

## 4.0 Project Alternatives

### 4.1 Introduction

Alternatives to the proposed Blythe Solar Power Project (BSPP or Project) are presented in this section. Alternatives include the “No Action” (also called “No Project”) alternative, alternative Project sites, layout or size, as well as Project design and technology alternatives. The section summarizes the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements with respect to alternatives evaluations and discusses the methodologies and criteria used to identify and screen the various kinds of alternatives (alternative sites, layouts, sizes, water supply alternatives, etc.).

As this section makes clear, many of the alternatives to the Project would not meet the Project’s basic objectives or the necessary screening criteria, and/or would not lessen the Project’s potential environmental effects. In each instance in which an alternative would achieve the Project objectives and lessen potential effects, the Project has been modified to adopt that alternative.

#### Summary

Alternatives evaluated by the Applicants include the “No Action” (“No Project”) alternative, alternative Project sites, an alternative site layout, a smaller facility, freeze protection and auxiliary boiler heating alternatives, alternative water sources, and alternative power generation technologies. The “No Project” alternative was rejected because it would not fulfill the Project’s objectives of helping meet Federal and State renewable energy mandates and goals.

The selected site was the most suitable among the various alternative sites based on economic, technical, environmental, transmission access, and other criteria. Four alternative sites were considered and rejected because they would not avoid or substantially reduce environmental impacts or meet Project objectives as well as the proposed site. Two of the sites posed substantial site control challenges; a third site is in a flood zone and much of the site is in designated desert tortoise critical habitat; the fourth alternative site directly conflicts with an off highway vehicle (OHV) use area. A smaller facility would not meet Project objectives as well and would not offer economies of scale. Given the ready availability of natural gas service, none of the other boiler fuel alternatives were economically preferable to the selected natural gas option. Even with dry cooling, the Project requires some water (e.g., for mirror washing, makeup feedwater, and domestic uses), and there are no feasible alternatives to site groundwater. Other renewable technology alternatives were rejected because one of the Applicants (Solar Millennium) is an industry leader in parabolic trough technology.

#### 4.1.1 CEQA Requirements

CEQA requires the lead agency to consider “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives” (Title 14 Code of Regulations [CCR] Section 15126.6(a)). The CEQA Guidelines (Title 14 CCR Section 15126.6(c)) further provide that “among the factors that may be used to eliminate alternatives from detailed consideration in an Environmental Impact Report” are:

- Failure to meet most of the basic project objectives,
- Infeasibility, or
- Inability to avoid significant environmental impacts.

### 4.1.2 NEPA Requirements

Like CEQA, NEPA requires the identification and analysis of a reasonable range of alternatives. NEPA's requirements for an alternatives analysis are found in NEPA Section 4332, 42 United States Code 4332(2)(C)(iii), and in Section 1502.14 of the White House Council on Environmental Quality (CEQ) NEPA Regulations (Title 40 Code of Federal Regulations [CFR] 1500-1508). Section 1502.14(a) requires Federal agencies to explore a reasonable range of alternatives, "and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." CEQ Guidance concerning the NEPA regulations adds that reasonable alternatives include those that are "[p]ractical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" (CEQ NEPA's 40 Most Asked Questions, Answer to Question #2). In short, NEPA requires an Environmental Impact Statement (EIS) to thoroughly explore and evaluate all reasonable alternatives that meet the purpose and need of the proposed action, including those that are not within the jurisdiction of the acting agency. NEPA also requires an explanation of the reasons that an alternative has been eliminated from detailed study.

The Federal Land Policy and Management Act (FLPMA) Section 1765 informs the Bureau of Land Management's (BLM's) NEPA review of the alternatives it must consider in an EIS. Per FLPMA Section 1765, the BLM must, when it grants a right of way (ROW), "minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment;" "require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance of [ROWs];" and "require location of the [ROW] along a route that will cause least damage to the environment, taking into consideration feasibility and other factors."

The California Energy Commission (CEC) will be the lead state agency for CEQA compliance for the Project. The BLM will be the Project's Federal agency for NEPA compliance. The CEC and BLM are conducting a joint review of the BSPP and will issue a combined CEQA/NEPA document (Draft Staff Assessment/Draft EIS). The following alternatives discussion is intended to support the combined CEQA/NEPA document.

## 4.2 Alternatives Screening Methodology

A range of potential alternatives to the proposed Project that could reasonably attain most of the basic objectives are identified and evaluated in this section. Alternatives include the "No Action" (also called "No Project") alternative, alternative project sites, an alternative site layout, a smaller plant alternative, freeze protection and auxiliary boiler heating alternatives, alternative water sources, and alternative power generation technologies.

Alternative solar technologies were not considered because the use of an alternative solar technology would not avoid or substantially reduce environmental impacts compared to the implementation of the Project as proposed. In addition, Solar Millennium, a Project Applicant, is a leader in parabolic trough technology and has demonstrated expertise in this technology; hence, as the Applicant, an alternative solar technology would not meet one of the Project's basic objectives -- to use solar troughs. Alternative transmission line routes were not considered because the location of the Southern California Edison (SCE) substation interconnect (Colorado River substation) was only recently finalized and a final transmission route has not yet been selected. The process of selecting the BSPP transmission line route will involve consideration of alternative routes using essentially the same screening methodology described below, but with criteria appropriate for a linear transmission facility rather than a 3,000-acre generating facility.

