

## **IV.1 INTRODUCTION TO IMPACT ASSESSMENT**

This volume analyzes the expected environmental consequences from implementing each alternative described in Volume II, Description of Alternatives. The scope of this impact analysis corresponds to the level of detail provided in the Volume II description of alternatives, and to both the availability and quality of the data used to assess them.

For a summary of the highlighted changes between the Draft EIR/EIS and this Final EIS, see Volume I, Section I.0.4.

A number of appendices provide full technical descriptions of methods and results; both are cited in this volume. Appendix R2 is the primary source of detailed data supporting information in Volume IV. Readers may refer to these appendices for more information about the methods used or other technical details underlying the conclusions and summaries in this volume.

This introductory chapter presents:

- The National Environmental Policy Act (NEPA) requirements guiding impact assessment.
- A summary of the Bureau of Land Management's (BLM) Proposed Land Use Plan Amendment (LUPA), analyzed with respect LUPA to NEPA.
- A summary of the characteristics of the six alternatives (No Action, Preferred Alternative, and Alternatives 1 through 4,) analyzed in each chapter.
- An approach to impact assessment.
- Specific additional NEPA requirements.
- The organization of each analysis section.

### **IV.1.1 NEPA Requirements Guiding Impact Assessment**

The purpose of a Programmatic Environmental Impact Statement (EIS) under NEPA is to consider "broad federal actions such as the adoption of new agency programs or regulations... timed to coincide with meaningful points in agency planning and decision making" (40 Code of Federal Regulations [CFR]1502.4[b]). This programmatic document discusses, on a broad level, the general environmental consequences of the Proposed LUPA and, more specifically, describes regional impacts within the LUPA daDecision Area.

This document broadlydescribes the potential environmental, economic, and social effects of the Proposed LUPA. The discussion of cumulative and growth-inducing impacts is also broad brush and corresponds to the level of analysis of a Programmatic EIS.

The methodology for this assessment also conforms to guidance described in the Council on Environmental Quality (CEQ) regulations for implementing NEPA: methodology and scientific accuracy (40 CFR 1502.24), cumulative impacts (40 CFR 1508.7), and effects (40 CFR 1508.8). Guidance is also found in the BLM NEPA Handbook (H-1790-1).

#### **IV.1.1.1 Impact Assessment**

The CEQ NEPA regulations use the terms “effects” and “impacts” interchangeably. The environmental consequences section of an EIS must discuss both direct and indirect impacts of a proposed project (40 CFR 1502.16[a]-[b]). Regulations define “effects” as “direct effects, which are caused by the action and occur at the same time and place” (40 CFR 1508.8[a]).

Indirect effects consider effects “later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR 1508.8[b]). “Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8).

Finally, cumulative impacts must be considered. A “cumulative impact” is an environmental impact created when an individually minor but collectively significant action is added to other past, present, and reasonably foreseeable future actions over time (40 CFR 1508.7). This EIS and Proposed LUPA consider cumulative effects.

Impacts should be addressed in proportion to their significance (40 CFR 1502.2[b]), meaning that severe impacts should be described in more detail than less severe impacts. The intention is to help both decision makers and the public focus on a project’s key effects. The NEPA regulations explicitly require discussion of:

- An irreversible or irretrievable commitment of resources (40 CFR 1502.16).
- Tradeoffs between short-term uses of the environment and long-term productivity (40 CFR 1502.16).
- Energy requirements and conservation potential of alternatives (40 CFR 1502.16[e]).

Effects include “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health [-related impacts], whether direct, indirect, or cumulative.” Effects may also be both beneficial and detrimental (40 CFR 1508.8).

### **IV.1.1.2 Mitigation Measures**

This EIS presents no mitigation measures; since LUPA already incorporates nearly 100 pages of comprehensive Conservation and Management Action (CMAs), none are required. (See Section II.3.4.2 in Volume II.) In addition, BLM is committed to implementing appropriate Solar Programmatic EIS (Solar PEIS) design features where appropriate, as well as various other policies, handbooks, and best practices, as described in each chapter of Volume III.

