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Adding Solar: The Role of the National Environmental Policy Act in Solar Development

**Arthur Fraas, Andre Bellefontaine, Lindsay Rich Steinmetz, Valkyrie Buffa, and
David Storment**

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About the Authors

Arthur Fraas is a visiting fellow at Resources for the Future (RFF). At RFF, Fraas works on a variety of issues related to energy and the environment, including projects looking at the development of retrospective analyses of major environmental rules, the treatment of uncertainty in regulatory analysis, the potential regulation of greenhouse gases under the Clean Air Act, and issues and tradeoffs with energy efficiency regulations. He retired in 2008 from OMB after serving 21 years as chief of the Natural Resources, Energy, and Agriculture Branch in OIRA. Before joining the OMB, Fraas was a senior economist at the Council on Wage and Price Stability, a staff member of the Senate Judiciary Subcommittee on Antitrust and Monopoly, an assistant professor of economics at the US Naval Academy, and a staff economist with the Federal Reserve System. He graduated from Cornell University with a bachelor's degree in engineering physics, and earned his doctorate in economics from the University of California at Berkeley.

Andre Bellefontaine is an associate in the Baton Rouge office of Kean Miller. He joined the firm in 2022 and practices with the energy and environmental litigation group. Prior to joining the firm, Andre served as a law clerk to the Louisiana Attorney General's Office. Andre has experience in environmental regulation, oil and gas, discovery plans, and labor and employment.

Lindsay Rich Steinmetz is an associate at Eastman and Smith and a 2020 graduate of the LSU Paul M. Hebert Law Center.

Valkyrie Buffa is an associate at Liskow. She is barred in Texas and Louisiana and has experience working in both the oil and gas industry and the environmental non-profit sector. Prior to joining Liskow, Kyrie supported corporate regulatory efforts ensuring compliance with EPA, FERC, FTC, Louisiana DEQ, and Texas CEQ regulations—as well as assisting with in-house counsel work involving administrative law, anti-bribery and anti-corruption, contractual indemnities, international legislation, premises liability, privacy, and tax law.

David Storment is a legal intern at Louisiana Sea Grant College and a 2023 graduate of the LSU Paul M. Hebert Law Center.

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Abstract

Decarbonizing the electric utility sector will require a substantial investment in renewable energy projects. The federal government has set the goal of reducing greenhouse gas emissions by half by 2030 and entirely by 2050. Investing in clean renewable energy is a vital part of realizing a goal of net zero-emissions.¹ The time required to complete National Environmental Policy Act (NEPA) review of major infrastructure projects—including for renewable energy—has been a key concern in recent years. The recently enacted Fiscal Responsibility Act of 2023 (FRA) included a permitting reform provision that codified presumptive deadlines for completing NEPA reviews. At the end of July, CEQ issued a proposed NEPA rule implementing the FRA provisions.

This case study examines the federal permitting processes affecting siting and construction of utility-scale solar projects to identify the possible barriers associated with achieving federal and state renewable energy goals.² We assembled a sample of 46 utility-scale solar projects completing NEPA review for 2005–2021. We believe this sample covers most—if not all—of the solar projects completing NEPA review over this period.

We find that most of these projects completed formal NEPA review within two years. However, many of them required 8–10 years from filing an initial application to reach operational status. The delay in taking these projects from initial application to full operation often occurred before (in a prequel stage) and/or after formal NEPA review. Resolving potential NEPA issues before formal review has likely contributed to delays in the early prequel stage. We also examine the efforts of the Bureau of Land Management (BLM) to expedite review and find that a major BLM initiative—the Western Solar Plan launched in 2012—has yielded a disappointing record over its first 10 years.

Section I provides background information on utility-scale solar facilities. Section II describes the NEPA process and associated reviews (Fish and Wildlife Service (FWS), US Army Corps of Engineers (USACE), etc.). Section III presents summary info on the projects that went through NEPA reviews and shows that many of the operational projects took 8–10 years (as of the end of 2021) from the initial application to reach operational status; Section IV outlines BLM's actions, including the Western Solar Plan, to expedite its review process for siting solar projects on public lands.

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- 1 States have a key role in promoting the development of renewable energy facilities to replace fossil fuels in the electricity sector. They have established Renewable Portfolio Standards (RPSs) requiring that a certain percentage of electricity sold to customers must be from renewable sources; 31 states, Washington, DC, and three territories have adopted RPSs, and seven states and one territory have set renewable energy goals (Shields 2021).
 - 2 The **Western Solar Plan** defines utility-scale solar as having a nameplate capacity of 20 or more megawatts (MW). We used the 20 MW threshold to identify major utility-scale projects.

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1. Introduction

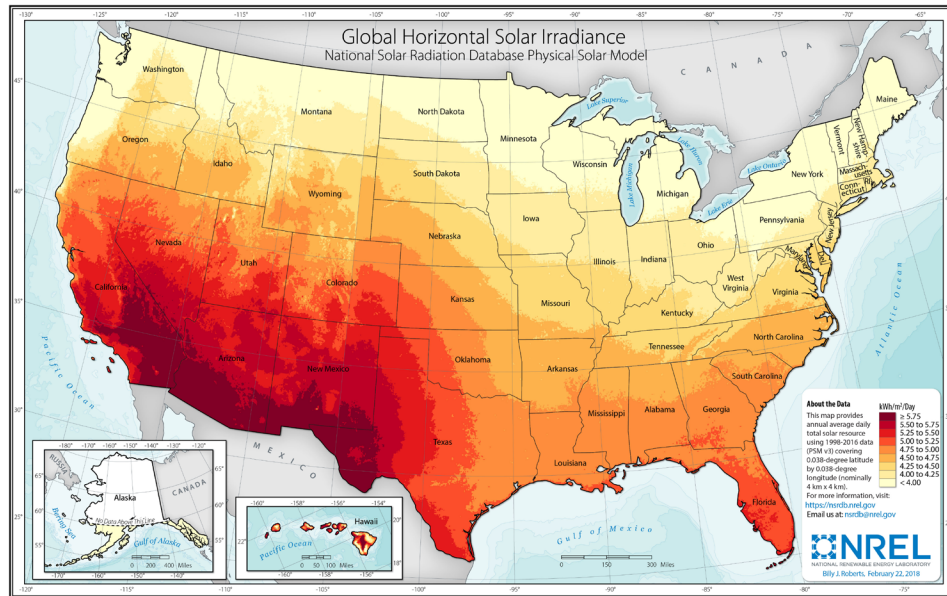
1.1. Overview of Utility-Scale Solar Projects

We identified 46 utility-scale solar projects in nine states—mostly in the US Southwest—that completed NEPA review and obtained a lease on federal or tribal lands, federal funding help, or federal permits from 2008 to 2021 (see Figure 1). The solar farms range in capacity from 30 to 850 megawatts (MW) (see Appendix A) and account for about 15 percent of total utility-scale solar capacity brought online from 2010 through 2021.¹

Thirty-seven of the projects generate electricity using photovoltaic (PV) technology; nine were slated to use concentrated solar power (CSP) technologies. PV uses semiconducting materials that convert light directly into electricity. The PV cell is mounted into a module, or solar panel, and these panels are grouped together to form a solar array.² PV is the most common and cheapest form of solar energy generation.³ CSP converts solar energy by concentrating solar rays through an arrangement of mirrors to produce steam or another high-temperature working fluid to generate electricity with turbines. These facilities vary significantly in design. For example, Ivanpah uses over 352,000 mirrors to reflect light onto three centralized towers to generate steam. Genesis is powered by parabolic trough solar collectors to concentrate sunlight to heat synthetic oil, which heats water to create steam.

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- 1 EIA reports an increase of about 60,000 MW of solar capacity from 2011 to 2021. (https://www.eia.gov/electricity/annual/html/epa_01_02.html)
 - 2 Almost all the PV projects use conventional PV technology on 200–8,200+ acres of land. The one exception—the Alamosa Solar Project (30 MW), on 225 acres—is the only one to use high-concentration PV technology.
 - 3 From 2007 to 2012, the cost of PV declined substantially relative to CSP designs. One source reports that by 2014, proposed bid prices for CSP were more than three times those of PV. (<https://www.greentechmedia.com/articles/read/update-bright-source-abengoa-tower-csp-project-terminated>)

Figure 1. US Solar Radiation Map



Source: NREL (2018) (<https://www.nrel.gov/gis/solar-resource-maps.html>)

Developers of utility-scale solar projects must undertake a variety of major tasks, including selecting the technology, choosing and designing a site, arranging funding, and securing a power purchase agreement with an electric utility. In addition, for a facility that is sited on federal land, could affect federally protected resources, or seeks federal funding, developers must also obtain federal agency approval before starting construction.

Most of the 46 identified solar projects requiring federal approval are located on BLM (29 projects) or tribal (six projects) lands. One PV site is on Department of Energy (DOE) land on a former US Atomic Energy Commission Superfund site. In addition, 10 other projects required federal review associated with siting, funding, and permitting activities.

2. Federal NEPA Review

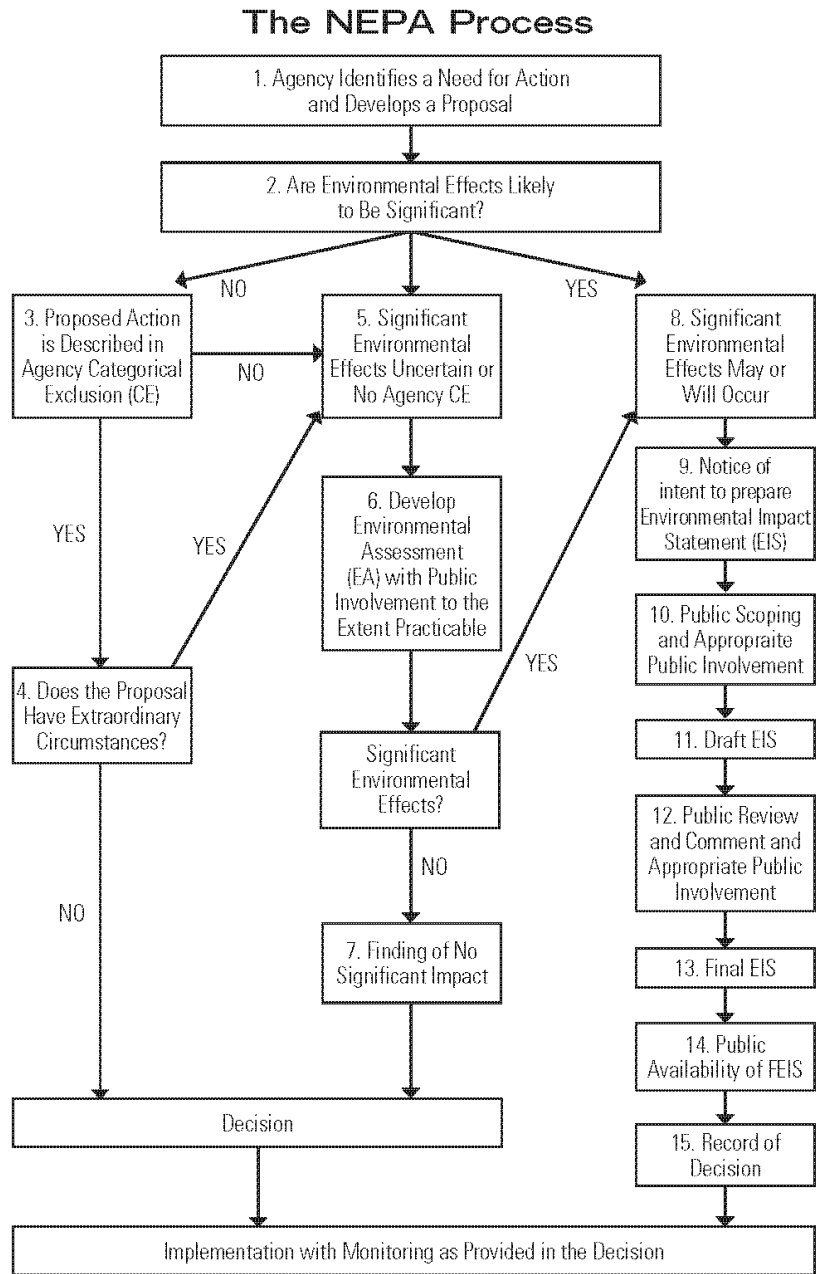
Federal preconstruction review is required for a major project under NEPA any time a federal agency authorizes siting a project on federal lands, directly or indirectly funds it, or reviews it as required by federal law, such as provisions protecting US waters and endangered species. A developer must complete NEPA review and obtain all applicable federal permits before beginning construction.⁴

