

# EXECUTIVE SUMMARY

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## ES.1 Background and Project Overview

In August 2007, the United States Bureau of Land Management (BLM) California Desert District and the California Energy Commission (CEC) entered into a Memorandum of Understanding (MOU) to jointly develop the environmental analysis documentation for solar thermal projects under the jurisdiction of both agencies. Consistent with that MOU, the BLM and the CEC prepared a joint environmental document to address the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) for the Palen Solar Power Project (PSPP). The resulting Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) was circulated for agency and public review between April 7, 2010, and July 1, 2010.

On April 7, 2010, the CEC and BLM determined that they would develop and publish separate final documents for compliance with CEQA and NEPA, respectively. The CEC issued a Revised Staff Assessment (RSA) in September 2010 and a Commission Decision in December 2010, and the BLM has prepared this proposed Plan Amendment/Final Environmental Impact Statement (PA/FEIS). For inter-agency consistency, the SA/DEIS, RSA and Commission Decision were the primary references used in preparing this FEIS. Comments received on the DEIS are addressed in this PA/FEIS. After the publication of this PA/FEIS, the BLM will prepare a Record of Decision (ROD) regarding the Agency Preferred Alternative. The publication of the ROD in the Federal Register is the final step required of the BLM to meet the requirements of NEPA for the PSPP.

Based on the analysis of environmental impacts of the Proposed Action and each of the alternatives summarized below and described in Chapter 2, *Proposed Action and Alternatives*, the BLM has determined that Reconfigured Alternative 2 is the Agency Preferred Alternative. BLM would amend the CDCA Plan to include Reconfigured Alternative 2 (500 MW), and would approve a solar energy generating facility and ancillary facilities on either of two layouts, issue a ROW grant, and amend the CDCA Plan to include the proposed generation facilities and transmission line as an approved use. Alternatively, the BLM could take no action on the project but amend the CDCA Plan to make the area available for future renewable development, take no action on the project and amend the CDCA Plan to make the area unavailable for future renewable energy development, or take no action on the project application and no action on a CDCA Plan amendment.

## ES.2 Purpose and Need

### BLM Purpose and Need

In accordance with FLPMA Section 103(c), public lands are to be managed for multiple use that takes into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electric energy (FLPMA § 501(a)(4)). Taking into account the BLM's multiple use mandate, the purpose and need for the proposed action is to respond to a FLPMA right-of-way (ROW) application submitted by Palen Solar I<sup>1</sup> (Applicant) to construct, operate, maintain and decommission a solar thermal facility on public lands administered by the BLM in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws (40 CFR 1502.13). Other applicable BLM authorities include:

1. Executive Order 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the "production and transmission of energy in a safe and environmentally sound manner."
2. The Energy Policy Act of 2005 (EPAct 05 or EPAct), Section 211 of which states: "It is the sense of the Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act, seek to have approved non-hydropower renewable energy projects located on public lands with a generation capacity of at least 10,000 megawatts of electricity."
3. Secretarial Order 3285A1, *Renewable Energy Development by the DOI*, dated February 22, 2010. This Secretarial Order establishes the development of renewable energy as a priority for the DOI and creates a Departmental Task Force on Energy and Climate Change. It also announced a policy goal of identifying and prioritizing specific locations (study areas) best suited for large-scale production of solar energy.

### Department of Energy Purpose and Need

The Applicant applied to the Department of Energy (DOE) for a loan guarantee under Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act"). DOE is a NEPA cooperating agency pursuant to an MOU between DOE and BLM signed in January 2010. The purpose and need for action by DOE is to comply with its mandate under EPAct by selecting eligible projects that meet the goals of that Act. Section 1705 of the Recovery Act authorized a program for rapid deployment of renewable energy projects and related facilities and electric power transmission projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency, science, assistance to the unemployed, and

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<sup>1</sup> Chevron Energy Solutions and Solar Millennium have a joint development agreement. Chevron Energy Solutions applied for the Right of Way for Palen Solar Power Project. To facilitate the permitting of the Palen Solar Power Project (PSPP), the Applicant is requesting that the Energy Commission issue one License to a Project-specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy and transmission projects.

## ES.3 Proposed Action and Alternatives

### Comparison of Alternatives

The Applicant did not request a CDCA Plan amendment directly. Nonetheless, the BLM has determined that a CDCA Plan amendment would be required if a ROW were granted for a solar power generating facility on the proposed site. Regardless of whether the Proposed Action is approved, the BLM could elect to amend the CDCA Plan. Consequently, the following range of outcomes of the BLM's potential CDCA Plan amendment process is as follows:

**PA1** – The CDCA Plan (1980, as amended) would be amended to identify the footprint of the PSPP site as suitable for the proposed type of solar energy development. (This is the proposed land use plan amendment.)

**PA2** – The CDCA Plan (1980, as amended) would not be amended. (This is No Action Alternative A, discussed below.)

**PA3** – The CDCA Plan (1980, as amended) would be amended to identify the PSPP application area as unsuitable for any type of solar energy development. (This is CDCA Plan Amendment/No Project Alternative B, discussed below.)

**PA4** – The CDCA Plan (1980, as amended) would be amended to identify the PSPP application area as suitable for any type of solar energy development. (This is CDCA Plan Amendment/No Project Alternative C, discussed below.)

Accordingly, the BLM is considering a CDCA Plan Amendment in connection with or independent of a ROW for the Proposed Action or one of the action alternatives. Each alternative summarized in this section is described in detail in Chapter 2, *Proposed Action and Alternatives*.

1. **Proposed Action:** The 500 MW PSPP would consist of Units 1 and 2, each with nominal capacity of 250 MW. The solar field would disturb approximately 2,760 acres within an approximately 5,200 acre ROW; linear facilities would disturb approximately 137 additional acres. The PSPP includes a private land component consisting of 40 acres. BLM would amend the CDCA Plan specifically for the PSPP.
2. **Reconfigured Alternative 1:** This reconfigured project would generate the same energy output as the PSPP, but would realign the solar fields to reduce impacts to the primary and secondary desert washes that cross the proposed site as well as to the sand dune habitat and the Mojave fringe-toed lizard in the northeastern portion of the PSPP site. Approximately 2,940 acres within the ROW would be disturbed for the solar field (approximately 180 acres more than the Proposed Action). BLM would amend the CDCA Plan for Reconfigured Alternative 1.
3. **Reconfigured Alternative 2:** This alternative would generate the same energy output as the PSPP, but would realign the solar fields to reduce impacts to the sand transport corridor, to sand dune habitat and to Mojave fringe-toed lizard. Reconfigured Alternative 2 includes two possible solar field layouts (Option 1 and Option 2). Option 1 consists of

public land administered by BLM as well as 240 acres of private land. Option 2 would avoid use of this private land and use only BLM-administered public land (with the exception of a 40-acre private parcel already owned by the Applicant). The total disturbance area of Option 1 would be 4,360.3 acres; for Option 2, it would be 4,323.8 acres. This alternative would require adjustment of the boundaries of the BLM ROW, as it includes land not currently included in the proposed ROW. BLM would amend the CDCA Plan for Reconfigured Alternative 2.

4. **Reduced Acreage Alternative:** This alternative would follow boundaries similar to those of Reconfigured Alternative 1, but it would be about 25 percent smaller, disturbing about 2,080 acres of land (as compared with 2,740 acres required for Units 1 and 2 of the PSPP). Reduced Acreage Alternative would avoid construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 1, would reduce impacts to primary and secondary desert washes, and would reduce impacts to sand dune habitats, the sand transport corridor, and Mojave Fringe-Toed Lizard. BLM would amend the CDCA Plan for Reduced Acreage Alternative.
5. **No Action Alternative A:** The ROW application would be denied, and the CDCA Plan would not be amended.
6. **CDCA Plan Amendment/No Project Alternative B:** The ROW application would be denied. The CDCA Plan would be amended to identify the project application area as unsuitable for any type of solar energy development.
7. **CDCA Plan Amendment/No Project Alternative C:** The ROW application would be denied. The CDCA Plan would be amended to identify the project application area as suitable for any type of solar energy development.

## Agency Preferred Alternative

As stated in PA/FEIS Section 2.4.4, *Agency Preferred Alternative*, the BLM has determined that it prefers Reconfigured Alternative 2 relative to the other alternatives evaluated. The Agency Preferred Alternative is described in PA/FEIS Section 2.4.3, *Alternatives Considered*. Direct, indirect and cumulative impacts associated with Reconfigured Alternative 2 are analyzed throughout Chapter 4, *Environmental Consequences*.

## ES.4 Connected/Cumulative Actions

The two actions described in PA/FEIS Section 2.3, *Connected Actions*, cannot or will not proceed unless other actions are taken previously or simultaneously; or else are interdependent parts of a larger action and depend upon the larger action for their justification. These actions include relocation of an existing Southern California Edison (SCE) power line that crosses the southwest portion of the PSPP site and SCE's proposed construction and operation of the Red Bluff Substation, including related generation-tie (gen-tie) lines, telecommunications and telemetry service, provision of power to the proposed substation during its construction, and related infrastructure.

## ES.5 Environmental Consequences

### Impact Summary Table

Table ES-1 summarizes by environmental parameter the direct, indirect and cumulative impacts of the Proposed Action, Agency Preferred Alternative and other alternatives, which are analyzed in PA/FEIS Chapter 4, *Environmental Consequences*.

### Major Conclusions

#### Areas of Controversy

Based on input received from agencies, members of the public and others, areas of controversy related to the PSPP include:

1. **Biological Resources:** The disturbance areas associated with the Proposed Action and alternatives consist almost entirely of native habitats, including desert dry wash woodland, unvegetated ephemeral dry wash, Sonoran creosote bush scrub, and stabilized and partially stabilized desert dunes. Specific areas of controversy relating to biological resources relate to waters of the State, wildlife connectivity, sand transport corridors and related landforms (e.g., dunes), sensitive plant communities, and special-status species. See, e.g., PA/FEIS Sections 4.17, *Impacts to Vegetation Resources*, 4.21, *Impacts to Wildlife Resources*.
2. **Cultural Resources:** Concerns related to damage, displacement and destruction of cultural artifacts and other resources; loss of integrity of cultural resources; and whether changes in the settings of cultural resources would be consistent with their historic or traditional cultural values. See, e.g., PA/FEIS Section 4.4, *Impacts to Cultural Resources*.
3. **Water Resources:** Concerns related generally to surface water and groundwater use and associated effects, and specifically to potential impacts to Colorado River water. See, e.g., PA/FEIS Section 4.19, *Impacts to Water Resources*.
4. **Visual Resources:** Concerns focused on glare that would be caused by sunlight reflecting off of the parabolic mirrors and on changes in landscape views (including cumulatively).
5. **Alternatives:** Concerns related to whether the range of alternatives was unreasonably narrow and whether it should be expanded.

Comments were received during the scoping process for the PSPP. The scoping process and public input received during that process are provided in detail in Appendix D, *Scoping Report*.

#### Issues to be Resolved

The BLM will decide whether to grant the proposed ROW, grant the ROW with modifications, or deny the ROW. Modifications may include modifying the proposed use or changing the route or location of the proposed facilities (43 CFR 2805.10(a)(1)). The BLM also will decide whether or not to amend the CDCA Plan to identify the application area as suitable for the proposed solar energy development, to identify it as suitable for any type of solar energy development, or to identify it as unsuitable for any type of solar energy development.

**TABLE ES-1  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Air Resources	<p><i>Construction:</i> NOx=209.9 tons/yr; VOC=30.4 tons/yr; CO=183.47 tons/yr; PM10=172.89 tons/yr; PM2.5=44.33 tons/yr; and SOx=0.69 tons/yr</p> <p><i>Operations:</i> NOx= 5.44 tons/yr; VOC=19.48 tons/yr; CO=20.16 tons/yr; PM10=35.75 tons/yr; PM2.5=9.23; tons/yr; and SOx=0.70 tons/yr</p> <p><i>Decommissioning:</i> Comparable in type and magnitude, but likely to be lower than, the construction emissions</p>	Similar to or slightly higher than the Proposed Action	Similar to or slightly higher than the Proposed Action	Similar to or slightly higher than the Proposed Action	<p><i>Construction:</i> Similar to the Proposed Action</p> <p><i>Operations:</i> Approximately 25% less than the Proposed Action</p>	Insufficient information on future project that would likely be constructed to determine future impacts	Insufficient information on future project that would likely be constructed to determine future impacts	Insufficient information on future project that would likely be constructed to determine future impacts
Global Climate Change	<p><i>Construction:</i> GHG: 101,000 MT CO<sub>2</sub>-Equivalent emissions and loss in carbon uptake of about 4,598 MT of CO<sub>2</sub> per year due to vegetation removal.</p> <p><i>Operations:</i> 14,818 MT CO<sub>2</sub>-Equivalent. GHG emissions during construction and operation are more than offset during the operation of the Proposed Action, as a result of displacement of electricity from fossil fueled power plants</p> <p><i>Decommissioning:</i> Comparable in type and magnitude, but likely to be lower than, the construction emissions</p>	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Approximately 25% less than the Proposed Action	No Impact	No Impact	Similar to the Proposed Action

**TABLE ES-1 (Continued)**  
**SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Cultural Resources	<p><i>Construction:</i> 49 known sites (9 prehistoric and 40 historic) Possibly additional resources yet to be discovered during construction</p> <p><i>Operations:</i> No additional impacts</p> <p><i>Decommissioning:</i> No additional impacts</p>	<p><i>Construction:</i> 41 known sites (2 prehistoric, 38 historic, and 1 multi-component)</p> <p><i>Operations:</i> Same as Proposed Action</p> <p><i>Decommissioning:</i> Same as Proposed Action</p>	<p><i>Construction:</i> 61 known sites (9 prehistoric and 52 historic)</p> <p><i>Operations:</i> Same as Proposed Action</p> <p><i>Decommissioning:</i> Same as Proposed Action</p>	<p><i>Construction:</i> 61 known sites (10 prehistoric and 51 historic)</p> <p><i>Operations:</i> Same as Proposed Action</p> <p><i>Decommissioning:</i> Same as Proposed Action</p>	<p><i>Construction:</i> 34 known sites (33 historic and 1 multi-component)</p> <p><i>Operations:</i> Same as Proposed Action</p> <p><i>Decommissioning:</i> Same as Proposed Action</p>	No Impact	No Impact	Similar to the Proposed Action
Environmental Justice	No Impact	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action
Lands and Realty	<p><i>Construction:</i> Minimal impacts to designated corridors, and access roads.</p> <p><i>Operations:</i> Minimal impacts to designated corridors, and access roads. Land within the Project site would be unavailable for placement of future site or linear facilities.</p> <p><i>Decommissioning:</i> No Impact</p>	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed action or slightly reduced	Greater, comparable, or reduced compared to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action
Livestock Grazing	No Impact	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action
Mineral Resources	<p><i>Construction:</i> Negligible and temporary effect on the availability of sand and gravel resources and no impact on the availability of other mineral or gas resources.</p> <p><i>Operations:</i> No impact.</p> <p><i>Decommissioning:</i> No impact.</p>	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Similar to the Proposed Action (slightly reduced impact)	Similar to the Proposed Action	Similar to the Proposed Action	No impact

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	Proposed Action	ALTERNATIVES						
		Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Multiple Use Classes	<p><i>Construction and Operations:</i> Disturbing of approximately 2,970 acres on predominately MUC-M classified lands. Restriction of multiple use opportunities on the PSPP site to a single dominant use for the lifespan of the project.</p> <p><i>Decommissioning:</i> Use opportunities on the site would return to the pre-PSPP conditions</p>	Similar to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action	Similar to the Proposed Action			
Noise	<p><i>Construction:</i> short-term elevated noise levels would occur associated with construction equipment and high pressure steam blow.</p> <p><i>Operations:</i> Long-term operational noise levels would be approximately 42 dBA Leq at the nearest sensitive receptor.</p> <p><i>Decommissioning:</i> short-term elevated noise levels would occur associated with construction equipment.</p>	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Slightly reduced compared to the Proposed Action	Similar to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action	Similar to the Proposed Action
Paleontological Resources	<p><i>Construction:</i> Damage and/or destruction of paleontological resources; possible net gain to the science of paleontology depending on fossils found.</p> <p><i>Operations:</i> No Impact.</p> <p><i>Decommissioning:</i> No Impact.</p>	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Potential impacts would be reduced commensurate with reduction in acreage disturbed.	No impact	No impact	Similar to the Proposed Action

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	Proposed Action	ALTERNATIVES						
		Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Public Health and Safety	<p><i>Construction and Decommissioning:</i> Risks to public health and contamination associated with construction equipment; hazardous materials required for construction and safety risk of encountering unexploded munitions.</p> <p><i>Operations:</i> large quantities of liquified petroleum gas and Therminol VP1 would be used; no short- or long-term adverse human health effects are expected; transmission line safety and nuisance hazards; traffic and transportation safety, including aviation safety; and worker safety and fire protection impacts; impacts associated with geologic hazards; site security.</p>	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Slightly reduced compared to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action	Similar to the Proposed Action	Greater, comparable, or reduced compared to the Proposed Action
Recreation	<p><i>Construction:</i> Direct and indirect impacts from noise, fugitive dust, and truck and other vehicle ingress and egress to the construction site; visual intrusions for visitors seeking experiences from a natural setting. The site would not be available for recreational use, such as day use, hiking and camping.</p> <p><i>Operations:</i> The site would not be available for recreational use, such as day use, hiking and camping.</p> <p><i>Decommissioning:</i> Similar impacts as those described for construction. Would ultimately benefit recreational values, since additional acres would be reclaimed and potentially made available for recreational use.</p>	Similar to the Proposed Action but would require approximately 180 additional acres.	Similar to the Proposed Action but would require approximately 1,390 additional acres.	Similar to the Proposed Action but would require approximately 1,354 additional acres.	Similar to the Proposed Action but would require approximately 890 less acres.	Insufficient information on future project that would likely be constructed to determine future impacts.	Insufficient information on future project that would likely be constructed to determine future impacts.	Same or similar impacts as the Proposed Action.

