of generating capacity by 2032.

**California Solar Initiative (CSI).** In 2006, the CSI was created by Senate Bill 1 (SB 1) with a total budget of \$2.167 billion and a goal to install approximately 1,940 MW of new solar generation capacity between 2007 and 2016. The CSI program is overseen by the CPUC and includes many components, such as a general market solar incentive program, low-income solar incentive programs, a new solar homes program, and a solar thermal incentive program.

- **Multifamily Affordable Solar Housing (MASH) and Single-family Affordable Solar Homes (SASH).** The California Legislature passed Assembly Bill 2723 in 2006, which required a minimum of 10% of CSI funds be directed toward installation of solar PV on low-income properties. The MASH and SASH programs were established by the CPUC to facilitate the installation of solar energy systems on affordable housing. The MASH program ended in 2023. The SASH program ended in 2022 and was replaced by DAC-SASH.
- **Disadvantaged Communities – Single-family Solar Homes (DAC-SASH).** The CPUC launched the DAC-SASH Program in 2019. The statewide program provides \$8.5 million annually in incentives to help homeowners in disadvantaged communities (DACs) (as defined by the program) to afford the installation of solar energy systems.<sup>20</sup>
- **New Solar Homes Partnership (NSHP).** The NSHP program provides financial incentives to encourage the installation of solar energy systems as part of new home construction. The NSHP has a target of 360 MW of distributed solar to be installed on new homes. The NSHP program is overseen by the CPUC and currently administered by the CEC.

**Self-Generation Incentive Program (SGIP).** In 2001, SGIP was created to provide financial incentives to support existing, new, and emerging distributed energy resources that are installed to meet all or a portion of a facility’s electricity needs. Qualifying technologies include wind turbines, waste heat to power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems.

**Publicly Owned Utilities (POU) Solar PV Incentives.** SB 1 required California’s publicly owned utilities to create a solar incentive program by January 1, 2008. Collectively, the publicly owned utility solar incentive programs are anticipated to invest \$700 million toward the installation of 784 MW of solar energy systems.

### Electric Program Investment Charge Program

The CEC’s Electric Program Investment Charge (EPIC) provides grant funding for scientific and technological research to accelerate the transformation of the electricity sector to meet the State’s energy and climate goals. Over \$130 million annually is invested in research to expand the use of renewable energy, build a safe and resilient electricity system, advance electric technologies, and enable a more

<sup>20</sup> The DAC-SASH program uses the CalEnviroScreen application to identify a disadvantaged community (DAC). A DAC is a community that is identified within CalEnviroScreen’s 25% highest scoring census tracts statewide. DACs also include the 22 census tracts identified in CalEnviroScreen’s 5% highest scoring census tracts for Pollution Burden, but that do not have an overall CalEnviroScreen score because of unreliable socioeconomic or health data. In 2020, the DAC-SASH program’s definition of DAC was expanded to include California Indian Country.

decentralized electric grid. Recipients of this grant funding include entrepreneurs and research and development organizations (CEC, 2025g).

### 3.3.2 Federal Tariffs

Many components of renewable energy systems are imported into the U.S. and therefore subject to U.S. trade policy, including tariffs (IEA, 2023). Depending on the energy system, these components may be parts of systems that are later manufactured into a finished product in the U.S., or they may be finished system components that are ready to be installed upon arrival. Each component is subject to a tariff determined by what the component is and the country of origin. In April 2025, the White House announced a series of tariff rate increases (The White House, 2025). These increased tariff rates will have a direct impact on the costs of required components to build renewable energy and storage facilities.

**Vulnerability of Renewable Energy Sector.** Because of the global supply chain that supports the renewable energy industry, technologies such as BESS, solar PV, and wind turbines are particularly vulnerable to tariff rates. For example, utility-scale BESS is heavily reliant on imports; up to 90% of system components are sourced from abroad, primarily from China (Energy Storage News, 2025). These components include lithium-ion battery cells, inverters, and advanced control systems. Similar to BESS, the PV solar industry relies heavily on imported products including solar panels, assemble modules, and raw materials. In addition to the blanket tariffs announced in April 2025, the White House announced higher tariffs on solar components from major solar exporting countries, citing injury to U.S. domestic producers (PV Magazine, 2025). Onshore wind energy also relies heavily on imports for various turbine components and faces the threat of tariff rate increases (DOE, 2022).

**Future Impacts to Renewable Energy Development.** Changes to federal policies will impact the incentive stack (i.e., combining multiple financial incentives) that project developers may use to offset increases to tariffs or to be viable in the market more generally. Changes in federal policies such as the IRA and its tax incentives (ITC, PTC, CEITC, CEPTC) would impact the viability of BESS, PV solar, and utility-scale wind in California by impacting project economics, investor confidence, and supply chain development. A reduction or rollback of the CEITC or CEPTC would increase capital costs and slow deployment, particularly for solar and wind projects. Weakening the IRA's clean energy incentives could also reduce domestic manufacturing momentum and stall grid-scale battery adoption. The outcome of these changes ranges from short-term higher costs to long-term manufacturing onshoring, or policy reversal under a different federal administration where tariff rates are dropped.

**Shifts in BESS Manufacturing.** The U.S. BESS industry is dependent on China for about 90% of its supply chain (Gifford, 2025). Although there is concern about the uncertainty of the tariffs on Chinese imports, the cost of batteries and energy storage systems have fallen significantly over the past decade or so, including an almost 50% reduction in costs in 2023 and 2024 due to innovations in cell and system energy density, smaller footprints, and less equipment per megawatt-hour. In real terms, one analyst predicts the tariffs will bring prices roughly back to 2022 levels (Martucci, 2025). There is also the potential for Chinese industries to absorb some of the tariff due to past and present price mark-ups, although to what extent this could occur is unknown. With tariff levels rising nearly every day, Chinese products may become financially unviable, which would create a U.S. market where demand outstrips supply (Benchmark, 2025). Manufacturers strongly rely on battery and cell shipments, even for their own-branded systems. For example, it is common for Korean and American battery manufacturers, to use electrochemical cells manufactured in China due to the lower cost of production.

The new tariffs were created in part to encourage U.S. manufacturing of all BESS components, including cells, and some companies are adapting by starting cell manufacturing (Gisbourne and Murray, 2025). It is likely that there will be a gradual move out of China for cell manufacturing for electric vehicles and BESS

(Gisbourne and Murray, 2025). However, tariffs have led to market uncertainty, which has halted plans for BESS projects and cell manufacturing facilities. Earlier this year, both Kore Power and T1 Energy cancelled plans to construct gigafactories<sup>21</sup> in the U.S. (Pickerel, 2025). Overall, the supply chain for energy storage systems remains complicated. Battery manufacturing in the U.S. is still a difficult landscape, and batteries are likely to continue to be more expensive to produce domestically. Therefore, imports will continue to have a critical role in the energy storage market.

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<sup>21</sup> Gigafactory refers to an electric vehicle battery manufacturing plant.

## Chapter 4 Renewable Energy Development Considerations

The following chapter provides a snapshot of the renewable energy and storage technologies that are commonly deployed in California, with a particular focus on those technologies that may be developed in unincorporated Los Angeles County given the County's resource potential.

### 4.1 Renewable Energy Technologies

The renewable energy and storage technologies that are discussed in this section include the following technology types that may be proposed for future development under the REO Update: solar PV, wind, and energy storage systems. Green hydrogen production is a technology that is also described in this section, although hydrogen fuel is not a renewable energy resource. The purpose of the green hydrogen information presented in this technical study is to help inform siting considerations for future hydrogen production facilities in Los Angeles County.

To understand the size and scale of each technology, the following terms are used throughout this section:

**Megawatt (MW) and Megawatt-hour (MWh)** – Megawatt is a measurement of a generation facility's capacity while megawatt-hour is a measurement of the generation that is produced. In 2020, the average California home consumed 6.5 MWh per year (EIA, 2023a).

**Utility-scale generation** – A utility-scale generation facility interconnects to the transmission grid and is typically over 20 MW (NREL, 2013). Utility-scale renewable energy facilities are generally built by developers who sign long-term contracts called power purchase agreements (PPAs) with utilities. The electricity is sold at wholesale prices and transported via the transmission grid to off-site users.

**Distributed generation** – A distributed generation facility interconnects to the distribution system to provide energy at or near the point of use. Distributed generation facilities are typically 20 MW or less, and they can be connected to the distribution system through various methods such as net metering, where excess electricity produced is fed back into the grid for credits, or through more advanced microgrid systems that may be designed to operate independently from the main power grid.

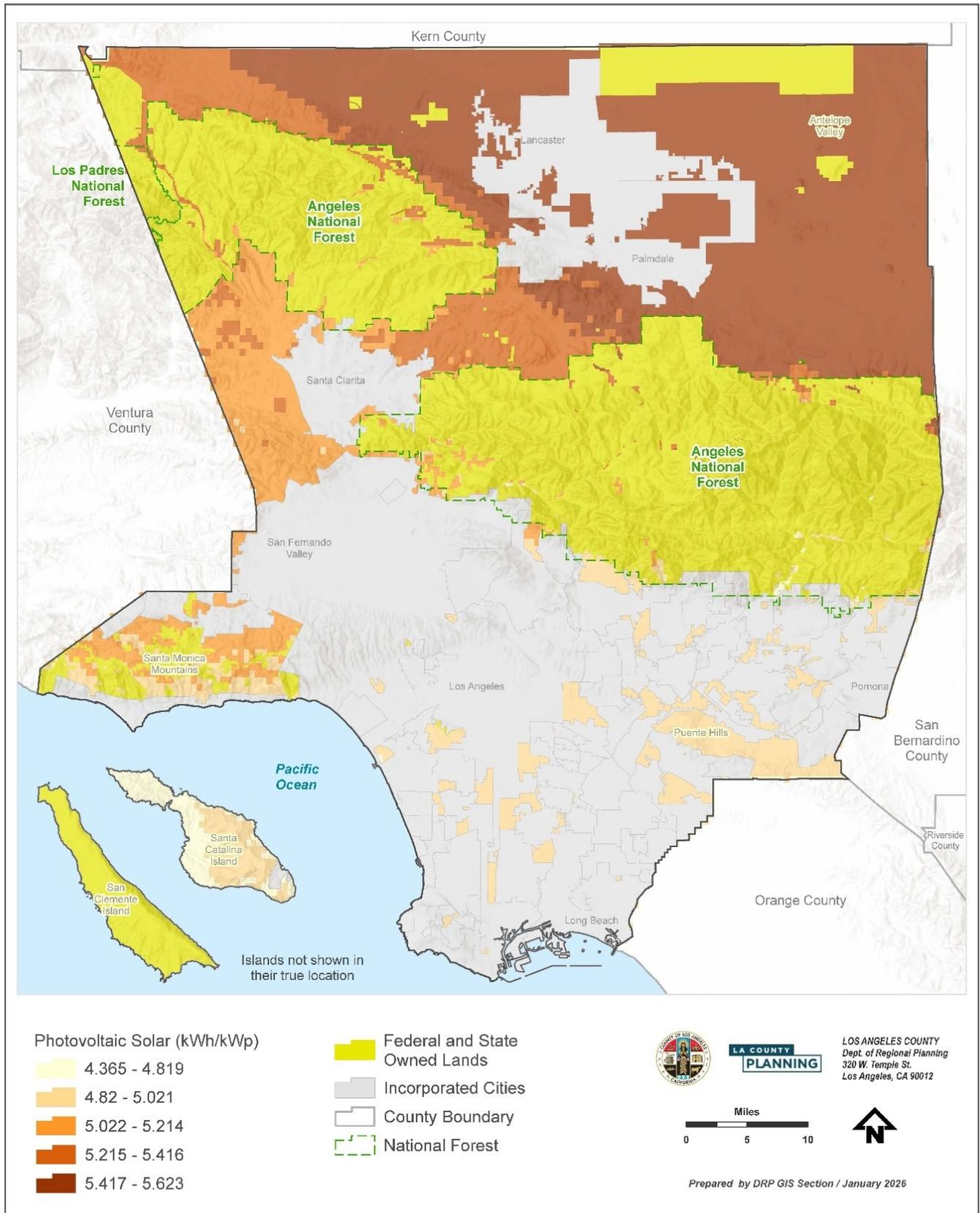
**Front-of-the-Meter** – This describes an energy generation or storage facility that is located on the utility side of the electric meter. Front-of-the-Meter generation can be interconnected to a transmission system or a distribution system.

**Behind-the-Meter** – This describes an energy generation or storage facility that is located on the customer side of the electric meter. Behind-the-Meter generation provides electricity directly to a particular user.

#### 4.1.1 Solar PV Systems

Solar PV systems utilize photovoltaic technologies to convert sunlight directly into electricity, primarily using silicon-based solar cells (DOE, 2025c). The individual cells are assembled into solar panels and mounted on metal frames. The most common technologies used for manufacturing solar panels include crystalline silicon PV cells, which can be made as monocrystalline or polycrystalline types. Monocrystalline panels have higher efficiency but are more expensive when compared to polycrystalline panels. Utility-scale PV facilities require vast arrays of these panels, typically installed on fixed-tilt or tracking systems that follow the sun's path to maximize energy capture. Four to six acres are generally required for each MW of power produced from a solar PV facility (Powertech, 2025).

Figure 4-1: Los Angeles County Solar Resources



Source: Global Solar Atlas, October, 2025

**Resource Potential within Los Angeles County.** Solar resource theoretical potential can be approximated using the global horizontal irradiation, a measure of direct and diffuse irradiation received by a horizontal surface. Practical solar PV Potential approximates the power output achievable by typical configurations of utility-scale PV systems. This is determined by simulating the conversion of the available solar resource to electric power considering the impact of air temperature, terrain horizon and albedo, as well as module tilt, configuration, shading, soiling, and other factors affecting the system performance (ESMAP, 2020). The practical solar PV potential evaluation produces a PVOUT measurement; PVOUT is the amount of power generated per unit of installed PV capacity over the long term, measured in kilowatts hours per installed kilowatt peak (kWh/kWp). PVOUT in Los Angeles County ranges from 4.365 to 5.623 kWh/kWp, as depicted in Figure 4-1.

#### 4.1.2 Wind Energy Systems

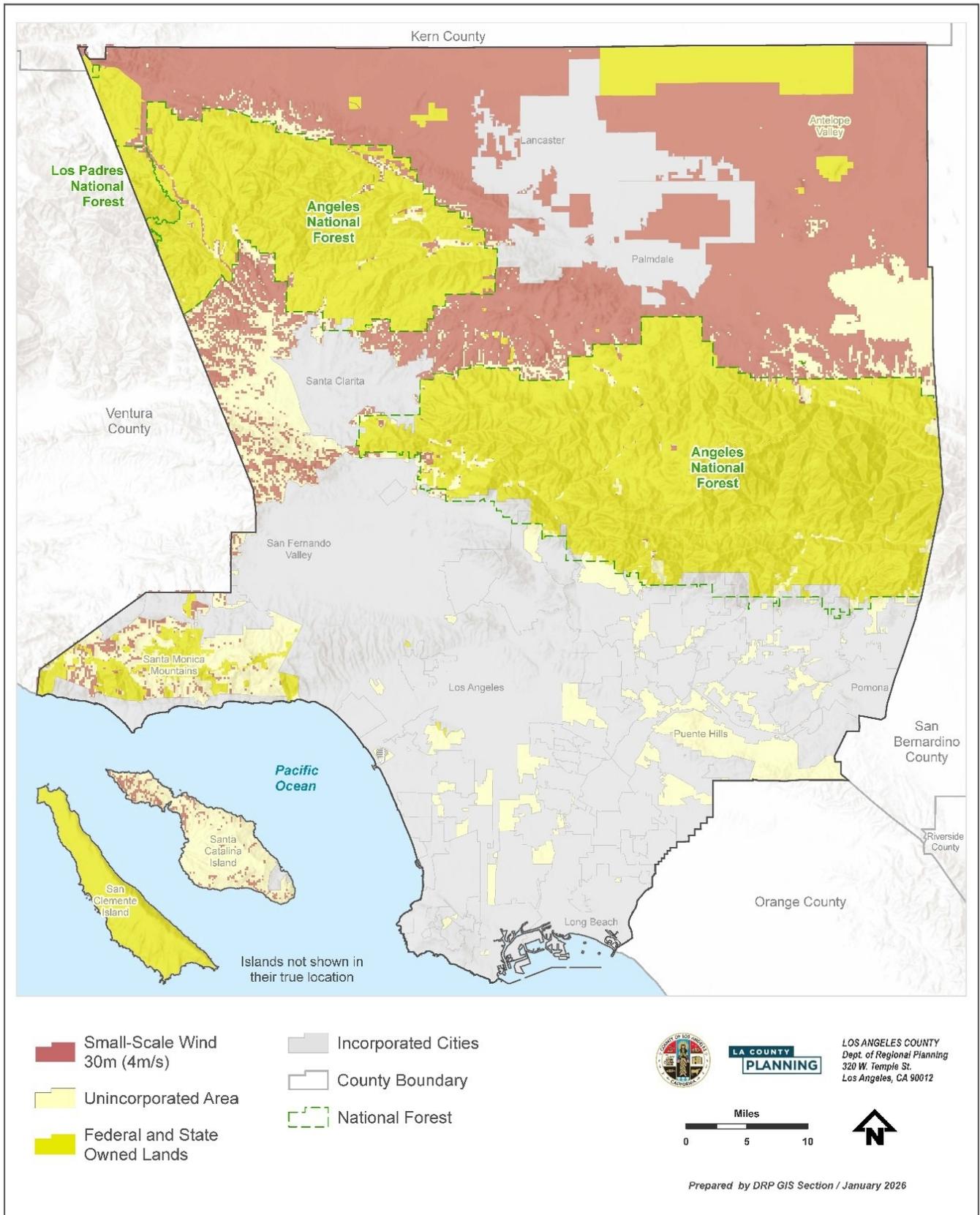
Wind energy facilities harness the power of wind to generate electricity using large wind turbines. The turbines consist of three primary components: the blades, the nacelle (which houses the generator and gearbox), and the tower. The kinetic energy of the wind turns the blades, which are connected to a drive shaft that turns an electric generator, which produces electricity (EIA, 2023b). The turbines used in utility-scale wind energy facilities are placed in areas with strong, consistent winds and installed in arrays to maximize electricity production.

Technological advancements in wind turbine design, such as longer blades and higher towers, have significantly improved efficiency by allowing turbines to capture more wind at higher altitudes. Onshore wind turbines have an average capacity of 2.75 MW per unit, and operations can consist of dozens to hundreds of turbines (USGS, 2022). Wind energy is a variable source of power, so it is often paired with energy storage systems or integrated into a smart grid to balance its intermittency.

The electrical output of a wind turbine is a function of wind speed, and the required wind speed to generate electricity will depend on the size of the turbine. Small turbines (less than 100 kW) are typically less than 160 feet in height and require an average wind speed of approximately four meters per second. Midsize turbines (between 101 kW to 1 MW) have an average height of 250 feet and require an average wind speed of approximately six meters per second. Utility scale turbines (greater than 1 MW) can range from 300 feet to over 600 feet in height and require a minimum wind speed of six meters per second.

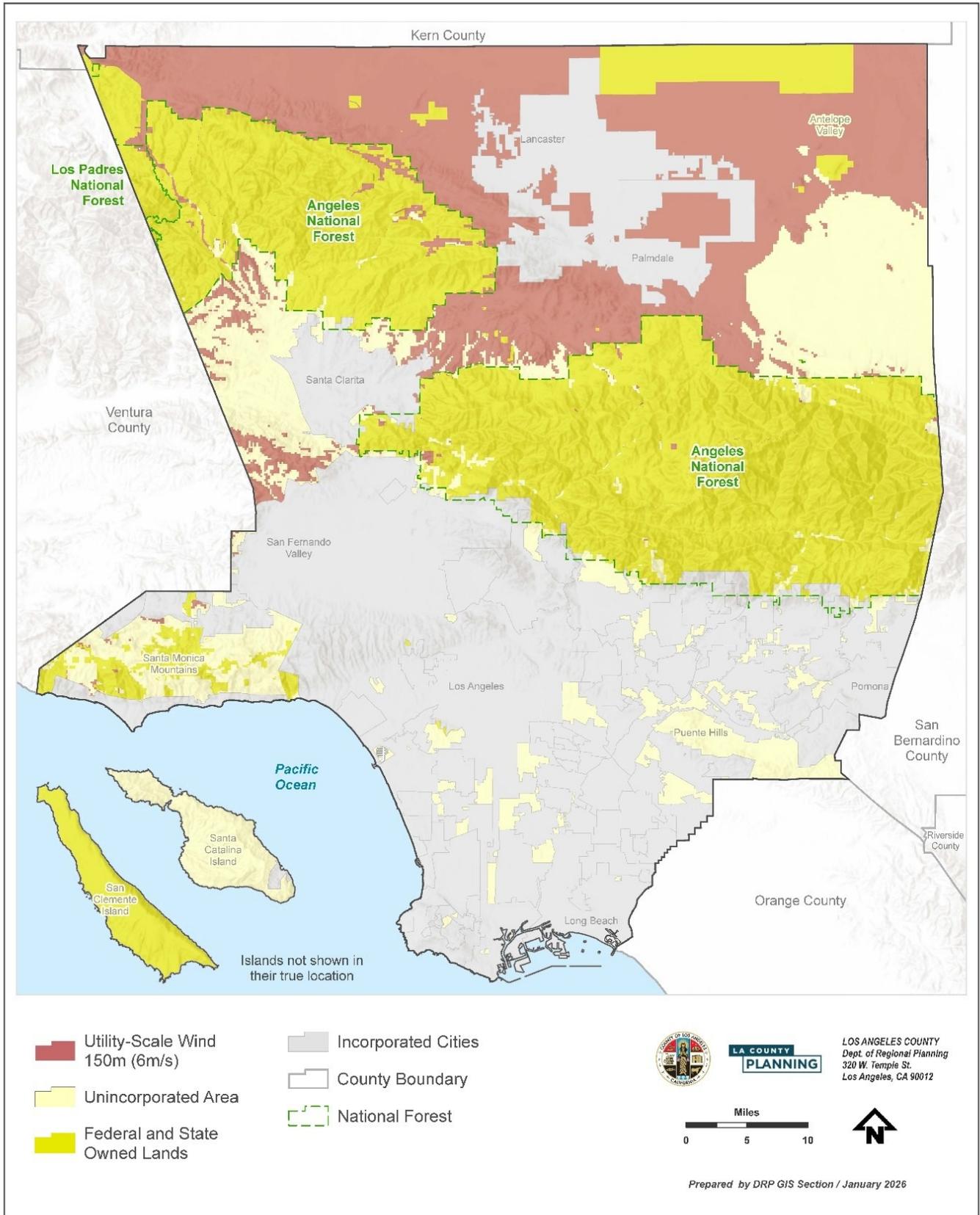
**Resource Potential within Los Angeles County.** The County of Los Angeles wind resources are mostly limited to the north County. Suitable wind resource exists along the northern county border with Kern County and extends south to the Antelope Valley and into the ridgelines of the San Gabriel Mountains. Limited potential exists in the ridgelines of the Santa Monica Mountains. The Los Angeles County basin has poor wind resource potential. Wind resources for small-scale wind, defined as a minimum wind speed of four meters per second at 30 meters in height (approximately 98 feet), are depicted in Figure 4-2. Wind resources for utility-scale wind, defined as a minimum wind speed of six meters per second at 150 meters (approximately 492 feet) in height, are depicted in Figure 4-3.