While the following screening methodology is presented in terms of alternative project locations (sites), the same process essentially applies to alternative site layouts, technologies, water sources, transmission line routes, etc. In accordance with Title 14 CCR Section 15126.6 (c), and consistent with Title 40 CFR Section 1502.14, alternatives were not carried forward for further analysis if:

- 1) The alternative would not meet most of the basic Project objectives,
- 2) The alternative would not avoid or substantially lessen significant environmental impacts of the proposed Project, or
- 3) The alternative was not “feasible.” Per Title 14 CCR Section 15126.6(f)(1), the factors that should be taken into account in determining whether an alternative is feasible are:
  - a) Site suitability,
  - b) Economic viability,
  - c) Availability of infrastructure,
  - d) Land use/land use plan consistency or regulatory/jurisdictional limitations, and
  - e) Site control.

In order to implement this screening process for selecting the Project site, the Applicants needed to:

- Define the Project objectives, purpose, and need;
- Identify the potentially significant environmental impacts associated with the proposed Project; and
- Further define the feasibility criteria.

These are presented below.

### **4.3 Project Objectives, Purpose and Need**

The Project’s objectives, purpose, and need, which guide the Project’s alternatives evaluation process, are restated below from Section 2.2.1, Project Description.

#### **4.3.1 Project Objectives and Purpose**

The specific objectives and purpose of the Project are:

- To develop a utility-scale solar energy project utilizing parabolic trough technology.
- To construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that would contribute approximately 2,000,000 megawatt hours (MWh) of clean, renewable solar energy per year to the State of California’s renewable energy goals.
- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy).
- To interconnect directly to the California Independent System Operator (CAISO) grid through the SCE electrical transmission system while minimizing additions to electrical infrastructure (e.g., avoiding lengthy new transmission lines).
- Commence construction in 2010 to qualify for the American Recovery and Reinvestment Act (ARRA) of 2009’s Renewable Energy Grant Program.

#### **4.3.2 Project Need**

The Federal government and the State of California have clearly established the need for the nation and State to increase the development and use of renewable energy in order to enhance the nation’s energy independence, meet environmental goals, and create new economic and employment growth opportunities. The Project will help meet these societal needs.

More specifically, the Project will further the development of renewable energy and thereby:

- Assist California in meeting its Renewable Portfolio Standard (RPS) goals of 20 percent of retail electric power sales by 2010 under existing law (Senate Bill 1078 – Chapter 516, Statutes of 2002) and 33 percent of electrical power retail sales by 2020 under pending legislation.
- Support U.S. Secretary of the Interior Salazar's Order 3283 and 3285 making the production, development, and delivery of renewable energy top priorities for the United States.
- Support Governor Schwarzenegger's Executive Order S-14-08 to streamline California's renewable energy project approval process and to increase the State's Renewable Energy Standard to 33 percent renewable power by 2020.
- Sustain and stimulate the economy of Southern California by helping to ensure an adequate supply of renewable electrical energy, while creating additional construction and operations employment and increased expenditures in many local businesses.
- Generate electricity without significant emissions of greenhouse gases, thereby meeting the statewide reduction goals of Assembly Bill 32.

Two integral goals of the ARRA of 2009's Renewable Energy Grant Program, for which the Project hopes to qualify, are to enhance America's energy independence and create near-term employment opportunities for Americans. The BSPP will help meet these vital societal needs.

#### 4.4 Alternative Site Selection Criteria

In a report titled "California Solar Resources," the CEC provided estimates of the solar resources located within California and potentially available for use in meeting the RPS and the California Power Authority's approved Energy Action Plan goals. The CEC provided estimates based on the "gross" potential (i.e., the potential unconstrained by technical, economic or environmental requirements) and the "technical" potential (i.e., unconstrained by economic or environmental requirements). Using National Renewable Energy Laboratory (NREL) direct beam insolation values on a grid size of 10 kilometers (6.2 miles) by 10 kilometers with NREL's Climatological Radiation Model, the CEC identified areas suitable for concentrating solar power (CSP) systems in California. The CEC analysis shows that the best locations for CSP facilities generally tend to be in the southeastern portion of the State. For example, using the criteria selected by the CEC, the total "technical" potential area within Riverside County (where the proposed Project site is located), is approximately 419,267 acres.

The Applicants conducted a similar analysis using NREL data, first analyzing base maps of solar energy values and then applying exclusion criteria to identify study areas for further analysis. The following exclusion criteria were applied:

- 1) Solar resource: The site must receive insolation of no less than 7.0 kilowatt-hours per square meter per day ( $\text{kWh/m}^2/\text{day}$ ).
- 2) Site size, shape, grade, hydrology, land use: The site must be large enough (at least 4,000 contiguous acres) and of adequate proportions to include four 250-MW parabolic trough solar thermal plants. The site also must be large enough to site the plants outside of large washes, to the extent possible. The site needs to have no more than a two percent grade and should not be located in a flood zone. Competing land uses and land use designations may make the site more difficult to develop.
- 3) Environmental sensitivity: The site should not be highly pristine or biologically sensitive (e.g., not within a designated wilderness area, Area of Critical Environmental Concern [ACEC], or a Desert Wildlife Management Area [DWMA]). The site should also not be located within a military base or park.