The heart of the NEPA process is developing the environmental impact statement (EIS)—a comprehensive study of a project and available alternatives if it is likely to have a significant environmental effect. The ultimate goal is to provide public officials with relevant information and ensure a hard look at the potential consequences. Each EIS must include a description of the agency action, the reason it is needed and its benefits, a description of the affected areas, and an analysis of the environmental impacts. It must consider any adverse effects associated with the action that cannot be avoided, reasonable alternatives, a list of ways to reduce or avoid these impacts, and any irreversible and irretrievable commitments of resources. No action can be taken that will have an adverse environmental impact or otherwise limit the choice of a reasonable alternative until the lead agency completes the process by issuing a record of decision (ROD)⁵ (see Figure 2).

4 National Environmental Policy Act, 42 USC § 4332 (C)(i). “The purposes of this chapter are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality” (42 USC § 4321)

5 40 CFR § 1502.25(b)

Figure 2. NEPA Process Flow Chart



**Significant new circumstances or information relevant to environmental concerns or substantial changes in the proposed action that are relevant to environmental concerns may necessitate preparation of a supplemental EIS following either the draft or final EIS or the Record of Decision (CEQ NEPA Regulations, 40 C.F.R. § 1502.9(e)).*

Source: https://ceq.doe.gov/docs/get-involved/Citizens_Guide_Dec07.pdf

To facilitate agency efforts to comply with NEPA, Council for Environmental Quality regulations created two additional categories to identify federal actions that do not require an EIS: categorical exclusions (CEs) and environmental assessments (EAs). CEs are categories of actions that do not individually or cumulatively have a significant effect on the human environment.⁶ CEs are not exemptions from the NEPA process; they require a specific finding by the relevant federal agency. However, once that determination has been made, federal agencies are normally not required to develop an EA or an EIS when a CE applies. Because an agency may not be sure whether an EIS is required, the EA provides a scoping process to determine whether a project may have a significant adverse environmental effect. An EA generally consists of four elements: 1) the purpose of the proposed action, 2) alternatives to it, 3) its environmental impacts and alternatives, and 4) the agencies consulted in preparing the EA. The EA process is completed when the agency either issues a finding of no significant impact (FONSI) or reaches the conclusion that an EIS is required (BLM n.d.c).

The EA and EIS processes involve a set of specific procedural steps: issuing a Notice of Intent (NOI) to the public and interested parties that the agency is preparing an EA or EIS, preparing a draft report for public comment, and completing a final report (BLM n.d.c).⁷ The process is completed with an ROD.

NEPA reviews also typically incorporate other federal agency reviews (see Table 1).⁸ The most prominent of these include the following:

- Endangered Species Act (ESA): FWS is responsible for protecting endangered plants and animals from extinction resulting from economic growth and development.
- Clean Water Act (CWA): The US Environmental Protection Agency (EPA) is responsible for limiting (and eliminating) pollution discharges to waterways. Section 402 establishes the CWA National Pollutant Discharge Elimination System (NPDES) permitting program to regulate discharges and stormwater runoff from construction activities and facility operations.
- CWA: Section 404: EPA and the USACE share the responsibility of establishing the federal program for permitting and regulating discharges of “fill” material into the waters of the United States. A major focus of the program is protecting wetlands.

6 Federal agencies that have established specific CEs for solar and wind projects include the Department of Energy, Rural Development, Aviation Administration, Energy Regulatory Commission, and National Capital Planning Commission (CEQ 2018b; 18 CFR § 380.4–5).

7 If, after completing an EA, an agency decides that it must prepare an EIS, then it must issue a new NOI and carry out the other steps required by an EIS.

8 See Fraas et al. (2021) for a more detailed description of the NEPA process and associated federal agency processes that affect the siting and funding of utility-scale solar facilities.

Table 1. Federal NEPA Review

Federal siting and funding	Agency environmental and cultural reviews
Bureau of Land Management <ul style="list-style-type: none"> • Right-of-way authorization (required for BLM land) 	
Bureau of Indian Affairs <ul style="list-style-type: none"> • Solar energy ground lease on tribal trust lands 	
US Forest Service <ul style="list-style-type: none"> • Special use permit (required if on USFS land) 	Department of the Interior, Fish and Wildlife Service <ul style="list-style-type: none"> • Endangered Species Act (special use permit)
	Migratory Bird Treaty Act (migratory bird permits) <ul style="list-style-type: none"> • Bald and Golden Eagle Protection Act (eagle incidental take permit)
Department of Energy <ul style="list-style-type: none"> • Loan guarantee (optional DOE debt assistance) 	Environmental Protection Agency (EPA) <ul style="list-style-type: none"> • Clean Air Act (construction permits for heavy equipment exhaust and fugitive dust emissions) • Clean Water Act (NPDES discharge permits, state water quality certification)
	Army Corps of Engineers and EPA <ul style="list-style-type: none"> • Clean Water Act (Section 404 wetlands permits)
	Advisory Council on Historic Preservation

A variety of commentators have pointed to the substantial burden NEPA imposes on federal agencies in approving infrastructure projects.⁹ The time to conduct the review and prepare the lengthy documents required are emblematic of this burden and have become key targets for NEPA reform.

In 2020, CEQ revised its NEPA regulations to expedite NEPA reviews, including adding the presumptive deadlines of two years for EIS reviews and one year for EA reviews and adopting page limits for the core EISs and EAs (excluding citations and appendices). The Fiscal Responsibility Act of 2023 includes a permitting reform title that modifies NEPA in several ways, including codifying the presumptive deadlines

9 <https://www.pillsburylaw.com/en/news-and-insights/biden-infrastructure-bill-nepa-reform.html>, <https://www.progressivepolicy.org/publication/americas-clean-energy-transition-requires-permitting-reform-policy-recommendations-for-success/>

and page limits for EIS and EA reviews.¹⁰ CEQ recently published a proposed rule addressing these issues (88 FR 49924). In particular, it proposed keeping the presumptive deadlines for EIS and EA reviews subject to a possible extension in consultation with the applicant (Section 1501.10(b)(1)&(2)). The clock starts the earliest that an agency (1) determines that NEPA requires an EIS or EA, (2) notifies the applicant that the application is complete, or (3) issues an NOI to prepare an EIA or EA (Section 1501.10(b)(3)).¹¹

3. Discussion: NEPA Review Plus Other Embedded Federal Agency Review

We have examined federal permitting processes for utility-scale solar projects to identify potential barriers in siting and funding facilities to achieve renewable energy goals. We identified 28 projects that completed an EIS and 18 that completed EA NEPA reviews from 2009 to 2021 (see Table 2.) Three-quarters of the EIS reviews covered solar projects on BLM lands. The remaining projects had various other reasons: Section 404 issues (USACE/Panoche), DOE funding (DOE/Topaz), and siting on tribal lands (Bureau of Indian Affairs (BIA)/Moapa).

We believe our sample covers almost all the solar projects completing formal NEPA review for siting on federal and tribal land over this period. We have not covered NEPA reviews concerned with gen-tie transmission facilities (where the solar facility was on private lands or a federal agency has already completed a NEPA review). We relied on the final EIS and EA plus the ROD as the primary information sources, but we also used documents from other federal and state agencies, newspaper and trade press articles, and publications from NGO groups.

The average time to complete a formal EIS review and issue an ROD for these 28 solar projects—29 months—is substantially shorter than the average NEPA review time across federal agencies (4.5 years) (CEQ 2018a). Roughly two-thirds of the projects completed the NEPA process—NOI, formal environmental review, EIS, and ROD—in 1–2 years (see Appendix B.1). For 10 projects, however, the NEPA/EIS review and associated federal permitting processes encountered longer delays for a variety of reasons: for three projects, changes in design as PV emerged as the dominant technology and changes in ownership (including bankruptcy); for four projects, environmental and tribal issues raised during NEPA reviews required design changes and reduced their acreage and capacity; for the remaining three projects, the primary agency EIS review process (see Appendix B.2).

¹⁰ Other key changes include altering the scope of “major federal action,” limiting the scope of review to effects with “a reasonably close causal relationship,” and limiting consideration to a “reasonable range of alternatives.” (<https://www.natlawreview.com/article/permitting-reform-package-passes-part-debt-ceiling-deal>)

¹¹ <https://www.govinfo.gov/content/pkg/FR-2023-07-31/pdf/2023-15405.pdf>

Table 2. Projects Completing NEPA: EIS Review

Name	Agency association	Initial application date	NOI date	ROD date	Operational	Tech	MW	State	Land	Acres
Panoche Valley	USACE	01/2006	07/2012	03/2016	01/2018	PV	130	CA	Private	4,717
Imperial Valley	BLM	01/2006	10/2008	10/2010	Terminated	CSP	584	CA	Federal	3,940
Stateline	BLM	02/2006	08/2011	02/2014	09/2016	PV	300	CA	Federal	1,685
Ivanpah	BLM	11/2006	11/2008	10/2010	02/2014	CSP	392	CA	Federal	3,600
Desert Sunlight	BLM	11/2006	01/2010	08/2011	11/2013	PV	550	CA	Federal	3,900
Genesis	BLM	01/2007	11/2009	11/2010	11/2013	CSP	250	CA	Federal	1,950
McCoy	BLM	01/2007	08/2011	03/2013	06/2016	PV	250	CA	Federal	2,300
Calico	BLM	03/2007	06/2009	10/2010	Terminated	CSP	850	CA	Federal	8,230
Sonoran	BLM	06/2007	07/2009	12/2011	Pending	PV	300	AZ	Federal	2,013
Palen	BLM	09/2007	11/2009	10/2018	12/2020	PV	500	CA	Federal	3,500
Desert Quartzite	BLM	09/2009	03/2015	01/2020	Pending	PV	450	CA	Federal	3,000
Desert Harvest	BLM	10/2007	09/2011	03/2013	01/2021	PV	150	CA	Federal	1,200
Amargosa Farm Road	BLM	12/2007	12/2009	11/2010	Terminated	CSP	464	NV	Federal	4,350
Soda Mountain	BLM	12/2007	10/2012	03/2016	Terminated	PV	287	CA	Federal	1,767
Crescent Dunes	BLM	12/2008	11/2009	12/2010	10/2015	CSP	110	CA	Federal	298
Silver State North	BLM	05/2009	06/2009	10/2010	05/2012	PV	50	NV	Federal	600

