

EXECUTIVE SUMMARY

ES.1 BACKGROUND

The U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) and the U.S. Department of Energy (DOE) are each considering taking actions to facilitate solar energy development in compliance with various orders, mandates, and agency policies. For the BLM, these actions include the evaluation of a new BLM Solar Energy Program applicable to utility-scale solar energy development on BLM-administered lands in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah).¹ For DOE, they include the evaluation of developing new program guidance relevant to DOE-supported solar projects.

The BLM and DOE are working jointly as lead agencies to prepare this programmatic environmental impact statement (PEIS), “Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States,” to evaluate the proposed BLM program and whether to develop DOE guidance. This PEIS evaluates the potential environmental, social, and economic effects of the agencies’ proposed actions and alternatives in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality’s regulations for implementing NEPA (Title 40, Parts 1500–1508 of the *Code of Federal Regulations* [40 CFR Parts 1500–1508]), and applicable BLM and DOE authorities.

ES.2 BLM’S PROPOSED ACTION

As discussed in Chapter 1, utility-scale solar energy facilities have not yet been constructed on BLM-administered public lands, but there is great interest in such development. As of February 2010, the BLM had 127 active applications for right-of-way (ROW) authorizations for solar facilities to be located on BLM-administered lands; 14 of these applications are being processed as “fast-track” projects.² In 2007, the BLM developed and issued a Solar Energy Development Policy (BLM 2007) to establish procedures for processing ROW applications. This policy was updated in 2010 by two more detailed policies (BLM 2010a,b; see Appendix A, Section A.1). In accordance with these policies, the BLM currently evaluates solar energy ROW applications on a project-specific basis, a process that involves assessment in accordance with the requirements of NEPA, Title V of the Federal Land Policy and Management Act of 1976 (FLPMA), the Endangered Species Act (ESA), the National

¹ Utility-scale facilities are defined as projects that generate electricity that is delivered into the electricity transmission grid, generally with capacities greater than 20 megawatts (MW).

² The applications as of February 2010 were used to support analysis in the PEIS; however as of December 1, 2010, the BLM had 104 active applications, including 30 in California, 35 in Nevada, 36 in Arizona, and 3 in New Mexico. Six fast-track projects with a total generation capacity of 3,572 MW have been approved in California and two have been approved in Nevada: BrightSource Energy’s Ivanpah Solar Electric Generating System, Tessera Solar’s Imperial Valley and Calico Solar Projects, Chevron Energy Solution’s Lucerne Valley Solar Project, NextEra’s Genesis Ford Dry Lake Solar Project, Solar Millennium’s Blythe and Amargosa Farm Road Solar Projects, and First Solar’s Silver State North Solar Project.

1 Historic Preservation Act (NHPA), and other applicable statutes and regulations. These
2 evaluations typically also assess required land use plan amendments.
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4 The BLM proposes to develop a new Solar Energy Program to further support utility-
5 scale solar energy development on BLM-administered lands that would be applicable to all
6 pending and future solar energy development applications upon execution of the Record of
7 Decision (ROD).
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10 **ES.2.1 BLM's Purpose and Need**

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12 The BLM has identified a need to respond in a more efficient and effective manner to the
13 high interest in siting utility-scale solar energy development on public lands and to ensure
14 consistent application of measures to avoid, minimize, or mitigate the adverse impacts of such
15 development. The proposed Solar Energy Program has been designed to further the BLM's
16 ability to meet the requirements for facilitating solar energy development on BLM-administered
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RELATIONSHIP OF BLM'S PROPOSED SOLAR ENERGY PROGRAM TO ONGOING PLANNING AND PROJECT APPROVAL ACTIVITIES

The evaluation and development of the BLM's new Solar Energy Program is being led by the Washington Office Minerals and Realty Management Directorate. The new program would be applicable to all utility-scale solar energy development on BLM-administered lands in the six-state study area and, therefore, would be applied by the BLM at the local level in coordination with other land use planning decisions.

The BLM's land use planning process is a dynamic process that is largely conducted at the field office level. While efforts have been made to collect current information about planning activities and decisions in each field office within the study area, it is recognized that some of the information presented in this Draft PEIS is out-of-date (e.g., where land use plan amendments have recently been finalized). In particular, despite extensive efforts to compile complete and current geographic information system (GIS) data for developing figures and describing spatial relationships, data gaps still remain.

A list of known inconsistencies and needed updates is provided in the PEIS Reader's Guide. However, because the new program would establish requirements for solar energy development in the context of specific *types* of sensitive resources, resource uses, and special designations, these data issues do not undermine the program's potential applicability or appropriateness, nor do they render the BLM's evaluation of the new program invalid or untimely. It is the BLM's intent that the new programmatic requirements would be applicable even as conditions and land use plan decisions (including amended or revised decisions) across the six-state study area change (e.g., if a new Area of Critical Environmental Concern [ACEC] is identified in a subsequent plan revision, solar energy development would be excluded from that area).

The BLM acknowledges that it is critical to reconcile elements of the new program with existing conditions and land use plan decisions in the field offices. This is particularly true for the decisions regarding proposed solar energy zones (SEZs). The data inconsistencies and gaps identified in the Reader's Guide, and similar issues identified during review of the Draft PEIS will be addressed in the final PEIS. Land use plans that are undergoing revision or amendment concurrent with the development of the PEIS (e.g., land use plan amendments for fast-track projects) will be reviewed to identify and resolve inconsistencies between the PEIS and individual planning efforts.

1 lands established by the Energy Policy Act of 2005 (Public Law [P.L.] 109-58) and Secretarial
2 Order 3285A1 issued by the Secretary of the Interior (2010). In particular, the proposed program
3 has been designed to meet the requirements of Order 3285A1 to identify and prioritize
4 development in locations best-suited for such development, called solar energy zones (SEZs).
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6 The objectives of the BLM's proposed Solar Energy Program include:
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- 8 • Facilitating near-term utility-scale solar energy development on public lands;
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- 10 • Minimizing potential negative environmental, social, and economic impacts;
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- 12 • Providing flexibility to consider a variety of solar energy projects (location,
13 facility size, technology, and so forth);
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- 15 • Optimizing existing transmission infrastructure and corridors; and
16
- 17 • Standardizing and streamlining the authorization process for utility-scale solar
18 energy development on BLM-administered lands.
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20 The anticipated elements of the BLM's proposed Solar Energy Program include:
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- 22 1. Identification of lands excluded from utility-scale solar energy development in
23 the six-state study area;
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- 25 2. Identification of priority areas within the lands open to solar energy
26 development that are best-suited for utility-scale production of solar energy in
27 accordance with the requirements of Secretarial Order 3285A1 (i.e., proposed
28 SEZs);
29
- 30 3. Establishment of mitigation requirements for solar energy development on
31 public lands to ensure the most environmentally responsible development and
32 delivery of solar energy; and
33
- 34 4. Amendment of BLM land use plans in the six-state study area to adopt those
35 elements of the new Solar Energy Program that pertain to planning.
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38 **ES.2.2 BLM's Scope of Analysis** 39

40 As discussed in Chapter 1, the geographic scope of the PEIS for BLM includes all
41 BLM-administered lands in the six-state study area (see Figure ES.2-1). The scope of the impact
42 analysis includes an assessment of the environmental, social, and economic impacts of utility-
43 scale solar facilities and required transmission connections from these facilities to the existing
44 electricity transmission grid over an approximately 20-year timeframe (i.e., until 2030).
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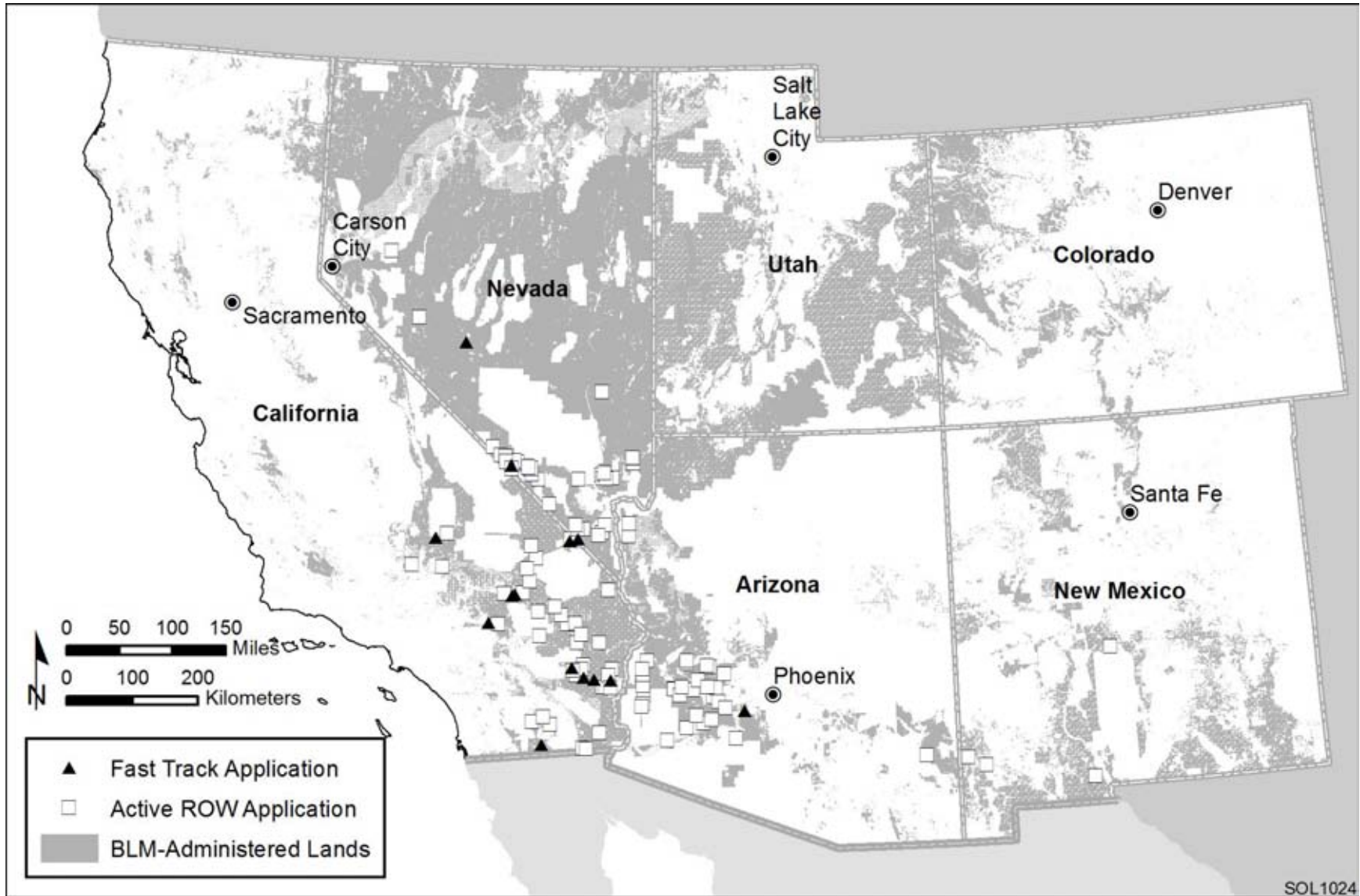


FIGURE ES.2-1 BLM-Administered Lands and Active Solar Facility ROW Applications in the Six-State Study Area