## **IV.1.2 Summary of Alternatives Analyzed**

Each resource chapter in this volume describes the environmental impacts of the six DRECP alternatives: the Preferred Alternative, the No Action Alternative, and Alternatives 1 through 4. The description of the No Action Alternative and Alternatives 1 through 4 remain largely unchanged from the Draft EIR/EIS for BLM-managed lands.

### **IV.1.2.1 Overview of Alternatives Development Process**

As described in Volume II, extensive analysis determined the range of DRECP alternatives. The alternatives first consider Development Focus Areas (DFAs) that could accommodate renewable energy generation within low biological resource conflict areas. Each alternative considers different development technologies and locations to analyze a range of potential impacts from renewable energy generation and transmission. Conservation designations were also developed for each action alternative.

The action alternatives also reflect a range of potential modifications to existing land use plans, and to rules with different approaches to the management of resources on BLM lands: recreational, cultural, scenic, and mineral. Proposed LUPA alternatives must also consider the regional, statewide, and national importance of resource values on BLM lands, as well as analysis in the Solar PEIS for solar development.

The basic components of the alternatives are renewable energy development and conservation designations defined in Volume II for each alternative. Table IV.1-1 shows the basic components in each alternative, including:

- 1. Renewable Energy and Transmission Development** – This portion of the table quantifies total DFA acreage on BLM-managed lands. Different mixes of renewable energy technologies were assigned to the alternatives to assess how the proportions of solar, wind, and geothermal projects would likely impact the environment. The ultimate mix will not be determined by the alternatives, but rather by the projects proposed by developers and electricity retailers. Renewable energy development

could still occur outside DFAs, but would require amendments to the applicable land use plan in all allocations except Variance Process Lands.

2. **Conservation Designations** – This portion of the table reports estimated conservation acreages for each alternative in the proposed conservation designations in the Proposed LUPA. Conservation types include National Landscape Conservation System (NLCS) lands, National Scenic and Historic Trails, Areas of Critical Environmental Concern (ACEC), and wildlife allocation lands. Additional designations include Special Recreation Management Areas (SRMAs) and other land use allocations to replace multiple use classes with Visual Resource Management (VRM) classes.

Table IV.1-1 summarizes information about each of the alternatives; the alternatives are described in more detail in Section IV.1.2.2 below. In addition, tables and descriptions with more detailed information about each alternative’s components appear in Volume II, Chapters II.2 through II.7.

**Table IV.1-1  
Summary of Alternative Components**

Components on BLM-Managed Lands <sup>1</sup>		No Action	Preferred Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Approximate megawatts		9,792	8,175	3,042	10,726	6,376	7,094
Acres of permanent disturbance <sup>2</sup> long-term disturbance from RE and transmission development		100,000	81,000	52,000	88,000	69,000	71,000
DFA acres		n/a	388,000	81,000	718,000	211,000	258,000
Developable acres <sup>3</sup> (No Action Alternative only)		2,804,000	n/a	n/a	n/a	n/a	n/a
Conservation Designations <sup>4</sup>	In the DRECP area	2,395,000	4,966,000	4,863,000	5,191,000	5,023,000	4,431,000
	In the CDCA outside the DRECP area	79,000	287,000	209,000	428,000	258,000	265,000
SPEIS <sup>5</sup> Solar Energy Zones (SEZ) as DFA		SEZ land is available	Yes, partial	Only a portion	Yes	Only a portion	Yes

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to

the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

- <sup>1</sup> BLM-managed lands include approximately 9,784,000 acres within the DRECP boundary and 1,085,000 acres in the CDCA area outside the DRECP boundary.
- <sup>2</sup> Ground disturbance impacts associated with siting, construction, and decommissioning; includes solar and ground-mounted distributed generation project area, wind ground disturbance, geothermal project area, and transmission right-of-way area. The geothermal project area impacts reported here include all associated geothermal facilities including the geothermal well field area, as detailed in the description provided in Volume II. Solar, wind, and geothermal impacts are reported for BLM-administered lands only; transmission impacts are reported for BLM and non-BLM lands.
- <sup>3</sup> For the No Action Alternative, available development lands are not defined as DFAs.
- <sup>4</sup> BLM LUPA conservation designations include proposed NLCS, existing and proposed ACECs, and Wildlife Allocations. There are approximately 3,259,000 acres of BLM-administered lands within existing conservation areas in the DRECP area and 629,000 acres of BLM-administered lands within existing conservation areas in the CDCA outside the DRECP area. BLM LUPA conservation designations that overlap existing conservation areas are not reported here. For the No Action Alternative, the BLM LUPA conservation designation acreage reported is comprised of existing ACECs (non-overlapping acreage) on BLM-administered lands outside of existing conservation areas.
- <sup>5</sup> Solar Programmatic Environmental Impact Statement (SPEIS).