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Social and Economic	<p><i>Construction:</i> Employment of 566 workers (average) and 1,145 workers (peak). Most, if not all, expected to live within two hours of site.</p> <ul style="list-style-type: none"> <li>Any temporary lodging demand met by existing housing or lodging. No new housing or motel development induced.</li> <li>Total direct construction spending benefits of \$218.7 million on labor and \$30 million on materials.</li> <li>Additional total indirect and induced spending benefits of \$184.3 million and 457 jobs.</li> <li><i>Operations:</i> Annual employment of 134 workers of which at least 75% expected to live within two hours of site.</li> <li>Any in-migration housing demand met by existing housing. No new housing growth induced.</li> <li>Annual direct spending benefits of \$5.8 million on labor and \$5.0 million on materials.</li> <li>Additional total indirect and induced spending benefits of \$6.1 million and 222 jobs.</li> </ul> <p><i>Decommission:</i> Temporary spending and employment benefit from deconstruction and site restoration work. Subsequent long term adverse impact from lost project jobs and spending.</p>	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar but reduced proportionate to size of alternative	Insufficient information on future project that would likely be constructed to determine future impacts.	Insufficient information on future project that would likely be constructed future impacts to determined.	Similar to the Proposed Action

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
			Option 1	Option 2				
Soils Resources	<p><i>Construction:</i> Total earth movement of approximately 4.5 million cubic yards.</p> <p><i>Construction and Operation:</i> With the implementation of the recommended BMPs and mitigation measures, the proposed action would cause minimal wind or water erosion generated soil loss.</p> <p><i>Operation:</i> The project would cause a total of 970 acres of direct impact to dune areas within the sand transport corridor, including 430 acres of direct impact within the most sensitive area for sand transport (Zone 2); and, 1,113 acres of indirect (sand shadow) impacts downwind of the project site where deflation and dune loss within the life of the project would likely occur. Most of the indirect impacts that would be caused by the proposed action would be within Zone 2.</p> <p><i>Decommissioning:</i> With the implementation of the recommended BMPs and mitigation measures, the proposed action would cause minimal wind or water erosion generated soil loss. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed. Natural sand migration and dune habitat processes would resume.</p>	<p><i>Construction and Operation:</i> Similar to proposed action for wind or water erosion generated soil loss.</p> <p><i>Operation:</i> Direct impacts to 187 more acres within the sand transport corridor as compared to the proposed action, including 90 more acres of direct impact to Zone 2 as compared to the proposed action. 100 acres less than the proposed action for indirect impacts within the sand transport corridor.</p> <p><i>Decommissioning:</i> Similar to proposed action for wind or water erosion generated soil loss and sand transport processes</p>	<p><i>Construction and Operation:</i> Similar to proposed action for wind or water erosion generated soil loss.</p> <p><i>Operation:</i> Direct impacts to dune habitat and the sand transport corridor greatly reduced to Zone 2 as compared to the proposed action (140 acres total). Indirect impacts to the sand transport corridor greatly reduced for Zone 2 as compared to the proposed action (130 acres total).</p> <p><i>Decommissioning:</i> Similar to proposed action for wind or water erosion generated soil loss and sand transport processes.</p>	<p><i>Construction and Operation:</i> Similar to proposed action for wind or water erosion generated soil loss.</p> <p><i>Operation:</i> Direct impacts to dune habitat and the sand transport corridor greatly reduced to Zone 2 as compared to the proposed action (150 acres total). Indirect impacts to the sand transport corridor greatly reduced for Zone 2 as compared to the proposed action (130 acres total).</p> <p><i>Decommissioning:</i> Similar to proposed action for wind or water erosion generated soil loss and sand transport processes.</p>	<p><i>Construction and Operation:</i> Similar to proposed action for wind or water erosion generated soil loss.</p> <p><i>Operation:</i> Direct impacts to dune habitat and the sand transport corridor greatly reduced to Zone 2 as compared to the proposed action (9 acres total). Indirect impacts to the sand transport corridor greatly reduced for Zone 2 as compared to the proposed action (55 acres total).</p> <p><i>Decommissioning:</i> Similar to proposed action for wind or water erosion generated soil loss and sand transport processes.</p>	No Impact	No Impact	Impacts to soils and sand transport similar to the impacts under the proposed Project.

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
Special Designations	<p><i>Construction:</i> 3.63<sup>3</sup> acres of impacts within the Chuckwalla DWMA/ACEC. Potential impacts to wilderness users' opportunities for solitude and primitive unconfined recreation.</p> <p><i>Operation:</i> potential impacts to wilderness users' opportunities for solitude and primitive unconfined recreation.</p> <p><i>Decommissioning:</i> Potential impacts to wilderness users' opportunities for solitude and primitive unconfined recreation.</p>	Same as the Proposed Action	No impact.	Similar to the Proposed Action	Similar to the Proposed Action			
Transportation and Public Access – Off Highway Vehicle Resources	<p><i>Construction:</i> temporary disturbance to motorized vehicles on local routes; traffic hazards from construction worker commuting and parking; increased traffic from construction activities; damage to roadways</p> <p><i>Operation:</i> closure of approximately 14 miles of designated open routes. Increased opportunities for vandalism, illegal cross-county use and other disruptive behavior from OHVs. Closure of open washes.</p>	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Similar to the Proposed Action (slightly reduced impact)	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action
Vegetation Resources	<p><i>Construction:</i> 4,024 acres vegetation communities lost; 344 acres ephemeral drainages lost; 5 special status plant species impacted</p>	<p><i>Construction:</i> 3,097 acres vegetation communities lost; 144 acres ephemeral drainages lost; 5 special status plant species impacted</p>	<p><i>Construction:</i> 4,366 acres vegetation communities lost; 407 acres ephemeral drainages lost; 5 special status plant species impacted</p>	<p><i>Construction:</i> 4,330 acres vegetation communities lost; 384 acres ephemeral drainages lost; 5 special status plant species impacted</p>	<p><i>Construction:</i> 2,242 acres vegetation communities lost; 133 acres ephemeral drainages lost; 5 special status plant species impacted</p>	<p>Short term: no impact</p> <p>Long term: Similar to Proposed Action</p>	No Impact	<p>Short term: no impact</p> <p>Long term: Similar to Proposed Action</p>

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	ALTERNATIVES							
	Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
Visual Resources	<p><i>Construction:</i> Mitigable short-term impacts from construction lighting and visible dust plumes; substantial adverse effects from large-scale visual disturbance in the landscape.</p> <p><i>Operations:</i> Mitigable impacts to night sky from facility lighting; Adverse and unavoidable impacts from visual disturbance and glint and glare from foreground/midground views. Cumulatively considerable impacts for motorists and special designations due to large-scale landscape conversion.</p> <p><i>Decommissioning:</i> Mitigable short-term impacts prior to successful restoration.</p>	Severity of adverse impacts slightly increased, but the overall visual resource conclusions remain the same.	Adverse impacts diminished in intensity relative to the action alternative, but only in terms of form and line contrast of the PSPP within the landscape. Other impacts remain the same.	Adverse impacts diminished in intensity relative to the action alternative, but only in terms of form and line contrast of the PSPP within the landscape. Other impacts remain the same.	Adverse impacts diminished in intensity relative to the action alternative, but only in terms of form and line contrast, and project dominance, of the PSPP within the landscape. Other impacts remain the same.	Short Term: no impact  Long Term: similar to proposed action, in proportion with the size of any potential future project.	Short Term: no impact  Long Term: similar to proposed action, in proportion with the size of the project.	Short Term: no impact  Long Term: similar to proposed action, in proportion with the size of the project.
Water Resources	<p><i>Construction and Operation:</i></p> <ul style="list-style-type: none"> <li>• Pumping/Consumption of 2,128 afy during construction and 2,308 afy during operation of groundwater.</li> <li>• Mitigable alteration of stormwater flows and drainage, including re-routing of existing flowpaths.</li> <li>• Mitigable water quality effects including use of heavy machinery and sedimentation during construction, and use of septic system, and other facilities during operation.</li> <li>• No effect on flows in the Colorado River is anticipated.</li> </ul> <p><i>Decommissioning:</i> Mitigable water quality effects due to use of heavy machinery and re-grading of site to match adjacent topography.</p>	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Approximately 25% less than Proposed Action for groundwater consumption, similar to the Proposed Action for all others.	No Impact	No Impact	Similar to the Proposed Action

**TABLE ES-1 (Continued)  
SUMMARY OF IMPACTS BY ALTERNATIVE**

Resource	Proposed Action	ALTERNATIVES						
		Reconfigured Alternative 1	Reconfigured Alternative 2		Reduced Alternative	No Action Alternative A	CDCA Plan Amendment/ No Project Alternative B	CDCA Plan Amendment/ No Project Alternative C
Wild Horse and Burros	No Impact	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action
Wildland Fire Ecology	<i>Construction:</i> Slight increase in threat of wildland fires in area <i>Operations:</i> threat of wildland fire similar to current situation	Similar to Proposed Action	Similar to Proposed Action	Similar to Proposed Action	Slightly less than Proposed Action	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action
Wildlife Resources	<i>Construction:</i> 4,024 acres wildlife habitat lost; 11 special status wildlife species impacted <i>Operations:</i> Disruption of migratory patterns; death or injury to individuals from striking powerlines, mirrors, arrays, poles or being struck by vehicles; increased predation.	<i>Construction:</i> 3,097 acres wildlife habitat lost; 11 special status wildlife species impacted on 23% fewer acres than Proposed Action <i>Operations:</i> Similar to Proposed Action	<i>Construction:</i> 4,366 acres wildlife habitat lost; 11 special status wildlife species impacted on 8% more acres than Proposed Action <i>Operations:</i> Similar to Proposed Action	<i>Construction:</i> 4,330 acres wildlife habitat lost; 11 special status wildlife species impacted on 8% more acres than Proposed Action <i>Operations:</i> Similar to Proposed Action	<i>Construction:</i> 2,242 acres wildlife habitat lost; 11 special status wildlife species impacted on 44% fewer acres than Proposed Action <i>Operations:</i> Similar to Proposed Action	Short term: No impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action

PA4 – The CDCA Plan (1980, as amended) would be amended. (This is CDCA Plan Amendment/ No Project Alternative C, discussed below.)

## **ES.6 Lead Agencies' Roles and Responsibilities**

The BLM's authority for the Proposed Action includes the Federal Land Policy and Management Act (FLPMA) of 1976, Section 211 of the Energy Policy Act, and BLM's Solar Energy Development Policy. The FLPMA authorizes the BLM to issue ROW grants for renewable energy projects. BLM's authority also extends to BLM-administered lands under the jurisdiction of the Palm Springs/South Coast Field Office, which are governed by the California Desert Conservation Area Plan (1980, as amended) (CDCA Plan). Because the CDCA Plan would need to be amended to allow the project to be developed on the proposed site, BLM also would oversee that CDCA Plan amendment process for the project.

The CEC has the exclusive authority to certify the construction, modification and operation of thermal electric power plants in California that generate 50 MW or more. CEC certification is in lieu of any permit required by State, regional or local agencies. The CEC must review power plant Applications for Certification to assess potential environmental impacts and compliance with applicable laws, ordinances, regulations, and standards (LORS). The CEC analysis regarding the project in the SA/DEIS was prepared and approved in accordance with the requirements of CEQA.

## **ES.7 Organizations and Persons Consulted**

In addition to the scoping and SA/DEIS public review processes, the BLM consulted and coordinated with public agencies that have been or may be requested to take action on the PSPP. Consultation and coordination is summarized below.

### **Native American Consultation and Coordination**

The BLM consults with Indian tribes on a government-to-government level in accordance with several authorities including NEPA, Section 106 of the National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), as amended; the American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996), as amended; and Executive Order 13007 (May 24, 1996), concerning Indian Sacred Sites. Adverse effects of the Proposed Action or an alternative could have on cultural resources will be resolved through compliance with the terms of a Programmatic Agreement (PA) reached on September 21, 2010, pursuant to NHPA Section 106 (16 USC Section 470; 36 CFR Section 800.14). See PA/FEIS Section 5.2.2, *Tribal Consultation and Section 106 Compliance*, for additional information.

### **United States Fish and Wildlife Service**

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over threatened and endangered species listed under the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.). Formal consultation with the USFWS under ESA Section 7 is required for any major federal action that

may adversely affect a federally-listed species. Consultation for the Proposed Action was initiated by the Applicant's submittal of a Draft Biological Assessment (BA), dated March 2010, which described the proposed action to the USFWS. Following review of the BA, the USFWS is expected to issue a Biological Opinion (BO) that specifies mitigation measures, which must be implemented for any protected species. Consultation with USFWS for the PSPP is ongoing.

## **ES.8 Public Participation**

Scoping activities were conducted by the BLM in compliance with the requirements of NEPA for the PSPP. Many of these scoping activities were conducted jointly with the CEC. The BLM's scoping activities are described in detail in the Final Scoping Report, which is provided in Appendix C. The scoping report documents the Notice of Intent, the scoping meetings, workshops, and the comments received during scoping.

## **ES.9 Comments and Responses**

The BLM and CEC distributed the joint SA/DEIS for the PSPP for public and agency review between April 7, 2010, and July 1, 2010. Eight comment letters were received. PA/FEIS Appendix K, *Comment Letters*, includes all of the written comments received by the BLM in response to the Notice of Availability. Section 5.5, *Public Comment Process*, provides responses to common and individual comments.

# CHAPTER 1

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## Introduction and Purpose and Need

Palen Solar I<sup>1</sup> (Applicant) is seeking a ROW grant for approximately 5,200 acres to construct, operate, maintain and ultimately to decommission a concentrated solar thermal electric generating facility (the Palen Solar Power Project, or PSPP) on BLM-administered public lands in the southern California inland desert, approximately 0.5 mile north of U.S. Interstate-10 (I-10) approximately 35 miles west of Blythe and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California (Figure 1-1).<sup>2</sup> Construction and operation of the proposed action would disturb approximately 2,970 acres; an additional 137.34 acres would be needed for linear facilities (i.e., the final transmission line, temporary construction power line, telecommunications line, and site access road). Acreage that would not be disturbed would not be part of the ROW grant. The proposed action would be located entirely on BLM-administered land, except for one 40-acre privately-owned parcel.

In March 2010, the United States Bureau of Land Management (BLM) and the California Energy Commission (CEC) issued a joint Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) to analyze environmental impacts of the proposed action and alternatives under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), respectively. On April 7, 2010, the BLM and CEC determined that they would develop and publish separate final documents for compliance with Federal and State law, respectively. The CEC issued a Revised Staff Assessment (RSA) in September 2010 pursuant to CEQA, and the BLM has prepared this Plan Amendment/Final Environmental Impact Statement (PA/FEIS) pursuant to NEPA. Although the BLM and CEC are not publishing a joint final environmental document, the agencies have shared staff expertise, information, and documentation throughout the process to promote intergovernmental coordination.

The SA/DEIS, RSA and December 2010 Commission Decision were the BLM's primary references in preparing this PA/FEIS. The PA/FEIS analyzes 24 alternatives in addition to the project, including three build alternatives (Reconfigured Alternative 1, Reconfigured Alternative 2 and a Reduced Acreage Alternative) and three no-build alternatives (No Action Alternative A, CDCA Plan Amendment/No Project Alternative B and CDCA Plan Amendment/No Project Alternative C). The remaining alternatives were considered but eliminated from further analysis. The proposed action and each of the alternatives are described in Chapter 2, *Proposed Action and Alternatives*.

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<sup>1</sup> Chevron Energy Solutions and Solar Millennium are joint developers of the PSPP. Chevron Energy Solutions applied for the ROW grant for the project. To facilitate the permitting of the PSPP, the developers have requested that the BLM authorize one ROW grant to a project-specific company. The company for the PSPP is Palen Solar I, LLC, a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

<sup>2</sup> All figures referenced in this PA/FEIS are included in Appendix A.

The environmental resources and other considerations that could be affected by the proposed action are described in Chapter 3, *Affected Environment*. The consequences of implementing the proposed action and alternatives on these resources and other considerations are analyzed in Chapter 4, *Environmental Consequences*. The consultation and coordination that has occurred between and among agencies, organizations and individuals, including responses to comments received on the SA/DEIS, are described in Chapter 5, *Consultation, Coordination and Public Involvement*.

Publication in the Federal Register of the EPA’s Notice of Availability (NOA) for this PA/FEIS will initiate a 30-day protest period on the proposed PA and a 30-day public review period on the FEIS. The decision to adopt the PA is a “plan decision”, and is subject to protest under applicable BLM regulations (43 CFR 1610.5-2). Any protest on the proposed PA must be filed with the Director of the BLM. Following resolution of any protests, BLM then may publish a Record of Decision (ROD) with respect to the Plan Amendment and the Project Application. The decision regarding the ROW grant is an “implementation decision” and is appealable to the Interior Board of Land Appeals upon issuance of the ROD pursuant to applicable BLM regulation (43 CFR 2801.10). The publication of the ROD in the Federal Register would be the final step required of the BLM to meet the requirements of NEPA for the PSPP.

## **1.1 Purpose and Need**

The BLM as the lead agency under NEPA, and the Department of Energy (DOE) as a cooperating agency, have independent purposes and needs for the project. Each is provided below.

### **1.1.1 BLM Purpose and Need**

NEPA guidance published by the Council on Environmental Quality (CEQ) states that an environmental impact statement’s Purpose and Need section “shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action” (40 CFR 1502.13). The following discussion sets forth the purpose of and need for the action as required under NEPA.

In accordance with Section 103(c) of the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple use that takes into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electric energy (Section 501(a)(4)). Taking into account the BLM’s multiple use mandate, the purpose and need for the proposed action is to respond to a FLPMA right-of-way application submitted by the applicant to construct, operate, maintain, and decommission a solar thermal energy-generating facility and associated infrastructure on public lands administered by the BLM in compliance with FLPMA, BLM right-of-way regulations, and other applicable Federal laws and policies.

In conjunction with FLPMA, the BLM's applicable authorities include the following:

1. Executive Order 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the production and transmission of energy in a safe and environmentally sound manner.
2. Section 211 of the Energy Policy Act of 2005 (119 Stat. 594, 660) (EPA 05 or EPA 05), which established a goal for the DOI (BLM's parent agency) to approved at least 10,000 megawatts of non-hydropower renewable energy power on public lands by 2015.
3. Secretarial Order 3285A1, Renewable Energy Development by the DOI, dated February 22, 2010. This Secretarial Order establishes the development of renewable energy as a priority for the DOI and creates a Departmental Task Force on Energy and Climate Change. It also announced a policy goal of identifying and prioritizing specific locations (study areas) best suited for large-scale production of solar energy.
4. Instruction Memorandum 2011-59, National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations, dated February 7, 2011. This IM reiterates and clarifies existing BLM NEPA policy to assist offices that are analyzing externally-generated, utility-scale renewable energy ROW applications. It includes examples and guidance applicable to such applications that supplement information in the BLM's NEPA Handbook (H-1790-1) that reflect that utility-scale renewable energy projects are distinct from many other types of land and realty actions due to their size and potential for significant resource conflicts, as well as the priority that has been placed on them by the Department of the Interior (DOI).

The BLM will decide whether to deny the proposed right-of-way, grant the right-of way, or grant the right-of-way with modifications. Modifications may include revising the proposed use or changing the route or location of the proposed facilities (43 CFR 2805.10(a)(1)).