Name	Agency association	Initial application date	NOI date	ROD date	Operational	Tech	MW	State	Land	Acres
Silver State South	BLM	05/2009	06/2009	02/2014	12/2016	PV	250	NV	Federal	2,000
Crimson	BLM	05/2009	03/2018	05/2021	Pending	PV	350	CA	Federal	2,500
Blythe	BLM	08/2009	11/2009	10/2010	04/2016	PV	485	CA	Federal	4,070
Quartzite Solar	BLM/WAPA	01/2010	01/2010	06/2013	Terminated	CSP	100	AZ	Federal	1,675
Topaz	DOE	03/2010	10/2010	09/2011	10/2014	PV	550	CA	Private	3,500
K-Road Moapa / Moapa Southern Paiute Solar	BIA	-	02/2011	06/2012	03/2017	PV	350	NV	Tribal	2,153
Moapa SEC / Arrow Canyon Solar Project	BIA	-	08/2012	05/2014	Pending	PV	200	NV	Tribal	850
Aiya/Tamarack	BIA	-	11/2014	09/2016	Pending	PV	100	NV	Tribal	900
Yellow Pine	BLM	06/2016	06/2018	11/2020	Pending	PV	500	NV	Federal	3,000
Eagle Shadow Mountain	BIA	-	02/2019	02/2020	Pending	PV	300	NV	Tribal	2,200
Gemini	BLM	07/2017	07/2018	05/2020	Pending	PV	690	NV	Federal	7,100
Southern Bighorn	BIA	-	05/2020	07/2021	Pending	PV	400	NV	Tribal	3,600

Note: For most projects, the initial application date was available in primary agency documents. For Quartzite, we used the earliest date that we were able to find showing activity by a Federal or state agency. We were unable to find an initial application date (or other early date prior to the NOI) where BIA served as primary agency. For the operational date, we preferred to use the date on which the solar facility began providing generation at levels close to design to the grid. In some instances, though, we were only able to identify the date the facility was commissioned. For facilities completed in several phases, we focused on the date the first phase reached generation levels close to design capacity. Our rationale was to identify the earliest date at which the developers were able to complete construction and connect to the grid.

Source: See Appendix D.1

In addition, 18 additional solar projects were able to use the less demanding NEPA Environmental Assessment process and typically completed the environmental and cultural reviews with a finding of no significant impact (FONSI) in a substantially shorter period of time. For the projects where we have data, 6 completed FONSI review in one year or less; 7 additional projects completed this process in 2 years or less; four projects required more than 2 years.¹² (See Appendix C.2)

We found that other related Federal agency reviews embedded within the NEPA process—reviews to protect endangered species, water resources, wetlands, and other environmental and cultural resources—were generally completed within the NEPA review. (Fraas et al. 2021) The FWS processes were generally well aligned with the NEPA/EIS process—the FWS biological opinions were largely completed before the action agency issued the ROD completing the NEPA process. In almost all cases, the Army Corps (USACE) found that project sites were non-jurisdictional under Section 404 of the CWA. There were though a few exceptions where the Section 404 reviews and the CWA processes for stormwater control and NPDES certification— especially for the earlier fast-tracked projects—were completed only after the NEPA process and ROD were completed. The lead agencies in most cases also completed the NHPA Section 106 cultural resource consultations with the state historical preservation officer and with Tribes within the NEPA review timeframe.

Once the NEPA review was completed, BLM and BIA issued ROW leases for siting on public lands in many cases within a month of completion of the ROD. DOE issued loan guarantees for most of the projects within 7 to 9 months after the ROD was issued, although two projects—facing the ARRA September 30, 2011, deadline—obtained loan guarantees within a month of completion of the NEPA review.¹³

3.1. NEPA Review in the Context of the Broader Challenge of Developing Solar Projects

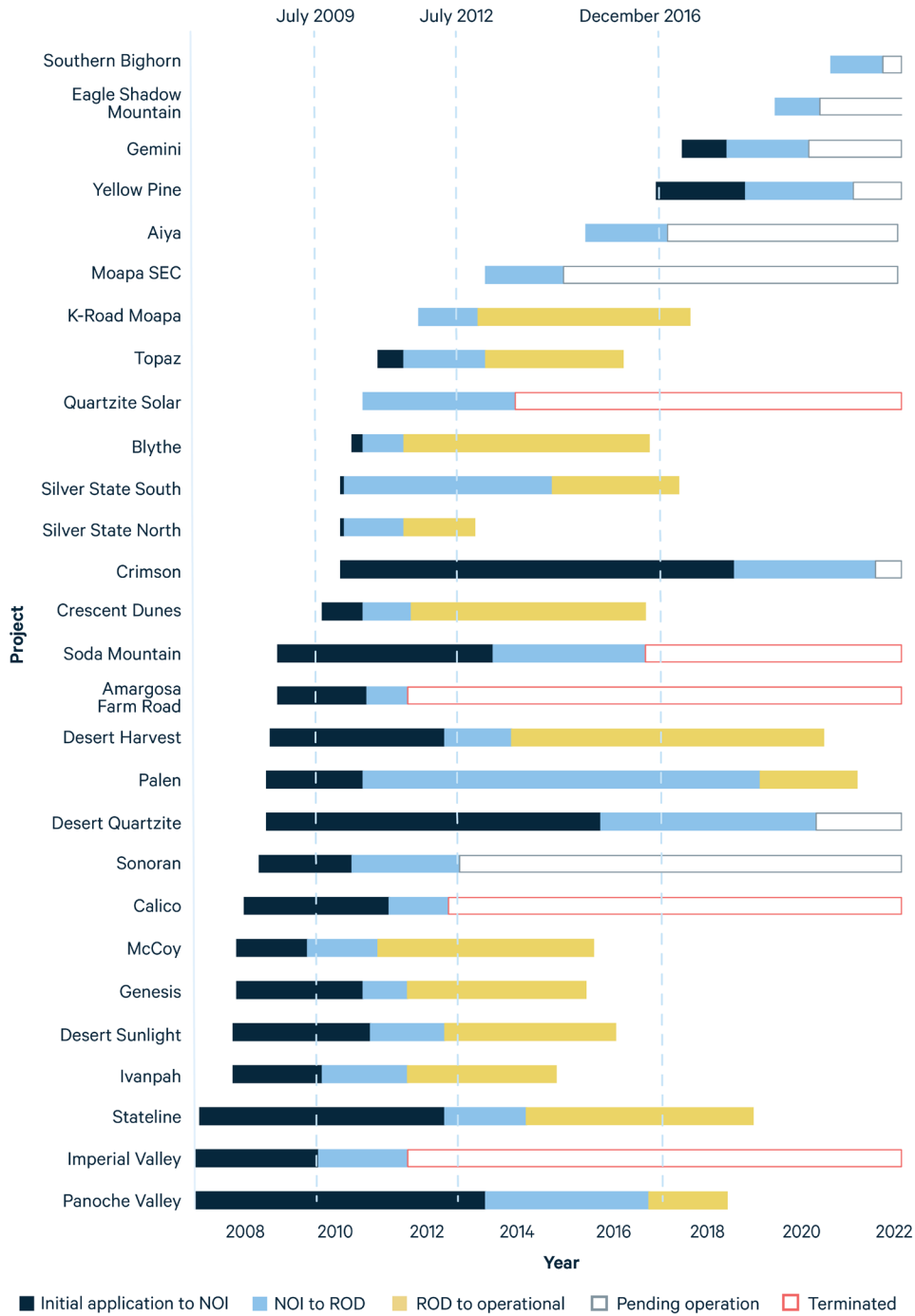
While most of the formal EA and EIS NEPA reviews were concluded in less than two years, the development process for many of these projects has required a much longer gestation period from initiation to completion. The NEPA review is sandwiched between an initial period of application development and scoping process and the post-NEPA review period marked by the time required to construct the solar facility, meet permit conditions, and interconnect to the grid. The record suggests a number of the projects within our sample required two or more years from the initial application for the project to the announcement of formal NEPA/EIS review. It is likely that addressing various NEPA-related issues contributed to—and even may have represented a dominant factor in—the

12 We were not able to identify a formal application date for many of these projects; in these cases, we used the earliest date we could find of a contact with a government agency.

13 In mid-2009, DOI announced fast-track procedures to receive priority processing to complete environmental reviews in order to receive federal loan guarantees under ARRA. These projects faced a deadline to begin construction by September 30, 2011, in order to be eligible for the loan guarantee (BLM 2009b; DOI 2009).

delay associated with this prequel period of application development. In addition, more than half of these projects also required two or more years from the completion of the formal NEPA review to reach operational status. (See Figure 3).

Figure 3. Projects Completing EIS NEPA Review: Timeline



Note: For figure sources, organized by location, see Appendix D.2.

Although we have only a spotty record on the factors responsible for some of the substantial delays in final NEPA action, we are able to offer some observations. For some early projects (e.g., Imperial Valley, Blythe, Crimson, Palen), developers changed the technology (from CSP to PV). Some projects also had financial issues (bankruptcy, acquisition by other entities, etc.)—for example, Blythe, Crimson, and Palen. Anecdotal evidence also suggests that developers (e.g., Gemini, McCoy, Silver State South, Sonoran, Stateline) reduced the size of the project to address environmental, tribal, etc. concerns identified in the preliminary “scoping” processes between filing an initial application and initiating formal NEPA review. Finally, some delays were due to issues directly associated with internal agency (bureaucratic) decisions.¹⁴

After completing NEPA review, many of the projects required two or more years to begin operations. Possible reasons include difficulties in obtaining a power purchase agreement with a utility or interconnection approval with the ISO/RTOs and relevant (transmission) utility. (Charles 2023) The factors contributing to these delays represent an opportunity for further research.

A few projects in our sample never reached the construction stage. Local authorities denied the Soda Mountain application for permits to allow its construction and operation. After obtaining BLM approval to site on federal lands, the developers for Amargosa Farm Road, Calico, Imperial Valley Solar, and Quartzite terminated the projects. (Basin and Range Watch 2022, Deign 2020, Helioscsp. 2013, Mount Signal Solar 2021, O'Reily 2011, Power Technology, 2014) In addition, the Crescent Dunes Solar Farm encountered operational problems with its molten salt technology and was shut down for several years; however it has recently restarted operation (Clark 2020, Haas 2021).¹⁵

4. Case Study: BLM’s Fast-Tracking and Western Solar Plan Initiatives

BLM has responsibility for much of the public land in the western United States, and a lot of the controversy surrounding the difficulty in siting solar facilities has focused on its record in approving leases. BLM was the primary agency conducting NEPA/EIS review accounting for three-fourths of the approved projects in our sample.¹⁶ We focus in this section on its process for reviewing applications and outline its repeated efforts to expedite this process.

