County of San Bernardino

General Plan

Renewable Energy and Conservation Element

Prepared for

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This draft will be updated prior to Element adoption by the County Board of Supervisors. This Element is a work in progress until review, discussion, and adoption by the Board of Supervisors.

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List of Abbreviations

AB: Assembly Bill

BLM: Bureau of Land Management

Btu: British Thermal Unit

CAA: Clean Air Act

CAISO: California Independent System Operator

CCA: Community Choice Aggregation

CDFW: California Department of Fish and Wildlife

CDP: Census Designated Place

CEC: California Energy Commission

CEQA: California Environmental Quality Act

CORE: Community-Oriented Renewable Energy

CPUC: California Public Utilities Commission

CPV: Concentrated Photovoltaic

CSA: Community Service Agency

CSI: California Solar Initiative

CSP: Concentrated Solar Power

CUP: Conditional Use Permit

DOD: Department of Defense

DOE: Department of Energy

DOI: Department of the Interior

DRECP: Desert Renewable Energy Conservation Plan

DTSC: Department of Toxic Substances Control

EIA: Energy Information Administration

EPA: Environmental Protection Agency

ESA: Endangered Species Act

EV: Electric Vehicle

FEMA: Federal Emergency Management Agency

GHG: Greenhouse Gas

GPCD: Gallons per Capita per day

GW: Gigawatt

GWh: Gigawatt-Hour

HCP: Habitat Conservation Plan

HERO: Home Energy Renovation Opportunity

HVAC: Heating, Ventilation, and Air Conditioning

IOU: Investor-Owned Utility

IPP: Independent Power Producer

ISEGS: Ivanpah Solar Electric Generating System

JPA: Joint Powers Authority

kV: Kilovolt

kW: Kilowatt

kWh: Kilowatt-hour

LADWP: Los Angeles Department of Water and Power

LCOE: Levelized Cost of Energy

MOU: Memorandum of Understanding

MSP: Mojave Solar Project

MSW: Municipal Solid Waste

MUP: Minor Use Permit

MW: Megawatt

Mwh: Megawatt-Hour

NEM: Net Energy Metering

Nox: Nitrous Oxides

NREL: National Renewable Energy Laboratory

PACE: Property-Assessed Clean Energy

PG&E: Pacific Gas and Electric Company

POU: Publicly Owned Utility

PPA: Power Purchase Agreement

PV: Photovoltaic

RE: Renewable Energy

RPS: Renewables Portfolio Standard

SANBAG: San Bernardino Associated Governments

SB: Senate Bill

SCAG: Southern California Association of Governments

SCE: Southern California Edison

SCG: Southern California Gas Company

SDG&E: San Diego Gas and Electric Company

SEGS: Solar Electric Generating Systems

SMUD: Sacramento Municipal Utility District

SUP: Special Use Permit

USFWS: US Fish and Wildlife Service

USGS: US Geological Survey

ZNE: Zero Net Energy

INTRODUCTION

The ability to generate, control, and distribute energy has a profound effect on our society. Reliable, affordable, and accessible energy keeps our homes comfortable, our families safe, our streets lit, and our businesses productive.

Historically, energy has been generated by burning fossil fuels such as coal, oil, and natural gas, the latter of which accounts for nearly three quarters of the County's energy production (per Figure 1). These energy sources have provided abundant cheap energy and allowed economic and quality of life increases that are unprecedented in human history. They are nonrenewable, however, and have taken heavy tolls on the environment and human health. As fossil fuel supplies dwindle and their effects on global climate mount, renewable energy (RE) sources have become essential.

RE technologies capture energy from ongoing natural sources such as solar radiation, wind, tides, waves, rivers, biological processes, and geothermal heat[1]. San Bernardino County has abundant RE resources with the potential to generate substantial energy.

Renewable Energy Potential

San Bernardino County has among the highest solar energy potential of anywhere in the United States, making it a prime location for solar energy facilities. Some of the mountain ridges in the county's desert areas are highly suitable for wind energy facilities. San Bernardino County also has higher than average potential for bioenergy facilities compared to the rest of California.

Source: NREL (2007, 2008, 2010)

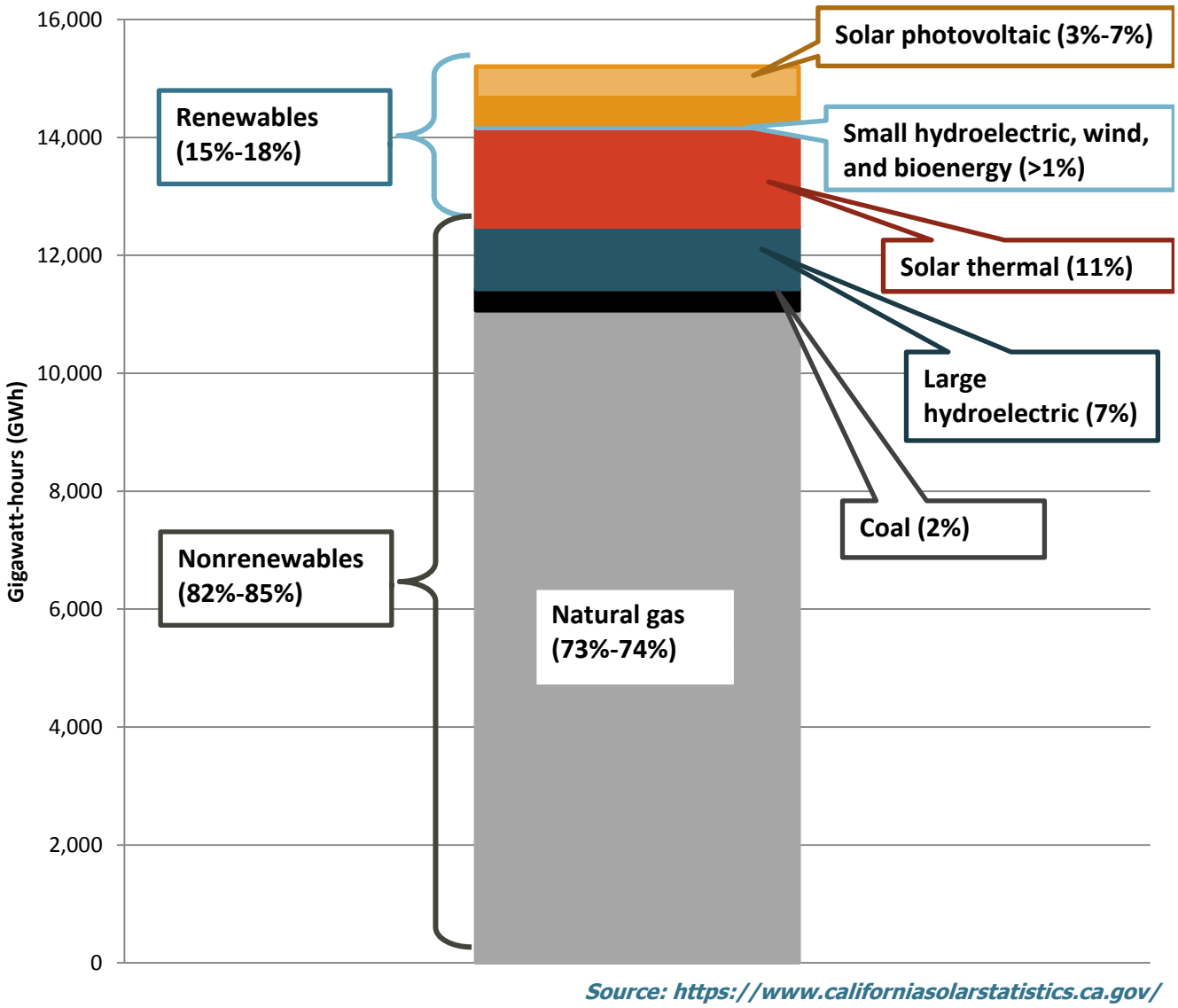
The County government has jurisdictional control over nearly 2 million acres of land representing 15% of total land within the county boundary, exclusive of incorporated cities and public land under the control of state or federal agencies. Much of this total has potential for RE generation facility siting.

Renewable resources available in the county include biomass fuels, wind, and solar energy. Various technologies are available to convert these renewable energy sources into a usable form of energy. Existing technologies and facilities in the county vary in their scale and intensity. The majority of existing renewable energy production in the county occurs at large facilities that supply energy to the statewide power grid for consumption throughout California and beyond.

Although renewable energy provides a path to a clean energy future, renewable energy facilities have the potential to cause unintended negative effects on sensitive biological species and habitat, visual resources, and nearby communities. To achieve a clean energy future that minimizes negative effects consistent with local values, the County has considered how to reduce energy use through energy efficiency and conservation measures, and identified renewable energy facility standards that concentrate on community-oriented RE facilities that produce electricity for local consumption.

[1] Details on different RE resources and technologies are included in a **Background Report,** prepared by consultant PMC.

Figure 1: Electricity Output by Facility Type in San Bernardino County



Source: https://www.californiasolarstatistics.ca.gov/

INTENTIONS OF THIS ELEMENT

Our County government seeks to manage land use and development in a manner consistent with the Countywide Vision. This effort includes a focus on sustainability, stewardship of the land, public health and wellness, and an environment in which those who reside and invest here can prosper and achieve well-being. In this context, the Renewable Energy and Conservation Element (Element) is intended to ensure efficient consumption of energy and water, reduce greenhouse gas emissions, pursue the benefits of renewable energy and responsibly manage its impacts on our environment, communities and economy.

Specifically, the purpose of this Element is to:

- Clarify the County's collective community, environmental, and economic values for RE development and conservation.
- Articulate what the County will strive to achieve and avoid through energy conservation, energy efficiency, and RE development.
- Establish goals and policies to manage RE development and conservation.
- Set a framework for Development Code standards.

While the Element is by law an optional component of the County's General Plan, County leaders chose to include it because of its importance to our people, economy and environment.

The State of California has established a set of RE mandates and incentives[2] that have major implications for the County of San Bernardino and its people. These mandates, technology advances, and increasing demand have created substantial volumes of permit applications for RE development in the county. Meanwhile, local residents and stakeholders have expressed increasing concerns about impacts from recent projects. Many have become opposed to RE development, particularly at utility scale. In this context, the County needs to strengthen its policies and regulatory system to strategically manage RE development and conservation.

The Element focuses primarily on policies that must be adhered to in the development process and conservation activities. These policies reflect a combination of insights from best practices, regional environmental conditions, local values, climate change and economic need. These policies work with our Development Code standards to ensure that constantly advancing technologies and development practices, or "Means," will be certain of achieving our goals, or "Ends". It is essential then that the County's regulatory system be clear as to its core values and guiding principles so that current and

[2] The Renewables Portfolio Standard, or RPS, is a state law mandating increased production of renewable electricity by California utilities. Under the targets of California's RPS, all electricity providers in the state must procure at least 50% of the electricity they sell from eligible renewable resources by 2030. California's RPS is administered jointly by the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC). For more information, see http://www.energy.ca.gov/portfolio/.http://www.energy.ca.gov/portfolio/.

future technologies can be evaluated and permitted in a highly predictable manner. While regulatory updates will be necessary from time to time, the guiding framework should be highly stable.

Generally, the Element emphasizes community-oriented renewable energy (CORE)[3]. Our ideal is local production primarily for local consumption. Programs like Community Choice Aggregation are highlighted to encourage locally appropriate development. . This Element presents a CORE-standards approach, coupled with stringent siting criteria for utility-scale RE development. Such generation facilities will be limited to specific areas that can accommodate them in a manner consistent with the policies and standards in our regulatory system. Specifically, the County will focus utility-scale facilities in well-defined areas that are (1) less desirable for the development of communities, neighborhoods, commerce, and industry, and (2) less environmentally sensitive.[4]

CORE VALUES

The Countywide Vision Statement adopted by the Board of Supervisors on June 30, 2011, fosters strategic countywide coordination in a manner that reflects the priorities of local residents, businesses, and stakeholders. The citizens of San Bernardino County share the following core values, as articulated in the Countywide Vision:

- **Quality of Life:** A high quality of life for residents of the county that provides a broad range of choices to support the county's diverse people, geography, and economy to live, work, and play.
- **Vibrant Economy:** Ample economic opportunities for current residents and businesses that support countywide prosperity, as well as new investment in economic growth.
- **Conservation of Natural and Cultural Resources:** Stewardship that conserves and responsibly uses environmental, scenic, recreational, and cultural assets, ensures healthy habitats for sensitive plants and wildlife, enhances air quality and makes the county a great place for residents and visitors alike. Renewable energy is a natural resource that supports this stewardship role.
- **Sustainable Systems:** High quality built, natural, and social systems that complement, rather than degrade, the county's natural resources, environment, and existing communities.
- **Self-Reliance:** Helping our communities help themselves while addressing the Meeting the needs of the county's population.

