

## **EXECUTIVE SUMMARY**

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## Executive Summary

### ES.1 Introduction

The Department of the Interior (DOI) Bureau of Land Management (BLM) Lower Sonoran Field Office (LSFO) has received a proposal from Boulevard Associates, LLC (Boulevard) to construct and operate the Sonoran Solar Energy Project (SSEP), a concentrated solar thermal (CST) power plant with ancillary linear facilities. The SSEP would be located in Little Rainbow Valley, east of State Route (SR) 85 and south of the Buckeye Hills in Maricopa County, Arizona. The SSEP would be located in portions of Sections 19 and 27–34 of Township 2 South, Range 2 West; portions of Sections 12–16, 19–26, and 36 of Township 2 South, Range 3 West; and portions of Sections 23–26 of Township 2 South, Range 4 West (Map 1).

The project footprint of the Proposed Action is approximately 3,620 acres, and would accommodate power blocks, solar fields, evaporation ponds, heat transfer fluid (HTF) land treatment areas, and required linear facilities (access roads, generation tie [gen-tie] line, gas lines, and well field and water pipelines). Land ownership is almost exclusively BLM, with approximately 1.5 miles of road improvements proposed on private and state lands at the western edge of the Project Area, as well as approximately 0.5 mile of gen-tie line on private land.

This project area is managed under the Lower Gila South Resource Management Plan (BLM 1988), as amended (BLM 2005a, BLM 2009a). A BLM team completed a land-use plan (LUP) conformance analysis on November 21, 2008, and determined that the Proposed Action would not conflict with other decisions throughout the plan. In addition to the Proposed Action, two action alternatives and one sub-alternative are also considered, as well as two options that could be applied to multiple alternatives. Sub-alternative A1 (which would use photovoltaic [PV] technology to reduce water consumption) and a Generation Tie (Gen-tie) Line Option were not considered in the draft environmental impact statement (EIS), but are considered in this final EIS. A supplemental EIS was not prepared because no supplemental documentation is needed for the BLM to make a reasoned decision between alternatives to the proposed federal action. Sub-alternative A1 would result in impacts either within the range of or less than those that would result from the alternatives considered in the draft EIS. Furthermore, Sub-alternative A1 was developed in direct response to public and agency comment on the draft EIS, and made possible by advancements in PV technology. Similarly, the Gen-tie Line Option would result in impacts of the same nature, to the same resources, and of the same approximate extent (within 1%) as those considered in the draft EIS, and would not result in any unique site-specific impacts not considered in the draft EIS. As part of its responsibilities under the National Environmental Policy Act of 1969 (NEPA), the BLM must consider a reasonable range of alternatives. The BLM has identified Sub-alternative A1 as the agency-preferred alternative. This sub-alternative would reasonably accomplish the purpose and need for the federal action while fulfilling the BLM's statutory mission and responsibilities, giving consideration to economic, environmental, and technical factors. In particular, this sub-alternative best addresses public and agency concerns regarding groundwater use while meeting the purpose and need.

As the administrator of federal lands within the Project Area, the BLM is the lead federal agency responsible for preparation of this EIS. The DOI/BLM Arizona State Office and the LSFO have determined that the proposed project constitutes a major federal action that requires the preparation of an EIS in accordance with NEPA, as amended. This final EIS was prepared in accordance with NEPA, and is intended to provide the public and decision makers with an opportunity to review and comment on a complete and objective evaluation of impacts that would occur from the Proposed Action and reasonable alternatives.

## ES.2 Purpose and Need

The BLM's purpose and need for this action is to respond to Boulevard's application under Title V of Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [U.S.C.] § 1761) for a right-of-way (ROW) grant to construct, operate, maintain, and decommission a solar power plant<sup>1</sup> and ancillary facilities in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to Boulevard for the proposed solar energy project.

### ES.2.1 Purpose of the Action

Specifically, the BLM's purposes in considering the SSEP are as follows:

- To meet public needs for use authorizations such as ROWs, permits, leases, and easements, while avoiding or minimizing adverse impacts to other resource values and locating the uses in conformance with LUPs. Section 211 of the Energy Policy Act of 2005 (119 Stat. 594, 660) and the BLM's Solar Energy Development Policy establish a framework to process applications for ROWs and direct the BLM to be responsive to solar energy project applicants while protecting the environment.
- To implement the FLPMA and the *Lower Gila South Resource Management Plan* (BLM 1988), as amended (BLM 2005a) by providing consistent land-management decisions based on the standards set forth by both authorities. Both authorities recognize that the Project Area is available for multiple uses.
- To process ROW application AZA-34187 submitted by Boulevard in an expeditious manner consistent with both Executive Order (EO) 13212 (Actions to Expedite Energy-Related Projects) and mandates of the Energy Policy Act of 2005 and the American Recovery and Reinvestment Act of 2009.

### ES.2.2 Need for the Action

The BLM's needs in considering the Proposed Action are as follows:

- Grant ROWs for "systems for generation, transmission, and distribution of electric energy" and/or "other necessary... systems or facilities which are in the public interest," under Title V of FLPMA (43 U.S.C. §§ 1761-1771)
- Support the President's New Energy for America Plan (2008), which seeks to ensure that 10% of United States electricity is generated from renewable sources by 2012 and to 25% by 2025.
- Further the purpose of Secretarial Order 3285A1 (March 11, 2009), which "establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior" (BLM Instruction Memorandum [IM] No. 2011-059).

<sup>1</sup> The purpose and need was changed under the BLM's authority as the lead federal agency for this action to be more inclusive of other solar power options considered in the final EIS.