14 For example, Desert Quartzite was delayed until BLM issued the DRECP. (<https://www.hsgac.senate.gov/imo/media/doc/Abram%20Testimony.pdf>)

15 The Crescent Dunes design directs the sun at a 640-foot-tall receiver tower to heat molten salt to 554–1,000+ degrees Fahrenheit, which is pumped into a hot salt storage tank, where it is used to generate steam to drive turbines. (<https://solarpaces.nrel.gov/project/crescent-dunes-solar-energy-project> and <https://www.power-technology.com/projects/crescent-dunes-solar-energy-project-nevada/>)

16 BIA was the primary agency for six projects; DOE and USACE had primary responsibility for one each.

4.1. BLM’s Review Process

Under the federal Land Policy and Management Act (FLPMA), BLM is authorized to grant ROW authorizations to generate, transmit, and distribute electric energy.¹⁷ These are grants or leases allowing the use of a specific parcel of land for a specified period. They cover siting solar collectors, towers, generators, and energy storage and ancillary facilities, such as transmission lines, connection facilities, and access roads (BLM 2018b).

FLPMA requires a two-step process in issuing ROW authorizations. First, BLM must develop regional resource management plans to consider a broad range of potential resource scenarios and management approaches under the principles of multiple use and sustained yield.¹⁸ These land use plans are generally major federal actions subject to NEPA review. We have not examined this first step. Some individual solar applications included in this review have also required a narrow amendment to the regional land use plan. Second, BLM must then issue specific ROW authorizations for individual projects sited within the regions; we have focused on this aspect.

Beginning with the initial renewable energy push by the Obama administration in 2009, Department of Interior (DOI) and BLM have made a succession of program changes to expedite review of ROW applications and fast-track project approvals. However, the “new” initiatives over the last 10-plus years—marked by both official announcements and contemporary articles—and the available data on the length of BLM review point to the limited success in speeding up the approval process.

4.2. BLM’s Repeated Efforts to Expedite Review of Solar Projects: A Chronology

In 2007, BLM revised its Solar Energy Development guidance for siting solar projects as its first step in meeting the 2005 Energy Policy Act (EPACT) goal of siting at least 10,000 MW of renewable electricity generation on public lands by 2015. In response to the revision, BLM received more than 150 applications for solar projects—and more than 400 for renewable energy projects. This flood of applications overwhelmed the limited BLM resources available.¹⁹

17 43 USC § 1761. An ROW is an easement, lease, permit or license to occupy, use, or traverse public lands (43 USC § 1702(f)).

18 Other provisions of law may set forth other specific management requirements, which need to be addressed within the resource management plans (43 USC § 1712). For example, the plans need to assure compliance with the Wild and Free-Roaming Horse and Burros Act (16 USC § 1331 (1971)).

19 <https://interiornewswire.com/stories/612682141-secretary-salazar-senator-reid-announce-fast-track-initiatives-for-solar-energy-development-on-western-lands-archive>, <https://grist.org/article/obama-administration-approves-first-big-solar-projects-to-be-built-on-feder/>

In mid-2009, DOI and DOE announced a “fast-track” initiative to establish priority processing for 14 projects selected as candidates for federal loan guarantees under the ARRA (BLM 2009b), which had to begin construction by September 30, 2011 to be eligible (Streater 2010; LaMonica 2011). Fast-tracked projects include the Ivanpah, Genesis, Crescent Dunes, and Amargosa farms (Streater 2009; Austin 2016; Basin and Range Watch 2009).²⁰ BLM used a noncompetitive process to provide ROW grants for these projects.

This push to complete environmental reviews for the ARRA candidates represented the first of a succession of BLM initiatives to streamline and expedite the approval of solar projects on BLM lands (see Box 1 for a chronology of the various initiatives).

Box 1: Chronology in Fast-Tracking

Beginning with the initial renewable energy push by the Obama administration in 2009, a succession of announcements from DOI and BLM have addressed renewed efforts to expedite review and fast-track projects. However, both the official announcements and contemporary articles indicate the slow progress in bringing these utility-scale solar facilities online.

April 2007: Initial BLM guidance in response to 2005 EPA goal for renewable energy on public land.

June 2009: DOI announces “Fast-Track” initiative for 14 western solar energy projects.

July 2012: DOI and DOE release the Final Programmatic Environmental Impact Statement (PEIS) as a “roadmap” for solar energy development in six southwestern states.

October 2012: BLM signs the Western Solar Plan ROD implementing solar energy policies, procedures, and land-use plan amendments for 6 southwestern states. It identified **categories of lands to be excluded** from utility-scale solar energy development and designated specific solar energy zones (SEZs) well suited for such projects.

June 2014: BLM holds a competitive leasing auction for six parcels in the Dry Lake SEZ.

December 2015: [press report] “**Mixed record for renewables on public lands.**” **Only three projects are approved** from the Dry Lake SEZ auction—with none for the remaining 17 SEZs.

March 2016: BLM releases regional mitigation strategies for AZ, CO, and NV.

September 2016: BLM completes the ROD for the Desert Renewable Energy Conservation Plan (DRECP).

December 2016: BLM issues the Competitive Leasing Rule for Solar and Wind Energy Development (81 FR 92122).

July 2018: [press report] BLM plans “**jack-rabbit**” pace. BLM plans expedited approval for eight new solar projects in the Southwest—this would represent the first approvals of solar projects in more than three years when complete.

Fall 2021: BLM announces competitive bidding offers for SEZ parcels in several of the states.

January 2022: US agencies to fast-track renewables on public land—DOI, USDA, Defense, DOE, and EPA announce a new MOU to prioritize and expedite permitting decisions for renewable energy projects on federal lands.

²⁰ However, in a couple of cases, additional issues cropped up after completion of the fast-tracked BLM review that delayed construction (DiDonato 2012; Sahagun 2012; Austin 2016).

In 2012, BLM adopted the Western Solar Plan as a comprehensive, systematic approach to expedite the leasing of public lands (BLM 2018a). Interior Secretary Ken Salazar stated that “[t]his blueprint for landscape-level planning is about facilitating faster, smarter utility-scale solar development on America’s public lands.”²¹ BLM’s 2012 Programmatic EIS (PEIS) supporting the plan identified 19 SEZs covering nearly 300,000 acres in six southwestern states—an area sufficient to support more than 23,700 MW.²² BLM selected the SEZs as areas that are well suited to solar energy development with limited environmental and cultural impacts and access to transmission corridors (BLM 2019). The plan had much broader implications for BLM land policy in the western states. The underlying solar PEIS also excluded 79 million acres from utility-scale solar development and identified an additional area covering 19.3 million acres as “variance” lands (BLM n.d.b.). BLM allows ROW applications within variance lands on a case-by-case basis. However, in addition to assigning a lower priority to reviewing projects in variance areas, BLM also established a higher threshold for ROW grants.²³ (See Appendix E for further details on the current noncompetitive ROW grant process.)

Completing the Western Solar Plan in 2012 represented only a first step in implementing it. In December 2016, BLM adopted the Competitive Leasing rule to promote “responsible” solar and wind energy development on public lands.²⁴ It built upon its regulations and policies to expand its ability to use competitive processes to award ROWs for development inside or outside of “designated leasing areas” (DLAs),²⁵ which it

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- 21 As an indication of the complexity of the Western Solar Plan, it included amendments to 89 BLM land use plans, including the California Desert Conservation Area Plan. ([https://eplanning.blm.gov/public_projects/88925/200202547/20039053/250045248/Crimson%20Solar%20Project_FEIS_PRMPA_Protest%20Resolution%20Report%20\(April%2030,%202021\).pdf](https://eplanning.blm.gov/public_projects/88925/200202547/20039053/250045248/Crimson%20Solar%20Project_FEIS_PRMPA_Protest%20Resolution%20Report%20(April%2030,%202021).pdf), https://eplanning.blm.gov/public_projects/lup/65266/79041/91306/2012_Solar_PEIS_ROD.pdf)
 - 22 The states covered include Arizona, California, Colorado, Nevada, New Mexico and Utah (<https://www.blm.gov/press-release/blm-takes-key-steps-expedite-solar-energy-development-public-lands-1>, https://solareis.anl.gov/documents/docs/PressRelease_Final_Solar_PEIS.pdf). BLM “deallocated” the Four Mile SEZ and associated variance lands in Colorado after receiving comments from local Native American tribes, the National Park service, and Colorado Parks and Wildlife (https://eplanning.blm.gov/public_projects/nepa/76102/162131/197822/DOI-BLM-CO-F030-2017-0005_EA_final.pdf)
 - 23 For example, applicants have the responsibility—and greater burden—of demonstrating through an NEPA environmental and cultural review process that their proposal will avoid or minimize adverse effects. In addition, they must consider the availability of lands in DLA/SEZs that could meet their needs. (<https://blmsolar.anl.gov/variance/process/>)
 - 24 BLM has used a variety of titles for this rule, including Competitive Leasing, Competitive Leasing for the Solar and Wind Energy, and Solar and Wind Energy. The Competitive Leasing Rule is an amendment to the 2005 Rights-of-Way rule. For convenience, we have chosen to use Competitive Leasing Rule.
 - 25 DLAs include, for example, the SEZs identified in the 2012 Western Solar Plan, Desert Renewable Energy Conservation Plan (DRECP) Development Focus Areas (DFAs), and Renewable Energy Development Areas in Arizona. Although SEZs are designated as DLAs under the Competitive Leasing Rule, we continue to use “SEZ” to identify the initial energy zones identified by the 2012 Western Solar Plan. (<https://blmsolar.anl.gov/variance/>)

has identified as preferred locations for solar energy development. BLM emphasized that a competitive bid process facilitates “responsible solar and wind energy development of public lands and ensures that American taxpayers receive a fair return from the use of those resources.”²⁶

The Competitive Leasing rule established an expanded multistep process to support competitive leasing of parcels in DLAs. (Figure 3 lays out the steps—the black boxes represent BLM decision steps.) The rule requires a competitive process within DLAs (with an exception for certain special circumstances).²⁷ BLM believes that the competitive bid process—sealed bids, oral auctions, or the combination of these—of the Western Solar Plan framework represents an effective way of identifying the highest-priority projects.²⁸ BLM expected that the successful bidder would generally receive an ROW lease—which offers a variety of incentives for applicants and reduces the uncertainty associated with the noncompetitive ROW grant process.²⁹ (For a discussion of the Competitive Leasing rule, see Appendix F.)