Figure 4-2: Los Angeles County Small-Scale Wind Resources



Source: NREL, July, 2025

Figure 4-3: Los Angeles County Utility-Scale Wind Resources



Source: NREL, July, 2025

### 4.1.3 Energy Storage Systems

An energy storage system charges from the electric transmission grid or a generating facility (renewable or conventional) and then discharges that energy when needed. Energy storage systems are essential components for managing and storing electricity on a large scale. The systems provide grid stability and enable the integration of renewable energy sources at times that do not coincide with generation. These systems are used to store electricity during times of low demand or when excess renewable energy generation is available and then discharge it when demand is high or renewable generation is offline.

Energy storage systems can be mechanical (pumped hydroelectric storage, compressed air, flywheel); thermal (liquified air, thermal storage), or chemical (BESS). Some technologies require site-specific conditions, such as access to lower and upper water reservoirs for pumped hydroelectric generation, and access to underground caverns for compressed air energy storage. Other technologies such as liquified air are considered an emerging technology and have only been developed at a pilot scale.

**Battery Energy Storage Systems.** Currently, BESS technologies are widely used for energy storage due to their scalability and their ability to help with system reliability and quick dispatch of power. Battery technologies for energy storage have varying chemistry and energy densities. Lead-acid, lithium-ion, nickel-cadmium, nickel-metal hydride, sodium-sulfur and vanadium-redox flow batteries are common for various energy storage requirements.

- Lithium-ion batteries. Lithium-ion batteries are currently the most common BESS technology given their high energy density, which allows more energy to be stored in a smaller volume, and their competitive cost. However, lithium-ion batteries are susceptible to thermal runaway, which occurs when a lithium-ion battery cell enters an uncontrollable self-heating state. Thermal runaway can result in fire, smoke, and off-gassing. Lithium-ion battery chemistries that have the greatest risk of thermal runaway include lithium nickel manganese cobalt (NMC), lithium nickel cobalt aluminum oxide, and lithium-ion cobalt oxide (RSA, 2025). Lithium iron phosphate batteries (LFP) are less likely to experience thermal runaway than other lithium-ion batteries (RSA, 2025).
- Non-lithium batteries. There are several types of BESS technologies that do not use lithium-ion. The following is a list of the most common non-lithium batteries currently on the market.
  - Nickel-cadmium is a type of rechargeable battery that has a long cycle life (i.e., number of charge-discharge cycles) compared to other non-lithium ion batteries, but it consists of a toxic heavy metal (cadmium) that poses an environmental risk (City Labs, 2024). These batteries are typically used in commercial electronic products and emergency backup systems. Because this battery type has a lower energy density and greater cost than lithium-ion batteries, nickel-cadmium batteries are not a competitive alternative to using lithium-ion batteries within BESS (EASE, 2016).
  - Nickel-metal hydride batteries are rechargeable batteries that are commonly used in portable electronics and electric vehicles; they have a higher energy capacity but a shorter cycle life than nickel-cadmium batteries (EPT, 2023). While nickel-metal hydride batteries have a lower energy density and efficiency than lithium-ion batteries, they are used to store energy from small-scale renewable generation (BatteryCell, 2023).
  - Sodium-sulfur is a rechargeable battery that uses molten sodium and molten sulfur electrodes at temperatures exceeding 300 degrees Celsius. This battery type is typically used for backup power during momentary voltage drops and power outages (Poelzer, 2025). Because of the high operating temperature requirements for this technology, it is not considered suitable for widespread applications (Poelzer, 2025).

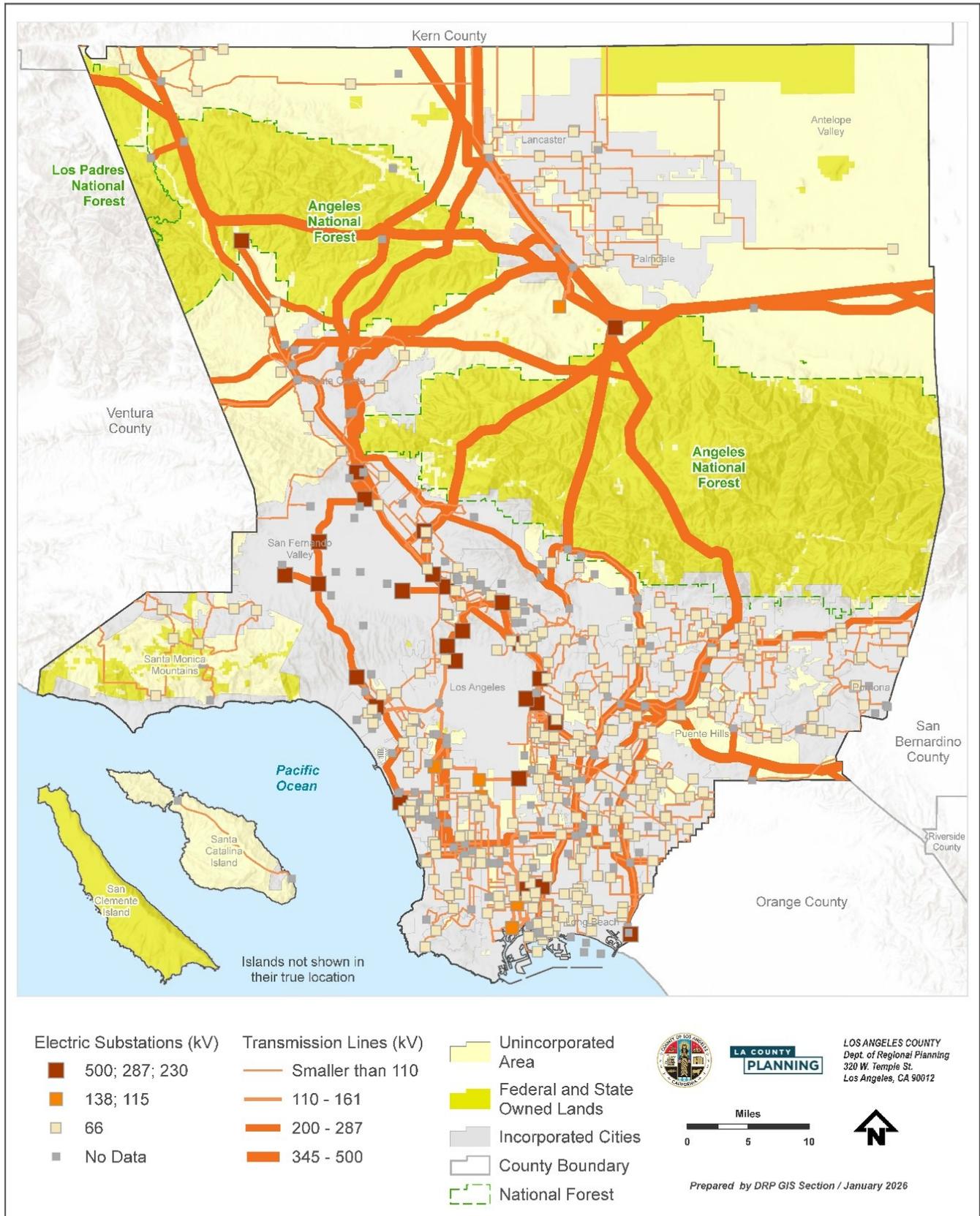
- Vanadium redox battery is a type of rechargeable flow battery that excels in long-duration energy storage, although the energy density of flow batteries is significantly lower than lithium-ion batteries. These batteries typically require large electrolyte tanks, which can limit their use in compact or portable energy storage systems (Abbasi, 2025). There are limited sources of vanadium which contribute to a supply constraint (Abbasi, 2025). An 800 MW/1,600 MWh flow battery is expected to begin construction in Switzerland and would be the world’s largest and most modern redox flow battery storage system (RSA, 2025).

**Non-battery storage systems.** Non-battery energy storage systems include alternative methods for storing electrical energy beyond conventional batteries, such as pumped hydro storage, compressed air energy storage, thermal storage, and flywheel technology.

- Pumped hydroelectric storage requires access to lower and upper water reservoirs for generation. Castaic Lake and Elderberry Lake are examples of pumped hydroelectric storage in Los Angeles County.
- Thermal energy storage uses a material such as molten salt to store energy as heat. When power is needed, the thermal energy is converted to steam to generate electricity.
- Compressed air energy storage uses power to compress air at a pressure of up to 1,000 pounds per square inch, which is typically stored in underground caverns. When electricity demand is high, the pressurized air is released to generate electricity through an expansion turbine generator. The proposed Willow Rock Energy Storage Center in the Mojave Desert in Kern County would be the first compressed air energy system in California.
- Flywheel technology uses power to accelerate a flywheel (a type of rotor) through which the energy is conserved as kinetic rotational energy. When energy is needed, the spinning force of the flywheel is used to turn a generator.

**Resource Potential within Los Angeles County.** An energy storage system does not generate electricity itself but instead stores and discharges electricity that is generated from another source (i.e., renewable or conventional generation). In order to provide grid stability and quick dispatch of power, a BESS project would be sited in proximity to existing electric infrastructure (e.g., transmission right-of-way or substation) to charge and discharge energy when needed (Twitchell et al., 2022). Siting BESS near load centers would also relieve transmission congestion in areas that may require transmission upgrades to meet growing energy demand (Bowen et al., 2019). Figure 4-4 shows the existing transmission grid and substations in LA County.

Figure 4-4: Los Angeles County Transmission System



Source: California Energy Commission, July, 2025

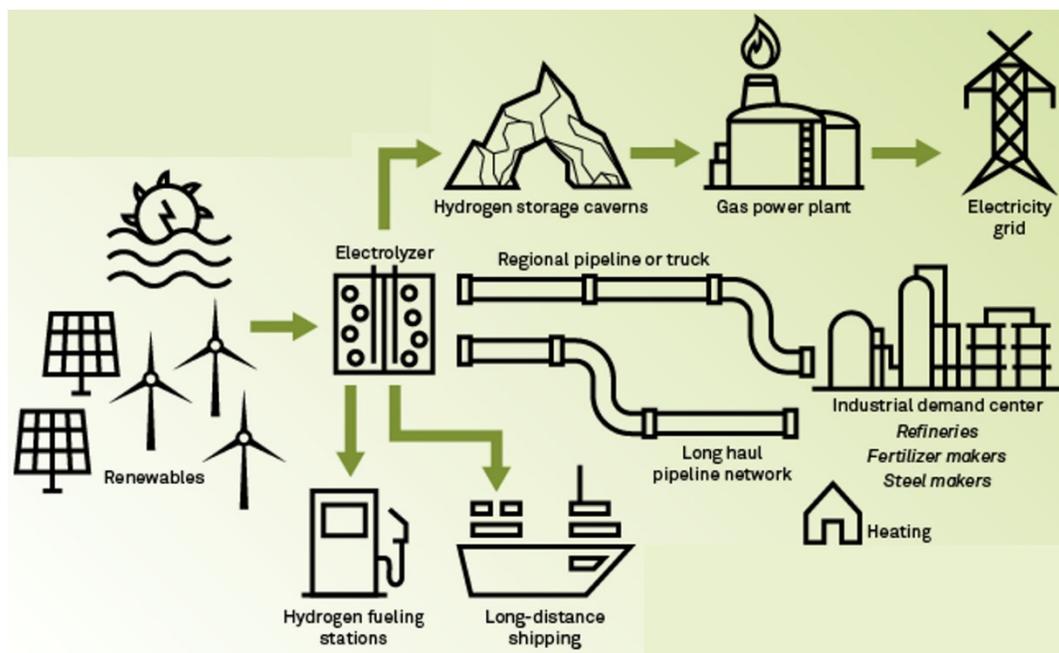
#### 4.1.4 Hydrogen Production

Hydrogen fuel, itself, is not a renewable energy resource. It must be created from an initial feedstock (i.e., raw materials used to produce fuel) and requires an energy-intensive process for production. The feedstock type determines whether the hydrogen fuel qualifies as renewable in California per SB 1505. Green hydrogen is one of many variants of hydrogen production. Green hydrogen is defined as hydrogen fuel that is created using electricity from a renewable generation source (e.g., solar, wind, or hydropower) (DOE, 2025b). While there are a number of green hydrogen production technologies that are emerging, the most established technology for producing green hydrogen is water electrolysis (i.e., splitting water molecules into hydrogen and oxygen) that is fueled by renewable energy.

Commercial-scale green hydrogen production facilities produce hydrogen through electrolysis, using renewable electricity to split water into hydrogen and oxygen. Given these input requirements, green hydrogen production facilities require access to renewable energy, water, as well as storage and transportation infrastructure as shown in Figure 4-5 (S&P, 2021). Green hydrogen can be stored in gas or liquid form, and specialized pipelines, trucks, or ships are required to transport the hydrogen fuel to end users.

Once it is created, hydrogen has a number of potential uses, such as a fuel source for fuel cell electric vehicles, an input in industrial manufacturing (i.e., petroleum, chemicals, metals), and as a natural gas replacement for use in power plants. There are currently challenges in using hydrogen within existing natural gas infrastructure (e.g., distribution and combustion equipment) due to the materials compatibility and unique combustion characteristics of hydrogen,<sup>22</sup> and further research and development in these fields are needed before hydrogen will qualify for utility-scale power generation.

**Figure 4-5 Green Hydrogen Production Process and Various End Uses**



Source: S&P, 2021

<sup>22</sup> Hydrogen embrittlement occurs when metals used for hydrogen production, transport, and storage can become brittle and fracture due to chemical reactions between the hydrogen and other metals.

## 4.2 Best Practices

This section focuses on the future of renewable energy generation and storage projects in unincorporated Los Angeles County. Section 4.2.1 identifies siting considerations and standard regulatory tools for each of the technologies discussed in this technical study. Section 4.2.2 provides examples of best practices used in California to support the development of renewable energy. Section 4.2.3 discusses approaches to streamline the permitting process for new renewable energy and storage projects.

### 4.2.1 Regulatory Strategies for Project Siting

Given the unique hazard and safety concerns for each technology, there are numerous factors to consider when siting a renewable energy facility. Key factors include zoning compatibility for the system and related electric infrastructure, availability of renewable energy resources, proximity to sensitive uses and population density, safety protocols, and environmental permitting requirements. The following discussion provides further detail on siting considerations and permitting strategies specific to each renewable energy technology.

#### Utility-Scale Solar PV

Utility-scale solar PV requires sites with high solar potential that are relatively flat and contain minimal water features or flood risks. Utility-scale facilities range in capacity from 20 MW to over 1 gigawatt (GW) and require between seven and 10 acres of land per MW produced. Because of the large land requirements for utility-scale solar, construction requires extensive grading and other site preparation activities that may contribute to stormwater runoff and create a source of fugitive dust. Implementing best management practices during project construction can substantially reduce or avoid these impacts. There has been a growing interest in co-locating compatible agricultural uses within a solar PV facility, which is described as agrivoltaics. Agrivoltaics in California typically includes sheep or goat grazing, maintaining pollinator-friendly vegetation, and beekeeping.

The following is a list of regulatory strategies that help guide the siting of utility-scale solar facilities:

- **Grid Connection.** Developers need to collaborate with utilities before site selection. There are benefits to siting solar generation in proximity to existing transmission infrastructure and for solar developers to co-locate intertie facilities adjacent to high voltage transmission. Give preference to the utilization of existing infrastructure to minimize the need for development of new high-voltage transmission infrastructure.
- **Water Use.** Utility-scale solar requires access to water during construction and operation (approximately five gallons per MWh generated) to maintain dust control and for routine panel washing. Require the applicant to prepare a groundwater impact assessment that evaluates the short and long-term impacts to groundwater usage.
- **Dust Emissions.** Fugitive dust emissions can contribute to human health concerns such as Valley Fever and asthma. Require the applicant to prepare a Fugitive Dust Control Plan that defines measures to minimize ground disturbance, soil erosion, flooding, and blowing of sand and dust.
- **Geology/Soils.** Some soil types are unstable or cannot support the weight of solar panels without sinking or shifting over time. Require the applicant to prepare a geotechnical study to identify geologic hazards that would indicate a site was unsuitable for utility-scale solar PV.
- **Safety.** Establish a buffer from airports or airstrips to avoid aviation impacts resulting from glint and glare of solar panels. Federal Aviation Administration (FAA) regulations may limit solar PV in close proximity to airports.

- **Community Character.** Establish a buffer from existing communities to avoid adverse effects on community development patterns and quality of life. The American Planning Association recommends a minimum setback of 100 feet from property lines to sufficiently buffer adjacent sensitive uses from the noise and visual impacts associated with utility-scale solar (Coffey, 2019). Tools to reduce visual impacts include minimized reflective surfaces, context-sensitive color treatments, nature-oriented geometry, minimized vegetation clearing under and around arrays, conservation of pre-existing native plants, removal of non-native vegetation, replanting of native plants as appropriate, and maintenance of natural landscapes around the edges of facility complexes.
- **Compatibility.** Give preference to projects sited on contaminated or disturbed land (industrial lands, mines, etc.). Encourage co-locating compatible uses within a solar PV facility, such as livestock grazing, pollinator-friendly habitat, and beekeeping.
- **Compensation.** Maintain a system of fees, taxation, and other compensatory tools that adequately covers the County's costs of providing necessary public services, including the costs associated with the regulation of solar project sites (i.e., permit reviews and processing, property taxes, etc.).
- **Decommissioning Plan.** Require solar facility developers to provide and implement a decommissioning plan that provides for reclamation of the site to a condition at least as good as that which existed before the lands were disturbed or another appropriate end use that is stable (i.e., with interim vegetative cover), prevents nuisance, and is readily adaptable for future alternative land uses.

### Utility-Scale Wind

Utility-scale wind development requires abundant land with sufficient mean wind speed conducive to large-scale generation, meteorological patterns, and terrain. Approximately 40 acres of land is required per each MW produced from a wind turbine. In order to be a feasible site for utility-scale wind, average annual wind speeds must be a minimum of 13 miles per hour (approximately six meters/second). The heights of utility-scale turbines range from 300 feet to over 600 feet and typically require a large concrete pad to support the turbine foundation. The exact type and size of foundation is determined by the tower design and soil properties (e.g., sand, bedrock, etc.). Given their large size, utility-scale turbines must be transported in subsections and assembled at the site. Remote locations that are difficult access may limit the feasible turbine size and design or may require expensive transportation methods such as helicopters or special purpose vehicles. Temporary road closures may be required to facilitate construction activities.

The following is a list of regulatory strategies that help guide the siting of utility-scale wind facilities:

- **Grid Connection.** Give preference to the utilization of existing infrastructure to minimize the need for development of new high-voltage transmission infrastructure.
- **Site Assessment Form.** Require all applicants for wind projects to complete a site assessment form that documents suitability of the project site (setbacks, soil conditions, interconnection requirements, wind resource data, grid proximity) as well as the turbine and tower type.
- **Siting Studies.** Require wind developers to prepare a shadow flicker study, ambient noise study, and blade throw analysis to identify potential impacts to sensitive uses.
- **Safety.** FAA regulations may limit wind generation in close proximity to airports due to the potential for safety hazards from the height of wind turbines and electrical infrastructure. Establish a buffer from airports or airstrips.
- **Color/Treatment.** Identify color treatment required for new wind turbines. Paint should be nonreflective with a patina that blends with background landscape colors.

- **Community Character.** Identify sufficient setback requirements to buffer utility-scale wind projects from existing communities to avoid adverse effects on existing and/or planned community development patterns and quality of life. Give preference to projects sited on contaminated or disturbed land (industrial lands, mines, etc.).
- **Compensation.** Maintain a system of fees, taxation, and other compensatory tools that adequately covers the County’s costs of providing necessary public services, including the costs associated with the regulation of solar project sites (i.e., permit reviews and processing, property taxes, etc.).
- **Decommissioning Plan.** Require wind facility developers to provide and implement a decommissioning plan that provides for reclamation of the site to a condition at least as good as that which existed before the lands were disturbed or another appropriate end use that is stable (i.e., with interim vegetative cover), prevents nuisance, and is readily adaptable for future alternative land uses.

### Energy Storage Systems

As the Board of Supervisors motion directs LA County Planning to incorporate BESS into the zoning code update, the energy storage system information presented in this technical study is focused on battery technologies.

Battery Energy Storage Systems (BESS) have proven to be important components of integrating renewable generation sources into the transmission grid. A BESS that is sited in conjunction with a renewable energy generation facility allows for the capture and storage of surplus energy generated, particularly from excess solar generation during the day. The stored energy can be discharged during other times as needed, such as the critical 4 p.m. to 9 p.m. period in the summer months when thousands of megawatts of solar are coming off the system, and conventional generation must come online.

Identifying the optimal locations for installing BESS in unincorporated Los Angeles County involves a strategic assessment of areas with high renewable energy generation and robust grid infrastructure. For example, deploying BESS in areas where existing solar installations are present can help manage the intermittency of solar power. The development of a BESS facility requires adequate land, proximity to an energy source for charging (i.e., renewable generation, conventional generation, or transmission), and access to the electric grid for discharging stored electricity. Land requirements for a BESS must consider the size of the facility as well as emergency access needs and required setbacks. Examples of land requirements range from 0.5 acre for a 20-MW BESS to 24 acres for a 600-MW BESS.

An optimal BESS site would be located near a section of the transmission grid that experience congestion or reliability issues. Deploying BESS in these areas can alleviate congestion, defer costly infrastructure upgrades, and improve overall grid reliability. Examples may include areas that have experienced grid congestion due to high electricity demand and limited transmission capacity; areas that have faced power reliability challenges during wildfire season; and urban load centers.

The most common public concerns with BESS facilities are public safety and noise. Public safety concerns are primarily focused on potential toxic air emissions (i.e., off-gassing) during a thermal runaway event. Noise concerns are specific to the operational noise generated from the BESS thermal management systems, power conversion systems, and transformers. This noise is often tonal in character which is more noticeable than other background sounds. Los Angeles County can address noise concerns during siting and design of a BESS facility by requiring a buffer between a BESS facility and sensitive uses, and by requiring the applicant to select and orient equipment with the intent of minimizing noise.

The following is a list of regulatory strategies that help guide the siting and design of BESS:

- **Community Safety.** Establish a buffer from sensitive uses such as residences, schools, day care facilities, and nursing homes to minimize exposure to emissions in the event of an incident. The U.S.

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Environmental Protection Agency recommends a minimum 330-foot isolation zone for a large commercial BESS facility (USEPA, 2025b).

- **Noise Control.** Require the applicant to conduct acoustical modeling of the proposed BESS equipment and site layout to characterize noise levels (e.g., noise source, spectral characteristics, directivity of noise, etc.). If modeled noise levels exceed County thresholds, require the applicant to incorporate noise control measures and to provide subsequent modeling that demonstrates the effectiveness of the control measures. Examples of noise control measures may include, but not be limited to, the following (NMS, 2024):
  - Re-orientation of BESS equipment;
  - Installation of a sound wall;
  - Reduction in battery fan speed; and
  - Installation of silencers on battery fans and power conversion system air intakes and vents.

Require the applicant to conduct noise compliance monitoring once the BESS facility is online. If the BESS facility exceeds County noise thresholds, require the applicant to implement additional noise control measures that lower noise levels to within the allowable threshold.