[3] CORE refers to situations where communities or businesses seek to generate primarily renewable energy for their own use. The County intends to encourage small-scale distributed generation that primarily addresses local needs and allows excess energy to be sold to the grid.

[4] Additional information on renewable energy, environmental considerations and community engagement can be found in the PMC **Background Report**.

- **Open Governance:** Governance guided by open, transparent, and ethical decision-making that values the county's environment, people, heritage, location, economy and community spirit.

GUIDING PRINCIPLES

This Element's Guiding Principles guide plans, projects, and investments that are subject to the General Plan. These principles encourage balanced, integrated, consistent, and predictable approaches to renewable energy development, addressing topics such as energy conservation, efficiency, siting, orientation of production (community or utility), types of technology, environmental stewardship, community compatibility, equity, access, and leadership. The Guiding Principles are intended to be relevant to every action that updates, amends, or implements this Element.

The County seeks to ensure that regulatory systems and land use decision-making are consistent with the values and goals expressed in this Element. By framing goals and policies in the context of Guiding Principles, the County is able to ensure continuity throughout its regulatory language and planning documents. Decision-makers then have a framework to inform discretionary review and can consistently determine whether proposed actions reflect County intentions on balance.

In the context of our Core Values, the County will consider the following guiding principles when making and adopting legislative land use decisions related to renewable energy development:

Community-Oriented

- Emphasize community-oriented renewable energy generation facilities.
- Encourage local renewable energy production to meet local energy demand while allowing excess energy to be sold to the grid.
- Pursue energy security and independence.
- Ensure that new renewable energy development is located, designed, and constructed in a manner that reflects Core Values and respects private property rights.
- Encourage more direct benefits to the county from renewable energy.
- Inform affected communities and stakeholders about proposed renewable energy development in a manner that allows meaningful, timely engagement in the review process.
- Collaborate with county residents and other stakeholders to improve understanding of renewable energy issues.
- Provide residents more affordable, reliable, diverse, and safe access to energy, especially renewable energy.
- Ensure that development of County-owned properties is consistent with the goals and policies of the Renewable Energy and Conservation Element.

Environmentally-Oriented

- Guide community and regional development to meet the needs of the present without compromising the ability of future generations to meet their own needs.
- Reduce greenhouse gas (GHG) emissions in response to state mandates.
- Improve air quality.
- Direct renewable energy facilities to suitable areas in the unincorporated county - especially to areas that have been previously disturbed, leverage the existing transmission network, and/or respond to local demand.
- Encourage design, materials, and technologies to support responsible, equitable, and highly efficient energy consumption.
- Conserve and sustain sensitive natural resources and habitats.
- Prohibit renewable energy production in areas identified as critical habitat or as a wildlife corridor for species of special concern as defined in the Conservation Element, without comprehensive and feasible mitigation or avoidance of potential impacts.
- Monitor RE generation facilities throughout their useful lives to ensure operations continue to conform to conditions of use.

Economically-Oriented

- Encourage economic growth that complements local values, needs and lifestyles.
- Encourage renewable energy development that promotes a strong economy.
- Maintain a system of fees, taxation, and other compensatory tools that adequately covers County costs of providing necessary public services, including the costs associated with the regulation of renewable energy project sites.
- Optimize the benefits of renewable energy to county residents, businesses, organizations, and government, while ensuring fiscal integrity, accountability, and consistency with the county's core values.
- Ensure predictability, consistency, clarity, and timeliness in the permitting process for renewable energy projects.
- Encourage and simplify the permitting of on-site renewable energy production for on-site consumption.

Finally, while the County does not approve or regulate utility transmission corridors, the goals and policies of this Element are intended to support the presence of adequate transmission infrastructure while minimizing the need for or development of new transmission corridors.

Element Content

This Element contains an introduction to the topic of renewable energy in San Bernardino County, an overview of the relevant existing regulatory framework, an explanation of the process completed to

develop the Element, and the new regulatory framework as presented in the goals, objectives, policies, and implementation strategies of this Element. These latter items are the building blocks for the regulatory framework outlined in this Element. The following definitions apply:

- **Goal:** A future statement of something desired or valued. Goals are aspirational but also attainable.
- **Objective:** An outcome that indicates when the goal has been achieved. Objectives are quantified and can be monitored.
- **Policy:** A statement derived from a goal that represents the County's adopted position and guides actions, implementation, and decision-making toward the goal.

The regulatory framework outlined in this Element is organized by the following key topics and issues:

1. **Energy Conservation and Efficiency** – How can the County reduce the need for energy generating facilities?
2. **Renewable Energy Systems** – How can RE technologies and organizational options be integrated to best serve the county?
3. **Community-oriented Renewable Energy (CORE)** – How can our unincorporated communities benefit most from RE systems?
4. **Environmental Compatibility** – How can RE development standards and other regulations optimize renewable energy output while minimizing negative effects to the natural environment?
5. **Siting** – What criteria should guide the siting of RE facilities in the county?
6. **County Government Systems** – How can the County leverage its role as a renewable energy regulator to ensure that permitting, development, operations and decommissioning of renewable energy facilities adhere to our standards and meet our goals?

For each of the six issues, this Element provides a goal with a corresponding objective when applicable and a set of policies in support of goal achievement. Goals and policies are not listed in order of priority unless so stated. Tables, figures, graphics, and text boxes are provided to support communication of the Element's key points.

Role of Element in General Plan and Other Planning Processes

The Renewable Energy and Conservation Element (RECE) is a component of the General Plan, an established regulatory framework, and is supportive of other county, state, and federal plans. This

section provides a brief explanation of the relationship of the RECE to the Countywide Vision, other General Plan elements, and the Desert Renewable Energy Conservation Plan (DRECP). The PMC **Background Report** describes the full regulatory context for the Element.

County of San Bernardino General Plan (2007)

California law requires every city and county in the state to prepare and adopt a comprehensive long-range general plan for the physical development of the jurisdiction (California Government Code Section 65300). Each general plan must include seven mandatory elements: land use, circulation, housing, conservation, open space, safety, and noise. The California Government Code also allows general plans to include other optional elements as desired.

The Renewable Energy and Conservation Element is an optional General Plan element, emphasizing an approach to renewable energy development that is respectful of sensitive biological species and habitat, visual resources, and human communities and considers the relationship of those issues to land use, conservation, and open space planning.

Desert Renewable Energy Conservation Plan

The State is preparing the Desert Renewable Energy Conservation Plan (DRECP), a multi-agency effort to develop a comprehensive habitat conservation plan with streamlined federal permitting for renewable energy projects on 22 million acres of state and federally owned public land. San Bernardino County is one of seven counties participating in this effort. The county's lands constitute 53% of the DRECP planning area. The DRECP establishes mitigation and conservation measures that renewable energy projects could implement for desert habitat and species impacts.

The DRECP and this Element are closely related in that they both address renewable energy in the county. However, the two plans differ in scope and focus. The DRECP focuses on renewable energy projects on state and federally owned land, as well as on projects that require federal permitting as a result of impacts to certain species and habitat. This Element focuses on unincorporated land under the County's jurisdictional control. It emphasizes the County's framework for regulating development of renewable energy projects on privately owned land in the unincorporated county.

Element Preparation Process

In 2013, the County of San Bernardino received a grant from the California Energy Commission (CEC) to develop the Renewable Energy and Conservation Element. In parallel with the DRECP effort, the grant provided an opportunity to the County to address renewable energy on private and County-owned lands in the unincorporated county. This Element is the result of a collaborative effort by a wide range of County staff, community members, and professional consultants. The following is a brief

overview of plan preparation processes, including technical analysis, the public participation process, and adoption.

TECHNICAL ANALYSIS

The approach to developing this Element reflects the special regulatory and land use considerations for energy production, supply, and consumption. To identify opportunities and develop goals, policies, and implementation strategies, the project team analyzed the energy context. This analysis included a review of renewable energy technologies, best practices case studies, local conditions of energy use, and the local and state context for energy regulation. These numerous issues overlap to determine the real opportunities to shape renewable energy in the county. By accounting for these factors, this Element provides a road map that the County can implement and achieve to meet the needs of the diverse types and intensities of energy users in the unincorporated county.

As a first step to prepare this Element, the County conducted an analysis of current policy conditions for renewable energy and efficiency. The project team evaluated the General Plan, the Countywide Vision, the Development Code, and 2014 amendments to Section 84.29 of the Development Code for commercial solar energy facilities. The team analyzed the policy framework using a strengths, weaknesses, opportunities, and threats (SWOT) exercise that explored the following question: to what extent do adopted policies and codes achieve the Element's vision of fostering renewable energy and conservation productivity? The question was addressed by evaluating the performance of the County's adopted policy framework relative to statewide guidance and best practices.

Building on this policy context, the project team next analyzed the County's energy demand characteristics and experience with renewable energy development to date. Because some of the largest renewable energy developments in the nation are located in San Bernardino County, unincorporated communities and the County government have a long history of dealing with renewable energy first-hand. The project team evaluated the characteristics of these facilities, from the scale and size of facilities to mitigation conditions and operational issues. Recognizing that many of the large projects in the county provide energy to users outside of the county, the project team also reviewed data on local energy usage. This review helped to identify local demand and opportunities.

To further understand feasible and appropriate strategies for energy production and consumption, the project team conducted mapping and a technical literature review. The results of the mapping analysis are provided throughout this Element. These maps present key resource and infrastructure requirements for renewable energy development and key environmental considerations in the county. The project team also used maps during the public outreach process, as described below.

PUBLIC PARTICIPATION

The SPARC Forum website provided an opportunity for residents to participate from their computers.

The development process for the Element relied heavily on public participation and community input. The County held four rounds of community engagement and conducted stakeholder engagement prior to the adoption of this Element. This extensive outreach and collaboration process was also collectively referred to as the "SPARC" effort, an acronym for the San Bernardino County Partnership for Renewable Energy and Conservation. The SPARC effort was the original vision for the process to develop this Element. During the outreach process, the County also provided opportunities for online feedback with the website SPARCForum.org.

Public Participation Round 1 (April 2014)

Participants at the first round of public workshops discuss local values and priorities.

During the first round of public participation, the County provided an overview of the project and received public opinion. Feedback from the public included responses on the appropriateness of certain renewable energy technologies and lessons learned from existing renewable energy projects. This first round of SPARC outreach involved workshops in five locations across the county, with over 80 participants attending in-person workshops. Workshop attendees participated in three facilitated interactive activities:

- **Community Priorities Selection** – Participants chose up to five priorities that were important to them from a list of options. Participants were also encouraged to add priorities to the list if they felt something important was missing. Participants recorded selections in individual workbooks.
- **SWOT Analysis** – In small groups, participants discussed strengths, weaknesses, opportunities, and threats in reference to the six renewable energy technologies summarized during the presentation. Facilitators recorded participant comments.
- **Evaluation Criteria** – Participants indicated the top three evaluation criteria the County should consider if reviewing an application for each of the six renewable energy technologies that were summarized during the presentation. Participants recorded selections in individual workbooks.

Overall, participant comments during the first round of public workshops revealed four primary values. The values expressed below were the most commonly discussed topics across all Round 1 public outreach opportunities (in person and online):

1. Renewable energy development sites should be limited to previously disturbed land.
2. Small-scale distributed generation wind and solar projects are preferred over utility-scale projects.
3. Protecting the environment and wildlife should be a paramount consideration.
4. Clear communication and transparency between residents and the County from the initial application through project implementation is critical to a successful renewable energy program.

Additional key themes that emerged from participant comments included:

- Participants view the Element as a significant opportunity for the County to demonstrate its role as a leader in renewable energy policy and implementation.
- Participants were supportive of the process if genuine consideration of their input is demonstrated in the final document.
- Permanent job opportunities should be developed in conjunction with a growing renewable energy industry.

