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Lobo's Travails on the Road from Limbo

By Edward A. Fitzgerald

The saga of the Mexican gray wolf continues. In 1998, the U.S. Fish and Wildlife Service (FWS) reintroduced the Mexican gray wolf into the Blue Range Wolf Recovery Area (BRWRA) in Arizona and New Mexico as a nonessential experimental population, pursuant to § 10(j) of the Endangered Species Act (ESA).[1] Mexican wolf recovery has proceeded with various stops and starts; since 2015 the Mexican wolf population has grown.[2] By 2021, there were at least 196 individual wolves across the BRWRA—a record number.[3]

In 2015, FWS instituted new 10(j) regulations for the management of the Mexican

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1 Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Fed. Reg. 1,752 (Jan. 12, 1998); Endangered Species Act of 1973, 16 U.S.C. § 1539(j).

2 Lindsey Botts, *Feds Count a Record Number of Wild Mexican Gray Wolves, but Advocates Want To See More*, AZCENTRAL (Mar. 31, 2022, 6:00 AM), https://www.azcentral.com/story/news/local/ arizona-environment/2022/03/31/federal-agency-counts-record-number-mexican-gray-wolves/7221220 001/; *see also* Edward A. Fitzgerald, *The Lobo Limps on from Limbo: A History, Summary, & Outlook for Mexican Wolf Recovery in the American Southwest*, 29 CO. NAT. RES. & ENV'T L. REV. 223, 281 (2018).

3 Botts, *supra* note 2.

wolf.[4] Since then, there has been significant litigation surrounding Mexican wolf recovery.[5] In *Center for Biological Diversity (CBD) v. Jewell*, an Arizona district court determined that the new 10(j) regulation violated the ESA and Administrative Procedure Act (APA).[6] In 2017, FWS announced an updated recovery plan for the Mexican wolf pursuant to § 4(f) of the ESA.[7] However, this updated plan was insufficient, and brought another round of litigation in C*BD v. Zink*e and *CBD v. Haaland*.[8] In 2022, FWS published the updated Mexican wolf recovery plan[9] and the final 10(j) regulations[10] and to address the court decisions. This article analyzes the recent litigation. It concurs with the court's decision in *CBD v. Jewell* regarding deficiencies in the § 10(j) regulation. It also agrees with the court's decisions in *CBD v. Zinke* and *CBD v. Haaland* regarding the lack of site-specific management actions in the recovery plan to address illegal killing of Mexican wolves, but disagrees with the findings regarding the sufficiency of objective, measurable criteria to address human-caused mortality, genetic diversity, and suitable habitat.

I. BACKGROUND

The Mexican wolf was listed as an endangered subspecies in 1976.[11] The entire

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4 Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512 (Jan. 7. 2015) (codified at 50 C.F.R. § 17.84(k)); 16 U.S.C. § 1539; 50 C.F.R. § 402.01(b) (2017).

5 *See, e.g.*, Ctr. for Biological Diversity v. Jewell, No. CV-16-00094-TUC-JGZ, 2018 WL 1586651, at *2, *13 (D. Ariz. Mar. 31, 2018).

6 *Id.*

7 Mexican Wolf Draft Recovery Plan, First Revision, 82 Fed. Reg. 29,918 (July 1, 2017); 16 U.S.C. § 1533.

8 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 80 (D. Ariz. 2021), *appeal dismissed sub nom.* WildEarth Guardians v. Haaland, No. 22-15029, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

9 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PLAN, SECOND REVISION ii (2022), http://www.fws.gov/southwest/es/mexicanwolf.

10 Designation of Experimental Populations, 87 Fed. Reg. 39,348 (July 1, 2022) (codified at 50 C.F.R. pt. 17).

11 Determination That Two Species of Butterflies Are Threatened Species and Two Species of Mammals Are Endangered Species, 41 Fed. Reg. 17,737 (April 28, 1976) (codified at 50 C.F.R pt. 17).

gray wolf species in North America, except Minnesota, was listed as endangered in 1978.[12] In the 1970s, the U.S. and Mexico established a captive-breeding program.[13] The captive breeding program originated with seven founders from three distinct populations: the McBride, Ghost Ranch, and Aragon lineages.[14]