- **Emergency Training.** Require training for BESS facility employees and management that addresses emergencies including command and control, emergency response, and evacuation. Employees should be required to participate in annual training updates. The training programs should include a joint component with the local fire department.
- **BESS Technical and Safety Data Sheets.** All applicants for BESS projects must provide technology-specific data sheets to County staff as part of the permit review. The technical and safety data sheets should include: (1) details on the BESS chemistry and system components; (2) the hazardous properties of the BESS; (3) BESS safety precautions; and (4) specifications on BESS storage and disposal.
- **Emergency Response and Emergency Action Plan.** Applicants must work with emergency response providers [e.g., Los Angeles County Fire Department (LACoFD)] to prepare an Emergency Response and Emergency Action Plan (EREAP) specific to a proposed BESS project. The EREAP should include fire safety components, emergency response procedures, and emergency evacuation procedures.
  - Fire safety components: The EREAP should include BESS facility schematic drawings and technical specifications; guidelines for regular inspections of the BESS facility; identification of emergency ingress and egress routes; special safety measures to be implemented for battery installation, replacement, and disposal; and provisions and timing for updating the EREAP.
  - Emergency response procedures: The EREAP should include emergency contact information for the BESS owner and technology provider; emergency shutdown procedures; alarm response procedures; handling procedures for damaged energy storage systems equipment; and schedules for conducting emergency drills.
  - Emergency evacuation procedures: The EREAP should include procedures for notifying local responders, BESS system owner, and BESS technology provider; evacuation procedures for a minimum initial evacuation zone in the event of a thermal runaway and/or fire; evacuation procedures for an emergency evacuation zone in the event of off-gassing; establishment of shelter-in-place orders; and establishment of road closures and notifications.
- **Compensation.** Maintain a system of fees, taxation, and other compensatory tools that adequately covers County costs of: (1) providing necessary public services; (2) regulation of energy storage project sites (i.e., permit reviews and processing, property taxes, etc.); and (3) training/staffing of fire

protection staff for LACoFD. Require BESS developers to fund training of a dedicated and specialized unit within LACoFD to handle BESS risk of upset issues and incidents.

- **Decommissioning Plan.** Require BESS developers to provide and implement a decommissioning plan that provides for reclamation of the site to a condition at least as good as that which existed before the lands were disturbed or another appropriate end use that is stable (i.e. with interim vegetative cover), prevents nuisance, and is readily adaptable for alternative future land uses.

## Green Hydrogen

Green hydrogen is specifically created using electricity from a renewable generation source (e.g., solar). Because hydrogen facilities are energy intensive (i.e., requiring approximately 5,280 MWh/day), a green hydrogen facility would need to be sited near a utility-scale renewable energy generation facility (NREL, 2023c). As such, the amount of land required for a green hydrogen facility would include the acreage of the renewable energy generation that supports the hydrogen facility, unless the hydrogen facility is constructed near an existing source of renewable energy. A study by the National Renewable Energy Laboratory found that a 100,000 kg/day green hydrogen facility could be powered by an 800-MW solar electricity, which would require approximately 4,000 acres for the solar facility and 150 acres for the hydrogen facility (NREL, 2023c).

The following is a list of regulatory strategies that help guide the siting of green hydrogen facilities:

- **Community Safety.** Establish a buffer from sensitive uses such as residences, schools, day care facilities, and nursing homes. Consider proximity of sensitive biological areas and agricultural resources to possible hazards exposure.
- **Hydrogen Facility Data Sheets.** All applicants for hydrogen projects would provide facility-specific information to County staff as part of the permit review. Information would include facility type (e.g., enclosed versus open-air); facility systems and components for production, storage, and transportation; setbacks from oxygen storage valves and hydrogen pressure valves; and emergency access.
- **Emergency Training.** Require training for hydrogen facility employees and management that addresses emergencies including command and control, emergency response, and evacuation. Employees should be required to participate in annual training updates. The training programs should include a joint component with the local fire department.
- **Emergency Response and Emergency Action Plan.** Applicants must work with emergency response providers (e.g., LACoFD ) to prepare an Emergency Response and Emergency Action Plan (EREAP) specific to a proposed hydrogen facility. The EREAP should include fire safety components, emergency response procedures, and emergency evacuation procedures.
  - Fire safety components: The EREAP should identify hydrogen facility safety measures, such as fire protection walls, safety barriers, hydrogen gas detectors, water sprinkler system, emergency shutdown system, safety vent system, handheld fire extinguishers, and hydrogen flame detectors. The EREAP should also include guidelines for regular inspections of the hydrogen facility, identification of emergency ingress and egress routes, and provisions and timing for updating the EREAP.
  - Emergency response procedures: The EREAP should include emergency contact information for the hydrogen facility owner, emergency shutdown procedures, alarm response procedures, and schedules for conducting emergency drills.

- Emergency evacuation procedures: The EREAP should include procedures for notifying local responders and hydrogen facility owner; evacuation procedures; establishment of shelter-in-place orders; and establishment of road closures and notifications.

## Distributed Generation

While the REO update is focused on regulations for Front-of-the-Meter utility-scale renewable energy, the County of Los Angeles has a number of policies within its Sustainability Plan and CAP to encourage the development of Behind-the-Meter distributed generation as a means of enhancing energy resilience within the County. Distributed renewable energy generation refers to the generation of solar or wind electricity at or near its point of use. Distributed generation may serve a single home, business, public utility use (e.g., reservoir, pump station, wastewater facility, etc.), or manufacturing facility, or it may be part of a microgrid. Strategies for siting distributed generation may include development incentives and streamlined permitting at preferred sites. The following strategies would help meet the County’s planning goals and policies for distributed generation:

- **Preferred Sites.** Encourage distributed solar or wind generation facilities on disturbed or degraded sites. Encourage the use of solar panels on rooftops, covered parking, and as shade structures.
- **Distributed Wind Site Assessment.** Require all applicants for distributed wind projects to complete a site assessment form that documents suitability of the project site (setbacks, soil conditions, interconnection requirements, wind resource data, grid proximity) as well as the turbine and tower type.
- **Accessory Solar Energy Permitting.** Permit rooftop, parking lot, and similar accessory solar energy facilities that primarily serve on-site energy needs in all zoning districts, including microgrid systems, with minimal regulation and permitting requirements. Note that per CEQA §21080.35, many of these types of installations qualify for a CEQA Statutory Exemption.
- **Incentives.** Consider the following incentives to encourage distributed solar on existing and new development:
  - Encourage installation of solar panels on rental properties, multi-family buildings, and buildings with multiple commercial tenants by working with property developers and owners (e.g., Solar on Multifamily Affordable Housing [SOMAH] Program).
  - Consider development incentives such as density bonuses and streamlined permitting for projects that install accessory renewable energy facilities.
  - Allow developers of nonresidential properties to reduce required on-site parking spaces below minimum standards when space equivalent to the parking space reduction is devoted to renewable energy generation and storage facilities designed to serve onsite energy needs.

## Grid Interconnection

The energy grid within Los Angeles County consists of a high-voltage transmission network (ranging from 70 kV to 500 kV) that is operated by SCE or LADWP, regulated by the CPUC, and is guided by CAISO, the State’s power balancing agency. The subtransmission network (ranging from 34.5 kV to 69 kV) transmits electricity from the major transmission system to regional distribution substations, and the distribution network (up to 33 kV) includes the remainder of the system that transmits electricity to the end user.

Wholesale power producers are those that would need to apply for an interconnection to the CAISO-controlled transmission system. Such projects would generally involve planning for transmission-grid impact, tend to be over 20 MW, and are more likely to trigger site-specific environmental review. Retail

interconnection occurs when there is no export of power sales to the CAISO-controlled transmission system, and therefore, this scale of generation relies on serving the loads within the distribution system.

The electric system infrastructure provides the best opportunities for new localized energy when the generator of the electricity is matched well with a load. The following regulatory strategies may help guide interconnection of new renewable energy projects.

- **Point of Interconnection.** Prior to submitting a renewable energy project application, a developer must check with the electric utility supplying power for a potential grid interconnection site, as locations are constantly varying due to the demands on the electric grid, generation sources, and needs for infrastructure updates.
- **Proximity to Substations.** A substation serves as a junction in the transmission grid where the voltage of electricity is stepped up for transmission or stepped down for distribution. When electricity is generated at a solar or wind facility, a substation is used to increase the voltage for long-distance transmission through the grid. Because batteries operate at low voltages, connection to a substation is also necessary to integrate a BESS with a transmission grid. Siting of new renewable energy and storage facilities near existing substations avoids the construction of new electrical infrastructure to connect these facilities to the transmission grid.

#### 4.2.2 Case Studies

Reviewing the development, operations, and decommissioning of renewable energy projects can provide useful insight into siting and permitting considerations and the effectiveness of regulatory tools. Each case study below briefly highlights a renewable energy project's successes and challenges, lessons learned, and applicability to the County's renewable energy development goals. Additional case studies are available in Appendix A.

##### Antelope Valley Solar

Antelope Valley Solar is a 242-MW solar PV facility that occupies 2,100 acres in the Antelope Valley area of unincorporated Los Angeles County. This facility was one of the largest solar PV projects in the world at the time it was built (fully operational in April 2014).

**Successes and Challenges.** This utility-scale solar project generates enough electricity to power the equivalent of 75,000 homes per year. Fugitive dust was an ongoing challenge during construction, and both construction crews and local communities were subject to an increased risk of Valley Fever during the construction phase.

**Lessons Learned.** Stringent construction measures were implemented to minimize fugitive dust, such as daily watering of graded sites, and halting ground disturbance activities during high wind events. Workers were provided with National Institute of Occupational Safety and Health (NIOSH)-certified respiratory protective equipment to protect against exposure to dust and fungi spores.

**Applicability to the County of Los Angeles.** Development of utility-scale solar PV in unincorporated Los Angeles County has been concentrated in the Antelope Valley given its abundance of relatively flat land, which is a key siting requirement for this technology, large parcels and resource potential. The Antelope Valley also contains the second highest number of Valley Fever cases in Los Angeles County (LADPH, 2022).<sup>23</sup> Important siting considerations for new development of utility-scale solar include the following: (1) avoiding locations near sensitive uses (i.e., residences, schools, day care and senior care facilities, and

<sup>23</sup> According to the U.S. Centers for Disease Control and Prevention (CDC), the highest number of Valley Fever cases in Los Angeles County were reported in the San Fernando Valley (LADPH, 2022).

recreation sites), (2) construction measures to minimize fugitive dust, and (3) NIOSH-certified protective equipment and training to protect workers from exposure to dust and fungi spores.

### **Alta Wind Energy Center**

Alta Wind Energy Center is a 1,550-MW wind facility that encompasses 3,200 acres in southeast Kern County and in a Wind Energy Combining District. The facility consists of multiple wind projects constructed over 11 phases, with the first phase commissioned in 2011. It is currently one of the largest wind energy facilities in the world.

**Successes and Challenges.** Wind energy facilities are typically concentrated in areas that have high wind resource potential, but siting wind facilities can be restricted by a lack of transmission capacity to these wind resource areas. Concentrated development of wind turbines also increases the risk of collision impacts for birds and bats. Installing wind turbines along ridgelines requires extensive construction or improvement of access roads to transport large turbines and equipment.

**Lessons Learned.** Micrositing, which is defined as the precise placement of wind turbines to optimize performance, can help avoid impacts to sensitive resources. Utility-scale wind facilities are compatible with certain land uses that include ranching and off-highway vehicle recreation. However, due to their nuisance effects (i.e., noise and shadow flicker), utility-scale wind facilities are not compatible near sensitive uses.

**Applicability to the County of Los Angeles.** Utility-scale wind facilities nearest to Los Angeles County are located in the mountainous regions that are north and east (e.g., Tehachapi Pass in Kern County and San Geronio Pass in Riverside County). The feasibility of utility-scale wind development within unincorporated Los Angeles County would depend on locating a site that meets the suitability requirements for this technology, specifically: sufficient wind speed, available acreage, grid proximity, suitable soil conditions, and sufficient distance from sensitive uses.

### **Distributed Solar at Point Reyes Farmstead Cheese Company**

Point Reyes Farmstead Cheese Company is a commercial dairy farm and creamery that installed a 217-kW solar rooftop system on the creamery and packaging building and the cold storage warehouse. The solar panels have been operational since 2021.

**Successes and Challenges.** The solar rooftop system had a large upfront cost but it allowed the company to reduce its electricity costs by approximately 56%. Due to these energy savings, the company will recover the costs of the solar panel system in approximately six years.

**Lessons Learned.** The company's cheese making activities are energy intensive. The solar rooftop system allowed the company to expand its cheese making operations while offsetting the increased electricity costs. Because the company had limited roof space, the company purchased a higher efficiency solar rooftop system in order to maximize its electricity production.

**Applicability to the County of Los Angeles.** The upfront cost to install a distributed solar energy system can be a barrier to businesses and homeowners. Opportunities to lower this upfront cost through bulk purchasing programs, grants, or local tax incentives could facilitate the expansion of distributed solar development. Energy intensive operations such as manufacturing and production may receive the greatest cost savings from a distributed solar energy system.

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## Distributed Wind at Palmdale Water District

Palmdale Water District (PWD) installed a 237-foot-tall distributed wind turbine in 2004 to offset the electricity used at its Leslie O. Carter Treatment Plant in the City of Palmdale. The 950-kW turbine operated for 20 years prior to being decommissioned.

**Successes and Challenges.** PWD received State funding to offset the costs of purchasing and installing the turbine. The electricity generated from the turbine allowed PWD to recover their costs in less than 10 years. During the life of the turbine, PWD faced challenges with finding parts and qualified technicians to repair and maintain the turbine. The turbine also needed substantial maintenance after approximately 12.5 years to upgrade the turbine's mechanics.

**Lessons Learned.** PWD experienced the greatest saving in energy costs (ranging from 30% to 50% in savings) when the treatment plant was operating. During the initial approval process, the turbine faced public opposition. In 2022, PWD approved replacing the wind turbine with two distributed solar energy systems that are a more efficient energy technology and would further reduce PWD's energy costs over their estimated 25-year lifespan.

**Applicability to the County of Los Angeles.** Similar to distributed solar, the cost of installing and maintaining a distributed wind turbine can be a barrier to businesses and homeowners. There are a number of site suitability requirements for this technology such as sufficient average wind speed and available acreage which may create additional barriers to development within the County of Los Angeles. Given that the average height of a midsize distributed wind turbine is 250 feet, wind turbines generally face opposition when proposed near residences and other sensitive uses.

## Gateway Energy Storage

Gateway Energy Storage is a 250-MW lithium-ion battery storage system (BESS) located in the Otay Mesa community of San Diego County. It occupies a 4-acre site that is adjacent to the Pio Pico Energy Center and Otay Mesa Energy Center. The battery technology utilizes nickel-manganese-cobalt lithium-ion batteries (USEPA, 2025c).

**Successes and Challenges.** The Gateway BESS facility is housed in five pre-engineered metal buildings totaling 68,000 square feet. On May 15, 2024, a fire began in one of the facility buildings which required evacuation of businesses in the immediate vicinity. After the fire was initially contained, it re-ignited multiple times and caused major damage to the battery containment building. Approximately 40 firefighters and a County hazardous materials (hazmat) team remained at the site for 17 days. Cal Fire officials estimated that eight million gallons of water was used during the fire response. The County's hazmat team determined that the smoke from the fire and from the water runoff during firefighting activities did not contain toxic levels (Nikolewski, 2024).

**Lessons Learned.** California Energy Commission investigated the thermal runaway event and concluded that the facility's BESS safety protocols worked correctly. The fire department was sufficiently trained in emergency response and there were no injuries to onsite staff, the firefighters, or the public. The Gateway Energy Storage fire illustrated the challenges of extinguishing a utility-scale BESS fire that is housed inside a dedicated and enclosed building.

**Applicability to the County of Los Angeles.** Industry experts are continuing to update the standards and guidelines for installing and maintaining BESS facilities. The National Fire Protection Association (NFPA) is currently preparing its 2026 edition of NFPA 855 (Standard for the Installation of Stationary Energy Storage Systems), which includes updated engineering design considerations and current practices for preventing explosions and safely containing fires. While NFPA 855 is a standard and not a code, local jurisdictions such as the County of Los Angeles may require BESS facilities under County review to comply

with NFPA 855 standards. Other key planning and siting considerations include: (1) avoiding BESS sites near sensitive uses (e.g., residences, schools, hospitals, etc.) in order to minimize those affected by an emergency evacuation or shelter in place order; (2) require emergency response plan coordination with local first responders (fire, police, hazmat teams); (3) require sufficient training for emergency response providers that is specific to the installed battery technology.

### **Plug Green Hydrogen Production in Georgia**

Plug Power began operating its green hydrogen production facility in Woodbine, Georgia in 2024. The 20-acre site contains eight 5-MW electrolyzers that create clean hydrogen fuel by separating water into hydrogen and oxygen. Liquid hydrogen fuel is used for several applications that include fuel cell electric vehicle fleets, material handling operations, and stationary power applications.

**Successes and Challenges.** The green hydrogen facility in Georgia is the largest liquid hydrogen production facility in the U.S., creating 15 metric tons of liquified hydrogen daily. However, liquified hydrogen production is water and energy intensive. In Georgia, the Plug facility's water usage will exceed the developer's original predicted water use, and the operator is attempting to secure permits to allow the extraction of groundwater from the Georgia Department of Natural Resources. Furthermore, future development of liquid hydrogen production facilities requires investments in infrastructure for hydrogen fuel transport and storage.

**Lessons Learned.** Intensive water use has created public concerns with hydrogen production. Plug Power has indicated it would invest in more water treatment plants near current and future production facilities to utilize recycled water. Because the current energy market is dominated by fossil fuels, future investment in green hydrogen facilities also requires financial incentives. However, federal funding for green hydrogen development is uncertain under the current federal administration. In May 2025, the Department of Energy terminated 24 awards that were issued by the Office of Clean Energy Demonstrations for programs such as the Regional Clean Hydrogen Hubs (H2Hubs) (DOE, 2025d).

**Applicability to the County of Los Angeles.** The future of hydrogen fuel as an alternative to fossil fuel in Los Angeles County is uncertain given the lack of federal funding to support large-scale infrastructure development for transport and storage of hydrogen fuel. A suitable site in Los Angeles County must either have access to renewable electricity from an existing solar or wind energy facility, or must have sufficient acreage to allow construction of a new solar or wind energy facility to support the production of green hydrogen. A suitable site must also have sufficient access to water (e.g., 755 acre-feet of water annually for a 100,000 kg/day production facility). Similar to BESS facilities, the siting of a hydrogen production facility should avoid proximity to sensitive uses in the event of a fire, explosion, or hydrogen gas release at the facility. Hydrogen production facilities under County of Los Angeles review may also be required to coordinate emergency response plans with local first responders (fire, police, hazmat teams) as well as provide sufficient training for emergency responders.

## **4.3 Renewable Energy Development Parameters**

### **4.3.1 Siting Considerations within Los Angeles County**

This section identifies siting considerations within unincorporated Los Angeles County.

#### **Zoning Considerations**

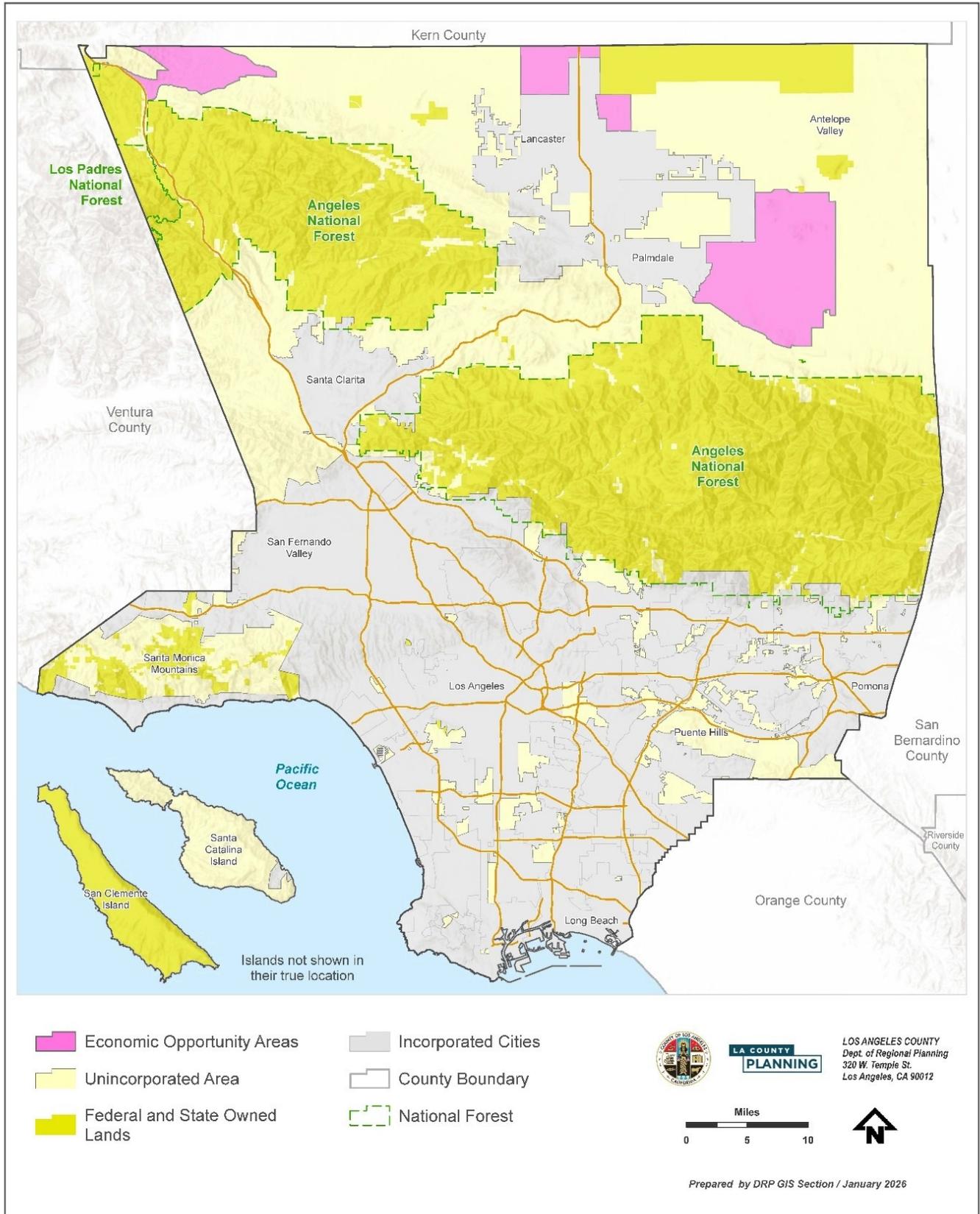
The Los Angeles County Zoning Code (Los Angeles County Code Title 22 - Planning and Zoning) divides the unincorporated area of the County into the following classes of zones:

- **Agricultural, Open Space, Resort and Recreation, and Watershed Zones.** These zones consist primarily of lands for agricultural uses or are in natural resource areas which limit dwellings and accessory uses. These zones provide areas for agricultural operations, open space, recreation, natural resource industries, or natural resource protection.
- **Residential Zones.** Residential Zones preserve, protect, and enhance areas for residential land uses in a range of densities; provide for orderly, well-planned, and balanced growth of residential neighborhoods; and ensure adequate light, air, privacy, and open space for each dwelling. These zones also provide for the appropriate location of public and semi-public uses such as schools, parks, and religious facilities that can serve and complement residential uses.
- **Commercial Zones.** Commercial Zones provide for the orderly, well-planned, and balanced growth of commercial districts; support commercial activity to meet the needs of the community, strengthen the County's tax base; and provide appropriate transitions between commercial and residential uses to promote commercial opportunities and preserve residential quality of life.
- **Industrial Zones.** Industrial Zones provide for the orderly, well-planned, and balanced growth of industrial districts and designate adequate land for the growth of employment centers in the County. Regulations in the Industrial Zones encourage all types of industrial establishments to achieve compatibility in the characteristics of their activities and processes in a manner that strives to be harmonious with surrounding community character and nearby sensitive uses.
- **Rural Zones.** These zones are established to implement the policies of preserving and maintaining the rural character of rural towns as identified in the General Plan.
- **Special Purpose Zones.** These zones include Institutional, Mixed Use Development, Specific Plan, and Restricted Parking.

Of the zones listed above, Agricultural, Commercial, and Industrial zones contain appropriate zoning and parcel sizes for consideration of development for the various utility-scale renewable technologies discussed in Section 4.1. Zones established to preserve primarily sensitive uses (such as Residential) would not be compatible for siting of utility-scale renewable energy facilities.