Public Participation Round 2 (August 2014)

Round 2 of SPARC community workshops provided the project team with a deeper and more nuanced understanding of renewable energy development issues of concern to San Bernardino County residents. The second round of engagement involved over 200 participants attending in-person workshops in five locations across the county and over 100 participants through SPARCForum.org. In addition, the County received e-mail correspondence and over 150 written letters. The intent of Round 2 community engagement was to review input received during the first round, update the community on project progress, and provide opportunities for participants to comment on and refine concepts for the Renewable Energy and Conservation Element.

Each workshop session followed the same approach, with the same presentation and workshop activities offered at each event. The presentation included a review of the meeting purpose, project status, a summary of Round 1 community engagement, a draft framework for developing policy goals, and an overview of technical mapping to date. Facilitated discussions focused on three topics — (1) productivity, (2) consumption, and (3) conservation — as described below.

1. **Productivity: Supply, Location, and Technology Type** – In small groups, participants responded to question prompts that aimed to refine definitions of key project terms such as "small-

scale," "disturbed land," and "distributed generation." Participants also clarified important criteria for the County to consider when evaluating potential renewable energy projects in the Desert, Valley, and Mountain regions.

2. **Consumption: Economy, Equity, Independence, and Resilience** – In small groups, participants responded to question prompts that covered topics such as County leadership, renewable energy cost reduction, support for off-grid community energy clusters, incentive access and programming, and adaptability.

3. **Conservation: Natural and Cultural Resource Conservation** – In small groups, participants responded to question prompts that confirmed the importance of protecting local resources. Participants also discussed criteria to help determine land qualities and locations that would be suitable for renewable energy development.

During the second round of public workshops, the public shared diverse opinions about how the County should move forward with renewable energy policy development. Some participants expressed extreme opposition to large-scale production of wind and solar energy, and were against anything larger than on-site production. Others acknowledged and identified a need for and the benefits of utility-scale renewable energy, but were reluctant to support the manner in which projects have been developed in the county. The majority of those who opposed large-scale production supported only the smallest scales of renewable energy production (e.g., small-scale renewable energy facilities on disturbed and developed lands, including rooftops). Some participants expressed a willingness to consider community-scale renewable energy if specific criteria were in place that addressed their concerns.

Additional discussion with some workshop participants revealed critical decisions for the County in preparation of this Element, including:

- **Where energy is used**, taking into consideration use on-site, use in the vicinity, use in the county, or export for use in other locations.

- **Where energy is produced**, taking into consideration land tenure (federal, state, local public, and private), level of land disturbance, county region, zoning, and proximity to distribution/transmission infrastructure.

- **How energy is produced**, taking into consideration type of technology, environmental compatibility, community compatibility, and scale.

- **How sites are enforced and decommissioned**, taking into consideration activities during construction and operation, including all costs associated with the regulatory activities that ensure compliance with project requirements, and upon discontinuation of renewable energy generation.

- **What role the County plays in renewable energy decision-making**, taking into consideration land tenure (federal, state, local public, and private), technology and scale, and the need for supporting resources such as roads and water.

Public Participation Round 3 (March 2015)

In Round 3 of the public participation program, the County provided a project update and an open forum for the residents to provide public comment. The third round involved an opportunity for public comment at a meeting held in San Bernardino, with live video-casting and opportunities for comment at remote locations in Hesperia and Joshua Tree. Approximately 100 people attended the in-person meeting in San Bernardino. Staff presented a draft version of the framework for the Element, including a discussion of key themes and the proposed organization for the Element, before moving on to the public comment period. The audience and major stakeholder groups, including environmental advocates, expressed substantial support for the framework. There was also continued advocacy for several key themes heard consistently through the first two rounds of public participation. These included:

- Opposition to large-scale renewable energy facilities located on pristine desert land and/or in close proximity to residential areas.
- A desire to protect undisturbed lands in pristine areas, strategically manage desert resources, including groundwater, and minimize other undesirable effects, like dust, from ground disturbances.
- A request to improve opportunities for public comment on renewable energy projects, including broader and more timely notifications.
- Support for community-oriented renewable energy facilities, in combination with building energy efficiency improvements.

Additional Public Outreach - Phase 2

Beginning in October, 2015, the County expanded its research to include cost and benefit analyses of RE projects. Three categories of costs and benefits were analyzed: economic, social and environmental. These were intended to identify means to enhance the net benefit of renewable energy development to the county. Research included working closely with stakeholder groups through five public meetings, two policy focus group meetings, dozens of one-on-one interviews, and 10 phone interviews. After a range of RE enhancement options and implementation tools were identified, the County conducted a public webinar to present and discuss its findings. This cost-benefit work was completed in June, 2016. Findings were then integrated into the administrative draft Element.

The public review Draft Element was completed for review in the late summer and fall of 2016, anticipating consideration by the Planning Commission and the Board of Supervisors in public hearings at the end of the year.

Goals, Policies, and Implementation Strategies

This Element provides a road map for the County to achieve its energy goals. Implementation of the Element will benefit each of the county's three unincorporated regions defined by the General Plan: Desert, Valley, and Mountain. The County will implement the Element through both direct and indirect roles related to the use and production of energy. As the land use authority for the unincorporated areas, the County is responsible for regulating new development, including the built environment and RE development. This direct role involves planning for the allowable placement, design, and intensity of RE projects on private land and County-owned lands. The County also regulates energy use through the Building Code, Development Code, and other government codes. The County enforces standards and rules through review and permitting of applications for new development in unincorporated areas.

While serving as a regulatory agency, the County has an indirect role to coordinate or support efforts regarding RE and energy conservation. In this role, the County can serve as a partner or educator. The County does not regulate RE in isolation, but works within existing partnerships and networks for energy use. Numerous utilities, state and federal agencies, stakeholders, developers, and other partners are working to address RE development and energy efficiency. Collaborating with these entities can help the County implement the Element. The County can also serve as an educator, sharing information and promoting programs that achieve the Element's goals. For instance, the County has the ability to promote state and regional energy conservation and efficiency funding resources. The County can also lead by example through energy retrofits of government operation.

As an educator and partner, the County can promote cost-effective energy savings measures. By first promoting reductions in countywide energy use through energy conservation and efficiency programs, the County can ensure that investments in renewable energy infrastructure are appropriate and necessary to offset real demand. Recognizing that significant amounts of energy can be wasted in the built environment, the County seeks to first foster efficiency and reductions in unnecessary energy use. In tandem with these efficiency and conservation efforts, the County can encourage the wise use of resources and investments in RE infrastructure with quick payback. This approach addresses energy demand that is necessary for the operations and functions of the unincorporated county, recognizing the benefit of RE production to offset energy needs that cannot be further reduced or eliminated.

Goals, policies, and implementation strategies in this Element will guide renewable energy development standards, including amendment of the Development Code and subsequent application of the Code to the development review process. Implementation of the Element will include an update to the Development Code for inclusion of specific standards for renewable energy projects consistent with the Element's goals and policies. The development code's standards will address location, design, natural

resource conservation, and general development issues unique to renewable energy projects in San Bernardino County.

The Element includes eight goals, as identified below. For easy reference across General Plan elements, each goal is accompanied by the abbreviation "RE". Realization of these goals will occur through ongoing and coordinated policy and strategy implementation.

- **RE Goal 1**: The County will pursue energy efficiency tools and conservation practices that optimize the benefits of renewable energy.
- **RE Goal 2:** The County will be home to diverse and innovative renewable energy systems that provide reliable and affordable energy to our unique Valley, Mountain, and Desert regions.
- **RE Goal 3:** Community-oriented renewable energy facilities will be prioritized to complement local values and support a high quality of life in unincorporated communities.
- **RE Goal 4:** The County will establish a new era of sustainable energy production and consumption in the context of sound conservation and renewable energy development practices that reduce greenhouse gases and dependency on fossil fuels.
- **RE Goal 5:** Renewable energy facilities will be located in areas that address County standards, local values, community needs and environmental priorities.
- **RE Goal 6:** County regulatory systems will ensure that renewable energy facilities are designed, sited, developed, operated and decommissioned in ways compatible with our communities, the natural environment, and applicable environmental laws.

I. Energy Conservation and Efficiency

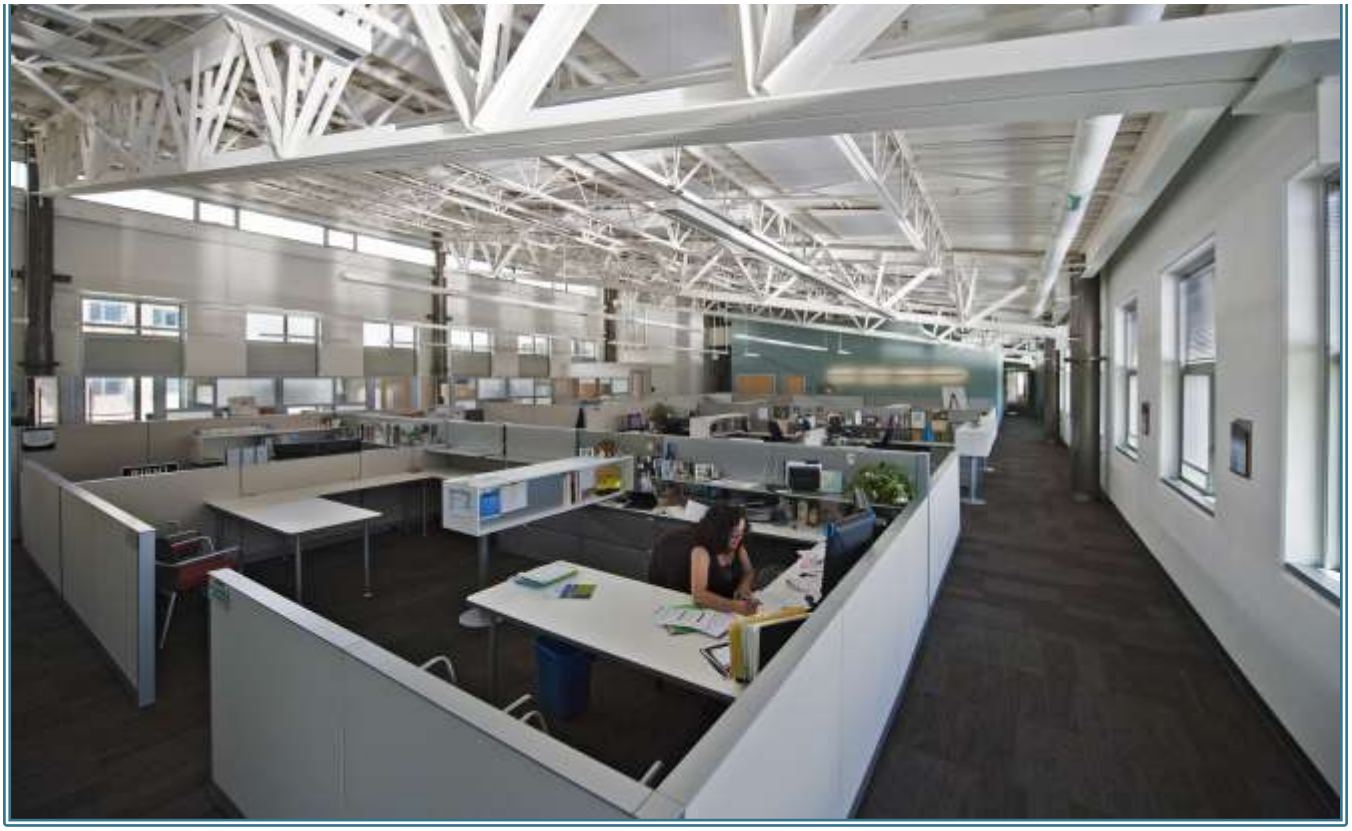
San Bernardino County's commercial, institutional and residential communities will continue to grow in the foreseeable future. Access to dependable and affordable energy sources is critical to maintaining and enhancing the quality of life enjoyed by San Bernardino residents and businesses. As energy needs grow, so do the needs to develop new energy sources. Development of these resources, whether they are renewable or fossil fuel–based, has the potential to conflict with adjacent land uses and degrade the local quality of life.