- 4) Proximity to transmission: The site should be located within approximately 10 miles of a CAISO-interconnected transmission line with a rating of 230-kilovolts (kV) or higher.
- 5) Road access: The site should be in reasonable proximity to existing large, paved roads or freeways.
- 6) Site control: The land must be available for sale or lease/ROW, at a reasonable cost (e.g., high-value irrigated agricultural lands were excluded). If private land, the site should not be subdivided between more than three landowners to avoid lengthy and/or unsuccessful negotiations. If private land, a lease or purchase option arrangement is necessary so that a large capital investment would not be necessary until the license is obtained.
- 7) Labor availability: The site should be close enough to areas with large construction labor pools so as to maximize the number of construction workers within daily commuting range.

Several factors that have been used to screen alternatives for other proposed large-scale projects were not considered here. Water availability was not considered, since, as a dry-cooled facility, the plant's water needs are minimal; thus, the Project would minimize potential impacts on local water supplies and other water users. Military low-flight areas were not considered, since the Project's tallest structures will meet low-flight area standards. Proximity to natural gas supply was also not considered to be a requirement since the Project's start up boilers can also be powered using propane.

As discussed in Section 4.3.2, application of the above criteria eliminated all other potential Project locations from being carried forward for more detailed analysis as alternatives to the proposed Project site. The site screening process that led to the selection of the proposed Project site and the elimination of alternative sites is discussed in the following section.

Solar Millennium plans to develop multiple solar projects in California with Chevron Energy Solutions (referred throughout the document as "the Applicants"). Accordingly, Solar Millennium evaluated sites in many parts of the California desert. Solar Millennium alone also is proposing a separate solar project in the northern High Desert of California on a site near Ridgecrest in Kern County, in one of the other areas of the California desert with high solar intensity and other suitable attributes. Solar Millennium and Chevron Energy Solutions also are joint Applicants on another solar project near Palen Dry Lake, approximately 35 miles west of the Project site and also within the U.S. Interstate 10 (I-10) corridor. All three of these projects are on BLM land and thus are under the jurisdiction of both the CEC and BLM. However, the three projects are subject to separate environmental review processes and separate Application for Certifications (AFCs) are being prepared for all three Projects.

The alternatives discussion presented below focuses only on the alternatives considered for a Project site generally speaking in or near the Blythe area of the I-10 corridor. It does not include the evaluation process that led to the selection of the Palen site because that is addressed in the separate Palen Solar Power Project (PSPP) AFC and subsequent CEQA/NEPA document prepared by the CEC and BLM. However, it should be noted that the same alternative sites were considered for both the BSPP and PSPP; all the others were rejected from further consideration ---except the *two* sites for which solar projects have been proposed by the Applicants.

An altogether separate set of sites were considered for the solar project proposed near Ridgecrest. The site evaluation that led to the selection of the proposed site will be addressed in the Ridgecrest Solar Power Project (RSPP) AFC. It is not discussed in the following pages.

The separate AFC for the PSPP, proposed near Desert Center has been submitted at the same time as this BSPP AFC. The RSPP AFC is currently in preparation and is scheduled for separate submittal to the CEC shortly after submittal of the BSPP AFC, which is the subject of this alternatives discussion.

## 4.5 Alternatives Considered

### 4.5.1 No Project Alternative

Under the No Project alternative, the Project would not be constructed, and the electrical power that would have been generated will be generated by other facilities, presumably natural gas-fired generation. Since solar power is generated close to peak consumption periods of the day, the peaking power needs met by Project-generated power would likely be met by fossil fuel-fired peaking units such as simple-cycle gas turbines and other rapid starting equipment (e.g., reciprocating engines) that would produce higher levels of air emissions than a solar thermal power plant.

Because the Project facilities would not exist, its potential adverse environmental impacts would not occur. However, the Project's beneficial impacts would also not occur, which would result in greater fossil fuel consumption to meet increasing electricity demand and, as a result, no Project-related reductions in air pollutants, including the gases that contribute to global climate change.

Moreover, the No Project alternative would not assist the State and the nation in meeting renewable energy goals. In 2002, California established the RPS program with a goal of increasing the percentage of renewable energy in the State's electricity mix to 20 percent by 2017. The 2003 Energy Report recommended accelerating the 20 percent goal for renewables to 2010, while the 2004 Energy Report and the State's 2005 Energy Action Plan recommended increasing the target percentage to 33 percent by 2020. The 2006 Energy Report Update states that "California must accelerate its pace of development if it is to meet its long-term RPS Goal of generating 33 percent of the State's electricity from renewable sources by 2020, as recommended by Governor Schwarzenegger, the Energy Commission, and the California Public Utilities Commission." The 2007 Integrated Energy Policy Report (IEPR) states that "renewable resources are an essential tool for reaching Assembly Bill 32 goals", but that "program adjustments" are needed to meet the 2010 RPS goals. The 2007 IEPR cites the statements "critical imperative to reduce greenhouse gas emissions" and "management of the risk borne by ratepayers for electricity generation" as the two main considerations driving the need to achieve the RPS goals. The IEPR states that the goal of 33 percent renewables by 2020 is achievable "with a concerted effort by and coordinated support from government, industry, and the public." The 2008 IEPR reiterates this goal.