1 The PEIS evaluates the environmental impacts of those utility-scale solar technologies
2 considered to be viable for deployment over the next 20 years, including three concentrating
3 solar power (CSP) technologies: parabolic trough, power tower, and dish engine systems; and
4 photovoltaic (PV) technologies (see Chapter 3 and Appendix F for more information about each
5 technology).
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7 The PEIS also evaluates the potential effects of establishing broad Solar Energy Program
8 elements and strategies across the six-state study area. The programmatic analysis will provide
9 the basis for future utility-scale solar energy development decisions. Because the proposed
10 program involves environmental effects over a broad geographic and time horizon, the depth and
11 detail of the impact analysis is fairly general, focusing on major impacts in a qualitative manner.
12 The PEIS does not assess site-specific issues associated with any future individual solar energy
13 development projects. A variety of location-specific factors (e.g., soil type, watershed,
14 groundwater availability and presence of jurisdictional waters, habitat, vegetation, watershed,
15 public sentiment, the presence of threatened and endangered species, and the presence of cultural
16 resources) would vary considerably from site to site, especially over a six-state region. In
17 addition, the variations in technology and project size and design would greatly determine the
18 magnitude of the impacts from given projects. This PEIS identifies the range of potential impacts
19 and identifies relevant design features (i.e., mitigation requirements) applicable to utility-scale
20 solar energy development in general. BLM’s proposed Solar Energy Program would require that
21 site-specific and species-specific issues be addressed during individual project reviews, where
22 resolution of these issues is more readily achievable.
23

24 In addition to the programmatic analysis described above, the Solar PEIS also provides
25 in-depth environmental analysis to inform BLM’s decision to identify SEZs within the six-state
26 study area as those locations that are best-suited for utility-scale solar energy development (i.e.,
27 high resource value and low [or limited] resource and/or environmental conflicts). In addition to
28 the general design features, the PEIS identifies specific design features for projects developed
29 within individual SEZs.
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32 **ES.2.3 BLM’s Alternatives**

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34 As discussed in Chapter 2, through this PEIS, the BLM is evaluating three alternatives for
35 managing utility-scale solar energy development on BLM-administered lands in the six-state
36 study area. These alternatives include two action alternatives—a solar energy development
37 program alternative and an SEZ program alternative—and a no action alternative. The solar
38 energy development program alternative is the BLM’s preferred alternative.
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40 The alternatives are summarized in the following sections. Table ES.2-1 identifies the
41 estimated amount of land that would be available for ROW application under each alternative by
42 state. Figures ES.2-2 through ES.2-7, provided after Section ES.2.5, show the approximate
43 locations of these lands and of specifically excluded BLM-administered lands.
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TABLE ES.2-1 Summary of Potentially Developable BLM-Administered Land under the No Action Alternative, the Solar Energy Development Program Alternative, and the SEZ Program Alternative^a

State	Total State Acreage ^b	BLM-Administered Lands Constituting No Action Alternative (acres)	BLM-Administered Lands Constituting Solar Energy Development Program Alternative (acres) ^c	BLM-Administered Lands Constituting SEZ Program Alternative (acres)
Arizona	72,700,000	9,218,009	4,485,944	13,735
California	100,200,000	11,067,366	1,766,543	339,090
Colorado	66,500,000	7,282,061	148,072	21,050
Nevada	70,300,000	40,794,055	9,587,828	171,265
New Mexico	77,800,000	12,188,361	4,068,324	113,052
Utah	52,700,000	18,182,368	2,028,222	19,192
Total	440,200,000	98,732,220	21,581,154	677,384

^a To convert acres to km², multiply by 0.004047.

^b From Table 4.2-1.

^c The acreage estimates were calculated on the basis of the best available geographic information system (GIS) data. GIS data were not available for the entire set of exclusions, so the exact acreage could not be calculated. Exclusions that could not be mapped would be identified during the ROW application process.

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3 **ES.2.3.1 Solar Energy Development Program Alternative (the Preferred**
4 **Alternative)**
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6 Under this alternative, the BLM would establish a new Solar Energy Program of
7 administration and authorization policies and required design features to replace certain elements
8 of its existing Solar Energy Policies (BLM 2007; 2010a,b).³ As discussed throughout the PEIS,
9 all BLM-administered lands are not appropriate for solar energy development. Under the solar
10 energy development program alternative, certain categories of land that are known or believed to
11 be unsuitable for utility-scale solar development would be excluded from development to guide
12 solar energy developers to areas where there are fewer resource conflicts and potential
13 controversy. This process, described as “screening for success,” would allow time and effort to
14 be directed to those projects which have a greater chance of success. Under this alternative, the
15 lands that would be excluded from solar energy development include BLM-administered lands
16 currently off-limits to solar energy development, including lands prohibited by law, regulation,
17 Presidential proclamation, or Executive Order (e.g., lands in the National Landscape

³ It is anticipated that elements of the existing policies addressing rental fees, terms of authorization, due diligence, bonding requirements, and BLM access to records would remain in effect.

1 Conservation System [NLCS]) along with lands that (1) have slopes greater than or equal to 5%,
2 (2) have solar insolation levels (i.e., the amount of sunlight that strikes the earth's surface) below
3 6.5 kWh/m²/day, and (3) have known resources, resource uses, or special designations identified
4 in local land use plans that are incompatible with solar energy development, as listed in
5 Table ES.2-2.⁴ On the basis of these exclusions, approximately 22 million acres (87,336 km²) of
6 BLM-administered lands would be available for ROW application under this alternative.
7

8 The BLM would also identify a number of SEZs within the lands available for ROW
9 application. An SEZ is defined by the BLM as an area with few impediments to utility-scale
10 production of solar energy where BLM would prioritize solar energy and associated transmission
11 infrastructure development. The proposed SEZs evaluated in this PEIS are shown in Figures
12 ES.2-2 through ES.2-7 and listed by state with acreage, BLM field office, and county in
13 Table ES.2-3. Approximately 677,400 acres (2,741 km²) have been identified as proposed SEZs.
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15 The BLM worked closely with BLM state and field office staff to identify potential SEZs
16 for further analysis and provided initial criteria to guide the effort. Staff was asked to identify
17 areas that were near existing transmission or designated corridors, near existing roads, generally
18 had a slope of 1 to 2% or less, and were a minimum of 2,500 acres (10.1 km²). Staff was also
19 requested to screen out NLCS lands and the classes of lands listed in Table ES.2-2. BLM state
20 and field office staff then applied additional filters based on local conditions, institutional
21 knowledge, and coordination efforts. In the future, based on lessons learned from individual
22 projects and/or new information (e.g., ecoregional assessments), the BLM could decide to
23 expand SEZs, add SEZs, or remove or reduce SEZs. Changes to SEZs would have to go through
24 a land use planning process, which would be subject to the appropriate environmental analysis.
25 Through the ROD for the PEIS, the BLM may decide to carry forward some or all of the
26 proposed SEZs as part of the agency's Solar Energy Program. Further, the Secretary of the
27 Interior may decide to withdraw the public lands encompassed in the SEZs from potentially
28 conflicting uses through the issuance of a Public Land Order.
29

30 This alternative would also establish comprehensive program administration and
31 authorization policies and design features to be applied to all utility-scale solar energy projects
32 on BLM-administered lands in the six-state study area. These policies and design features were
33 developed in part on the basis of impact analyses presented in Chapter 5. The BLM would
34 establish additional SEZ-specific design features to address SEZ-specific resource conflicts
35 identified in the analyses presented in Chapters 8 through 13. Collectively, these design features
36 represent the most widely accepted methods to avoid and/or minimize potential impacts from the
37 types of activities associated with solar energy development and to successfully administer solar
38 energy development on public lands. The proposed policies and design features are summarized
39 in the text box and presented in full in Section A.2 of Appendix A.
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⁴ The proposed exclusions would apply only to the siting of utility-scale solar energy generation facilities and not to any required supporting linear infrastructure, such as roads, transmission lines, and natural gas or water pipelines. Management decisions for supporting linear infrastructure, including available lands, are defined in existing applicable land use plans. Siting supporting infrastructure would be analyzed in project-specific environmental reviews.

TABLE ES.2-2 Areas for Exclusion under the BLM Solar Energy Development Program Alternative^a

1. Lands with slopes greater than or equal to 5%.
 2. Lands with solar insolation levels less than 6.5 kWh/m²/day.
 3. All Areas of Critical Environmental Concern (ACECs), including Desert Wildlife Management Areas (DWMAs) in the California Desert District.
 4. All critical habitat areas (designated and proposed) for listed species under the Endangered Species Act of 1973 (as amended).
 5. All areas where the applicable land use plan designates no surface occupancy (NSO).
 6. All areas where there is an applicable land use plan decision to protect lands with wilderness characteristics.
 7. All Special Recreation Management Areas (SRMAs), developed recreational facilities, and special-use permit recreation sites (e.g., ski resorts and camps).
 8. All areas where solar energy development proposals are not demonstrated to be consistent with the land use management prescriptions for or where the BLM has made a commitment to take certain actions with respect to sensitive species habitat, including but not limited to sage grouse core areas, nesting habitat, and winter habitat; Mohave ground squirrel habitat; and flat-tailed horned lizard habitat.
 9. All ROW exclusion areas designated in applicable plans.
 10. All ROW avoidance areas designated in applicable plans.
 11. All areas where the land use plan designates seasonal restrictions.
 12. All Desert Tortoise translocation sites identified in applicable land use plans.
 13. Big Game Migratory Corridors identified in applicable land use plans.
 14. Big Game Winter Ranges identified in applicable land use plans.
 15. Research Natural Areas.
 16. Lands categorized as Visual Resource Management Class I or II (and, in Utah, Class III^b).
 17. National Recreation Trails and National Back Country Byways.
 18. National Historic and Scenic Trails, including a corridor of 0.25 mi (0.4 km) from the centerline of the trail, except where a corridor of a different width has been established.
 19. National Historic and Natural Landmarks.
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TABLE 2.2-2 (Cont.)

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20. Within the boundary of properties listed in the *National Register of Historic Places* and additional lands outside the designated boundaries to the extent necessary to protect values where the setting and integrity is critical to their designation or eligibility.
 21. Areas with important cultural and archaeological resources, such as traditional cultural properties and Native American sacred sites, as identified through consultation.
 22. Wild, Scenic, and Recreational Rivers, including a corridor of 0.25 mi (0.4 km) from the ordinary high-water mark on both sides of the river, except where a corridor of a different width has been established.
 23. Segments of rivers determined to be eligible or suitable for Wild or Scenic River status, including a corridor of 0.25 mi (0.4 km) from the ordinary high-water mark on either side of the river.
 24. Old Growth Forest.
 25. Lands within a solar energy development application found to be inappropriate for solar energy development through an environmental review process that occurred prior to finalization of this PEIS.^c
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^a Consultation with the U.S. Fish and Wildlife Service is ongoing and could result in the modification, refinement, or addition of exclusion areas.

^b In Utah, Visual Resource Management (VRM) Class III lands have also been removed due to the high sensitivity and location proximity to Zion, Bryce, Capital Reef, Arches, and Canyonlands National Parks, and to significant cultural resource special management areas (in southeast Utah).

^c For example, lands considered, but not included in the approved applications for BrightSource Energy's Ivanpah Solar Electric Generating System, Tessera Solar's Imperial Valley and Calico Solar Projects, NextEra's Genesis Ford Dry Lake Solar Project, and Solar Millennium's Blythe Solar Project.

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Under the solar energy development program alternative, individual ROW applications would continue to be evaluated on a project-by-project basis; however, the BLM proposes that these evaluations would tier to the programmatic analyses presented in this PEIS and the decisions implemented in the resultant ROD and land use plan amendments to the extent appropriate. Site- and project-specific data would be assessed in the individual project reviews and impacts not adequately mitigated by the program's administration and authorization policies and design features would be addressed through the implementation of additional mitigation requirements incorporated into the project Plan of Development (POD) and ROW authorization stipulations. Analysis of an application may result in a decision to deny the application.