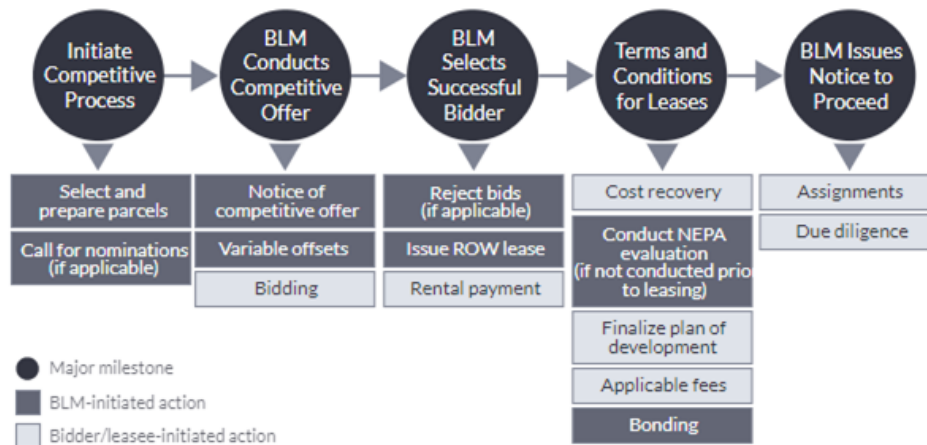
26 <https://www.blm.gov/programs/energy-and-minerals/renewable-energy/laws/solar-and-wind-energy-rule>, <https://www.blm.gov/programs/energy-and-minerals/renewable-energy/solar-energy/permitting-and-development/competitive-leasing>

27 BLM also has the discretion under the Competitive Leasing Rule to use a competitive process in variance areas. However, BLM has done so only in its most recent 2023 auction for two parcels adjacent to the Amargosa Valley SEZ. (<https://www.doi.gov/pressreleases/biden-harris-administration-holds-record-breaking-auction-solar-energy-development>)

28 <https://www.govinfo.gov/content/pkg/FR-2016-12-19/pdf/2016-27551.pdf>

29 Through the noncompetitive process, applicants must demonstrate that their proposal will avoid or minimize adverse effects to sensitive resources and face a greater burden in terms of satisfying required environmental and cultural reviews through an EIS-level NEPA review process, consultation with interested federal, state, and tribal authorities, and the associated public outreach processes. In addition, the review must also consider whether available SEZ/DLA areas would provide an alternative site that meets the applicant’s needs. (81 FR 92224 (Dec 19, 2016)) (https://www.blm.gov/sites/blm.gov/files/uploads/Solar%20Wind%20Regulation_17Jan2017Presentation.pdf)

Figure 4. Procedures for Issuing Solar Energy ROW Grants Competitively



Source: <https://blmsolar.anl.gov/competitive/>

In addition to the Competitive Leasing rule, BLM also completed a couple of other actions in 2016 to facilitate the leasing process. In a separate initiative to expedite the review of applications for solar facilities in California, BLM worked with FWS and the state to identify southern desert areas that are most suitable (BLM, n.d.a). The decisions set out in the ROD for the September 2016 DRECP apply to 22.6 million acres in the southeastern desert region, including the three California SEZs. BLM also announced “mitigation strategies” for SEZs in three states—Arizona, Colorado, and Nevada—that assess potential adverse environmental effects up front, identify appropriate offsets, and recommend a per-acre fee to fund off-site mitigation measures. BLM explained that these policy initiatives—the Western Solar Plan, the DRECP, and the Competitive Leasing rule—and their associated supporting documents are intended to provide a framework for leasing sites for solar projects and streamline environmental review for individual projects within the SEZs.

However, BLM required five years to complete the Competitive Leasing rule—until the end of 2016.³⁰ In the interim, BLM only awarded ROW leases under the Western Solar Plan for three projects in a single SEZ—Dry Lake.³¹

30 BLM issued an ANPRM for the Competitive Leasing rule in December 2011 (76 FR 81906) and published the proposal along with the EA in September 2014 (79 FR 59021). BLM elected to prepare an Environmental Assessment under NEPA even though the competitive leasing rule was eligible for categorical exclusion. (https://www.blm.gov/sites/blm.gov/files/uploads/Solar%20Wind%20Regulation_17Jan2017Presentation.pdf)

31 In June of 2014, BLM conducted a competitive auction for parcels in the Dry Lake SEZ as a “pilot” using “interim competitive procedures.” BLM completed EAs for these three projects within 10 months by tiering to the 2012 Western Solar Plan PEIS and announced approval of them in June of 2015. (<https://blmsolar.anl.gov/sez/nv/dry-lake/>, <https://blmsolar.anl.gov/sez/competitive-leasing/procedure/>, <https://www.nrdc.org/experts/bobby-mcenaney/21st-century-energy-just-got-21st-century-leasing-process>)

BLM reviews of individual projects were delayed further by the churning associated with the transition to the new Trump administration; its review of key policy decisions embedded within the Western Solar Plan (and related documents) included opening up public lands to other resource uses (e.g., mining, oil and gas production, and grazing) and, more specifically, an effort to walk back the DRECP provisions excluding projects such as mining and oil and gas production from roughly 10 million acres of BLM-administered lands in California.³²

In mid-2018, BLM finally announced plans to launch an expedited approval process for eight solar projects—yielding the first action on these applications for ROWs in more than three years. None of these projects were in SEZs covered by the Western Solar Plan. Although BLM’s announced schedule called for completing NEPA review within one year, only two reviews (Palen and Sweetwater) achieved this—Desert Quartzite required 18 months, the Gemini review required 22 months, and Yellow Pine and Crimson required more than 2 years.³³

During the Trump administration, BLM did not open up parcels for competitive bidding at any of the SEZs.³⁴ Although BLM’s Utah office prepared a plan for a lease sale at an SEZ site, it was reportedly blocked at the policy level in favor of continuing to allow grazing at the site.³⁵

Under the Biden administration, BLM has largely returned to the policy positions established over the 2012 to 2016 period. BLM approved ROW leases for the Crimson solar farm in May 2021—one of the projects targeted as part of the Trump administration initiative in mid-2018—and the joint Arica and Victory Pass projects in

32 BLM also issued an instruction memorandum establishing as policy that compensatory mitigation could not be required as a condition for project approval. (<https://blmsolar.anl.gov/sez/policies/regional/>, <https://www.blm.gov/press-release/blm-cancels-withdrawal-proposal-california-desert>, <https://shanghaibrown.wixsite.com/thesunrunner/single-post/2018/02/08/BLM-Opens-13-Million-Acres-of-California-Deserts-to-Mining>, <https://www.earthandwatergroup.com/doi-limits-compensatory-mitigation-on-blm-lands/>)

33 The BLM plan included the completion of a review to designate the Dry Lake East area as a DLA as one of the eight projects. The other seven projects addressed NEPA reviews for specific utility-scale solar facilities. BLM completed review for six of these; the developers for Sandstone terminated it before the review was completed. (<https://news.bloombergtax.com/federal-contracting/blm-plans-jackrabbit-pace-to-ok-eight-big-solar-projects-out-west?context=article-related>, <https://www.spglobal.com/marketintelligence/en/news-insights/blog/insight-weekly-august-22-2023>)

34 However, BLM did designate the Dry Lake East site in early 2020 as an additional DLA for PV solar development. (<https://eplanning.blm.gov/eplanning-ui/project/86813/510>)

35 Bureau of Land Management, “Milford Flats South Solar Energy Zone Competitive Leasing.” (<https://eplanning.blm.gov/eplanning-ui/project/97506/510>, <https://www.americanprogress.org/article/trump-administration-stifling-renewable-energy-public-lands-waters/>)

December 2021.³⁶ In the fall of 2021, BLM finally requested—five years after issuing the Competitive Leasing rule—competitive bidding offers for SEZ parcels in two of the states (Arizona and Utah).³⁷ In the spring of 2022, BLM added a request for sealed bid offers on the Dry Lake East DLA parcel.³⁸ In December 2021, BLM also issued a separate solicitation for Expressions of Interest for utility-scale solar development on an additional 90,000 acres in SEZs in CO, NV, and NM.³⁹

Finally, BLM recently (June 16, 2023) proposed changes to its ROW, Leasing and Operations for Renewable Energy rule to adjust acreage rents and capacity fees for solar and wind energy projects. It also would provide BLM with more flexibility in processing such applications inside designated leasing areas by giving it the option to make parcels in DLAs available for noncompetitive leasing without first using a competitive process.⁴⁰ BLM believes these changes will facilitate responsible solar and wind energy development on its public lands.

4.3. Synopsis: The First Decade of the Western Solar Plan

Despite the promise of the 2012 Western Solar Plan/(SEZ initiative), BLM's performance in siting new utility-scale projects in SEZs over 2012–2021 has been disappointing. As of December 2021, the Playa and Harry Allen solar projects in the Dry Lake (Nevada) SEZ were the only projects approved and in operation under the plan's provisions.⁴¹ No additional operating projects were in the other 16 SEZs with leases awarded under the Western Solar Plan provisions⁴² (Solar PEIS ROD, p. 146).

36 BLM evaluated the two projects together because they were proposed by subsidiaries of the same company, are next to each other, will be developed within the same time, and will have similar environmental impacts. (https://eplanning.blm.gov/public_projects/1502795/200388112/20043653/250049844/Arica%20and%20VP%20Environmental%20Assessment.pdf)

37 <https://www.govinfo.gov/content/pkg/FR-2021-09-10/pdf/2021-19555.pdf>, <https://www.federalregister.gov/documents/2021/11/04/2021-24021/notice-of-competitive-offer-for-solar-energy-development-on-public-lands-in-the-state-of-arizona>

38 <https://www.govinfo.gov/content/pkg/FR-2022-04-05/pdf/2022-07078.pdf>

39 https://www.newsdata.com/california_energy_markets/southwest/blms-largest-ever-solar-interest-solicitation-90-000-acres-in-southwest/article_55d53b4c-6446-11ec-88e6-63a7818dcc9e.html

40 88 FR 39726

41 BLM exempted “pending” applications—submitted before June 30, 2009—for parcels within the SEZs from requirements associated with the 2012 Western Solar Plan. Solar projects in operation in the Riverside East SEZ as of December 2021 were approved under earlier BLM land use plans. (https://solareis.anl.gov/documents/docs/Solar_PEIS_ROD.pdf)

42 The Riverside East SEZ has several operating projects where applications were filed before 2010. Leases for these projects were awarded under earlier procedures established for fast-tracking projects.

Key factors contributed to BLM's delay in awarding ROWs in the SEZs over 2010–2021:

- the efforts of BLM over the early years—2012-2016—to put in place the Western Solar Plan, Competitive Leasing Rule, and other key implementation policies (e.g., DRECP); and
- the Trump administration review of major public lands policies embedded in the Western Solar Plan, DRECP, and Competitive Leasing rule and the failure to request any competitive offers for parcels in the SEZs, resulting in a further delay of five years in the practical implementation of the Western Solar Plan.

BLM expected that the Western Solar Plan would enable it to avoid protracted NEPA reviews at the site-specific NEPA review stage by “tiering” its review to earlier NEPA reviews⁴³ (BLM 2018a). However, this multistep process has proved to be vulnerable to delay both because of issues in deciding to undertake key preliminary steps—DLA designation, regional mitigation strategies, and preauction NEPA review—and the time required to complete them.

4.4. Demand for Solar Sites

A separate aspect affects the development of solar energy projects within BLM jurisdiction: the extent to which developers are interested in it.