Economic Opportunity Areas (EOAs) are defined in the Antelope Valley Area Plan (see Figure 4-6). These areas were identified as having, "tremendous potential for economic growth and development. Thus, any development induced by [the High Desert Corridor and the Northwest 138 Corridor Improvement Project] should be guided to these areas so that the areas around them can be preserved and maintained at low density, or agricultural uses." The current REO prohibits utility-scale renewable development in the EOAs. However, the EOAs contain appropriate zoning and parcel sizes to support renewable energy development. Choosing to allow utility-scale renewable energy in the EOAs could support the Antelope Valley Area Plan's intentions to preserve the surrounding low density and agricultural uses.

Figure 4-6: Economic Opportunity Areas



Source: LA County Planning, January, 2026

The zoning code also establishes "Combining Zones" as additional zone designations to be used in combination with the basic zones. These include:

- **(-BE) Billboard Exclusion** is established to exclude new outdoor advertising signs in designated commercial and industrial areas within the County where such signs could cause hazards to pedestrians and motorists, or detract from the appearance or character of such areas, or be detrimental to an important aspect of the economic base of such areas. Zone (-BE) may be used for any use permitted in the basic zone, subject to the same standards and limitations, except that outdoor advertising signs are prohibited.
- **(-DP) Development Program** is established to provide a zone in which development occurring after a property has been rezoned, will conform to plans and exhibits submitted by the applicant in instances where such plans and exhibits constitute a critical factor in the decision to rezone. Adherence to such developmental plans is assured by the requirement of submission and approval of a Conditional Use Permit (Title 22, Chapter 22.158) incorporating a development program by the applicant providing necessary safeguards to insure completion as specified.
- Property in Zone **(-P) Parking** may be used for any permitted use or use subject to permit in the basic zone, subject to the same permit or review application and standards, or parking facilities.
- **(-IP) Industrial Preservation** is intended to preserve industrially-zoned properties specifically for current and future industrial uses, labor-intensive activities, wholesale sales of goods manufactured on-site, major centers of employment, and limited employee-serving commercial uses.
- **(-GZ) Green Zone** is a Combining Zone established to identify industrially-zoned parcels, including those in a Specific Plan, that are within a 500-foot radius of a lot containing a sensitive use, and therefore, subject to specific land use regulations. The Green Zone promotes environmental justice in communities that are disproportionately affected by toxic pollutants and contaminants generated from various land uses over time. It provides regulations and procedures for new and existing land uses to ensure that such land uses will be operated in consideration of the surrounding sensitive uses as defined in Title 22, Chapter 22.14 (Definitions), minimizing potential adverse health and safety impacts, and promoting clean industrial uses.

Through the Green Zone Ordinance, the Zoning Code has defined "Sensitive Use" as a land use where individuals are most likely to reside or spend time, including dwelling units, schools and school yards - including trade schools, public and private schools, faith-based and secular schools, parks, playgrounds, daycare centers, preschools, nursing homes, hospitals, licensed care facilities, shelters, and daycares or preschools as accessory to a place of worship, that are permitted in the zones where they are located. A sensitive use shall not include a caretaker residence or a legal, nonconforming residence in an industrial zone. The Green Zone Ordinance establishes a 500-foot buffer around these identified sensitive uses, and establishes development and operation requirements for Industrial uses within that buffer.

The buffer used in the Green Zone Ordinance may serve as a precedent for the REO. A similar consideration of distance from sensitive uses may be appropriate for siting of utility-scale facilities such as BESS and Green Hydrogen, due to their safety risks.

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## Environmental Considerations

This section identifies siting considerations related to existing biological and environmental resources, hazards, as well as existing energy infrastructure within unincorporated Los Angeles County.

- **Brownfields.** Brownfields, which are illustrated in Figure 4-7, are defined as properties where expansion, redevelopment or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant. Brownfields may offer existing infrastructure or grid connectivity, and redeveloping these disturbed or polluted lands avoids land-use conflicts and protects pristine natural habitats.
- **Vacant parcels.** Vacant parcels, which are illustrated in Figure 4-8, are unincorporated parcels that have been identified by the Assessor as Vacant. Typically, vacant parcels are privately-owned, undeveloped land and are sometimes identified as irrigated farmland by the Assessor. Vacant parcels that meet zoning and size requirements may offer space and flexibility to support utility-scale renewable energy development.
- **Oil Wells.** Oil wells, which are illustrated in Figure 4-9, are identified in the California Department of Conservation Geologic Energy Management Division's Well Statewide Tracking and Reporting System, or WellSTAR. Inactive oil well sites may be ideal for development of renewable energy facilities. Similar to brownfields, existing infrastructure and redeveloping already disturbed land make these sites ideal for renewable energy facilities.
- **Environmentally Sensitive Sites.** An environmentally sensitive site (see Figure 4-10) includes the areas identified below. Their ecological significance makes them less ideal for siting certain renewable energy projects. Additional details including data sources can be found in Appendix C.
  - California Protected Areas Database (CPAD)
  - Critical Habitat
  - DOC- designated Prime Farmland and Farmland of Statewide Importance
  - Flood Hazard Zones
  - Floodway
  - Hazardous Waste Sites
  - Wetlands
- **Sensitive Uses.** Sensitive Use sites (see Figure 4-11) are sites in which people are likely to be. For the purpose of this analysis sensitive uses were defined consistent with Title 22.14.190. Sensitive uses are identified below. Additional details including data sources can be found in Appendix C.
  - Adult Care Facilities
  - Child Care
  - Hospitals
  - Parks
  - Preschools and Early Learning Care Sites
  - Residential Uses
  - Retirement Communities
  - Schools

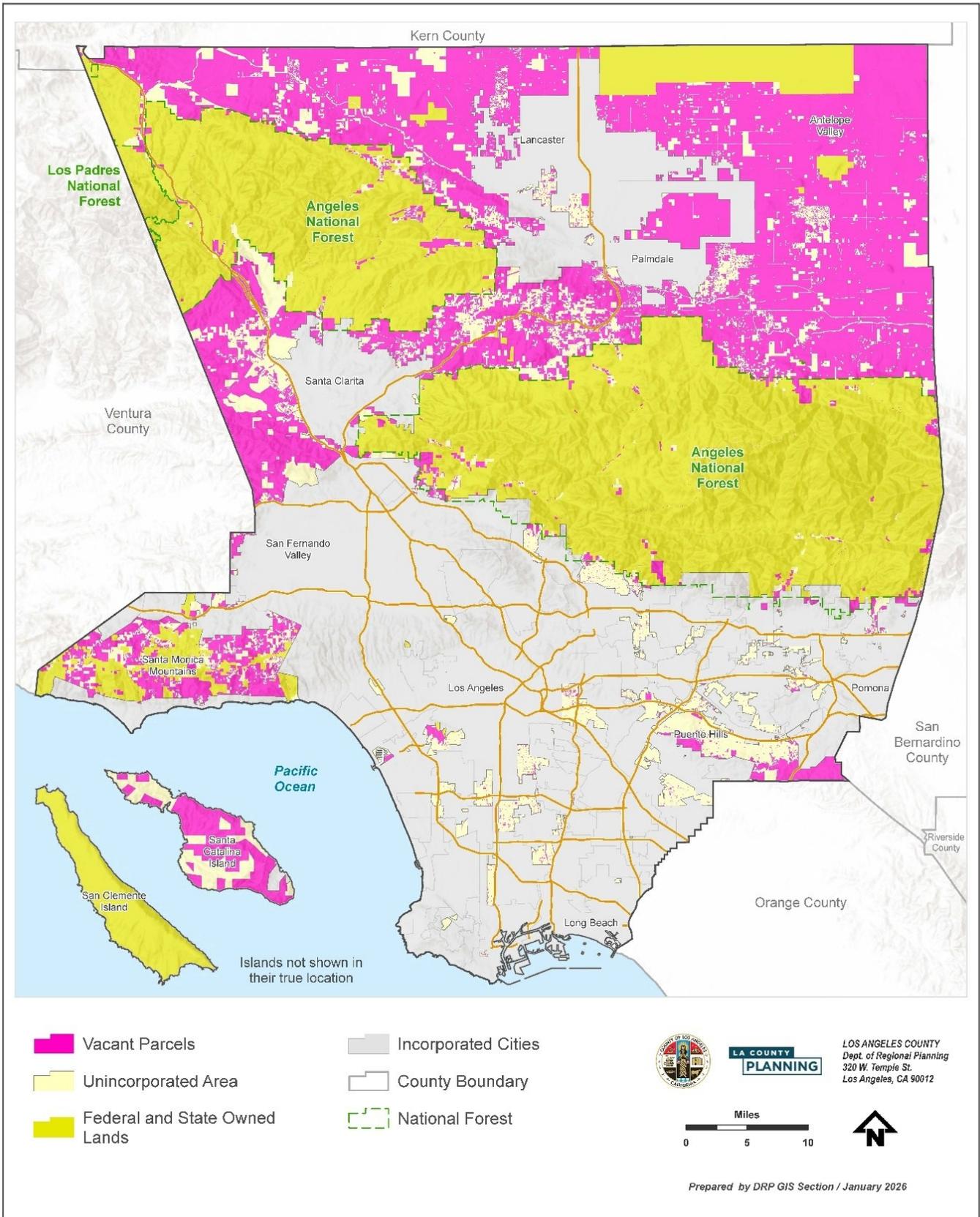
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- Shelters
  - **Significant Ecological Areas (SEAs).** SEAs, which are illustrated in Figure 4-12, are officially designated areas within Los Angeles County with irreplaceable biological resources. The SEA Program objective is to conserve genetic and physical diversity within Los Angeles County by designating biological resource areas that are capable of sustaining themselves into the future. Renewable energy development should not occur within identified SEAs so as not to conflict with biological resources.
  - **Antelope Valley Regional Conservation Investment Strategies (RCIS).** An RCIS (see Figure 4-13) is a voluntary, non-regulatory, and non-binding conservation plan designed to incentivize and guide investments in resource conservation. The RCIS program went into effect on January 1, 2017, and is administered by the California Department of Fish and Wildlife. An RCIS for the Antelope Valley was finalized in 2021 and identifies guidance for conservation. Areas identified in the Antelope Valley RCIS should be avoided to support the effort’s conservation goals. As the RCIS is broad, specific elements that should be looked at include:
    - Natural Communities of Conservation Importance in the Antelope Valley RCIS Area
    - Protected Areas in the Antelope Valley RCIS Area (subset of data selected are the Areas of Critical Environmental Concern [ACEC])
    - Joshua Tree High Conservation Value Habitat (Desert Species Group)
  - **Very High Fire Hazard Severity Zones.** The State Fire Marshal is mandated to classify lands within State Responsibility Areas into Fire Hazard Severity Zones (FHSZ). Fire Hazard Severity Zones fall into one of the following classifications: Moderate, High, and Very High. Projects that conflict with safety response to fire should be avoided in a Very High FHSZ (VHFHSZ), which are illustrated in Figure 4-14. For example, BESS technologies that are prone to thermal runaway would not be suitable in a VHFHSZ. Similarly, the flammability of hydrogen fuel, which can create an explosion, should be considered when siting a green hydrogen facility within a FHSZ. Other technologies (Solar, Wind, non-lithium-ion BESS) may be better suited in a VHFHSZ as they do not present the same risks associated with thermal runaway or explosions.
  - **Grid Proximity.** There are benefits to siting solar generation in proximity to existing transmission infrastructure and for solar developers to co-locate intertie facilities adjacent to high voltage transmission (see Section 4.1.3, Figure 4-4). Siting projects in proximity to the existing grid gives preference to the utilization of existing infrastructure, minimizes the need for development of new high-voltage transmission infrastructure, and allows for quick dispatch of power. When projects are sited near load centers, they also relieve transmission congestion in areas that may require transmission upgrades to meet growing energy demand (Bowen et al., 2019).
  - **SB 535 Disadvantaged Communities.** Disadvantaged communities, which are illustrated in Figure 4-15, were designated by the California Environmental Protection Agency (CalEPA) for the purpose of SB 535. These areas represent the 25% highest scoring census tracts in CalEnviroScreen 4.0, census tracts previously identified in the top 25% in CalEnviroScreen 3.0, census tracts with high amounts of pollution and low populations, and federally recognized tribal areas as identified by the Census in the 2021 American Indian Areas Related National Geodatabase (SB 535 Communities are further described in section 4.3.3). Disadvantaged communities have historically faced a disproportionate burden of environmental hazards and pollution. While it is important that disadvantaged communities experience the benefits of clean energy, adding more large-scale infrastructure may be seen as continuing this pattern of inequitable development.
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Figure 4-7: Brownfield Parcels



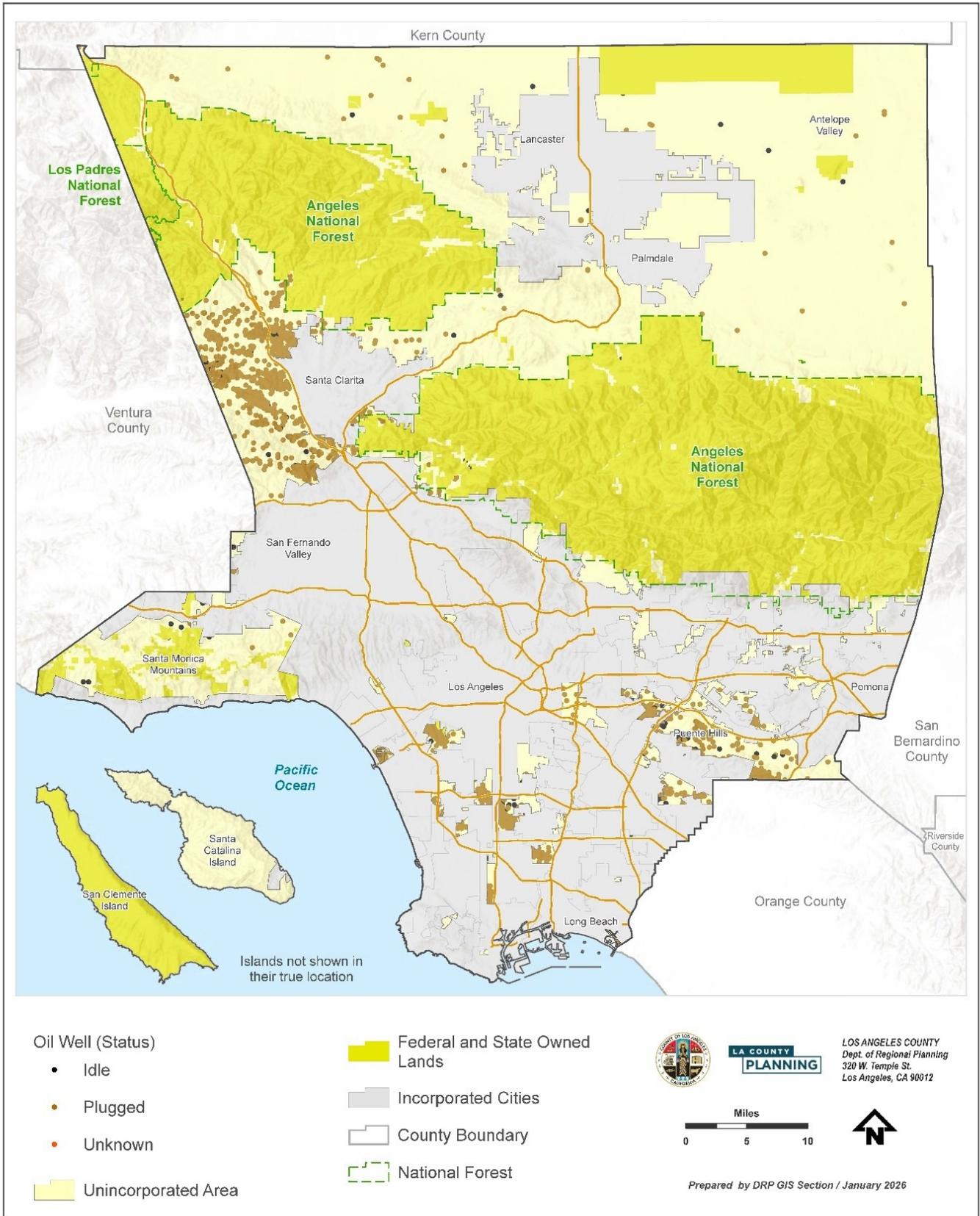
Source: Environmental Protection Agency, March, 2025

Figure 4-8: Vacant Parcels



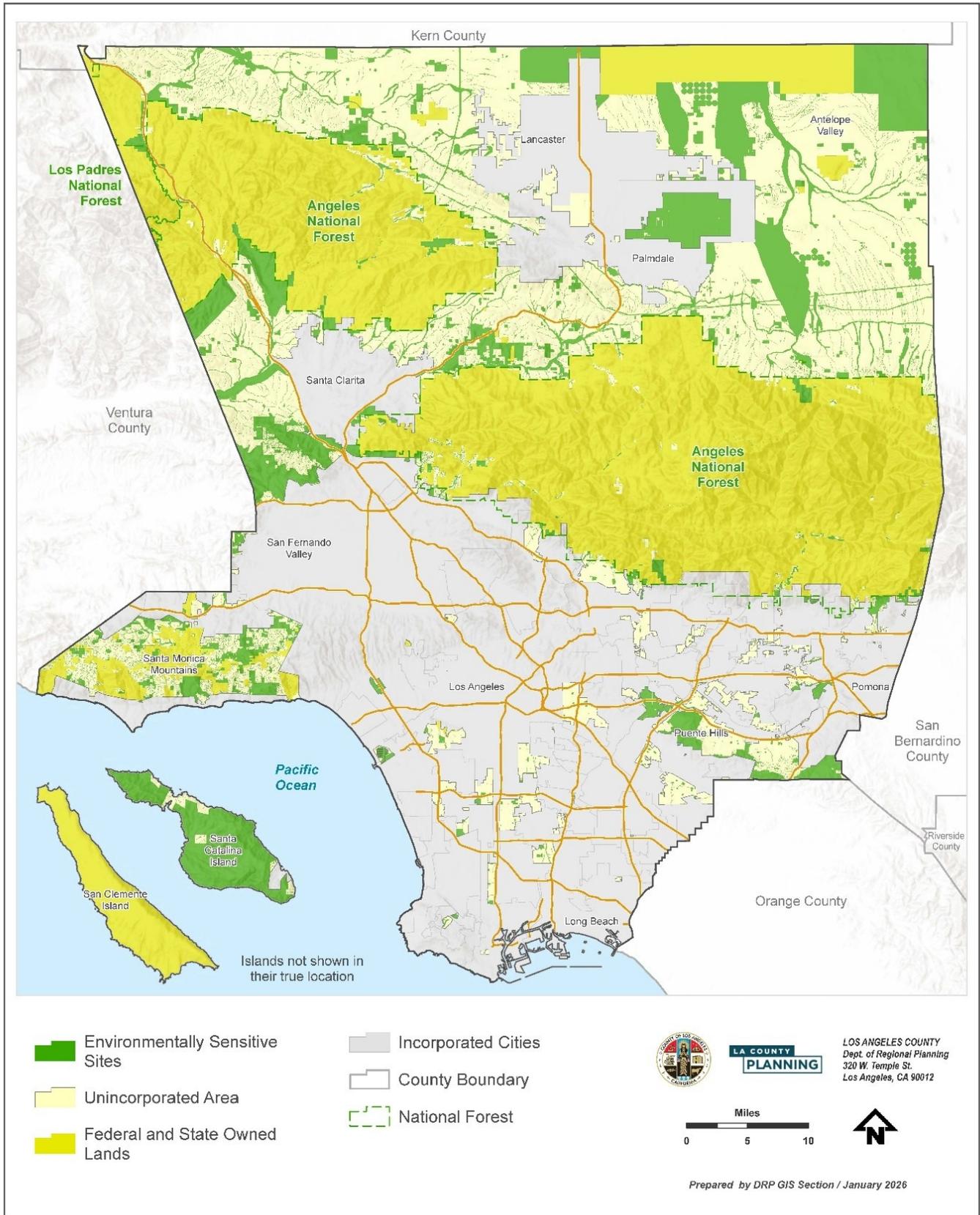
Source: LA County Assessor Office, October, 2025

Figure 4-9: Oil Wells



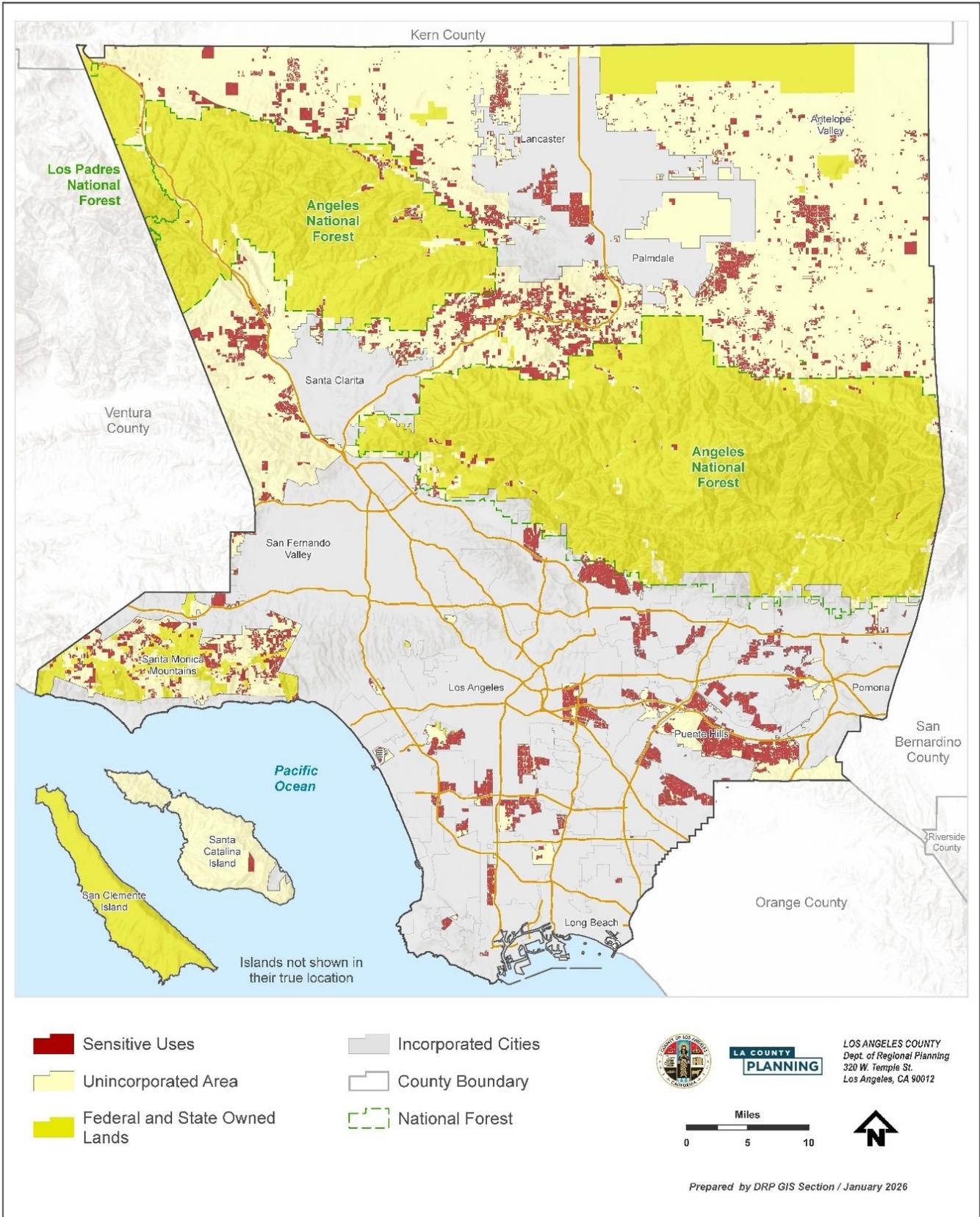
Source: California Geologic Energy Management Division (CalGEM), October, 2025