## ES.3 Public Involvement

### ES.3.1 Public Scoping

The BLM has taken a variety of steps to inform the public, special interest groups, and local, state, and federal agencies about the Proposed Action and alternatives for the SSEP, and to solicit feedback from these interested parties to help shape the project's scope and alternatives.

The BLM conducted internal agency and public scoping to solicit input and identify the environmental and social concerns and issues associated with the SSEP. A notice of intent (NOI) was published in the *Federal Register* on July 8, 2009. Publication of the NOI initiated a 60-day formal public and agency scoping period, during which the BLM solicited comments regarding the SSEP and its potential impacts. The BLM prepared scoping information materials and provided copies to federal, state, and local agencies; Native American tribes; and members of the general public. Information regarding upcoming meetings and opportunities for comment was published in various local news media. The BLM conducted open house meetings to disseminate information, answer questions, and solicit comments on August 4, 2009, in Phoenix, Arizona; on August 5, 2009, in Buckeye, Arizona; and on August 6, 2009, in Gila Bend, Arizona. The BLM also provided opportunities for comments to be submitted through the United States mail and via email.

### ES.3.2 Identified Issues

As noted above, issues to be addressed in the EIS were identified internally, and by the public and the agencies during the scoping process. The 24 issues identified during scoping are summarized below.

#### ***Issue 1: Process***

Which tribes will be consulted as part of the required government-to-government consultation? How would construction and operation of the SSEP affect the interests and concerns of Native American people? Have the U.S. Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AZGFD) been consulted regarding how construction and operation of the SSEP would affect wildlife, including threatened, endangered, and sensitive species, and their habitat? Has the U.S. Army Corps of Engineers (USACE) been consulted regarding how construction and operation of the SSEP would affect waters of the United States? How would other federal, state, and local agencies; interest groups; and individuals be involved as stakeholders? What additional permits would be needed for facility construction and operation?

#### ***Issue 2: Purpose and Need***

What effect would construction and operation of the SSEP have on continued use of fossil fuels for electrical generation? What energy market would this facility serve?

#### ***Issue 3: Alternatives***

What is the desired energy profile (capacity factor and time of energy output) for the SSEP, and is it supported by the purpose and need of the SSEP? What other Project Area configurations or technologies would meet the SSEP purpose and reduce impacts to resources? Are there other locations for the SSEP that would reduce potential use conflicts and meet the SSEP purpose, even if they are not located on public land? Would residential and wholesale-distributed generation, in conjunction with energy efficiency practices, be a viable alternative to the proposed SSEP?

***Issue 4: Air Quality***

What effect would construction and operation of the facility have on local air quality? What is the SSEP's projected use of natural gas? Within the constraints of the desired energy profile (capacity factor and time of energy output), what opportunities exist to reduce impacts to air quality through operational changes such as the inclusion of a thermal storage unit? What effect would inclusion of a thermal storage unit have on reducing emissions from natural gas-fired electrical generation? What effect would expansion of the solar field to replace the thermal input provided by gas have on reducing emissions or on other resources? What opportunities exist to reduce impacts to air quality through mitigation plans (e.g., fugitive dust control and equipment emissions mitigation plans)?

***Issue 5: Climate Change***

What is the full carbon footprint of the proposed SSEP, and what phases of the SSEP are appropriate to include in that analysis? Against what other energy-generation types should the SSEP's greenhouse gas (GHG) footprint be measured to determine the net GHG reductions or gains? Could the SSEP be designed in a way to reduce the impact to carbon sequestration? How should potential change in climate be measured and quantified in the EIS? How might anticipated change in climate affect the Project Area's resources and sensitive areas? How would this affect the operation of the proposed SSEP? How might climate change affect cumulative impacts?

***Issue 6: Cultural Resources***

How would construction and operation of the SSEP affect cultural resources, including the physical integrity of sacred sites?

***Issue 7: Geology and Minerals***

What effect would construction and operation of the SSEP have on landforms and subsurface geology in the Project Area? How would construction and operation of the SSEP impact mineral resources and their availability for use?

***Issue 8: Hazardous Materials and Hazardous and Solid Waste***

How would waste generated during construction and operation of the facility be managed (i.e., storage and disposal)?

***Issue 9: Land Use and Access***

What effect would construction and operation of a solar facility have on existing land uses in and adjacent to the Project Area, including master-planned communities, the Hidden Valley transportation system, a sand and gravel operation, and military air space? What effect would construction and operation of a solar facility have on proposed land uses in and adjacent to the Project Area, including the land-use objectives of federal, state, tribal, and local plans and policies?

***Issue 10: Livestock Grazing***

What effect would construction and operation of the SSEP have on grazing allotments in the area (i.e., the Beloat and Arnold grazing allotments)?

**Issue 11: Mitigation**

What opportunities exist for on-site mitigation of impacts to other resources and values? What opportunities exist to ensure adequate funds would be available for complete restoration of the SSEP site after it is retired or abandoned?

**Issue 12: Noise**

What effect would construction and operation of the SSEP have on the soundscape in nearby residential communities? What effect would construction and operation of that facility have on the experience of visitors to the adjacent wilderness?

**Issue 13: Paleontology**

Would construction of the SSEP result in the discovery or destruction of fossils in the area?

**Issue 14: Recreation and Wilderness Characteristics**

What effect would construction and operation of the SSEP have on the suitability and availability of surrounding public lands and access roads for recreation purposes? There is an area adjacent to the SSEP to the south that may have wilderness characteristics. How would the construction and operation of that facility impact the potential wilderness characteristics of this area?