TABLE ES.2-3 Proposed SEZs and Approximate Acreage by State^a

Proposed SEZ (BLM Office/County)	Approximate Acreage
Arizona	
Brenda (Lake Havasu/La Paz)	3,878
Bullard Wash (Hassayampa/Yavapai)	7,239
Gillespie (Lower Sonoran/Maricopa)	2,618
Total	13,735
California	
Imperial East (El Centro/Imperial)	5,722
Iron Mountain (Needles/San Bernardino)	106,522
Pisgah (Barstow/ San Bernardino)	23,950
Riverside East (Palm Springs–South Coast/ Riverside)	202,896
Total	339,090
Colorado	
Antonito Southeast (La Jara/Conejos)	9,729
De Tilla Gulch (Saguache/Saguache)	1,522
Fourmile East (La Jara/Alamosa)	3,882
Los Mogotes East (La Jara/Conejos)	5,918
Total	21,050
Nevada	
Amargosa Valley (Southern Nevada/Nye)	31,625
Delamar Valley (Ely/Lincoln)	16,552
Dry Lake (Southern Nevada/Clark)	15,649
Dry Lake Valley North (Ely/Lincoln)	76,874
East Mormon Mountain (Ely/Lincoln)	8,968
Gold Point (Battle Mountain/Esmeralda)	4,810
Millers (Battle Mountain/Esmeralda)	16,787
Total	171,265
New Mexico	
Afton (Las Cruces/Dona Ana)	77,623
Mason Draw (Las Cruces/Dona Ana)	12,909
Red Sands (Las Cruces/Otero)	22,520
Total	113,052
Utah	
Escalante Valley (Cedar City/Iron)	6,614
Milford Flats South (Cedar City/Beaver)	6,480
Wah Wah Valley (Cedar City/Beaver)	6,097
Total	19,192
Total	677,384

^a To convert acres to km², multiply by 0.004047.

Required Elements of BLM’s Proposed Solar Energy Program

The BLM is proposing to establish a new Solar Energy Program, including a suite of program administration and authorization policies, programmatic design features, and SEZ-specific design features. These requirements have been defined on the basis of the general impact analyses presented in Chapter 5, SEZ-specific impact analyses presented in Chapters 8 through 13, scoping comments, and cooperating agency reviews. The proposed policies and design features are listed in Appendix A, Section A.2.

Policies

The proposed program administration and authorization policies establish requirements for coordination and/or consultation with other federal and state agencies, government-to-government consultation, and public involvement. Collectively, these policies will ensure that all projects are thoroughly reviewed, input is collected from all potentially affected land managers and interested stakeholders, and any project proposals that are anticipated to result in unacceptable adverse impacts are eliminated early in the application process.

Programmatic Design Features

Design features are mitigation measures that have been incorporated into the proposed action to avoid or reduce adverse impacts. The proposed programmatic design features would be applicable to all utility-scale solar energy projects on BLM-administered lands. They establish a broad array of requirements applicable to each phase of development (i.e., site evaluation, construction, operation, and decommissioning) to protect natural and cultural resources, resource uses, and specially designated areas.

SEZ-Specific Design Features

SEZ-specific design features will be required within individual SEZs in addition to the programmatic design features within individual SEZs. The SEZ-specific design features have been established to address specific resource conflicts within individual SEZs identified through the course of the PEIS impact analyses.

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As an element of the proposed program, the BLM would implement an adaptive management plan for solar energy development, developed in coordination with potentially affected natural resource management agencies, to ensure that new data and lessons learned about the impacts of solar energy projects would be reviewed and, as appropriate, incorporated into the program through revised policies and design features. Changes to BLM’s Solar Energy Program will be subject to appropriate environmental analysis and land use planning.

The elements of the new Solar Energy Program would be implemented through amendment of the land use plans within the six-state study area (see Appendix C).

ES.2.3.2 Solar Energy Zone Program Alternative

Under the SEZ program alternative, the BLM would adopt the same set of standard program administration and authorization policies and design features for utility-scale solar energy development as proposed under the solar energy development program alternative, but would authorize such utility-scale solar energy development only in the SEZs listed in Table ES.2-3. Unlike the solar energy development program alternative, lands outside of SEZs would be excluded from utility-scale solar energy development ROW applications. Under this alternative, about 677,400 acres (2,741 km²) of BLM-administered lands would be available for

1 ROW application. In the future, based on lessons learned from individual projects and/or new
2 information (e.g., ecoregional assessments), the BLM could decide to expand, add, remove, or
3 reduce SEZs. Changes to SEZs would have to go through a land use planning process, which
4 would be subject to the appropriate environmental analysis.
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6 Under the SEZ program alternative, the management of solar energy development on
7 BLM-administered lands would be the same as described for the solar energy development
8 program alternative. The BLM would establish comprehensive program administration and
9 authorization policies and design features (see Appendix A, Section A.2). The elements of the
10 BLM's new program under this alternative would be implemented through amendment of the
11 land use plans within the six-state study area (see Appendix C).
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14 **ES.2.3.3 No Action Alternative**

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16 Under the no action alternative, solar energy development would continue on BLM-
17 administered lands in accordance with the terms and conditions of the existing Solar Energy
18 Policies (BLM 2007; 2010a,b). The BLM would not implement a comprehensive Solar Energy
19 Program to provide guidance to BLM field staff, developers, and other stakeholders in the
20 six-state study area. Specifically, the required program administration and authorization policies
21 and design features and land use plan amendments proposed in the two action alternatives would
22 not be implemented. Future solar energy projects and land use plan amendments would continue
23 to be evaluated solely on an individual, case-by-case basis.
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26 **ES.2.3.4 Reasonably Foreseeable Solar Energy Development**

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28 A reasonably foreseeable development scenario (RFDS) was developed to help define
29 the potential magnitude of solar energy development that could occur within the six-state study
30 area over the next 20 years. Assumptions were made to further predict how that development
31 might be allocated between BLM- and non-BLM-administered lands. Two different
32 methodologies for calculating the RFDS were examined and the one providing the maximum
33 estimated development was used to establish an upper bound on potential environmental impacts
34 (see Appendix E). This methodology calculated the RFDS on the basis of the requirements for
35 electricity generation from renewable energy resources established in the Renewable Portfolio
36 Standards (RPSs) in each of the six states. To establish an upper bound, it was assumed that 75%
37 of development would occur on BLM-administered lands and that 50% of the RPS-based
38 requirement for renewable energy production would be provided from solar energy.
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40 On the basis of the RFDS, the estimated amount of solar energy generation on BLM-
41 administered lands in the study area over the 20-year study period is about 24,000 megawatts
42 (MW), with a corresponding dedicated use of about 214,000 acres (866 km²) of BLM-
43 administered lands. Table ES.2-4 presents the RFDS for each state in terms of projected
44 megawatts and estimated acres of land required to support that level of development.
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**TABLE ES.2-4 Reasonably Foreseeable Development Scenario
Projected Megawatts of Solar Power Development by 2030 and
Corresponding Developed Acreage Estimates^a**

State	Landholding	Estimated RFDS (MW)	Estimated Acres Developed under RFDS ^b
Arizona	BLM	2,424	21,816
	Non-BLM	808	7,272
California	BLM	15,421	138,789
	Non-BLM	5,140	46,260
Colorado	BLM	2,194	19,746
	Non-BLM	731	6,579
Nevada	BLM	1,701	15,309
	Non-BLM	567	5,103
New Mexico	BLM	833	7,497
	Non-BLM	278	2,502
Utah	BLM	1,219	10,971
	non-BLM	406	3,654
	Total for BLM- administered lands	23,791	214,119
	Total for non-BLM lands	7,930	71,370

^a See Appendix E for details on the methodologies used to calculate the RFDS.

^b Acreage calculated assuming land use of 9 acres/megawatt. To convert acres to km², multiply by 0.004047.

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The RFDS estimates are considered to be representative of the potential development that could occur under each of the alternatives examined in this PEIS. Although it is possible that the pace and total level of development on BLM-administered lands might be curtailed under two of the alternatives (as discussed below), the extent to which this might occur cannot be quantified at this time. Because the RFDS is based on RPS requirements, which are mandatory in each of the six states except Utah, it was assumed that development that does not occur on BLM-administered lands for various reasons would be made up for by development on non-BLM-administered lands within each state.

1 **ES.2.4 Summary of Impacts of BLM's Alternatives**

2
3 The BLM assessed the potential direct and indirect environmental, social, and economic
4 impacts of solar energy development at a programmatic level as well as for the individual SEZs.
5 The description of the affected environment, based on available regional-, state-, or county-level
6 data, is presented in Chapter 4. The programmatic analysis, presented in Chapter 5, identifies a
7 broad range of potential impacts for individual solar facilities, associated transmission facilities,
8 and other off-site infrastructure that might be required to support solar energy development. This
9 analysis identifies the impacts associated with typical facilities but does not consider site- or
10 project-specific data. This analysis also identifies potentially appropriate design features that
11 could be implemented to avoid or minimize impacts. The SEZ-specific impact analyses,
12 presented in Chapters 8 through 13, identify more specific impacts on the basis of the detailed
13 information about the affected environment in each SEZ. These analyses identify additional
14 design features that would be needed to address SEZ-specific resource conflicts. An analysis of
15 the environmental impacts anticipated under each alternative is presented in Chapter 6 and
16 summarized in Table ES.2-5.

17
18 In addition to the impact analyses described above, the BLM evaluated each alternative to
19 gauge the extent to which it would (1) meet the stated objectives for the PEIS identified in
20 Section ES.2.1, (2) assist the BLM in meeting the projected demand for utility-scale solar energy
21 development estimated by the RFDS, and (3) support the BLM's efforts to meet the mandates
22 established in the Energy Policy Act of 2005 and Secretarial Order 3285A1 (Secretary of the
23 Interior 2010). A detailed analysis of the alternatives is presented in Chapter 6. Table ES.2-6
24 presents a summary-level comparison of the management alternatives with respect to these three
25 criteria.

26
27 The BLM evaluated the cumulative impacts of solar energy development on
28 BLM-administered lands over the next 20 years, at the level projected by the RFDS
29 (see Section ES.2.3.4), in the context of other activities that also could impact environmental
30 resources in the six-state study area. Overall, the amount of BLM-administered lands that would
31 be dedicated to utility-scale solar energy development over the next 20 years would be relatively
32 small in comparison to all BLM-administered lands in the six-state study area (about
33 214,000 acres [866 km²] are assumed to be developed under the RFDS in comparison with a
34 total of 120 million acres [486,000 km²] of BLM-administered lands in the area). The
35 development of required linear infrastructure (e.g., roads, transmission lines, and natural gas or
36 water pipelines) would impact some additional lands, preferably in the form of upgrades to
37 previously existing infrastructure, but also through construction on previously undisturbed public
38 or private lands).

39
40 The contribution of solar development on BLM-administered lands to cumulative impacts
41 in the six-state study area would vary by resource. For some resources that have generally low
42 impacts (assuming implementation of required policies and design features) when considered
43 alone, cumulative impacts would also be low (e.g., for hazardous materials and waste, health and
44 safety, lands and realty, rangeland resources, military and civilian aviation, geologic setting and
45 soils, mineral resources, air quality, acoustic environment, paleontological resources,
46 transportation). For other resource impacts could be high, depending on site- and project-specific

TABLE ES.2-5 Summary-Level Assessment of Potential Environmental Impacts by Alternative^a