After the Mexican wolf was listed as an endangered species, FWS was required to develop and implement the 1982 Mexican Wolf Recovery Plan to provide for the conservation and survival of the species.[15] The plan was required to contain: site-specific management actions; objective, measurable criteria for removing the species from the list; and an estimate of the time required and costs to implement the plan.[16] The plan provided the road map for recovery and the means to secure the species long-term survival in the wild.[17] The initial recovery goal was to recover "at least 100 Mexican wolves in the middle to high elevations of a 5,000-square-mile area within the Mexican wolf's historic range."[18]

In 1982, Congress enacted § 10(j) of the ESA, which grants the Secretary of Interior flexibility to establish and decrease the legal protection afforded to any reintroduced species.[19] To qualify as an experimental population under 10(j), however, the population must be "wholly separate geographically from nonexperimental populations of the same species."[20] Further, the experimental population must be released outside the current range

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12 Reclassification of the Gray Wolf in the United States and Mexico, with Determination of Critical Habitat in Michigan and Minnesota, 43 Fed. Reg. 9,607 (March 9, 1978) (codified as amended in scattered sections of 50 C.F.R pt. 17).

13 Endangered Status for the Mexican Wolf, 80 Fed. Reg. 2,488, 2,515 (Jan. 16, 2015) (codified at 50 C.F.R § 17.11(h)).

14 *Id.*

15 16 U.S.C. § 1533(f)(1)(B) (1994).

16 *Id.*

17 Fund for Animals v. Babbitt, 903 F. Supp. 96, 107–08 (D.D.C. 1995).

18 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PLAN, FIRST REVISION 13 (2017), https://www.fws.gov/sites/default/files/documents/2017MexicanWolfRecoveryPlanRevision1Final.pdf.

19 16 U.S.C. § 1539(j).

20 *Id.* § 1539(j)(1).

of species.[21] Before authorizing such a release, the Secretary, utilizing the best available information, must determine if the experimental population is essential or nonessential to the survival of the endangered or threatened species.[22] A nonessential population is only managed as a threatened species when it is present in the National Wildlife Refuge System or the National Park System.[23] Otherwise, the population is considered to be a species proposed for listing.[24] No critical habitat is designated for a nonessential population.[25]

The 1998 final rule authorized reintroduction of the Mexican wolf into the BRWRA in central Arizona and New Mexico as a nonessential experimental population.[26] Just months after this final rule was published, FWS began releasing captive-bred wolves into the BRWRA.[27] Wolves born and raised in captivity could only be released in certain areas in Arizona and were not allowed to establish territories on public lands outside the BRWRA.[28] The rule also required that FWS retrieve dispersing wolves and re-release them in the recovery area.[29] This reintroduction was unsuccessfully challenged by the livestock industry[30] and the Coalition of Arizona/New Mexico Counties for Stable Economic Growth.[31]

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21 *Id.* § 1539(j)(2)(A).
22 *Id.* §§ 1539(j)(2)(B)–(C).
23 *Id.* § 1539(j)(2)(C)(1).
24 *Id.* § 1539(j)(2)(C)(i).
25 *Id.* § 1539(j)(2)(C)(ii) (1994).
26 Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Fed. Reg. 1,752 (Jan. 12, 1998) (codified at 50 C.F.R. §§ 17.11(h), (k)).
27 *Conserving the Mexican Wolf*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/program/ conserving-mexican-wolf/what-we-do (last visited Aug. 8, 2023).
28 Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Fed. Reg. at 1,769.
29 *Id.*
30 N.M. Cattle Growers Ass'n v. U.S. Fish & Wildlife Serv., No. Civ. 98-367M/JHG, 1999 WL 34797509, at *28–29 (D.N.M. Oct. 28, 1999); *see also* Edward A. Fitzgerald, *Lobo Returns from Limbo: New Mexico Cattle Growers Ass'n v. U.S. Fish & Wildlife Service*, 46 NAT. RES. J. 9, 10 (2006).
31 Coal. of Ariz./N.M. Cntys. for Stable Econ. Growth v. U.S. Fish & Wildlife Serv., No. CIV 03-508 MCA/LCS, 2004 WL 7337667, at *22–23 (D.N.M. July 6, 2004).