Figure 4-10: Environmentally Sensitive Sites



Source: LA County Planning, October, 2025

Figure 4-11: Sensitive Uses



Source: LA County Planning, October, 2025

Figure 4-12: Significant Ecological Areas

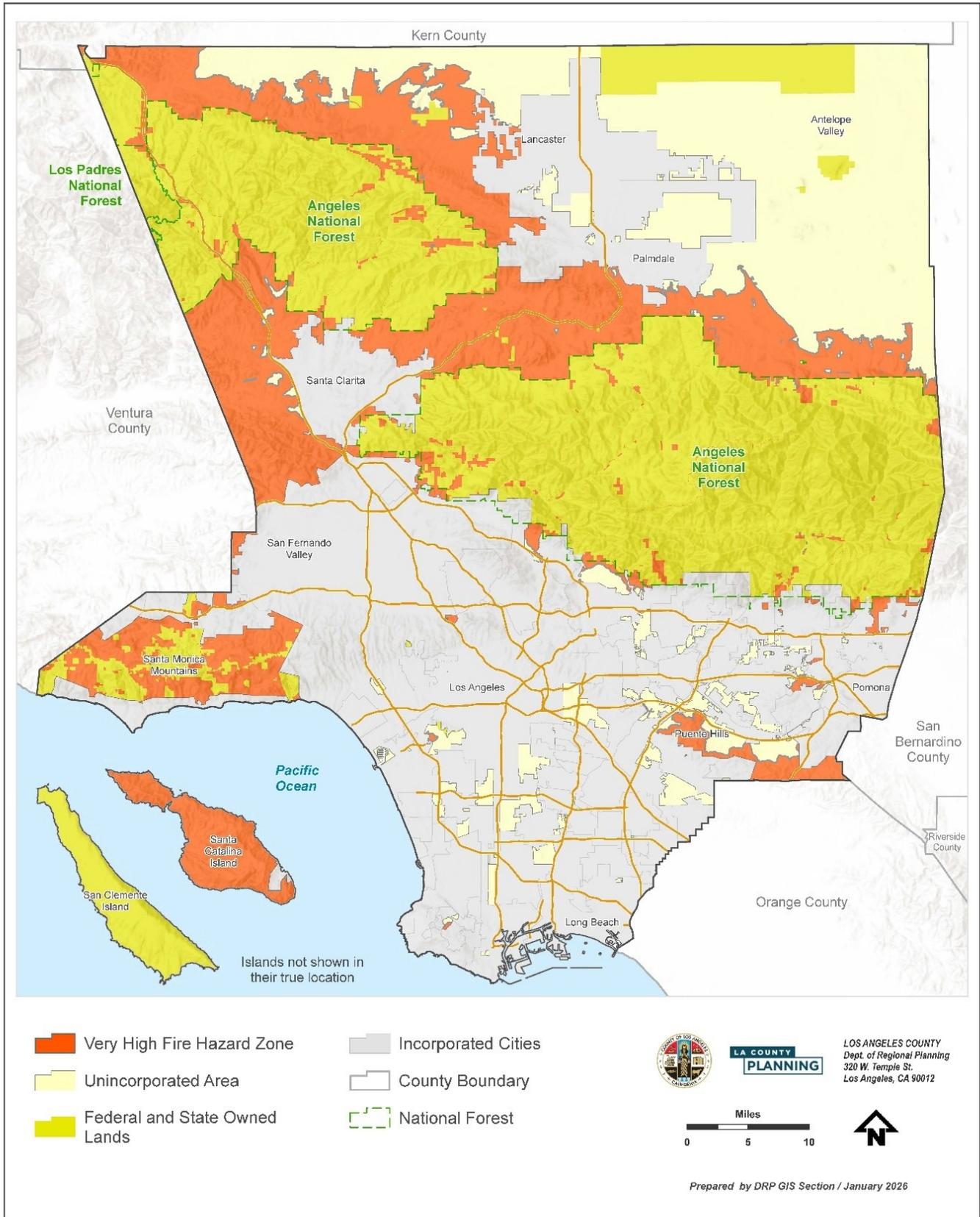


Source: LA County Planning, October, 2025

Figure 4-13: Antelope Valley Regional Conservation Investment Strategy Areas

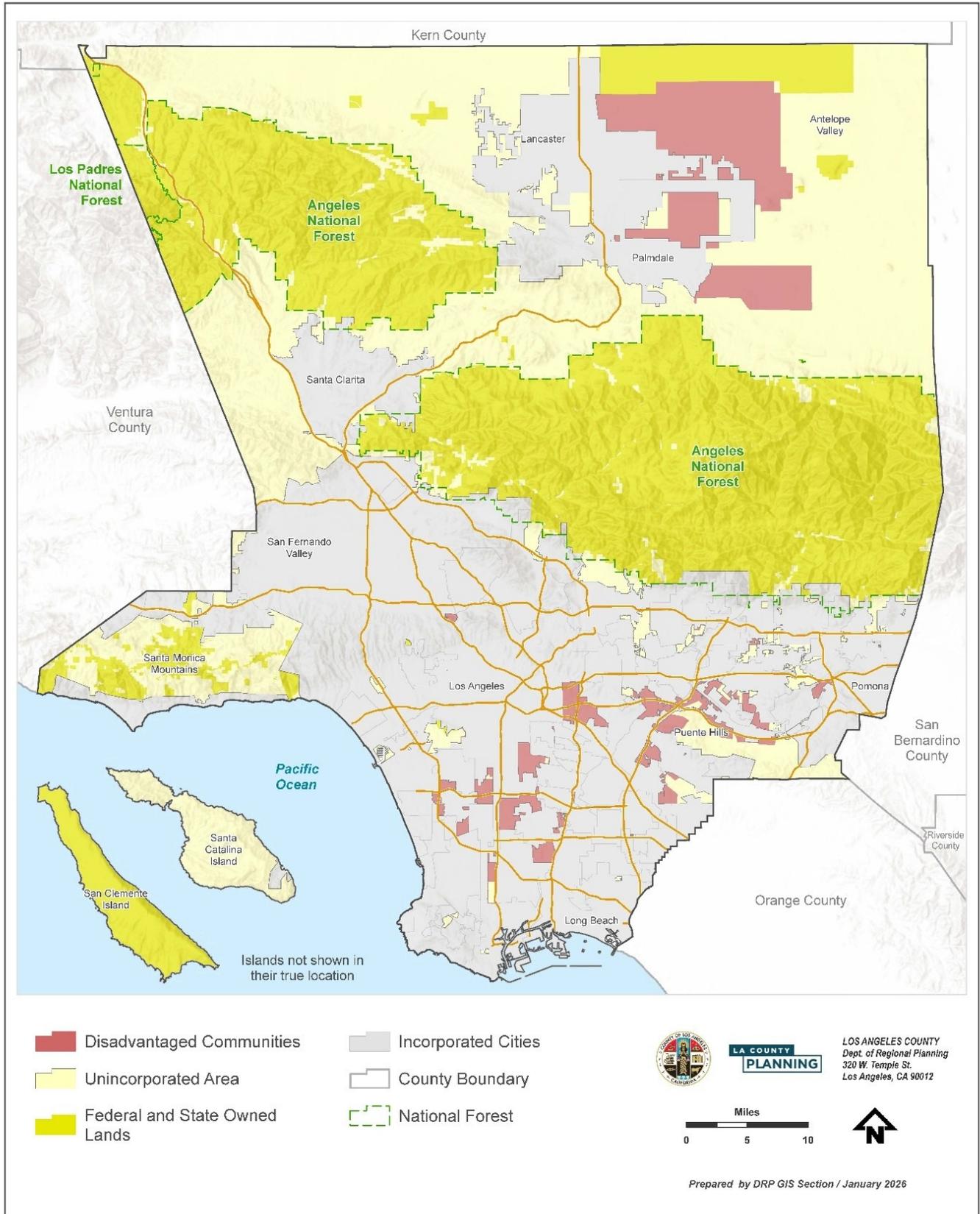


Figure 4-14: Very High Fire Hazard Severity Zones



Source: California Department of Forestry and Fire Protection, August, 2025

Figure 4-15: Disadvantaged Communities (SB 535)



Source: California Environmental Protection Agency (Cal EPA) – Office of Environmental Health Hazard Assessment (OEHHA), May, 2022

### 4.3.2 Environmental Justice Community Considerations

Although renewable energy and BESS projects are perceived as providing more benefits and less risk to the public than fossil fuel energy projects, renewable energy generation may introduce siting concerns in the communities where they are located. Oftentimes new renewable energy and storage projects are constructed in communities that are already affected by legacy pollution due to land use decisions that predominately place low-income communities of color in proximity to polluting industries. The potential health, cultural, and socioeconomic effects of renewable energy projects may cumulatively affect historically burdened communities (i.e., environmental justice communities). As the renewable energy industry utilizes siting tools to consider resource potential, access to transmission, and avoiding sensitive resources, it should also consider the location of environmental justice communities in its siting considerations.

Environmental justice is defined by California law as “the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (Gov. Code, § 65040.12, subd. (e)). In keeping with its commitment to environmental sustainability and access to all, California was one of the first states to codify the concept of environmental justice in its statutes.

The State of California Attorney General has recognized that promoting effective environmental justice planning at a local level is an ongoing effort and has recommended the use of CalEnviroScreen, Climate and Economic Justice Screening Tool (CEJST), or EJScreen to assist local governments with implementing Senate Bill (SB) 1000 (CA DOJ, 2023). These screening tools use different indicators, data sources or aggregation, and criteria of a population with environmental justice concerns. As such, they capture different aspects of environmental justice communities. It should be noted that CEJST and EJScreen were tools to support the implementation of Executive Orders 12898 and 14008, which were both rescinded in January 2025. As such, both tools have been removed from the White House and the U.S. Environmental Protection Agency websites.

Different agencies have different terms to describe communities with environmental justice concerns, including “disadvantaged communities,” “environmental justice communities,” “low-income communities,” “people of color,” “underserved,” “underrepresented,” and others. Some federal and State legislation use specific nomenclature to define these communities. Although several of these terms have evolved since their original use, they may be used because they are codified in statute. For instance, the term “disadvantaged communities” is used in SB 535. There has been interagency discussion and public comment on both the harms associated with certain nomenclature (e.g., “disadvantaged communities”) and the confusion that program staff and grantees have experienced (CEC, 2024f; CA DWR, 2022). Communities with environmental justice concerns, regardless of their categorization, have a diversity of experiences, strengths, and perspectives. The County recognizes that some communities are more exposed to environmental risks than others, as well as the cumulative burdens some of these communities bear. When making land use decisions such as the REO Update, the County uses State tools and data, as well as County tools to inform decision-making that may improve community health and quality of life for residents surrounding major sources of pollution. These are discussed below.

**CalEnviroScreen and SB 535.** As a science-based tool that was created for the State of California, CalEnviroScreen provides an objective method for evaluating multiple pollutants and stressors in local communities, and ultimately for identifying disadvantaged communities.

This tool is specific to California and offers State-specific indicators to characterize both pollution burden and population characteristics. The tool uses U.S. Census tracts as the geographic unit of analysis. The current version was released in 2021 (4.0) and uses 2010 Census boundaries.

The CalEnviroScreen model incorporates 21 indicators that measure a community's exposure, environmental effects, sensitive population, and socioeconomic factors. Indicators for exposure and environmental effects comprise a Pollution Burden group, and indicators for sensitive populations and socioeconomic factors comprise a Population Characteristics group.

The CalEnviroScreen model uses U.S. Census tract data as a geographic scale for identifying disadvantaged communities within California. For each Census tract, CalEnviroScreen calculates an overall score by combining the individual indicator scores within each of the two groups (i.e., Pollution Burden and Population Characteristics), then multiplying the Pollution Burden and Population Characteristics scores to produce a final score. Since each of the two groups (i.e., Pollution Burden and Populations Characteristics) has a maximum score of 10, the maximum CalEnviroScreen Score is 100.

CalEPA released its updated designation of disadvantaged communities for the purpose of SB 535 in May 2022. Disadvantaged communities are defined as follows (OEHHA, 2025):

- Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0.
- Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores.
- Census tracts identified in the 2017 disadvantaged community (DAC) designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0.
- Lands under the control of federally recognized Tribes. For purposes of this designation, a Tribe may establish that a particular area of land is under its control even if not represented as such on CalEPA's DAC map and therefore should be considered a DAC by requesting a consultation with the CalEPA Deputy Secretary for Environmental Justice, Tribal Affairs and Border Relations.

**Environmental Justice Screening Method and Green Zone.** SB 1000 requires that local jurisdictions include an Environmental Justice Element to their General Plan or related goals, policies, and objectives as they relate to disadvantaged communities in other elements of the General Plan. Adopted by the County Board of Supervisors on June 14, 2022, and effective July 14, 2022, the County of Los Angeles Green Zone Program seeks to enhance public health and support land use compatibility in the unincorporated communities that bear a disproportionate pollution burden. The Green Zone Program supports the goals of SB 1000 and the implementation of environmental justice throughout the unincorporated areas by identifying communities that disproportionately bear a burden from stationary sources of pollution due to incompatible land uses and by better regulating incompatible land uses in close proximity to each other through new Zoning Code definitions, new permitting requirements, and development standards.

The Green Zone ordinance added new and revised policies in the General Plan to address Environmental Justice (Los Angeles County, 2024c). Changes include the following:

- Goal LU 7: Compatible land uses that complement neighborhood character and the natural environment
  - Policy LU 7.1: Reduce and mitigate the impacts of incompatible land uses, where feasible, using buffers, appropriate technology, building enclosure, and other design techniques.
  - Policy LU 7.8: Promote environmental justice in the areas bearing disproportionate impacts from stationary pollution sources.
- Goal LU 9: Land use patterns and community infrastructure that promote health and wellness.
  - LU Policy 9: Encourage patterns of development that protect the health of sensitive receptors.

- Goal ED 2: Land use practices and regulations that foster economic development and growth.
  - Policy ED 2.8: Incentivize as much as feasible, environmentally sustainable practices and high standards of development in the communities that bear disproportionate pollution and health impacts.

The Green Zone ordinance uses the Environmental Justice Screening Method (EJSM) to measure the cumulative impacts at the census-tract level and identify disadvantaged communities in Los Angeles County and inform the Green Zone. EJSM includes the following four cumulative impact categories as part of the scoring: (1) proximity to hazards and sensitive land uses, (2) health risk and exposure, (3) social and health vulnerability, and (4) climate change vulnerability (Los Angeles County, 2023b). EJSM incorporates some CalEnviroScreen data as part of the Health Risk and Exposure layers (PM2.5, ozone concentration, and pesticides); however, EJSM includes more parcel-level data than CalEnviroScreen. EJSM is a more refined mapping tool for use in Los Angeles County when compared to CalEnviroScreen as it was developed specifically for County use.

The Green Zone parcels are determined based on the high number of stationary sources of pollution near sensitive uses (e.g. residences, schools, parks, and shelters) using EJSM scoring. During the Green Zone ordinance development, the County also looked at unincorporated communities with a majority of census tracts scoring in the top 25% of CalEnviroScreen for environmental impacts and considered the proximity of incompatible land uses. Per the Green Zone ordinance, certain new industrial, recycling, or vehicle-related uses need to comply with updated development standards in parcels that are zoned with the -GZ combining zone (Los Angeles County, 2024d).

**Economic Opportunity Areas.** The Economic Opportunity Area (EOA) designation is introduced in the Antelope Valley Area Plan adopted by the Board of Supervisors on June 16, 2015. The EOAs were identified as having potential for economic growth and development. Development is intended to be guided to these EOAs so that the areas around them can be preserved and maintained at low density or for agricultural use. Currently ground-mounted, utility-scale solar projects are banned in EOAs. However, the motion, “Accelerating Renewable Energy Development and Promoting Community Resiliency in Los Angeles County,” adopted by the Board of Supervisors on April 9, 2024, states that, “[a]reas where facilities are currently prohibited, such as some of the Economic Opportunity Areas identified in the Antelope Valley Area Plan, should be considered [for renewable energy development zones].”

**LA County Disadvantaged Communities.** Based on a review of the above State and local environmental justice data, the following observations inform siting considerations:

- Communities with identified Green Zone (-GZ) parcels are located in the southern and southeastern portions of the County: Avocado Heights, East Los Angeles, East Rancho Dominguez, Florence-Firestone, South San Jose Hills, Walnut Park, West Athens-Westmont, West Carson, West Rancho Dominguez-Victoria, West Whittier-Los Nietos, and Willowbrook.
- All mapped Green Zone parcels overlap with SB 535-designated disadvantaged communities.
- Additional SB 535-designated disadvantaged communities are located in the north and northeastern areas of unincorporated Los Angeles County.
- The East and Central EOAs both contain one or more SB 535-designated disadvantaged communities.

There are strategies that can enable the County to advance renewable energy projects while respecting and advancing environmental justice goals. Five leading practices to consider in the development of renewable energy projects include the following (EPRI, 2022):

1. During the site selection process, determine whether the vicinity includes one or more environmental justice community using a screening tool, such as EJSM, and other information.

2. Evaluate project approaches and opportunities for meaningful engagement, mitigation, and benefits to determine which impacts may occur and how each may be addressed.
3. Undertake meaningful engagement using a stepwise approach. This includes meeting with community-based organizations and local leaders early in the process; preparing for changes and learning; and committing to integrity and transparency.
4. Design mitigation approaches collaboratively to address community concerns.
5. Encourage developers to identify and implement community benefits.

**Mitigation Strategies.** Environmental justice communities are unique from each other and have different needs. One of the most important ways to incorporate environmental justice into siting decisions is through meaningful engagement with the relevant communities. Some techniques include the following (EPRI, 2022):

- Early consultation that actively engages with the community.
- Identify individuals who have an understanding of the community's interests and represent the community. Actively listening to the stories of community members.
- Plan for meaningful engagement that includes follow-through, determining whether objectives are being met or whether the plan itself needs to be modified in order to be effective.
- Format and design interactions that are based on and within the local community and that ensure accessibility.
- Employ techniques to build respect or trust even when parties are not in agreement at various points.
- Provide training and/or opportunities for community members to develop expertise and understanding.
- Co-develop safety plans and commitments on operation.

**Community Benefits.** There are a number of inherent community benefits associated with the development of renewable energy projects, including generation of tax revenue from sale and property taxes, economic benefits from the procurement of local services and materials, and environmental benefits such as reducing fossil fuel pollution and mitigating climate change impacts.

In addition to mitigation efforts and these inherent benefits, there is an opportunity to include community benefit program commitments when developing renewable energy projects. Community benefits should be opportunities rooted in understanding community needs. While community benefit programs are unique to each community's needs, they may include creation of jobs, job training, and job security; access to renewable energy; energy efficiency; grid resilience; infrastructure upgrades; or co-ownership of projects sited within the community (EPRI, 2022).

A formal means of providing community benefits is for a developer to enter into a Community Benefits Agreement (CBA) with community organizations. A CBA can help provide transparency, inclusivity, efficiency, clarity of outcomes, and accountability (DOE, 2017). For example, the U.S. Department of Energy recommends the following:

*The CBA process should begin while energy development is still being formulated by the project proponent. It is important to consider participation in proposed projects that have the potential to offer benefits and those that impact immediate and surrounding neighborhoods. Once a coalition is formed, the community should announce its formation, thereby making it easier for developers to communicate and foster cooperation. Developers should actively seek partnership with neighborhoods, as their support would*

*raise the probability of state or local government approvals for zoning variances, state permits, and other regulatory approvals.*

CBA's may provide benefits to both the community and the developer. Potential community benefits include local and targeted hiring commitments, living wage and benefits, educational partnerships between developers and community schools, and support for local businesses. Potential developer benefits include community coalition support of the project, in addition to reduced risk for developers by gaining support from the community (DOE, 2017).

The California Energy Commission's streamlined environmental review and authorization process under AB 205 is an example of mixed results of a policy-driven CBA requirement. As part of the AB 205 Opt-In Application, project applicants are required to enter into one or more legally binding and enforceable agreements with, or that benefit, a coalition of one or more community-based organizations (CEC, 2024g). The first two published Opt-In Staff Assessments (i.e., Darden Clean Energy Project and Fountain Wind Project) have resulted in opposite public perspectives regarding each project's CBA's. The applicant for the Darden Clean Energy project successfully executed agreements with the following organizations: Centro La Familia Advocacy, Tree Fresno, Central California Food Bank, Westside Elementary School, Central California Asthma Collective, Cornell University, Fresno Rural Transit Agency, and Fresno Housing Education Corps (CEC, 2025d). The City of Mendota submitted public comments sharing its support of the project and acknowledging the commitment the applicant has shown to the communities in Mendota (City of Mendota, 2025). In contrast, the CBA for the Fountain Wind Project was turned down by multiple organizations, including the Pit River Tribe. While the Fountain Wind Project applicant eventually executed a CBA with Shasta College Foundation, Shasta County submitted several public comments criticizing this CBA including the CBA's confidentiality provisions and lack of transparency to the public (Shasta County, 2024).

When CBA's are implemented with consideration of the affected communities, while also including the community in the process, they can provide mutually beneficial relationships between the community and the developer.

### 4.3.3 Project Construction and Operation Measures

Construction and operation of renewable energy and storage projects contribute to a number of short-term and long-term impacts such as ground disturbance, fugitive dust, noise, construction traffic, and nighttime lighting, which can affect sensitive resources and land uses within or surrounding a project site. There are standard measures that are designed to address these anticipated impacts. Table 4-1 provides a list of general and technology-specific measures that are recommended for construction and operation of renewable energy generation and storage projects.

**Table 4-1 Standard Measures for Renewable Energy and Storage Projects**

Issue	Measure
<b>General Measures for all Technologies</b>	
Fugitive Dust	Require applicant to prepare a Dust Control Plan that identifies all sources of fugitive dust emissions and the associated mitigation measures to address those emissions.
	All soil excavated or graded should be sufficiently watered to prevent excessive dust (e.g., minimum of twice daily on unpaved roads and active construction areas).
	All clearing, grading, earth moving, and excavation activities should cease during periods of winds greater than 20 miles per hour (averaged over one hour), or when dust plumes exceed Visual Dust Emissions (VDE) standards (e.g., 20 percent or greater opacity impact public roads or neighboring property). Opacity measurements are determined by a qualified observer (USEPA, 1993).