Beyond the State RPS program, there is significant State and Federal focus on promoting and expediting the development of renewable resources:

- On August 8, 2007, the U.S. Department of the Interior, BLM, California Desert District, and the CEC staff signed a memorandum of understanding concerning joint environmental review for solar thermal power plant projects. The memorandum sets out a 12-month schedule for joint AFC/EIS review of applications submitted for solar projects located on BLM lands.
- On November 17, 2008, Governor Schwarzenegger signed Executive Order S-14-08, which raises California's renewable energy goals to 33 percent by 2020.
- On January 16, 2009, Department of Interior Secretary Kempthorne's Order 3283 established BLM renewable coordination offices to expedite permitting of solar projects and electrical transmission facilities.
- On March 11, 2009, Department of Interior Secretary Salazar's Order 3285 established the Departmental Task Force on Energy and Climate Change to increase renewable energy development on public lands.

The No Project alternative would mean that the proposed solar project would not be developed. Consequently, the No Project alternative would not support the program goals of the State's RPS, the Governor's Executive Order, or the orders issued by successive Secretaries of the Interior. The purpose of the Project is to generate renewable solar power and provide electric power to California's electrical

users. In short, the No Project alternative would not provide the additional power needed in California in a manner that assists the State in meeting its renewable power and greenhouse gas reduction goals.

**4.5.2 Project Site Alternatives**

Using the site screening process described above, five candidate site locations (including the proposed site) were identified for a 1,000-MW project. The Applicants did not restrict the site selection efforts merely to the lower portions of the California desert.

The demonstration of this fact is that Solar Millennium also is proposing to develop, (and has considered site alternatives for) a solar project near Ridgecrest, California in the Kern County portion of the High Desert over 150 miles northwest of the BSPP site. The approximate locations of the sites other than the proposed site are shown on Figure 4-1 and described in Table 4-1.

**Table 4-1 Alternative Sites Considered and Rejected**

Site	General Description/Location
<b>El Centro</b>	BLM property north of Plaster City, California
<b>Johnson Valley</b>	BLM, State of California, and private property near Johnson Valley, California
<b>East of Lancaster</b>	Private land east of Lancaster, California
<b>Chuckwalla Valley</b>	BLM property in general area southwest of Blythe, California

The Applicants propose to deliver the power generated from the Project via a new 500-kV gen-tie line built from the plant site which will interconnect with Southern California Edison’s Devers-Palo Verde No. 2 500-kV transmission line to SCE’s planned Colorado River substation, the location of which was recently finalized about five miles southwest of the Project site and south of I-10. Because of the uncertainty about the substation location, no BSPP transmission route alternatives have been defined or evaluated. When the Project’s transmission line route is finalized and studied, alternative transmission routes also will be analyzed and the information provided to the regulatory agencies and other stakeholders.

**4.5.2.1 Insolation, Size, Grade, Road Access**

All of the sites considered have good solar insolation, although the El Centro site’s insolation level at 6.9 kWh/m<sup>2</sup>/day is slightly below the 7.0 kWh/m<sup>2</sup>/day criterion (see Figure 4-2). All of the sites are large enough for a 1,000-MW facility. Most of the sites have acceptable grade; although the site east of Lancaster is least desirable with slopes of three to four percent. All of the sites are adjacent to large paved roads or freeways.

**4.5.2.2 Environmental Sensitivity**

Two of the alternative sites lie within the Colorado Desert, and two of the sites lie within the Mojave Desert. Much of the Colorado Desert is managed under the Northern and Eastern Colorado Desert (NECO) Coordinated Management Plan by the BLM under the multiple use objectives of the FLPMA and the California Desert Conservation Area Resource Management Plan; the same is true with regard to the Mojave Desert and the West Mojave Plan. Considerable land areas are already designated for other land uses: areas for off-road vehicle use, national parks, military areas, etc. The Chuckwalla Valley site is located within desert tortoise critical habit (see Figure 4-3); it is also in a flood zone. Under the West Mojave Plan, neither the East of Lancaster nor the Johnson Valley site is located within a DWMA. However, the Johnson Valley site is located in Category 2 Desert Tortoise Habitat, per the San

Bernardino County Official Land Use Plan Biotic Resource Overlay. None of the sites are located in desert tortoise conservation areas, military bases, parks, wilderness areas or ACECs.

**4.5.2.3 Proximity to Transmission**

The El Centro site is located approximately seven miles from the existing San Diego Gas & Electric (SDG&E) 500-kV Imperial Valley substation and less than two miles from the proposed SDG&E Southwest Powerlink 500-kV transmission line. The East of Lancaster site is located within 14 miles of SCE’s Vincent 500-kV substation. The Chuckwalla Valley site is located seven miles from the proposed Colorado Rivert substation of the SCE Devers-Palo Verde 500-kV transmission line. The Johnson Valley site is located 31 miles from the SCE Lugo 500-kV substation; however, it is located three miles away from the proposed Los Angeles Department of Water and Power 500-kV “Green Path” transmission line (eventual substation locations to be established).

**4.5.2.4 Site Control**

Two sites have issues related to site control. The Johnson Valley site combines Federal, State and private ownership, while the East of Lancaster site is privately owned and heavily subdivided. Multiple ownerships make obtaining site control a more difficult and higher risk situation. A summary of the site selection criteria and reasons for elimination of alternative sites from further consideration are presented below and summarized in Table 4-2.