II. CHANGE IN STATUS

In 2009, environmental groups petitioned FWS to change the status of the Mexican wolf from a threatened to endangered subspecies or distinct population segment and establish its critical habitat.[32] FWS denied the petition in October 2012 because the species was already listed under the ESA.[33] Environmental groups brought suit. In the resulting settlement agreement, the FWS agreed to reconsider its decision by January 2015.[34]

FWS was already in the process of reviewing the status of the gray wolf nationwide. In 2013, FWS determined that there were three distinct species of gray wolves currently inhabiting the lower 48 states: *Canis lupus*, *Canis rufus*, and *Canis lycaon*.[35] *Canis lupus* is subdivided into three subspecies: *Canis l. nubilus*, *Canis l. occidentalis*, and *Canis l. baileyi* (Mexican wolf).[36] FWS planned to delist *C. l. nubilus* and *C. l. occidentalis*, but grant *C. l. baileyi* (Mexican wolf) status as an endangered subspecies.[37] FWS also considered creating a Southwest Distinct Population Segment (DPS) across central and southern Arizona and New Mexico, where the Mexican wolf would be treated as an endangered species.[38] After criticism from prominent scientists, the Obama administration

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32 Susan Montoya Bryan, *Groups Push for Special Wolf Protections*, CTR. FOR BIOLOGICAL DIVERSITY (August 12, 2009), https://www.biologicaldiversity.org/news/center/articles/2009/associated-press-08-11-2009.html.

33 12-Month Finding on Petitions to List the Mexican Gray Wolf as an Endangered Subspecies or Distinct Population Segment With Critical Habitat, 77 Fed. Reg. 61,375 (Oct. 9, 2012).

34 Julie Cart, *Lawsuit Seeks Subspecies Status for Protected Mexican Wolves*, L.A. TIMES (Dec. 30, 2012), https://www.latimes.com/science/la-xpm-2012-dec-10-la-sci-sn-wolves-20121210-story.html.

35 Steven M. Chambers et al., *An Account of the Taxonomy of North American Wolves from Morphological Genetic Analysis*, 77 N. AM. FAUNA 1, 3 (2012).

36 *Id.* at 12.

37 Removing the Gray Wolf (Canis lupus) from the List of Endangered and Threatened Wildlife and Maintaining Protections for the Mexican Wolf (Canis lupus baileyi) by Listing it as Endangered, 78 Fed. Reg. 35,664 (June 13, 2013) (codified at 50 C.F.R. § 17.11(h)).

38 *Id.*

withdrew the proposal.[39]

FWS published its final rule designating the Mexican wolf as an endangered subspecies in January 2015.[40] FWS determined that the Mexican wolf qualified as an endangered subspecies because of the aggregated impacts from illegal human-caused mortality, inbreeding, diminished genetic diversity, reduced adaptive potential, and its small populations size.[41] Furthermore, absent ESA protection, there would be inadequate regulatory protections to ensure the Mexican wolf's survival.[42] There were 97 wolves in the BRWRA at the end of 2015, down from the 110 wolves in 2014, primarily because of low pup survival.[43]

III. CHANGE IN MANAGEMENT REGULATIONS

In November 2012, CBD filed a complaint seeking to compel FWS to conduct formal rulemaking to amend the 10(j) regulation regarding Mexican wolves, and in August 2013, the U.S. District Court for the District of Columbia approved a settlement agreement that required the FWS to submit revised 10(j) regulation by January 2015.[44]

The final 2015 rule included several important provisions. First, it expanded the area allowed for the initial release of Mexican wolves by a factor of ten, and increased the area that the wolves could occupy by a factor of four.[45] The BRWRA was terminated and

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39 Edward A. Fitzgerald, *Wolf Delisting: Old Wine in New Bottles*, 44 ENV'T L. REP. NEWS & ANALYSIS 10,413, 10,423 (2014).

40 Endangered Status for the Mexican Wolf, 80 Fed. Reg. 2,488 (Jan.16, 2015) (codified at 50 C.F.R. § 17.11(h)).

41 *Id.* at 2,488.

42 *Id.*

43 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PROGRAM, PROGRESS REPORT #18 10 (2015).