Issue	Measure
Weed Management	All construction equipment should be power washed prior to arrival at the project site to prevent the establishment of noxious weeds in the project area.
Worker Training	Require applicant to implement a Worker Environmental Awareness Program for construction crews. Training materials and briefings would include identification and values of wildlife and natural plant communities, hazardous substance spill prevention and containment measures, and review of all mitigation measures.
Noise	Require applicant to prepare a site-specific noise analysis (.e.g., ambient noise study or acoustical modeling) that identifies noise control measures to minimize impacts to noise-sensitive uses (e.g., residences, churches, medical care facilities, schools, childcare facilities, public parks, public recreation areas, and Significant Ecological Areas). Require applicant to prepare a site-specific noise analysis (.e.g., ambient noise study or acoustical modeling).
	Require applicant to prepare a noise monitoring and mitigation plan that includes: (1) measures to minimize noise impacts to noise-sensitive uses, and (2) measures to ensure compliance with local noise standards.
Traffic	Require applicant to prepare a transportation plan for all phases of project development. The transportation plan should address methods for reducing construction worker traffic volumes and project-related equipment transport. The transportation plan should ensure that access is maintained along public roadways.
<b>Utility-Scale Solar</b>	
Lighting	To minimize night-sky effects, use minimum intensity lighting consistent with safety needs; prohibit strobe lighting except where it is required for safety; shield all permanent lighting unless otherwise required for safety; mount lighting so that it is focused downward; control lighting with timers, sensors, and dimmers; and use vehicle-mounted lights for nighttime maintenance work rather than permanently mounted lighting.
Vegetation Management	Where feasible, weed control should be accomplished by mowing instead of discing to leave the ground undisturbed and with a vegetative covering.
<b>Utility-Scale Wind</b>	
Visual	Site turbines to reduce visibility; cluster turbines in a manner that creates visual order and unity among groups of turbines.
	Use radar-activated visual warning systems to reduce night-sky impacts.
	Prohibit signs and messages on towers.
	Keep turbines clean and in good repair and promptly remove disused or abandoned equipment and parts.
Noise	Wind energy facilities must comply with decibel thresholds defined by the County of Los Angeles Noise Ordinance. Minimum setbacks in the industry for midsize and large turbines are generally 300 meters from the nearest receptor (Pinchuk et al., 2025).
	Require applicant to prepare acoustical studies to demonstrate compliance with local noise standards.
<b>Energy Storage Systems</b>	
Engineering and administrative controls	Require preparation of an Emergency Response and Emergency Action Plan.
	A BESS system must include a battery management system (BMS) and deflagration panels.
	Recommend a dedicated command and control center outside the BESS facility for safe incident management.
	Recommend installation of closed-circuit television (CCTV) cameras (with pan, tilt, zoom and low-light capability) that cover the entire BESS site, and with their own separate power supply.

Issue	Measure
Fire Safety	Require fire lanes to exist down the length and width of the BESS units wide enough to allow for fire engine access.
	Require annual joint training program with the local fire department.
	Require placement of thermal infrared cameras for real-time monitoring and early detection of potential fire events.
	Require a Command-and-Control Protocol for staff and management to perform emergency duties and responsibilities detection, initiation, and possible escalation of a BESS fire.
	Require placement of fire hydrants, or pipelines, from an onsite water tank if the project is not serviced by a public utility water main, at the corners and midline location.
	Consult with the Los Angeles County Fire Department in preparing the fire protection system specifications and drawings for the BESS, any operations control room, and any maintenance building.
<b>Green Hydrogen</b>	
Fire Prevention and Suppression	Require an active fire suppression system (e.g., water mist systems, carbon dioxide suppression, clean agent fire suppression systems) in areas where hydrogen is stored, transported, or used.
	Require project to install hydrogen-specific fire extinguishers (e.g., Class D fire extinguishers for metal fires) and to provide adequate training for personnel on how to use them in the event of a fire.
	Strictly prohibit open flames in or near hydrogen production, storage, or distribution areas. Enforce strict no-smoking policies and eliminate all ignition sources.
Emergency Response and Evacuation Plans	Require project to implement automatic emergency shutdown systems that can quickly isolate hydrogen production or storage areas in case of a leak or fire. These systems should include emergency stop buttons, automated valves, and shutdown protocols for all processes.
	Require project to clearly mark evacuation routes, emergency exits, and designated assembly areas that are located at a safe distance from hydrogen-related risks. Project owner should conduct regular evacuation drills for all personnel.
	Provide comprehensive safety training for all plant workers, including specific training for handling hydrogen leaks, fires, and other emergency situations.
Employee Personal Protective Equipment	Require project owner to ensure all personnel working in or around hydrogen systems are equipped with appropriate personal protective equipment (PPE), such as flame-retardant clothing, face shields, flame-resistant gloves, and hearing protection (if working near high-pressure equipment).
	In the event of a leak, project owner should provide self-contained breathing apparatus (SCBA) or air-purifying respirators to protect workers from inhaling potentially hazardous gases, particularly if the leak occurs in a confined space.
Monitoring and Control Systems	Require continuous real-time monitoring systems for hydrogen concentration, temperature, pressure, and other key parameters within critical areas (such as electrolyzers, storage tanks, and pipelines).
	Require remote monitoring capabilities for critical parameters and alarms and safety triggers that can notify operators of hazardous conditions in real-time.

#### 4.3.4 Project Decommissioning Measures

As part of best practices and streamlining opportunities, a decommissioning plan is recommended for any renewable energy generation or storage project. A decommissioning plan should be consistent with agreements reached between the applicant and other landowners of participating properties to ensure the return of all participating properties to a useful condition (e.g., preconstruction condition), including

removal of above-surface facilities and infrastructure that have no ongoing purpose. Decommissioning plans may include the following requirements:

- Require applicant to provide financial assurance for full decommissioning of the facility at the end of the project’s operational life, which may be provided in the form of a bond, a parent company guarantee, or an irrevocable letter of credit. Typically, the financial assurance is equal to or greater than the estimated cost of decommissioning the project, and may be provided in increments (e.g., every five years).
- Identify the conditions to which the project site must be restored following decommissioning.
- Describe the activities that would occur under the decommissioning plan to restore the project site to the identified conditions, such as:
  - Removal of project facilities and infrastructure (aboveground and underground)
  - Plants to reuse, salvage, recycle, and/or dispose of project materials
  - Site restoration activities: recontouring, drainage restoration, and revegetation
- Schedule for reevaluation of plan during project operations to account for advancements in technologies and processes for decommissioning, salvaging, or repowering of renewable energy facilities.

### 4.3.5 Regulatory Requirements for Emerging Technologies

Technologies such as BESS and Green Hydrogen are subject to stringent State regulations as well as industry codes and standards for construction and operation. Table 4-2 identifies the key regulations, codes, and standards for these technologies.

**Table 4-2 Current Regulations for BESS and Green Hydrogen**

Agency/Organization	Regulations, Codes, and Standards
<b>Battery Energy Storage Systems</b>	
California Legislation	<p>Senate Bill (SB) 1383- Electricity: storage facilities: standards and records. SB 1383 requires the California Public Utilities Commission (CPUC) to implement and enforce standards for the maintenance and operation of ESS facilities that are owned by an electrical corporation.</p> <p>AB 205- Committee on Budget. Energy. AB 205 enacted a streamlined environmental review and permitting process through the CEC for eligible clean energy project (includes energy storage systems that are 200 MWh or more). Known as the CEC’s Opt-In program, developers can choose to bypass the local jurisdictional permitting process to submit an application for certification to the CEC. The Opt-In program includes specific application requirements, including a community benefits agreement, project labor agreements, and a determination of economic benefits to the local community. The program is set to expire on July 1, 2027.</p>

Agency/Organization	Regulations, Codes, and Standards
	<p>SB 38- Battery energy storage facilities: emergency response and emergency action plans. SB 38 requires the owner or operator of a BESS facility to develop an emergency response and emergency action plan in close coordination with local emergency response agencies, to establish a notification and communication procedure, and to consider potential off-site impacts to the surrounding community and environment. Under SB 38, the owner or operator of the facility must coordinate with local emergency management agencies, unified program agencies, and local first responders to develop the plan and submit the plan to the county and, if applicable, the city where the facility is located. Requirements are incorporated into California Public Utilities Code section 761.3(g).</p> <p>Proposed AB 303, as introduced, Addis. Battery energy storage facilities (proposed 2025). Energy storage projects that are 200 MWh or greater are current eligible for certification through CEC’s Opt-In program (under AB 205). If approved, AB 303 would prohibit battery energy storage projects from participating in CEC’s Opt-In program. All proposed BESS projects would be subject to the local jurisdiction’s permitting authority. AB 303 would also prohibit the authorization of a large BESS (200 MWh or more) on an environmentally sensitive site<sup>1</sup> or within 3,200 feet of a sensitive receptor.<sup>2</sup></p>
California Electric Code	24 CCR Article 690: Specific requirements for battery systems, including interconnection with the grid
California Fire Code	<p>24 CCR Section 1203: General requirements for energy storage systems, including installation, maintenance, and separation distances</p> <p>24 CCR Section 1203.1: Maintenance procedures for existing BESS installations</p> <p>24 CCR Section 1203.2: Requirements for emergency and standby power systems depending on the facility type</p> <p>24 CCR Section 322.4.3: Outdoor storage requirements for batteries, including minimum distances from buildings and property lines</p>
California Public Utilities Commission	General Order 167-C. Establishes standards to enhance BESS safety in compliance with SB 38 and SB 1383.
CSA Group and American National Standards Institute (ANSI)	CSA/ANSI C22.2 No. 340: Battery Management Systems 2023
Factory Mutual Insurance Company (FM Global)	FM Global Property Loss Prevention Data Sheet 5-33: Electrical Energy Storage Systems, January 2017, Interim Revision July 2020
International Electrotechnical Commission (IEC)	IEC 62619: Safety Requirements for Secondary Lithium Cells and Batteries for use in Industrial Applications
Institute of Electrical and Electronics Engineers (IEEE)	<p>IEEE 1547: Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electrical Power System Interfaces</p> <p>IEEE 2030.2.1-2019: Guide for Design, Operation, and Maintenance of BESS</p> <p>IEEE 1547-2018: Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces</p> <p>IEEE 1547.9-2022: Guide for Using IEEE Std 1547 for Interconnection of Energy Storage Distributed Energy Resources with Electric Power Systems</p> <p>IEEE 2800-2022: Standard for Interconnection and Interoperability of Inverter-Based Resources Interconnecting with Associated Transmission Electric Power Systems</p>
International Organization for Standardization (ISO)	<p>ISO 55000: Asset Management Standards</p> <p>ISO 13374: Condition Monitoring and Diagnostics of Machines</p>
National Fire Protection Association (NFPA)	<p>NFPA 1: Fire Code</p> <p>NFPA 68: Standard on Explosion Protection by Deflagration Venting</p> <p>NFPA 69: Standard on Explosion Prevention Systems</p>

Agency/Organization	Regulations, Codes, and Standards
	<p>NFPA 70: National Electrical Code</p> <p>NFPA 72: National Fire Alarm and Signaling Codes</p> <p>NFPA 853: Standard for the Installation of Stationary Fuel Cell Power Systems, 2025</p> <p>NFPA 855: Standard for the Installation of Stationary Energy Storage Systems</p> <p>NFPA 1660: Standard for Emergency, Continuity, and Crisis Management</p>
UL Solutions	<p>UL 991: Standard for Tests for Safety-Related Controls Employing Solid-State Devices</p> <p>UL 1642: Standard for Lithium Batteries</p> <p>UL 1741: Standard for Inverters, Converters, Controllers, and Interconnection System Equipment for Use with Distributed Energy Resources</p> <p>UL 1973: Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications</p> <p>UL 9540: Standards for Energy Storage Systems and Equipment</p> <p>UL 9540A: Test Methods for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems</p>
<b>Hydrogen Facilities</b>	
California Legislation	<p>State Executive Order S-7-04. Governor Schwarzenegger signed this executive order in 2004 to create a public-private partnership to build a Hydrogen Highway Network. The executive order also directed the California Environmental Protection Agency and the CEC to develop a California Hydrogen Economic Blueprint Plan.</p> <p>SB 1505- Fuel: hydrogen alternative fuel. SB 1505 requires the State Air Resources Board to adopt regulations that will ensure that any state funding for the production and use of hydrogen fuel, as described in the California Hydrogen Highway Blueprint Plan, contributes to the reduction of greenhouse gas, criteria air pollutant, and toxic air contaminant emissions.</p> <p>SB 1075- Hydrogen: green hydrogen: emissions of greenhouse gases. SB 1075 requires the CEC to study and model potential growth for hydrogen and its role in decarbonizing the electrical and transportation sectors of the economy.</p> <p>SB 1420- Hydrogen production facilities: certification and environmental review. SB 1420 allows certain hydrogen production facilities to be considered an eligible energy infrastructure project for streamlining benefits related to CEQA, and to be eligible for certification as an environmental leadership development project by the CEC. An eligible hydrogen production facility would receive funding from specified state and federal programs, and would not derive hydrogen from a fossil fuel feedstock.</p>
OSHA	<p>40 CFR Part 98 Subpart P – Hydrogen Production</p> <p>29 CFR Part 1910 Subpart H – Hazardous Materials. Applicability depends on maximum quantity and state of H2 (gas or liquid)</p> <p>29 CFR Part 1910 Subpart H – Hazardous Materials, 1910.103 – Hydrogen</p> <p>29 CFR Part 1910 Subpart H – Hazardous Materials, 1910.104 – Oxygen</p>
Cal-OSHA	<p>8 CCR Article 138, Section 5465-5498: Hydrogen. General Industry Safety Orders, Group 20. Flammable Liquids, Gases and Vapors</p> <p>8 CCR Article 139, Section 5500-5509: Oxygen. General Industry Safety Orders, Group 20. Flammable Liquids, Gases and Vapors</p> <p>Title 8 CCRs: Pressure vessels [note: Cal OSHA is currently in the process of updating these regulations and has posted the proposed updates for public review and comment found on the CalOSHA website.]</p>

Agency/Organization	Regulations, Codes, and Standards
American Society of Mechanical Engineers (ASME)	ASME B31.12: Hydrogen Piping and Pipelines
Compressed Gas Association (CGA)	ANSI/CGA G-5-2024: Hydrogen (an American National Standard)
	CGA H-3: Standard for Cryogenic Hydrogen Storage
	CGA G-5.4: Standard for Hydrogen Piping Systems at User Locations
CSA Group and ANSI	CSA/ANSI 22.2 No. 22734: Hydrogen Generators using Water Electrolysis - Industrial, Commercial and Residential Applications
Cybersecurity and Infrastructure Security Agency (CISA)	6 CFR Part 27: Chemical Facility Antiterrorism Standards
European Industrial Gases Association (EIGA)	Doc 154 09 E: Safe Location of Oxygen and Inert Gas Vents
	Doc 211 17: Hydrogen Vent Systems for Customer Applications
IEC	IEC 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use (Part 1: General requirements)
ISO	ISO 22734: Hydrogen generators using water electrolysis — Industrial, commercial, and residential applications
	ISO/TR 22734-2: Hydrogen Generators Using Water Electrolysis (Part 2: Testing guidance for performing electricity grid service)
NFPA	NFPA 1: Fire Code
	NFPA 2: Hydrogen Technologies Code (Chapters 4 and 7)
	NFPA 55: Compressed Gases and Cryogenic Fluids Code
	NFPA 704: Standard System for the Identification of the Hazards of Materials for Emergency Response
	NFPA 2112: Standard on Flame Resistant Garments
Society of Automotive Engineers (SAE) International	Standard J2719: Hydrogen quality
	Standard J2600: Hydrogen connectors, nozzles, and receptacles
	Standard J2799: Hydrogen fueling stations communications hardware and protocol
U.S. Department of Transportation (DOT)	Emergency Response Guidebook

Notes:

- 1- Proposed AB 303 defines environmentally sensitive sites as the following: Coastal Zone; Prime Farmland or Farmland of Statewide Importance; lands within an agricultural or conservation easement; wetlands; Very High Fire Hazard Severity Zone; hazardous waste site (unless found suitable for energy storage by a State or local agency); delineated earthquake fault zone; special flood hazard area; regulatory floodway; habitat for federal or State candidate, sensitive, or special status species.
- 2- Proposed AB 303 defines sensitive receptors as the following: residence; educational facility (preschool through grade 12, inclusive of daycare center, park, playground, university or college); community resource center, including a youth center; health care facility, including a hospital, retirement home, or nursing home; live-in housing, including a long-term care hospital, hospice, prison, detention center, or dormitory; building that contains a business that is open to the public.

## 4.4 Renewable Energy Technology Screening Analysis

This section discusses the methodology and results of LA County Planning’s Renewable Energy Technology Screening Analysis. The analysis evaluates the suitability of parcels within unincorporated Los Angeles County (Figure 4-16, Project Area Map) for renewable energy development.

### 4.4.1 Approach to Renewable Energy Technology Screening

Using the resource potential described in Section 4.1, and the criteria described in Section 4.3.1, appropriate zones from the County Zoning Code were identified for each class of project. Environmental considerations were factored to identify, as applicable, minimum parcel sizes, exclusion areas and buffers. This was used to establish baseline siting criteria for each project type allowed in the Renewable Energy Ordinance.

#### BESS Projects

Battery Energy Storage Systems are not currently defined in the County’s Renewable Energy Ordinance. Two categories of BESS projects were analyzed:

- BESS projects over 500 MWh
- BESS projects, 500 MWh or less

500 MWh was used as a threshold to distinguish between BESS project sizes. Additional siting criteria and exclusion areas were applied to projects greater than 500 MWh to address safety of larger facilities, while allowing greater flexibility for smaller, distributed energy storage projects.

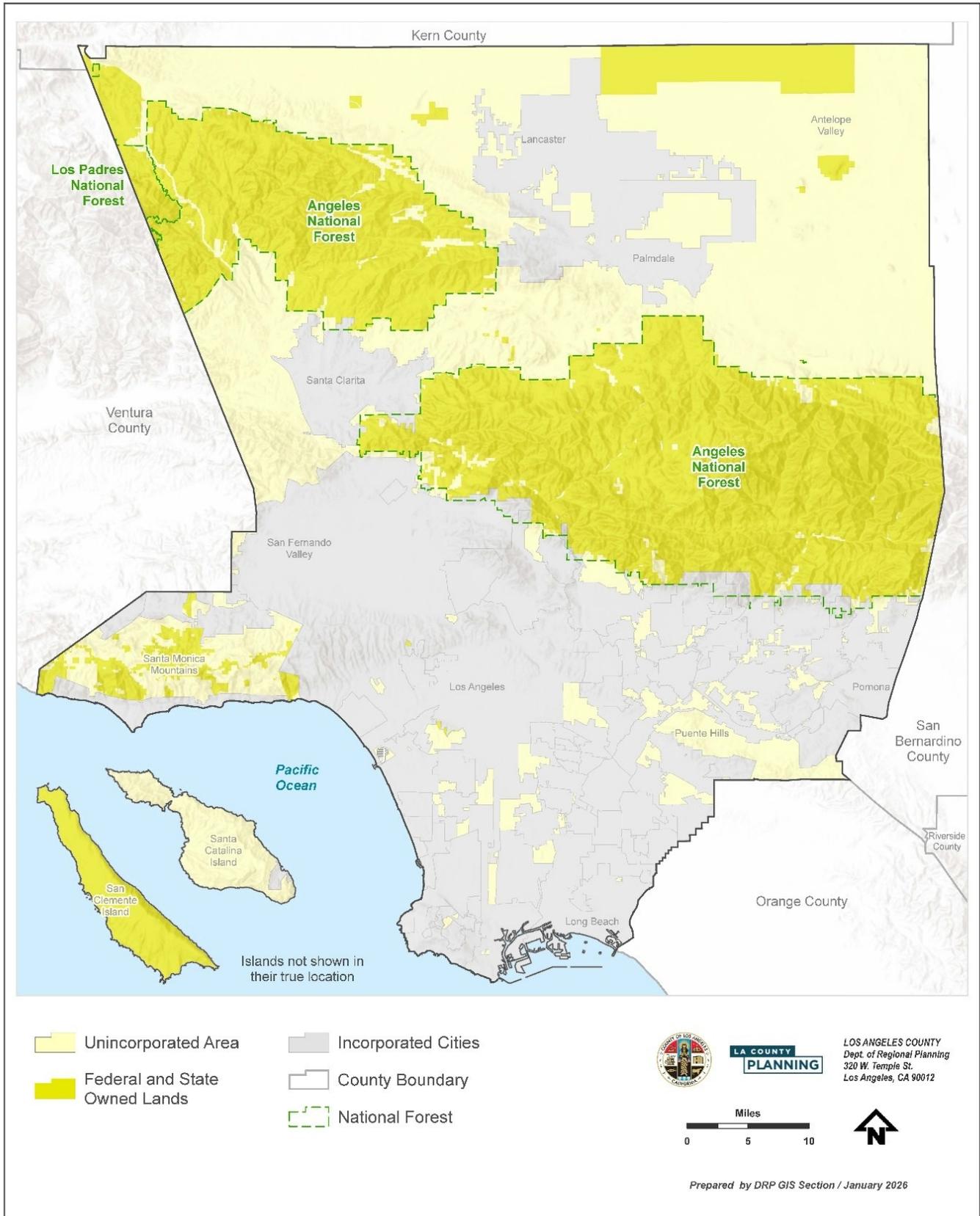
Generally, BESS projects charge from the electric transmission grid and discharge when that energy is needed; as such, proximity to the grid is a significant consideration for project siting. Additional siting considerations may include: project site size to accommodate required emergency access and required setbacks, and proximity of sites to Sensitive Uses or to environmentally sensitive areas. Based on examples of existing projects in the County, a minimum parcel size of four acres was identified to ensure that all necessary setbacks and container separation distances could be achieved in a utility-scale BESS facility.

For BESS facilities, the same zones where utility-scale ground mounted solar is allowed were identified in order to accommodate these compatible uses. This includes the following zones: Heavy Agricultural (A-2), Commercial Manufacturing (C-M), Light Manufacturing (M-1), Restricted Heavy Manufacturing (M-1.5), Heavy Manufacturing (M-2), and Institutional (IT).

Considerations of siting BESS projects include:

- Flammability of the most common BESS technologies (lithium-ion)
- Health and safety concerns from exposure to toxins released during a BESS fire
- Biological concerns including heavy metal concentrations in water and soils resulting from BESS fire
- Safety risks associated with decommissioning of BESS facilities
- First responder training specifically for BESS fires
- Proximity to electric grid

Figure 4-16: Project Area Map



Through the Renewable Energy Ordinance, exclusion areas and buffers may be used to mitigate impacts related to these considerations. Based on the considerations listed above, appropriate exclusion areas for all BESS projects include:

- Significant Ecological Areas
- Select layers from the Antelope Valley Regional Conservation Investment Strategies (RCIS) as described in Section 4.3.1
- Very High Fire Hazard Severity Zones
- Sites that meet the zoning criteria but were deemed inappropriate for BESS development in Puente Hills Landfill, Rio Hondo College, Rose Hills Cemetery and Mobile Home Parks

#### **Additional Considerations for BESS projects over 500 MWh**

Environmentally sensitive sites were included as an additional exclusion area for projects over 500 MWh. The environmentally sensitive sites (identified in Section 4.3.1) are mostly located in less developed areas of the County where larger projects are more likely to be sited. This additional exclusion was used in order to extend protections from larger projects to these additional sensitive sites.

In order to mitigate impacts, a buffer from sensitive uses (defined in Section 4.3.1) was applied to projects over 500 MWh to limit development of larger projects in proximity to these locations. A buffer of 300 feet from the sensitive use property line was used in this analysis to address safety.

As described in Section 3.1.3 above, BESS typically charge from the electric transmission grid or from a generating facility (renewable or conventional) connected to the electric transmission grid. Ideal sites for energy storage system projects are in proximity to existing electric transmission infrastructure. In this suitability analysis, a buffer of five miles from the electric transmission grid was considered as preferential for BESS. Parcels located within the 5-mile buffer were defined to be within “resource potential” areas for BESS projects.