In addition to the renewable energy and conservation designations included in each of the alternatives, a transmission scenario was developed for each alternative. (See additional detail in Section IV.1.3.3 and Appendix K from the Draft DRECP and EIR/EIS.)

#### **IV.1.2.1.1 Variance Process Lands**

Variance Process Lands are lands that are potentially available for renewable energy development, but it would not be streamlined or incentivized. Variance Process Lands include referred to as Future Assessment Areas and DRECP Variance Process Lands in the Draft EIR/EIS though these land areas have been revised for the Preferred Alternative based upon comments received on the Draft EIR/EIS, as shown in Table IV.1-2.

Applications for solar, wind, and geothermal projects of any size in Variance Process Lands will follow the variance process described in Volume II, Section II.3.3.3.2. This process includes public outreach, interagency coordination, and consideration of environmental factors before to the NEPA process. On BLM-administered lands, the Variance Process Lands (Future Assessment Areas and DRECP Variance Process Lands) for Alternatives 1 through 4 are the same as they were in the DRECP Draft EIR/EIS, as shown in Table IV.1-2.

**Table IV.1-2**  
**Variance Process Lands Defined by Alternative**

Alternative	Location of Variance Process Lands
<b>Preferred Alternative</b> 40,000 acres	<ul style="list-style-type: none"> <li>• East of California City north of Edward Air Force Base</li> <li>• South of the Interstate 40 near Amboy</li> <li>• North of Interstate 40 west of Needles</li> <li>• North of Blythe, immediately south of the Big Maria Mountains Wilderness Area</li> <li>• North of State Route 178 West of Pahrump</li> <li>• On the edge of the Salton Sea North of Bombay Beach</li> </ul>

**Table IV.1-2  
 Variance Process Lands Defined by Alternative**

Alternative	Location of Variance Process Lands
<b>Alternative 1</b> 35,000 acres	<ul style="list-style-type: none"> <li>• East of Highway 395, north of Independence in Inyo County</li> <li>• South of Sandy Valley along the California/Nevada border</li> <li>• West of Needles</li> <li>• Near State Route 62, west of Parker, Arizona, near the California/Arizona border</li> <li>• North of Blythe, immediately south of the Big Maria Mountains Wilderness Area</li> <li>• South of State Route 98, east of Imperial Valley, along the California/Mexico border</li> <li>• Near Hidden Hills</li> <li>• South of Historic Route 66, east of MCAGCC Twentynine Palms, and both east and west of the City of Twentynine Palms</li> <li>• Near the Big Maria Mountain Wilderness Areas</li> </ul>
<b>Alternative 2</b> 29,000 acres	<ul style="list-style-type: none"> <li>• Immediately south of Marine Corps Air-Ground Combat Center (MCAGCC) Twentynine Palms both east and west of the City of Twentynine Palms</li> <li>• North of Victorville</li> </ul>
<b>Alternative 3</b> 2,000 acres	<ul style="list-style-type: none"> <li>• In the Lucerne Valley, both east and west of State Route 247.</li> </ul>
<b>Alternative 4</b> 579,000 acres	<ul style="list-style-type: none"> <li>• East of Highway 395, north of Independence in Inyo County</li> <li>• South of Sandy Valley along the California/Nevada border</li> <li>• West of Needles</li> <li>• Near State Route 62, west of Parker, Arizona, near the California/Arizona border</li> <li>• North of Blythe, immediately south of the Big Maria Mountains Wilderness Area</li> <li>• South of State Route 98, east of Imperial Valley, along the California/Mexico border</li> <li>• North of Hidden Hills along the California/Nevada border</li> <li>• North of the I-15 east of Fort Irwin</li> <li>• Surrounding the Owens Dry Lake</li> <li>• East of California City north of Edward Air Force Base</li> <li>• Surrounding Barstow</li> <li>• Scattered around Adelanto, Victorville, and in Lucerne Valley</li> <li>• East and West of the City of Twentynine Palms</li> <li>• South of the I-40 near Ludlow</li> <li>• South of Historic Route 66 east of MCAGCC Twentynine Palms</li> <li>• North of the Rice Valley Wilderness and Big Maria Mountains Wilderness Area along State Route 62</li> <li>• South of the I-10 east of the Chuckwalla Mountains Wilderness</li> <li>• South of the I-10, immediately north of the Palo Verde Mountains Wilderness</li> <li>• Scattered west and south of the Chocolate Mountains east of the Imperial Sand Dunes including east of Holtville and south of State Route 98</li> </ul>