One of the best ways to make sure new energy developments don't degrade quality of life is to reduce the need for them. The CEC recommends maximizing energy efficiency and conservation as a key step in offsetting traditional forms of energy with renewable sources. The materials used to construct buildings, the orientation of the buildings, and the placement of windows and shading can improve energy efficiency by reducing the need for a furnace or air conditioner (a technique called passive design). Buildings can also reduce heating and cooling demand through proper insulation and sealing, and the use of energy-efficient lights and appliances. Many of these techniques can also improve energy efficiency in existing buildings, particularly energy-efficient lighting and sealing air leaks, which often have the largest energy use reduction relative to their cost and may not require significant retrofits. Energy conservation can be applied equally to new or existing buildings. Energy efficiency and conservation are also important steps to help achieve zero net energy (ZNE), which is discussed later in this Element.

The State of California, utility companies, and some local governments have a number of programs and rebates to support energy efficiency and conservation. For example, the Energy Upgrade California program will provide homeowners with up to $4,500 in rebates to conduct energy efficiency retrofits. California creates energy efficiency standards for new buildings and new appliances. These standards are usually upgraded every few years to become increasingly more stringent. Locally, the County has streamlined and prioritized roof-top solar energy system permits. Property owners in the unincorporated area of the county can also participate in the Home Energy Renovation Opportunity (HERO) program, which provides low-interest financing for retrofit projects.

By optimizing the energy efficiency of existing buildings, encouraging energy conservation behaviors, and requiring new buildings to be highly efficient, the County can reduce energy needs. This approach can also help ensure new RE systems offset existing fossil fuel sources, instead of just supplementing them. A countywide commitment to energy conservation and efficiency offers many benefits, including local economic development, energy bill savings, properly sized RE systems, more resilient utility grids, and GHG emissions reductions.

This office has been designed using energy-efficient techniques. Due to effective window placement, the need for electric lights is replaced mostly or entirely by natural daylight (NREL 2010).



RE Goal 1: The County will pursue energy efficiency tools and conservation practices that optimize the benefits of renewable energy.

RE Objective 1.1: By 2030, electricity and natural gas usage will be the same as or less than 2007 levels.

RE Policy 1.1: Continue implementing the energy conservation and efficiency measures identified in the County of San Bernardino Greenhouse Gas Emissions Reduction Plan.

RE Policy 1.2: Optimize energy efficiency in the built environment.

- RE 1.2.1: Support low- to no-cost retrofits to improve energy efficiency of existing homes through grant and loan programs.
- RE 1.2.2: Encourage property owners to participate in the HERO program for access to energy efficiency retrofit financing.
- RE 1.2.3: Encourage utilities to expand free to low-cost audit and retrofit programs in the built environments.
- RE 1.2.4: Work with utilities (Southern California Edison (SCE), Southern California Gas Company (SCG), etc.) to identify retrofit opportunities with short payback periods, such as variable-speed pool pumps, building air sealing, and attic insulation, for County use in conducting focused energy efficiency outreach.
- RE 1.2.5: Collaborate with community partners to promote the benefits of energy efficiency to County residents, businesses, and industries.
- RE 1.2.6: Encourage new development to comply with the optional energy efficiency measures of the CALGreen Code.
- RE 1.2.7: Encourage passive solar design in subdivision and design review processes.

RE Policy 1.3: Promote the local economic benefits of energy efficiency retrofits.

- RE 1.3.1: Support workforce development and certification for green trades.
- RE 1.3.2: Provide networking opportunities to connect local contractors with energy efficiency retrofit programs such as the HERO program and Energy Upgrade California.

RE Policy 1.4: Encourage residents and businesses to conserve energy.

- RE 1.4.1: Collaborate with utilities to support and learn from annual energy benchmarking reports that large energy users are conducting pursuant to AB 1103.

- RE 1.4.2: Collaborate with the CEC, utilities, and local partners to launch online energy tracking competitions.

II. Renewable Energy Systems

Renewable energy technologies can be installed in large fields of hundreds or thousands of acres. Alternatively, they can be used in small-scale installations, such as the photovoltaic panels on the roof of this home (NREL 2014).

San Bernardino County's ample renewable energy resources and diversity of land use types, topography, and natural systems allow for a variety of renewable energy technologies. These technologies provide a number of benefits for county residents and businesses, including individual financial gain, expansion of manufacturing and skilled trades jobs, community economic benefits, potential environmental enhancements, and energy independence and resiliency. However, not all renewable energy technologies, site designs or proposed sites may be feasible or appropriate for San Bernardino County. Incompatible facilities can cause substantial negative effects on biological communities, resources, and aesthetics. At the same time, we understand that technologies are evolving rapidly. A technology that may not be appropriate or feasible at the present may be refined and become so within a number of years. To ensure our priorities are addressed in the future, we therefore embrace a standards-based approach to development. That is, rather than focus on technology types, we will we will consider whatever technology is proposed, based on its performance and impacts. Each project will be evaluated on its merits, according to explicit standards and permitting criteria.

Among the varieties of energy-generating technologies that are considered renewable under California law, the four most suitable at this time for San Bernardino County are solar photovoltaic (PV) installations, solar water heating, wind energy systems, and bioenergy facilities. Energy storage technologies, which store "excess" electricity for later use, are also available for use in the county and are included in the discussion of renewable energy in this Element.

RE Goal 2: The County will be home to diverse and innovative renewable energy systems that provide reliable and affordable energy to our unique Valley, Mountain, and Desert regions.

RE Objective 2.1: By 2030, access to community-oriented renewable energy generation will be available throughout San Bernardino County.

RE Policy 2.1: Support solar energy generation, solar water heating, wind energy and bioenergy systems that are consistent with the orientation, siting and environmental compatibility policies of the General Plan.

- RE 2.1.1: Utilize renewable energy development standards to minimize impacts on surrounding properties.

RE Policy 2.2: Promote use of energy storage technologies that are appropriate for the character of the proposed location.

- RE 2.2.1: Encourage onsite energy storage with RE generation facilities, consistent with County Development Code requirements.
- RE 2.2.2: Define and allow energy storage facilities as an accessory component of RE generation facilities.
- RE 2.2.3: Establish thresholds for conditions under which energy storage facilities are a primary use and subject to separate permit processes.
- RE 2.2.4: Periodically review and encourage appropriate technology types for energy storage facilities.
- RE 2.2.5: Support state policies and efforts by utility companies to plan for and develop energy storage technologies through legislative advocacy and coordination with utility companies.

RE Policy 2.3: Encourage the use of feasible emerging and experimental renewable energy technologies that are compatible with County regulatory standards.

- RE 2.3.1: Monitor emerging renewable energy technologies and amend County development standards as needed to accommodate suitable new technology types.
- RE 2.3.2: Monitor improvements in existing renewable energy technologies, and consider allowing additional types of renewable energy facilities as they become compatible with County regulatory standards.

RE Policy 2.4: Identify and prioritize programs that support cost-effective and universal access to renewable energy.

- RE 2.4.1: Expand outreach and education efforts through the County's online Community Development Toolkit on programs such as the availability of federal and state tax credits, participation in the HERO program, and other mechanisms to reduce the cost of renewable energy facilities for onsite use on new and existing buildings.
- RE 2.4.2: Educate developers about the County's RE goals and policies, and encourage the inclusion of renewable energy facilities for onsite use in new developments.
- RE 2.4.3: Engage with residential developers to discuss and identify opportunities and incentives to expand onsite renewable energy facilities consistent with the goals and policies of this Element.
- RE 2.4.4: Encourage installation of renewable energy systems on rental properties, multi-family buildings, and buildings with multiple commercial tenants by working with property developers and owners, using tools such as green leases, split incentive programs, and the California Solar Initiative's MASH program.
- RE 2.4.5: Encourage the pursuit of community choice aggregation programs in collaboration with other interested jurisdictions in the region.

RE Policy 2.5: Support renewable energy systems that accelerate zero net energy (ZNE) through innovative design, construction, and operations of residences, businesses, and institutions that are grid-neutral and independent of centralized energy infrastructure.

- RE 2.5.1: Allow and encourage construction of new buildings designed to ZNE standards consistent with state programs.
- RE 2.5.2: Incorporate ZNE into outreach and educational strategies about renewable energy and energy efficiency.
- RE 2.5.3: Allow and encourage construction of new buildings or developments in remote locations with stand-alone energy systems not connected to the grid.
- RE 2.5.4: Encourage energy independence and resiliency, including zero net energy and stand-alone systems not connected to the grid, in County economic development presentations and outreach efforts.
- RE 2.5.5: Collaborate with incorporated cities and other jurisdictions to create region-specific ZNE programs and Community Development toolkit tools tailored to the climates and characteristics of each region to provide consistency and leverage resources.

RE Policy 2.6: Encourage energy efficiency through appropriate renewable energy systems.

- RE 2.6.1: Pursue and consider development incentives such as density bonuses and streamlined permitting for projects that install accessory renewable energy facilities.
- RE 2.6.2: 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.
- RE 2.6.3: Encourage solar energy generation on rooftops and on covered parking as the first priority for on-site energy generation.

III. Community-Oriented Renewable Energy

For over a decade, the language of renewable energy development has become increasingly confusing and controversial. Federal and state agencies, utilities and developers use different measures and standards, often arbitrary and esoteric, for both the scale and purpose of production. This has created immense controversy regarding what constitutes utility-scale or distributed generation. Even the term "distributed generation" has become ambiguous and controversial, with disagreement over whether to use acreage, megawatts, transmission connections, technology, end-users, location of consumption or some mix of these in categorizing RE projects.

Community-Oriented Production

This term refers to modular renewable energy systems that generate electricity where it's needed. Their priority is "local production primarily for local consumption". Community-oriented facilities are often owned by non-utility entities, such as schools, neighborhoods, coops, communities or businesses that offset all or part of their on-site electrical need.

After dozens of public meetings, digital outreach, focus groups and other forms of public engagement, the SPARC Forum program began to focus on renewable energy development from a community perspective. That is, we now use "community-orientation" as our most fundamental criterion for categorizing RE projects. Community-oriented RE facilities are primarily intended to serve the people near them. Utility-scale projects are not. For too long, this fundamental difference has been treated as a side issue while megawatt output per facility has been an unnecessarily confusing fixation nationwide.

RE industry specialists tend to agree that the era of primary investment in utility-scale production facilities is coming to a close. Indeed, there are forecasters who say that regional utilities must reinvent themselves through a transition to community-orientation. With RE technologies advancing rapidly, output efficiencies rising and production costs declining, a new era is clearly on the horizon, where community-oriented production will be the energy industry's priority. Initially referred to as "distributed generation", this approach is really coming to be understood as "local production primarily for local consumption".

SPARC Forum participants embraced this new concept and supported community-oriented production as a priority. This transition to a more diverse scale of energy production better serves the array of community needs in the unincorporated county. Large, utility-scale production facilities will be more carefully regulated and sited on a limited number of land types to minimize their negative impacts. While such facilities continue to bring value to the nation as a whole, they must be sited and perform according to higher standards than they have in the past.

Finally, SPARC Forum also highlighted the importance of collaboration with Southern California Edison and CEC in pursuit of policies, regulations and systems that enhance the economics, efficiency, and overall effectiveness of a community-oriented approach to renewable energy development.

Table 1 summarizes this Element's renewable energy production segments approach, as further described in the following goals, policies, and implementation strategies.

At left, a part of one of the fields of the Solar Electric Generating System (SEGS), a utility-scale renewable energy facility. At right, workers install a small solar photovoltaic array on the roof of an existing house. Different policies are necessary to address the issues raised by these different sizes of renewable energy installation (NREL 2012a, 2015).