#### **Solar PV**

The County Renewable Energy Ordinance currently allows development of utility-scale ground mounted solar facilities in the following zones:

- Heavy Agricultural (A-2)
- Commercial Highway (C-H)
- Restricted Commercial (C-1)
- Neighborhood Commercial (C-2)
- General Commercial (C-3)
- Commercial Manufacturing (C-M)
- Commercial Recreation (C-R)
- Major Commercial (C-MJ)
- Rural Commercial (C-RU)
- Light Manufacturing (M-1)
- Restricted Heavy Manufacturing (M-1.5)
- Heavy Manufacturing (M-2)

- Unlimited Manufacturing (M-4) - obsolete
- Resort and Recreation (R-R)
- Rural Mixed Use Development (MXD-RU)
- Mixed Use Development (MXD)
- Institutional (IT)

A preliminary review of the zoning showed that the M-4 Zone is obsolete and has been removed from the Los Angeles County Planning and Zoning Code. As described earlier, solar PV projects typically require between four and six acres for each MW of power produced. As such, large project sites are a pre-requisite for utility-scale ground mounted solar projects. Through preliminary GIS analysis, it was determined that various zones where solar PV projects are currently allowed do not support the size of parcels needed for these projects. Allowed zones for utility-scale ground mounted solar projects were therefore revised to A-2, C-M, M-1, M-1.5, M-2, and IT. Because of their large site requirements, utility-scale ground mounted solar projects have the potential to impact environmentally sensitive lands. The current REO prohibits development of these projects within its officially designated Significant Ecological Areas. In keeping with this prohibition, select layers from the Antelope Valley Regional Conservation Investment Strategies conservation areas were added to the exclusions (defined in Section 4.3.1). Economic Opportunity Areas, identified in the Antelope Valley Area Plan, were not included as part of the exclusion area to analyze the potential for solar development.

## Wind

The current REO allows development of small-scale wind defined as wind energy systems that produce electricity, primarily for on-site use and have a rated capacity less than 50 kW. For the purposes of this analysis, two categories of small-scale wind energy systems were analyzed:

- Wind energy systems 100 kw or less
- Wind energy systems greater than 100 kw

A threshold of 100 kw was used to distinguish between systems that are likely to serve residential vs industrial and commercial uses.

Utility-scale wind, which produces energy for off-site use and has a typical rated capacity of 1 MW or greater, was not included in the screening analysis. As summarized in Section 2.2.2, Table 2-4, CAISOs Projected Energy Technology Capacity to Meet SB 100 Targets (Year 2045), 0 MW of utility-scale wind are projected in the Greater LA and Greater Kramer renewable resource regions; 345 MW are projected in the Greater Tehachapi resource area. The Greater Tehachapi resource area encompasses a portion of northern Los Angeles County and extends north into Kern and Tulare counties. The Tehachapi wind resource potential area, currently developed with approximately 3,576 MW of utility-scale wind, is located entirely within this renewable resource region. Given the lack of projected need in unincorporated Los Angeles County, along with the current prohibition on utility-scale wind, this analysis instead focuses on optimizing the siting of small-scale wind.

Development of small-scale wind energy systems (50 kW or less) is currently allowed in the following zones and would be compatible with the development standards for these zones:

- Single-Family Residence (R-1)
- Two-Family Residence (R-2)
- Limited Density Multiple Residence (R-3)

- Medium Density Multiple Residence (R-4)
- High Density Multiple Residence (R-5)
- Residential Agricultural (R-A)
- Light Agricultural (A-1)
- Heavy Agricultural (A-2)
- Open Space (O-S)

For wind systems between 100 kw and 1 MW that would more likely serve industrial and commercial uses, analysis was limited to the A-2 zone, which would meet required development standards for larger turbines. The REO's existing development standards for wind systems less than 50 kw require a minimum lot size of 0.5 acres; maximum tower height is dependent on the parcel size and can range from 35 feet to 85 feet. Based on best practices, it was determined that the REO's current development standards do not align with the minimum site requirements for small-scale wind energy systems. To account for the appropriate space requirements, a minimum parcel size of one acre was used for the analysis.

### Green Hydrogen

Determining site suitability for a hydrogen production facility would depend upon the project-specific requirements (e.g., on-site storage tanks and co-located renewable energy generation) as well as evaluating proximity to critical infrastructure such as pipelines and transportation routes. This type of technology does not lend itself to a broad screening analysis that utilizes zoning, parcel size, and exclusions to identify site suitability, and therefore was not included in LA County Planning's Renewable Energy Technology Screening Analysis. The following is a discussion of general siting considerations for green hydrogen production facilities.

Siting considerations for green hydrogen facilities include:

- **Size considerations.** Green hydrogen facilities must have access to electricity generated from a renewable energy resource. Because hydrogen facilities are energy-intensive (e.g., 5,280 MWh/day), a green hydrogen facility would need to be sited near a utility-scale renewable energy generation facility. The amount of land required for siting a green hydrogen facility must also include the acreage of the renewable energy generation that supports the hydrogen facility. An NREL study found that a 100,000 kg/day green hydrogen facility would require 800 MW of solar electricity. An 800-MW solar facility would require approximately 4,000 acres of land, which would be in addition to the approximately 150 acres required for the hydrogen facility.
- **Compatibility.** If a green hydrogen facility were to be co-located with a utility-scale renewable energy generation facility, this technology would need to be sited within the same zones as the generation source. The following zones are identified in Section 4.4.1 as potentially suitable for a utility-scale ground mounted solar facility: Heavy Agricultural (A-2), Commercial Manufacturing (C-M), Light Manufacturing (M-1), Restricted Heavy Manufacturing (M-1.5), Heavy Manufacturing (M-2), and Institutional (IT).
- **Fire and Explosion Risk.** Amongst all renewable energy generation technologies, green hydrogen carries the highest risk of fire and explosion. Technology concerns include electrolysis safety and fire risk. Technology would require fire protection walls, safety barriers, hydrogen gas detectors, a water sprinkler system, an emergency shutdown system, a safety vent system, handheld fire extinguishers, and hydrogen flame detectors. Due to the fire and explosion risks, the types of exclusion areas and buffers that would apply to large BESS facilities (over 500 MWh) may be suitable for green hydrogen production facilities.

■ **Facility Structure Considerations**

- Different fire and safety issues for facilities that are contained in a building versus open-air facilities.
- Setbacks from oxygen storage or release valves and hydrogen pressure relief valves to other facility buildings.
- Emergency access via at least two gates.
- Balance of plant considerations: This refers to systems that move the hydrogen from the electrolysis to the storage system (pumps, compressors, cooling systems, purifiers, separators).
- Storage needs: High pressure storage, liquification storage (-253°C or -423°F), cryogenic, adsorption (-197°C) in carbon-based materials, chemical hydrides, metal hydrides.

- **Feasibility.** Prioritizing locations with abundant existing renewable energy generation sources is essential to be cost-effective and maximize tax credits under the Federal Inflation Reduction Act (IRA) or California’s Low Carbon Fuel Standard (LCFS).

**Summary of Criteria**

The criteria are summarized below in Table 4-3; a discussion of the considerations for each project type follows.

**Table 4-3 County of Los Angeles Siting Criteria for Renewable Energy Generation and Storage**

Project Type	Zones Allowed*	Minimum Parcel Size	Exclusions	Buffer
<b>BESS</b>				
≤500 MWh	A-2, C-M, M-1, M-1.5, M-2, IT	4 acres	SEA, VHFHSZ, AV RCIS, PH / RH / MH**	
>500 MWh	A-2, C-M, M-1, M-1.5, M-2, IT	4 acres	Environmentally Sensitive Sites, SEA, VHFHSZ, AV RCIS, PH / RH / MH**	300 ft from Sensitive Uses
<b>Solar</b>				
Utility-Scale Ground Mounted	A-2, C-M, M-1, M-1.5, M-2, IT	-	SEA, AV RCIS	
<b>Wind</b>				
≤100 kw	R-1, R-2, R-3, R-4, R-5, R-A, A-1, A-2, O-S	1 acre	-	
>101 kw to 1 MW	A-2	1 acre	-	
<b>Green Hydrogen Production</b>				
Green Hydrogen Production Facility	A-2, C-M, M-1, M-1.5, M-2, IT	-	Environmentally Sensitive Sites, SEA, VHFHSZ, AV RCIS, PH / RH / MH**	300 ft from Sensitive Uses

\* For all the zoning categories, the equivalent Specific Plan categories were also included

\*\* PH/RH/MH: Zones where renewable energy would be allowed in the Puente Hills Landfill, Rio Hondo College, Rose Hills Cemetery and Mobile Home Parks are excluded.

## Resource Potential and Additional Environmental Considerations

Parcels that met the criteria above for each technology type were also assessed to determine if they are within each respective technology's resource potential area and if they met one or more of the following environmental considerations outlined in Section 4.3.1:

- Within five miles of a transmission line or substation
- On an existing vacant parcel, brownfield site, or idle oil well site
- Not in an SB 535 Disadvantaged Community
- 500 feet or more from the nearest sensitive use

If a parcel was inside of the respective resource potential area and one of the above criteria were met, the site was determined preferential and assigned the category of "more suitable."

### Exclusion of Federal and State Lands

For all technologies, Federal and State lands within unincorporated Los Angeles County were excluded as the County does not have jurisdiction in these areas. Private inholdings within Federal and State lands were included in the analysis.

## 4.4.2 Results

Suitability for renewable energy development was analyzed throughout unincorporated Los Angeles County and was divided into the following three ratings:

- Not suitable – parcels do not meet zoning, minimum parcel size, exclusion or buffer criteria.
- Suitable – Parcels meet zoning, minimum parcel size, exclusion and/or buffer criteria as applicable (outlined in Table 4-3).
- More suitable – Parcels meet above-mentioned suitability criteria, are within the applicable resource potential area, and meet at least one of the additional environmental considerations identified in Section 4.4.1.

### Solar PV

The results for utility scale solar photovoltaic projects are shown on Figure 4-17, Utility Scale Ground-Mounted Final Suitability Output. Parcels suitable for development with utility-scale ground mounted solar are predominantly limited to northern Los Angeles County, with a limited number of parcels identified within the Los Angeles County Basin.

### Wind

Two different set of criteria were analyzed for small-scale wind. The results are shown on Figure 4-18, Small-Scale  $\leq 100$  kw Wind Final Suitability Output, and Figure 4-19, Small-Scale Wind 101 kw to 1 MW Final Suitability Output. For wind energy systems with a rated capacity up to 100 kw, parcels suitable for development are concentrated in the north area of Los Angeles County with some potential identified in foothills of the Los Angeles County Basin, including in the Santa Monica Mountains, Baldwin Hills, and Puente Hills. For wind energy systems with a rated capacity between 101 kw and 1 MW, parcels suitable for development are limited to the northern area of Los Angeles County extending south from the northern County line into the Antelope Valley.

## BESS

Suitability for two classes of BESS projects was analyzed, and the suitability criteria for each of the project classes are summarized in Table 4-3. The results are presented in Figure 4-20, BESS equal to or less than 500 MWh Final Suitability Output, and Figure 4-21, BESS greater than 500 MWh Final Suitability Output. Generally, parcels suitable for development with BESS are limited to the northern area of Los Angeles County, along the northern County line and east of the City of Palmdale. A limited number of suitable parcels was identified in the Los Angeles County Basin, mostly in Supervisorial District 2.

### Summary of Results

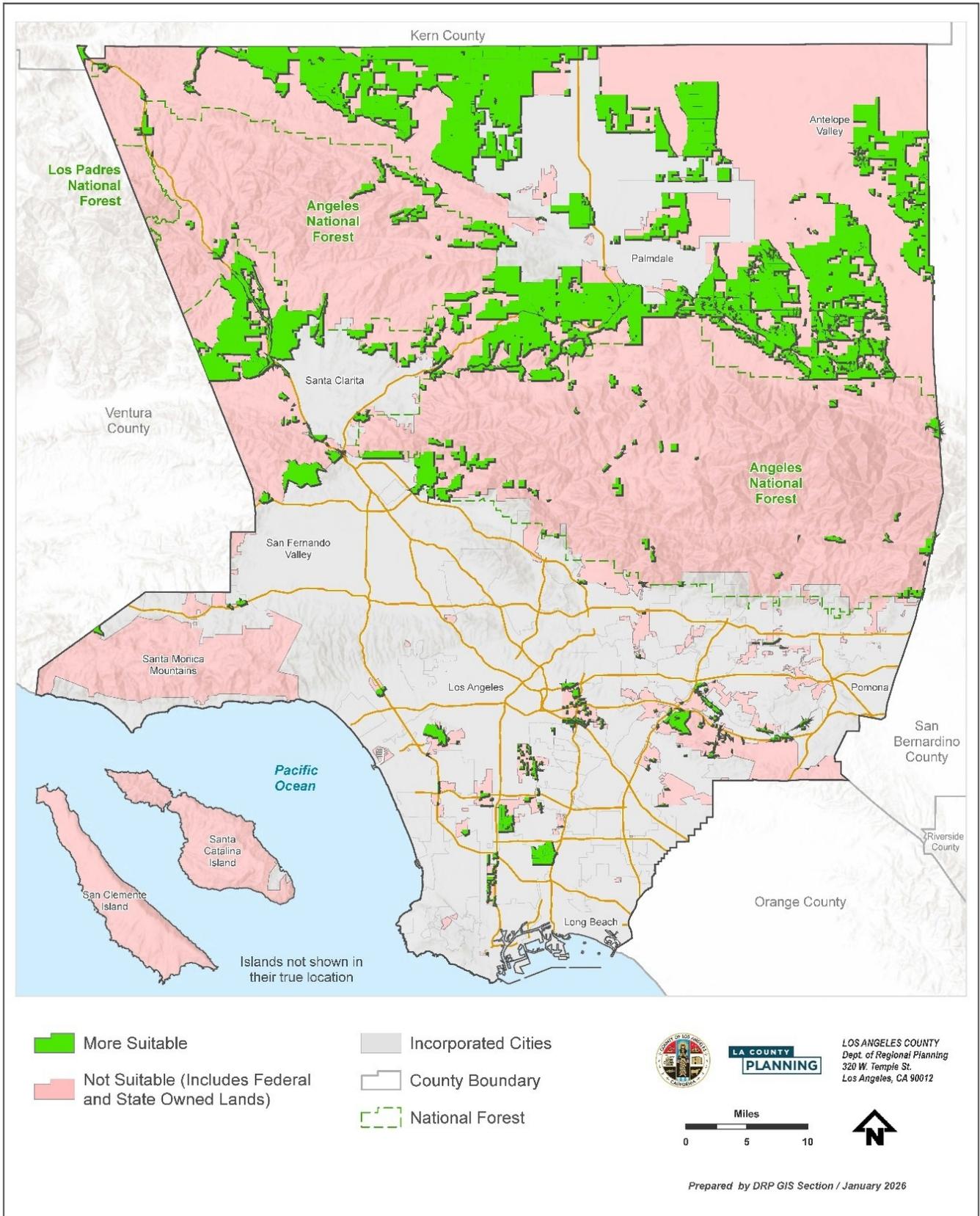
Table 4-4 identifies the total acreages identified as suitable for each of the renewable energy generation and storage technologies evaluated in LA County Planning’s screening analysis.

**Table 4-4 Suitability Determinations and Available Acreages**

	GREATER KRAMER	GREATER LA METRO	GREATER TEHACHAPI	Total
<b>BESS Large Suitability</b>	<b>24,944.42</b>	<b>15,013.71</b>	<b>41,753.16</b>	<b>81,711.28</b>
More Suitable	14,336.61	14,581.14	41,691.40	70,609.14
Suitable	10,607.82	432.57	61.76	11,102.14
<b>BESS Small Suitability</b>	<b>30,512.37</b>	<b>28,333.58</b>	<b>72,107.10</b>	<b>130,953.06</b>
More Suitable	18,034.88	25,290.80	70,398.56	113,724.24
Suitable	12,477.50	3,042.78	1,708.53	17,228.82
<b>Solar PV Suitability</b>	<b>32,785.38</b>	<b>123,060.37</b>	<b>115,361.78</b>	<b>271,207.52</b>
More Suitable	32,785.38	123,060.37	115,361.78	271,207.52
<b>Wind Large Suitability</b>	<b>125,422.71</b>	<b>178,500.12</b>	<b>231,539.47</b>	<b>535,462.30</b>
More Suitable	63,110.98	78,184.85	228,077.97	369,373.79
Suitable	62,311.74	100,315.28	3,461.50	166,088.51
<b>Wind Small Suitability</b>	<b>134,312.47</b>	<b>286,910.30</b>	<b>297,256.71</b>	<b>718,479.47</b>
More Suitable	102,924.76	173,115.92	282,286.83	558,327.51
Suitable	31,387.71	113,794.38	14,969.88	160,151.97

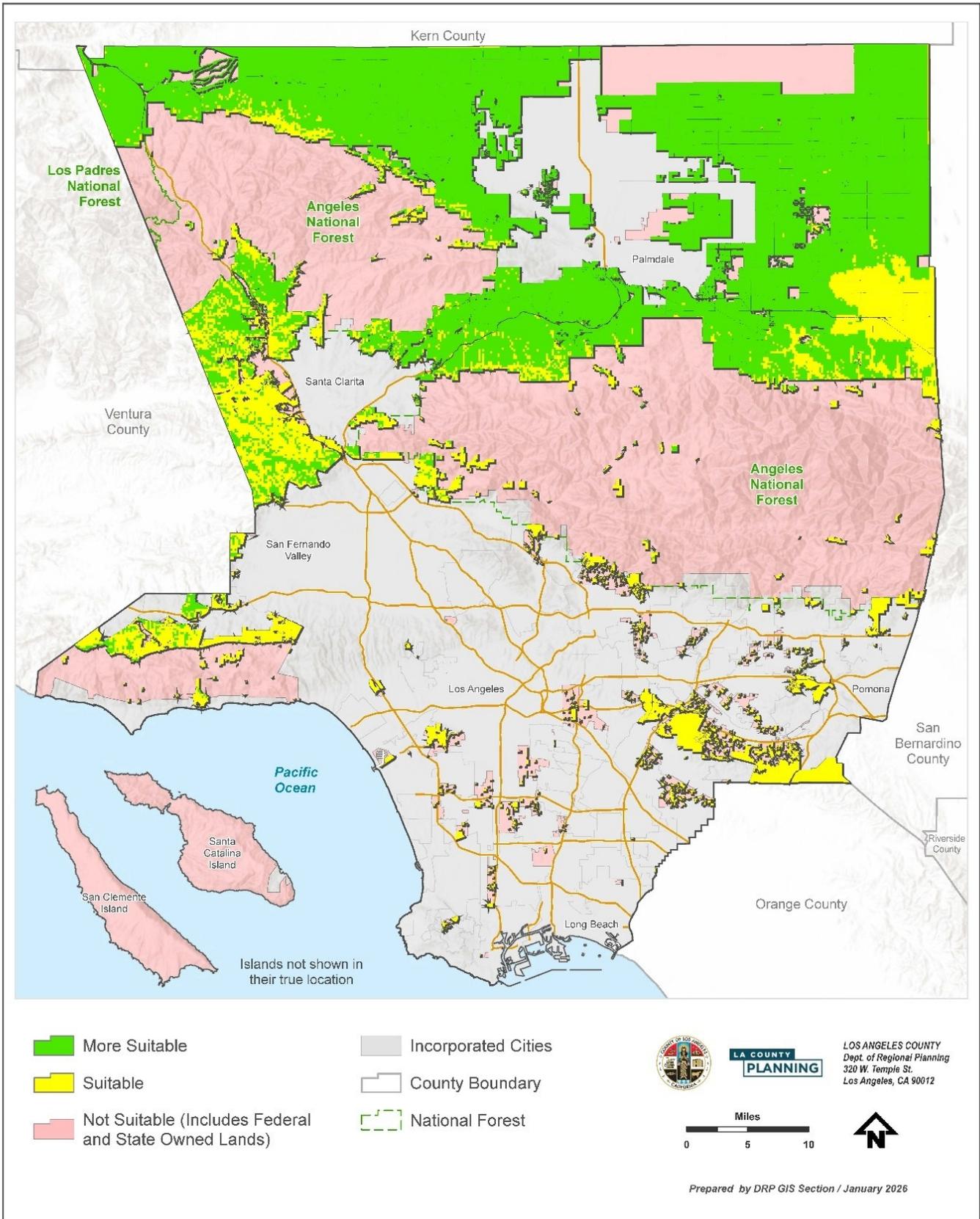
Source: Los Angeles County, 2025d

Figure 4-17: Suitability for Utility-scale Ground-mounted Solar



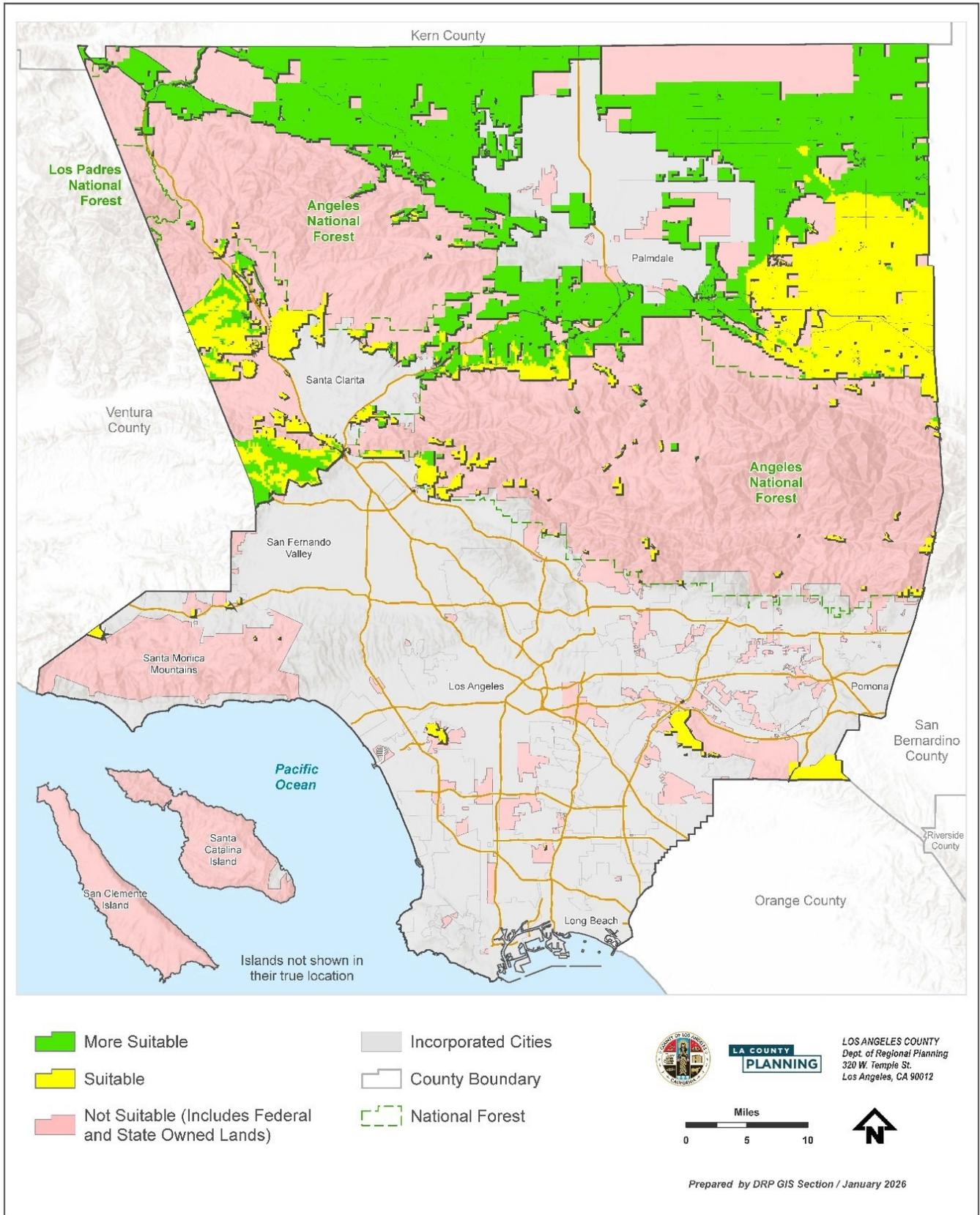
Source: LA County Planning, January, 2026

Figure 4-18: Suitability for Small-Scale Wind ( $\leq 100$  kw)