As of the end of 2021, BLM had solicited bids under the Western Solar Plan for a limited set of sites—three in Arizona, three in Nevada, and one each in Utah and Colorado. The Nevada sites—Dry Lake SEZ, Dry Lake East DLA, and Amargosa Valley SEZ just north of Las Vegas—attracted substantial interest and high winning bids. The other areas—not so much. Two received no bids; three received winning bids that were quite small relative to those in Nevada (on a per-acre basis) (see Table 3).⁴⁴

43 <https://blmsolar.anl.gov/sez/nv/dry-lake/>, <https://blmsolar.anl.gov/sez/policies/nepa/>

44 BLM held an additional auction (June 2023) for parcels in and adjacent to the Amargosa Valley SEZ. The trend of high bids for parcels in Nevada continued. This auction included variance lands—the first time BLM used a competitive process for such lands—and their bids were substantially less than those for the SEZ parcels but considerably higher than for SEZ parcels in other states.

Table 3. BLM Competitive Lease Offers in SEZs

Date	SEZ	State	Parcel	Size (acres)	Successful bid	Dollars per acre
10/2013	DeTilla Gulch	CO		1,064	No bid	
	Los Mogotes East	CO		2,650	No bid	
6/2014	Dry Lake	NV	1	712.2	\$780,000	1,096
			2	222.8	\$880,000	3,950
			3	758.7	\$1,320,000	1,739
			4	729	\$1,460,000	2,003
			5	507.7	\$1,175,000	2,314
			6	152.7	\$220,000	1,440
11/2021	Millford	UT		4,800	\$164,444	34
	Brenda	AZ		3,348	\$114,428	34
12/2021	Agua Caliente	AZ		2,560	\$78,728	31
	Gillespie	AZ			No bid	
5/2022	Dry Lake East	NV		1,635	\$10,288,780	6,293
6/2023	Amargosa Valley	NV	A (SEZ)	3,775	\$35,250,000	9,338
			B (SEZ)	3,451	\$46,600,000	13,503
			1 (Var)	10,129	\$21,000,000	2,073
			2 (Var)	6,320	\$2,300,000	364

Note: For sources organized by location, see Appendix D.3.

In addition to interest in these Nevada SEZ sites, developers have also obtained approval for eight additional Nevada sites within the post-Western Solar Plan era. Most of these are near Las Vegas—not in the several other BLM SEZs in Nevada. Developers obtained BLM ROW grants at three non-SEZ sites in variance areas in Nevada; using a noncompetitive “first-come, first-served” process, BLM completed EAs with an FONSI for Luning I and II and EISs for Gemini and Yellow Pine⁴⁵ (see Table 4). Developers also obtained BIA solar energy ground leases for five sites—in close proximity to the two Dry Lake SEZs—on the Moapa River Indian Reservation 25 miles north of Las Vegas.

45 The competitive leasing rule also permits BLM to use competitive processes for sites in the variance areas.

Compared to the Nevada SEZs and the Riverside East SEZ in California, we have not found a similar level of interest in the other SEZs. The response to BLM's solicitation at the end of 2021 for Expressions of Interest for utility-scale solar development on an additional 90,000 acres in SEZs in Colorado, Nevada, and New Mexico will provide additional information on developer interest.

These observations raise the question as to whether BLM has identified SEZs that provide developers with the most attractive locations within these southwestern states. It is also not clear that the Western Solar Plan offers strong incentives for developers to select SEZ sites. The time required from initial application to completion of the ROD for projects on variance lands—from two years for Luning I and II to almost three years for Gemini and more than four years for Yellow Pine—is comparable to the time required to designate and complete the competitive bid process for the Dry Lake East DLA in Nevada.

Table 4. BLM Competitive Lease Offers in SEZs

<i>Sites Not Located in SEZs</i>					
Project name	Review process	Application date	NOI date	ROI date	Operational
Luning I	EA	07/2013		07/2015	04/2017
Yellow Pine	EIS	06/2016	06/2018	11/2020	Pending
Gemini	EIS	07/2017	07/2018	05/2020	Pending
Luning II	EA	02/2020		12/2021	Pending

5. Policy Observations and Considerations for Future Policy

This review of BLM's experience in implementing the Western Solar Plan over its first 10 years yields these observations and considerations for future policy:

1. Implementation of the plan involves several key discretionary steps. Over the first decade of the program, BLM delay in taking those steps has slowed solar development in the SEZs. Given the flexibility and discretion in the BLM process for issuing ROWs, it is doubtful that the FRA presumptive deadlines for EIS and EA NEPA reviews will significantly expedite the siting of solar facilities on public lands.
2. Interest in the original SEZ parcels—apart from Riverside East and the Dry Lake areas—has also been limited, as evidenced by zero or low bids for parcels in the other SEZs. It remains unclear whether BLM selection of preferred SEZ/DLA areas represent the most attractive locations from the developer perspective

3. Based on a limited set of four cases, the time required from initial application to completion of the NEPA review process for projects in variance areas has been comparable to (if not better than) that for those in SEZ/DLAs. BLM should consider doing more to facilitate projects in variance areas. For example, BLM used the NEPA review for the Luning I project to expedite the follow-on application for Luning II in the same area. This allowed BLM to “tier” to the earlier NEPA review to avoid more protracted steps in awarding an ROW grant. BLM also included two parcels on variance land in an auction in the Amargosa Valley SEZ
4. Several SEZs have only been large enough to accommodate a single utility-scale solar project. The resources and time required to designate an area as a DLA and take the additional steps to make it available for auction are significant. If BLM expands the number of DLAs, it should focus on designating larger areas to accommodate parcels for multiple utility-scale projects.

6. Summary

We collected information on the time required to complete the NEPA review for 46 solar projects, 2009–2021. These are mostly in the US Southwest; more than half are on BLM lands. Twenty-eight projects completed a comprehensive NEPA/EIS review; 18 completed the less rigorous NEPA/EA review with an FONSI. Other federal agency environmental reviews and historic and cultural preservation reviews for these solar projects were mostly embedded within the NEPA review. These reviews include ESA, Migratory Bird Treaty Act, CWA, Section 404 (wetlands) reviews and the cultural reviews required by the AHPA.

Two-thirds of the projects completed NEPA/EIS review in 1–2 years from the time of formal notice of review (NOI) to final EIS; the other projects mostly required 2.5–5 years (with one taking 107 months). By comparison, CEQ (2018a) reported that the average time across all federal agencies for completion of EIS reviews was 4.5 years.

Six EA reviews were completed in one year or less; eight were completed within two years. Four required more than two years.

However, many of these projects required 7–10 years between the initial application and completion. In several cases, the formal NEPA review began 24+ months after the application. This initial period involved refining and modifying the application—likely including changes to address NEPA-related issues. A variety of factors played a role in the substantial time required to take solar projects from an initial application to operational status—developers switched from CSP to PV technology, changed ownership as the initial group of developers encountered financial problems, and revised project design by cutting back on capacity and acreage. In some cases, the federal agencies carrying out NEPA review were responsible for the delays. The delays in reaching operational status may also reflect difficulties developers encountered in securing power purchase agreements with utilities and obtaining agreements on interconnection with the grid—but further research is required to understand the reasons for post-NEPA delays.

Finally, over its first decade, the Western Solar Plan has fallen well short of the promises offered in 2012. It only partially addressed the issues and hurdles in awarding ROWs for siting solar facilities. BLM took another four years to complete the Competitive Leasing rule and related policy actions, such as the DRECP and Solar Regional Mitigation Strategies, required to support the Western Solar Plan. The change in administrations in 2017 resulted in further churning as BLM reviewed major policy decisions for both the broader use of public lands in the desert Southwest and issues specific to solar development in the Southwest. The Trump administration also failed to open up the SEZs to competitive offers, delaying further development of solar projects within the SEZs by 4 years.

At the same time, developers have pursued some solar projects—Luning I and II, Gemini, and Yellow Pine—in variance areas in Nevada instead of one of its other SEZ areas.⁴⁶ In addition, developers also obtained BIA solar energy ground leases for five sites—in close proximity to the two Dry Lake SEZs—on the Moapa River Indian Reservation 25 miles north of Las Vegas.

46 The Gemini solar project—also in a variance area—is close to the Dry Lake SEZ/DLAs. (https://eplanning.blm.gov/public_projects/nepa/100498/20017803/250023790/Signed_ROD_Gemini_Solar_5.8.20_with_Appendices.pdf)

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Appendix A. Full List of Projects

Table A.1. Full List of Projects

Name	Tech	MW	State	Land	Acres
Abengoa Mojave	CSP	250	CA	Private	1765
Agua Caliente	PV	290	AZ	Private	2400
Aiya	PV	100	NV	Tribal	900
Amargosa Farm Road	CSP	464	NV	Federal	4350
Antelope Valley	PV	230	CA	Private	2100
Arica	PV	200	CA	Federal	2000
Arlington Valley	PV	125	AZ	Private	1160
Astoria	PV	175	CA	Private	2060
Blythe	PV	485	CA	Federal	4070
Calico	CSP	850	CA	Federal	8230
California Valley	PV	250	CA	Private	1966
Camino	PV	44	CA	Federal	383
Campo Verde	PV	139	CA	Private	1400
Crescent Dunes	CSP	110	CA	Public	298
Crimson	PV	350	CA	Federal	2500
Desert Harvest	PV	150	CA	Federal	1200
Desert Quartzite	PV	450	CA	Federal	3000
Desert Sunlight	PV	550	CA	Federal	3900
Dry Lake	PV	130	NV	Federal	694
Eagle Shadow Mountain	PV	300	NV	Tribal	2200
Gemini	PV	690	NV	Federal	7100
Genesis	CSP	250	CA	Federal	1950
Harry Allen	PV	130	NV	Federal	715
Imperial Valley	CSP	584	CA	Federal	3940

Name	Tech	MW	State	Land	Acres
Ivanpah	CSP	392	CA	Federal	3600
K-Road Moapa	PV	350	NV	Tribal	2153
Long Island	PV	32	NY	Federal	200
Lookout Solar	PV	110	SD	Tribal	810
Luning I	PV	50	NV	Federal	560
Luning II	PV	50	NV	Federal	575
McCoy	PV	250	CA	Federal	2300
Mesquite	PV	400	AZ	Private	2300
Midway	PV	236	TX	Private	1500
Moapa Solar Energy Center	PV	200	NV	Tribal	850
Palen	PV	500	CA	Federal	3500
Panoche Valley	PV	130	CA	Private	4717
Playa	PV	200	NV	Federal	1710
Quartzite Solar	CSP	100	AZ	Federal	1675
Silver State North	PV	50	NV	Federal	600
Silver State South	PV	250	NV	Federal	2000
Soda Mountain	PV	287	CA	Federal	1767
Solana	CSP	280	AZ	Private	1920
Sonoran	PV	300	AZ	Federal	2013
Southern Bighorn	PV	400	NV	Tribal	3600
Stateline	PV	300	CA	Federal	1685
Sweetwater	PV	80	WY	Federal	703
Topaz	PV	550	CA	Private	3500
Victory Pass	PV	200	CA	Federal	2000
Yellow Pine	PV	500	NV	Federal	3000

Appendix B. NEPA EIS Review

Appendix B.1. Review Period for the Stages between Initial Application and Operational Status

Table B.1. Review Period for the Stages between Initial Application and Operational Status