44 Ctr. for Biological Diversity v. Jewell, No. CV-16-00094-TUC-JGZ, 2018 WL 1586651, at *8 (D. Ariz. Mar. 31, 2018).

45 Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512, 2,519–20 (Jan. 16, 2015) (codified at 50 C.F.R. § 17.84(k)).

replaced by the Mexican Wolf Experimental Population Area (MWEPA), which includes all areas in Arizona and New Mexico south of Interstate 40 (I-40) to the Mexican border.[46]

Second, the revised rule established a population objective of 300 to 325 wolves after thirteen years.[47] The population objective provided for "the persistence of [the] population . . . and its removal from the endangered species list."[48] Additional releases of more than one to two effective migrants per generation would be considered to address inbreeding problems.[49] Furthermore, a wide range of other management options would be considered, particularly translocation.[50]

Third, the new rule modified circumstances for lethal and non-lethal takings. This provided greater management flexibility and avoided conflicts with livestock owners and hunters.[51] The rule also addressed unacceptable adverse impacts on wild ungulate (hooved mammal) herds.[52] If the Arizona Game and Fish Department and New Mexico Department of Game and Fish determined that wolves had an adverse impact on wild ungulate herds, the agencies could request removal of wolves from the impacted area.[53]

The rule also required that the agencies "submit a science-based report document that has been subjected to peer-review and public comment," explaining why the wild ungulate herd is below management objectives and detailing the agency's attempt to identify other causes for the herd's decline.[54] An "unacceptable adverse impact" is

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46 *Id.*
47 *Ctr. for Biological Diversity*, 2018 WL 1586651 at *9 (quoting Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. at 2,512, 2,515).
48 *Id.*
49 *Id.*
50 *Id.*
51 *Id.*
52 *Id.*
53 *Id.*
54 *Id.*

determined by the state ungulate management goals or "a 15 percent decline in the ungulate herd . . . documented by the state agency."[55] Once these conditions are met, FWS will establish the management actions necessary for the species' conservation.[56] Finally, the revised rule maintained the nonessential experimental designation.[57] FWS determined that any reconsideration of the population's nonessential status was beyond the scope of this rulemaking.[58]

FWS asserted that the rule was just the first step on the road toward recovery.[59] Expanding and improving the genetic health of the Mexican wolf population would increase the possibility of restoring the species to a healthy state.[60] FWS acknowledged that additional measures would likely be necessary in the future to recover the species, including: (1) the establishment of delisting criteria, (2) the creation of a scientifically based population goal, and (3) the expansion of the dispersal area to accommodate a growing population.[61] FWS planned to review progress under the new rule in five years.[62]

This revised rule was criticized by environmental groups on several grounds.[63] First, Mexican wolves could be killed on certain private and state lands, even in the absence

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55 *Id.*
56 *Id.*
57 *Id.* at *10.
58 *Id.*
59 *Id.* at *11.
60 *See id.*
61 *Id.*
62 *Id.*
63 Drew Kerr, *Endangered Mexican Gray Wolf Rule Would Hinder Species Recovery*, WILDEARTH GUARDIANS (Nov. 25, 2014), https://wildearthguardians.org/press-releases/endangered-mexican-gray-wolf-rule-would-hinder-species-recovery/; Ctr. for Biological Diversity, *Conservationists Take Aim at Flawed New Rule on Mexican Gray Wolf Management*, COMMON DREAMS (Jan. 15, 2015, 2:15 PM), https://www.commondreams.org/newswire/2015/01/15/ conservationists-take-aim-flawed-new-rule-mexican-gray-wolf-management.

of livestock predation, if the wolves posed an adverse impact on big game.[64] State managers had discretion to decide when wolves presented an unacceptable adverse impact on prey species, which triggered removal of wolves.[65] Second, Mexican wolves needed more room to roam, and much of the expanded area in the MWEPA was unsuitable.[66] Third, FWS ignored the best available science.[67] The rule was contrary to the 2012 draft recovery plan, which asserted that wolves must be able to move north of I-40 into southern Colorado and Utah.[68] The 2012 draft plan had also called for three genetically linked subpopulations in the Southwest, consisting of 750 wolves.[69] Fourth, the multiphase implementation approach restricted reintroduction and movement throughout the MWEPA for another 12 years.[70] Finally, FWS capitulated to the Arizona Game and Fish Department's requests after it threatened FWS with litigation if FWS did not accept its management options.[71]

The New Mexico Department of Game and Fish also rebuked the rule because it did not quantify the specific number of wolves necessary for recovery.[72] Additionally, the regulation did not focus on suitable habitat and failed to articulate the unacceptable adverse

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64 Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512, 2,525 (Jan. 16, 2015) (codified at 50 C.F.R. § 17.84(k)).