The BLM's action also will include consideration of a concurrent amendment of the California Desert Conservation Area (CDCA) Plan of 1980, as amended. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission that are not identified in the CDCA Plan to be added to it through the land use plan amendment process. CDCA boundaries are shown on Figure 1-1. The project site is within the CDCA, but is not identified in the CDCA Plan for solar power generation. Therefore, if the BLM decides to approve the issuance of a ROW grant, a CDCA Plan amendment also would be required.

## 1.1.2 Department of Energy Purpose and Need

The Applicant has applied to the Department of Energy (DOE) for a loan guarantee under Title XVII of the EPA 05, as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act") for Solar Power Units 1 and 2 of the project. DOE is a cooperating agency on this EIS pursuant to an MOU between DOE and BLM signed in January 2010. The purpose and need for action by DOE is to comply with its mandate under the Act by selecting eligible projects that meet its goals.

The EPAct established a Federal loan guarantee program for eligible energy projects, and was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency, science, assistance to the unemployed, and State and local fiscal stabilization. The Section 1705 Program is designed to address the current economic conditions of the nation, in part, through renewable energy, transmission and leading edge biofuels projects. The purpose and need for the proposed action is to meet the objectives of these laws.

## **1.2 Major Authorizing Laws and Regulations**

The primary agency-specific authorizing laws and regulations are summarized as follows:

### **1.2.1 BLM**

BLM's authority and policy guidance for making a decision related to the proposed action flows from Section 1701 et seq. of FLPMA, Section 211 of the EPAct, the American Recovery and Reinvestment Act of 2009, and BLM's Solar Energy Development Policy of October 7, 2010 (Instruction Memorandum (IM) 2011-003. FLPMA establishes public land policy and guidelines for administration, and provides for the management, protection, development, and enhancement of public lands. Section 501(a)(4) of FLPMA specifically authorizes BLM to issue ROW grants for the generation, transmission, and distribution of electric energy. The EPAct renewed interest in developing utility-scale renewable energy facilities on federal public land: Section 211 of the Act establishes a target of approving 10,000 MW of non-hydropower renewable energy generation on public lands by 2015. The United States Congress also intensified the need for accelerated development of such projects with passage in early 2009 of the American Recovery and Reinvestment Act, which confers economic benefits on renewable energy projects that begin construction before the end of 2010 (the availability of these benefits has been extended through 2011). BLM's Solar Energy Development Policy of 2010 is discussed below, in Section 1.3.1, *Relationship to BLM Policies, Plans and Programs*.

### **1.2.2 California Energy Commission**

The CEC has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 MW or larger. The CEC certification is in lieu of any permit required by State, regional, or local agencies and by Federal agencies to the extent permitted by Federal law (Pub. Res. Code § 25500). The CEC must review and analyze the Applicant's power plant Application for Certification (AFC) in accordance with Public Resources Code section 25500 and following, the implementing regulations set forth in Title 20 of the California Code of Regulations section 1701 and following, and CEQA (Pub. Res. Code § 21000 et seq.; 14 Cal. Code Regs. § 15000 et seq.). The CEC approved the project in December 2010.

### 1.2.3 U.S. Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) has jurisdiction over threatened and endangered species listed under the Endangered Species Act (ESA) (16 U.S.C. Section 1531 et seq.). Formal consultation with the USFWS under Section 7 of the ESA is required for any Federal action that may adversely affect a Federally-listed species. Consultation for the Proposed Action was initiated by the Applicant's submittal of a Draft Biological Assessment (BA), dated March 2010, which described the proposed action to the USFWS. Following review of the BA, the USFWS is expected to issue a Biological Opinion (BO) that specifies reasonable and prudent measures that must be implemented for any protected species that may be affected adversely by the proposed action. The BO will be issued prior to the BLM's issuance of the ROD and compliance with the measures identified by the USFWS in the BO would be required under the ESA and also in the ROD.

### 1.2.4 Tribal Consultation

The BLM consults with Native American tribes in accordance with several authorities, including NEPA, the National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), as amended; the American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996), as amended; Executive Order (E.O.) 13007 (May 24, 1996), concerning Indian Sacred Sites; E.O. 13175 (Nov. 6, 2000), concerning Consultation and Coordination With Indian Tribal Governments; and the Presidential Memorandum of April 29, 1994 (59 FR 22951 (1994)). For this project, in coordination and cooperation with the CEC, BLM expanded its consultation to include Native American groups not recognized by the federal government.

The BLM initiated consultation in the early stages of project planning by certified letter on July 1, 2009. Tribes were invited to a general scoping meeting and project site visit held on January 25, 2010. On February 10, 2010, the BLM Palm Springs Field Office Manager and Archaeologist met with the Fort Yuma Quechan Tribal Council. The BLM provided information on several solar energy projects, including the proposed project, and answered questions. On March 3, 2010, the BLM mailed letters to the below-listed tribes requesting consultation under NHPA Section 106 with tribes, the Energy Commission, the Applicant, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation to develop a Programmatic Agreement (PA) that describes the actions that will be taken by the parties in order to meet their environmental compliance responsibilities for the project.

An initial meeting regarding the PA was held on April 23, 2010 in Palm Desert, to which all interested tribes were invited. They also were notified of a workshop on the PSPP SA/DEIS, held on April 29, 2010, in the BLM Palm Springs Field Office, where, additionally, BLM also held an informational meeting for the tribes on May 25, 2010. The BLM issued a draft PA for the PSPP on June 17, 2010, allowing 30 days for public and Native American comment. Appendix I of the draft PA included a log-to-date of BLM's consultation with specific individuals and groups.

Most recently, BLM held a meeting in Palm Desert on August 11, 2010, to review and discuss the revised draft PA; some Native Americans were in attendance. At this meeting, representatives of two non-federally recognized consulting organizations (California Union for Renewable Energy and La Cuna de Aztlan Sacred Sites Protection Circle) expressed concern over geoglyphs and other sacred sites and ancient trails that solar development in the Chuckwalla Valley and on Palo Verde Mesa could affect. Outside of these communications with the non-federally recognized consulting parties, through formal consultation efforts with Native Americans identified no additional cultural resources beyond those analyzed in the SA/DEIS that could be impacted by the project.

Thirteen tribes or related entities were identified and invited to consult on this project, including:

1. Ramona Band of Mission Indians
2. Torres-Martinez Desert Cahuilla Indians
3. Augustine Band of Cahuilla Mission Indians
4. Agua Caliente Band of Cahuilla Indians THPO
5. Morongo Band of Mission Indians
6. Twentynine Palms Band of Mission Indians
7. Fort Yuma Quechan Indian Tribe
8. Colorado River Indian Tribes
9. Chemehuevi Reservation
10. Colorado River Reservation
11. San Manuel Band of Mission Indians
12. Quechan Indian Tribe
13. Fort Mojave Indian Tribe

Adverse effects that the proposed action could have on cultural resources will be resolved through compliance with the terms of a Programmatic Agreement reached on September 21, 2010, pursuant to NHPA Section 106 (16 USC Section 470; 36 CFR Section 800.14) in consultation with the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, Indian tribes, and other interested parties. Implementation of the terms of the Programmatic Agreement is identified as a recommended mitigation measure (see Section 4.4, *Cultural Resources*, and Appendix B, *Conditions of Certification*).

## 1.2.5 U.S. Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction to protect the aquatic ecosystems, including water quality and wetland resources, under Section 404 of the Clean Water Act (33 U.S.C. 1344). Under this authority, USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands, by reviewing proposed projects to determine whether they may impact such resources and, thereby, be required to obtain a Section 404 permit. Throughout the NEPA process, the BLM has provided information to the USACE to assist the agency in making a determination regarding its jurisdiction and the need for a Section 404 permit. The USACE rendered a final opinion on August 2, 2010 concluding that the proposed action does not affect waters of the U.S. and thus, does not require a Section 404 permit.

## 1.2.6 California Department of Fish and Game

The California Department of Fish and Game (CDFG) protects fish and aquatic habitats within the State through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. In this context, the term “streambed” encompasses all portions of the bed, banks, and channel of any stream, including intermittent and ephemeral streams, extending laterally to the upland edge of riparian vegetation. In the case of vegetated ephemeral dry washes, such as those present on the project site, this CDFG interpretation often results in an asserted geographic jurisdictional area that is much wider than the active channel of the stream and, therefore, much wider than the jurisdiction of the USACE. Fish and Game Code Section 1602(a) states that it is unlawful for an entity to “substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake” without first notifying CDFG of that activity. If CDFG determines that the activity may substantially adversely affect an existing fish or wildlife resource, the entity will need to obtain a Lake or Streambed Alteration Agreement (SAA) from the CDFG before it may commence the activity. CDFG would include in the SAA measures necessary to protect the affected resources (Id.). The BLM, CEC, and the Applicant have provided information to CDFG to assist in its determination of the impacts to streambeds, and identification of permit and mitigation requirements. The Applicant filed a Streambed Alteration Agreement with CDFG for the purposes of altering the terrain and installing channels. This application currently is being reviewed. Compliance with the requirements of the Streambed Alteration Agreement is identified as a recommended mitigation measure (see Section 4.21, *Wildlife Resources*, and Appendix B, *Conditions of Certification*).

CDFG also regulates potential impacts to species that are protected under the California Endangered Species Act (CESA) (Fish and Game Code Section 2050, et seq.). The Applicant filed an application for an incidental take permit and revised desert tortoise technical report (including Fall 2009) in January 2010. Compliance with the requirements of the Incidental Take Permit is identified as a recommended mitigation measure (see Section 4.21, *Wildlife Resources*, and Appendix B, *Conditions of Certification*).

## 1.3 Relationship of Proposed Action to BLM Policies, Plans, and Programs, and LUP Conformance Determination

### 1.3.1 Relationship to BLM Policies, Plans and Programs

The relationship of the PSPP to the BLM’s Solar Energy Development Policy, the BLM’s proposed Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Solar PEIS), Secretarial Order No. 3310 (Dec. 22, 2010), and the Federal Wildland Fire Policy is discussed in this section. Land Use Plan conformance, including the project’s relationship to the CDCA Plan, Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan), and California Desert Renewable Energy Conservation Plan are discussed below.

## **BLM's Solar Energy Development Policy**

The BLM processes solar energy right-of-way applications for lands in accordance with its Solar Energy Development Policy (Instruction Memorandum No. 2011-003) (BLM, 2010). Pursuant to this policy, applications for commercial solar energy facilities are processed as right-of-way authorizations under Title V of FLPMA and its implementing regulations (43 CFR Part 2800); they also must comply with the BLM's environmental and planning requirements. Among other things, BLM's Solar Energy Development Policy provides policy guidance on early coordination with Federal land managers and stakeholders, the term of solar energy right-of-way authorizations, diligent development requirements, bond coverage, Best Management Practices (BMPs), and BLM access to records. Further, the BLM's Solar Energy Development Policy states, "Secretarial Order 3285A1, signed on March 11, 2009, and amended on February 22, 2010, established the development of renewable energy as a priority of the Department of the Interior.... The BLM has identified some 23 million acres of the public lands with utility-scale solar energy potential, and over 200 right-of-way applications have been submitted to the BLM for processing. As the cost of producing solar energy declines in future years, and as additional transmission capacity is developed, there will be an even greater interest in locating utility-scale solar energy projects on the public lands. This policy IM helps ensure environmentally-responsible development of solar projects on public lands and provides for effective processing of the right-of-way applications." The BLM has considered the proposed action within the framework of this policy.

## **BLM's Proposed Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development**

In response to direction from Congress under Section 211 of the Energy Policy Act of 2005, as well as Executive Order 13212, Actions to Expedite Energy-Related Projects, the BLM and the DOE are collaborating to prepare an evaluation pursuant to NEPA and CEQ regulations of the potential impacts of (1) utility-scale solar energy development, (2) the development and implementation of agency-specific programs or guidance to establish environmental policies and mitigation strategies for solar energy projects, and (3) amendment of relevant BLM land use plans with the consideration of establishing a new BLM Solar Energy Program.

A draft of the environmental analysis, known as the Draft Solar Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Draft Solar PEIS) was issued on December 16, 2010. Issuance of the draft initiated a 90-day public comment period, and a 30-day extension was granted. During the comment period, the BLM and DOE will host 14 open meetings, beginning in Washington, D.C. on February 2, 2011, to invite and encourage public input. Meetings also will be held in Palm Springs, Barstow and El Centro, California.

The Draft Solar PEIS considers various alternatives, including a no-action alternative, under which solar energy development would continue on BLM-administered lands in accordance with the terms and conditions of the BLM's existing policies, plans and programs, and two action

alternatives for implementing new BLM Solar Energy Programs. Under the BLM's preferred alternative, the BLM would establish a new Solar Energy Program standardizing and streamlining the authorization process and establishing mandatory design features for solar energy development on BLM-administered lands in six southwestern states. The alternative also would exclude solar energy development from certain BLM-administered lands. For the DOE, the Draft Solar PEIS analyzes a no- action alternative, under which DOE would continue to conduct environmental reviews of DOE-funded solar projects on a case-by-case basis, and one action alternative, under which the agency would develop programmatic guidance to further integrate environmental considerations into its analysis and selection of solar projects that it will support.

Pending a final determination on the Solar PEIS, the BLM continues to process existing solar energy applications, including the Applicant's PSPP application.

### **Secretarial Order No. 3310, Protecting Wilderness Characteristics on Lands Managed by the Bureau of Land Management**

In issuing Secretarial Order No. 3310 on December 22, 2010, the Secretary of the Interior affirmed that the protection of the wilderness characteristics of public lands not only is a high priority for the BLM but also is an integral component of the agency's multiple use mission. In accordance with this policy, all BLM offices protect inventoried wilderness characteristics when they make land use planning and project-level decisions by avoiding the impairment of such characteristics unless the BLM determines that the impairment is appropriate and consistent with other applicable requirements of law and other management considerations. Where the BLM determines that it is appropriate to approve uses that may impair inventoried wilderness characteristics, the BLM must document the reasons for its determination and consider measures to minimize impacts on those wilderness characteristics.

### **Federal Wildland Fire Policy**

The BLM coordinates its fire management activities with the actions of related Federal and State agencies responsible for fire management. The Federal Wildland Fire Policy is a collaborative effort that includes the BLM, USFS, National Park Service (NPS), USFWS, Bureau of Indian Affairs, the National Biological Service, and State wildlife management organizations. The collaborative effort has formulated and standardized the guiding principles and priorities of wildland fire management. The National Fire Plan is a collaborative interagency effort to apply the Federal Wildland Policy to all federal land management agencies and partners in state forestry or lands departments. Operational collaboration between the BLM, USFS, NPS, and USFWS is included in the Interagency Standards for Fire and Fire Aviation Operations 2003. This federally-approved document addresses fire management, wildfire suppression, fuels management and prescribed fire safety, interagency coordination and cooperation, qualifications and training, objectives, performance standards, and fire management program administration. If the PSPP right-of-way grant is authorized and the CDCA Plan amended, any fire management efforts related to the project or the site would occur in the context of the Federal Wildland Fire Policy.

## 1.3.2 Land Use Plan Conformance and Consistency

This section addresses Land Use Plan conformance, including the project's relationship to the CDCA Plan and Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan).

### **California Desert Conservation Area Plan**

The CDCA Plan, which was developed as mandated by FLPMA, is the Resource Management Plan for the project site and the surrounding area. The CDCA Plan is a comprehensive, long-range plan that was adopted in 1980; it since has been amended many times. The CDCA is a 25-million-acre area that contains over 12 million acres of BLM-administered public lands in the California Desert, which includes the Mojave Desert, the Sonoran Desert, and a small part of the Great Basin Desert. Those 12 million acres of BLM-administered lands are approximately half of the total land area in the CDCA. The site proposed for the project includes approximately 5,200 acres of BLM-administered land and 40 acres of privately-owned property in the CDCA. As described by the BLM California State Director in his letter presenting the 1980 CDCA Plan:

The California Desert Plan encompasses a tremendous area and many different resources and uses. The decisions in the Plan are major and important, but they are only general guides to site-specific actions. The job ahead of us now involves three tasks: 1) Site-specific plans, such as grazing allotment management plans or vehicle route designation; 2) On-the-ground actions, such as granting mineral leases, developing water sources for wildlife, building fences for livestock pastures or for protecting petroglyphs; and 3) Keeping people informed of and involved in putting the Plan to work on the ground, and in changing the Plan to meet future needs.

The CDCA Plan provides guidance concerning the management, use, development, and protection of the resources and public lands within the CDCA. It is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The CDCA Plan's goals and actions for each resource are established in its 12 elements, each of which provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern and a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

The project site is classified in the CDCA Plan as Multiple-Use Class (MUC) M (Moderate Use). MUC M is based on a controlled balance between higher-intensity use and protection of public lands. This class provides for a wide variety of uses and also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause. The CDCA Plan allows the development and operation of electrical generation plants within the Moderate Use designation if NEPA requirements are met and a plan amendment is completed.

### ***Need for a CDCA Plan Amendment***

To accommodate the proposed action or any of the build alternatives, the CDCA Plan must be amended because sites associated with power generation or transmission not identified in the Plan

will be considered through the Plan Amendment process. As specified in CDCA Plan Chapter 7, *Plan Amendment Process*, there are three categories of Plan Amendments:

**Category 1**, for proposed changes that will not result in significant environmental impact or analysis through an EIS;

**Category 2**, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and

**Category 3**, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

Based on these criteria, approval of the proposed action would require a Category 3 amendment. This section summarizes the procedures necessary to evaluate the proposed plan amendment, as well as the procedures required to perform the environmental review of the ROW application.

### ***Statement of Plan Amendment***

The Implementation section of the Energy Production and Utility Corridors Element of the CDCA lists a number of Category 3 amendments that have been approved since adoption of the CDCA Plan in 1980. An additional amendment is proposed to be added to this section of the CDCA, and would read “Permission granted to construct the Palen solar energy facility.”

### ***Plan Amendment Process***

The Plan Amendment process is outlined in Chapter 7 of the CDCA Plan. In analyzing an applicant’s request for amending or changing the plan, the BLM District Manager, Desert District, will evaluate each of the considerations listed below. For the proposed action, this analysis is provided in Section 4.8.7, *Land Use Plan Amendment Consistency Analysis*.

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment;
2. Determine if alternative locations within the CDCA are available that would meet the applicant’s needs without requiring a change in the plan’s classification, or an amendment to any plan element;
3. Determine the environmental effects of granting and/or implementing the applicant’s request;
4. Consider the economic and social impacts of granting and/or implementing the applicant’s request;
5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from Federal, State, and local government agencies; and
6. Evaluate the effect of the proposed amendment on BLM management’s desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

### ***Decision Criteria for Evaluation of a Proposed Plan Amendment***

The decision criteria to be used for approval or disapproval of the proposed plan amendment require the BLM Desert District Manager to make following determinations:

1. The proposed plan amendment is in accordance with applicable laws and regulations; and
2. The proposed plan amendment will provide for the immediate and future management, use, development, and protection of the public lands within the CDCA.