### IV.1.2.2 Key Features of Each Alternative

The following sections identify key features of each alternative analyzed in this volume. Detailed descriptions appear in Volume II, Chapters II.2 through II.7. The environmental

impacts of each alternative are described in further detail in Volume IV chapters. Maps showing the DFAs for each alternative appear in Volume II, Figures II.2-1, II.3-1, II.4-1, II.5-1, II.6-1, and II.7-1.

Volume II describes Proposed LUPA decisions for each alternative. These decisions will change the management actions and allowable uses of BLM-administered lands both within the CDCA and the Resource Management Plan areas of Bakersfield and Bishop. The Proposed LUPA does not include the Colorado River corridor, which is managed by BLM's Arizona State Office.

The Proposed LUPA alternatives each contain some or all of the following: DFAs, Variance Process Lands, NLCS lands, ACECs, wildlife allocations, SRMAs, and Extensive Recreation Management Areas (ERMAs). They also establish VRM classes and National Trail corridors and close some grazing allotments.

#### **IV.1.2.2.1 No Action Alternative**

The No Action Alternative contains about 2.8 million acres of BLM-managed land where renewable energy development is allowed. The remaining approximately 6.6 million acres have some development restrictions.

The most likely locations for future renewable energy development, without the Proposed LUPA, would follow permitting patterns established over the past several years.

Characteristics of renewable energy in the No Action Alternative specify that:

- No DFAs would be created. The geographic distribution of renewable energy development would follow past development patterns and technology mixes. The locations of development of renewable energy facilities would likely be less restricted than under any of the action alternatives.
- Current development patterns would continue and likely emphasize:
  - Solar development in the Cadiz Valley and Chocolate Mountains and the Pinto Lucerne Valley and Eastern Slopes ecoregion subareas, in eastern Riverside and southwestern San Bernardino counties, respectively.
  - Wind development in the West Mojave and Eastern Slopes ecoregion subarea, in the Tehachapi Mountains.
  - Geothermal development in the Imperial Borrego Valley ecoregion subarea.
- Solar PEIS variance lands would remain the same as for the Solar PEIS (approximately 577,000 acres). There would be no other Variance Process Lands.

- BLM Conservation Designations would remain the same.
- Conservation policies and practices would continue in the over 3.2 million acres of BLM-administered lands in existing conservation as well as nearly 2.4 million acres of existing ACECs.
- Existing SRMAs would continue on 299,000 acres of BLM managed lands.

#### **IV.1.2.2.2 Preferred Alternative**

The Preferred Alternative contains more than 388,000 acres of BLM-managed land designated as DFAs. The characteristics of the Preferred Alternative are that:

- The largest DFAs are located in the Imperial Valley and eastern Riverside County. Smaller DFAs include areas along U.S. Route 395 north of Edwards Air Force Base, west of Naval Air Weapons Station China Lake, and between the China Lake facility and Fort Irwin National Training Center.
- Solar development would likely be concentrated in the Cadiz Valley and Chocolate Mountains ecoregion subarea, with scattered smaller developments in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Wind energy projects would likely be located in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Geothermal energy projects would likely be developed in the Haiwee Geothermal Leasing Area in the Owens River Valley ecoregion subarea and the Chocolate Mountains area of the Imperial Borrego Valley ecoregion subarea.
- Variance Process Lands are primarily south of Historic Route 66 and east of the Marine Corps Air Ground Combat Center Twentynine Palms and northwest of California City.
- Conservation designations are generally balanced between ACECs and NLCS, with somewhat greater presence on NLCS lands.
- SRMAs would be increased by 2,458,000.
- ERMAs are located in the eastern portion of the DRECP area and cover 946,000 acres.