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Lands and Realty	<p>Utility-scale solar energy development would preclude other land uses within the project footprint and could alter the character of largely rural areas. Development of supporting infrastructure (e.g., new transmission lines, roads) would also locally impact land use. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features (e.g., stakeholder coordination/consultation, consolidation of infrastructure) could effectively avoid or minimize many of these impacts.</p>	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread.
Specially Designated Lands and Lands with Wilderness Characteristics	<p>Specially designated lands and lands with wilderness characteristics could be significantly impacted through direct and indirect impacts (e.g., visual impacts, reduced access, noise impacts, fugitive dust) during both the construction and operations phases. Impacts potentially could be dispersed across the 22 million acres.</p> <p>All NLCS lands (4,714,372 acres) would be excluded, along with SRMAs (3,213,151 acres); ACECs (3,474,696 acres); Desert Wildlife Management Areas (DWMAs); National Recreation Trails and National Back Country Byways; Wild, Scenic, and Recreational Rivers, and segments of rivers determined to be eligible or suitable for Wild and Scenic River status (not quantified).^b</p> <p>All areas where there is an applicable land use plan decision to protect lands with wilderness characteristics would be excluded (not quantified)</p>	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts but affect a smaller number of areas.	<p>Same impacts as solar energy development program alternative except that only NLCS lands currently off-limits to solar energy development would be excluded.</p> <p>Impacts could be potentially more widespread and greater to specially designated lands and lands with wilderness characteristics excluded under the action alternatives.</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Rangeland Resources	<p>Some livestock grazing allotments may be affected by solar energy development ROW authorizations through reductions in acreage and/or loss of animal unit months (AUMs).</p> <p>Wild horses and burros also could be affected with animals displaced from the development area; the number of wild horse and burro herd management areas (HMAs) overlapping with or in the vicinity of lands available for ROW application would be less than under the no action alternative.</p>	<p>Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller geographic area with a known set of grazing allotments.</p>	<p>Same impacts as solar energy development program alternative except impacts could be potentially more widespread and there is less certainty about which grazing allotments and HMAs potentially could be affected.</p>
Recreation	<p>Impacts potentially could be dispersed across the 22 million acres.</p> <p>Recreational uses would be precluded within lands used for solar energy development. Recreational experiences could be adversely impacted in areas proximate to solar energy projects and related transmission. Impacts potentially could be dispersed across the 22 million acres. All SRMAs excluded from solar energy development (3,213,151 acres), along with developed recreational facilities, and special-use permit recreation sites (not quantified)</p>	<p>Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts but affect fewer recreational resources.</p>	<p>Same impacts as solar energy development program alternative except SRMAs, recreational facilities, and special-use permit recreation sites not excluded.</p> <p>Impacts could be potentially more widespread and greater to those recreational areas excluded under the action alternatives.</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Military and Civilian Aviation	Military and civilian aviation impacts would be identified and adequately mitigated prior to BLM's issuance of a ROW authorization.	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread.
Geologic Setting and Soil Resources	Development of large blocks of land for solar energy facilities and related infrastructure would result in impacts to geologic and soil resources in terms of soil compaction and erosion, although these impacts could be effectively mitigated. Impacts to biological soil crusts would be long term and possibly irreversible. Impacts potentially could be dispersed across the 22 million acres.	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread.
Mineral Resources	Mineral development within the project footprint for utility-scale solar energy development would generally be an incompatible use; however, some resources underlying the project area might be developable (e.g., directional drilling for oil and gas or geothermal resources, underground mining). Impacts potentially could be dispersed across the 22 million acres. Lands within SEZs could be withdrawn from location and entry under the mining laws.	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread. No SEZs would be identified or withdrawn.

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Water Resources	<p>Solar thermal energy technologies with wet-cooling systems require large volumes of water, with potentially significant environmental impacts; however, such projects would be limited primarily to locations with ample groundwater supplies where water rights and the approval of water authorities could be obtained. Solar thermal projects with dry-cooling systems require less than one-tenth of the amount of water required for wet-cooling systems.</p> <p>All solar energy facilities require smaller volumes of water for mirror or panel washing and potable water uses, which would result in relatively minor impacts on water supplies.</p> <p>Other potential impacts, including modification of surface and groundwater flow systems, water contamination resulting from chemical leaks or spills, and water quality degradation by runoff or excessive withdrawals, can be effectively mitigated.</p>	<p>Same impacts solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts but affect fewer water resources.</p>	<p>Same impacts as solar energy development program alternative except impacts could be potentially more widespread.</p>
Vegetation	<p>Development likely to require total removal of vegetation at most facilities, which could result in significant direct impacts in terms of increased risk of invasive species introduction, changes in species composition and distribution, habitat loss (e.g., dune or riparian areas), and damage to biological soil crusts. Indirect impacts also likely in terms of dust deposition, altered drainage patterns, runoff, and sedimentation. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features (e.g., invasive species control programs, fugitive dust control, minimizing size of disturbed areas) could significantly reduce many of these impacts.</p> <p>Multiple exclusions would avoid such impacts, including exclusion of ACECs, Research Natural Areas, and Old Growth Forest (not quantified).</p>	<p>Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts but affect a smaller number of areas.</p> <p>About 48% of the SEZ lands are located within the Sonoran Basin and Range</p>	<p>Same impacts as solar energy development program alternative except there would be no explicit exclusions to avoid known sensitive vegetation resources.</p> <p>Impacts could be potentially more widespread and greater to those vegetation resources excluded under the action alternatives.</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Vegetation (Cont.)	<p>About 46% of the lands available for ROW application are located within the Central Basin and Range Ecoregion. About 14% each of the Central Basin and Range and Chihuahuan Deserts Ecoregions, 11% of the Sonoran Basin and Range Ecoregion, and 5% of the Madrean Archipelago Ecoregion are located within the lands that would be available for application. Other ecoregions coincide with these lands at levels below 5%.</p> <p>The land cover types for the following example species overlap with lands that would be available for ROW application by the percentage shown:</p> <p>Joshua tree – 7% Saguaro – 10%</p>	<p>Ecoregion. Of the five ecoregions that coincide with SEZs, 1% or less of each ecoregion would be available for ROW application.</p> <p>Less than 1% of the land cover type for Joshua tree and saguaro species are located within the SEZs.</p>	<p>Lands available for ROW application span 22 ecoregions. About 44% of the available lands are located within the Central Basin and Range Ecoregion. Over 50% of 2 ecoregions (Central Basin and Range, Northern Basin and Range) would be available for application.</p> <p>The land cover types for the following species overlap with the lands that would be available for ROW application by the percentage shown:</p> <p>Joshua tree – 32% Saguaro – 26%</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Wildlife and Aquatic Biota	<p>Numerous wildlife species would be adversely impacted by loss of habitat, disturbance, loss of food and prey species, loss of breeding areas, effects on movement and migration, introduction of new species, habitat fragmentation, and changes in water availability. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features (e.g., limiting land disturbance, conducting pre-disturbance surveys, controlling surface water runoff) could reduce many of these impacts.</p> <p>Multiple exclusions would avoid such impacts, including exclusion of ACECs, big game migratory corridors and winter ranges, Research Natural Areas, and lands with seasonal restrictions (not quantified).</p> <p>The following example species' habitats overlap with lands that would be available for ROW application by the percentage shown:</p> <ul style="list-style-type: none"> Western rattlesnake – 6% Golden eagle – 5% Black-tailed jackrabbit – 6% Pronghorn – 5% Mule deer – 6% Mountain lion – 5% 	<p>Same impacts as solar energy development program alternative except the potential area of impact would be limited to a smaller, known geographic area.</p> <p>Less than 1% of the habitats for western rattlesnake, golden eagle, black-tailed jackrabbit, pronghorn, mule deer, and mountain lion are located within the SEZs.</p>	<p>Same impacts solar energy development program alternative except there would be no explicit exclusions to avoid known sensitive wildlife resources.</p> <p>Impacts could be potentially more widespread and greater to those wildlife resources excluded under the action alternatives.</p> <p>The following species' habitats overlap with the lands that would be available for ROW application by the percentage shown:</p> <ul style="list-style-type: none"> Western rattlesnake – 27% Golden eagle – 23% Black-tailed jack rabbit – 24% Pronghorn – 22% Mule deer – 22% Mountain lion – 21%

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Special Status Species	<p>Special status species and critical habitats would be protected in accordance with ESA requirements either through avoidance, translocation (plants), or acquisition and protection of compensatory habitat. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Critical habitat designated or proposed by USFWS would be excluded (over 5,954,000 acres). All ACECs designated for habitat would be excluded along with identified Desert Tortoise translocation sites and other areas where BLM has made a commitment to protect sensitive species (not quantified).</p> <p>Lands available for ROW application include areas of potentially suitable habitat for special status species (see Appendix J). For example, the following species' habitats overlap by the percentage shown:</p> <p>Plants:</p> <ul style="list-style-type: none"> Nevada dune beardtongue – 61% White-margined beardtongue – 8% Munz's cholla – 16% <p>Animals:</p> <ul style="list-style-type: none"> Desert tortoise – 12% Western burrowing owl – 8% Greater sage-grouse – 8% Gunnison prairie dog – 3% Gunnison sage-grouse – 1% Northern aplomado falcon – 11% Southwestern willow flycatcher -- <1% Townsend's big-eared bat – 7% Utah prairie dog – 12% 	<p>Special status species and critical habitats would be protected as under solar energy development program alternative.</p> <p>Same exclusions as under solar energy development program alternative, except, in some states, habitat identified by state fish and game agencies would also be excluded (not quantified).</p> <p>Lands available for ROW application include areas of potentially suitable habitat for special status species (see Appendix J). For example, about 1% or less of the habitat for two plant species (Nevada dune beard tongue, white-margined beard tongue) and nine animal species (desert tortoise, western burrowing owl, greater sage-grouse, Gunnison prairie dog, Gunnison sage-grouse, northern aplomado falcon,</p>	<p>Special status species and critical habitats would be protected as under solar energy development program alternative.</p> <p>Critical habitat, ACECs designated for habitat value, and other areas where BLM has made a commitment to protect sensitive species would not be excluded.</p> <p>Lands available for ROW application include areas of potentially suitable habitat for special status species (see Appendix J). For example, the following species' habitats overlap by the percentage shown:</p> <p>Plants:</p> <ul style="list-style-type: none"> Nevada dune beardtongue – 66% White-margined beardtongue – 34% Munz's cholla – 45%

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Special Status Species (Cont.)		southwestern willow flycatcher, Townsend's big-eared bat, and Utah prairie dog) is located within the SEZs; about 4% of the plant Munz's cholla habitats is located with the SEZs.	Animals: Desert tortoise – 29% Western burrowing owl – 27% Greater sage-grouse – 54% Gunnison prairie dog – 15% Gunnison sage-grouse – 24% Northern aplomado falcon – 26% Southwestern willow flycatcher -- 7% Townsend's big-eared bat – 23% Utah prairie dog – 36%
Air Quality and Climate	Air quality would be adversely affected locally and temporarily during construction by fugitive dust and vehicle emissions, although impacts would be relatively minor and could be mitigated (e.g., dust control measures, emissions control devices, vehicle maintenance). Impacts potentially could be dispersed across the 22 million acres. Operations would result in few air quality impacts. Relatively minor CO ₂ emissions would be generated by the use of heavy equipment, vehicles, and backup generators. Overall, CO ₂ emissions would be reduced if solar energy production offsets fossil fuel energy production.	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts, particularly during construction, but affect a smaller number of areas.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread and of smaller magnitude locally. Carbon dioxide emission reductions would occur more slowly if the pace of development is slower.

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Visual Resources	<p>Solar energy projects and associated infrastructure introduce strong contrasts in forms, line, colors, and textures of the existing landscape which may be perceived as negative visual impacts. Suitable development sites typically located in basin flats surrounded by elevated lands where sensitive viewing locations exist. Impacts potentially would be dispersed across the 22 million acres.</p> <p>Design features could reduce impacts but some large impacts cannot be avoided.</p> <p>All NLCS lands (4,714,372 acres) would be excluded, ACECs, (3,474,696 acres), SRMAs (3,213,151 acres), along with developed recreational facilities, special-use permit recreation sites, National Recreation Trails, and National Back Country Byways (not quantified).</p> <p>902 potentially sensitive visual resource areas (not including ACECs) are located in or within 25 mi (40 km) of the lands available for ROW viewsheds.</p>	<p>Same impacts as solar energy development program alternative except the impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts, particularly during construction, but affect a smaller number of areas.</p> <p>SEZs are visible from 149 potentially sensitive visual resource areas (not including ACECs) within 25 mi.</p>	<p>Same impacts as solar energy development program alternative except that only NLCS lands currently off-limits to solar energy development would be excluded.</p> <p>Impacts could be potentially more widespread and greater to those areas excluded under the action alternatives.</p> <p>1,510 potentially sensitive visual resource areas (not including ACECs) are located in or within 25 mi (40 km) of the lands available for ROW application and could be affected by solar development within their viewsheds.</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Acoustic Environment	<p>Construction related noise could adversely affect nearby residents and/or wildlife, and would be greatest for CSP projects requiring power block construction. Operations related noise impacts would generally be less significant than construction related noise impacts but could still be significant for some receptors located near power block or dish engine facilities. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features (e.g., siting, engineering controls) would significantly reduce impacts in some circumstances.</p>	<p>Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts, particularly during construction, but affect a smaller number of areas.</p>	<p>Same impacts as solar energy development program alternative except impacts could be potentially more widespread.</p>
Paleontological Resources	<p>Paleontological resources subject to loss during construction but impacts also possible during operations. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features would significantly reduce impacts.</p>	<p>Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area.</p>	<p>Same impacts as solar energy development program alternative except impacts could be potentially more widespread.</p>
Cultural Resources and Native American Concerns	<p>Cultural resources subject to loss during construction but impacts also possible during operations. Impacts potentially could be dispersed across the 22 million acres.</p> <p>Design features (e.g., minimizing land disturbance, consultation and records searches, training and education programs) would significantly reduce some impacts.</p>	<p>Same impacts as development program except impacts would be concentrated into a smaller, known geographic area.</p>	<p>Same impacts as solar energy development program alternative except there would be no explicit exclusions to avoid known sensitive cultural resources.</p>

TABLE ES.2-5 (Cont.)