65 Kerr, *supra* note 63.

66 *See id.* (criticizing the strict restriction on wolves' movements north of I-40 into the Grand Canyon and Southern Rockies as unscientific and motivated by politics); Ctr. for Biological Diversity, *supra* note 63 (describing the area north of I-40 as an essential part of the wolves' habitat and calling the expansion of MWEPA without these territories as "one step forward, one or two steps back").

67 Kerr, *supra* note 63; Ctr. for Biological Diversity, *supra* note 63.

68 Kerr, *supra* note 63; Ctr. for Biological Diversity, *supra* note 63.

69 Kerr, *supra* note 63.

70 *Id.*

71 *Id.*

72 *The Status of the Federal Government's Management of Wolves: Hearing Before the House Nat. Res. Subcomm. on Oversight & Investigation*, 114th Cong. 80 (2016) (statement of Alexandra Sandoval, Dir., N.M. Dep't of Game & Fish).

impacts that wolf recovery would have on wildlife.[73]

IV. *CENTER FOR BIOLOGICAL DIVERSITY V. JEWELL*

In *CBD v. Jewell*, CBD sued in U.S. District Court for the District of Arizona, challenging the revised 10(j) regulation for violating the ESA and the APA.[74]

A. STANDARD OF REVIEW

Judicial review under the ESA is governed by the APA.[75] Under the APA, agency action will be set aside when "it is found to be 'arbitrary, capricious, an abuse of discretion or otherwise not in accordance with' the applicable law."[76] An agency action is arbitrary and capricious when the agency has relied on factors outside the parameters of the statute, ignored important aspects of the problem, offered an explanation for its decision that is not supported by the evidence, or is so implausible that it cannot be attributed to agency expertise.[77]

The arbitrary and capricious standard is deferential and presumes the agency action is valid if there is a reasonable basis for its decision.[78] The court generally is most deferential when examining scientific determinations, which are within the realm of the agency's expertise.[79] Furthermore, an agency's decision regarding contested evidence is granted deference when it does not contradict the statute or regulation.[80] The APA requires that the court engage in a "substantial inquiry" to determine whether "an action was within

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73 *Id.*
74 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *1 n.2 (D. Ariz. Mar. 31, 2018).
75 *Id.* at *2.
76 *Id.* (quoting 5 U.S.C. § 706(2)(A) (1966)).
77 Motor Vehicle Mfrs. Ass'n of U.S. Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983).
78 *See, e.g.*, *Ctr. for Biological Diversity*, 2018 WL 1586651, at *3.
79 *Id.*
80 *Id.*

the agency's delegated authority."[81] Although the agency action is presumed to be valid, the court must still conduct a "thorough, probing, in-depth review" of the agency's decision.[82]

B. Population Size and Genetics

FWS determined that a single population of 300 to 325 wolves in the MWEPA, with one or two effective migrations per generation, would advance conservation.[83] FWS did not expect to reach the 300 to 325 goal until after year 13.[84] Nevertheless, FWS concluded that the population objective would ensure the population's persistency and enable it to make further progress toward recovery.[85] The 10(j) rule was only an interim measure meant to be sufficient until the recovery plan was completed.[86] Finally, FWS would consider all management options—particularly translocation—to avoid exceeding the population objective.[87]

FWS relied on 2 studies by Drs. Carroll, Fredrickson, and Hedrick, which envisioned 750 wolves in 3 separate, interrelated populations of 250 wolves.[88] FWS incorrectly interpreted the studies to say that if two effective migrants join the population each generation (every four years), there would be no long-term extinction risk.[89] FWS then extrapolated from the studies to consider one population of 300 wolves with 1 to 2

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81 *Id.*
82 *Id.*
83 *Id.* at *9.
84 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *9.
85 *Id.*
86 *Id.* at *13.
87 *Id.* at *9.
88 *Id.*; Memorandum of Law in Support of Plaintiffs' Motion for Summary Judgment at 24, 26–27, Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651 (D. Ariz. Mar. 31, 2018) (No. CV-15-00285-TUC-JGZ), 2016 WL 1136709 [hereinafter Motion for Summary Judgment].
89 Motion for Summary Judgment, *supra* note 88, at 26–27.