Project name	Months from initial application to NOI	Months from NOI to ROD	Months from ROD to operational	Months since ROD, still pending operation as of 12/2021	Project terminated after last completed stage
Southern Bighorn	ND	14	-	5	-
Gemini	12	22	-	19	-
Eagle Shadow	19	12	-	22	-
Yellow Pine	24	29	-	13	-
Aiya	ND	22	-	63	-
Moapa SEC	ND	ND	21	91	-
K-Road Moapa	ND	16	57	-	-
Topaz	7	22	37	-	-
Quartzite Solar	No Date	41	-	-	Yes
Blythe	3	11	66	-	-
Silver State South	1	56	34	-	-
Silver State North	1	1	16	-	-
Crimson	106	38	-	7	-
Crescent Dunes	11	13	63	-	-
Soda Mountain	58	41	-	-	Yes
Amargosa Farm Road	24	11	-	-	Yes
Desert Harvest	47	17	84	-	-
Palen	26	107	26	-	-

Project name	Months from initial application to NOI	Months from NOI to ROD	Months from ROD to operational	Months since ROD, still pending operation as of 12/2021	Project terminated after last completed stage
Desert Quartzite	90	58	-	23	-
Sonoran	25	29	-	119	-
Calico	39	16	-	-	Yes
McCoy	19	19	58	-	-
Genesis	34	12	48	-	-
Desert Sunlight	37	20	46	-	-
Ivanpah	24	23	40	-	-
Stateline	66	22	61	-	-
Imperial Valley	33	24	-	-	Yes
Panoche Valley	78	44	21	-	-

4.1. Appendix B.2. Solar Projects with Formal EIS Review Greater Than 2 Years

Sonoran (July 2009): Shift from CSP to PV design occurred during NEPA review. The shift to PV was associated concerns about water use by the CSP design and the emerging economic advantage of PV. EPA supported use of PV design to limit water use.

Silver State South (June 2009): The developer reduced the size of the facility footprint and agreed to mitigation measures to protect the desert tortoise during NEPA review.

Palen (November 2009): Shift to PV design because of economic concerns. The developers went into bankruptcy after the NOI was issued, resulting in a hiatus in NEPA review; new owners re-started NEPA review in July 2016.

Quartzite (January 2010): FEIS reports extensive meetings with tribes during NEPA review; concerns included visual effects and occupation and disturbance of cultural sites. As a result of these discussions, BLM determined that project was not consistent with the higher-quality visual restrictions of the Regional Management Plan and published a separate NOI on March 30, 2011, to analyze and amend the land use plan to support the Quartzite project. This additional review delayed completion of the review process.

Panoche (July 2012): 3.5 year review by USACE.

Soda Mountain (October 2012): Design changes were made in PV facility during NEPA review to reduce the footprint to preserve room for increasing range for bighorn sheep, reduce visual effects on Mojave National Preserve, and minimize project water requirements. (Note: County refused to permit facility over environmental issues.)

Stateline (February 2014): 3.5 year review by BLM.

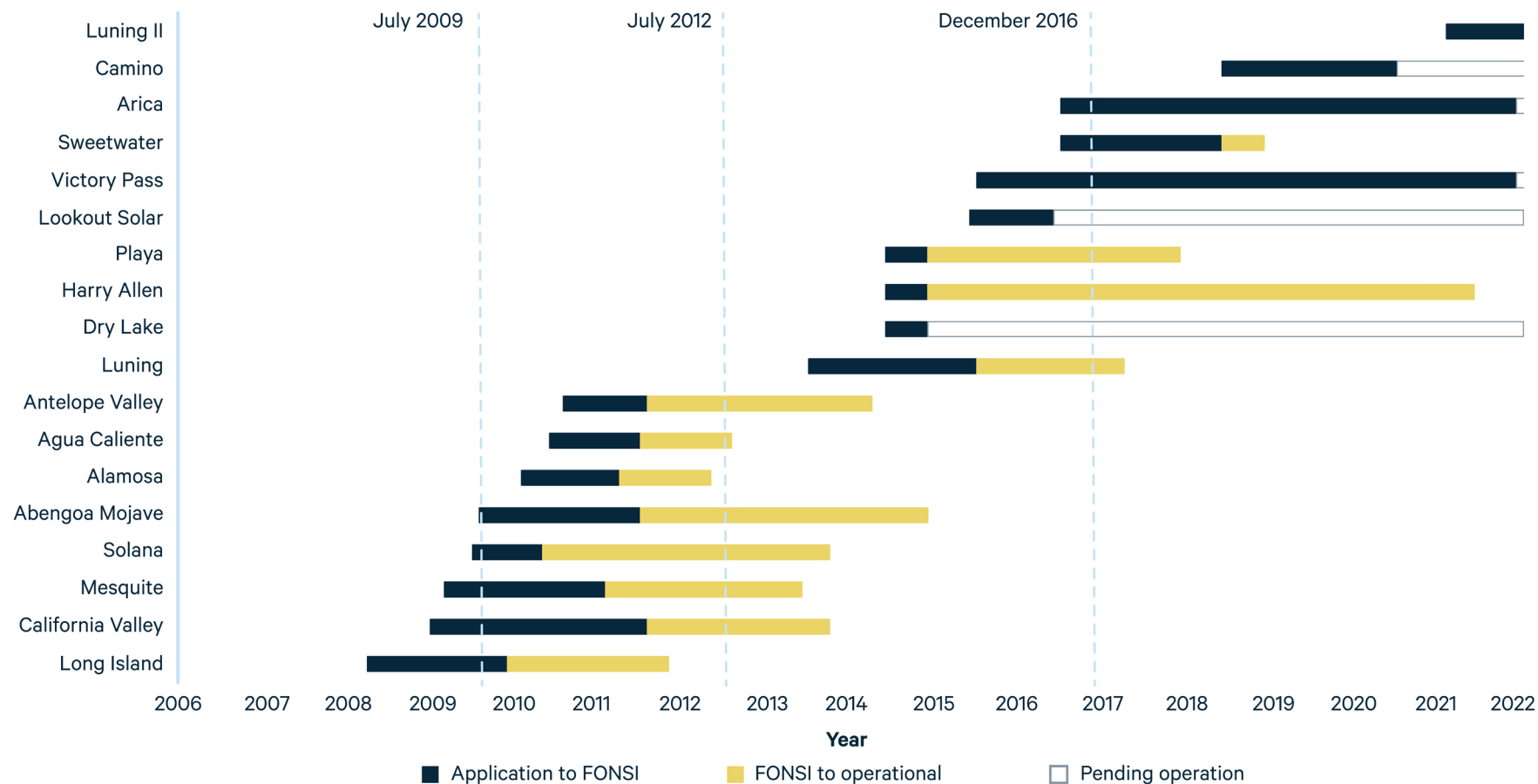
Desert Quartzite (March 2015): Initial Plan of Development (POD) submitted in 2008—but developers did not move forward with active permitting until 2014. BLM requested that developers undertake a comprehensive project analysis for the 2016 DRECP, substantially extending the NEPA review, even though it was exempt from the DRECP requirements.

Crimson (March 2018): Initial application for a tower power project was filed in 2009. Initial developers did not complete the ROW authorization process. A new group of developers acquired the project in 2016 and converted the project from a CSP design to a PV design. The developers took successive steps to reduce the footprint of the project and respond to concerns of stakeholders and Federal agencies both before and after BLM issued the NOI in 2018. Design changes and SHPO objections delayed completion of NEPA review.

Yellow Pine (June 2018): BLM review took 2.5 years.

Appendix C. Projects Undergoing NEPA Environmental Assessment Review

Figure C.1. EA Projects: Project Stage Timeline



Note: For sources, organized by location, see Appendix D.2.

Table 5. Projects Completing EA NEPA Review

Name	Agency	Initial application date	FONSI date	Operational date	Tech	MW	State	Land	Acres
Long Island	DOE	04/2008	12/2009	11/2011	PV	32	NY	Federal	200
California Valley	DOE	01/2009	08/2011	10/2013	PV	250	CA	Private	1,966
Mesquite	DOE	03/2009	02/2011	06/2013	PV	400	AZ	Private	2,300
Solana	DOE	07/2009	05/2010	10/2013	CSP	280	AZ	Private	1,920
Abengoa Mojave	DOE	08/2009	07/2011	12/2014	CSP	250	CA	Private	1,765
Agua Caliente	DOE	08/2009	07/2011	08/2012	PV	290	AZ	Private	2,400
Alamosa	DOE	02/2010	04/2011	05/2012	CPV	30	CO	Private	225
Antelope Valley	DOE	08/2010	08/2011	04/2014	PV	230	CA	Private	2,100
Luning	BLM	07/2013	07/2015	04/2017	PV	50	NV	Federal	560
Dry Lake	BLM	06/2014	12/2014	Pending	PV	130	NV	Federal	694
Harry Allen	BLM	06/2014	12/2014	05/2021	PV	130	NV	Federal	715
Playa	BLM	06/2014	05/2015	12/2017	PV	200	NV	Federal	1,710
Lookout Solar	BIA	06/2015	06/2016	Pending	PV	110	SD	Tribal	810
Victory Pass	BLM	07/2015	12/2021	Pending	PV	200	CA	Federal	2,000
Sweetwater	BLM	07/2016	06/2018	12/2018	PV	80	WY	Federal	703
Arica	BLM	07/2016	12/2021	Pending	PV	200	CA	Federal	2,000
Camino	BLM	06/2018	05/2020	Pending	PV	44	CA	Federal	383
Luning II	BLM	02/2021	12/2021	Pending	PV	50	NV	Federal	575

Note: For table sources, organized by location, see Appendix D.2.

Table C.2. EA Projects, Months Between Project Stages

Project Name	Agency	Months from Application to FONSI	Months from FONSI to Operational	Months Since FONSI, Pending Operation
Long Island	DOE	20	23	-
California Valley	DOE	31	26	-
Mesquite	DOE	23	28	-
Solana	DOE	10	41	-
Abengoa Mojave	DOE	23	41	-
Alamosa	DOE	14	13	-
Agua Caliente	DOE	13	13	-
Antelope Valley	DOE	12	32	-
Luning I	BLM	24	21	-
Dry Lake	BLM	6	-	85
Harry Allen	BLM	6	78	-
Playa	BLM	6	36	-
Lookout Solar	BIA	12	-	68
Victory Pass	BLM	77	-	1
Sweetwater	BLM	23	6	-
Arica	BLM	65	-	1
Camino	BLM	25	-	19
Luning II	BLM	23	-	-

Notes: For table sources, organized by location, see Appendix D.2. Initial application date or the earliest date of record of government agency activity associated with the project

Appendix D. Sources by Location

1.1. Appendix D.1. Sources for Projects Completing NEPA/EIS Review

The following sources correspond to Table 2 and 3.

Aiya/Tamarack

BIA. 2016. Record of Decision: Final Environmental Impact Statement for the Aiya Solar Project. US Department of the Interior. https://www.doi.gov/sites/doi.gov/files/uploads/signed_aiya_rod.pdf

Department of Energy. 2022. NEPA Determination. <https://www.energy.gov/sites/default/files/2022-09/CX-026408.pdf>

Amargosa

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Appendix D.3.

These sources correspond to Table 3.