Table 1: Renewable Energy Generation Categories

	Community-Oriented				Utility-Oriented
	Accessory: Site-Oriented				
Key Traits	Rooftop	Ground-Mounted Accessory	Neighborhood	Community	
Typical Use	Accessory structure in support of on-site consumption	Accessory structure in support of on-site consumption	Provides electricity primarily for adjacent use	Provides electricity primarily for local off-site use	Supplies electricity to the transmission grid
Preferred Technology Types	Solar PV and water heater energy systems Geothermal Wind energy systems	Solar PV and water heater energy systems Geothermal Wind energy systems	Solar PV energy systems Geothermal	Solar PV energy systems Bioenergy Geothermal	Solar PV energy systems Bioenergy
Permit Type	Building Permit	Building Permit	Minor Use Permit	Conditional Use Permit	Conditional Use Permit
Typical Size	Varies depending on size of facility/ residential roof	Varies depending on on-site needs	Up to 5 acres in total area	5 to 60 acres in total area	More than 60 acres in total area - Limited Sites*
Typical Power Generation	Varies depending on facility/ residence size	Up to approximately 70 kW (standard layout)	Up to approximately 710 kW (standard layout)	Up to approximately 10 MW (standard layout)	More than 10 MW

Notes: * Limited sites for utility-oriented development are specified in the Development Code

RE Goal 3: Community-oriented renewable energy facilities will be prioritized to complement local values and support a high quality of life in unincorporated communities.

RE Objective 3.1: By 2030, 30% of total households and businesses in the county will be served by on-site rooftop or ground-mounted accessory renewable energy production; and 30% of neighborhoods in unincorporated communities will have access to community-oriented renewable energy.

RE Policy 3.1: Prioritize, facilitate, and encourage onsite accessory RE generation to serve the unincorporated county.

- RE 3.1.1: Permit accessory RE generation facilities that primarily serve on-site energy needs in all zoning districts, including microgrid systems, with minimal regulation and permitting requirements.

RE Policy 3.2: Encourage community-oriented renewable energy (CORE) generation that primarily serves local uses in the county.

- RE 3.2.1: Specific standards shall be established and maintained for community-oriented RE generation facilities appropriate to the Valley, Desert, and Mountain regions.
- RE 3.2.2: Encourage through the regulatory system the establishment of local and regional organizations to pursue community-oriented RE production and storage.
- RE 3.2.3: Encourage utilities and developers to establish community-shared solar programs that allow residents and businesses to purchase shares of the output of RE generation facilities to offset their electricity bills.
- RE 3.2.4: Provide information and educational opportunities in the Countywide Plan Community Development Tool Kit for local organizations pursuing the acquisition of Community-Oriented Renewable Energy (CORE).
- RE 3.2.5: Encourage utilization of microgrid technologies to support the principle of "local production primarily for local consumption," to enhance local energy security and to improve local costs of living and commerce.
- RE 3.2.6: Encourage infrastructure, net metering and regulatory systems that support CORE facilities.

RE Policy 3.3: Limit utility-oriented renewable energy generation facilities in unincorporated areas of the County to sites consistent with standards set forth in the Development Code.

RE Policy 3.4: Promote an adaptive distributed energy infrastructure that sustains local communities and improves resiliency to grid failures and increasing energy prices.

- RE 3.4.1: Support research, planning and investment in accessory and community-oriented energy generation, distribution, and storage infrastructure by adapting regulatory tools to respond to rapidly evolving RE technologies.
- RE 3.4.2: Encourage new institutional campuses and large residential/commercial developments to include microgrids with onsite renewable energy generation and energy storage systems.

RE Policy 3.5: Require construction and operation of renewable energy facilities to minimize negative effects and optimize benefits to unincorporated communities.

- RE 3.5.1: Address measures required to minimize ground disturbance, soil erosion, flooding, and blowing of sand and dust in the Development Code.
- RE 3.5.2: Establish inspection protocols and programs to ensure that RE facilities are constructed, operate, and are eventually decommissioned consistent with the requirements of the San Bernardino County Code, and in a manner that will not be detrimental to the public health, safety, or welfare in unincorporated communities.

RE Policy 3.6: Require renewable energy facilities developed in spheres of influence of incorporated cities to be compatible and consistent with standards of the sphere cities.

RE Policy 3.7: Incorporate resident, business owner, and stakeholder input into the development and implementation of County policies for renewable energy.

RE Policy 3.8: Encourage renewable energy facilities to meet community goals, including supporting community health, wellness, and recreational needs.

- RE 3.8.1: Include opportunities to incorporate public art and encourage design features that provide screening in renewable energy facilities on public spaces, nonresidential facilities, and multi-family buildings.
- RE 3.8.2: Encourage the use of renewable energy facilities as shade structures in parks and community centers, and over parking lots and parking structures.

RE Policy 3.9: Continue to foster local economic benefits of renewable energy facilities.

- RE 3.9.1: Encourage RE generation facility developers to give preference to San Bernardino County residents in hiring for construction, operation, and decommissioning of the facility.
- RE 3.9.2: Encourage local community colleges, vocational schools, and workforce training centers to offer programs on renewable energy installation and maintenance.

- RE 3.9.3: Encourage innovation zones for manufacturers to locate and operate in the unincorporated county to research, construct, test, and distribute renewable energy technologies.

IV. Environmental Compatibility

Today, the single greatest benefit of renewable energy is its contribution to the environment. Greenhouse gas reduction is a local priority and a state mandate. Traditional forms of energy production are a major obstacle to this need. In an era of drought, water conservation is also a key priority. Renewable energy offers dramatic savings in gallons of water consumed per megawatt of production versus any fossil fuel or nuclear production methods. Renewable energy production isn't just desirable, it is essential.

Southern California Edison's Mountainview Generating Station in San Bernardino County is the most polluting power plant in the state according to the Environment California Research & Policy Center.

Even so, renewable energy facilities, as with any other form of development, can have undesirable effects on the natural environment. These effects could result in negative consequences for plant and animal species and their habitats, paleontological resources, artifacts and relics with cultural or historic significance, or critical natural resources such as groundwater. RE development must be held to the same high standards as other forms of land use.

In a region as diverse as San Bernardino County, environmental conditions vary dramatically. Environmental constraints in the Colorado Desert, in the southeast portion of the county, are very different from the environmental constraints near Mount Baldy, almost 200 miles away. A number of sensitive plant and animal species live in San Bernardino County, including golden eagles, burrowing owls, and the desert tortoise. Various parts of the county also include unique habitats, such as sensitive wetlands, pebble plains, and desert river environments. Large portions of the county are critical areas for wildlife movement and migration, including a number of areas deemed essential wildlife corridors by the state. Significant portions of the county are included in national parks or other protected areas.

It is not only the biological conditions that create environmental constraints for renewable energy facilities in San Bernardino County. Some soils in the county are particularly sensitive. There are local concerns that dust from development may lead to health problems if desert land is disturbed without appropriate mitigation. In addition, there are over 12,000 heritage locations in the county, ranging from Native American cultural sites to sites that are of importance to pre-1950 American history. Few people are aware that there are approximately 3,000 sites with known paleontological resources and need management consideration.

Water conservation is a State and local priority. Two decades of extensive international study demonstrate that lifecycle water consumption – including during construction – by photovoltaic energy

facilities is among the lowest of all energy sources, and among the lowest water-demand commercial land uses. For comparison, consider the following consumption rates of water per megawatt hour produced by major energy sources:

Energy Production Type	Gallons per MWh
Fossil Fuels	25,096
Hydroelectric	17,964
Coal	687
Nuclear	672
Utility-oriented PV	26

These figures from the U.S. Department of Energy are very similar to those from other sources, especially in terms of exceedingly low water consumption of solar PV in comparison to others. Given that practically all energy coming to San Bernardino County is from California (including the state's highest polluting power plant in our own county), solar PV is a highly desirable source in terms of regional water consumption. Nevertheless, solar PV development applications would need to pass rigorous environmental review, including consideration of water consumption, before being permitted.

San Bernardino County's natural environment is a source of pride for the community, a habitat for hundreds of sensitive species, and a major driver of the local tourism economy, among other things. This includes well-known national monuments such as Joshua Tree National Park, Mojave National Preserve and Castle Mountains National Monument. Many of the county's residents settled in San Bernardino County in large part because of the environmental setting, and the county's natural resources continue to draw large numbers of tourists every year. By developing renewable energy facilities responsibly, San Bernardino County can serve our residents' social and economic needs while protecting our environmental resources and the benefits they provide.

The landscape of Joshua Tree National Park, partially located in San Bernardino County (NPS/Kurt Moses 2015).

RE Goal 4: The County will establish a new era of sustainable energy production and consumption in the context of sound conservation and renewable energy development practices that reduce greenhouse gases and dependency on fossil fuels.

RE Objective 4.1: The County will continue to meet or exceed State Greenhouse Gas reduction goals.

RE Policy 4.1: Apply standards to the design, siting, and operation of renewable energy facilities that protect the environment, including sensitive biological resources, air quality, water supply and quality, cultural, archaeological, paleontological and scenic resources.

RE Policy 4.2: Ensure that renewable energy facilities do not disrupt, degrade, or alter the local hydrology and hydrogeolgy.

RE Policy 4.3: Encourage siting, construction and screening of RE generation facilities to avoid, minimize or mitigate significant changes to the visual environment including minimizing light and glare.

- RE 4.3.1: Reduce visual impacts through a combination of minimized reflective surfaces, context-sensitive color treatments, nature-oriented geometry, minimized vegetation clearing under and around arrays, conservation of pre-existing native plants, replanting of native plants as appropriate, maintenance of natural landscapes around the edges of facility complexes, and lighting design to minimize night-sky impacts.

RE Policy 4.4: Require RE generation 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 alternative land uses. Decommissioning plans shall:

- RE 4.4.1: Include a cost estimate of the decommissioning and site restoration work for the purpose of providing a bond to guarantee completion of decommissioning.
- RE 4.4.2: Provide for an inspection after all decommissioning and site restoration work to ensure that the work has been completed to the standards required by the County, prior to release of the decommissioning bond.
- RE 4.4.3: Require any structures created during construction to be demolished and all material recycled to the greatest extent possible.

- RE 4.4.4: Require all material recovered during decommissioning and site restoration work of a renewable energy facility, including the renewable energy technology itself, to be reused or recycled to the greatest extent possible.

RE Policy 4.5: Require all recyclable electronic and/or toxic materials to be recycled in accordance with the requirements of the Basel Convention or comparable standard.

RE Policy 4.6: RE project site selection and site design shall be guided by the following priorities relative to habitat conservation and mitigation:

- Avoid sensitive habitat, when feasible, through site selection and project design.
- Where necessary and feasible, conduct mitigation on-site.
- When on-site mitigation is not possible or adequate, conduct mitigation off-site in an area designated for conservation.

RE Policy 4.7: Encourage mitigation for RE generation facility projects to locate conservation offsets on public lands.

- RE 4.7.1: Collaborate with appropriate state and federal agencies to facilitate mitigation/conservation activities on public lands.

RE Policy 4.8: Encourage RE facility developers to design projects in ways that provide sanctuary (i.e., a safe place to nest, breed and/or feed) for native bees, butterflies and birds.

V. SITING

The County of San Bernardino has jurisdictional control over approximately 1.9 million acres of land. This land is spread across three distinct regions (Desert, Mountain, and Valley) and numerous land use designations. The siting of renewable energy facilities determines their effectiveness and the extent to which they are in conflict with local values and nearby land uses.

Siting policies seek to ensure reasonable opportunities for development of renewable energy in a manner consistent with priorities expressed in the Countywide Vision. More specifically, regulation of RE facilities siting is intended to manage land use conflicts; safeguard the environment; protect public health and safety; and facilitate energy development. These intentions are best accomplished through the adoption of siting standards. This is particularly true in the context of ongoing and dramatic changes in RE technologies that can greatly change their performance, size, installation and impacts. Standards located in the Development Code will help ensure that future RE development will be suitable for site-specific conditions and compatible with surrounding uses and environmental resources.

Siting policies consider five key issues, each of which is addressed in detail in the Development Code:

1. Condition of the underlying ground: Fundamentally, RE should be developed on disturbed or degraded lands.

2. Impact on the natural environment: Siting that may negatively impact critical habitats and species that are threatened or endangered will be given very careful scrutiny. Generally, RE and all other types of development will be expected to minimize and mitigate negative environmental impacts.

3. Relationship to surrounding land uses: RE development should not substantially conflict with surrounding land uses.

4. Proximity to transmission and/or distribution infrastructure: Generally, the intent is to discourage siting that requires substantial new infrastructure, especially transmission lines.

5. Contribution to the benefits of community-oriented RE: There is substantial growth nationally in CORE facilities development. The Element emphasizes CORE development, including the principles of energy reliability, consumer cost reduction, local production for local consumption, and locally appropriate services. Therefore, there are many conditions under which CORE facilities sited in or adjacent to communities may complement the collective needs of the community or neighborhood.