effective migrations per generation.[90] FWS planned to release two packs from the captive population every four years, with the hope of achieving one to two effective migrations per generation.[91] Effective migration in the context of the metapopulation involves individuals dispersing between populations, breeding, and raising pups.[92] FWS estimated that between 1998 and 2013, for every 100 wolves released, 21 became effective migrants.[93] If the population grew larger, the number of effective migrants needed would decrease.[94] If genetic variability was not achieved with one or two effective migrations, more wolf pups would be cross-fostered[95] and more captive wolves with pups would be released.[96]

In *Jewell,* the court held that FWS misinterpreted the scientific studies, and thus failed to use the best available science.[97] Prior to the publication of the final rule, the scientists behind the above study that the agency had relied on informed FWS that it misstated and misinterpreted their findings. Drs. Carroll and Frederickson stated in public comments that the release of two effective migrants per generation from the captive population would not be sufficient to protect the BRWRA population's genetic health and

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90 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *9.

91 Motion for Summary Judgment, *supra* note 88, at 26–27.

92 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *11.

93 *Id.*

94 *See* Motion for Summary Judgment, *supra* note 88, at 26.

95 Cross-fostering consists of placing captive born pups into wild dens in the MWEPA to be raised in the wild. It was first tested in 2014 and done annually. Revision to the Nonessential Experimental Population of the Mexican Wolf, 86 Fed. Reg. 59,953, 59,958 (Oct. 29, 2021) (codified at 50 C.F.R. § 17.84(k)). In total, seventy-eight pups have been cross-fostered between 2014 and 2021, including placing seventy-two pups from captive dens into wild ones, and six pups from one wild den into another wild den. *Id.* Cross-fostered pups have about the same survival rate as wild-born pups (50%). *Id.* at 59,961. Of the seventy-two released from captivity through cross-fostering, seven of thirty pups have survived to breeding age. *Id.* Pups released in 2020 and 2021 (twenty and twenty-two, respectively) had not yet reached breeding age in spring 2021, so they were not eligible to be included in the number of pups surviving to breeding age. *Id.* Of seven cross-fostered animals that survived to breeding age in 2021, two have produced one litter and two have produced multiple litters, resulting in the equivalent of four effective migrants and no documented reproduction in the remaining three animals. *Id.*

96 *See* Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512, 2,524 (Jan. 16, 2015) (codified at 50 C.F.R. § 17.84(k)).

97 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *13–17.

would frustrate recovery.[98] The scientists stressed that their work specifically dealt with the rate of effective migration that would protect the genetic health in a recovered metapopulation consisting of three distinct populations, not in the single isolated genetically compromised BRWRA population.[99] Further, steps to prevent genetic deterioration and reduce the high relatedness of the population must begin at an early state when the population is small, so they can impact recovery.[100] Drs. Carroll and Fredrickson later noted that their study, contrary to FWS's analysis, indicated that more than two effective migrations per generation would be necessary to prevent further genetic degradation and reduce the high relatedness in the population.[101] The court refused to defer to FWS's expertise when the very scientists FWS had relied on did not support the agency's findings.[102]

The court correctly held that the FWS decision was arbitrary and capricious. The Mexican wolf was facing imminent genetic peril resulting from inbreeding depression.[103] Genetically compromised wolves experience reproductive problems that result in "smaller litter sizes, lower birth weights, and higher rates of pup mortality, as well as lowered disease resistance and other accumulated health problems."[104] FWS stressed that the population must be genetically healthy to contribute toward recovery.[105]

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98 *Id.* at *10.
99 *Id.*
100 *Id.*
101 *Id.*
102 *Id.* at *14. The court noted that Drs. Carlos Carroll and Richard J. Fredrickson are among prominent wolf biologists who have often been cited by FWS for Mexican grey wolf recovery and reintroduction matters since 1998. *Id.* at *10 n.8. "[T]he same scientists that are cited by the agency publicly communicated their concern that the agency misapplied and misinterpreted findings. . . . To ignore this dire warning was an egregious oversight by the agency." *Id.* at *53.
103 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *11.
104 *Id.*
105 Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512, 2,524 (Jan. 16, 2015) (codified at 50 C.F.R. § 17.84(k)).