The BLM Desert District Manager will base the rationale for these determinations on the principles of multiple use, sustained yield, and maintenance of environmental quality as required by FLPMA.

### ***Decision Criteria for Evaluation of Application***

In addition to defining the required analyses and decision criteria for plan amendments, the CDCA Plan also defines the decision criteria to be used to evaluate future applications in the Energy Production and Utility Corridors Element of Chapter 3. These criteria include:

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
2. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
3. Provide alternative corridors to be considered during processing of applications;
4. Avoid sensitive resources wherever possible;
5. Conform to local plans whenever possible;
6. Consider wilderness values and be consistent with final wilderness recommendations;
7. Complete the delivery systems network;
8. Consider ongoing projects for which decisions have been made; and
9. Consider corridor networks which take into account power needs and alternative fuel resources.

## **Northern and Eastern Colorado Desert Coordinated Management Plan**

The BLM's Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) amended the CDCA Plan in 2002 to make it compatible with desert tortoise conservation and recovery efforts. The NECO Plan is a landscape-scale planning effort that covers most of the California portion of the Sonoran Desert ecosystem, including over five million acres and two desert tortoise recovery units. The proposed action and alternatives are consistent with the NECO plan, and no NECO Plan amendment is proposed as part of this action.

## 1.4 Interagency Coordination

The BLM and CEC have sought comments from, and worked closely with, other regulatory agencies that administer laws, ordinances, regulations and standards that may be applicable to the proposed action. These agencies include the U.S. Environmental Protection Agency, USFWS, USACE, State Water Resources Control Board/Regional Water Quality Control Board, State Historic Preservation Office, CDFG, and the Mojave Desert Air Quality Management District. For example, on December 21, 2009, the CEC sent the PSPP AFC to all local, State, and Federal agencies that could be affected by or have an interest in the proposed action and, on July 12, 2010, the U.S. EPA provided comments on the DEIS. Further, the BLM has notified affected Indian Tribes regarding the proposed action, has sought their comments, and has invited them to consult on the proposed action on a government-to-government basis (see also, Section 1.2.4, *Tribal Consultation*).

## 1.5 Issues Analyzed in this EIS

Preliminary issues to be analyzed were identified during the scoping process for the SA/DEIS (see Section 5.4 and Appendix D, *Results of Scoping*). The issues evaluated include the physical, biological, cultural, socioeconomic, and other resources that have the potential to be affected by activities related to the proposed action and alternatives. The issues are:

**Air Resources:** What direct, indirect and cumulative impacts would the proposed action or alternatives have with respect to ozone, PM<sub>2.5</sub> and other air emissions?

**Climate Change:** What greenhouse gas emissions/climate change impacts would occur related to wildlife, vegetation and habitat? What are the anticipated climate change benefits of solar energy? What effects would the proposed trenching, grading and filling have related to carbon sequestration of the natural desert?

**Cultural Resources:** Has a 100 percent archaeological inventory been conducted pursuant to Section 106 of the National Historic Preservation Act and BLM Manual 8100? Have archaeological sites been evaluated pursuant to the National Register of Historic Places criteria? Has consultation with Native Americans take place?

**Environmental Justice:** Would the proposed action and alternatives disproportionately affect minorities and low-income communities?

**Lands and Realty:** What existing rights-of-way of record would be affected by the proposed action? How would the solar plant site and transmission lines affect Interstate 10 and existing facilities within the rights-of-way?

**Mineral Resources:** What mineral resources are present on the project site? How could such resources be affected?

**Multiple Use Classes:** What multiple use classes would be affected by the proposed action and alternatives? What impacts would be associated with restricting use of the site to a single use for the life of the project?

**Noise:** Will wildlife be considered to be sensitive receptors? What impacts will the dry cooling process noise/vibration impacts have on wildlife?

**Paleontological Resources:** What paleontological resources would be affected by the project? What direct and indirect impacts could result, and what mitigation measures would address them?

**Public Health and Safety:** What fire prevention BMPs will be used to address the proposed use of high temperature liquids? How will bioremediation areas be used for soil contaminated by heat transfer fluid? Will there be concentrated, dewatered solid waste associated with evaporation ponds?

**Recreation:** Will impacts to camping, photography, hiking, wildlife viewing, and rockhounding be considered? Will the evaluation of impacts include the number of users, value of affected land for recreational purposes, and need to locate and acquire replacement venues for lands lost? What indirect impacts could be caused by displacing recreational users?

**Social Economics:** Will economic impacts due to construction, implementation, and operation be evaluated? What economic impacts would be associated with the loss of commerce due to recreational use losses?

**Soils Resources:** What impacts would be caused related to desert soils, increased siltation during flooding and dust, and crypto-biotic crust? How would the preparation of a drainage, erosion, and sediment control plan address such impacts?

**Special Designations:** What activities are proposed to occur within Areas of Critical Environmental Concern, Desert Wildlife Management Areas, Wildlife Habitat Management Areas, the NECO planning area? Is the proposal consistent with applicable regulations and land use plans, including Executive Order 11644, which allows for use of off-road vehicles on public lands?

**Transportation and Public Access:** Will impacts to off-highway vehicle use be considered? What cumulative loss of land available for OHV recreation would result?

**Biological Resources (Vegetation and Wildlife):** Are threatened or endangered species present in the area where the proposed action or alternatives would be developed? Will a formal adaptive management plan be required? Will impacts to all known species, not just special status species, be analyzed? How will habitat be protected and habitat loss and fragmentation minimized? What impacts would be associated with the construction of fences? What impacts could be associated with increased shade in the desert environment? Will seasonal surveys be performed for sensitive plant and animal species? Will ponded water or bioremediation areas that could attract wildlife, particularly migratory waterfowl, be analyzed? Will the acquisition of conservation lands be part of the mitigation strategy? Will fire prevention BMPs be required to address the use of high

temperature liquids? What impacts could occur related to habitat fragmentation and loss of connectivity? What scale will be used for vegetation maps? Will impacts due to non-native invasive species be analyzed? Will an invasive plant management plan be required? Will impacts to dwarf germander, Harwood's milkvetch, jackass clover, and Coachella Valley milkvetch be analyzed? Will impacts to desert tortoise be evaluated, especially impacts to existing movement corridor connection from the Chuckwalla DWMA, impacts associated with translocation, and the portion of that site designated as critical habitat? Will impacts to burrowing owl, desert bighorn sheep, Mojave fringe-toed lizard, mule deer, American badger, Northern harrier, Swainson's hawk, loggerhead shrike, purple martin, migratory birds, and golden eagles be analyzed?

**Visual Resources:** How will the baseline for visual resources be categorized? How will impacts to visually sensitive areas be avoided?

**Water Resources (Surface and Groundwater):** What connection, if any, will there be between groundwater wells that will supply water to serve the project and the lower Colorado River? How would the need to obtain an entitlement to use Colorado River water affect the project? What impacts to jurisdictional waters of the U.S. and California could occur? What are the effects of additional groundwater pumping in conjunction with other groundwater issues? What subsidence potential would be associated with the project's use of groundwater? What impacts could occur to downgradient groundwater, surface water, and wetlands? What effects could be associated with the diversion of water from ephemeral streams? What water would be required for dust control, fire prevention and containment, vegetation management, sanitation, equipment maintenance, construction, and human consumption? What water conservation measures are proposed to reduce water demands? What are the effects of climate change on water supply? What potential effects could project discharges have, if any, on surface and groundwater quality? How will wastewater or other fluids, if any, be disposed of? Will a Clean Water Act Section 404 permit be required? Is any component of project within a 50- or 100-year floodplain? Would any Clean Water Act Section 303(d) impaired waters be affected?

**Wildland Fire Ecology:** Will the possibility of increased risk of wildland fires and its effect on vegetation and wildlife species be evaluated? What environmental effects could result from the proposed fire suppression efforts?

## CHAPTER 2

# Proposed Action and Alternatives

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On March 14 2007, the BLM Palm Springs-South Coast Field Office received an Application from Palen Solar I<sup>1</sup> (Applicant) for Transportation and Utility Systems and Facilities on Federal Lands to construct, operate, maintain and decommission the Palen Solar Power Project (PSPP) on BLM-administered public lands in eastern Riverside County, California (see Figure 1-1).<sup>2</sup> The project would consist of two adjacent, independent power block units (Units) of 250 MW nominal capacity each, for a total nominal capacity of 500 MW. The proposed action includes a right-of-way (ROW) area of approximately 5,200 acres on generally level desert terrain. The portion of the ROW area proposed for disturbance encompasses approximately 4,024 acres, including the power plant site, access roads, and an associated off-site, single-circuit 230 kilovolt (kV) overhead transmission line (gen-tie). The gen-tie would extend south from the project site and across I-10, and would connect the project to the regional power grid at one of the two potential sites identified for Southern California Edison's proposed Red Bluff Substation.

The project site is located in the California inland desert, approximately 0.5 mile north of U.S. Interstate-10 (I-10) approximately 35 miles west of Blythe and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California (Figure 2-1). The site includes one privately-owned 40-acre parcel that is not under BLM's jurisdiction; the remainder of the project facilities would be entirely on Federal land. See Figure 2-2, which shows BLM-administered lands in tan and privately-owned property in gray.

The Applicant is seeking a ROW grant for approximately 5,200 acres of BLM-administered land. The disturbance area for construction and operation of the project, including drainage channels, would be about 2,970 acres; an additional 137.34 acres would be needed for linear facilities (i.e., the final transmission line, temporary construction power line, telecommunications line, and site access road). Acreage that would not be disturbed would not be part of the ROW grant. The BLM has determined that an amendment of the CDCA Plan would be required to grant the requested ROW. Accordingly, although the Applicant has not requested a CDCA Plan amendment directly, the BLM nonetheless will consider such an amendment as part of its deliberations concerning the PSPP.

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<sup>1</sup> Chevron Energy Solutions and Solar Millennium would be joint developers of the PSPP. Chevron Energy Solutions applied for the ROW grant for the PSPP. To facilitate the permitting of the project, the developers have requested that the BLM issue one ROW grant to a project-specific company. The company for PSPP is Palen Solar I, LLC, a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

<sup>2</sup> All figures referenced in this PA/FEIS are included in Appendix A.

The Staff Assessment/Draft Environmental Impact Statement jointly prepared by the California Energy Commission and the BLM analyzed the project as well as Reconfigured Alternative 1 (Figure 2-3) and the Reduced Acreage Alternative (Figure 2-4). In response to potential impacts to biological resources, including the Mojave fringe-toed lizard and the sand transport corridor, the proposed site was reconfigured again to reduce impacts to the MFTL and sand transport corridor as described in Reconfigured Alternative 2 of this FEIS. Reconfigured Alternative 2 includes two possible solar field layouts, only one of which would be constructed if this alternative is approved. The first solar field layout (Option 1) would include the use of 240 acres of private land near the southeast corner of the project site that could be available if an agreement is reached between the Applicant and the landowner (Figure 2-5). In case no agreement is reached, the second solar field layout (Option 2) would call for the development of this alternative to proceed entirely on BLM-administered federal land (Figure 2-6).

## 2.1 Proposed Land Use Plan Amendment Decisions and Alternatives

The management of BLM-administered lands in the California Desert is governed by the CDCA Plan. The CDCA Plan recognizes the potential compatibility of solar generation facilities on public lands and, if the CDCA Plan does not associate a specific site with power generation or transmission, requires consideration of a CDCA Plan amendment to make that site-specific association. The planning criteria for considering an amendment to the CDCA Plan are discussed in CDCA Plan Chapter 4.10, *Land Use and Corridor Analysis*.

The project site is classified as Multiple-Use Class M (Moderate Use) in the CDCA Plan. That classification is intended to conserve desert resources and to mitigate damage to those resources which permitted uses may cause. Public lands classified as Moderate Use are managed to provide a controlled balance between higher-intensity use and protection of public lands. Energy and utility development uses are allowed. Accordingly, no re-classification of the site is being considered. Instead, the BLM is considering whether to amend the CDCA Plan to identify the site as appropriate for the development of a solar power generating facility.

Regardless of whether the project is approved, the BLM could elect to amend the CDCA Plan to associate the site with energy generation or transmission. The range of potential outcomes of the BLM's CDCA Plan amendment process is as follows:

**PA1** – The CDCA Plan would be amended to identify the footprint of the project site as suitable for the proposed type of solar energy development. (This is the proposed land use plan amendment and also the amendment that would occur in connection with any of the “build” alternatives discussed below, i.e., Reconfigured Alternative 1, Reconfigured Alternative 2 or Reduced Acreage Alternative.)

**PA2** – The CDCA Plan would not be amended. (This is No Action Alternative A, discussed below.)

**PA3** – The CDCA Plan would be amended to identify the project site as unsuitable for any type of solar energy development. (This is CDCA Plan Amendment/No Project Alternative B, discussed below.)

**PA4** – The CDCA Plan would be amended to identify the project site as suitable for any type of solar energy development. (This is CDCA Plan Amendment/No Project Alternative C, discussed below.)

## 2.2 Proposed Action

### 2.2.1 Right-of-Way Application Area

The Applicant has filed an application for a ROW to construct, operate, maintain and decommission the project and single circuit 230 kV power overhead transmission line (gen-tie) on the BLM-administered land described below and shown in Figure 2-7:

#### **San Bernardino Base and Meridian**

Township 5 South, Range 17 East: Section 27, N $\frac{1}{2}$ , SE $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ SW $\frac{1}{4}$ ; Section 28; Section 29, NE $\frac{1}{4}$ , S $\frac{1}{2}$ ; and Sections 32, 33 and 34.

Township 6 South, Range 17 East: Section 2; Section 3, N $\frac{1}{2}$ N $\frac{1}{2}$ , SW $\frac{1}{4}$ NW $\frac{1}{4}$ , W $\frac{1}{2}$ SW $\frac{1}{4}$ , E $\frac{1}{2}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ ; Section 4, N $\frac{1}{2}$ ; and Section 5, N $\frac{1}{2}$ N $\frac{1}{2}$ .

The Applicant used the following selection criteria to choose the proposed site:

1. The site must receive insolation of no less than 7.0 kilowatt-hours per square meter per day (kWh/m<sup>2</sup>/day).
2. The site must be large enough (at least 4,000 contiguous acres) and of adequate proportions to include two 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. A suitable site must have no more than a 2 percent grade and should not be located in a flood zone. Competing land uses and land use designations could make the site more difficult to develop.
3. 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 also should not be located within a military base or park.
4. The site should be located within approximately 10 miles of a California Independent System Operator (CAISO)<sup>3</sup> interconnected transmission line with a rating of 230 kV or higher.
5. The site should be in reasonable proximity to existing large, paved roads or freeways.

<sup>3</sup> The CAISO is the non-profit public benefit corporation that operates the majority of California's high-voltage wholesale power grid. It balances the demand for electricity with an equal supply of megawatts, and provides the impartial link between power plants and the utilities that serve more than 30 million consumers. The CAISO offers equal access to the grid for all qualified users and plans strategically for the transmission needs of this vital infrastructure (CAISO, 2011).

6. The land must be available for sale or lease/ROW, at a reasonable cost (e.g., the Applicant excluded high value irrigated agricultural lands from consideration). If private land, the site should not be subdivided among 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 required until a ROW is granted.
7. 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.

## 2.2.2 Major Project Components

The major components and features of the project include:

1. Power Block Unit #1 (east);
2. Power Block Unit #2 (west);
3. Access road, 1,350-feet long, paved, two-way, two-lane with graded shoulders, from existing I-10 Corn Springs Road exit to on-site office;
4. Class II all weather secondary emergency access road to I-10 exiting from the solar field at southern site fence line;
5. Office and parking;
6. Land Treatment Unit (LTU) for bioremediation/land farming of heat transfer fluid (HTF)-contaminated soil;
7. Warehouse/maintenance building and laydown area;
8. Onsite transmission facilities, including central internal switchyard;
9. Dry wash rerouting; and
10. Groundwater wells used for water supply.

The two proposed power blocks are identical in design. Each power block includes the following major components:

1. Steam generation heat exchangers;
2. HTF overflow and expansion vessels;
3. One HTF freeze protection heat exchanger;
4. One auxiliary boiler;
5. One steam turbine-generator (STG);
6. One generator step up transformer (GSU);
7. Air cooled condenser (ACC);
8. One wet cooling tower for ancillary equipment;
9. Water filter system and clarifier system;
10. Combination firewater/clarified water tank;
11. Reverse osmosis (RO) reject water surge tank;
12. Potable water system;

13. Demineralized water system;
14. Demineralized water tank;
15. High pH reverse osmosis (HERO) waste water recovery system;
16. Recovered water surge tank;
17. Evaporation waste stream pond(s);
18. Water and HTF pipelines exiting the power block;
19. One propane storage tank, above ground;
20. Operations and Maintenance buildings; and
21. Transmission and telecommunications lines exiting the power block.

The approximate dimensions of various project components are provided in Table 2-1.

**TABLE 2-1  
GENERAL PROJECT DIMENSIONS**

<b>Component</b>	<b>Approximate Dimension</b>
Total proposed ROW area	5,200 acres
Disturbance area (total area within ROW disturbed by construction and operation)	3,107.34 acres
Facility footprint (total area within disturbance area that is inside security fencing encompassing both units)	3,079 acres
Power Plant Units 1 and 2 (solar field and power block)	1,380 acres each
Each solar field includes a power block	1547 feet x 535 feet General height: 60 feet ACC height: 120 feet (9 acres)
Parking area	40,600 square feet (.93 acres)
Administration building	10,000 square feet (.23 acres)
Laydown area	47.5 acres
warehouse/assembly hall	197 feet x 558 feet x 36 feet (approximately 2.52 acres)
Substation/switchyard	250,000 square feet (5.74 acres)
On-site unpaved access roads	51.2 acres
On-site paved site roads	31,000 feet x 24 feet wide (17.47 acres)
Unpaved secondary emergency access road	24 feet x 180 feet (approximately 0.2 acres)
Off-site paved main access road	1,280 feet x 24 feet (0.71 acres). In addition, there are 8-foot unpaved shoulders on either side of the access road that are not included as part of this figure, but which are included as part of the disturbance calculations for purposes of the environmental analysis.
Gen tie line (on-site)	120 feet x 15,500 feet (approximately 3 miles, or 43 acres)
Gen tie line (off-site) interconnecting at the proposed Red Bluff substation	Approximately 4.5 miles
Gen-tie transmission towers	Heights range from 90 to 145 feet
Bioremediation/land treatment areas	8 acres
Domestic septic system/leach field	22,000 square feet (0.51 acres)

## 2.2.3 Power Plant Civil/Structural Features

The project and each of the action alternatives described in Section 2.4.3, *Alternatives Considered*, would use solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. An HTF is brought to a high temperature (750°F) as it circulates through the receiver tubes. The hot HTF then is piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam then is fed to a traditional steam turbine generator to produce electricity.