Standards help ensure that development impacts adhere to an explicit, clear, and fair set of performance measures and limitations. They also inform industry as to how facilities should be designed, constructed, and maintained to attain and retain permit approvals.

Specific RE development standards and siting criteria are stated in the Development Code. In addition to qualitative siting standards in the Code, this Element encourages utility-oriented RE development on federal land in DRECP Development Focus Areas (DFAs), specifically those endorsed for this purpose by Board of Supervisors resolution.

Siting of RE facilities that produce energy for off-site use requires access to appropriate infrastructure. RE installations producing 20 megawatts or more need to be able to connect to specialized power lines called transmission lines, or to substations. Land close to substations can be more appropriate for large renewable energy installations, as it reduces the need to build additional infrastructure, degrade the natural environment and increase the cost. Smaller renewable energy facilities are less dependent on specialized infrastructure, but they often still need to be adjacent to a more common type of power line (called a distribution line). Other important considerations include the availability of suitable land types and the presence of any environmental constraints.

RE Goal 5: Renewable energy facilities will be located in areas that address County standards, local values, community needs and environmental priorities.

RE Objective 5.1: Standards will ensure that locally appropriate RE tools benefit communities socially, economically and environmentally, regardless of RE technology.

RE Objective 5.2: Utility-oriented RE facilities will be subject to site selection criteria consistent with County priorities expressed in this Element.

RE Policy 5.1: Encourage the siting of RE generation facilities on disturbed or degraded sites in proximity to necessary transmission infrastructure.

- RE 5.1.1: Community-oriented RE generation facility sites may be less disturbed or degraded, but should contribute direct benefits to the communities they are intended to serve.
- RE 5.1.2: Siting of community-oriented and utility-oriented RE generation facilities will conform to applicable standards set forth in the Development Code.
- RE 5.1.3: Encourage new subdivision applications to set aside an area of land capable of supporting neighborhood-oriented renewable energy generation.
- RE 5.1.4: Encourage microgrids supported by energy storage and innovative technologies for incorporation into neighborhood- and community-scale renewable energy projects

RE Policy 5.2: Large utility-scale RE generation projects – 10 megawatts or more – on private land will be limited to the site-types below in the unincorporated County:

i. Waste Disposal Sites
ii. Mining Sites (operating and reclaimed)
iii. Fallow agricultural lands
iv. Airports (existing and abandoned or adaptively re-used)
v. Brownfields
vi. California Department of Toxic Substance Control Cleanup Program Sites
vii. Resource Conservation and Recovery Act Sites
viii. Within electric transmission and distribution corridors
ix. Industrial zones
x. Other sites that reflect the significantly disturbed nature or conditions of those listed above

RE Policy 5.3: Collaborate with utilities and RE generation facility developers to encourage collocation of transmission and intertie facilities.

RE Policy 5.4: Support renewable energy projects that are compatible with conservation of the scenic and recreational assets that define San Bernardino County for its residents and make it a destination for tourists.

RE Policy 5.5: Coordinate with the Department of Defense on the siting of RE generation facilities in a manner that will not significantly impact military operations in the unincorporated county.

RE Policy 5.6: Discourage conversions of productive agricultural lands to RE generation facilities.

VI. County Government Systems

Through its roles as a development review authority, regulator, service provider, monitor, and information provider, the County is a highly visible local leader on the topic of renewable energy. With this visibility, the County has the opportunity to illustrate the feasibility of the concepts in this Element by encouraging the types of renewable energy facilities that are effective and most consistent with local values and priorities. County leadership can catalyze high quality and appropriately sized renewable energy projects in collaboration with the private and public sectors.

County leadership will guide the transition to a new era of environmentally sound energy generation that meets local needs while minimizing conflicts, optimizing benefits and protecting existing communities. This leadership role complements the County's commitment to act as a responsible regulator, implementing the Countywide Vision and upholding the core values and goals of this Element. As a regulator, the County will create clear standards and tools to implement this Element.

A parking garage at the National Renewable Energy Laboratory, with much of the roof space covered by solar panels. Government agencies can lead by example to demonstrate the feasibility of renewable energy installations, as well as energy efficiency and conservation practices (NREL 2012b).

RE Goal 6: County regulatory systems will ensure that renewable energy facilities are designed, sited, developed, operated and decommissioned in ways compatible with our communities, natural environment, heritage and commerce.

RE Objective 6.1: By 2030, the primary developers of community-oriented RE facilities will be community-related organizations.

RE Policy 6.1: Ensure consistency, clarity, and timeliness in the development permitting process for RE generation facilities.

- RE 6.1.1: Expedite the permitting process for accessory and community-oriented RE generation facilities
- RE 6.1.2: Provide public information to facilitate installation of accessory RE generation systems, including rooftop solar PV, solar water heaters, and accessory wind energy systems.
- RE 6.1.3: Establish and maintain design guidelines for ground-mounted accessory RE generation facilities in residential areas and Rural Living land use designations to address issues of aesthetics, safety, flood risks, wind, and dust.
- RE 6.1.4: Maintain a system for new renewable energy project applications that clearly identifies standards, the environmental review process, and permit requirements.

RE Policy 6.2: Establish mechanisms by which the County can restore and maintain the nexus between costs and benefits in RE development.

- RE 6.2.1: Work with the federal and state governments that may approve renewable energy projects on public lands, to seek appropriate revenue mechanisms to cover the cost of services provided by the County.
- RE 6.2.2: Maintain a fee system that adequately covers the County's costs of providing necessary public services to renewable energy generation facility developers during permitting, development, operations and decommissioning.

RE Policy 6.3: Share information and communicate the costs and benefits of investing in energy efficiency retrofits, energy conservation behaviors, and renewable energy systems.

- RE 6.3.1: Update the County's renewable energy web portal to include information to publicize successes of community-oriented renewable energy (CORE) projects, sharing lessons learned, and encouraging duplication.

- RE 6.3.2: Participate in regional collaborative efforts such as the Countywide Vision working groups to identify, vet, and implement energy programs that are feasible at the regional scale but may not be feasible for one jurisdiction to implement independently, such as energy partnerships with utilities or regional education programs.

- RE 6.3.3: Promote opportunities for low-cost property financing for energy efficiency and onsite accessory RE generation through efforts such as the HERO program at County events and during the review of building permits and applications for building expansion or renovation.

RE Policy 6.4: Support the governor's initiative to obtain 50% of the energy consumed in the state through RE generation sources by 2040.

- RE 6.4.1: Continue to implement policies and strategies for energy conservation by the County in the Greenhouse Gas Emissions Reduction Plan, including capture and use of landfill gas, installation of renewable energy systems and use of alternative fuels.

- RE 6.4.2: Consider options for entering into an energy services contract or power purchase agreement for expanding the renewable energy that serves County facilities while reducing the County's overall utility costs.

- RE 6.4.3: Consider utilizing public/private partnerships to install onsite solar energy on County government facilities, sharing costs and benefits.

RE Policy 6.5: Encourage pilot projects to demonstrate energy efficiency retrofit investments and renewable energy opportunities.

- RE 6.5.1: Where feasible, install renewable energy projects on County facilities that provide visible, public examples of the County's commitment to cost-effective renewable energy.

- RE 6.5.2: Consider utilizing County lands or facilities for research and development or university exploration of new renewable energy technologies that seek to minimize adverse effects to the environment.

- RE 6.5.3: Encourage development of a highly visible private property pilot project for the small-scale use of distributed renewable energy, such as projects at local tourist-serving uses.

- RE 6.5.4: Identify opportunities to create revenue for the County by leasing the rights to renewable energy resources on County property for distributed energy storage or distributed generation through power purchase agreements or similar arrangements.

RE Policy 6.6: Investigate new RE generation incentive programs, such as Community Choice Aggregation, for their appropriateness to our communities.

- RE 6.6.1: Promote incentives available to County residents and businesses for solar photovoltaic, solar water heating, wind energy, and bioenergy installations. Incentives may be offered by the County, federal agencies, other local and regional agencies, or private partners.

RE Policy 6.7: Induce high volume energy users to develop onsite RE generation systems through streamlining of permit requirements.

SOURCES

Barnett, E., and M. Casper. 2001. "A Definition of 'Social Environment'." American Journal of Public Health, 91 (3), 465.

BLS (US Bureau of Labor Statistics). 2011. Measuring Green Industry Employment: Developing a Definition of Green Goods and Services. http://www.bls.gov/osmr/pdf/st110190.pdf.

California Legislative Information. 2015. "SB-350: Clean Energy and Pollution Reduction Act of 2015." http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

CEC (California Energy Commission). 2005. Implementing California's Loading Order for Electricity Resources. http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF.

———. 2013. Renewables Portfolio Standard Eligibility. http://www.energy.ca.gov/2013publications/CEC-300-2013-005/CEC-300-2013-005-ED7-CMF-REV.pdf.

———. 2015. "Glossary of Energy Terms." http://www.energy.ca.gov/glossary/.

DOE (US Department of Energy). 2011. A Guide to Community Solar: Utility, Private, and Non-Profit Project Development. DOE/GO-102011-3189. http://www.nrel.gov/docs/fy11osti/49930.pdf.

———. 2013. "Glossary of Energy-Related Terms." http://energy.gov/eere/energybasics/articles/glossary-energy-related-terms.

———. 2015a. "Processing and Conversion." http://www.energy.gov/eere/bioenergy/processing-and-conversion.

———. 2015b. "Community Choice Aggregation." http://apps3.eere.energy.gov/greenpower/markets/community_choice.shtml.

———. 2015c. "The Role of Microgrids in Helping to Advance the Nation's Energy System." http://energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-system.

County of San Bernardino. 2014a. Development Code.

EIA (Energy Information Administration). 2015. "Glossary." http://www.eia.gov/tools/glossary/.

EPA (US Environmental Protection Agency). 2011. "Brownfields Definition." http://www.epa.gov/brownfields/overview/glossary.htm.

———. 2013a. "Superfund – Basic Information." http://www.epa.gov/superfund/about.htm.

———. 2013b. "Resource Conservation and Recovery Act." http://www.epa.gov/agriculture/lrca.html.

———. 2014a. "Green Building." http://www.epa.gov/greenbuilding/pubs/about.htm#1.

———. 2014b. "Abandoned Mine Lands." http://www.epa.gov/aml/.

———. 2014c. "Nitrogen Dioxide." http://www.epa.gov/air/nitrogenoxides/.

———. 2014d. "About LMOP – Basic Information." http://www.epa.gov/lmop/basic-info/index.html.

———. 2015. "Terminology Services." http://iaspub.epa.gov/sor_internet/registry/termreg/home/overview/home.do.

———. 2015. "Terminology Services." http://iaspub.epa.gov/sor_internet/registry/termreg/home/overview/home.do.

IEA (International Energy Agency). 2014. Energy Storage Technology Roadmap: Technology Annex. https://www.iea.org/media/freepublications/technologyroadmaps/AnnexA_TechnologyAnnexforweb.pdf .

IES (Institute of Education Sciences). 1998. "A Marketer's Guide to Discretionary Income." http://eric.ed.gov/?id=ED310997.

Merriam-Webster, Inc. 2015. "Merriam-Webster Dictionary and Thesaurus." http://www.merriam-webster.com/.

NREL (National Renewable Energy Laboratory). 2007. "California Biomass Resources." http://en.openei.org/w/index.php?title=File:NREL-eere-biomass-california.jpg.

———. 2008. "United States Concentrating Solar Power Resource: Direct Normal." http://en.openei.org/w/index.php?title=File:NREL-National-CSP-Poster.pdf.

———. 2010. "California – Average Wind Speed at 80 m." http://en.openei.org/w/index.php?title=File:NREL-ca-80m.jpg.

———.2011. "Power Purchase Agreements." http://www1.eere.energy.gov/femp/pdfs/afo_ppa_pres.pdf.

———. 2014. "Renewable Portfolio Standards." http://www.nrel.gov/tech_deployment/state_local_governments/basics_portfolio_standards.html.

OPR (California Office of Planning and Research). 2005. California Planning Guide: An Introduction to Planning in California. http://opr.ca.gov/docs/California_Planning_Guide_2005.pdf.