**Issue 15: Socioeconomics**

What employment opportunities would be provided by construction and operation of the SSEP? What contribution would construction and operation of that facility have on local revenue and the economy? What effect would the facility have on minority and low-income populations? What effect would the facility have on local services such as emergency medical treatment and police response?

**Issue 16: Soils**

What effect would the construction and operation of the SSEP have on soils in the Project Area, including cryptobiotic crust, cyanobacteria, mosses, and lichens? What measures can be taken to reduce impacts to drainage, erosion, and sediment control?

**Issue 17: Special Designations**

What effect would construction and operation of the SSEP have on the resource values and experiences of visitors to the adjacent national monument and wilderness?

**Issue 18: Threatened, Endangered, and Special-status Species (plants and animals)**

What effect would the construction and operation of the SSEP (including the ancillary facilities) have on local populations of Endangered Species Act (ESA)-listed or candidate species or other special-status species and suitable habitats? This would include impacts to suitable upland, riparian, wetland, or aquatic (Gila River) habitat and impacts to species that are listed or candidates for listing under the ESA, or are otherwise designated as a sensitive species, including Tucson shovelnosed snake (*Chionactis occipitalis klauberi*), Sonoran desert tortoise (*Gopherus morafkai*), yellow-billed cuckoo (*Coccyzus americanus*), Yuma clapper rail (*Rallus longirostris yumanensis*), southwestern willow flycatcher (*Empidonax traillii extimus*), California barrel cactus (*Ferocactus cylindraceus*), least bittern (*Ixobrychus exilis*), and western burrowing owl (*Athene cunicularia hypugea*)? What measures could be taken to reduce the adverse impacts?

**Issue 19: Transportation and Traffic**

What effect would construction and operation of the SSEP have on the operation of planned or existing transportation or utility systems and facilities? What effect would construction and operation of necessary utilities for the SSEP have on existing and proposed transportation systems? What effect would the SSEP have on access to local private and public lands?

**Issue 20: Vegetation**

What effect would the construction and operation of the SSEP and associated facilities have on native plants (including loss of native vegetation from direct disturbance [e.g., grading the proposed Project Area] and increased shade from the installation of equipment as well as the introduction and spread of invasive species into the Project Area)? Could plant loss be mitigated by salvage and reuse or replanting of native plants in the Project Area?

**Issue 21: Visual Resources**

What effect would construction of the SSEP have on the scenic quality and character of the existing landscape? How would the character of the viewshed from key observation points (KOP) in the Sonoran Desert National Monument and the North Maricopa Mountains and Sierra Estrella Wilderness be modified by the construction and operation of a solar power-generating facility? What would be the cumulative effect to visual resources (the scenery) visible from KOPs along Arizona highways from the construction and operation of a solar-powered electricity-generating facility if all the approximately 35 ROWs for similar facilities were approved? What measures could be taken to reduce the impacts?

**Issue 22: Water Resources**

How would the withdrawal of groundwater from the Project Area impact the quantity and quality of water in the aquifer under the City of Goodyear, including the flow of lower-quality water into the aquifer from the waterlogged area near the Gila River? How would it affect the quantity of water available for use by the Buckeye Hills Regional Park, or the quantity and quality of water in existing private wells in the area; the water table in Rainbow Valley? How would it affect aquatic habitats, springs, soils, and land surface (e.g., subsidence)?

What measures could be taken to prevent further degradation of impaired waters? How would the permitting process for the SSEP impact existing water rights? What methods could be used to reduce the amount of groundwater needed for the SSEP, and what would be the impact on the quantity and quality of surface water and groundwater resources if these methods were implemented? How would construction and operation of the SSEP impact the quality of existing surface water or groundwater? How would construction and operation of that facility impact existing Project Area drainage patterns, including floodplains and washes? What would be the cumulative impact on the local hydrographic basin from the development and use of local water sources to meet SSEP water demands? How would the concentrated dewatered waste from evaporation ponds, total dissolved solids (TDS), nitrates, boron, and salt be disposed of? What effect would groundwater pumping to supply water for the SSEP have on area aquifers? What effect would other solar-powered electricity-generation technologies have on use and conservation of water?

**Issue 23: Wildlife**

To what extent would modification of the landscape in the Project Area's boundary impact adjacent habitat? Would disruptions in surface flows in washes and uplands lead to broad-scale mortality of vegetation and impact wildlife distribution and abundance beyond the SSEP footprint?

What effects would the construction and operation of the SSEP and ancillary facilities have on local wildlife populations and individuals? Would effects include disruption of north-south movements of wildlife between the Maricopa Mountains and the Buckeye Hills; disruption of the regional landscape of wildlife linkages between the Gila Bend Mountains, the Sierra Estrella mountain range, and the Gila River; impacts to individual animals and populations as a result of increased shade introduced into the environment from the installation of equipment; impacts to wildlife species, particularly migratory waterfowl, as a result of exposure to contaminants in evaporation ponds or stormwater detention basins; impacts to wildlife species near the Gila River; and impacts to desert bighorn sheep (*Ovis canadensis nelsoni*) historical habitat and reintroduction plans?

### ***Issue 24: Cumulative Impacts***

What would be the cumulative effects of other solar-powered electricity-generating facilities being considered in western Arizona, California, and Nevada on the Sonoran Desert landscape? What past, present, and reasonably foreseeable projects and their connected actions (i.e., transmission needs and associated projects) would be appropriate to include in a cumulative impacts analysis? What resources are appropriate to include in a cumulative impacts analysis? What are appropriate impact indicators and information to include in that analysis? How might climate change affect the cumulative impacts of these facilities on the Sonoran Desert?