The problem with inbreeding dates back to the original McBride lineage, which began with only three individuals that were successfully bred.[106] By the mid-1990s, the McBride pups were as related to each other as pups from full siblings.[107] In 1995, the captive breeding program brought two wolves from the Aragon and two wolves from the Ghost Ranch lineages, both highly inbred, together with the McBride lineage in an effort to increase genetic diversity.[108] The entire current Mexican wolf population descends from these seven founders.[109]

Nevertheless, much of the genetic diversity of the founders has been lost. In 2017, the captive population had only retained approximately 83% of the gene diversity of its founders, indicating that the problem of inbreeding isn't over.[110] The current captive population was only expected to retain 78.5% of the gene diversity of its founders after 100 years;[111] this was lower than the recommended retention of 90% genetic diversity after 100 years.[112] Furthermore, Dr. Hedrick pointed out that the current Mexican wolf population "retains the genetic material of only approximately two individual founders."[113]

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106 Removing the Gray Wolf (Canis lupus) from the List of Endangered and Threatened Wildlife and Maintaining Protections for the Mexican Wolf (Canis lupus baileyi) by Listing it as Endangered, 78 Fed. Reg. 35,664, 35,704 (June 13, 2013) (codified at 50 C.F.R. § 17.11(h)); *Endangered Species: Mexican Gray Wolf (Canis Lupus Baileyi)*, SW. WILDLIFE CONSERVATION CTR., https://www.southwestwildlife.org/what-we-do/conservation-research/endangered-species/mexican_gray_wolves.html (last visited Aug. 8, 2023).

107 Removing the Gray Wolf (Canis lupus) from the List of Endangered and Threatened Wildlife and Maintaining Protections for the Mexican Wolf (Canis lupus baileyi) by Listing it as Endangered, 78 Fed. Reg. at 35,704.

108 *Id.* at 35,704–05.

109 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *6; *Endangered Species: Mexican Gray Wolf (Canis Lupus Baileyi)*, *supra* note 106.

110 Plaintiffs' Memorandum in Support of Motion for Interim Injunctive Relief at 1, Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651 (D. Ariz. 2018).

111 *Id.* at 5.

112 *Id.* at 1.

113 Earthjustice, Comment Letter with Exhibits Attached as Files on Mexican Wolf Draft Recovery Plan, First Revision at 33 (Aug. 29, 2017), https://www.regulations.gov/comment/FWS-R2-ES-2017-0036-9399.

Consequently, the Mexican wolf population "descends from one of the smallest effective founder numbers of any reintroduced endangered species, which portends severe genetic problems."[114]

The genetics of the reintroduced wild population were even worse. The wild population had lost 33% more of the founder's genetic material than the captive population and its members were almost like full siblings.[115] Dr. Fredrickson explained that "the reintroduced population is a genetic basket case in need of serious genetic rehab."[116] He warned that failing to address this issue "is irresponsible and also managing for extinction."[117]

Another complicating genetic factor was that most of the reintroduced wild population traced their genetic heritage to a single breeding female wolf.[118] All current breeding pairs were producing pups related to this female in the McBride lineage, which was causing genetic deterioration.[119] Dr. Hedrick explained that inbreeding among a small population with low genetic variation will produce an "extinction vortex," which is a self-reinforcing cycle that will compromise fitness and decrease survival rates.[120]

FWS further jeopardized the Mexican wolf's genetic health through the excessive removal of Mexican wolves from the wild.[121] The Mexican wolf was reintroduced as a

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114 Philip Hedrick, *Genetics & Recovery Goals for Mexican Wolves*, 206 BIOLOGICAL CONSERVATION 210, 210–11 (2017), https://www.sciencedirect.com/science/article/pii/S0006320716305535?via%3 Dihub.

115 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *12.

116 *Id.* (quoting an email from Dr. Fredrickson to FWS).

117 *Id.*

118 Plaintiffs' Memorandum in Support of Motion for Interim Injunctive Relief, *supra* note 110, at 2.

119 *See id.* at 2, exhibit 1.

120 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *12.