### **Solar Collector Assemblies (SCAs)**

The proposed SCAs would be oriented north-south to rotate east-west to track the sun as it moves across the sky throughout the day. The SCAs would collect heat by means of linear troughs of parabolic reflectors, which would focus sunlight onto a straight line of heat collection elements (HCEs) welded along the focus of the parabolic “trough.”

### **Parabolic Trough Collector Loops**

Each of the collector loops would consist of two adjacent rows of SCAs with each row being about 1,300 feet long. The two rows would be connected by a crossover pipe. The heat transfer fluid (HTF) would be heated in the loop and would enter the header, which would return hot HTF from all loops to the power block where the power generating equipment is located.

### **Mirrors**

The parabolic mirrors would be low-iron glass mirrors. Typical life spans of such mirrors are expected to be 30 years or more.

### **Heat Collection Elements (HCEs)**

The HCEs of the two solar plants would be comprised of a steel tube surrounded by an evacuated glass tube insulator. The steel tube would have a coated surface, which would enhance its heat transfer properties with a high absorptivity for direct solar radiation, accompanied by low emissivity. Glass-to-metal seals and metal bellows would be incorporated into the HCE to ensure a vacuum-tight enclosure. The enclosure would protect the coated steel tube and reduce heat losses by acting as an insulator.

### **HTF System**

In addition to the HTF piping in the solar field, each of the four HTF systems would include three elements: 1) the HTF heat exchanger, 2) the HTF expansion vessel and overflow vessel, and 3) the HTF ullage system. Rather than a fired HTF heater, a heat exchanger would be installed to assist in ensuring that temperatures stay above 54°F (12°C) since freezing of the HTF piping system can occur during cooler winter nights or whenever the unit is offline. The proposed HTF heat exchanger is an unfired unit that utilizes steam from the auxiliary boiler as the heating

medium. HTF would be routinely circulated at low flow rates throughout the solar field using hot HTF from the storage vessel as a source. A HTF expansion vessel and overflow vessel would be required to accommodate the volumetric change that would occur when heating the HTF to the operating temperature.

During plant operation, the HTF would degrade into components of high and low boilers (substances with high and low boiling points). The low boilers would be removed from the process through the ullage system. HTF would be removed from the HTF surge tank and flashed, leaving behind high boilers and residual HTF. The flashed vapors would be condensed and collected in the ullage system.

### **Solar Steam Generator System (SSG)**

At both of the Units, the SSG system would transfer the sensible heat from the HTF to the feedwater. The steam generated in the SSG would be piped to a Rankine-cycle reheat steam turbine. Heat exchangers would be included as part of the SSG system to preheat and boil the condensate, superheat the steam, and reheat the steam.

### **Steam Turbine Generator (STG)**

The STG would receive steam from the SSG. The steam would expand through the STG turbine blades to drive the steam turbine, which then would drive the generator, converting mechanical energy to electrical energy. Each of the project's STGs would be a three-stage casing type with high pressure (HP) intermediate pressure (IP), and low pressure (LP) steam sections. The STG would be equipped with the following accessories: steam stop and control valves, gland seal system, lubricating and jacking oil systems, thermal insulation, and control instrumentation.

### **Cooling Systems**

The power plant would include two cooling systems: 1) the air-cooled steam cycle heat rejection system and, 2) the closed cooling water system for ancillary equipment cooling.

The cooling system for heat rejection from the steam cycle would consist of a forced draft air-cooled condenser, or dry cooling system. At each power block, this system would receive exhaust steam from the LP section of the STG and condense it to liquid for return to the SSG.

The auxiliary cooling water systems would use wet cooling towers for cooling plant equipment, including the STG lubrication oil cooler, the STG generator cooler, steam cycle sample coolers, large pumps, etc. The water would be warmed by the various equipment items being cooled and would reject the heat to the cooling tower. This auxiliary cooling system would allow critical equipment such as the generator and HTF pumps to operate at their design ratings during hot summer months when the project's power output would be most valuable. An average of 73,000 gallons of water per day (82 acre feet per year (afy)) would be consumed by the auxiliary cooling water system; the maximum rate of consumption would be 112,000 gallons per day in summer.

## **Water Supply and Use**

The project would be dry-cooled. The proposed action's primary water uses include solar mirror washing, feedwater makeup, fire water supply, onsite domestic use, and cooling water for auxiliary equipment heat rejection.

The average total annual water usage for each of the two Units is estimated to be about 150 acre feet per year (afy) for a total of 300 afy, which corresponds to an average flow rate of about 188 gallons per minute (gpm), based on pumping 24 hours per day, 350 days per year. Usage rates during operations would vary during the year and would be higher in the summer months when the peak maximum flow rate could be as much as about 50 percent higher (about 275 gpm).

Water needs would be met by use of groundwater pumped from 10 wells on the plant site. Water for domestic uses by project employees also would be provided by onsite groundwater treated to potable water standards. It is expected that new water supply wells in the project site would adequately serve the entire project. Multiple wells would provide redundancy and backup water supply in the event of outages or maintenance of one or more of the other wells.

There would be two major covered water tanks: one 1,000,000 gallon Service/Fire Water storage tank and one 340,000 gallon demineralized water storage tank. A much smaller RO reject water tank would also be provided. Several other small water system surge tanks also would be installed in between various steps in the water treatment process. Water storage tanks would be vertical, cylindrical, field-erected steel tanks supported on foundations consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

To facilitate dust and contaminant removal in each of the solar fields, water from the demineralization process would be sprayed on the solar collectors for cleaning. The collectors would be cleaned once or twice per week, determined by the reflectivity monitoring program. This mirror washing operation would be done at night and involves a water truck spraying treated water on the mirrors in a driveby fashion. The Applicant expects that the mirrors would be washed weekly in winter and twice weekly from mid spring through mid fall. Because the mirrors are angled down for washing, water does not accumulate on the mirrors; instead, it would fall from the mirrors to the ground and, due to the small volume, is expected to soak in with no appreciable runoff. Any remaining rinse water from the washing operation would be expected to evaporate on the mirror surface. The treated water production facilities would be sized to accommodate the solar mirror washing demand of about 114 afy.

## **Roads/Site Surface**

There is an existing highway exit near the southwest boundary of the project site. Access would be via a new, 1,350-foot long, 24-foot wide paved access road (with shoulders) starting at the existing Corn Springs Road north of I-10. No improvements to I-10 are anticipated.

Only a small portion of the site would be paved, primarily the site access road, the service roads to the power blocks, and portions of the power blocks (paved parking lot and roads encircling the

STG and SSG areas). The remaining portions of each power block would be gravel surfaced. In total, each power block area would be approximately 18.4 acres each, with approximately six acres of paved area. The solar fields would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic; an approved dust suppression coating would be used on the dirt roadways within and around the solar fields. Roads and parking areas located within the power block areas and adjacent to the administration building and warehouses would be paved with asphalt.

### **Fencing and Security**

The perimeter of the solar fields and support facilities would be secured with a combination of chain link and wind fencing. Fencing would be desert tortoise proof to prevent tortoises from entering onto the action area. Chain link metal fabric security fencing would consist of eight-foot tall fencing with one-foot barbed wire or razor wire on top along the north and south sides of the facilities. Thirty-foot tall wind fencing, comprised of A-frames and wire mesh, would be installed along the east and west sides of each solar field. Controlled access gates would be located at the site entrance. As discussed below, the drainage channels would be outside the fence line but still within the proposed ROW.

### **Drainage and Earthwork**

The existing topographic conditions of the site show an average slope of approximately one foot in 75 feet (1.33%) toward the northeast. The Applicant filed a Streambed Alteration Agreement on November 25, 2009, for the purposes of altering the terrain and installing channels. Authorization was received pursuant to the California Energy Commission's approval of the Application for Certification (Pub. Res. Code § 25500).

### **Lighting System**

The proposed lighting system would provide operations and maintenance personnel with illumination in normal and emergency conditions. AC lighting would be the primary form of illumination, but DC lighting would be included for activities or emergency egress required during an outage of the plant's AC system.

### **Fuel Supply and Use**

The auxiliary boiler would be fueled by propane. Propane would be delivered to the project site via truck from a local distributor and stored in 18,000-gallon above ground tanks (one in each power block). The estimated propane usage per unit for normal operations is 8 million British thermal units per hour (MBtu/hr) overnight and 34 MBtu/hr for one half-hour during startup each morning. The boiler will run at 100% load overnight when supplemental HTF freeze protection is needed, which is estimated at 100 hours per year.

## **Fire Protection**

Fire protection systems would be provided to limit personnel injury, property loss, and project downtime resulting from a fire. The systems would include a fire protection water system, foam generators, carbon dioxide fire protection systems, and portable fire extinguishers. The project would be within the jurisdiction of the Riverside County Fire Department.

Firewater would be supplied from the one million-gallon clarified water storage tanks located at each of the two power blocks on the site. One electric and one diesel fueled backup firewater pump, each with a capacity of 5,000 gallons per minute (gpm), would deliver water to the fire protection piping network.

The piping network would be configured in a loop so that a piping failure could be quickly isolated with shutoff valves without interrupting water supply to other areas in the loop. Fire hydrants would be placed at intervals throughout the project site that would be supplied with water from the supply loop. The water supply loop also would supply firewater to a sprinkler deluge system at each unit transformer, HTF expansion tank and circulating pump area, and sprinkler systems at the steam turbine generator and in the administration building. Fire protection for each solar field would be provided by zoned isolation of the HTF lines in the event of a rupture that results in a fire.

## **Waste Generation and Management**

Project wastes would be comprised of non-hazardous wastes including solids and liquids and lesser amounts of hazardous wastes and universal wastes. The non-hazardous solid waste primarily would consist of construction and office wastes, as well as liquid and solid wastes from the water treatment system. The non-hazardous solid wastes would be trucked to the nearest Class II or III landfill. Non-hazardous liquid wastes would consist primarily of domestic sewage and waste water streams such as: RO system reject water boiler blowdown, and auxiliary cooling tower blowdown. A septic tank and leach field system would be installed to manage domestic sewage. All other waste streams will be either recycled or sent to the evaporation pond(s).

## **Wastewater**

The project would produce four primary wastewater streams:

1. Non-reusable sanitary wastewater produced from administrative centers and operator stations;
2. Non-reusable cooling tower blowdown;
3. Partially recyclable boiler blowdown (to be used as cooling tower makeup); and
4. Reusable RO and demineralized reject water that would be sent to a High pH Reverse Osmosis (HERO) type system, or concentrated to minimize waste streams to the evaporation ponds.

Sanitary wastewater production is based on domestic water use. Maximum domestic water use is expected to be less than 166,000 gallons per month (5,500 gallons per day, or 6.2 ac-ft/yr). It is

anticipated that the wastewater would be consistent with domestic sanitary wastewater and would have biochemical oxygen demand and total suspended solids in the range of 150 to 250 mg/L.

### ***Wastewater Treatment***

Sanitary wastes would be collected for treatment in septic tanks and disposed via leach fields located at the two power blocks as well as at the administration and warehouse areas. Smaller septic systems would be provided for the control room buildings to receive sanitary wastes at those locations. Based on the current estimate of 5,500 gallons of sanitary wastewater production per day for the entire site, a total leach field area of approximately 11,000 square feet would be required spread out among three or more locations.

The three plant waste water streams - cooling tower blowdown, boiler blow down, and RO/ demineralized water rejects - would be recycled as much as possible to the high pH reverse osmosis (HERO) system for recovery. The HERO system will recover 70% or more (depending on water quality) of this waste stream and would significantly limit the size of the required evaporation pond. Some waste water sources such as cooling tower blowdown or boiler blowdown in certain cases may not be recoverable in the HERO system and would be sent directly to the evaporation pond.

The waste water treatment system would require two 4-acre evaporation ponds per power block. Two ponds were selected for reliability. The plant would operate on one pond for approximately 24 months, and then switch to the second pond. Approximately 18 months would be required for one pond to evaporate and be ready for use again. If a pond requires maintenance or solids removal, the plant still could operate with the other pond. The evaporation ponds would be double-lined and covered with narrow-mesh netting to prevent access by ravens and migratory birds in accordance with applicable regulations.

### ***Non-Hazardous Solid Waste***

Non-hazardous solid wastes could be generated by construction, operation and maintenance of the project that are typical of power generation facilities. Such wastes may include scrap metal, plastic, insulation material, glass, paper, empty containers, and other solid wastes. Disposal of these wastes would be accomplished by contracted solid refuse collection and recycling services.

### ***Hazardous Solid and Liquid Waste***

Limited hazardous wastes would be generated during construction and operation. During construction, these wastes may include substances such as paint and paint-related wastes (e.g., primer, paint thinner, and other solvents), equipment cleaning wastes and spent batteries. During project operation, these wastes may include used oils, hydraulic fluids, greases, filters, spent cleaning solutions, spent batteries, and spent activated carbon. Both construction and operation-phase hazardous waste would be recycled and reused to the maximum extent possible. All wastes that cannot be recycled and any waste remaining after recycling would be disposed of in accordance with all applicable laws, ordinances, regulations and standards (LORS) (see Appendix C).

### ***Hazardous Materials Management***

A variety of hazardous materials would be used and stored during construction and operation of the project. Hazardous materials that would be used during construction include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. All hazardous materials used during construction and operation would be stored onsite in storage tanks/vessels/containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities would include the needed secondary containment in case of tank/vessel failure. Above-ground carbon steel tanks (300 gallons) also would be used to store diesel fuel at each power block. Secondary containment would be provided for these tanks.

### **On-Site Land Treatment Unit**

The Project site would include a land treatment unit (LTU) to treat soil that could be impacted by minor leaks or spills of heat transfer fluid (HTF) during daily operation and maintenance activities. The LTU would include a two-foot-thick clay layer on the floor (underlain by three feet of native soil compacted to 95 percent relative compaction) that would serve as a protective barrier to the downward movement of contaminants. The LTU also would be surrounded on all sides by minimum 2-foot high berms that would protect the facility from surface water inflow from up to a 100-year flood event. At ambient temperatures, the HTF is highly viscous and virtually insoluble in water. Accordingly, the HTF is not likely to mobilize from the soil downwards to the water table, which is approximately 180 feet or more beneath the surface at the Project site. Each LTU would be designed in accordance with Colorado River Basin Regional Water Quality Control Board (RWQCB) requirements and is expected to comprise an area of about four acres per solar plant, or eight acres total.

The bioremediation facility would utilize indigenous bacteria to metabolize hydrocarbons contained in non-hazardous HTF contaminated soil. A combination of nutrients, water, and aeration facilitates the bacterial activity where microbes restore contaminated soil within two to four months. The California Department of Toxic Substances Control (DTSC) has determined for a similar thermal solar power plant that soil contaminated with up to 10,000 mg/kg of HTF is classified as a non-hazardous waste. However, the DTSC has further indicated that site-specific data would be required to provide a classification of the waste. Soil contaminated with HTF levels of between 100 and 1,000 mg/kg would be land farmed at the LTU, meaning that the soil would be aerated but no nutrients would be added.

## **2.2.4 Construction**

Project construction is expected to occur over a total of 39 months. Project construction would require an average of 566 employees over the entire 39-month construction period, with manpower requirements peaking at approximately 1,140 workers in Month 17 of construction. The construction workforce would consist of a range of laborers, craftsmen, supervisory personnel, support personnel, and management personnel.

If approved, project construction could begin in 2011, with commercial operation commencing as early as 2013.

Temporary construction parking areas would be provided within the project site adjacent to the laydown area. The solar power plant laydown area would be utilized throughout the build out of the two solar units. The construction sequence for power plant construction includes the following general steps:

### **Site Preparation**

This would include detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Grading for the solar field, power blocks, and drainage channels would be completed during the first 24 months of the construction schedule.

### **Linear Facilities**

Linear facilities would include the site access road, temporary construction power line and final transmission line. The site access road and temporary construction power line would be constructed during the first six months of the construction schedule in conjunction with plant site preparation activities. The transmission and telecommunications lines would be constructed during the first 18 months of the construction schedule.

### **Foundations**

Foundation work would include excavations for large equipment (ACC, STG, SSG, GSU, etc.), footings for the solar field, and ancillary foundations in the power block.

### **Major Equipment Installation**

Once the foundations are complete, the larger equipment would be installed. The solar field components would be assembled in an onsite erection facility and installed on their foundations.

### **Drainage and Earthwork**

Solar fields have fairly stringent grading requirements as parabolic troughs must be almost level along their troughs, and grades perpendicular to the troughs are generally benched to 2 percent or less. The existing topographic conditions of the proposed site show an average slope of approximately one foot in 75 feet (1.33 percent) toward the northeast.

The applicant filed a Streambed Alteration Agreement on November 25, 2009, for the purposes of altering the terrain and installing channels. This application is currently being reviewed by the California Department of Fish and Game.

### **Construction Water**

Construction water requirements cover all construction-related activities including:

1. Dust control for areas experiencing construction work as well as mobilization and demobilization,
2. Dust control for roadways,

3. Water for grading activities associated with both cut and fill work,
4. Water for soil compaction in the utility and infrastructure trenches,
5. Water for soil compaction of the site grading activities,
6. Water for stockpile sites,
7. Water for the various building pads,
8. Water for concrete pours on site,
9. Concrete batch plant operations,
10. Water for vehicle washing, and
11. Domestic potable water use.

The predominant use of water would be for grading activities. Average water use at the site is estimated to be about 1,619,899 gallons (about 4.97 acre-feet) per calendar day. Total water use for the 39-month construction period is estimated to be about 5,750 acre-feet. Construction water would be sourced from onsite wells. Potable water during construction would be brought onsite in trucks and held in day tanks.

### **Concrete Batch Plant**

With the estimated concrete volume of approximately 125,000 cubic yards per solar plant, an onsite batch would provide concrete for the solar fields and power block foundations and pads. The batch plant would have a production capacity of 150 cubic yards per hour and operate 10 hours per day, five days a week. Night operation of the batch plant likely would be required to overcome the difficulty of performing concrete placement in extremely high ambient temperatures. It would consist of a series of storage bins and piles, conveyors, mixers, ice storage and chipper, and would include a 75 kW power supply (with diesel generator if needed) and provision for dust control. Concrete would be transported from the batch plant to the placement area via a fleet of eight concrete trucks. The batch plant would be movable and would be deployed to the current area of work at the power blocks or main warehouse area.