Saelens, B. E., and S. L. Handy. 2008. "Built Environment Correlates of Walking: A Review." Medicine and Science in Sports and Exercise, 40 (7 Suppl).

USACE (US Army Corps of Engineers). 2007. US Army Corps of Engineers Jurisdictional Guidance Form Instructional Guidebook. http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/RelatedResources/CWAGuidance.aspx.

US Census Bureau. 2004. Income Data Quality Issues in the Annual Social and Economic Supplement to the Current Population Survey. http://www.census.gov/hhes/www/income/publications/cpsdataquality101504.pdf.

———. 2012. 2010 Census Summary File 1: 2010 Census of Population and Housing – Technical Documentation. http://www.census.gov/prod/cen2010/doc/sf1.pdf.

USFWS (US Fish and Wildlife Service). 2005. Habitat Conservation Plans. http://www.fws.gov/endangered/esa-library/pdf/HCP_Incidental_Take.pdf.

USGS (US Geological Survey). 2014. "Land Cover Trends Project – Classification System." http://landcovertrends.usgs.gov/main/classification.html.

IMAGE SOURCES

Daniels, D. 2011. Golden eagle (Aquila chrysaetos). Licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license. http://commons.wikimedia.org/wiki/File:Golden_Eagle_RWD1.jpg.

NPS (National Park Service)/Kurt Moses. Joshua Tree National Park: Boulders Glow with Clouds in the Distance. Licensed under the Creative Commons Attribution-2.0 Generic license. https://www.flickr.com/photos/joshuatreenp/16647946902/.

NREL (National Renewable Energy Laboratory). 2010. Ellen Fortier working in her office at the RSF. Dennis Schroeder, NREL (17904).

———. 2012a. Solar Benefits Colorado. Dennis Schroeder, NREL (22158).

———. 2012b. 2012 Aerial STM. Dennis Schroeder, NREL (21804).

———. 2014. A residential home fitted with photovoltaic (PV) panels in Lakewood, CO. Dennis Schroeder, NREL (31255).

———. 2015. The world's largest solar power facility, installed 186-1988; Kramer Junction, California. Kramer Junction Company (11070).

Southern California Edison. Mountainview Generating Station, Redlands, California

GLOSSARY

abandoned mine land site: Lands, waters, and surrounding watersheds where the extraction or processing of ores and minerals has occurred (EPA 2014b).

accessory renewable energy facility: A renewable energy facility that is physically located on the primary end-user's property and serves the on-site needs of the primary use before supplying energy into the grid. On-site needs may include a separate legal parcel, if both properties are owned by the same individual or entity. These facilities are a type of distributed generation (separately defined). Also referred to as an on-site accessory energy facility. Accessory renewable energy facilities include rooftop and ground-mounted accessory facilities.

air compressor: A machine that uses energy to compress air to a pressure greater than standard atmospheric conditions. Compressed air can be used as a form of energy storage (IEA 2014).

anaerobic: A condition characterized by the absence of free oxygen (Merriam-Webster 2015).

anaerobic digester: A piece of equipment with an anaerobic chamber containing bacteria and other microbes. Biomass is placed in the anaerobic digester, where the microbes convert it to bioenergy or an intermediate product through biochemical conversion (CEC 2015).

biochemical conversion: A process that uses plants or microbes to produce usable energy (CEC 2015).

biodiesel: A type of biofuel that acts as a substitute for petroleum-based diesel fuel. Biodiesel is derived from vegetable oils, animal fats, and/or recycled grease (EIA 2015).

bioenergy: Energy derived from organic material (CEC 2015). In general, bioenergy is energy converted from biomass, from sources such as animal waste and plant residues produced on farms and in forests, crops grown specifically to produce energy (energy crops), and urban-derived food, yard, and other organic waste, as well as energy produced from landfill emissions and gas or waste from water treatment facilities. Bioenergy comes in many forms, including electricity, gaseous fuels (biogas or biomethane as well as synthetic natural gas), and liquid transportation fuels. The generation of electricity from biomass can occur at a variety of scales, powering both on- and off-site uses. Bioenergy facilities can either produce electricity only, or in a combined heat and power operation, a portion of the stream is extracted to provide process heat. Bioenergy power generation can be developed at the utility scale or distributed generation scale.

biofuel: A liquid fuel and form of bioenergy that can act as a substitute for petroleum-based fuels, often for transportation proposes (EIA 2015).

biogas: A mixture of methane and carbon dioxide produced by decomposition of organic material by microbes in an anaerobic environment; also a form of a bioenergy (EIA 2015).

biomass: Broadly, the physical matter from a living or recently deceased organism. In an energy context, organic material that can be used to produce energy (EIA 2015).

biomethane: Biogas that has been processed and refined to serve as a substitute for natural gas (CEC 2013).

Board of Supervisors: In California, the organization that oversees the operation of a county government (Merriam-Webster 2015).

British Thermal Unit: A unit of measurement for energy, often for heat energy, abbreviated as Btu. Equal to the amount of energy required to increase the temperature of one pound of liquid water by one degree Fahrenheit at the temperature at which water is most dense (EIA 2015).

brownfield site: Property where any expansion, redevelopment, or reuse of the property may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (EPA 2011).

building efficiency: The energy use of a building relative to its size, type, and other factors that affect energy demand (CEC 2015).

building envelope: The structural elements (walls, roof, floor, and foundation) of an enclosed building, also known as the shell (DOE 2013).

building orientation: The relationship of a building to true south, as specified by the direction of its longest axis (DOE 2013).

built environment: Generally speaking, the part of the physical environment constructed by humans, as distinct from the natural environment (Saelens and Handy 2008).

carbon dioxide: A colorless and odorless gas molecule comprising one carbon atom attached to a single oxygen atom. It is produced as a byproduct of combustion and other processes. Carbon dioxide is a type of greenhouse gas. The chemical formula of carbon dioxide is CO_2 (EIA 2015).

chemical conversion: A process that uses chemicals to convert a material into usable energy (DOE 2015a).

Clean Air Act: A federal law first passed in 1963, allowing the Environmental Protection Agency to establish controls on air pollution (EPA 2015).

cogeneration: Generating both heat and electricity from a single fuel type. The heat can be used for space heating purposes or to generate additional electricity (DOE 2013).

combustion: Technically, the chemical oxidation of a material, which releases heat and light. In a general sense, burning. A form of thermal conversion (EIA 2015).

commercial energy facility: A renewable energy facility with the primary purpose of selling energy to a utility company for off-site use. This may include neighborhood, community, and regional tiers of renewable energy facility.

community choice aggregation: A state-level policy enabling local governments to supply energy to end-users within their jurisdictions using the existing electrical grid (DOE 2015b).

community solar: A voluntary solar-electric system that provides energy or financial benefit to multiple community members or is owned by multiple community members (DOE 2011)

concentrated solar power: See solar thermal.

Conditional Use Permit: A permit that provides a process for reviewing uses and activities that may be appropriate in the applicable land use zoning district, but whose effects on a site and surroundings cannot be determined before being proposed for a specific site (County of San Bernardino 2014).

contaminated site: A site containing a physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil (EPA 2015).

cooking: An end-use that involves preparing food for eating, usually by using heat (Merriam-Webster 2015).

cooling: Reducing the air temperature of an indoor space to improve comfort, e.g., air conditioning (EIA 2015).

data center: A type of nonresidential building or part of a building used to store, process, and/or distribute data on networked computer servers (Merriam-Webster 2015).

deferred maintenance: The act of postponing maintenance on buildings, structure and infrastructure, or equipment, in order to reduce short-term costs (Merriam-Webster 2015).

direct use: Any use of a renewable energy resource in which the resource is converted directly from its raw form into its final form.

discretionary income: Income after regular needs and bills are paid (IES 1998).

disposable income: Income after taxes, regular interhousehold transfers, and charitable contributions (US Census Bureau 2004).

distributed generation: Small, modular renewable energy generation technologies that provide electric capacity or energy located where it's needed, often at a customer's location or close to a load center. Distributed generation facilities are often owned by non-utility entities, such as generation developers or utility customers that offset all or part of the customer's on-site electrical load. Typically (although not always), distributed energy facilities produce less than 20 megawatts of power and are

located near the point of use. Distributed generation facilities can include wind turbines, photovoltaics, fuel cells, microturbines, reciprocating engines, combustion turbines, cogeneration, and energy storage systems. Such facilities may be either connected to the local electric power grid or isolated from the grid in stand-alone applications.

distribution: The delivery of energy from centralized systems to individual customers (EIA 2015).

distribution facilities: Facilities and infrastructure that transport energy from a centralized system to individual customers or that assist in this process (EIA 2015).

disturbed land: Areas where the natural environment has been altered by human activity to a point of significant change (USGS 2014). This includes land with existing buildings and structures, including paved surfaces such as parking lots; lands with significant grading, excavation, or stockpiling that have not been restored to their natural state; sites with industrial operations such as mining or mineral extraction; lands developed for former industrial or commercial sites that were previously degraded or contaminated and then abandoned or underused; and areas that were developed and contaminated by hazardous or potentially hazardous materials.

electricity: A form of energy caused by the presence and motion of charged subatomic particles (EIA 2015).

Endangered Species Act: A 1973 law requiring government agencies to establish protections for listed species and their habitat to ensure the species' continued survival (EPA 2015).

end-use: The purpose for which energy is consumed (DOE 2013).

end-user: A person or entity who purchases energy for their own consumption and not for resale (EIA 2015).

energy: The capacity to do work. Energy comes in several forms, including electrical, heat, kinetic, chemical, and nuclear (CEC 2015).

energy conservation: Reducing energy use by achieving a different outcome (CEC 2015).

energy consumption: The amount of energy used by the end-user (CEC 2015).

energy efficiency: Using less energy to accomplish the same outcome (CEC 2015).

energy efficiency retrofit: Installing or upgrading features of a building so that the building uses less energy (CEC 2015).

energy intensity: The amount of energy used by a building, piece of equipment, or other process or activity relative to its size, the number of people involved, or other factor.

energy loading order: A framework for ensuring a reliable and sustainable supply of energy in a successful, cost-effective manner (CEC 2005).

energy production: The act of converting energy into a useful form (EIA 2015).

energy supply: Energy made available for use (EIA 2015).

energy use: See energy consumption.

environmental constraints: Resources in the natural environment that impose constraints or limitations on land use actions that may occur on a site or specified location. Constraint types may include topography, the presence of sensitive species or habitat types, and the risk of natural hazards.

equitable access: Refers to equal access to resources between individuals of all groups, such as individuals of all incomes, classes, geographies, ethnicities, or other socioeconomic factors.

ethanol: A clear, colorless, and flammable alcohol that is often produced from organic material and used as a source of bioenergy, especially as a biofuel. Ethanol is typically produced through a biochemical or chemical conversion process. The chemical formula of ethanol is CH_3CH_2OH, sometimes written C_2H_5OH or C_2H_6O (EIA 2015).

feedstock: A raw material to be converted into a product. Can refer to any material resource for any product, but in an energy context generally refers to a type of biomass to be converted to bioenergy (DOE 2013).

fermentation: A biochemical conversion process in which microbes convert organic material into another product. In an energy context, the product is frequently methane or an alcoholic biofuel such as ethanol (DOE 2013).

flywheel: A spinning wheel, often used to control the speed of a piece of machinery. A flywheel can also serve as an energy storage device (Merriam-Webster 2015).

fossil fuel: A source of energy formed from decayed organic material over millions of years, subjected to intense heat and pressure in the earth's crust. Coal, petroleum, and natural gas are all fossil fuels (EIA 2015).

gasification: A form of thermal conversion that relies on high pressure and specific quantities of oxygen to convert an energy source to a gaseous fuel (CEC 2015).

geothermal energy: Thermal energy in the earth's crust, a result of leftover heat from the earth's formation and radioactive decay (EIA 2015).

gigawatt: A measure of power, equal to one billion watts, one million kilowatts, or one thousand megawatts (EIA 2015).

gigawatt-hour: A measure of energy, equal to one billion watt-hours, one million kilowatt-hours, or one thousand megawatt-hours (EIA 2015).

goal: A broad statement identifying desired future conditions.

government facility: A type of nonresidential building owned by a government agency and/or used for government operations.