#### **IV.1.2.2.3 Alternative 1**

Alternative 1 has the smallest area of DFAs, with about 81,000 acres of BLM-managed land within DFAs. Its characteristics are that:

- The very limited DFAs are in the Imperial Valley, with small DFA acreage in the Blythe area, Hesperia/Lucerne Valley, and in the Barstow area. There are scattered DFAs in the Tehachapi area, and very small DFAs along the U.S. Route 395 corridor.



- The alternative assumes more solar energy development than either wind or geothermal.
- Solar energy projects would be mostly developed in the Pinto Lucerne Valley and Eastern Slopes and West Mojave and Eastern Slopes ecoregion subareas.
- Wind energy development would most likely be in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Geothermal development would most likely be in the Imperial Borrego Valley ecoregion subarea.
- Variance Process Lands include about 35,000 acres.
- Conservation designations mostly include ACECs and wildlife allocations.
- SRMA acreage would increase by approximately 2,537,000.

#### ***IV.1.2.2.4 Alternative 2***

Alternative 2 has the most DFA acreage, with more than 718, 000 BLM-managed acres within DFAs. Its characteristics are that:

- The DFAs are large and geographically dispersed in the Imperial Valley south of the Chocolate Mountains, eastern Riverside, the Lucerne Valley, Barstow and Tehachapi areas, along the U.S. Route 395 corridor, in the Silurian Valley, and near Hidden Hills.
- More geographically dispersed wind energy projects could be built on both public and private lands.
- There would be greater siting flexibility for renewable energy development.
- Geothermal would likely be developed in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- Variance Process Lands include about 29,000 acres.
- BLM LUPA Conservation Designation lands would most likely be on NLCS lands.
- SRMA acreage would increase by approximately 2,463,000.

#### ***IV.1.2.2.5 Alternative 3***

Alternative 3 contains more than 211,000 acres of DFAs on BLM-managed lands. Its characteristics are that:

- The DFAs are widely scattered in the Imperial Valley, Blythe area, Lucerne Valley, Barstow area, Searles Dry Lake, Haiwee, and in the Tehachapi area.

- Dispersed solar energy projects would be mostly built in the Imperial Borrego Valley, Cadiz Valley and Chocolate Mountains, and West Mojave and Eastern Slopes ecoregion subareas.
- Wind project development would most likely be in the Pinto Lucerne Valley and Eastern Slopes and West Mojave and Eastern Slopes ecoregion subareas.
- Geothermal energy would likely be developed in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- Variance Process Lands include about 2,000 acres.
- Conservation Designations include ACECs and NLCS lands with a somewhat greater emphasis on NLCS lands.
- SRMA acreage would increase by approximately 2,531,000.

#### **IV.1.2.2.6 Alternative 4**

Alternative 4 has over 258,000 acres of DFAs on BLM-managed lands. Its characteristics are:

- The DFAs are mostly in eastern Riverside County, with smaller areas in the Lucerne Valley, Barstow area, Imperial Valley, and in the Tehachapi area.
- Solar energy development would mostly be in the Cadiz Valley and Chocolate Mountains ecoregion Subarea.
- Dispersed wind energy projects would be primarily in the West Mojave and Eastern Slopes ecoregion Subarea.
- Geothermal development would be mostly in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- There are large areas of Variance Process Lands throughout the region totaling nearly 577,000 acres, almost three times the DFA acreage on BLM-managed lands.
- Conservation Designations are balanced between ACECs and NLCS lands.
- SRMA acreage would increase by approximately 2,489,000.

### **IV.1.3 Approach to Impact Assessment**

Each Volume IV chapter considers potential impacts to each resource in each of the following chapter sections:

1. Section IV.1.3.1 describes typical impacts from the construction, operation, and decommissioning of renewable energy and transmission projects within the LUPA Decision Area. Note that similar types of impacts could also result from other types

of activities on BLM-managed lands, which could be permitted by BLM after approval of this Proposed LUPA.