### **ES.3.3 Public Comments and Meetings on the Draft EIS**

As part of NEPA requirements, notices of availability (NOA) of the draft EIS were published in the Federal Register by the EPA on April 9, 2010, and by the BLM on April 19, 2010. Publication of the EPA NOA initiated a 45-day, formal public and agency comment period, during which the BLM solicited comments regarding the project, the alternatives analyzed, and potential environmental impacts. Copies were mailed to individuals and made available in public libraries in Buckeye, Gila Bend, and Goodyear, Arizona, and on the BLM's website.

In addition, the BLM held agency and public meetings to discuss the draft EIS in Phoenix, Arizona, on April 27, 2010, and public meetings in Gila Bend and Buckeye, Arizona, on April 28 and 29, 2010, respectively. Meeting attendees were encouraged to provide written comments on the issues and alternatives analyzed in the draft EIS. The BLM received a total of 161 comment letters on the draft EIS. In preparing the final EIS, the BLM considered all comments. Appendix A (Response to Comments) contains each unique comment received and BLM's associated response. The appendix also contains a description of the comment analysis and response process.

## **ES.4 Alternatives**

Four alternatives and one sub-alternative are considered in detail in this final EIS: the No Action alternative, the Proposed Action, Alternative A: Reduced Water Use (dry-cooled CST), Sub-alternative A1: Photovoltaic, and Alternative B: Reduced Footprint. An optional component, a brine concentrator, is considered as an additional element that could be added to the action alternatives that would use a wet-cooling system (the Proposed Action and Alternative B). In addition, an alternative gen-tie line alignment is being considered as part of the action alternatives as an optional means of routing produced electricity from the SSEP solar field to the Jojoba Switchyard. These alternatives are briefly described below and described more fully in Chapter 2.

### ES.4.1 No Action Alternative

Under the No Action alternative, Boulevard's ROW application would not be authorized and the SSEP would not be developed. Existing land uses in the area would continue, including livestock grazing and limited dispersed recreation.

### ES.4.2 Proposed Action

Under the Proposed Action, the SSEP would consist of three major types of facilities: a well field, external linear facilities, and power plants (the main project footprint). Each of these components is explained in detail in Chapter 2 (Section 2.5).

The power plant facilities would be located on approximately 3,313 graded acres in the primary project footprint. The power plant facility footprint would be fenced and would function largely as a single facility. Specific components of the power plant facilities would include power block areas, administration buildings and local warehouses, solar collector field arrangements, evaporation ponds, a land-treatment unit, on-site transmission facilities, on-site gas pipeline facilities, drainage collection and discharge facilities, groundwater wells used for water supply, and access roads.

The linear facilities would include access roads, a gen-tie line to carry electricity to the Jojoba switchyard, a natural gas pipeline, and water pipelines.

As many as four high-capacity groundwater production wells would be needed to meet the water supply requirements of the SSEP at full build-out, with an estimated total water demand of 2,305–3,003 acre-feet per year (afy) for the 375-megawatt (MW) project in an average year. A well field would be developed to supply water for the SSEP during the construction and operation phases. The well field would be located approximately 1.2 miles east of the power plant area, and would include four wells with on-site pumping facilities, a booster pump station, supporting linear facilities (including service roads, buried pipelines, and electrical service), and a number of linear facilities to be developed externally from the main power plant footprint.

Under the Proposed Action, the cooling system for heat rejection from the steam cycle would consist of a surface condenser, circulating water system, and a wet-cooling tower. Water for cooling tower make-up, process water make-up, and other industrial uses (such as mirror washing) would be supplied from the groundwater wells described above, which would also be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). A package water treatment system would be used to treat the water to meet potable standards. A sanitary septic system and on-site leach field would be used to dispose of sanitary wastewater. A full description of the Proposed Action is found in Chapter 2 (Section 2.5).

### ES.4.3 Alternative A: Reduced Water Use (dry-cooled CST)

Alternative A was developed to respond to concerns about consumptive water use by the SSEP that were expressed during public and agency scoping. Under Alternative A, the SSEP would be constructed with dry-cooling technology rather than the wet cooling considered under the Proposed Action. Alternative A would require approximately 116–151 afy for the 375-MW project, which is approximately 95% less water than would be used under the Proposed Action. Two groundwater wells would be located in the same area as under the Proposed Action. Under Alternative A, dry cooling would produce approximately 9% less energy than the Proposed Action from the same size solar field.

In general, most aspects of Alternative A would be the same as under the Proposed Action. Major elements that differ from the Proposed Action include smaller evaporation ponds and an air-cooled condenser (ACC) for power plant cooling. Under Alternative A, the evaporation ponds would be

approximately 2 acres for the 125-MW unit and 4 acres for 250-MW unit, instead of 10 acres and 20 acres, respectively, under the Proposed Action. One ACC would be installed in each power block, and would include two "wet surface air coolers" that would be used for auxiliary cooling. A full description of Alternative A is found in Chapter 2 (Section 2.6).

#### **ES.4.4 Sub-alternative A1: Photovoltaic**

Sub-alternative A1 was developed to respond to public and agency comments on water consumption. It was developed after the draft EIS due to advancements in technology and a change in market conditions that allowed for a reconsideration of PV technology as a viable alternative (see Section 1.2). Under Sub-alternative A1, the SSEP would be constructed as a 300-MW PV power plant and would generate electricity using multiple arrays of PV panels electrically connected to associated power inverter units.