Resource	Solar Energy Development Program Alternative (Approximately 22 million acres available for application)	SEZ Program Alternative (Approximately 677,000 acres available for application)	No Action Alternative (Approximately 99 million acres available for application)
Cultural Resources and Native American Concerns (Cont.)	ACECs designated for cultural or historic resource values, National Historic and Scenic Trails, National Historic and Natural Landmarks, properties designated or eligible for the National Register of Historic Places, and areas with important cultural and archaeological resources excluded.		Impacts could be potentially more widespread and greater to those cultural resources excluded under the action alternatives.
Transportation	Local road systems and traffic flow could be adversely impacted during construction. Impacts during operations would be minor. Impacts potentially could be dispersed across the 22 million acres. Design features (e.g., road improvements, ride-sharing programs, staggered work schedules, traffic control measures) would significantly reduce impacts.	Same impacts as solar energy development program alternative except impacts would be concentrated into a smaller, known geographic area. This could increase the magnitude of potential impacts, particularly during construction, but affect a smaller number of areas.	Same impacts as solar energy development program alternative except impacts could be potentially more widespread.

^a To convert acres to km², multiply by 0.004047.

^b The acreage estimates were calculated on the basis of the best available GIS data. GIS data were not available for the entire set of exclusions and, therefore, the acreages cannot be quantified at this time.

TABLE ES.2-6 Comparison of BLM’s Alternatives with Respect to Objectives for the Agency’s Action

Objective	Solar Energy Development Program Alternative	SEZ Program Alternative	No Action Alternative
Facilitate near-term utility-scale development on public land	Increased pace of development	Increased pace of development likely due to detailed analyses of SEZs	No discernible effect on pace of development
	Development in the prioritized SEZs likely to occur at an even faster pace	Reduced costs to the government, developers, and stakeholders	Development could shift toward nonfederal lands, making it more difficult for BLM to achieve its mandates ^a
	Reduced costs to the government, developers, and stakeholders	Effective in assisting BLM in meeting its mandates ^a	
	Effective in assisting BLM in meeting its mandates ^a		
Minimize potential environmental impacts	Comprehensive program to identify and avoid, mitigate, or minimize potential adverse impacts	Comprehensive program to identify and avoid, mitigate, or minimize potential adverse impacts	Environmental impacts evaluated project-by-project with potential for inconsistencies in the type and degree of required mitigation
	Protection of resources, resource uses, and special designations through combination of exclusions and mitigation	Development limited to the SEZs, protecting more resources, resource uses, and special designations through avoidance	If development shifts to nonfederal lands, it would be subject to less federal environmental oversight and public involvement
	Prioritization of development in SEZs, which were identified as lands well-suited for solar energy development where potential resource conflicts have been identified and appropriate mitigation has been suggested	Additional mitigation required in SEZs	Potentially would allow a greater degree of development on previously disturbed lands
	Potentially would allow a greater degree of development on previously disturbed lands		

TABLE ES.2-6 (Cont.)

Objective	Solar Energy Development Program Alternative	SEZ Program Alternative	No Action Alternative
Minimize potential social and economic impacts	Economic benefits in terms of (1) direct and indirect jobs and income created and (2) ROW rental payments to the Federal Government	Economic benefits in terms of (1) direct and indirect jobs and income created and (2) ROW rental payments to the Federal Government	Potential economic benefits essentially the same as under the action alternatives, although realized at a slower rate if pace of development is slower
	Prioritization of development in the SEZs, could concentrate benefits in a smaller number of local economies	With development limited to the SEZs, benefits would be concentrated in a smaller number of local economies	Less potential for these benefits to be concentrated in specific areas
	Potential adverse and beneficial social impacts	Potential adverse and beneficial social impacts	
Provide flexibility to solar industry	A great degree of flexibility in identifying appropriate locations for utility-scale development	Limited flexibility in identifying appropriate locations for utility-scale development	Maximum degree of flexibility in identifying appropriate locations for utility-scale development
			Limited guidance to developers on which lands and projects would ultimately be approvable
Optimize existing transmission infrastructure and corridors	Opportunities for developers to identify and propose projects that optimize existing transmission infrastructure and/or designated corridors	Opportunities for developers to identify and propose projects that optimize existing transmission infrastructure and/or designated corridors limited to SEZs	Maximum opportunities for developers to identify and propose projects that optimize existing transmission infrastructure and/or designated corridors
		Opportunities to consolidate infrastructure required for new solar facilities	

TABLE ES.2-6 (Cont.)

Objective	Solar Energy Development Program Alternative	SEZ Program Alternative	No Action Alternative
Standardize and streamline authorization process	Streamlining of project review and approval processes; more consistent management of ROW applications With prioritization of development in the SEZs, additional streamlining of opportunities over development on other available lands	Streamlining of project review and approval processes; more consistent management of ROW applications	No discernible effect in terms of standardizing and streamlining the authorization process
Meet projected demand for solar energy development as estimated by the RFDS	About 22 million acres ^b available for ROW application, which is more than adequate to support the RFDS projected level of development	Less than 677,400 acres available for ROW application, which may not be enough land to support the RFDS projected level of development in some states BLM identification of additional SEZs in the future would make additional land available but would require additional environmental review and land use plan amendments	About 99 million acres available for ROW application, which is more than adequate to support the RFDS projected level of development

^a These mandates are established by the Energy Policy Act of 2005 (P.L. 109-58) and Secretarial Order 3285A1 (Secretary of the Interior 2010) (see Section 1.1).

^b To convert acres to km², multiply by 0.004047.

1 factors (e.g., impacts on specially designated areas and lands with wilderness characteristics,
2 recreation, water resources, vegetation, wildlife and aquatic biota, special status species, visual
3 resources, cultural resources, Native American concerns, and environmental justice). Potentially,
4 prioritized development in the SEZs would result in greater concentrations of impacts in the
5 vicinity of the SEZs. Accordingly, the BLM also evaluated the cumulative impacts of
6 development on an SEZ-specific basis, assuming a maximum development scenario for each
7 SEZ, regardless of the state-specific RFDS projections. However, such concentration cannot be
8 assumed under the solar energy development program alternative, which makes approximately
9 22 million acres (87,336 km²) of land available. Under the new BLM Solar Energy Program
10 proposed by both action alternatives, potential environmental impacts would be mitigated to the
11 maximum extent possible by the required policies and design features.

14 **ES.2.5 BLM's Preferred Alternative**

16 The BLM has selected the solar energy development program alternative as the preferred
17 alternative for the purposes of the Draft PEIS. On the basis of the comparisons presented in
18 Table ES.2-6, the BLM has determined that the solar energy development program alternative
19 would best meet the BLM's objectives for managing utility-scale solar energy development on
20 BLM-administered lands. It would likely result in the highest pace of development at the lowest
21 cost to the government, developers, and stakeholders. Simultaneously, it would provide a
22 comprehensive approach for ensuring that potential adverse impacts would be minimized to the
23 greatest extent possible. If the pace of development is greatest under this alternative, it would
24 accelerate the rate at which the economic and environmental benefits would be realized at the
25 local, state, and regional levels. This alternative would make an adequate amount of lands
26 available to support the level of development projected in the RFDS and would provide a great
27 deal of flexibility in siting both solar energy facilities and associated transmission infrastructure.
28 In addition, the solar energy development program alternative would be very effective at
29 facilitating development on BLM-administered lands in accordance with the mandates of the
30 Energy Policy Act of 2005 and Secretarial Order 3285A1 (Secretary of the Interior 2010).

33 **ES.3 DOE'S PROPOSED ACTION**

35 As discussed in Chapter 1, different offices within DOE address different aspects and/or
36 approaches to the mission of solar power development. For example, the Solar Energy
37 Technologies Program (Solar Program) of DOE's Office of Energy Efficiency and Renewable
38 Energy is working to improve the efficiency and reduce the cost of solar technology through
39 research, development, and demonstration in partnership with industry, universities, and national
40 laboratories. The Solar Program also facilitates the deployment of solar technology through
41 resource assessment; development of codes and standards; market and policy analysis; and by
42 providing technical information to national, state, and local entities. DOE is also evaluating its
43 sites around the country for suitability for various renewable energy technologies, including
44 solar. As another example, the Solar Program and the DOE's National Nuclear Security
45 Administration (NNSA) have proposed a solar demonstration project at the Nevada National
46 Security Site (previously named the Nevada Test Site). In addition, DOE's Loan Guarantee