**Table 4-2 Alternative Sites Dropped from Further Analysis**

Site	Site suitability	Site control	Transmission	Environmental Sensitivity
Proposed Site – BSPP	Excellent – Site large enough for four 250-MW plants. Two percent slope.	Good – BLM property	Excellent – Within five miles of existing SCE Colorado River substation.	Good – No outstanding resource values or known environmental conflicts (not in ACEC, DWMA, critical habitat, etc.)
Johnson Valley	Good – Site large enough for four 250-MW projects. Slope of two to three percent.	Poor – BLM, State of California, and private property	Poor – 31 miles from nearest 500 kV substation. However, site is located three miles from the planned Green Path 500-kV transmission line (substation locations presently unknown).	Medium - Located in Category 2 Desert Tortoise habitat, per San Bernardino County Official Land Use Plan Biotic Resource Overlay. Within one to three miles of several landing strips. Within 10 miles of 29 Palms military base.

**Table 4-2 Alternative Sites Dropped from Further Analysis**

Site	Site suitability	Site control	Transmission	Environmental Sensitivity
El Centro	Good – Site large enough to support four 250-MW plants. Two to three percent slope.	Good – BLM property	Good – approximately seven miles from the existing SDG&E Imperial Valley 500-kV substation and less than two miles from the planned SDG&E Southwest Powerlink 500-kV line.	Poor – potential conflicting resource use; in Plaster City Off Highway Vehicle Open Area.
East of Lancaster	Medium – Site large enough to support four 250-MW plants. Three to four percent slope.	Poor – Heavily subdivided private property	Medium – 14 miles from nearest 500-kV substation.	Good – No outstanding resource values or known environmental conflicts (not in ACEC, DWMA, critical habitat, etc.).
Chuckwalla Valley	Excellent – Site large enough to support four 250-MW plants. Two percent slope.	Good – BLM property	Good - Seven miles to SCE Devers-Palo Verde 500-kV proposed Midpoint substation.	Poor – Per NECO plan, sizable portion of site located in desert tortoise critical habitat. Also, located in flood zone.

#### 4.5.2.5 Alternative Sites Would Not Avoid or Substantially Reduce Environmental Impacts

All of the alternative sites considered would require about 12 square miles of contiguous, rectangularly shaped land area and linear corridors of varying lengths. The Chuckwalla Valley site is located in Desert Tortoise critical habitat, and the Johnson Valley site is located in Category 2 Desert Tortoise habitat, per the San Bernardino County Official Land Use Plan Biotic Resource Overlay. The El Centro site is located in an Off Highway Vehicle Open Area.

#### 4.5.2.6 Alternative Sites Would Fail to Meet Project Objectives

The first two screening criteria categories, solar resource and site suitability, address two of the Project objectives: to construct a 1,000-MW parabolic trough solar thermal power plant and to locate it on a contiguous, sufficiently large area of land with high direct normal insolation (DNI) and slopes of 2 percent or less. The East of Lancaster site has the lowest solar resource of all of the alternative sites. It also does not meet the Project objective of proximity to an existing SCE transmission system.

#### 4.5.2.7 Selection of the Proposed Site

Table 4-2 above compares the potential environmental effects and overall suitability of the BSPP site with the other alternatives. As shown in the table, only the proposed BSPP site received “good” or “excellent” ratings in all four criteria listed in Table in table 4-2. None of the alternative sites would feasibly attain

most of the basic objectives of the Project while also avoiding or substantially reducing any potentially significant impacts of the Project.

The BSPP site and the alternative sites are all able to meet the basic objective of hosting four 250-MW solar power plants, but the BSPP site has several advantages over the others. The BSPP is located entirely on BLM land; it has a slope of less than two percent; it shows little environmental sensitivity and is considered to be low-value habitat for desert tortoise. The site was used during World War II by General Patton's tanks for training exercises, as part of the 18,000-square mile California-Arizona Maneuver Area covering 18,000 square miles. It is easily accessible from major roads. The site is not located in a wilderness study area, ACEC, or DWMA, and it is not in critical habitat.

Based on the foregoing analysis, the No Project Alternative would have the least potential for significant impacts. However, the No Project Alternative would not meet the basic project objectives and would not provide the benefits of the Project. It also fails to implement the multiple use goals of the FLPMA and the various State and Federal renewable energy goals.

Given the clear preferability of the proposed site for the Project, both in terms of meeting necessary site screening criteria and reducing environmental impacts, none of the alternative sites was carried forward for detailed analysis.

#### **4.6 Alternative Site Layout**

The proposed 1,000-MW Project configuration is the result of geographic, site control and environmental constraints, as well as engineering design and operating constraints and requirements of a utility-scale 1,000-MW solar thermal power plant.

- Geographic and site control constraints: The Project configuration has been limited by site area geographic constraints such as Blythe Airport to the southeast, and private property in the center and adjacent to the south of the site.
- Environmental constraints: The requested ROW area was reduced to avoid impacting the environmentally sensitive McCoy Wash, which traversed the northeastern-most portion of the original ROW.

#### **4.7 Plant Size**

The Applicants also considered the alternative of developing the Project as a single 250-MW unit or a 500-MW unit. Building one or two units would have a smaller footprint and thus likely also fewer environmental impacts than the proposed 1,000-MW facility. However, given the infrastructure requirements and environmental impacts associated with building a single 250-MW plant, or even two 250-MW units, as the Applicants have proposed 35 miles west of the BSPP (the Palen Solar Power Project), building four plants on one site allows for greater economies of scale than a smaller project.