Although annual (solar) generating capacity would be reduced by approximately 95,000 MWh under this sub-alternative, it would result in a reduced project footprint and decreased water consumption relative to the Proposed Action. It would also reduce or avoid impacts to other resources raised as issues by the public and agency cooperators, including wildlife habitat and travel corridors, washes, and nearby residences.

The primary project footprint under Sub-alternative A1 would occupy approximately 1,907 acres, or approximately 58% of the footprint under the Proposed Action (Map 2). Sub-alternative A1 would require approximately 33 afy of water for operations (and an annual average of 65 afy with construction use factored in), which would be supplied by up to two groundwater wells in the same area as under the other action alternatives. This sub-alternative would consume approximately 98% less water than the estimated water requirements of the Proposed Action. Total solar energy generation would be approximately 11% less than the anticipated generation under the Proposed Action.

#### **ES.4.5 Alternative B: Reduced (Project) Footprint**

Alternative B was developed to respond to issues identified during agency and public scoping, including potential impacts to wildlife linkages and travel corridors, residential areas, xeroriparian vegetation and washes, water use, and the overall level of surface disturbance resulting from the SSEP. Alternative B would address these issues with a project footprint that is approximately 35% smaller than under the Proposed Action. Under Alternative B, the SSEP would consist of two concentrated solar electricity-generating facilities, each with an expected net output of 125 MW (for a total of 250 MW), rather than 375 MW as under the Proposed Action. This design would allow for a reduced project footprint and avoidance of wildlife habitat features, including xeroriparian habitat (an unnamed tributary to Waterman Wash) and a water source (stock pond) located in the eastern portion of the Project Area under the Proposed Action.

The main project footprint under Alternative B (not including linear features such as roads, pipelines, or transmission lines) would occupy approximately 2,136 acres, or approximately 63% of the main project footprint under the Proposed Action. Alternative B would require approximately 1,518–2,003 afy of water for the 250-MW project, which is approximately 34% less water used and 33% less solar generation than under the Proposed Action. Water would be supplied by three groundwater wells located in the same area as under the Proposed Action. The same cooling method would be used as under the Proposed Action. A full description of Alternative B is found in Chapter 2 (Section 2.8).

#### **ES.4.6 Reduced Water Use Option: Brine Concentrator**

The water treatment design under the Proposed Action and Alternative B (both wet cooled) includes pre-treatment and post-treatment systems that would consist of multimedia filters and a two-pass reverse-osmosis system. A brine concentrator is an optional piece of equipment that can be added to the post-

treatment system under either of these alternatives. The use of a brine concentrator would reduce the volume of wastewater exiting the facility. It would also allow a reduction in evaporation pond sizes and a 7% reduction in plant water consumption. The additional heat requirement for this piece of equipment would result in a slight decrease in electrical output. A full description of the Reduced Water Use Option is found in Chapter 2 (Section 2.9).

#### **ES.4.7 Generation Tie Line Option**

As part of the Arizona Corporation Commission Certificate of Environmental Compatibility (CEC) process (see Section 1.6.3 for a description), Boulevard has developed an alternate gen-tie line alignment, which could be applied to any of the action alternatives. Because this optional route would meet the purpose and need for the project and could feasibly be implemented, BLM is considering it in this final EIS as an alternative (or optional) means of routing produced electricity from the SSEP solar field to the Jojoba Switchyard. This option would address alternate methods and locations for crossing existing high-voltage transmission lines near the project, as well as an alternate route through existing designated utility corridors that may be subject to future development.

The Gen-tie Line Option would be routed in a generally southwestern direction and would use an existing utility corridor, as described in Section 2.5.2.5.3. It would be initially routed directly south along a new road and would then make a 90 degree turn to the west, also along a new road. It would then extend westward to the Jojoba Switchyard, as shown on Map 3. There would be approximately 10 pulling sites required to install the conductors along the Gen-tie Line Option alignment. Maps 2, 4, 5, and 6 show the location of the Gen-tie Line Option in relation to alternative site layouts.

### **ES.5 Environmental Setting**

As previously noted, the SSEP would be located in the west end of the Little Rainbow Valley, south of the Buckeye Hills in Maricopa County, Arizona. The closest communities to the SSEP are the Town of Gila Bend, the City of Goodyear, and the Town of Buckeye.

The Project Area is located in the Basin and Range Physiographic Province, which is distinguished by isolated, roughly parallel mountain ranges separated by closed desert basins. Mountain ranges trend north-south with distinctive alluvial areas known as bajadas. A subdivision of the Basin and Range Province, the Sonoran Desert, encompasses the entire Project Area and adjacent lands. The Sonoran Desert is characterized by mountains with intervening plains. The Project Area and surrounding vegetation are located entirely in the Lower Colorado Valley Subdivision of the Sonoran Desertscrub Biome (Brown 1994).

Little Rainbow Valley is a small valley that lies between the Buckeye Hills to the north and the Maricopa Mountains to the south, and connects the much larger Rainbow Valley to the east with the Gila Bend area to the west. The Project Area landscape is characterized by flat-to-low desert hills and plains with low vegetative diversity typical of creosote flats. The Project Area is almost entirely undeveloped, though a few areas have isolated developments. Primary land uses in and around the Project Area include agriculture, cattle grazing, mining, utilities, dispersed residences, dispersed recreation activities, and transportation. West of the Project Area, land uses include a regional landfill and state prison complex. Approximately 50 residences are located east of the Project Area in addition to two dairies surrounded by areas of agricultural lands. Off-highway vehicle (OHV) use occurs throughout the area on existing, primitive roads and utility corridors.