2. Section IV.1.3.2 describes the impacts of Ecological and Cultural Conservation and Recreation Designations in the BLM Proposed LUPA decisions in the Decision Area, both within and outside of the DRECP area.
3. Section IV.1.3.3 describes the required transmission facilities that would be located outside of the DRECP area.

### **IV.1.3.1 Renewable Energy and Transmission Facilities**

This analysis covers the construction and operation of renewable energy projects and the transmission lines and substations needed to deliver their electricity to load centers via investor-owned electric utility transmission lines. Each alternative analyzed in this document includes both generation and transmission development. Descriptions of how this EIS considers these facilities follow.

#### ***IV.1.3.1.1 Effects of Renewable Energy Generation***

For each action alternative, renewable energy generation facilities are assumed to be built within DFAs. Three major phases of project construction create the greatest environmental impacts: site characterization, construction and decommissioning, and operations and maintenance. Each chapter addresses the potential environmental impacts of Proposed LUPA decisions on BLM-administered lands within the LUPA Decision Area. CMAs would also apply to approved activities, defined in detail in Volume II, Chapter II.3.

**Site Characterization.** Before renewable energy project construction begins, many site characterization activities are required. These activities are often completed even before a formal application is submitted to a lead agency since an application must contain detailed information on site resources. Site characterization includes reconnaissance surveys (e.g., biological and cultural resource surveys), geotechnical borings, meteorological station installations, and vehicle use along temporary or permanent access roads.

**Construction and Decommissioning.** Primary environmental impacts from construction include ground disturbance, vegetation clearing, earth moving, road construction, ground excavation, foundation construction, drilling and blasting, as well as other activities. Decommissioning requires structure removal, which creates similar disturbances as during construction, in addition to noise, dust, and vehicle traffic.

**Operation and Maintenance.** Some of the activities from operating and maintaining a renewable energy facility include panel washing, road grading, facility inspection, and vehicle use. These activities also cause impacts that may continue over many years. In addition, the

actual operation of renewable energy facilities can affect resources in many ways. For example, birds and bats could be killed or injured if they collide with wind turbine blades or transmission lines or conductors. The glint, glare, and solar flux from the sun, reflecting off solar panels or mirrors, can adversely impact birds, bats, and insects. Large industrial facilities can also impair an area's natural visual beauty for visitors.

#### ***IV.1.3.1.2 Effects of Transmission Facilities Within the LUPA Decision Area***

Transmission lines and substations would be required to deliver electricity from remote renewable energy facilities to high-demand areas. Transmission facilities include transmission lines of various ratings, substations, access roads, and construction yards. The impacts of transmission facilities would be phased in three stages: site characterization, construction, and operation and maintenance. The analysis in this EIS is based on an estimate of the acres of disturbance required for new transmission, but the specific locations of future transmission lines are not yet known.

#### **IV.1.3.2 Conservation Designations and Conservation and Management Actions**

Volume II identifies and defines proposed conservation designations for each alternative. A map for each alternative shows these areas. Certain CMAs would also apply within the DFAs to avoid, minimize, and mitigate the impacts of renewable energy and transmission development. The CMAs are described in Volume II, Section II.3.4.2. Changes to conservation designations can create a range of adverse environmental impacts. For example, existing conservation management may either protect sensitive soil resources or restrict recreational uses or access to mineral resources. The effects of the conservation designations are analyzed for each alternative in this EIS.

#### **IV.1.3.3 Transmission Outside the DRECP Area**

Transmission lines would be required outside of the DRECP area in order to deliver project-generated electricity to high-demand areas via investor-owned electric utilities' transmission lines. Alternative-specific transmission plans are described in text and shown on maps in the Draft DRECP Appendix K (Transmission Technical Group Report). These scenarios are based on the allocation of generation from the projects, shown in Draft EIR/EIS Appendix F. Most transmission corridors are the same for all alternatives, but some alternatives would require an additional transmission line to tie into a nearby electric utility transmission grid.

Each section analyzes these transmission impacts in as much detail as possible given the current information and assumptions of future transmission line locations, which are not yet known.

## IV.1.4 Methods and Organization of Impact Analysis

Each Volume IV chapter defines the assessment methods used to evaluate the impacts of project development and conservation designations.