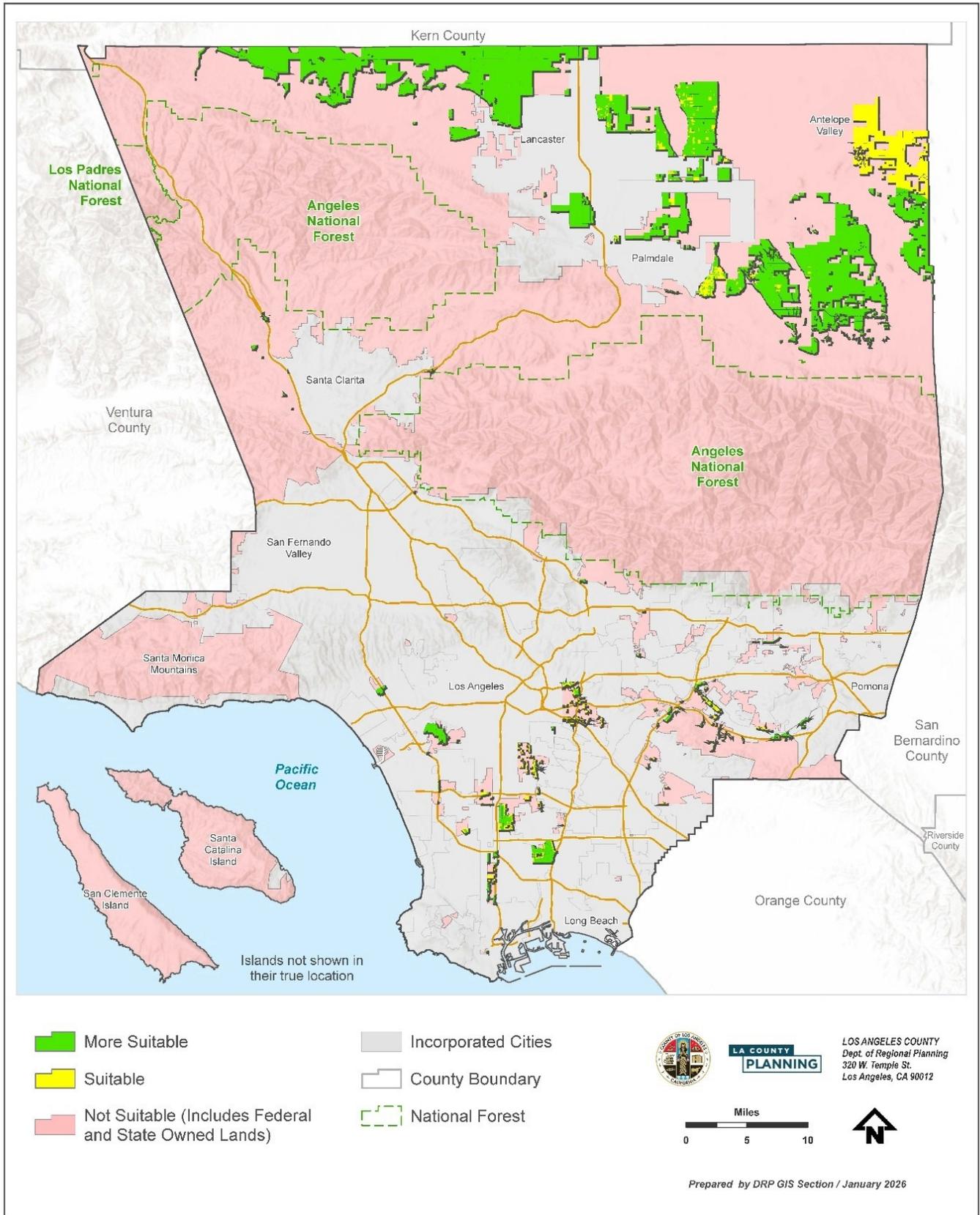
Source: LA County Planning, January, 2026

Figure 4-19: Suitability for Small-Scale Wind (>100 kw)



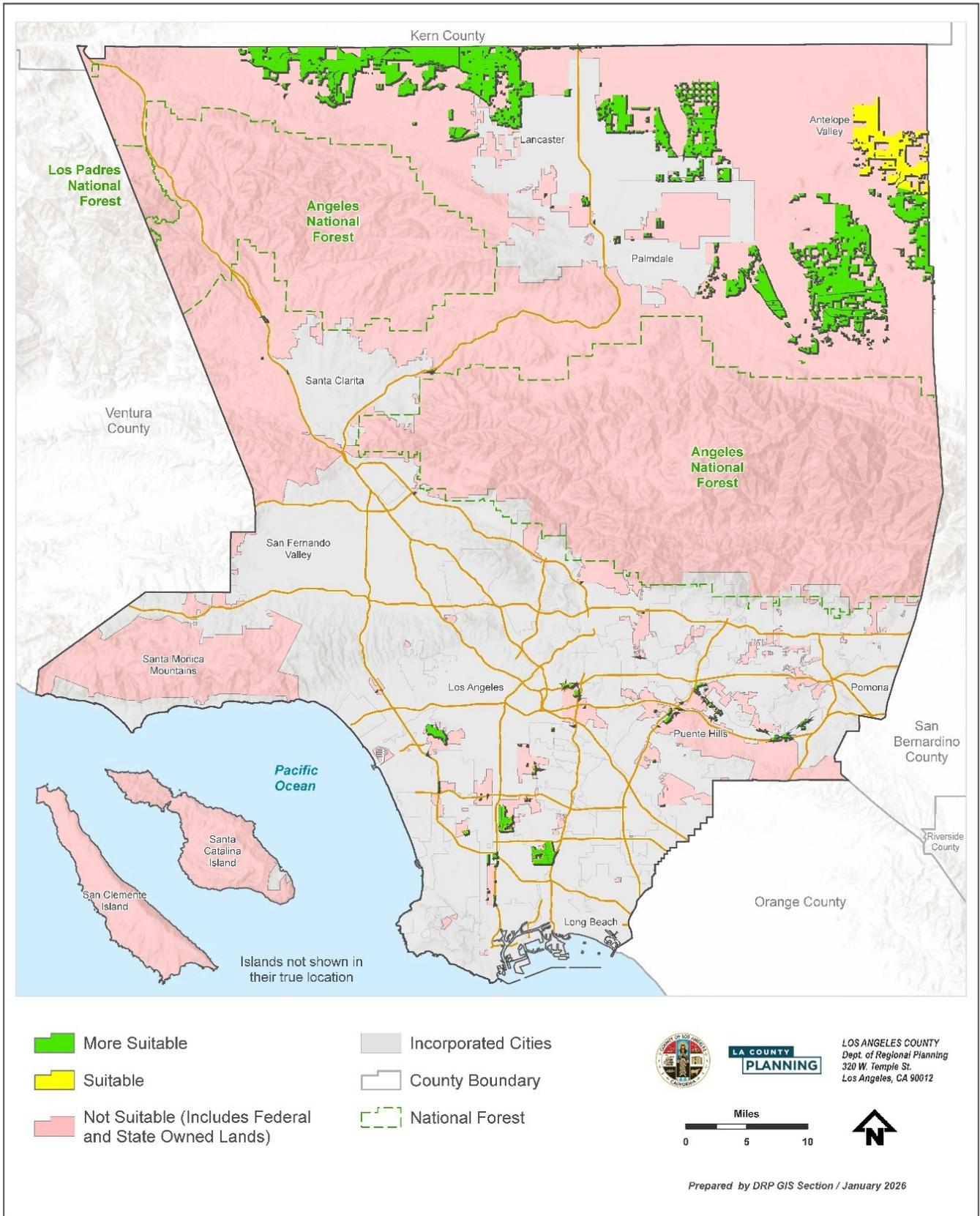
Source: LA County Planning, January, 2026

Figure 4-20: Suitability for BESS Projects (≤ 500 MWh)



Source: LA County Planning, January, 2026

Figure 4-21: Suitability for BESS Projects (> 500 MWh)



Source: LA County Planning, January, 2026

## CHAPTER 5 Findings and Recommendations

### 5.1 Findings

This REO Update Technical Study describes the many factors that contribute to the current status of renewable energy development within Los Angeles County and discusses considerations for facilitating future renewable energy development. The following are key findings based on the information presented in Sections 2 through 5 of this technical study.

**Current County policy guidance both supports and creates barriers to renewable energy development.**

As discussed in Section 2.1.3, the REO operates within a framework of County planning documents. The General Plan emphasizes the importance of advancing zero-carbon electricity to support State and regional sustainability initiatives, while the Los Angeles Countywide Sustainability Plan and the County’s CAP establish targets, strategies, and timelines for renewable energy infrastructure deployment. These County planning documents recognize that utility-scale renewable development (i.e., solar) has primarily occurred in the Antelope Valley due to the region’s suitable topography and access to transmission infrastructure. However, the Antelope Valley Area Plan includes policies that restrict the locations and types of future renewable energy development.

**Renewable energy policies do not necessarily dictate the total renewable energy capacity that is developed within a county.** Section 2.1.4 discusses the renewable generation capacity of California counties that have previously developed a renewable energy policy framework. For the counties that have a large capacity for renewable energy generation, much of this capacity was developed prior to the adoption of a new or updated renewable energy policy framework. The extent of renewable energy development within each county is an outcome of several essential factors:

- **Resource Potential** – The most important factor influencing the extent to which renewable energy development occurs is the amount of resource potential within a county. Utility-scale renewable energy generation requires sufficient solar radiation or mean wind speed, combined with abundant land with suitable terrain (i.e., less than 5-degree slope for solar technologies).
- **Economics** – A developer must secure a power purchase agreement (PPA) for any new energy project (including energy storage) to be financially viable, which provides for a long-term source of revenue for the project’s electricity generation. The developer must show proof of this PPA as part of CAISO’s interconnection application process to be connected to the Statewide transmission grid. A developer’s decision to propose new renewable energy and storage projects is also tied to eligibility for federal tax credits and State grant funding.
- **State Planning Efforts** – To meet the State’s aggressive SB 100 targets of 100% renewable energy by 2045, State agencies such as CAISO, CPUC, and CEC are responsible for energy resource planning and transmission planning to identify needed system upgrades and expansions. CAISO is the State’s power balancing agency and is responsible for guiding the transmission interconnection process for new energy generation. A key factor for successfully navigating CAISO’s interconnection process is to locate new energy projects within proximity to existing transmission to allow for tie-in to the electricity grid.
- **Federal Planning and Land Designations** –The majority of southern California’s wind and solar resource potential is located on BLM-administered lands in the California desert. The BLM adopted the Desert Renewable Energy Conservation Plan (DRECP) in 2016, which established a regulatory mechanism for siting and permitting utility-scale renewable energy within predetermined sites (i.e., Development Focus Areas). The extensive renewable energy development that has occurred in the California desert is attributable to BLM’s streamlined siting and permitting process under the DRECP.

**Los Angeles County must have sufficient renewable energy generation resources to achieve its carbon neutrality goals.** As discussed in Section 2.2.1, Los Angeles County (both incorporated cities and unincorporated County lands) currently has 1,940 MW of utility-scale renewable energy generation capacity, with almost 80% of this generation attributable to solar PV. According to CAISO’s 20-Year Transmission Outlook, future utility-scale solar development is projected to occur in the high desert regions north and east of Los Angeles County, primarily within Kern County (CAISO, 2024). There is no projected new capacity for utility-scale solar or utility-scale wind in the Los Angeles County Basin due to insufficient resource potential or land area to support these technologies at a utility scale (CAISO, 2024). CAISO’s 20-Year Transmission Outlook also indicates that Los Angeles County could accommodate substantial development of new lithium-ion BESS, which would add to the 1,254 MW of BESS capacity currently installed. However, new energy storage projects in Los Angeles County are unlikely to include long duration energy storage (LDES), as these sites are typically sited in unpopulated areas near a renewable generation resource (CAISO, 2024). According to CAISO’s resource modeling, suitable sites for LDES would be located near utility-scale solar and wind resource areas in the upper Tehachapi region and in the California desert region.

This technical study notes that approximately 34% of the land within Los Angeles County is under the County’s jurisdiction. Given the amount of land required for utility-scale solar and limited opportunities for new development, the County has successfully maximized generation within its existing renewable resource areas. Future utility-scale development is likely to focus on energy storage given few remaining opportunities for utility-scale solar generation. Almost half of CAISO’s projections for utility-scale BESS has already been developed in Los Angeles County (i.e., 1,254 MW as of July 2025), while an additional 1,273 MW of capacity would be required to reach CAISO’s projections for the Greater LA Metro region. With the 130,953 acres of identified suitable land for BESS development, there is more than enough opportunity to develop the projected capacity.

**Several factors directly affect renewable energy development and are outside of the County’s control.**

While the County’s REO Update is intended to facilitate the development of new renewable energy generation and storage projects, there are several factors that may impede renewable energy planning efforts. Below is a summary of these factors and opportunities for the County of Los Angeles to address these constraints:

- **Infrastructure Constraints** – Future energy projects may require upgrades to the existing transmission system. The extent to which future energy development is constrained by the transmission system would depend on the size, generation output, or energy storage capacity of an energy facility, and the location of interconnection to the electric grid. While the County of Los Angeles does not have jurisdiction to permit transmission infrastructure, the County can plan for and facilitate electric system interconnection. The County may also participate as a stakeholder to engage and provide feedback during CAISO’s policy initiative process (CAISO, 2025b).
- **Lengthy Interconnection Processes** – Once a project developer has identified a feasible site for connecting new renewable energy generation or storage to the transmission system, the project must navigate CAISO’s generation interconnection planning process. Proposed generation projects often experience long wait times within the CAISO interconnection queue. Although the County of Los Angeles cannot accelerate this process, the County can streamline the land use entitlement and franchise agreement permitting timeline for project applicants in order to facilitate project interconnection.
- **Availability of Green Power Programs** – While green power programs provide flexibility with using generation sources outside of Los Angeles County to meet renewable electricity procurement targets, a shortage of new renewable generation may limit enrollment within these programs. As customer

enrollment increases, power providers such as CPA must continue to secure eligible renewable generation projects that meet stringent CPUC Procurement requirements. Increasing renewable generation and storage projects within the County can help to reduce CPA's reliance on out-of-state procurement. The County of Los Angeles can support the development of eligible renewable generation and storage projects by creating opportunities to streamline the permitting timeline for project applicants.

- AB 205 Opt-In Projects – The County's objective in updating the Renewable Energy Ordinance is to create a clear pathway for permitting renewable energy generation and storage projects. However, developers may choose to instead pursue the AB 205 Opt-In process. This alternative permitting process is intended to fast track eligible renewable energy projects that contribute to meeting the State's SB 100 targets of 100% renewable energy by 2045. While the AB 205 Opt-In program may result in new utility-scale renewable energy generation and storage development within Los Angeles County, project siting and approval would bypass the County's jurisdictional permitting process. By actively engaging with the CEC during the AB 205 Opt-In process for a particular project, the County of Los Angeles can provide input on development standards; construction, operation, and decommissioning measures; and community benefit programs. The deadline for allowing new projects to be permitted through the AB 205 Opt-In program is June 30, 2034.

#### ***Key Takeaways***

- The County's renewable energy policies and measures are primarily focused on solar PV generation, energy storage, and participation in green power programs. Because green power programs use generation sources outside of Los Angeles County, they provide the County with flexibility in meeting its 100% renewable electricity procurement targets. County policies that focus on in-County development of solar generation and battery storage are generally consistent with the recent Statewide and regional studies that have been prepared by CAISO, CEC, and CPUC.
- Many types of hydrogen production facilities could be built in Los Angeles County depending on the methods of hydrogen production. Green hydrogen production is both an energy-intensive and water-intensive process, and must have access to renewable energy generation sources, water, as well as hydrogen fuel storage and transportation infrastructure. Future development of liquid hydrogen production facilities requires investments in infrastructure for hydrogen fuel transport and storage. Given the risks for fire and explosion associated with hydrogen facilities, siting considerations should be similar to utility-scale BESS facilities.
- Development of utility-scale renewable energy projects would provide positive economic benefits to the County. New projects would generate economic activity from construction and maintenance of the facilities and construction labor. Additional direct County benefits include property tax revenue, permit fee generation, and sales tax revenues that vary depending on the location of the project. Financial considerations that influence new renewable energy development include tariffs, federal tax credits, and State incentive programs.
- Community benefit plans that are developed with consideration of the affected communities, and that include the community in the process, can provide mutually beneficial relationships between the community and the developer and create a source of new community resources (e.g., education funding, job training, electric bill rebates, funding for behind-the-meter battery systems, etc.).
- While the County's REO Update is intended to guide renewable energy development, variables that are outside of the County's control and affect energy development within the County include: electric infrastructure constraints, lengthy transmission interconnection processes, availability of green power programs, AB 205 Opt-In process, and changes to tax credits and tariff considerations. In spite of existing constraints, this study identifies sufficient suitable acreage within unincorporated LA County to meet CAISO's BESS capacity projections for the Greater LA Metro region.

## 5.2 Recommendations

The following recommendations reflect the technology-specific siting considerations and regulatory tools presented in the REO Update Technical Study. Table 5-1 summarizes the siting recommendations and permitting tools for each County department.

**Utility-Scale Solar.** Solar resource potential, land availability, and slope suitability are fundamental requirements for siting new utility-scale solar energy developments. The County may impose other siting and development criteria to minimize impacts to sensitive uses, such as establishing a buffer from specific land use types and requiring construction measures that minimize fugitive dust.

**Utility-Scale Wind.** As stated in Section 2.2.2 of this technical study, State projections for new utility-scale wind capacity do not anticipate development of new generation within Los Angeles County. LA County Planning did not include utility-scale wind (capacity of 1 MW or greater) in the renewable energy technology screening analysis and does not anticipate adding development criteria for utility-scale wind as part of the REO update.

**BESS.** While NFPA 855 is a standard and not a code, the County can require BESS facilities to comply with NFPA 855 standards. Other key siting considerations include avoiding BESS sites near sensitive uses (i.e., residences, schools, hospitals, etc.), requiring noise control measures, requiring emergency response plan coordination with local first responders per SB 38, and requiring sufficient training for emergency response providers that is specific to the installed battery technology.

**Green Hydrogen.** Siting considerations for a hydrogen production facility should be similar to a BESS project and must avoid proximity to sensitive uses in the event of a fire, explosion, or hydrogen gas release at the facility. A project application for a green hydrogen facility must also demonstrate sufficient access to renewable energy generation sources and water resources. The County can require applicants to develop emergency response plans in coordination with local first responders, and to provide sufficient training for emergency responders.

**Distributed Generation.** While the REO update is focused on regulations for Front-of-the-Meter utility-scale renewable energy, the County of Los Angeles has a number of policies within its Sustainability Plan and CAP to encourage the development of Behind-the-Meter distributed solar PV as a means of enhancing energy resilience within the County. The County of Los Angeles encourages the expansion of distributed generation and microgrids across the County so that all communities can experience the public health and resilience benefits associated with distributed solar PV (Los Angeles County, 2025b). The upfront cost to install a distributed solar PV system can be a barrier to businesses and homeowners. Opportunities created by the County to lower this upfront cost through bulk purchasing programs, grants, or local tax incentives could facilitate the expansion of distributed solar development. Industrial sites that are energy intensive operations are well suited for a distributed solar PV system given the potential cost savings. Continuing to offer development incentives for accessory solar energy systems (i.e., rooftop and parking lot) would help meet the County's planning goals and policies for distributed generation.

**Community Benefits.** As discussed in Section 4.3.2, there is an opportunity to incorporate community benefits into the permitting process for utility-scale renewable energy projects. This study recommends including a community benefits plan as part of the discretionary permit process, which may include encouraging project developers to enter into CBAs with the surrounding community. To facilitate development of a community benefits plan, the County may provide applicants with a list of strategies for meaningful engagement with relevant communities, as discussed in Section 4.3.2. The County may also consider pursuing a nexus study to include an impact fee that can be put towards distributing benefits in communities with utility-scale renewable energy projects.

**County Ordinance and Siting Considerations.** Based on the County’s renewable energy screening analysis, LA County Planning has identified the following zone-specific recommendations for siting renewable energy:

- Commercial Manufacturing, Agricultural, and Industrial zones must be compatible with acreage requirements for utility-scale renewable energy generation and storage projects.
- County-designated conservation areas, which include Significant Ecological Areas, and areas within the Antelope Valley Regional Conservation Investment Strategy, are not compatible with utility-scale renewable energy projects. Future development should avoid these conservation areas.
- Allowing utility-scale renewable energy within designated Economic Opportunity Areas (EOAs) would be compatible with the Antelope Valley Area Plan’s goals of preserving the surrounding low density and agricultural uses. As demonstrated in Section 3.2, new renewable energy development would support the economic growth and development goals of the EOA designation by creating employment opportunities and generating economic revenue through permitting and taxation.

**Table 5-1 Recommended County Tools for Renewable Energy Generation and Storage Projects**

<b>Recommendation</b>	<b>Utility-Scale Solar</b>	<b>BESS</b>	<b>Green Hydrogen Production</b>
<b>Department of Public Works</b>			
Require applicant to prepare a transportation plan for all phases of project development. The transportation plan should address methods for reducing construction worker traffic volumes and project-related equipment transport. The transportation plan should ensure that access is maintained along public roadways.	X	X	X
<b>LA County Planning</b>			
Require applicant to prepare a noise monitoring and mitigation plan that includes measures to minimize noise impacts to noise-sensitive receptors, and measures to ensure compliance with local noise standards.	X	X	X
Require applicant to use minimum intensity lighting consistent with safety needs; prohibit strobe lighting except where it is required for safety; shield all permanent lighting unless otherwise required for safety; mount lighting so that it is focused downward; control lighting with timers, sensors, and dimmers; and use vehicle-mounted lights for nighttime maintenance work rather than permanently mounted lighting.	X	X	X
Require applicant to prepare a Dust Control Plan that identifies all sources of fugitive dust emissions and the associated mitigation measures to address those emissions.	X	X	X
Require applicant to provide financial assurance for full decommissioning of the facility at the end of the project’s operational life, which may be provided in the form of a bond, a parent company guarantee, or an irrevocable letter of credit. Typically, the financial assurance is equal to or greater than the estimated cost	X	X	X

<b>Recommendation</b>	<b>Utility-Scale Solar</b>	<b>BESS</b>	<b>Green Hydrogen Production</b>
of decommissioning the project, and may be provided in increments (e.g., every five years).			
Require applicant to prepare a decommissioning plan that includes the following: <ul style="list-style-type: none"> <li>■ Identifies the conditions to which the project site must be restored following decommissioning.</li> <li>■ Describes the activities that would occur under the decommissioning plan to restore the project site to the identified conditions.</li> <li>■ Describes the activities that would occur under the decommissioning plan to restore the project site to the identified conditions.</li> </ul>	X	X	X
Setbacks	X	X	X
Require a buffer from sensitive uses.	Minimum 100 feet	Minimum 300 feet	Minimum 300 feet
Perimeter wall/ Fencing	X	X	X
Recommended zones for project siting	A-2, C-M, M-1, M-1.5, M-2, IT	A-2, C-M, M-1, M-1.5, M-2, IT	A-2, C-M, M-1, M-1.5, M-2, IT
Define 'green' hydrogen production facility in the Zoning Code for purposes of project siting and permitting.			X
<b>Public Health</b>			
Update the noise ordinance to account for low frequency noise.	X	X	X
<b>LACoFD</b>			
Require a Command and Control Center that can be used to perform emergency duties and responsibilities during the detection, initiation, and escalation of a BESS fire.		X	
Require an annual joint training program with LACoFD.		X	X
Require comprehensive safety training for all plant workers, including specific training for handling hydrogen leaks, fires, and other emergency situations.			X

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