A detailed description of the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the Project Area is described in detail in Chapter 3. A total

of 18 resources identified through public and agency scoping and collaboration with the Interdisciplinary Team (ID Team) is brought forward for analysis and described in Chapter 4.

## ES.6 Environmental Impacts

Table 2.16 in Chapter 2 summarizes the potential impacts to each element of the environment under each alternative. Detailed descriptions of the impacts under each alternative are provided in Chapter 4, along with a discussion of potential mitigation measures, residual impacts, short-term uses versus long-term productivity, and irretrievable and irreversible commitments of resources that would result from implementation of the alternatives. Cumulative impacts to resource values and uses of the Project Area that would result from implementation of the alternatives are also disclosed in Chapter 4. A summary describing the general conclusions of the effects analysis is presented below.

### ES.6.1 Air Quality

The SSEP would be located in Maricopa County, most of which is a serious nonattainment area for particulate matter (PM) with aerodynamic diameter equal to or less than 10 micrometers (PM<sub>10</sub>) and a nonattainment area for 8-hour ozone. Project-specific and cumulative air quality impacts would occur under all action alternatives. Construction and operational emissions could contribute to the exceedances of the National Ambient Air Quality Standards (NAAQS) for PM with an aerodynamic diameter equal or less than 2.5 micrometers (PM<sub>2.5</sub>) and PM<sub>10</sub>; however, emissions of ozone precursors from the SSEP are unlikely to cause or contribute to exceedances of the 8-hour ozone NAAQS. Under the action alternatives, minor impacts to visibility would also result from plume visibility by casual observers in nearby recreation areas, except for Sub-alternative A1, which would have no point sources of emissions and therefore no visible plume of water vapor. Boulevard has committed to meeting the de minimis level of construction emissions to ensure conformance to the State Implementation Plan (SIP).

### ES.6.2 Climate Change

Implementation of the action alternatives would result in reduced carbon dioxide (CO<sub>2</sub>) sequestration (biosequestration) through removal of vegetation and increased GHG emissions from construction and operation of the SSEP. However, the SSEP would have a net lifetime GHG emissions level of less than zero. Under Sub-alternative A1, total construction and operations GHG emissions generated over the life of the project would be less than 1% of the total GHG emissions that would result from the Proposed Action. Implementation of any action alternative would reduce GHG emissions levels over the life of the project by displacing nonrenewable grid electricity with renewable electricity.

### ES.6.3 Cultural Resources

Nine archaeological sites were identified in the 8,646-acre cultural resources analysis area (Swanson 2009). BLM consulted with the Arizona State Historic Preservation Office (SHPO) as part of its compliance with Section 106 of the National Historic Preservation Act (NHPA; 16 U.S.C. § 470F) to determine the National Register of Historic Places (NRHP) eligibility of these nine sites. According to the NRHP, historic properties can be archaeological sites, objects, districts, buildings, or structures eligible for the NRHP. SHPO concurred with the BLM's determination that three sites in the area of potential effects (APE) are eligible for the NRHP under Criterion D of 36 CFR § 60.4 (see Section 5.4 for detail on SHPO and tribal consultation processes). These three sites—AZ T:10:238 (Arizona State Museum [ASM]), T:14:165 (ASM), and T:14:167 (ASM)—are prehistoric artifact scatters associated with the Hohokam Tradition. SHPO has recommended a memorandum of agreement (MOA) and data recovery plan to resolve the direct adverse effect on one unavoidable site, with monitoring of the other two sites to ensure that they are avoided during construction and operations. A copy of the draft MOA was sent to

SHPO for review on July 28, 2011, and to the tribes on July 12, 2011. SHPO provided comments on a draft version of the MOA on August 22, 2011. BLM is working with SHPO and other consulting parties to finalize the MOA and a historic properties treatment plan, which will address procedures for scientific data recovery, monitoring, and unanticipated discoveries in the event the project is approved.

#### **ES.6.4 Geology and Minerals**

Two geological units have been identified in the Project Area. Terrain modification (e.g., cuts, fills, drainage diversion channels, and protective berms) from construction activities (e.g., excavation and grading) would result under all action alternatives. Additionally, mineable bedrock deposits used for crushed rock are present in the Project Area. Construction and operation of the SSEP under the action alternatives would preclude these deposits from being used within the project footprint for the 30-plus year life.

#### **ES.6.5 Hazardous Materials and Hazardous and Solid Waste**

Under all action alternatives except for Sub-alternative A1, construction and operation of the SSEP would involve the use and generation of hazardous materials and hazardous and solid waste (e.g., HTF, petroleum products, etc.). Under Sub-alternative A1, the generation of other hazardous and nonhazardous solid waste streams would be the same as the Proposed Action, except there would be no activated and spent carbon hydrogen volumes required and no waste mirror glass generated. Additionally, no HTF, natural gas pipeline, sodium hydroxide, hypochlorite, or sulfuric acid would be required under Sub-alternative A1. Thus, there is potential for direct impacts (such as contamination of soils) from hazardous materials and hazardous and solid waste spills and leaks during construction and operation of the SSEP under the action alternatives. However, these potential impacts would be mitigated by adherence to existing laws, ordinances, regulations, and standards that govern the use, handling, and disposal of these materials.