Impacts may also be either short term or long term. For purposes of this analysis, short-term impacts generally occur within 2 years of an action. For example, construction noise impacts would be short term. Loss of vegetation from site construction would be a long-term impact because of the long recovery periods in desert ecosystems. Another example of a long-term impact would be reduction of available groundwater from pumping water to clean panels or mirrors, or to meet other operational needs.

Following are the Volume IV chapter titles.

IV.2 Air Quality	IV.15 Mineral Resources
IV.3 Meteorology and Climate Change	IV.16 Livestock Grazing
IV.4 Geology and Soils	IV.17 Wild Horses and Burros
IV.5 Flood Hazard, Hydrology, and Drainage	IV.18 Outdoor Recreation
IV.6 Groundwater, Water Supply, and Water Quality	IV.19 Transportation and Public Access
IV.7 Biological Resources	IV.20 Visual Resources
IV.8 Cultural Resources	IV.21 Noise and Vibration
IV.9 Native American Interests	IV.22 Public Safety and Services
IV.10 Paleontological Resources	IV.23 Socioeconomics and Environmental Justice
IV.11 Land Use and Policies	IV.24 Department of Defense Lands and Operations
IV.12 Agricultural Land and Production	IV.25 Cumulative Impacts Analysis
IV.13 BLM Lands and Realty—Rights-of-Way and Land Tenure	IV.26 Other CEQA and NEPA Considerations
IV.14 BLM Land Designations, Classifications, Allocations, and Lands with Wilderness Characteristics	IV.27 Comparison of Alternatives

As described in Volume III, Chapter III.1 (Affected Environment), the affected environment is essentially the environmental baseline used to measure environmental impacts from the Proposed LUPA. Impacts are assessed in each alternative by examining resource changes

against the baseline. Chapters IV.2 through IV.23 are resource-specific analyses. Each chapter identifies the impacts for each alternative.

#### **IV.1.4.1 Impact Assessment Methodology**

##### **Action Alternatives**

This section defines the steps used to assess and evaluate project development impacts within the Proposed LUPA. More specific descriptions of this approach for each resource appear at the beginning of each Volume IV chapter.

##### ***Step 1: Geographic Distribution of Impact Acreage***

As described in Draft EIR/EIS Appendix F, the acreage impacted by each renewable energy technology was allocated to DFAs based on installed generation capacity (megawatts) in each ecoregion subarea. The method used to allocate this capacity is shown in Draft EIR/EIS Appendix F1. Using standard acreage assumptions for each renewable technology, ground disturbance was quantified for each technology and alternative, which then became the basis for the impact analyses.

##### ***Step 2: Development Restriction Within DFAs***

Application of CMAs would preclude or constrain renewable energy development in portions of the DFAs (the CMAs are explained in detail in Volume II, Section II.3.4.2). The DFA area remaining for development after applying the CMAs is the “net available DFA.”

##### ***Step 3: Distribution of Technologies and Acres of Development***

The DFAs for each alternative include substantially more land area than expected to be developed for renewable energy projects on BLM-managed lands under this Proposed LUPA. This larger area allows flexibility in siting projects within DFA boundaries and also allows for the fact that not all land within a DFA is either suitable or available for development. The specific locations of future development within DFAs is not yet known.

In order to determine environmental effects within each DFA, the proportion of ground disturbance was first calculated, followed by calculating each resource’s acreage, using the same proportion. The analysis (using Geographic Information Systems [GIS]) then applies this proportional model to define the acres of impacts for each resource. For example, if 5% of the DFAs in an ecoregion subarea would be impacted by solar development, then the analysis assumes that 5% of the resources in that DFA would be impacted by solar development. In this example, if resources exist in only one portion of a DFA, the analysis assumes 5% of the acres of that resource within the DFA would be impacted, not 5% of the

entire DFA. The net result is the true number of acres impacted from each technology developed within a DFA. A GIS-based formula ultimately prorates impacted acres within each DFA, based on the technology-specific acreage required to develop that DFA's generation capacity.

Again, the impact estimates for each alternative have different assumptions and depend upon the relative mix of solar, wind, and geothermal projects. However, the selection of one alternative over another is not expected to affect the mix of technologies actually built.