It also potentially has some apparent environmental advantages compared to four separate facilities (or two separate facilities). In a sense, there are environmental economies of scale. For example, separate facilities inherently consume more total acreage because they must duplicate amenities that can be shared at larger facilities. This increases potential habitat loss, habitat fragmentation, and for resource and/or use-related conflicts (e.g., environmentally sensitive area or recreational use). Because of increased potential impacts of a transmission corridor, a larger facility would disturb less habitat in a single transmission corridor than singular 250-MW units with multiple transmission corridors. Similarly, infrastructure needs for solar facilities, potentially including water and/or gas pipelines, road improvements, and their associated environmental and other impacts, would likely be greater for multiple facilities compared to a single larger facility.

Finally, given the importance of attainment of renewable energy mandates and objectives, a 250-MW or 500-MW facility would not be as effective in meeting the Project objective of supporting renewable energy goals as a 1,000-MW facility. For these reasons, the development of a smaller project was rejected.

#### **4.8 Freeze Protection and Auxiliary Boiler Heating Alternatives**

The Applicants considered several alternatives for generating energy for freeze protection of the heat transfer fluid (HTF) and quick start for the auxiliary boiler during early morning hours. The four options that can achieve this are:

- Electricity purchased from SCE,
- Solar energy from the Project,
- Propane acquired from a third-party distributor, or
- Installation of a natural gas pipeline.

As discussed in Section 5.2, Air Quality, emissions related to the propane option are relatively minor and are well below the thresholds of the Federal permitting and Clean Air Act programs that are applicable to major sources of emissions. As the solar and purchased electricity approaches also do not pose air quality concerns, the alternatives analysis focused on economic efficiency.

Electricity delivered via the Project's transmission interconnect could be used for generating energy freeze protection of the HTF and quick start for the auxiliary boiler. This would entail the installation of several small electric boilers. This alternative is high in capital cost.

The Applicants analyzed the option of using solar energy to heat the HTF, in essence using the Project's own thermal energy to heat its own HTF. This option would eliminate the need for an alternative fuel source, but would delay the daily heating to operating temperatures of the HTF. This delay in morning hour production would significantly impact the efficiency and power generation of the overall plant. The loss in production would make the Project economically infeasible.

The Applicants have researched the alternative of designing a heating system that would use propane as the fuel. Propane would be delivered to the Project by a third-party distributor in bulk using trucks. The propane would be stored on site near the propane heating system.

While propane is a suitable option for the Project, natural gas is a better one. A natural gas option is a short distance away from the Project site (less than two miles from the site boundary). The Project can interconnect to the Southern California Gas main feeder line just south of the I-10. Considering the various factors, the Applicants have selected the option of utilizing natural gas as the fuel for HTF freeze protection and for quick start up of the entire facility.

#### **4.9 Water Supply Alternatives**

The Project was initially planned with wet cooling due to the considerable operational efficiencies and economic advantages associated with this technology. However, after careful research and analysis of the proposed Project site conditions and development plan, and in the context of the current water supply situation in California and State water policy, the Applicants have chosen to propose dry cooling. No water will be used for power plant cooling. This means that the Project will be in compliance with State Water Resources Control Board Policy 75-58.

Even a dry-cooled facility requires some water use, although it is a small fraction of what is required for wet cooling. Water will be needed for plant requirements such as solar mirror washing, feed water makeup, fire water supply, onsite domestic use, makeup water for ancillary equipment, heat rejection, and

dust control. The total anticipated water usage for operational requirements of the proposed facilities is approximately 600 acre-feet per year, or 150 acre-feet per plant per year. The Project will also need approximately 3,100 acre-feet of water during the construction period for soil compaction and dust control.

Currently, available data indicates that the water available from groundwater wells is brackish (high Total Dissolved Solids). A package water treatment system will be used to treat the water to meet potable standards. A sanitary septic system and onsite leach field will be used to dispose of sanitary wastewater. Existing offsite wells could provide backup water supply in the event of outages affecting the onsite supply well.

As part of the initial site analysis, the Proponent investigated potential alternatives to meet the water requirements for the proposed Project. Three potential water sources were investigated: 1) onsite groundwater (the alternative that was selected), 2) reclaimed water from the City of Blythe wastewater plant, and 3) water purchased from the Palo Verde Irrigation District. All three alternatives are discussed below:

<b>Groundwater via wells on the site</b>	Onsite wells (two, the second for backup in case of outage of the first) are adequate for the BSPP's needs and would utilize brackish water that can be treated for use. This is the selected alternative.
<b>Reclaimed water from City of Blythe wastewater plant</b>	The City of Blythe wastewater treatment plant is located approximately 12 miles from the site. The City's 30-year old wastewater treatment facility is a Class III facility that discharges 1,456 acre-feet per year of water into percolation ponds. Although the City's wastewater could potentially supply Project water needs, the City wastewater is owned by the Palo Verde Irrigation District and cannot be sold outside the District's boundaries. Even if this were not the case, it would not be economically feasible to build a pipeline from the treatment plant to the Project site.
<b>Supply of water from the Palo Verde Irrigation District</b>	As noted above, the District cannot sell water outside its boundaries. Please see Figure 4-3.

The Project site is located outside water district boundaries (see Figure 4-3). BSPPs proposed water use, which will be supplied by onsite wells and does not use any water for power plant cooling, is consistent with California water law and policy.