#### **ES.6.6 Land Use and Access**

Under the action alternatives, existing land uses would be precluded and replaced with renewable energy production within the SSEP facility footprint. Impacts to land use and access include loss of existing land uses (grazing and recreation) and temporary interruption of access by increased traffic on SR-85 and Komatke Road during construction of the SSEP. There would also be impacts to residential land use under all action alternatives due to increases in noise levels above ambient conditions of up to 20 A-weighted decibels (dBA) during construction at residential receptor ST-2, and up to 5 dBA at residential receptor LT-1. There is potential for conflict with an existing mining claim under the action alternatives. The Project Area would be closed to backcountry driving, resulting in a loss of opportunities for motorized recreation. Access to adjacent public lands would remain available via roads leading and adjacent to the Project Area.

#### **ES.6.7 Livestock Grazing**

Removal of vegetation and fencing of the proposed SSEP facility under each action alternative would prevent grazing and foraging by livestock and loss of animal unit months (AUM) on grazing allotments in the Project Area. Additionally, increased traffic associated with the construction and operation of the SSEP would increase the risk of injury or death to individual cattle through vehicle strikes.

#### **ES.6.8 Noise**

Construction activities (e.g., vehicle traffic, equipment operation, soil compaction, and venting during site commissioning) as well as operational activities (e.g., vehicle traffic, operation of power blocks, the

transmission line and switchyard) would increase ambient noise levels near the SSEP. Noise levels would increase during construction by approximately 5–20 dBA, depending on the distance between the Project Area and the noise receptor.

### **ES.6.9 Paleontology**

No paleontological resources are known to exist in the Project Area, and the potential for fossils is low (Potential Fossil Yield Classification [PFYC] 2). There are no anticipated impacts to paleontological resources associated with construction of the SSEP under any action alternative.

### **ES.6.10 Recreation and Wilderness Characteristics**

Implementation of any of the action alternatives would alter the recreational setting and opportunities of the Project Area due to vegetation removal, introduction of human-made facilities to the landscape, increases in ambient noise levels from construction, increased traffic, and competition from other nonrecreation activities. The primitive recreational experience and setting in the adjacent Sonoran Desert National Monument, North Maricopa Mountains Wilderness, Sierra Estrella Wilderness, and the Buckeye Hills Regional Park would be impacted due to alteration of portions of the viewshed by industrial activities and increases in ambient noise levels from construction. Motorized use of the main Project Area would end with construction and operation of the SSEP. The Project Area does not possess wilderness characteristics. BLM lands of sufficient size to meet the wilderness characteristics size criteria are not present due to roads that cross the BLM lands in and surrounding the Project Area.

### **ES.6.11 Socioeconomics**

Implementation of the action alternatives would result in changes to area employment (an increase in the number of jobs and employment income) from construction and operation of the SSEP. There is potential for a short-term decrease in property values of up to 14.9% for homes within 0.15 mile of the SSEP. Under all action alternatives, there would be an increase in state and county taxes and revenues during construction and operations. In addition, BLM would receive annual rental and MW capacity fees under all action alternatives. No impacts were identified under any alternative that would disproportionately affect potential environmental justice (EJ) populations living within a 5-mile radius of the SSEP.

### **ES.6.12 Soils**

Six soil complexes have been identified in the Project Area. Under all action alternatives, long-term disturbance to soils would occur from the clearing of vegetation, grading of the project footprint to 3% slope, compaction within the project footprint, and from the improvement and construction of roads in the Project Area. Short-term disturbance to soils would occur from the installation of the buried gas and water lines, and from temporary access roads. Impacts to soils include the loss of soil productivity from topsoil loss, soil erosion, and the loss of water infiltration due to soil compaction.

### **ES.6.13 Special Designations**

There is potential for impacts to three special designation areas near the Project Area (though not directly within the project footprint) under any action alternative. Indirect negative impacts to special designation areas, including the North Maricopa and Sierra Estrella wilderness areas and the Sonoran Desert National Monument, would consist of degradation of primitive recreation settings due to alteration of the viewshed due to project construction and operation, and impacts to wildlife from activities associated with construction and operation of the SSEP.

### ES.6.14 Transportation and Traffic

Each action alternative would result in traffic congestion and delays on SR-85 from an increase in traffic during SSEP construction and operation (a decreased level of service). Construction of the SSEP would preclude motorized travel on existing primitive roads in the Project Area, reducing opportunities for motorized recreation.

### ES.6.15 Vegetation and Special-status Species

Implementation of any action alternative would result in the temporary and long-term removal of vegetation communities and special-status plant species from the Project Area. Indirect impacts would also occur to vegetation communities and special-status plant species from fugitive dust and increased risk of weed introduction associated with increased vehicle traffic on paved roads for the life of the project.

### ES.6.16 Visual Resources

Implementation of any action alternative would result in direct impacts to the landscape (scenery) due to vegetation removal, leveling of the existing landform, and the construction of human-made facilities on the landscape. The visual contrasts from the SSEP would rank from weak to strong depending on the time of day and viewing location. The industrial character of these facilities would contrast with the natural landscape character of the existing landforms and vegetation. Glare and other visual effects from the solar panels would be visible for some distance adjacent to the Project Area.

### ES.6.17 Water Resources

Construction and operation of the SSEP under any action alternative would disturb drainages and floodplains in the area. There would be direct and indirect changes to stormwater, flood, and surface water flows in and around the solar field. Additionally, use of on-site wells would lower existing groundwater levels and increase drawdown in area wells. This drawdown would be most dramatic under the Proposed Action. Alternative A and Alternative B would use approximately 95% and 33% less water, respectively, than the Proposed Action. Sub-alternative A1 would have the lowest amount of groundwater usage of all action alternatives (98% less than the Proposed Action), and would result in drawdown in regional wells of less than 1 foot.