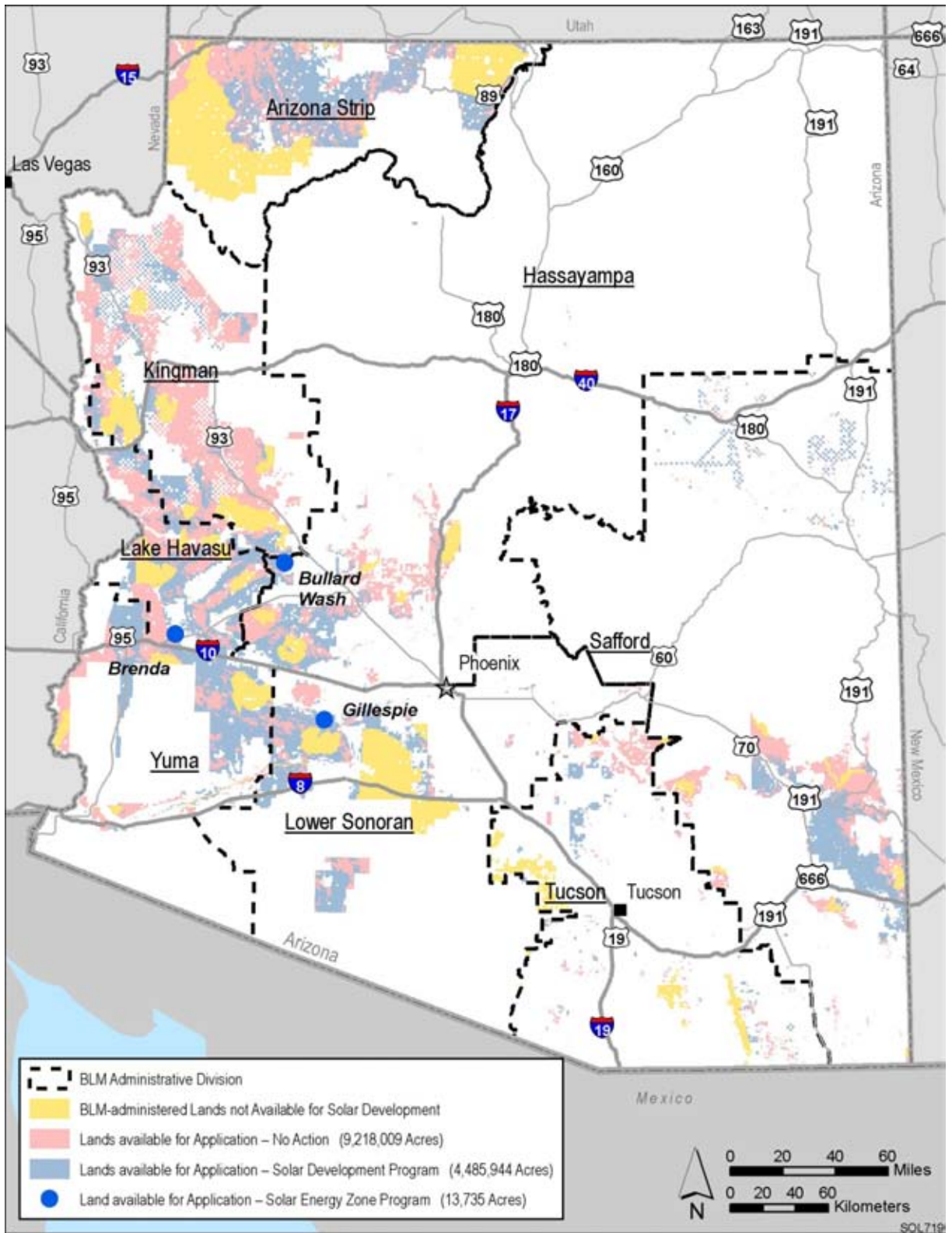
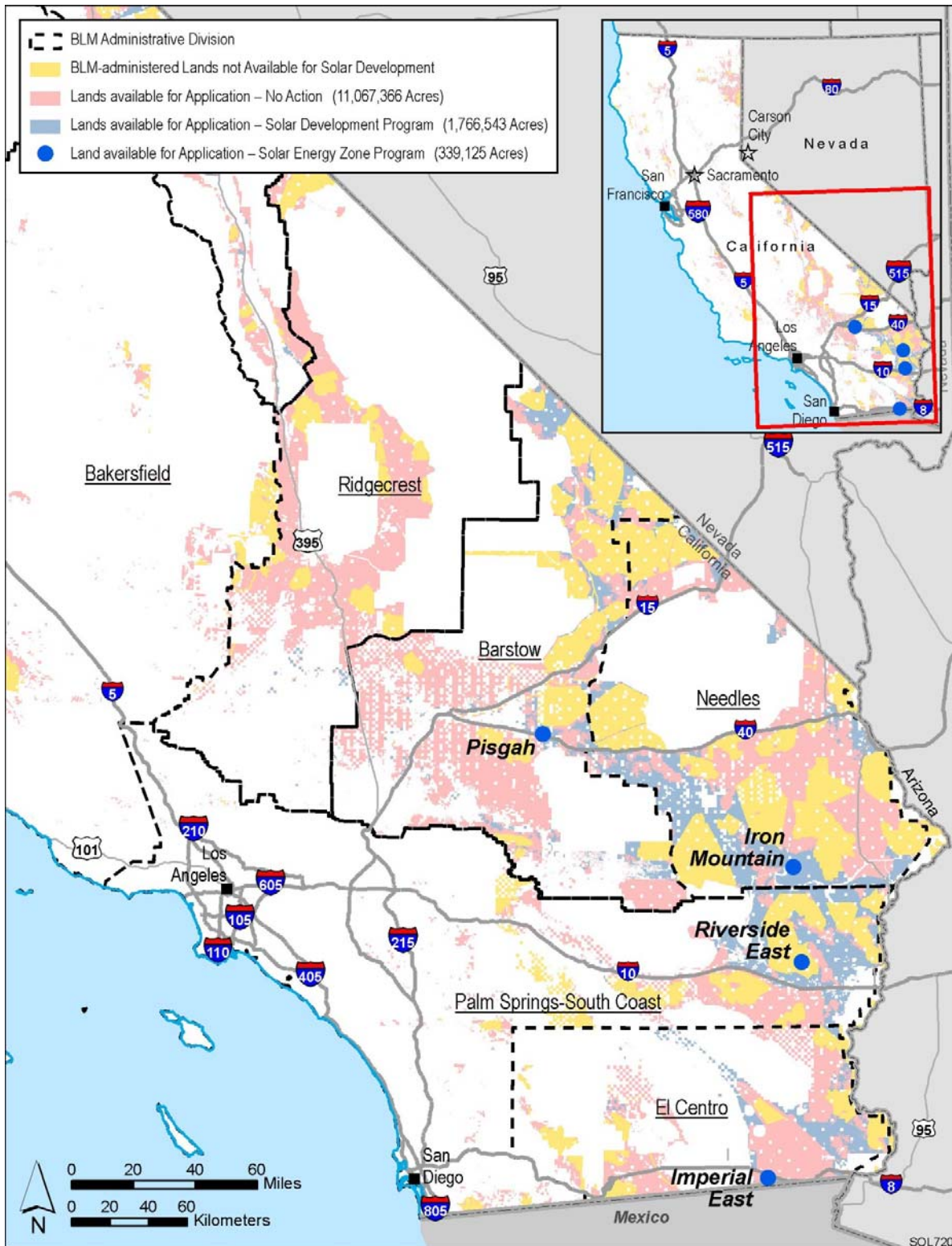


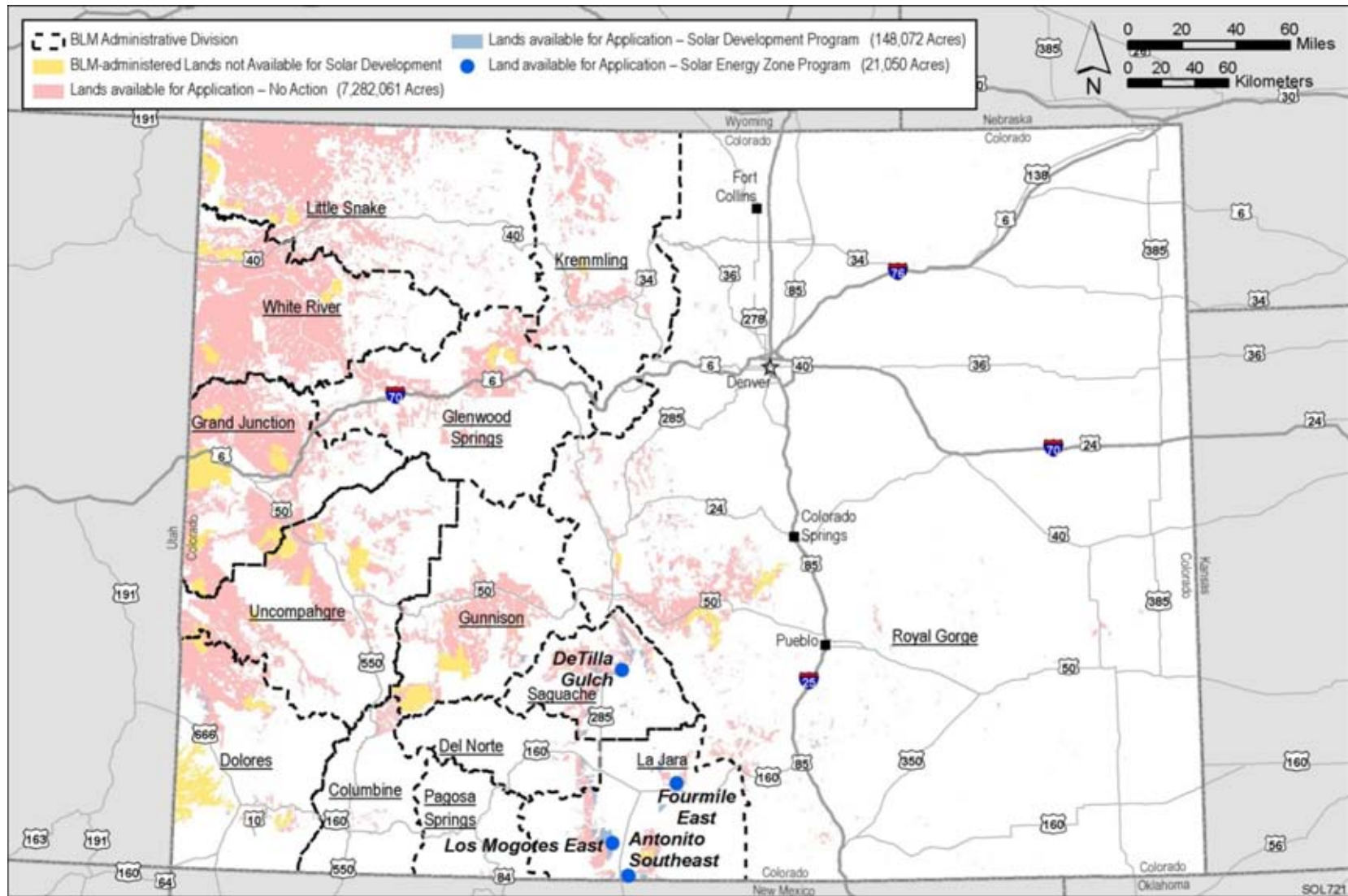
FIGURE ES.2-2 BLM-Administered Lands in Arizona Available for Application for Solar Energy ROW Authorizations under the BLM Alternatives Considered in This PEIS (Note: the lands available under the no action alternative include both the pink and blue shaded areas.)



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4

FIGURE ES.2-3 BLM-Administered Lands in California Available for Application for Solar Energy ROW Authorizations under the BLM Alternatives Considered in This PEIS (Note: the lands available under the no action alternative include both the pink and blue shaded areas.)



1
2 **FIGURE ES.2-4 BLM-Administered Lands in Colorado Available for Application for Solar Energy ROW Authorizations under**
3 **the BLM Alternatives Considered in This PEIS (Note: the lands available under the no action alternative include both the pink and**
4 **blue shaded areas.)**