### **Fuel Depot**

A fuel depot would be constructed to refuel, maintain, and wash construction vehicles, and would occupy an area of approximately 75 feet x 150 feet. It would consist of a fuel farm with two 2000-gallon on-road vehicle diesel tanks, two 8,000-gallon off-road vehicle diesel tanks, two 250-gallon gasoline tanks, and one wash water holding tank. The fuel farm would include secondary spill containment, a covered maintenance area also with secondary containment, and a concrete pad for washing vehicles.

### **Construction Power**

Construction power would be provided to the site by Southern California Edison. Two alternative sources of construction power are being investigated. Both sources feed from the 12.47 kV distribution system in Desert Center on Rice Road. The first alternative would be a new 12.47 kV

line built within the 161 kV ROW from Rice Road to the project site. The second alternative would be a new 12.47 kV line built within the surveyed 230 kV transmission line ROW from Rice Road to the project site. This line would be built as a combination of new 12.47 kV line or hung on the new 230 kV transmission line towers that connects the single circuit 230 kV line to the project site. The project would include construction of a 12.47 kV internal distribution system and step down transformers to provide power as needed to construction operations.

## **Construction Wastewater**

Sanitary wastes produced during construction would be held in chemical toilets and transported offsite for disposal by a commercial chemical toilet service. Any other hazardous wastewater produced during construction, such as equipment rinse water, would be collected by the construction contractor in Baker tanks and transported off site for disposal in a manner consistent with applicable regulatory requirements.

## **2.2.5 Operation and Maintenance**

While electrical power is to be generated only during daylight hours, the project would be staffed 24 hours a day, seven days per week. A total estimated workforce of 134 full time employees would be needed with both units operating.

### **Distributed Control System (DCS)**

At each solar field, a DCS containing several automation units controls the HTF and steam loops and all auxiliary plant systems, and determines the appropriate operating sequences for them. It would also monitor and record the primary operating parameters and functions as the primary interface for system control. The DCS would communicate with all subsystem controls, including electrical system equipment, steam cycle controllers, variable frequency drives and balance-of-plant system controllers via serial data communication. It would receive analog and digital inputs/outputs from all instruments and equipment not served directly by dedicated local controllers. The DCS would control both the steam and HTF cycles directly, operating rotating equipment via relevant electrical panels. It would include a graphical user interface at an operator console in the main control room.

Day-to-day, the following operation modes would occur in the HTF system: warm up, solar field mode (heat transfer from solar field to power block), shutdown, and freeze protection.

#### ***Warm up***

Usually in the morning, the warm up mode would bring the HTF flow rate and temperatures up to their steady-state operating conditions. It would do this by positioning all required valves, starting the required number of HTF main pumps for establishing a minimum flow within the solar field and tracking the solar field collectors into the sun.

At the beginning of warm up at each of the four units, HTF would be circulated through a bypass around the power block heat exchangers until the outlet temperature reaches the residual steam

temperature in the heat exchangers. HTF then would be circulated through the heat exchangers and the bypass closed. As the HTF temperature at the solar field outlet would continue to rise, steam pressure would build up in the heat exchangers until the minimum turbine inlet conditions are reached, upon which the turbine could be started and run up to speed. The turbine would be synchronized and loaded according to the design specification until its power output matches the full steady state solar field thermal output.

### ***Solar Field Control Mode***

The DCS would enter solar field control mode automatically after completing the warm-up mode. It would regulate the flow by controlling the HTF main pump speeds to maintain the design solar field outlet temperature.

HTF pumps would generally be operated in parallel, at the speed required to provide the required flow in the field. If the thermal output of the solar field is higher than the design capacity of the steam generation system, collectors within the solar field would be de-focused to maintain design operating temperatures.

### ***Shutdown***

If the minimal thermal input to the turbine required by the project's operating strategy cannot be met under the prevalent weather conditions, then shutdown would be indicated. Operators would track all solar collectors into the stow position, reduce the number of HTF main pumps to a minimum, and stop the HTF flow to the power block heat exchangers.

### ***Freeze Protection***

At each unit, a freeze protection system would be used to prevent freezing of the HTF piping systems when the solar plant is shut down. Since the HTF freezes at a relatively high temperature (54°F or 12°C), HTF would be routinely circulated at low flow rates throughout the solar field using hot HTF from the storage vessel as a source. This circulation of the warm HTF overnight would typically provide adequate freeze protection. During the coldest winter nights, however, when circulation alone would be insufficient to provide adequate freeze protection, then the auxiliary boiler, which would typically run at 25% capacity overnight to provide steam for the STG steam seals, would instead be utilized at 100% capacity to provide steam to an HTF heat exchanger to further heat the HTF.

### **Solar Mirror Washing Water**

At each solar field, to facilitate dust and contaminant removal, water from the demineralization (Reverse Osmosis) process would be sprayed on the solar collectors for cleaning. The collectors would be cleaned once or twice per week, determined by the reflectivity monitoring program. This mirror washing operation would be done at night and involve a water truck spraying treated water on the mirrors in a drive-by fashion. The applicant expects that the mirrors would be washed weekly in winter and twice weekly from mid-spring through mid-fall. Because the mirrors would be angled down for washing, water would not accumulate on the mirrors; instead,

it would fall from the mirrors to the ground and, due to the small volume, is expected to soak in with no appreciable runoff. Any remaining rinse water from the washing operation would be expected to evaporate on the mirror surface. The treated water production facilities would be sized to accommodate the solar mirror washing demand of about 114 ac-ft/yr.

### **HTF Leak Detection**

Leak detection of HTF would be accomplished in various ways. Daily visual inspection throughout the solar field would detect leaks occurring at ball joints or other connections. Additionally, the configuration of the looped system would allow different sections of the loops to be isolated. Isolation valves would be installed such that each HTF loop section could be contained in the unlikely event of a major rupture in the HTF piping. Large leaks would be detected using remote pressure sensing equipment and remotely actuated valves to allow for isolation of large sections of the large-bore header piping in the solar field.

## **2.2.6 Closure, Decommissioning and Restoration**

The planned operational life of the project is 30 years, but the facility conceivably could operate for a longer or shorter period depending on economic or other circumstances. If the project remains economically viable, it could operate for more than 30 years. However, if the facility were to become economically non-viable before 30 years of operation, permanent closure could occur sooner. In any case, a Decommissioning Plan would be prepared and put into effect when permanent closure occurs.

### **Temporary Closure**

If a temporary closure occurs, security would be maintained 24 hours per day at the project site and the BLM and other responsible agencies would be notified. Temporary closure activities would differ depending on whether or not a release of hazardous materials is involved.

If there is no actual or threatened release of hazardous materials, a contingency plan would be implemented for the temporary halting of facility operations. The contingency plan would be developed before operations and its purpose is to ensure compliance with all applicable LORS and appropriate protection of public health, safety, and the environment. Depending on the expected duration of the temporary shutdown, the contingency procedures implemented could include draining and properly disposing of chemicals from storage tanks and other facility equipment, safe shutdown of all facility equipment, and other measures as needed to ensure protection of onsite workers, the public, and the environment.

If the temporary closure were to involve an actual or threatened release of hazardous materials, the procedures followed would be those provided in the Hazardous Materials Business Plan that would be developed for the proposed action. Procedures would include, at a minimum:

1. Measures to control the release of hazardous materials;
2. Notifications required to the appropriate agencies and the public;

3. Emergency response procedures; and
4. Training requirements for project personnel in hazardous materials release response and control.

When all issues related to the hazardous materials release have been resolved, temporary closure would proceed as described above for temporary closure without a hazardous materials release.

## **Permanent Closure**

The procedures provided in the Decommissioning Plan would be developed to ensure compliance with applicable LORS, and to ensure public health and safety and protection of the environment. The Decommissioning Plan would be submitted to the CEC and BLM for review and approval prior to a planned closure.

Security for the project would be maintained on a 24-hour basis during permanent closure. In general, the Decommissioning Plan would address: decommissioning measures for the project and all associated facilities; activities necessary for site restoration/revegetation if removal of all equipment and facilities is needed; recycling of facility components, collection and disposal of hazardous and non-hazardous wastes, resale of unused chemicals to other parties; decommissioning alternatives other than full site restoration; costs associated with the planned decommissioning activities and where funding would come from for these activities; and conformance with applicable LORS (Solar Millennium 2009a, p. 3-2).

It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to those described above for construction of the project. Also, it is assumed the closure and decommissioning workforce would be drawn from the same regional and local area as the construction and operations workforce.

Upon closure, the owner of the project would implement a final Decommissioning and Reclamation Plan. The Decommissioning and Reclamation Plan would include a cost estimate for implementing the proposed decommissioning and reclamation activities subject to review and revisions from the CPM in consultation with BLM, USFWS and CDFG.

## **Reclamation Plan**

The BLM is developing a plan related to reclamation requirements associated with solar development that is expected to be in place before the project is decommissioned. The project would be subject to all reclamation requirements in place at the time of decommissioning, including the reclamation requirements now under development should they be approved. Moreover, if approved, the ROW grant would require a "Performance and Reclamation" bond to ensure compliance with the terms and conditions of the ROW grant, consistent with the requirements of 43 CFR 2805.12(g). The Performance and Reclamation bond would consist of three components: environmental liabilities, including hazardous materials; decommissioning, removal, and proper disposal of improvements and facilities; and reclamation, revegetation, restoration and soil stabilization.

## 2.3 Connected Actions

Under NEPA, “connected actions” should be evaluated in the same EIS as the proposed action. The relocation of the existing power line is included within the analysis for the proposed action. The Red Bluff Substation Project analysis is incorporated by reference: see Appendix E for a summary of the relevant analysis and identification of another available document that covers similar issues, effects and resources considered in this PA/FEIS. Actions are “connected” if they automatically trigger other actions that may require EISs [40 CFR 1508.25(a)(1)]. For the project, the two actions described below are connected actions and are part of each of the action (build / project) alternatives described in Section 2.4.3, *Alternatives Considered*.

### 2.3.1 Relocation of Existing Power Line

An existing Southern California Edison 161-kV Eagle Mountain-Blythe power line runs in a northwesterly direction across the southwest portion of the project site. The Applicant is working with Southern California Edison to relocate the line within its existing Eagle Mountain 161 kV transmission line ROW (see, e.g., Figure 2-2).

### 2.3.2 Construction, Operation and Maintenance of the Red Bluff Substation Project

The proposed Red Bluff Substation would be constructed east of Desert Center, in eastern Riverside County. It would provide interconnections between the proposed action or alternatives and other renewable projects in the Desert Center area, and allow the associated electricity to be carried by the Devers-Palo Verde No. 1 (DPV1) 500 kV transmission line (see, e.g., Figure 2-2). There are two alternative Red Bluff Substation locations: the east location and the west location. Although the ultimate location of the Red Bluff Substation has yet to be selected as between the two likely sites, the substation is expected to be located north of and adjacent to the Devers-Palo Verde #1 transmission line within an existing CDCA utility corridor (see, e.g., Figure 2-2). The substation location will be finalized in conjunction with Southern California Edison as part of the Desert Sunlight project.

Direct, indirect and cumulative impacts of the construction, operation and maintenance the Red Bluff Substation Project are analyzed in the BLM’s *Desert Sunlight Solar Farm Project California Desert Conservation Area Plan Amendment and Final Environmental Impact Statement* (April 2011) (Desert Sunlight EIS).<sup>4</sup> Sections of the Desert Sunlight EIS relevant to the Red Bluff Substation Project are summarized where appropriate in this PA/FEIS. The Red Bluff Substation Project (including the Red Bluff Substation, transmission lines to connect the substation to DPV1, gen-ties, distribution line for substation light and power, telecommunications service, access road and other components) is described in Chapter 2 of the Desert Sunlight EIS beginning on page 2-24.

<sup>4</sup> The Desert Sunlight EIS is available for inspection by potentially interested parties on the BLM’s website: [http://www.blm.gov/ca/st/en/fo/palmsprings/Solar\\_Projects/Desert\\_Sunlight.html](http://www.blm.gov/ca/st/en/fo/palmsprings/Solar_Projects/Desert_Sunlight.html).

Electricity produced by the project would be distributed from a central, internal switchyard via a new, single-circuit 230-kV generation tie (gen-tie) line. The proposed gen-tie line would exit the northwest corner of the project site and extend approximately 7.5 miles west and south through BLM lands and across I-10, to the planned 230/500 kV Red Bluff Substation. The substation would occupy approximately 90 acres. Associated features would include an access road, transmission lines, modification of some existing DPV1 structures near the substation, an electric distribution line for substation light and power, telecommunication facilities, and drainage facilities. Surface stormwater would be redirected around the substation, which would add an additional 20 to 30 acres of land disturbance. In addition, the site would be bounded on three sides by 8-foot tall berms. The BLM is treating the proposed Red Bluff Substation and associated facilities as connected actions for the project even though they are being built to facilitate interconnection of several projects because, regardless of whether the Desert Sunlight Solar Farm project proceeds, interconnection would be necessary for the project. Accordingly, the BLM has approached the identification of connected actions conservatively, by identifying these actions as potential connected actions and thereby ensuring comprehensive analysis.

## **2.4 Alternatives**

### **2.4.1 Alternatives Considered**

Twenty-four alternatives to the proposed action were developed and evaluated in the SA/DEIS. Several scoping comments requested that the project be reconfigured or reduced in size to avoid the northeastern region where impacts to sand dunes and the Mojave fringe-toed lizard would be greater and to avoid the desert washes associated with desert tortoise connectivity. Such comments suggested including the disturbed lands in the vicinity of the site in the project footprint to make up for any loss in acreage. The SA/DEIS analyzed the proposed action, Reconfigured Alternative 1, and the Reduced Acreage Alternative. In its analysis, the BLM determined that the proposed action and the Reconfigured Alternative 1 would have had substantial impacts to biological resources, particularly to the Mojave fringe-toed lizard and the sand transport corridor.

Accordingly, after the issuance of the DEIS and based on its analysis, the Applicant developed and submitted for the BLM's consideration another site configuration alternative in June 2010. The new alternative is analyzed in this FEIS as Reconfigured Alternative 2. Reconfigured Alternative 2 is a practical, feasible 500-MW reconfiguration that could reduce or eliminate significant impacts to sand dunes and the Mojave fringe-toed lizard. As described below, this new alternative is within the spectrum of alternatives analyzed in the DEIS and includes two possible layouts referred to in the FEIS as Option 1 and Option 2. Each layout is described below. A key difference between Option 1 and Option 2 is that Option 1 would include the use of 240 acres of private land near the southeast corner of the proposed site; by contrast, Option 2 would not the use of this privately-owned property and instead would rely (like the proposed action) primarily on BLM-administered lands.

Of the 24 alternatives, the BLM determined that three were reasonable under NEPA: Reconfigured Alternative 1, Reconfigured Alternative 2, and the Reduced Acreage Alternative. Three “no project” alternatives also were evaluated, including: No Action Alternative A, CDCA Plan Amendment/No Project Alternative B and CDCA Plan Amendment/No Project Alternative C.

The remaining alternatives were considered but eliminated from detailed analysis (see Section 2.4.3). Table ES-1 provides a summary of impacts by alternative. Of the various alternatives considered, Reconfigured Alternative 2 was selected as the Agency’s Preferred Alternative.

## Reconfigured Alternative 1

Reconfigured Alternative 1 was analyzed in the SA/FEIS. Reconfigured Alternative 1 would be a 500 MW solar facility, like the project, but would reconfigure the proposed solar Units 1 and 2 by changing their shapes, as illustrated in Figure 2-3. Unit 1 (the eastern solar field) would be a 250 MW solar generating facility on about 1,490 acres and reconfigured relative to the proposed action to avoid use of the northern third of the proposed field. It would result in the separation of Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured Unit 1 would be outside of the Applicant’s ROW application area, but would remain entirely on BLM-administered lands. Reconfigured Alternative 1 would require the Applicant to submit a revised application to include the requisite acreage for Unit 1. Unit 2 (the western solar field) would be a 250 MW solar generating facility, on approximately 1,450 acres of land in the same approximate location as for the proposed action. However, it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site.

Reconfigured Alternative 1 differs from the proposed action in that the reconfiguration of Units 1 and 2 would use approximately 180 acres more land than the proposed action’s Units 1 and 2, which were located on 1,380 acres each. Reconfigured Alternative 1 also would modify the power block, water treatment system, water storage tanks, and the administration, control, warehouse, maintenance, and lab buildings relative to the proposed action.

Similar to proposed action, Reconfigured Alternative 1 would transmit power to the grid through the Red Bluff Substation. It would require the same infrastructure as the proposed action, including on-site wells, transmission line, road access, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line, road access, and gas pipeline would remain approximately the same length as for the proposed action. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations.

A comparison among alternatives and impacts is provided in Table ES-1, *Summary of Impacts by Alternative*. Briefly, in comparison to the proposed action, Reconfigured Alternative 1:

1. Retains the 500 MW generation capacity defined for the proposed action and the Applicant has determined that the engineering is feasible;
2. Reduces impacts to the primary and secondary desert washes that cross the proposed site;

3. Reduces impacts to the sand dune habitat and the Mojave fringe-toed lizard in the northeastern portion of the site; and
4. Causes comparable impacts related to visual resources, cultural resources and land use because Reconfigured Alternative 1 would be within the same ROW as the proposed action.

## **Reconfigured Alternative 2**

Reconfigured Alternative 2 was defined in June 2010 after it was determined in the SA/DEIS that the reconfigured alternative analyzed in the SA/DEIS (i.e., Reconfigured Alternative 1) would cause substantial impacts to biological resources including Mojave fringe-toed lizard, sand dune habitat and the sand transport corridor. The new alternative is qualitatively within the spectrum of alternatives that were discussed in the DEIS.

Like the proposed action and Reconfigured Alternative 1, this alternative would have a nominal output of 500 MW and consist of two independent 250 MW power plants (Units 1 and 2). The components of Reconfigured Alternative 2 would be the same as the proposed action. The size of the power block equipment and warehouse and the functional use of the space for each also would be the same. Like the proposed action, Reconfigured Alternative 2 would include a warehouse/ laydown yard, an administrative office area, and a parking lot. A single circuit 230 kV transmission line originating at each power block would terminate at the Central Switchyard located in the same area as with the proposed action. A single circuit 230 kV gen-tie line would connect from the Central Switchyard to Southern California Edison's proposed Red Bluff Substation. The 230 kV gen-tie line would remain in the same location, as would the administrative office area and site access. As with the proposed action, the existing Southern California Edison 161-kV Eagle Mountain-Blythe power line which runs in a northwesterly direction across the southwest portion of the proposed site, would require relocation.