### ES.6.18 Wildlife and Special-status Species

Under any action alternative, impacts to wildlife from construction and operation of the SSEP would include wildlife displacement and habitat degradation due to human activities and weed invasion, loss of habitat connectivity from habitat fragmentation and road barrier effects, and increased risk of exposure to potentially toxic constituents in evaporation ponds. Loss of habitat (water) from removal of the Civilian Conservation Corps (CCC) stock pond would occur under all the action alternatives except for Sub-alternative A1.

## ES.7 Potential Mitigation Measures

Under all action alternatives, applicant-committed environmental protection measures and best management practices (BMP) would be implemented to minimize adverse impacts to sensitive environmental resources (see Section 2.3.3, Table 2.2).

Under all action alternatives, Boulevard would comply with all applicable laws, ordinances, regulations, and standards (LORS), and would obtain and meet the requirements of all necessary permits. Resource-specific LORS are presented in Chapter 3 and, as applicable to the analysis, Chapter 4.

Potential mitigation measures are also proposed for individual resources in Chapter 4. Potential mitigation includes additional means, measures, or practices not incorporated into the Proposed Action or action alternatives that would further reduce or eliminate impacts. Residual impacts that would persist following implementation of potential mitigation measures are addressed immediately following each Potential Mitigation Measures section in Chapter 4. The selection of these proposed mitigation measures will be decided in the record of decision (ROD) for the final EIS.

## **ES.8 Agency Coordination/Consultation**

Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction of their designated critical habitat. It also requires consultation with the USFWS in making that determination. A biological assessment (BA) was prepared to determine if the development and/or operation of the SSEP would have any effects on species included in the list provided by the USFWS. The BA was submitted to the USFWS on December 8, 2009. The USFWS responded on January 11, 2010, issuing its concurrence that no adverse effects are likely to occur to the species listed, and indicating that no further consultation with the USFWS would be required at this time. In its concurrence letter, the USFWS recommends that a groundwater monitoring plan be established and implemented to track and confirm that the SSEP would have no unanticipated effects on the Gila River. Copies of the August 11, 2009 species list letter and the January 11, 2010 concurrence letter are included in Appendix B (Consultation Letters).

The USACE was contacted on September 4, 2009, for an approved Department of the Army jurisdictional determination (JD) for the Project Area. The USACE indicated that the Project Area does not contain any waters of the U. S., and thus no Section 404 permit would be required for the discharge of dredged or fill material associated with the SSEP.

In July 2009, the BLM invited 20 federal, state, and local entities to participate in the project as cooperating agencies. Formal cooperating agency status has been confirmed with the Town of Buckeye, the City of Goodyear, AZGFD, and the Arizona Department of Water Resources (ADWR).

The BLM is engaged in formal government-to-government consultation with several federally recognized tribes with interest in the SSEP. Consultation with tribes is required under Section 106 of the NHPA, NEPA, and other laws and EOs.

The BLM formally initiated Section 106 consultation with the Arizona SHPO on October 1, 2009. The Class III cultural resources survey report and BLM's recommendations of eligibility were forwarded to SHPO for further consultation. SHPO concurred with the BLM's determination that three archaeological sites are eligible for the NRHP. SHPO was updated on the addition of Sub-alternative A1 on April 11, 2011, and the BLM recommended a determination of adverse effect. SHPO responded reiterating the eligibility of the three sites, concurring with the adverse effect determination, and recommending an MOA and data recovery plan to resolve the direct adverse effect on the unavoidable site, with monitoring of the two sites to ensure that they are avoided during construction and operations. A copy of the draft MOA and data recovery plan was sent to SHPO for review on July 28, 2011. As required, a Notification of Adverse Effect Determination was sent to the Advisory Council on Historic Preservation on July 20, 2011, inviting the council to participate in development of the MOA. The council declined participation on August 5, 2011.

The BLM initiated formal consultation with tribes in consultation letters on July 7, 2009. These letters were sent to the following eight federally recognized tribes: Ak-Chin Indian Community, Fort McDowell Yavapai Nation, Gila River Indian Community, Hopi Tribe, Pascua Yaqui Tribe, Salt River Pima-Maricopa Indian Community, Tohono O'odham Nation, and the Yavapai-Prescott Indian Tribe. The tribes were provided copies of the survey report and draft EIS for review and comment. The tribes were updated on the addition of Sub-alternative A1 to the final EIS on April 11, 2011, and consulted on determinations of eligibility and effect. A letter requesting tribal participation in the MOA was sent to the tribes with a copy of a preliminary draft MOA on July 12, 2011. Tribal consultations will continue through the development and implementation of the MOA and a historic properties treatment plan (which will include a data recovery plan). The MOA and treatment plan will be attachments to this project's ROD.

## **ES.9 Next Steps**

Following EPA and BLM's publication of an NOA of the final EIS in the *Federal Register*, there will be a 30-day review and comment period. After the 30-day period, a ROD will be prepared and signed. Decisions made regarding the Proposed Action and alternatives will be documented in the ROD, which will be signed by the authorized officer, the BLM's Phoenix District Manager. The BLM decision will apply only to public lands.

In the ROD, the BLM Phoenix District Manager will determine the following:

- Whether the analysis contained in this EIS is adequate for the purposes of reaching an informed decision regarding the ROW application
- Whether to approve the Proposed Action, select a different alternative, select a combination of alternatives, or deny the ROW request
- Whether the Proposed Action and alternatives are in conformance with applicable land and resource management plans (RMP)
- Appropriate terms and conditions, if the ROW is approved