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Nevada (Dry Lake SEZ, Parcels 1–6)

BLM. 2014. Dry Lake Solar Energy Zone Auction Selects Three Potential Developers. <https://www.blm.gov/press-release/dry-lake-solar-energy-zone-auction-selects-three-potential-developers>

Arizona (Brenda, Agua Caliente, & Gillespie)

BLM. 2021. BLM Arizona Advances Development in Solar Energy Zones. <https://www.blm.gov/press-release/blm-arizona-advances-development-solar-energy-zones>

Utah (Milford)

BLM. 2022. Bureau of Land Management Utah Issues First Competitive Solar Leases. <https://www.blm.gov/press-release/bureau-land-management-utah-issues-first-competitive-solar-leases>

Nevada (Dry Lake East)

BLM. 2022. BLM Identifies Successful Bidder to Submit a Proposal for the Dry Lake East Designated Leasing Area. May 23.

Nevada (Amargosa Valley)

DOI. 2023. Biden–Harris Administration Holds Record-Breaking Auction for Solar Energy Development. <https://www.doi.gov/pressreleases/biden-harris-administration-holds-record-breaking-auction-solar-energy-development>

Appendix E. Noncompetitive ROW Grants

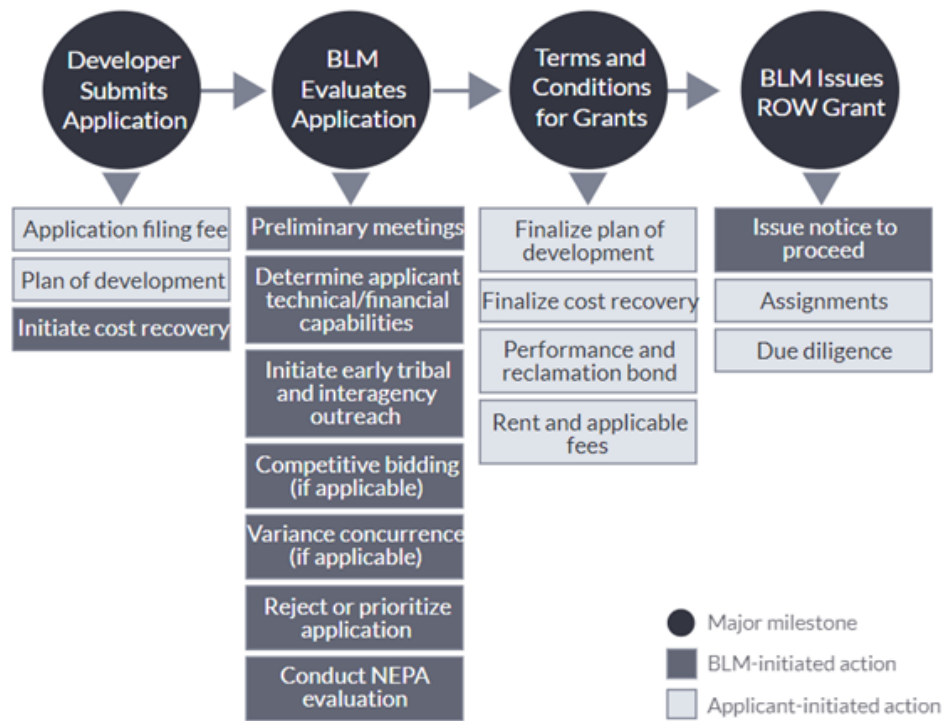
BLM established a multistep process for obtaining ROW authorization for noncompetitive grants.¹ Developers seeking to locate on BLM lands must first submit an ROW application to obtain BLM authorization. The application serves as the basis for BLM's calculation of a processing fee. After paying the fee, developers are required to submit a POD that lays out the specific design of the project, plan for construction, environmental and cultural considerations, related facilities required (e.g., transmission infrastructure), alternatives considered by the applicant, and federal, state and local permit requirements.²

When the POD is complete, BLM initiates a scoping process to evaluate the application, sets up early outreach with other federal agencies and with tribes, and conducts NEPA review by publishing a NOI to prepare an EA or EIS. If BLM elects to proceed with an EA, it completes the review process with an FONSI or, if it finds the possibility of a significant impact while completing the EA, it must issue an NOI and complete an EIS. With completion of the NEPA review process, BLM issues an ROD granting (or denying) the ROW.

1 This process is largely similar to that used in reviewing developer applications in the years before BLM issued its 2016 Competitive Leasing rule. <https://blmsolar.anl.gov/program/authorization-policies/row-authorizations/>

2 https://www.blm.gov/sites/blm.gov/files/Energy_solarenergyplanofdevelopment.pdf, <https://blmsolar.anl.gov/program/authorization-policies/row-authorizations/>

Figure E.1. Procedures for Issuing Noncompetitive Solar Energy ROW Grants



Source: <https://blmsolar.anl.gov/non-competitive/>

Appendix F. Competitive Bidding and Auctions

When BLM opened up public lands for solar projects, it had a “first-come, first-served” process for reviewing applications.³ BLM was swamped with more than 150 applications because a ROW lease for solar projects is a valuable asset providing exclusive use of public land for 30 years. Many of these applications, however, were unlikely to be approved due to issues such as site selection.⁴ In response, BLM sought to restructure and streamline the process using its experience with processes adopted in leasing public lands for other purposes (81 FR 92122).

BLM explained that the Competitive Leasing rule is intended to facilitate responsible solar and wind energy development by promoting use of preferred areas and establishing competitive processes, terms, and conditions (e.g., rental and bonding requirements).⁵ In addition, the competitive bid process helps to ensure that the federal government receives fair market value for the use of public lands (81 FR 92122).

The competitive process facilitates selecting viable projects. Instead of going through applications on a one-by-one, “first-come, first-served” basis, the successful high bidders in a competitive bid process rise to the fore—thus providing a credible way of identifying the “best” projects.⁶ Assigning such rights through a competitive process is arguably more efficient compared to a bureaucratic process with BLM picking the successful applicants.

Thus, apart from a few exceptions, the rule requires BLM to use a competitive bid process as the first step in awarding ROWs in DLAs.⁷ BLM can only turn to a noncompetitive approach after failing to receive a winning bid through a competitive process. Because of the prior evaluation and planning—including the associated NEPA reviews—through the Western Solar Plan, Competitive Leasing rule, and other similar efforts (e.g., taking the steps necessary to initiate a competitive bid process), BLM expects to be able to “tier” to these earlier reviews and issue a ROW lease almost immediately after holding an auction (BLM 2018a).

3 <https://www.nrdc.org/experts/bobby-mcenaney/21st-century-energy-just-got-21st-century-leasing-process>

4 https://www.doi.gov/news/pressreleases/2009_06_29_release

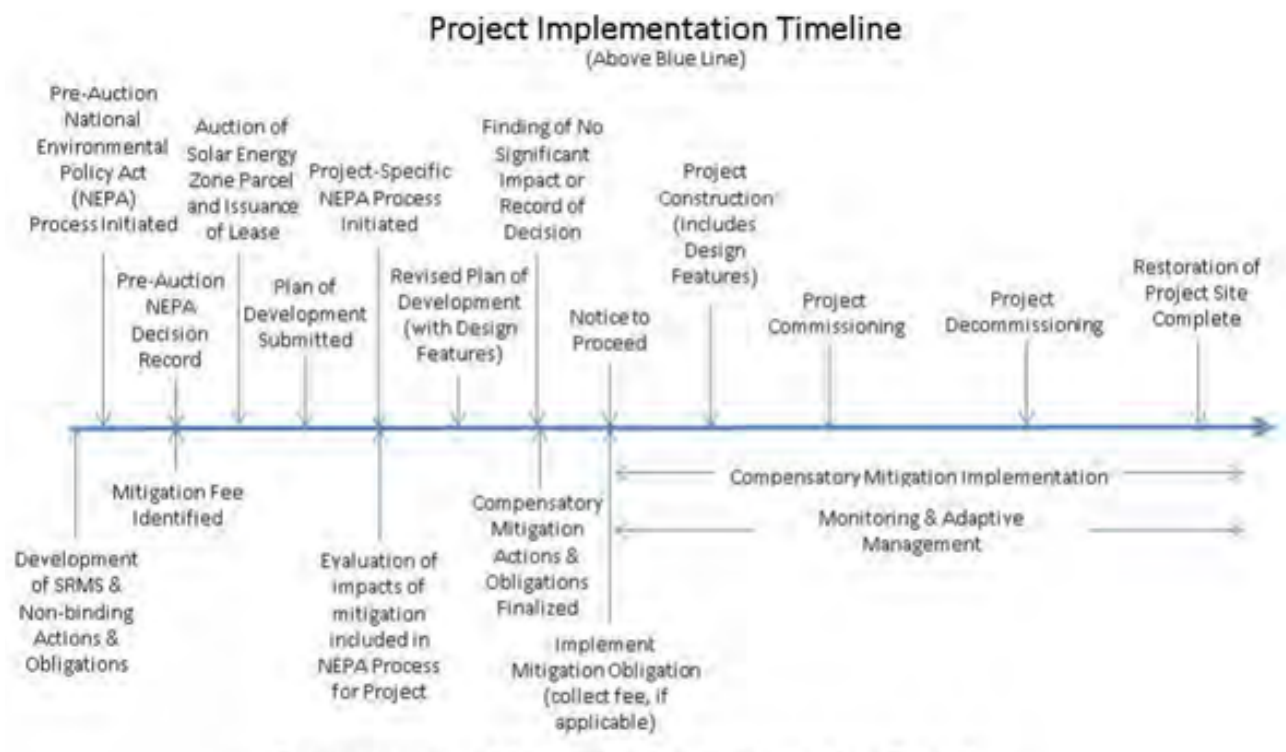
5 Regulations before 2016 only authorized BLM to use competitive bidding when two or more applicants had filed right-of-way applications for the same facility or system (81 FR 92122).

6 Bidders must demonstrate that they meet BLM qualification requirements and submit a payment equal to BLM’s established minimum bid plus 20 percent of the bonus bid. BLM will refund bids to unsuccessful developers. Successful bidders must submit a plan of development within 2 years of the issue of the ROW lease (81 FR 92122)

7 In California, BLM may decide to follow a competitive process and issue a lease for solar development within DRECP-designated Development Focus Areas (DFAs). <https://blmsolar.anl.gov/competitive/>

However, before initiating the competitive process, BLM must also identify DLAs or SEZs—a process requiring a NEPA analysis—and establish regional mitigation strategies for each affected state. As an example, BLM required more than four years to establish Dry Lake East as a DLA—even though it is adjacent to the Dry Lake SEZ—and award a ROW lease to the winning bidder. In addition, a subsequent tiered NEPA analysis—perhaps in the form of an EA—of the leaseholder’s POD will generally still be necessary to ensure that it is compatible with the BLM’s land use decisions before the project can proceed (81 FR 92185). Figure F-1 presents a schematic of the various steps associated with the competitive lease process (BLM decisions are presented above the line; developer decisions are below the line.)

Figure F.1. Procedural Steps for Leasing Competitive Solar Energy ROW Leases



Source: https://blmsolar.anl.gov/documents/docs/Final_AZ_SRMS_Mar_2016.pdf