government operations: Activities, procedures, and operations carried out by a government agency as part of its responsibilities. Examples include maintenance activities, permit review activity, or the provision of public services.

green building: A building with features enabling it to have a lesser environmental impact than comparable buildings. Generally, green buildings are those that use processes that are environmentally responsible and resource-efficient for the life cycle of the building, from design and construction, to operation and deconstruction (EPA 2014a).

green energy economy: Economic activity created by the design, construction, and maintenance of renewable energy facilities or by operations necessary to support these actions.

greenhouse gas: A gas that, in the earth's atmosphere, allows sunlight through but reflects heat energy, thereby trapping heat in the atmosphere. An increase of greenhouse gases in the atmosphere is responsible for climate change (EIA 2015).

green trades: Jobs that produce goods or provide services that benefit the environment or conserve natural resources, also known as green jobs (BLS 2011).

grid: The infrastructure used to produce electrical energy and convey it to end-users (EIA 2015).

habitat conservation plan: A plan, authorized by the US Fish and Wildlife Service, to minimize impacts to a listed species. A habitat conservation plan is required for activities that may result in the accidental harming of a listed species (USFWS 2005).

heating: An end-use that involves adding thermal energy to a system (Merriam-Webster 2015).

housing stock: The total of all housing units in a jurisdiction or set area.

housing unit: Living quarters where the occupant or occupants live separately from other individuals and have direct access to their living quarters from outside the building or through a common hall (US Census Bureau 2012).

implementation strategy: A specific, prescribed action intended to implement or support implementation of a policy.

incorporated city: A community that has established itself as a distinct legal entity for the purpose of establishing its own government and providing its own services (US Census Bureau 2012).

independent power producer: An entity that generates electricity for sale to an electric utility (CEC 2015).

indirect use: Any use of a renewable energy resource in which the resource is converted to one or more intermediate states before being converted into its final form.

industrial facility: A nonresidential building type primarily used for industrial processes.

industrial processes: Processes that involve the production of a good or service, including supportive processes such as research and logistic activities (Merriam-Webster 2015).

infrastructure: The basic equipment and structures needed for a system to properly function (Merriam-Webster 2015).

intermittency: An issue wherein the output of an energy generating facility is controlled by the natural variability of the resource (e.g., sunlight or wind) rather than by the facility's operators (EIA 2015).

jurisdictional control: The ability of a government to exercise regulatory authority. Land within which a government may exercise this authority is under said government's jurisdictional control.

kilovolt: One thousand volts (EIA 2015).

kilowatt: One thousand watts (EIA 2015).

kilowatt-hour: One thousand watt-hours (EIA 2015).

kinetic energy: The energy of a moving body, determined by its mass and velocity (DOE 2013).

Landfill Methane Outreach Program: A voluntarily program to help reduce methane emissions from landfills by encouraging the recovery and use of landfill biogas as an energy resource (EPA 2014d).

land use authority: The ability to regulate the way land is used, including the form and function of buildings and structures, the impacts from activities on resources, and how construction and demolition activities are carried out.

land use planning: Planning for how land can or should be used in the future.

lighting: An end-use that converts energy into illumination (Merriam-Webster 2015).

listed species: A species protected under the provisions of the Endangered Species Act (EPA 2015).

local consumption: The use of energy generated from off-site sources within the local distribution network.

local energy resources: Energy resources present in the unincorporated area of San Bernardino County.

local production: The generation of energy for off-site use within the local distribution network.

local use: See local consumption.

megawatt: One million watts or one thousand kilowatts (EIA 2015).

megawatt-hour: One million watt-hours or one thousand kilowatt-hours (EIA 2015).

methane: A colorless, odorless, and flammable gas comprising a single carbon atom and four hydrogen atoms. Methane is the primary component of natural gas and acts as a greenhouse gas in the atmosphere. The chemical formula of methane is CH_4 (EIA 2015).

microgrid: A localized energy distribution grid that can disconnect from the traditional grid to operate autonomously. Microgrids often include renewable energy and/or energy storage systems (DOE 2015c).

military facility: A type of nonresidential building or facility owned by the US Department of Defense, used for national defense purposes.

mineral extraction facility: A type of industrial facility for the purpose of extracting a mineral resource from the natural environment, e.g., a mine.

motor: A machine that converts energy into force and/or motion (DOE 2013).

natural environment: All living and inorganic natural things around us, including the earth, air, water, and plants and animals (DOE 2013).

natural gas: A mixture of gases comprising hydrogen and carbon, with methane being the primary component (EIA 2015).

navigable waters: Waters currently used, or used in the past, or which may be susceptible to use, in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide (USACE 2007).

net energy metering: The practice of using a single meter to measure both consumption and production of energy by a small generation facility, such as a rooftop solar photovoltaic system, and to sell excess energy to a utility (DOE 2013).

non-local consumption: For purposes of energy, refers to supplying energy to the transmission grid.

non-local production: The production of energy outside the unincorporated county that supplies energy demand in the unincorporated county.

non-local use: See non-local consumption.

nonrenewable energy: Energy sources that cannot be replenished within a reasonable period of time (e.g., fossil fuels) (EIA 2015).

nonresidential: Buildings used for a purpose other than as human dwellings, such as offices, retail stores, and industrial facilities (CEC 2015).

NOx: A generic term for mono-nitrogen oxides, which consist of nitric oxide (chemical formula: NO) and nitrogen dioxide (chemical formula: NO_2), both of which are air pollutants. The gases are most commonly emitted through the combustion of certain fuel sources and can contribute to smog, acid rain, and ozone pollution (EPA 2014c).

nuclear energy: Energy derived from a self-sustaining and controlled nuclear reaction. All nuclear energy used by people is derived from nuclear fission reactions (EIA 2015).

off grid: A building or group of buildings not connected to an energy distribution network.

office: A nonresidential building type, usually where people work at desks on business-related or professional activities (Merriam-Webster 2015).

office equipment: An end-use that involves operating equipment necessary for business-related or professional activities, such as computers and copier machines (CEC 2015).

off-site use: The use of energy not generated on the property.

on-site accessory energy facility: See accessory renewable energy facility.

outcome: Something that happens as a result of an activity or process (Merriam-Webster 2015).

passive solar: The use of energy from the sun without any electrical or mechanical systems, usually for heating or cooling purposes (EIA 2015).

passive solar building: A building that incorporates passive solar features.

payback: The period of time before the savings resulting from an action equal the cost of the action; for example, when the utility bill savings from a rooftop solar array equal the cost of installing and maintaining the array (DOE 2013).

photovoltaic cell: A device formed of layers of semiconducting materials, capable of creating an electrical current when illuminated (EIA 2015).

policy: A statement derived from a goal to guide decision-making and implementation strategies toward a specific outcome.

power: The rate at which energy is produced, transferred, or used. Measured in watts (EIA 2015).

power purchase agreement: An agreement between two entities wherein one agrees to generate power and sell it to the other (NREL 2011).

private sector: Private entities, including individuals and companies owned by individual shareholders.

propane: A gas comprising three carbon atoms and eight hydrogen atoms, present in unprocessed natural gas, which can be used as a fuel. Primarily used for lighting, heating, and industrial applications. The chemical formula of propane is C_3H_8 (CEC 2015).

public health: The health of members of the general public.

public land: Land owned by a government agency, not necessarily open for public access.

public sector: Government entities.

pumped hydro storage: A method of energy storage that involves using excess power to pump water uphill into a reservoir. During times of high demand, the reservoir releases water to operate hydroelectric generators (CEC 2015).

refrigeration: The process of removing heat from one location and transferring it to another. A home refrigerator removes the heat inside the device and transfers it to the air in the room (DOE 2013).

renewable energy: Energy derived from resources that naturally replenish themselves within a reasonable period of time (EIA 2015).

renewable energy facility: A facility that generates renewable energy (DOE 2013).

renewable energy technology: A technology type that allows for the generation of renewable energy (DOE 2013).

renewable portfolio standard: A government mandate to produce a set amount of energy from renewable energy resources (NREL 2014). California's standard is known as the Renewables Portfolio Standard and requires electric utilities to procure 33% of their electricity from qualified renewable sources by 2020 (CEC 2015).

residential: Buildings used as a human dwelling, e.g., a home or apartment (CEC 2015).

resiliency: The ability to remain functional following a negative event (Merriam-Webster 2015).

Resource Conservation and Recovery Act site: A site participating in cleanup actions of hazardous waste under the Resource Conservation and Recovery Act's Corrective Action program (EPA 2013b).

retail: A type of land use or energy user that includes stores and shops providing a variety of merchandise.

scales: Different categories of renewable energy facilities, as determined by size and purpose.

sensitive biological species and habitat: Listed species, other rare species, species of special consideration, other species deemed worthy of protection, and the habitat necessary to support them, as well as habitat deemed worthy of protection for other reasons.

social environment: The immediate physical surroundings, social relationships, and cultural milieus within which defined groups of people function and interact. Includes built infrastructure, industrial and occupational structure, labor markets, social and economic processes, wealth, social and health services, race relations, social inequality, cultural practices, the arts, religious institutions and practices, and beliefs about place and community (Barnett and Casper 2001).

solar energy: Energy derived from electromagnetic radiation emitted by the sun (EIA 2015).

solar energy system: A system that collects solar energy and converts it to one or more usable forms using electrical and/or mechanical processes. Solar energy systems include but are not limited to photovoltaic, solar thermal, and solar water heating technologies. Solar energy systems do not include passive solar technologies, including solar cooking or passive solar features in a building for space heating and cooling.

solar oven: A device that concentrates heat energy from the sun in an enclosed or partially enclosed space for the purpose of cooking food.

solar thermal: An energy technology that converts solar radiation to heat energy (EIA 2015).

space heating: Increasing the air temperature in an enclosed space to improve comfort, e.g., through the use of a furnace (EIA 2015).

substation: A type of grid facility that switches, converts, and/or regulates the flow of electricity (EIA 2015).

sulfur dioxide: A colorless, toxic gas formed of a single sulfur atom and two oxygen atoms released through the combustion of materials containing sulfur. Sulfur dioxide is classified as a major air pollutant (EIA 2015).

Superfund site: An abandoned hazardous waste site undergoing cleanup activities through an EPA-administered program established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (EPA 2013a).

system: A group of related parts that move or work together (Merriam-Webster 2015).

therm: A unit of measurement for heat energy, equal to 100 Btus, or approximately the amount of heat energy released by the combustion of 100 cubic feet of natural gas (EIA 2015).

thermal conversion: A process that uses heat to convert a resource into usable energy (DOE 2015A).

tier: Renewable energy systems can be developed for a variety of end-users at a range of sizes. When discussing renewable energy systems in the context of San Bernardino County, the different combination of scales and intended users is referred to as renewable energy "tiers."

toxin: A substance or mixture of substances that can cause harm to humans or animals (EPA 2015).

transformer: A device that converts an electric current to a different voltage (EIA 2015).

transmission: The movement of energy from a central generating station or supply source along centralized corridors (EIA 2015).

unincorporated county: In California, the areas of a county not included in any incorporated city.

ventilation: The process of moving air in and out of an enclosed space, either naturally or through mechanical systems (DOE 2013).

visitor-serving use: A facility that supports individuals who do not normally reside or work in the area, including lodging.

visual resources: The factors and elements of the natural and built environment that contribute to the look of a particular location.

volt: A standard unit of electric potential (EIA 2015).

vulnerability: The condition of being open to harm or damage (Merriam-Webster 2015).

warehouse: A type of nonresidential building used for storing goods (Merriam-Webster 2015).

water heating: An end use that involves raising the temperature of water (Merriam-Webster 2015).

waterwheel: A device that uses the weight and/or force of moving water to turn a wheel to power machinery (EIA 2015).

watt: The standard unit of power (EIA 2015).

watt-hour: A common unit of energy, equal to one watt of power supplied or delivered continuously for one hour (EIA 2015).

wind energy: Energy derived from the kinetic energy of moving air particles (EIA 2015).

windmill: A form of wind turbine that converts energy into mechanical energy, usually for grinding grain (DOE 2013).

wind turbine: A device to convert wind energy to a usable form. Usually used to refer to devices that generate electricity (EIA 2015).

zero net energy: Producing as much energy as is consumed on-site (CEC 2015).