#### ***Step 4: Effects of Transmission Facilities***

Transmission facilities by their nature are not confined to DFAs, so their environmental impacts would be both within and outside of DFAs. Within DFAs, transmission would be required because each generation facility needs transmission infrastructure to transport its electricity. Additional transmission facilities would be located both within and outside of DFAs for the transmission lines and substations needed to move electricity from multiple remote sources to populated areas of high electricity demand. The Transmission Technical Group report (see Draft DRECP EIR/EIS Appendix K), defines the estimated acreage needs for transmission and substation facilities within the LUPA Decision Area. This acreage data determines the total impact of generation and transmission.

#### **IV.1.4.2 Impact Reduction Strategies**

This EIS considers impact reduction strategies in several ways. First, the Preferred Alternative and Alternatives 1 through 4 have been designed to incorporate CMAs and to conservation designations avoid, minimize and mitigate impacts from renewable energy development. These CMAs and conservation designations are described in Volume II, Chapter II.3, Section II.3.1, Overview of the Preferred Alternative.

The Regulatory Setting for each Volume III chapter discusses existing laws and regulations that apply to renewable energy development. Existing BLM land use plans (e.g., CDCA) and regional plans (e.g., Solar PEIS) apply to all development on BLM-managed lands and contain mandatory provisions to reduce their environmental impacts. These existing plans are described in Volume II, Chapter II.2 under the No Action Alternative.

Each chapter in Volume IV summarizes both existing laws and regulations and applicable portions of existing land use plans.

### **IV.1.4.3 Cumulative Impacts**

The cumulative impact assessment presented in Chapter IV.25 analyzes how environmental conditions may be affected by the Proposed LUPA in combination with other likely past, present, and reasonably foreseeable future activities within the LUPA Decision Area.

## **IV.1.5 Other Required NEPA Considerations**

NEPA requires definitions for the specific considerations shown below. Chapter IV.26 analyzes each of these issues.

**Relationship of Short-Term Uses of the Environment and Long-Term Productivity.** CEQ regulations (40 CFR 1502.16) and the BLM NEPA Handbook (H-1790-1) require discussion of the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity involved in implementing the Preferred Alternative or other alternatives.

**Irreversible and Irrecoverable Commitment of Resources.** CEQ regulations (40 CFR 1502.16) and the BLM NEPA Handbook (H-1790-1) require discussion of any adverse effects that cannot be avoided, and any irreversible and irretrievable commitments of resources if a project is built. An irreversible commitment of resources is made when direct and indirect effects of the activities limit options for future land use. A resource commitment is considered irretrievable when it is no longer available for future use. Examples of irretrievable commitments include loss of production, harvest, or the use of natural resources.

**Energy Requirements and Conservation Potential of Various Alternatives and Mitigation Measures.** NEPA requires that an EIS describe energy requirements and the conservation potential of various alternatives and mitigation measures (40 CFR 1502.16[e]).

**Indirect Effects Including Growth-Inducing Effects.** NEPA requires an analysis of indirect effects, including growth-inducing effects (1508.8[b]). Indirect effects may include induced changes in land use patterns, population density or growth rate, and other related impacts to air, water, and other natural systems, including ecosystems.

## **IV.1.6 Organization of Each Analysis Section**

Volume IV contains 22 chapters, as listed in Section IV.1.4. Chapters IV.2 through IV.23 are organized as shown below. In addition to the resource-specific impact analyses, Chapter IV.24 describes Department of Defense lands, Chapter IV.25 discusses cumulative impacts, and Chapter IV.26 explores additional NEPA requirements. Chapter IV.27 summarizes and compares the impacts of the five action alternatives evaluated in this volume.



Each Volume IV chapter presents the following topics for each alternative:

- Impacts of Renewable Energy and Transmission
  - Impacts of Variance Process Lands
  - Design Features of the Solar PEIS
  - Conservation and Management Actions
- Impacts of Ecological and Cultural Conservation and Recreation Designations
- Impacts of Transmission Outside the DRECP Area
- Comparison of Preferred Alternative With No Action Alternative
- Comparison of Alternatives 1 through 4 With Preferred Alternative

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