The Applicants are aware of the Bureau of Reclamation's proposed (but now withdrawn) rule regarding the use of Colorado River water (1006-AA50). The proposed rule would have established an "accounting surface" to determine when water pumped from an aquifer is replaced with water drawn from the lower Colorado River. If the rule or one like it were adopted, the rule could require the Project to contract with a Colorado River entitlement holder for water supply. As noted, the rule has been withdrawn and no new rule has been proposed.

**4.10 Power Generation Technology Alternatives**

An objective of the Project is to support the State's policies/goals with respect to increasing the use of renewable energy sources. Fossil fuel technologies (simple-cycle, combined-cycle, advanced combustion turbine technologies, integrated gas combined cycle, fluidized bed boilers, etc.) by definition do not support this objective and thus were not considered as alternatives for the Project. In addition, nuclear power is not renewable energy and is prohibited by California law at present because of concerns about nuclear waste disposal.

As for alternative renewable energy sources, the proposed Project would generate power by using concentrating solar thermal trough technology to produce high-pressure steam to drive a steam turbine generator. Other renewable energy technologies, including, for example, photovoltaic solar energy, have not been analyzed as alternatives because Solar Millennium is a technology leader in parabolic trough technology and has expertise with this technology. In addition, there is little evidence that the use of other technologies would meaningfully decrease the Project's potential environmental impacts.

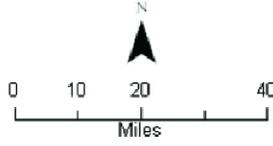
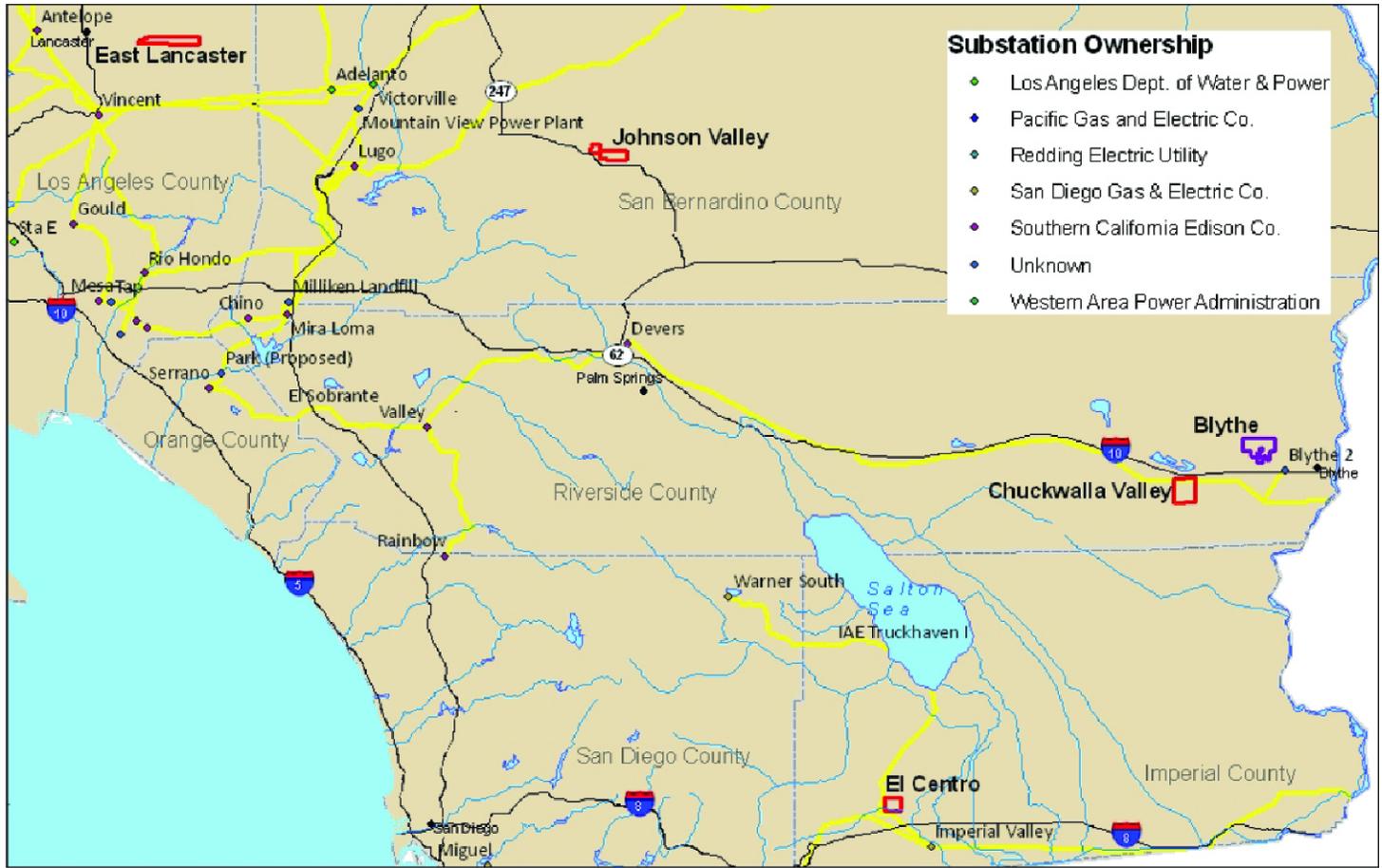
#### **4.11 References**

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CEQ, 1981. <http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm>. Accessed July 2009.