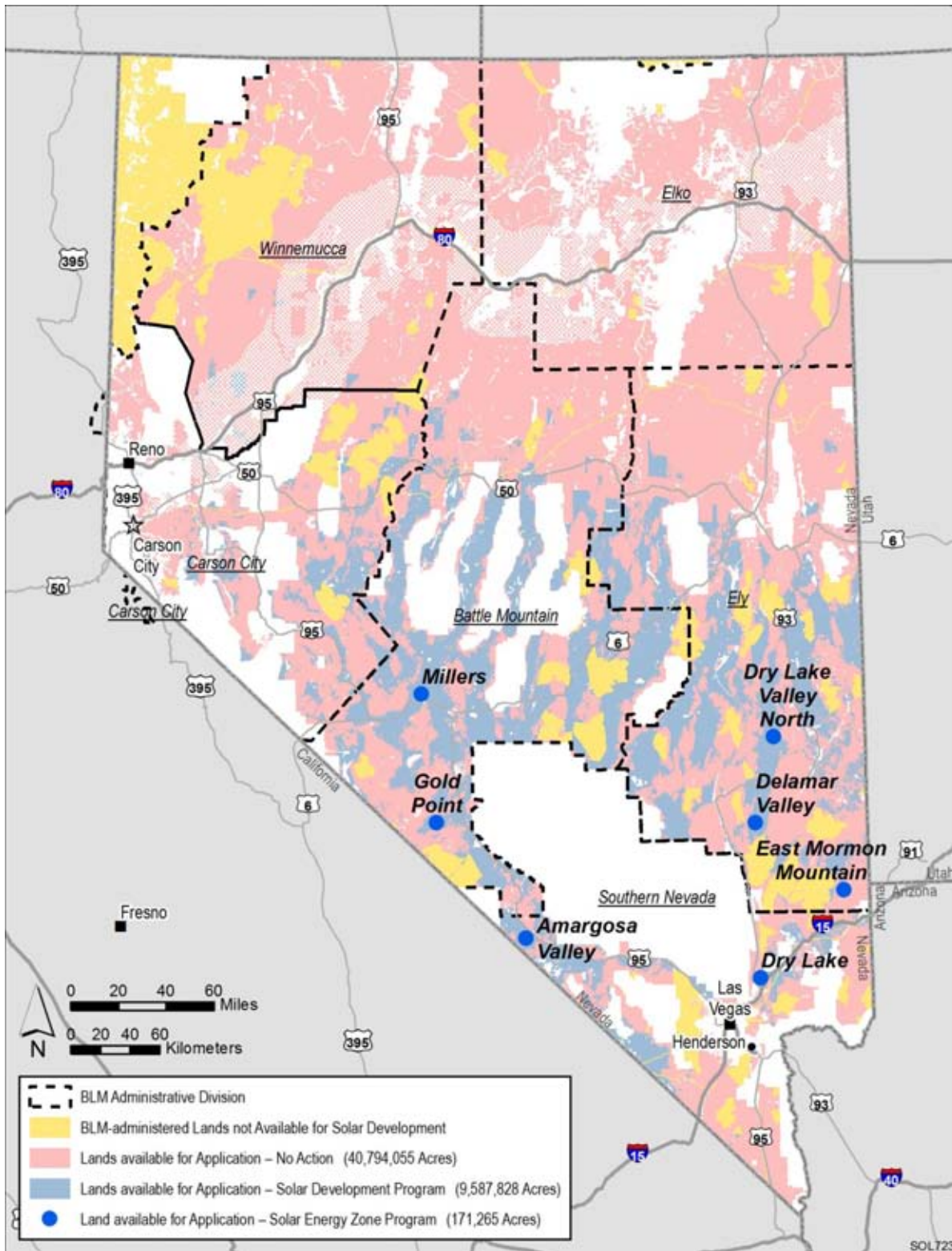
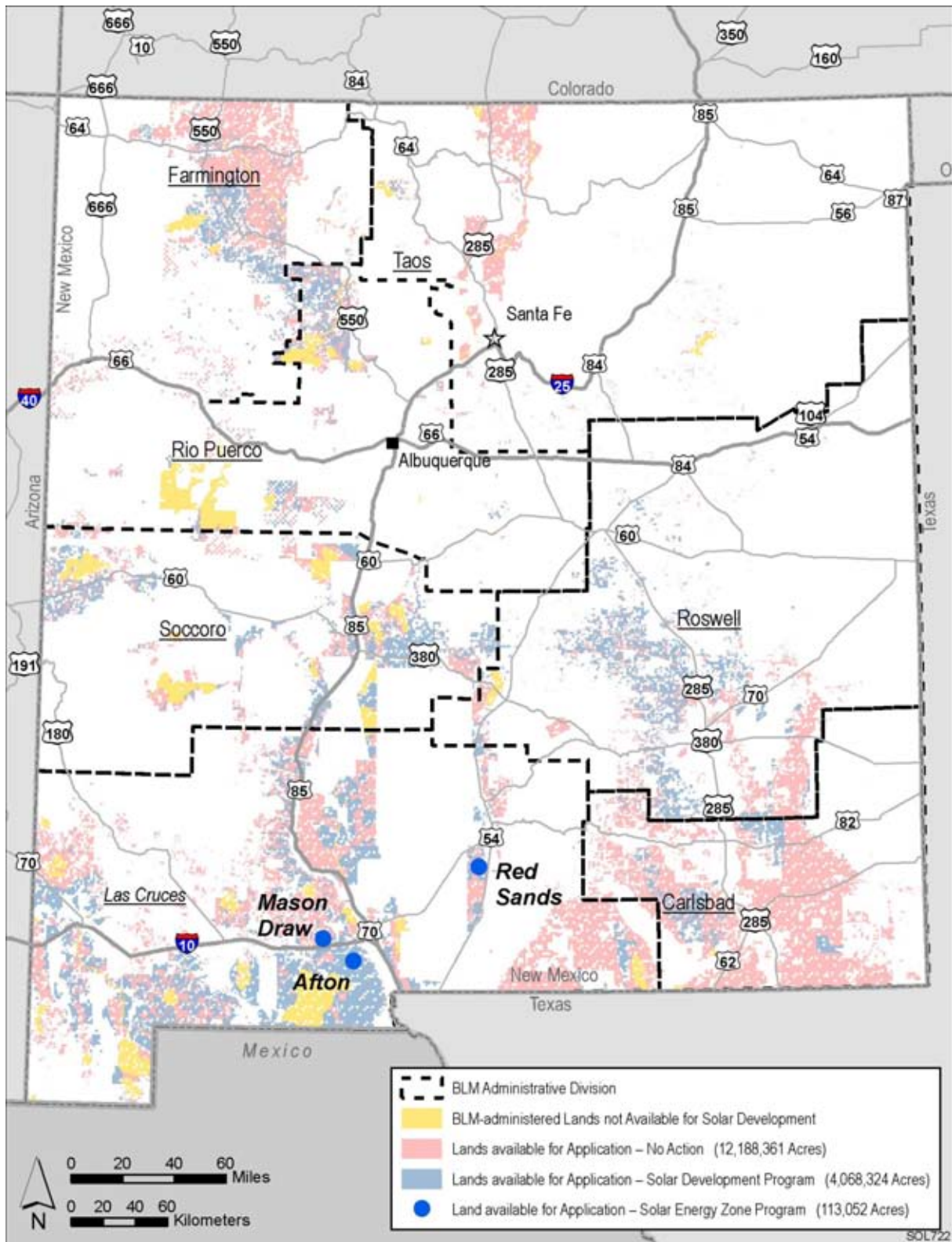
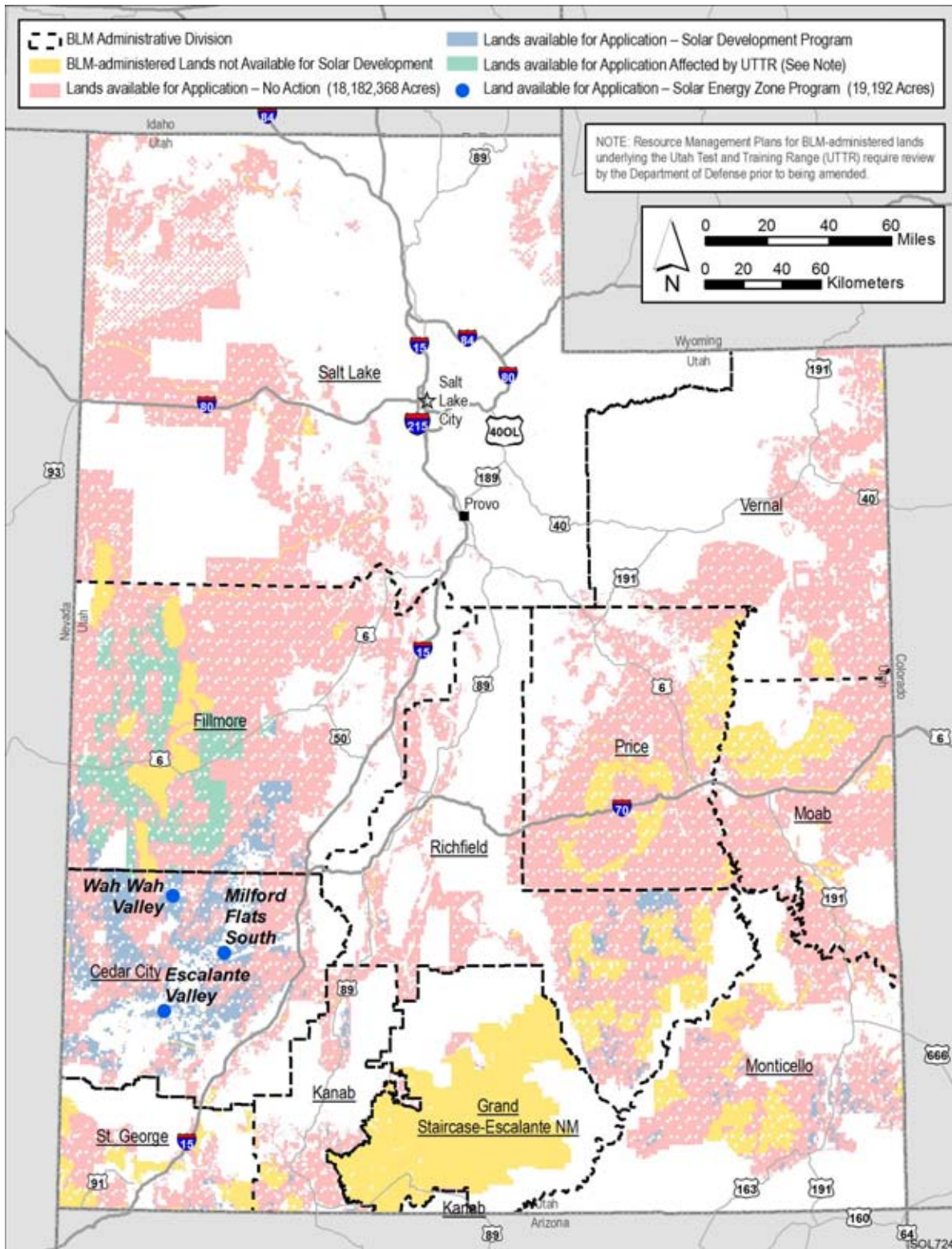


FIGURE ES.2-5 BLM-Administered Lands in Nevada Available for Application for Solar Energy ROW Authorizations under the BLM Alternatives Considered in This PEIS (Note: the lands available under the no action alternative include both the pink and blue shaded areas.)





1

2 **FIGURE ES.2-7 BLM-Administered Lands in Utah Available for Application for Solar**
 3 **Energy ROW Authorizations under the BLM Alternatives Considered in This PEIS (Note: the**
 4 **lands available under the no action alternative include both the pink and blue shaded areas.)**
 5

1 Program provides financial support for the development of renewable energy projects, including
2 solar energy projects implemented at utility scale.

3
4 DOE's Western Area Power Administration (Western) markets and transmits wholesale
5 electrical power through an integrated 17,000-circuit mile, high-voltage transmission system
6 across 15 western states, including parts of the six-state study area for this PEIS. Western's Open
7 Access Transmission Service Tariff provides open access to its transmission system. Western
8 provides these services through an interconnection if there is available capacity on the
9 transmission system, while protecting power deliveries to existing customers and transmission
10 system reliability, and considering the applicant's objectives. With respect to new utility-scale
11 solar energy facilities, any interconnection between such a facility and the Western transmission
12 system would need to comply with Western's interconnection policies and environmental
13 requirements and would require NEPA review in accordance with DOE's NEPA regulations.

14
15 While solar technologies generally are considered to be clean and sustainable, they can
16 result in adverse direct and indirect impacts on the environment, especially utility-scale facilities.
17 DOE is interested in exploring new ways to generate and store energy captured from the sun
18 while minimizing the impacts of solar development on the environment and reducing the cost of
19 solar energy development. DOE is committed to supporting the development of these and other
20 solar and renewable energy projects in an environmentally responsible manner.

21 22 23 **ES.3.1 DOE's Purpose and Need**

24
25 As discussed in Chapter 1, DOE is required to take actions to meet mandates under
26 Executive Order (E.O.) 13212, "Actions to Expedite Energy-Related Projects" (*Federal Register*,
27 Volume 66, page 28357, May 22, 2001); E.O. 13514, "Federal Leadership in Environmental,
28 Energy, and Economic Performance" (*Federal Register*, Volume 74, page 52117, Oct. 5, 2009);
29 and Section 603 of the Energy Independence and Security Act of 2007 (EISA) (P.L. 109-58).
30 DOE's purpose and need is to satisfy both E.O.s and comply with congressional mandates to
31 promote, expedite, and advance the production and transmission of environmentally sound
32 energy resources, including renewable energy resources and, in particular, cost-competitive solar
33 energy systems at the utility scale.

34
35 Specifically, DOE proposes to further integrate environmental considerations into its
36 analysis and selection of solar projects that it will support. DOE will build on the BLM's
37 analysis of potential impacts of utility-scale solar development on the environment for all phases
38 of development, and on the identified potential mitigation measures, to provide a technical basis
39 for development of guidance. DOE would consider, as appropriate, the relevance of the
40 analytical results for all lands, not just BLM-administered lands.

41
42 DOE would use this information to develop guidance for the development of solar energy
43 projects. DOE's investment and deployment strategy would incorporate a decision-making
44 framework of guidance for early consideration of sound environmental practices and potential
45 mitigation measures for solar energy development. Development of a framework of guidance,
46 based on the analyses of the PEIS, would give DOE the tools with which to make more

1 informed, environmentally sound decisions at the outset, would help to streamline future
2 environmental analysis and documentation for DOE-supported solar projects, and would support
3 DOE's efforts to comprehensively (1) determine where to make technology and resource
4 investments to minimize the environmental impacts of solar technologies, and (2) establish
5 environmental mitigation recommendations for financial assistance recipients to consider in
6 project plans when applying for DOE funding.