Reconfigured Alternative 2 includes two possible solar field layout options (Option 1 and Option 2). Under either layout, the same design of Unit 2 would be used as for the proposed action. Unit 2 would consist of 288 solar loops and one 250 MW power block in the same location as with the project as proposed. Unit 1 would change as described below. In addition to the modifications to Unit 1, Reconfigured Alternative 2 would differ from the proposed action in two respects, regardless of which solar field is developed. First, the power block equipment associated with Unit 1 would be shifted south by approximately 2,700 feet (0.5 miles). Second, the location of the warehouse/laydown yard would be shifted west by about 3,000 feet.

### ***Option 1***

Under Option 1, Unit 1 (the eastern solar field) would be reconfigured into a triangular shape trending southeast to avoid use of the northeastern third of the proposed field. This reconfigured eastern solar field would be located partially on public land managed by BLM, on a 40 acre private parcel on which the Applicant has a purchase option, and on two privately owned parcels not currently controlled by Applicant, which total 200 acres, for a total of 240 acres of private lands. The site plan for Reconfigured Alternative 2 Option 1 assumes that the Applicant can acquire the 240 acres of private land. This alternative also would require adjustment of the

boundaries of the BLM ROW because the alternative includes land not currently included in the proposed ROW. See Figure 2-5.

The drainage concept and the grading approach is the same as for the proposed action, although the detailed design for Reconfigured Alternative 2 Option 1 would be slightly different. Drainage channels for the alternative include the following components:

1. The western channel is the same as for the proposed action.
2. The central channel is essentially unchanged from the proposed action but would be approximately 800 feet longer than in the proposed action plan. The width and depth of the central channel will remain unchanged. The flow in the channel is also anticipated to be very similar to the configuration for the proposed action.
3. The east channel will be approximately 7,000 feet longer than for the proposed action, but the flows from the upstream areas to the downstream areas will be maintained for peak flows and volumes just as they were in the proposed action.
4. Under Reconfigured Alternative 2 Option 1, one additional drainage channel has been added on the southeast side of the project site to intercept off-site drainage flows. This channel will be engineered in the same fashion as the other channels such that the upstream flow is directed to the same general downstream discharge area as the pre-development flow.
5. One additional on-site peripheral channel has been added in the mid-northeastern portion of the Reconfigured Alternative 2 Option 1 site plan to direct on-site flows to the appropriate downstream area.

A comparison among alternatives and impacts is provided in Table ES-1, *Summary of Impacts by Alternative*. Briefly, in comparison to the proposed action, Reconfigured Alternative 2 Option 1:

1. Retains the 500 MW generation capacity for the proposed action and the Applicant has determined that the engineering is feasible;
2. Substantially reduces impacts to the sand dune habitat, Mojave fringe-toed lizard and sand transport corridor in the northeastern portion of the site; and
3. Would cause comparable impacts related to cultural resources and visual resources.
4. The total disturbance area of Option 1 would be 4,365 acres.

### **Option 2**

Option 2 is very similar to Option 1, but would not require use of private land not currently controlled by the Applicant. Unit 1 would consist of 288 solar loops and one 250 MW power block reconfigured so that it is triangular in shape trending southeast. Unlike Option 1, this layout would avoid use of the private land along Unit 1's southern border.<sup>5</sup> There would be no change to the

<sup>5</sup> As with the proposed action, Option 2 would include the 40 acre private parcel owned by the Applicant.

power block equipment layout associated with Unit 1, but the entire power block would be shifted south by approximately 2,700 feet (0.5 miles). See Figure 2-6.

The evaporation ponds for Unit 1 of Option 2 would not be changed in terms of function and size, but would be relocated slightly south and east of their location as indicated for the proposed action. Similarly, Unit 1's bioremediation area under this alternative would remain unchanged in terms of function and size, but would be relocated to the mid-southwesterly portion of the solar field.

The grading and drainage detailed design for Option 2 would be slightly different from the proposed action, but the drainage concept and the grading approach would be the same. The drainage plan for Option 2 would include the following components:

1. The west channel would be exactly the same as for the proposed action.
2. The central channel would be essentially unchanged from the proposed action but would be approximately 5,500 feet shorter than in the project plan. The width and depth of the central channel would remain unchanged. The flow in the channel also is anticipated to be very similar to the proposed action configuration. In addition, the central channel lateral diffuser would be replaced with a fan diffuser in this alternative due to the fact that the release point for the drainage water would occur at a location where the fan spread of the pre-development flow is narrower.
3. The east channel would be approximately 1,000 feet longer than for the proposed action, and the lateral diffuser at the end of the east channel would be extended approximately 1,200 feet to disperse flows from the solar fields. The additional length of the east channel will have negligible effect on the peak flows and volumes, and these flows from the upstream areas to the downstream areas would be maintained just as they were in the proposed action.
4. Under Option 2, one additional drainage channel would be added to the southeast side of the project site to intercept off-site drainage flows. This channel would be engineered in the same fashion as the other channels so that the upstream flow is directed to the same general downstream discharge area as the pre-development flow.
5. Two additional on-site peripheral channels and three fan diffusers would be added in the mid-northeastern portion of the Option 2 site plan to direct on-site flows to the appropriate downstream area.

A comparison among alternatives and impacts is provided in Table ES-1, *Summary of Impacts by Alternative*. Briefly, in comparison to the proposed action, Reconfigured Alternative 2 Option 2:

1. Retains the 500 MW generation capacity for the project and the Applicant has determined that the engineering is feasible;
2. Reduces impacts to the sand dune habitat and Mojave fringe-toed lizard in the northeastern portion of the site;
3. Reduces impacts to the sand transport corridor along the northern and northeastern portions of the site; and
4. Would cause comparable impacts related to cultural resources and visual resources.

5. The total area of disturbance for Option 2 would be approximately 4,330 acres.

### **Reduced Acreage Alternative**

The Reduced Acreage Alternative would follow boundaries similar to those of Reconfigured Alternative 1, but it would be about 25 percent smaller, disturbing about 2,080 acres of land (as compared with 2,740 acres required for Units 1 and 2 of the proposed action). The boundaries of the Reduced Acreage Alternative are shown in Figure 2-4.

The Reduced Acreage Alternative would incorporate the following changes from Reconfigured Alternative 1:

It would modify the boundaries of Unit 1 to accomplish the following:

1. Preclude the use of the northeastern quarter of the westernmost solar field; and
2. Reduce and revise the easternmost solar field to avoid the dune habitat.

It would modify the boundaries of Unit 2 to accomplish the following:

1. Eliminate the southernmost segment of Unit 2 (170 acres within Desert Tortoise Critical Habitat);
2. Eliminate the northernmost area of Unit 2 (260 acres of dune sands and Mojave fringe-toed lizard habitat); and
3. Add 215 acres to the western end of the second and third rows of solar trough loops to make up for some of the reductions described above.

A comparison among alternatives and impacts is provided in Table ES-1, *Summary of Impacts by Alternative*. Briefly, in comparison to the proposed action, the Reduced Acreage Alternative:

1. Reduces impacts by eliminating several areas with the most likely resource conflicts (about 25 percent of the area of the proposed action);
2. Avoids construction within Desert Tortoise Critical Habitat by removing the southern row of the solar trough loops of Unit 1;
3. Reduces impacts to primary and secondary desert washes crossing the proposed site;
4. Reduces impacts to sand dune habitats, the inner sand dune corridors of the Chuckwalla Valley aeolian sand corridor, and the Mojave Fringe-Toed Lizard by prohibiting construction of the northeastern portion and southeastern portion of the Unit 1 solar fields;
5. Reduces the net generating capacity of the project to approximately 375 MW (as compared with the 500 MW of the proposed action); and
6. Cause comparable impacts related to cultural resources and removal of open space lands.

The Reduced Acreage Alternative is similar to the proposed action in that it would retain the basic solar collector assemblies, retain the north-south alignment of collector rows, and retain all

loops at the same size (as required for feasibility of the project design). The Reduced Acreage Alternative's Unit 1 would reduce impacts to dune habitat and the Chuckwalla Valley sand dune corridor and result in an approximately 125 MW power facility. By reducing the acreage in Unit 2, this alternative would avoid impacts to desert tortoise critical habitat and dune habitat while retaining the acreage and configuration to power a nominal 250 MW power facility.

Similar to the project, the Reduced Acreage Alternative would transmit power to the grid through the Red Bluff Substation. It would require infrastructure including on-site wells, transmission line, road access, administration building, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line and road access would remain approximately the same length as for the project. The gas pipeline would also remain approximately the same length as for the project. The linear facilities would require minor adjustments to accommodate the modified layout.

### **No Action Alternative A**

Under this No action alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA Plan would not be amended.

### **CDCA Plan Amendment/No Project Alternative B**

Under this alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA Plan would be amended to identify the project application area as unsuitable for any type of solar energy development.

### **CDCA Plan Amendment/No Project Alternative C**

Under this alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA Plan would be amended to identify the project application area as suitable for any type of solar energy development.

## **2.4.2 Agency Preferred Alternative**

The selection of the Agency Preferred Alternative involves difficult judgments, requiring one environmental value to be balanced against another. For the project, the BLM has determined that Reconfigured Alternative 2 is the Agency Preferred Alternative because it is the alternative that would best fulfill the BLM's statutory mission and responsibilities under FLPMA, BLM ROW regulations, and the other applicable Federal laws and policies (see PA/FEIS §§ 1.2.1, 1.3) giving consideration to the economic, environmental, technical and other factors analyzed in PA/FEIS Chapter 4, *Environmental Consequences*.

## 2.4.3 Alternatives Considered but Eliminated From Detailed Analysis

### Rationale for Eliminating Alternatives

In accordance with 43 C.F.R. 2804.10, the BLM worked closely with the Applicant during the pre-application phase to identify appropriate areas for the project. BLM discouraged the Applicant from including in its application alternate BLM locations with significant environmental concerns, such as critical habitat, Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs), designated off-highway vehicle (OHV) areas, wilderness study areas, and designated wilderness areas or other sensitive resources. BLM encouraged the Applicant to locate its project on public land with the fewest potential conflicts. This approach is consistent with the criteria list for areas to avoid in siting renewable projects defined by Audubon California and other groups.

Numerous alternative sites, technologies and methods were considered but eliminated from detailed analysis under NEPA. These alternatives were eliminated from detailed analysis because one or more of the following criteria from Section 6.6.3 of the BLM NEPA Handbook H-1790-1 apply:

1. It is ineffective (it would not respond to the BLM project purpose and need);
2. It is technologically or economically infeasible;
3. It is inconsistent with the basic policy objectives for the management of the area (e.g., does not conform to the CDCA Plan);
4. Its implementation is remote or speculative;
5. It is substantially similar in design to an alternative that is analyzed; and/or
6. It would have substantially similar effects to an alternative that is analyzed.

Not all of these criteria from the BLM Handbook were used in eliminating alternatives from consideration as described below. This process for eliminating these alternatives from detailed analysis complies with 40 CFR 1502.14(a) and is described briefly in the following sections.

### Alternatives Considered but Eliminated from Detailed Analysis

Alternative sites, technologies and methods were considered as alternatives to the action but not carried forward for detailed analysis. Such alternatives are identified and the rationale for elimination from detailed analysis is discussed below.

### Site Alternatives

A number of commenters requested that smaller project alternatives and alternatives on disturbed private lands be considered. This section considers potential alternatives to the proposed action that were evaluated and determined to not be feasible or result in lesser impacts than the proposed

action. The Site Alternatives identified below are discussed in detail in Section II(g) of the CEC's December 2010 *Palen Solar Power Project Commission Decision* and Section B.2.8.1 of the RSA. Briefly, however, because these alternatives would not avoid or substantially reduce the adverse impacts of the project or because they do not meet project objectives, the purpose and need for the project, or are otherwise not reasonable alternatives, they are not analyzed in complete detail throughout this PA/FEIS. Instead, the following discussion explains why the following suggested alternative sites were evaluated and eliminated from further analysis:

1. North of Desert Center Alternative
2. Cibola Alternative
3. Palen Pass Alternative
4. Desert Center Alternative
5. Palo Verde Mesa Alternative

### ***North of Desert Center Alternative***

The North of Desert Center Alternative would require approximately 3,900 acres of land located along Desert Center Rice Road (State Route 177) east of Kaiser Road, north of Oasis Road, approximately 1.6 miles north of I-10. The North of Desert Center Alternative is comprised largely of private properties but also includes approximately 2,000 acres of BLM-administered land and some County of Riverside land. Center for Biological Diversity published a Potential Solar Energy Study Areas map dated September 9, 2009, which highlights potential Solar Energy Study Areas on private lands immediately adjacent to BLM-identified Solar Energy Study Areas. A portion of the North of Desert Center Alternative is located within this area. The land would be within the Colorado Desert with appropriate slope and solarity requirements.

However, the North of Desert Center Alternative site would be made up of approximately 151 unique parcels with 40 land owners. The Final Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) and updated in September 2009 identified private land areas for solar development only if there were no more than 20 owners in a 2-square-mile (1,280-acre) area. Also, the majority of the North of Desert Center parcels have supported agricultural operations in the past, some of which are currently in agricultural production; construction of this alternative would result in the permanent conversion of approximately 3,000 acres of land previously used for agriculture to renewable energy production and eliminate foreseeable future agricultural use on the site. Furthermore, impacts of this alternative on nearby resources such as the Desert Lily Preserve ACEC, Joshua Tree National Park, and Chuckwalla Mountains Wilderness and aesthetic values would be comparable to the project.

### **Rationale for Elimination**

This alternative was eliminated from further consideration in this PA/FEIS because it is determined to be infeasible as well as speculative based on the number of private land owners whose agreement would be required and because it would have substantially similar effects to the proposed action.

### ***Cibola Alternative***

The Cibola Alternative was identified by the Applicant as a potential alternative site for the project. The Cibola Alternative is located on private land owned by the Metropolitan Water District of Southern California and public land managed by the Department of the Interior. The private land is located west of the Palo Verde Hodges Drain, on undisturbed land. It is located south of Blythe, Riverside County. The elevation of the Cibola Alternative is between approximately 300 and 500 feet above sea level. The alternative site is made up of 29 parcels with two separate land owners. Approximately 6,700 acres were identified by the applicant for this alternative site; however, it is assumed that approximately 4,000 acres of land would be required for the alternative.

Cibola was not pursued by the applicant as a possible site for the project because it had a lower-voltage transmission line crossing the site from north to south and was privately owned. Additionally, the site has excessive slope, between 2 and 4 percent, which would require extensive grading, potentially resulting in erosion and runoff. The crossing of the site by three large desert washes could increase sediment flow in and around the site. The Cibola site would be visible from the Mule Mountains to the west; given the size of the power plants and the approximately 30-foot tall solar trough structures, visual impacts would be considerable and similar to those at the project site.

### **Rationale for Elimination**

The Cibola Alternative was eliminated from further consideration in this PA/FEIS because the site is located on undisturbed private land that would require excessive grading, the impacts of which could be exacerbated by the presence of three large desert washes. Development of this site for a solar use such as the one proposed would cause comparable (and could cause greater) impacts relative to those analyzed in detail in the PA/FEIS.

### ***Palen Pass Alternative***

The Palen Pass Alternative was identified by the applicant in the AFC as a potential alternative site for the project. The Palen Pass Alternative is located on BLM-administered land north of Desert Center, adjacent to Highway 177, in Riverside County. The elevation of Palen Pass Alternative is between approximately 500 and 700 feet above sea level. The site is located east of the Joshua Tree National Park in an area identified by the BLM in August 2008 as one that could be included in expansions of the Joshua Tree National Park and/or the McCoy Wilderness. BLM historically has declined to grant ROWs for this particular area.

### **Rationale for Elimination**

The Palen Pass Alternative was not found to be a reasonable alternative for the project because it is inconsistent with the BLM's purpose and need, which includes consideration of whether the proposal would comply with BLM mandates under FLPMA, BLM ROW regulations, and other applicable Federal laws. For example, BLM Instruction Memorandum No. 2011-059, *National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations*, requires particular consideration of whether and how an alternative could affect

nationally designated systems or units, including units of the National Park Service and designated Wilderness. The Palen Pass Alternative was determined to be inconsistent with future expansion of the Joshua Tree National Park and/or the McCoy Wilderness in the area.

### ***Desert Center Alternative***

The Desert Center Alternative was identified by the Applicant as a potential alternative site for the project. The Desert Center Alternative is made up of 103 parcels and is owned by 53 separate landowners, including the BLM. The site would be located on 10,900 acres partially within the Chuckwalla DWMA, which is managed as an ACEC for recovery of the desert tortoise, as designated by the BLM Northern and Eastern Colorado Desert Coordinated Management Plan (NECO). The BLM established the Chuckwalla DWMA to protect federally listed desert tortoise and 38 special status plant and animal species and included the specific feature of a 1 percent surface disturbance limitation on federal lands within DWMA's. The U.S. Fish and Wildlife Service also designated the area as Critical Habitat for the desert tortoise. BLM historically has declined to grant ROWs for this particular area.

### **Rationale for Elimination**

The Desert Center Alternative was eliminated from further consideration in the PA/FEIS because it is considered speculative and infeasible based on the number of landowners whose agreement would be required, and because it would have impacts equal to or greater than the other action alternatives with respect to the federally listed desert tortoise and other special status species. Further, this alternative does not justify a change in BLM's prior practice of denying development ROWs for this area based upon the resources meant to be protected.

### ***Palo Verde Mesa Alternative***

The Palo Verde Alternative was identified by the Applicant as a potential alternative site for the project. The Palo Verde Alternative is located on public and private land adjacent to the Mule Mountain ACEC west of Blythe, and consists of 12 parcels owned by 8 separate landowners, including the BLM. It also would be located immediately south of several rural residences, and so impacts to public health, noise, and visual resources would potentially be worse than the proposed site. Extensive grading of the Palo Verde Mesa Alternative site would be required and the ephemeral waters and washes that cross it would likely have to be rerouted, resulting in more severe impacts to biological and cultural resources than are expected to result from the alternatives analyzed in detail in the PA/FEIS. BLM historically has declined to grant ROWs for this particular area.

### **Rationale for Elimination**

The Palo Verde Alternative site was eliminated from detailed consideration in the PA/FEIS because it is considered speculative and infeasible based on the number of landowners whose agreement would be required and because it would have substantially similar (or likely greater) effects than alternatives analyzed in detail in the PA/FEIS.