State Water Resources Control Board, 1975. State Water Resources Control Board Resolution No. 75-58 Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling.



Data Sources:  
 United States Fish and Wildlife Service  
 (<http://criticalhabitat.fws.gov/>)

**Blythe Solar Power Project**

**Figure 4-1**  
**Alternative Sites Initially Considered**

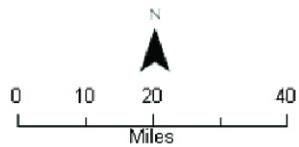
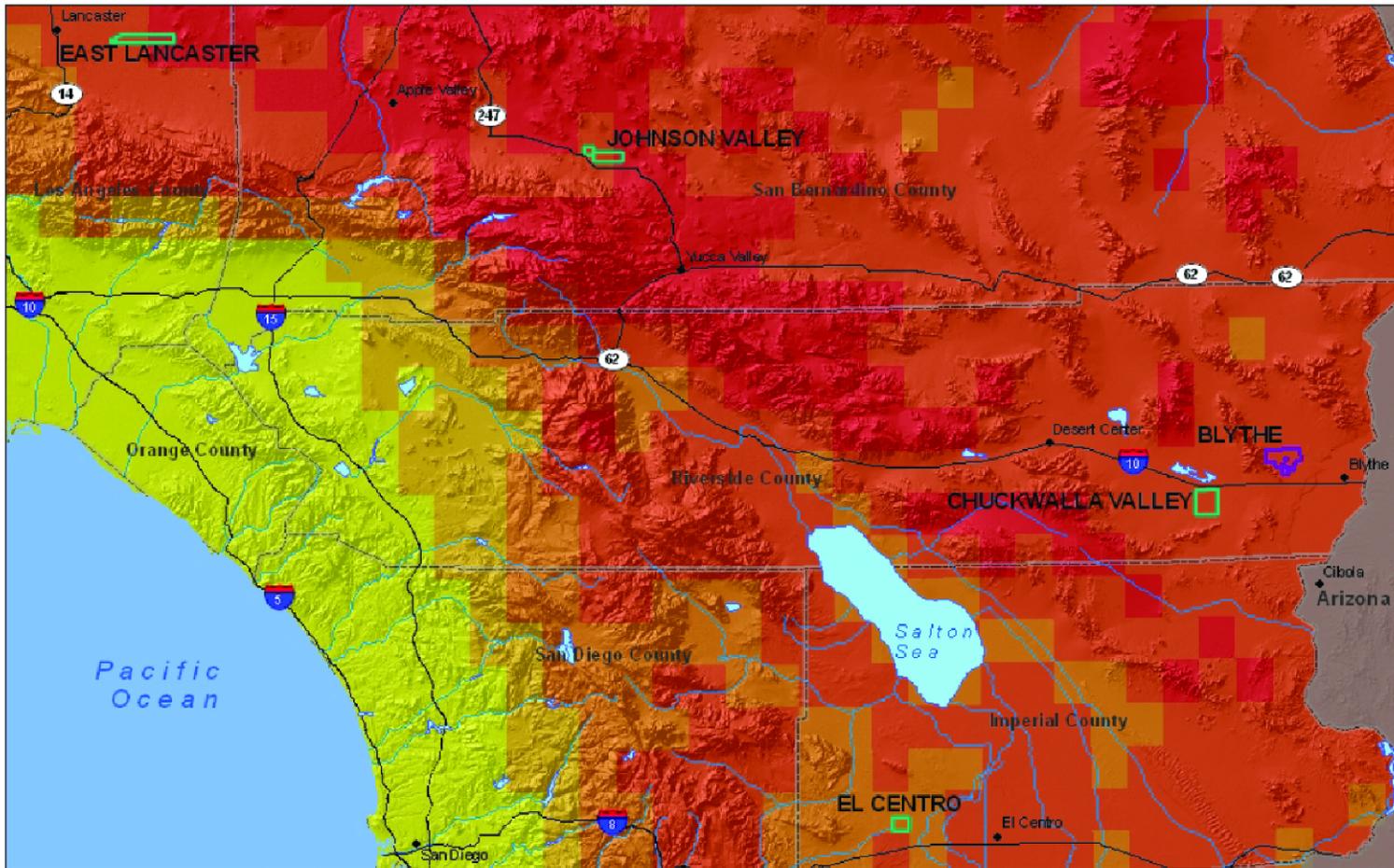
**Solar Millennium**

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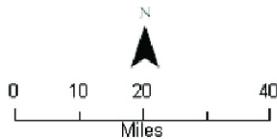
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**Blythe Solar Power Project**  
  
**Figure 4-2**  
**Alternative Sites Initially**  
**Considered and Solar**  
**Resource Quality**

 <b>Solar Millennium</b>

Project: 12944-002 Date: August 2009



Alternative Site
  Planned Site
  Desert Tortoise Critical Habitat



Data Sources:  
 United States Fish and Wildlife Service  
<http://criticalhabitat.fws.gov/>

**Blythe Solar Power Project**  
  
**Figure 4-3**  
**Alternative Sites and**  
**Desert Tortoise Critical Habitat**



**Solar Millennium**

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