7
8 Western's purpose and need for participating in this PEIS is to identify potential
9 transmission impacts and recommend mitigation measures for transmission lines associated with
10 solar energy projects. Western anticipates using the transmission environmental impact and
11 mitigation measures analysis in this PEIS to streamline its own NEPA documents once specific
12 projects are identified and interconnection requests are filed with Western. With the PEIS
13 providing the basis for this analysis, project-specific NEPA documentation for interconnections
14 should be more concise and take less time to prepare, resulting in efficiencies for both Western
15 and the project proponent.

16 17 18 **ES.3.2 DOE's Scope of Analysis**

19
20 The geographic scope of applicability for DOE's proposed guidance includes both
21 BLM-administered lands and other lands (e.g., private) in the six-state study area. DOE may
22 support solar projects within SEZs identified by the BLM; on other BLM-administered lands; or
23 on other federal, state, Tribal, or private lands. Similarly, Western may be involved in associated
24 transmission development on lands administered by any of these entities.

25
26 The scope of the impact analysis includes an assessment of the environmental, social,
27 and economic impacts of utility-scale solar facilities and required transmission connections from
28 these facilities to the existing electricity transmission grid. Viable solar technologies to be
29 deployed over the next 20 years include parabolic trough, power tower, dish engine systems,
30 and PV.

31 32 33 **ES.3.3 DOE's Alternatives**

34
35 Through this PEIS, DOE is evaluating two alternatives: an action alternative (proposed
36 action) and a no action alternative.

37 38 39 **ES.3.3.1 DOE's Proposed Action**

40
41 Under the proposed action (action alternative), DOE would develop programmatic
42 guidance to further integrate environmental considerations into its analysis and selection of solar
43 projects that it will support. DOE would use the information about environmental impacts
44 provided in this PEIS to appropriately amend its programmatic approaches to facilitate the
45 advancement of solar energy development. This proposed action has been developed to support
46 DOE in meeting the mandates discussed in Chapter 1 that provide the purpose and need for

1 agency action. Specifically, these mandates are established by E.O.s 13212 and 13514 and
2 Section 603 of the EISA. Collectively, these mandates require DOE to promote, expedite, and
3 advance the production and transmission of environmentally sound energy resources, including
4 renewable energy resources and solar energy in particular.
5
6

7 **ES.3.3.2 DOE's No Action Alternative**

8

9 Under the no action alternative, DOE would continue to conduct environmental reviews
10 of DOE-funded solar projects on a case-by-case basis. It would not develop programmatic
11 guidance and explicit environmental practices and mitigation recommendations to apply to DOE-
12 funded solar projects.
13
14

15 **ES.3.4 Summary of Impacts of DOE's Alternatives**

16

17 Under DOE's proposed action (action alternative), the department would develop
18 guidance to amend its programmatic approaches, as appropriate, to facilitate the advancement of
19 solar energy development. Investment and deployment strategies would incorporate guidance on
20 environmental practices and mitigation strategies into the decision-making process; the guidance
21 would be based on information concerning environmental impacts and potentially applicable
22 mitigation measures provided in this PEIS. With this guidance, DOE would have the tools for
23 making more informed, environmentally sound decisions on projects.
24

25 One advantage of the guidance would be to better enable DOE to comprehensively
26 determine where to make technology and resource investments to minimize the environmental
27 impacts of solar technologies. For example, the guidance would promote investments in projects
28 that address water requirements and total land disturbance of specific technologies. Over time,
29 such investments could result in the development of commercially deployable technologies with
30 reduced environmental impacts. Projects using such technologies might be more quickly
31 approved by regulatory agencies, as well as more acceptable to stakeholders.
32

33 A second element of the guidance would enable DOE to establish environmental
34 mitigation recommendations to be considered by project proponents seeking financial assistance
35 from DOE. These recommendations, which would be based upon the analysis of impacts of solar
36 energy development and potentially applicable mitigation measures presented in Chapter 5 of
37 this PEIS, would help DOE ensure that environmental impacts of DOE-funded solar projects
38 would be avoided, minimized, or mitigated. In addition, promoting the application, as
39 appropriate to DOE projects, of a comprehensive set of mitigation measures consistent with the
40 mitigation requirements that the BLM proposes to establish through its new Solar Energy
41 Program (see Section ES.2.3.1) would likely streamline project-specific environmental impact
42 analyses and bring consistency to the application of mitigation measures to DOE-supported
43 projects.
44

45 Collectively, streamlined environmental reviews, quicker project approval processes,
46 and reduced opposition to solar energy development would likely increase the pace of such

1 development and reduce the costs to industry, regulatory agencies, and stakeholders. These
2 outcomes would support the mandates of E.O.s 13212 and 13514 and Section 603 of the EISA.

3
4 Increasing the pace of solar energy development would, in turn, translate into other
5 benefits. As discussed in Section 5.11.4, utility-scale solar energy development would result in
6 reduced emissions of greenhouse gases (GHGs) and combustion-related pollutants, if the
7 development offsets electricity generation by new fossil fuel power plants. If the pace of solar
8 energy development is faster as a result of DOE's proposed action, the potential beneficial
9 impacts of reduced GHG emissions would be realized at a faster rate.

10
11 As discussed in Chapter 5, utility-scale solar energy development would result in local
12 and regional economic benefits in terms of both jobs and income created. The associated
13 transmission system development and related road construction would also translate into new
14 jobs and income. These benefits would occur as both direct impacts, resulting from the wages
15 and salaries, procurement of goods and services, and collection of state sales and income taxes,
16 and indirect impacts, resulting from new jobs, income, expenditures, and tax revenues
17 subsequently created as the direct impacts circulate through the economy. Increasing the
18 pace of solar energy development would cause these economic benefits to be realized at a
19 faster pace as well.

20
21 While there may be some adverse socioeconomic impacts resulting from changes in
22 recreation, property values, and environmental amenities (e.g., environmental quality, rural
23 community values, or cultural values), and disruption potentially associated with solar
24 development, there could also be beneficial socioeconomic impacts in these areas resulting from
25 economic growth and a positive reception to the presence of a renewable energy industry. At the
26 programmatic level, it is difficult to quantify these impacts. Increasing the pace of solar energy
27 development would also speed up the pace of these types of socioeconomic changes.

28
29 In summary, the guidance that DOE would develop under its proposed action would be
30 used specifically to promote the reduction of environmental impacts of solar energy development
31 and to streamline environmental reviews for DOE-funded projects. As a result, the pace of solar
32 energy development could increase and the associated costs could decrease. More rapid
33 penetration of utility-scale solar energy development would likely result in quicker decreases in
34 GHG emissions and combustion-related pollutants and quicker realization of economic benefits
35 at both the regional and local levels.

36
37 Under the no action alternative, DOE would continue its existing case-by-case process
38 for addressing environmental concerns for DOE-supported solar projects. It would not develop
39 programmatic guidance to apply to DOE-funded solar projects. As a result, DOE would not
40 undertake any specific efforts to programmatically promote (i.e., programmatic environmental
41 guidance) the reduction of environmental impacts of solar energy development or streamline
42 environmental reviews for DOE-funded projects. Such achievements, and the potential benefits
43 in terms of increased pace of solar energy development and decreased associated costs, might
44 occur under the no action alternative, but they would not be explicitly promoted by DOE (by
45 issuance of programmatic environmental guidance with recommended environmental practices
46 and mitigation measures).

1 ES.4 PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

2
3 A Notice of Intent (NOI) to prepare this PEIS was published in Volume 73, page 30908
4 of the *Federal Register* (73 FR 30908) on May 29, 2008. This notice initiated the first scoping
5 period, which lasted from May 29 to July 15, 2008. During that period, the BLM and DOE
6 invited the public to provide comments on the scope and objectives of the PEIS, including
7 identification of issues and alternatives that should be considered in the PEIS analyses. Public
8 meetings were held at 11 locations across the 6 states. Comments were also collected via the
9 project Web site (<http://solareis.anl.gov>) and by mail.

10
11 A second scoping period was announced through a Notice of Availability of Maps and
12 Additional Public Scoping published in the *Federal Register* (Volume 74, page 31307) on
13 June 30, 2009. This scoping period was initiated to solicit public comments on 24 specific tracts
14 of BLM-administered land to receive in-depth study for solar development in the PEIS.
15 Specifically, the agencies solicited comments about environmental issues, existing resource data,
16 and industry interest with respect to the 24 solar energy study areas. Public comments were
17 collected via the project Web site and by mail.

18
19 It is estimated that approximately 15,900 individuals, organizations, and government
20 agencies provided comments during the first scoping process and approximately 300 entities
21 provided comments during the second scoping process. Comments received during the initial
22 scoping period largely fell into several key categories: environmental, socioeconomic, siting and
23 technology, stakeholder involvement, cumulative impact analyses, impact mitigation, policy,
24 land use planning, alternatives to be analyzed, and coordination with ongoing regional and state
25 planning efforts. Comments received during the second scoping process covered the same topics
26 but also provided information on resources present in and around the 24 solar energy study areas.
27 The results of the first scoping process were documented in a report issued in December 2008
28 (DOE and BLM 2008). The comments received during the second scoping process are
29 summarized in Chapter 14 of the Draft PEIS. The scoping summary report and copies of the
30 individual comments received during both scoping periods, including transcripts of the public
31 meetings, are available on the project Web site.

32
33 In addition to public scoping, the BLM initiated government-to-government consultation
34 with 316 Tribes, Chapters, and Bands with a potential interest in solar energy development on
35 BLM-administered lands in the six-state study area. The BLM also is coordinating with
36 appropriate agencies in accordance with the requirements of Section 106 of the National Historic
37 Preservation Act (NHPA) and Section 7 of the Endangered Species Act (ESA).

38
39 Nineteen federal, state, and local government agencies, identified in Section 1.5, are
40 working with the BLM and DOE as cooperating agencies. As cooperators, these agencies have
41 been involved in the development of the Draft PEIS and they will continue to be involved
42 throughout preparation of the PEIS.

43
44 The BLM and DOE invite the public to comment on this Draft PEIS. The entire
45 document is available on the project Web site (<http://solareis.anl.gov>) along with information on

1 how to participate in the process, including how to provide comments and announcements
2 regarding public meetings.

3 4 5 **ES.5 REFERENCES**

6
7 *Note to Reader:* This list of references identifies Web pages and associated URLs where
8 reference data were obtained for the analyses presented in this PEIS. It is likely that at the time
9 of publication of this PEIS, some of these Web pages may no longer be available or their URL
10 addresses may have changed. The original information has been retained and is available through
11 the Public Information Docket for this PEIS.

12
13 BLM (Bureau of Land Management), 2007, *Instruction Memorandum 2007-097, Solar Energy*
14 *Development Policy*, U.S. Department of the Interior, Bureau of Land Management,
15 Washington, D.C., April 4.

16
17 BLM, 2010a, *Instruction Memorandum 2010-141, Solar Energy Interim Rental Policy*,
18 U.S. Department of the Interior, Bureau of Land Management, Washington, D.C., June 10.

19
20 BLM, 2010b, *Instruction Memorandum 2011-003, Solar Energy Development Policy*,
21 U.S. Department of the Interior, Bureau of Land Management, Washington, D.C., Oct. 7.

22
23 DOE and BLM (U.S. Department of Energy and Bureau of Land Management), 2008, *Summary*
24 *of Public Scoping Comments Received during the Scoping Period for the Solar Energy*
25 *Development Programmatic Environmental Impact Statement*, Washington, D.C., Oct.

26
27 Secretary of the Interior, 2010, “Renewable Energy Development by the Department of the
28 Interior,” Amendment No. 1 to Secretarial Order 3285, Feb. 22. Available at [http://elips.doi.gov/](http://elips.doi.gov/app_so/act_getfiles.cfm?order_number=3285A1)
29 [app_so/act_getfiles.cfm?order_number=3285A1](http://elips.doi.gov/app_so/act_getfiles.cfm?order_number=3285A1).

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