## Alternative Solar Generation Technologies

Consistent with BLM Instruction Memorandum 2011-53, the BLM typically does not analyze alternative technologies when a ROW application is submitted for a specific technology (e.g., evaluate a photovoltaic alternative for a concentrated solar power application) because such an alternative does not respond to the BLM's purpose and need to consider an application for the authorized use of public lands for a specific renewable energy technology. If, through discussions with the applicant, the BLM determines that the applicant has flexibility with respect to the proposed technology or is uncertain about a specific technology, it may be appropriate to fully analyze an alternative for a different technology. Several alternative solar generation technologies initially were evaluated as potential alternatives to the proposed action, including:

1. Stirling Dish Technology
2. Solar Power Tower Technology
3. Linear Fresnel Technology
4. Utility scale Solar Photovoltaic (PV) Technology
5. Distributed Solar Technology

Each of the alternative solar generation technologies is discussed in detail in Section II(h) of the CEC's December 2010 *Palen Solar Power Project Commission Decision* and Section B.2.8.2 of the RSA; these discussions are not repeated here, but are incorporated by reference.<sup>6</sup> The rationale for their elimination from more detailed consideration is provided below. Relevant sections of these documents are summarized where necessary to explain the elimination.

### Rationale for Elimination

Alternative solar technologies are eliminated from detailed discussion because they are infeasible. Consistent with BLM Instruction Memorandum 2011-53, the BLM considered whether the Applicant has flexibility to implement alternative technologies or is uncertain about the specific technology proposed and determined that would not be appropriate to fully analyze alternative technologies because there is no evidence that this Applicant could or would develop a technology other than the proposed concentrated solar thermal.

The Stirling Dish Technology also is eliminated because it could increase the footprint of the project between 10 and 45 percent. Further, due to its greater height, it could increase visual impacts. With a minimum size of nearly 4,500 acres for 500 MW, Stirling Dish Technology would not eliminate any of the significant impacts of the project.

The Solar Power Tower Technology also is eliminated because no substantial reduction in impacts would occur under this alternative technology. The large area needed for a solar power tower plant would be greater than the land requirement for the project. Grading requirements for

<sup>6</sup> The Commission Decision and RSA, sections of which are incorporated by reference here and elsewhere within this Section 2.4.3, *Alternatives Considered but Eliminated From Detailed Analysis*, are available in the administrative record for this proposed action as well as on the CEC's website. The Commission Decision is found here: <http://www.energy.ca.gov/2010publications/CEC-800-2010-010/CEC-800-2010-010-CMF.PDF>. The RSA was issued in two parts. RSA Part 1 is here (<http://www.energy.ca.gov/2010publications/CEC-700-2010-007/CEC-700-2010-007-REV-PT1.PDF>) and RSA Part 2 is here (<http://www.energy.ca.gov/2010publications/CEC-700-2010-007/CEC-700-2010-007-REV-PT2.PDF>).

the Solar Power Tower Technology would be less than for the project because the Solar Power Tower Technology does not require grading of the entire solar field; however, grading would still be required for the access roads in between the rows of heliostats. For these reasons, recreation and land use, biological resources, and cultural resource impacts would be similar to those of the project. In addition, due to the extent of the facility and the height of the power towers, impacts to the Desert Center Airport would potentially be greater for this alternative.

The Linear Fresnel Technology also is eliminated because it is infeasible. This technology is a proprietary technology owned by Ausra, Inc. However, Ausra, Inc. has changed its focus to being a technology and equipment provider rather than an independent power developer and owner and will focus on medium-sized (50 MW) solar steam generating systems for customers including steam users, such as food processors, enhanced oil recovery firms, and utilities for power augmentation systems that deliver steam into existing fossil-fuel power plants. A project of 500 MW is theoretically possible, and would require smaller acreage per megawatt. However, at nearly 2,500 acres for 500 MW, this technology would not eliminate the significant impacts of the proposed solar trough technology at this site.

Solar Photovoltaic Technology - Utility Scale also is eliminated because it would not reduce major impacts of the project facility due to the extent of land and access roads required as well as the more extensive grading and stormwater management system required. Due to its requirement for a nearly flat site,<sup>7</sup> it would require similar grading as the project, with similar air emissions and erosion potential.

Distributed generation refers to the installation of small-scale solar energy facilities at individual locations at or near the point of consumption (e.g., use of solar PV panels on a business or home to generate electricity for on-site consumption). Distributed generation systems typically generate less than 10,000 kW. Other terms for distributed generation include on-site generation, dispersed generation, distributed energy, and others.

Current research indicates that development of both distributed generation and utility-scale solar power will be needed to meet future energy needs in the United States, along with other energy resources and energy efficiency technologies (NREL, 2010). For a variety of reasons (e.g., upper limits on integrating distributed generation into the electric grid, cost, lack of electricity storage in most systems, and continued dependency of buildings on grid-supplied power), distributed solar energy generation alone cannot meet the goals for renewable energy development. Ultimately, both utility-scale and distributed generation solar power will need to be deployed at increased levels, and the highest penetration of solar power overall will require a combination of both types (NREL, 2010).

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<sup>7</sup> See, e.g., *Desert Sunlight Solar Farm Project Final EIS and CDCA Plan Amendment*, [http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/desert\\_sunlight.Par.20894.File.dat/Desert%20Sunlight%20FEIS%20chapter%202.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/desert_sunlight.Par.20894.File.dat/Desert%20Sunlight%20FEIS%20chapter%202.pdf) (April 2011), p. 2-3, which lists “flat topography (grade of less than three percent)” as the first of the site selection criteria.

Alternatives incorporating distributed generation with utility-scale generation, or looking exclusively at distributed generation, do not respond to the BLM's purpose and need for agency action in this document.

The applicable federal orders and mandates providing the drivers for specific actions being evaluated in this document compel the BLM to evaluate utility-scale solar energy development. The Energy Policy Act of 2005 (Public Law [P.L.] 109-58) requires the Secretary of the Interior to seek to approve non-hydropower renewable energy projects on public lands with a generation capacity of at least 10,000 MW of electricity by 2015; this level of renewable energy generation cannot be achieved through distributed generation systems. In addition, Secretarial Order 3285 A1 requires the BLM and other Interior agencies to undertake multiple actions to facilitate large-scale solar energy production. Accordingly, the BLM's purpose and need for agency action in this document is focused on the siting and management of utility-scale solar energy development on public lands. Furthermore, the agency has no authority or influence over the installation of distributed generation systems, other than on its own facilities, which the agency is evaluating at individual sites through other initiatives.<sup>8</sup>

## Alternative Renewable Technologies

Consistent with BLM Instruction Memorandum 2011-53, the BLM typically does not analyze alternative technologies when a ROW application is submitted for a specific technology (e.g., evaluate a photovoltaic alternative for a concentrated solar power application) because such an alternative does not respond to the BLM's purpose and need to consider an application for the authorized use of public lands for a specific renewable energy technology. If, through discussions with the applicant, the BLM determines that the applicant has flexibility with respect to the proposed technology or is uncertain about a specific technology, it may be appropriate to fully analyze an alternative for a different technology. Non-solar renewable generation technologies considered as potential alternatives to the project included the following:

1. wind energy
2. geothermal energy
3. biomass energy
4. tidal energy
5. wave energy

The non-solar renewable technologies alternatives (wind, geothermal, biomass, tidal, wave) are discussed in detail in Section II(h) of the CEC's December 2010 *Palen Solar Power Project Commission Decision* and in Section B.2.8.3 of the RSA; these discussions are not repeated here, but rather are incorporated by reference. The rationale for elimination of these alternatives from more detailed consideration is provided below. Relevant sections of the incorporated documents are summarized where necessary to explain the elimination.

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<sup>8</sup> See generally, National Renewable Energy Laboratory, 2010. "Solar Power and the Electric Grid." *NREL Energy Analysis*. <http://www.nrel.gov/docs/fy10osti/45653.pdf>. March 2010.

### **Wind Energy Alternatives**

Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development. The technology is well developed and can be used to generate significant amounts of power. There are now approximately 2,490 MW of wind being generated in California. For example, the San Geronimo Pass, northwest of Palm Springs, is considered one of the best regions in California for producing wind energy. However, there is little undeveloped land remaining for expansion beyond the already existing wind farms. Because there is minimal expansion room, the wind industry is instead replacing the older turbines in the region with newer, fewer, more efficient ones. Approximately 2,500 to 8,500 acres of land would be required for a 500 MW wind electricity power plant, although this land would not be densely developed. While wind plants would not necessarily impact the same types of wildlife and vegetation as the project plant, the significant acreage necessary for a 500 MW wind plant would still cause significant habitat loss in addition to potentially significant impacts from habitat fragmentation and avian and bat mortality. Wind turbines are often over 400 feet high for 2-MW turbines. As such, any wind energy project would be highly visible.

### **Rationale for Elimination**

Wind energy alternatives were eliminated from detailed consideration in the PA/FEIS for multiple reasons. First, they would not respond to the BLM's purpose and need for the proposed action, which is to respond to the Applicant's application under Title V of FLPMA (43 U.S.C. 1761) for a ROW grant to construct, operate, and decommission a *solar* thermal facility on public lands in compliance with FLPMA, BLM ROW regulations, and other Federal applicable laws. Second, wind-generated power is considered an infeasible alternative to the proposed action because it is not within the Applicant's area of expertise, and so may not be technically or economically feasible for the Applicant to implement: There is no evidence that this Applicant could or would develop a wind energy generation project.

### **Geothermal Energy Alternatives**

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. Geothermal plants account for approximately 5 percent of California's power and range in size from under 1 MW to 200 MW. California is the largest geothermal power producer in the United States, with about 1,800 MW installed capacity. Geothermal plants provide highly reliable base load power, with capacity factors from 90 to 98 percent. Geothermal plants must be built near geothermal reservoir sites because steam and hot water cannot be transported long distances without substantial thermal energy loss.

Approximately 5-10 average-sized geothermal projects would be required to achieve 500 MW of geothermal energy. The amount of land required for a geothermal facility varies greatly. Five hundred MW of geothermal energy could require the use of many thousands of acres of land. However, the amount of ground disturbance on that area would be less than 10 percent. Additionally, while components of the power plant, cooling towers and brine ponds would likely be fenced, there would not likely be fencing required for the wells and well pads.

Concerns regarding geothermal power plants include air quality, hazardous materials, and geology. Benefits from geothermal power plants include an increased reliability and less ground disturbance than some renewable resources, including solar.

Geothermal generation is a commercially available technology and is important for California's renewable energy future because it provides base load power that is available 24 hours a day. It also can be developed with substantially less ground disturbance than that needed for the project, so impacts related to biological and cultural resources, water and soils resources, and traffic/transportation would be reduced. Generation of 500 MW of geothermal power at times of peak demand (to equate to the project), would require development of several large geothermal facilities.

### **Rationale for Elimination**

Geothermal energy alternatives were eliminated from detailed consideration in the PA/FEIS for multiple reasons. First, they would not respond to the BLM's purpose and need for the proposed action which is to respond to an application to develop a solar facility. Second, geothermal power is considered an infeasible alternative to the action because it is not within the Applicant's area of expertise, and so may not be technically or economically feasible for the Applicant to implement: There is no evidence that this Applicant could or would develop a geothermal energy project. Finally, geothermal energy alternatives are considered remote or speculative: few new geothermal energy projects have been proposed in the last two years.

### ***Biomass Alternatives***

Electricity can be generated by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass also can be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Several techniques are used to convert these fuels to electricity, including direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land required by the other renewable energy sources discussed; however, they produce much smaller amounts of electricity (in the range of 3 to 10 MW) than other sources of electricity.

Currently, nearly 19 percent of the State's renewable electricity derives from biomass and waste-to-energy sources. Generally, small amounts of land are required for biomass power facilities; however, a biomass facility should be sited near a relatively large source of biomass in order to minimize the cost of bringing the biomass waste to the facility.

The emissions due to biomass fuel-fired power plant operation generally are unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards and impacts relating to PM10 and ozone emissions. Vehicle-related air emissions caused by the numerous truck deliveries that would be required to supply biomass energy plants with the necessary waste could be considerable. Waste-to-energy facilities also generate concerns about the emission of toxic chemicals such as dioxin, and the disposal of the toxic ash that results

from biomass burning. Toxic air contaminants from routine operation also would cause health risks that could locally adversely affect sensitive receptors. Furthermore, biomass/biogas facility emissions also could adversely affect visibility and vegetation in federal Class I areas or wilderness areas, which would significantly deteriorate air quality related values in such areas.

### **Rationale for Elimination**

Biomass alternatives were eliminated from detailed consideration in the PA/FEIS for multiple reasons. First, they would not respond to the BLM's purpose and need for the proposed action. Second, biomass/biogas power general is not within the Applicant's area of expertise, and so could be technically or economically feasible for the Applicant to implement: There is no evidence that this Applicant could or would develop a biomass energy project. Third, biomass alternatives are considered remote or speculative and therefore infeasible, based on the number of new plants that would be required to generate an amount of electricity necessary to replace the project.

### ***Tidal Technologies***

Certain coastal regions experience higher tides than others. This is a result of the amplification of tides caused by local geographical features such as bays and inlets. In order to produce practical amounts of power, a difference between high and low tides of at least 5 meters is required. There are about 40 sites around the world with this magnitude of tidal range. The higher the tides, the more electricity can be generated from a given site and the lower the cost of electricity produced.

Tidal technologies, especially tidal fences, have the potential to cause significant biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on the bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. Even the in-flow turbines could have environmental impacts on marine systems. The in-flow turbines off New York City underwent environmental monitoring for 18 months to ensure the turbines would not create environmental impacts to the river's marine wildlife. The results thus far show no observed evidence of increased fish mortality or injury.

### **Rationale for Elimination**

Tidal technologies were eliminated from detailed consideration in the PA/FEIS because they would not respond to the BLM's purpose and need for the proposed action which is to respond to an application for a solar facility. Tidal technologies also are not within the Applicant's area of expertise, and so could be technically or economically feasible for the Applicant to implement: There is no evidence that this Applicant could or would develop a tidal energy project. Further, in-flow tidal turbines are a relatively new technology that is unproven at the scale that would be required to replace the project. Furthermore, the environmental impacts of tidal turbines are still under review; they could be comparable or greater than the impacts of the alternatives analyzed in detail in the PA/FEIS.

### **Wave Power Technologies**

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million MW. In favorable locations, wave energy density can average 65 MW per mile of coastline. The environmental impacts of wave power have yet to be fully analyzed. A recent study published by the U.S. Department of Commerce and National Oceanic and Atmospheric Administration listed a number of potentially significant environmental impacts created by wave power:

1. Significant reduction to waves with possible effects to beaches (e.g., changes to sediment transport processes).
2. The use of buoys may have positive effects on forage fish species, which in turn could attract larger predators. Structures need to reduce potential entanglement of larger predators, especially marine turtle species. Impacts on fish and marine mammals caused by noise coming from the buoys should be understood and mitigated.
3. Modifications to water circulation and currents may result in changes to larval distribution and sediment transport.
4. Wave energy development may affect community structures for fish and fisheries.
5. Lighting and above-water structures may result in marine bird attraction and collisions and may alter food webs and beach processes.
6. A diversity of concerns would arise regarding marine mammals including entanglement issues.
7. Energy-absorbing structures may affect numerous receptors and should avoid sensitive habitats.
8. Chemicals used in the process must be addressed both for spills and for a continuous release such as in fouling paints.
9. New hard structures and lighting may break loose and increase debris accumulation.
10. Electromagnetic effects may affect feeding or orientation and should be better understood.
11. Impact thresholds need to be established. As projects scale up in location or implementation, new risks may become evident.

### **Rationale for Elimination**

Wave power technologies were eliminated from detailed consideration in the PA/FEIS because they would not respond to the BLM's purpose and need for the proposed action. Wave power technologies also are eliminated because they are new and may not be technologically feasible at the scale that would be required to replace the project. Further, wave power technologies are not within the Applicant's area of expertise, and so could be technically or economically feasible for the Applicant to implement: There is no evidence that this Applicant could or would develop a wave power project.

## **Alternative Methods of Generating Electricity**

The following alternative methods of generating or conserving electricity were considered as potential alternatives to the proposed action:

1. Natural gas
2. Coal
3. Nuclear energy

These alternatives are discussed in detail in Section II(h) of the CEC's December 2010 *Palen Solar Power Project Commission Decision* and in Section B.2.8.4 of the RSA. Briefly, however, natural gas power generation accounts for approximately 22 percent of all the energy used in the United States and comprises 40 percent of the power generated in California. A gas-fired power plant generating 500 MW would generally require less than 80 acres of land. Natural gas power plants may result in numerous environmental impacts; of greatest concern is emission of air pollutants and greenhouse gases. In 2006, California enacted SB 1368 which prohibits utilities from making long-term commitments for electricity generated from plants that create more carbon dioxide (CO<sub>2</sub>) than clean-burning natural gas plants. Additionally, California law currently prohibits the construction of any new nuclear power plants in California. The rationale for the elimination of these alternatives from more detailed consideration is provided below.

### **Rationale for Elimination**

Alternative methods of generating or conserving electricity are eliminated from detailed discussion because they would be too great a departure from the application to be considered a modification of the Applicant's proposal, and so are infeasible under NEPA. These alternative methods would not respond to the BLM's purpose and need which is to respond to an application for a solar facility, and with the exception of nuclear, none of these address the BLM's public policy goals of increasing renewable energy on public lands, which is part of the purpose and need of this project. Additionally, none of these alternative methods of generating electricity is within the Applicant's area of expertise; therefore, it would not likely be technically or economically feasible for the Applicant to implement them. There is no evidence that this Applicant could or would develop any of these alternative methods to generate energy. Moreover, coal-based power generation is discouraged (see Senate Bill 1368, Pub. Util. Code § 8340 et seq.) and the permitting of new nuclear facilities in California is currently illegal, so these technologies also are eliminated as infeasible.

## **Conservation and Demand-Side Management**

Conservation and demand-side management is discussed in Section II(h) of the CEC's December 2010 *Palen Solar Power Project Commission Decision* and in Section B.2.8.4 of the RSA. Briefly, however, it consists of a variety of approaches to reduce electricity use, including energy efficiency and conservation, building and appliance standards, load management, and fuel substitution.

### **Rationale for Elimination**

Conservation and demand-side management is eliminated from detailed discussion because it does not respond to the BLM's purpose and need for the proposed action. Conservation and demand-side management also is eliminated because it is remote or speculative: with population growth and increasing demand for energy, there is no evidence that conservation and demand-management alone would be sufficient to address all of California's energy needs.<sup>9</sup> Further, affecting consumer choice to the extent necessary for a conservation and demand side management solution is beyond the BLM's or the Applicant's control.

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<sup>9</sup> See, e.g., National Energy Policy Development Group, 2001. National Energy Policy of 2001, <http://www.wtrg.com/EnergyReport/National-Energy-Policy.pdf> (May 2001), which states, "Over the next 20 years, growth in U.S. energy consumption will increasingly outpace U.S. energy production, if production only grows at the rate of the last 10 years."