121 *See id.* at *14 n.13; Amended Complaint for Declaratory and Injunctive Relief at 23–24, Ctr. for Biological Diversity v. Haaland, No. 22-35583, 2022 WL 18457426 (9th Cir. 2022) (No. 4:22-cv-00303-JAS).

nonessential experimental species, which provides FWS with greater management flexibility, including the limited taking of individual wolves.[122] However, whenever there was a complaint regarding the Mexican wolf (i.e. depredation, human threat), FWS quickly removed the offending wolf from the wild to placate the opponents to reintroduction.[123] Between 1998 and 2019, FWS authorized the removal of 206 Mexican wolves from the reintroduced population.[124] FWS acknowledged that permanent removals can be equated with wolf mortality.[125] These removals have resulted in the loss of genetically valuable wolves.[126]

FWS misrepresented the relationship between population size and the extinction risk to the experimental population.[127] FWS acknowledged that a small isolated Mexican wolf population, like the BRWRA population, cannot be viable or self-sustaining.[128] Regardless, FWS insisted that its population objective was sufficient to maintain the population and prepare it for the "next phase" of the Mexican wolf population recovery.[129]

The court held that the ESA recovery mandate did not focus on persistence, which only ensures short-term survival.[130] FWS must be concerned with the long-term viability of the species in the wild—not just its survival.[131] The ESA was designed not only to

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122 Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Fed. Reg. 1,752, 1,762 (Jan. 12, 1998).

123 *See* Amended Complaint for Declaratory and Injunctive Relief, *supra* note 121, at 23–24.

124 *Id.* at 23.

125 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *11.

126 *Id.* at *14–15.

127 *Id.* at *14.

128 *Id.*

129 *Id.*

130 *Id.* (first citing Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv., 378 F.3d 1059, 1070 (9th Cir. 2004) ("[T]he ESA was enacted not merely to forestall the extinction of species (i.e. promote a species survival), but to allow a species to recover to the point where it may be delisted."); then citing Sierra Club v. U.S. Fish & Wildlife Serv., 245 F.3d 434, 438 (5th Cir. 2001) ("The objective of the ESA is to enable listed species not merely to survive, but to recover from their endangered or threatened status.")).

131 *See Ctr. for Biological Diversity*, 2018 WL 1586651, at *14.

prevent extinction, but to allow recovery so the species can be delisted.[132]

Scientists on the 2012 recovery team asserted that a well-connected metapopulation was important for the recovery of the Mexican wolf.[133] The metapopulation should consist of several different Mexican wolf populations comprised of 250 wolves each, with dispersal between the populations.[134] Connectivity between different populations decreases the problem of inbreeding by expanding genetic distribution.[135] An internally well-connected metapopulation would provide a bulwark against unforeseen circumstances, such as disease, climate change, wildfires, or excessive human killing.[136] The creation of such metapopulation would enhance the species' ability to survive a catastrophic event and ensure the long-term viability of the species.[137]

FWS committed to use all available management options to not exceed the population cap of 300 to 325 Mexican wolves.[138] The court noted that even though FWS preferred to utilize translocation, it was still allowed to remove or kill genetically valuable Mexican wolves.[139]

C. RECOVERY PLAN

FWS additionally argued that the revised 10(j) regulations were just an interim measure to provide management guidance.[140] It contended that there was no direct

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132 *Gifford Pinchot*, 378 F.3d at 1070.

133 Amended Complaint for Declaratory and Injunctive Relief, *supra* note 121, at 24 (explaining that "well-connected metapopulations are better able to withstand less favorable demographic rates (e.g., birth rate, fertility rate, life expectancy) and catastrophic environmental events (e.g., wildfire, disease outbreak) than are isolated populations").

134 Hedrick, *supra* note 114, at 210.

135 *Id.*

136 *Id.*

137 *Id.*

138 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *9 (D. Ariz. Mar. 31, 2018).

139 *Id.* at *14 n.13.

140 *Id*. at *16.

relationship between these short-term management actions and long-term recovery and that such concerns would be addressed later in the revised recovery plan.[141]

However, the court refused to allow FWS to await the future recovery plan.[142] The court held that the recovery plan did not govern all aspects of recovery, but was a non-binding statement of the agency's plan to achieve the long-term goal of conservation.[143] The agency could proceed with recovery under other sections of the ESA, even without a recovery plan.[144] Moreover, the court stressed that recovery plans are not mandatory, but discretionary.[145] The expectation of a future recovery plan did not relieve FWS of the 10(j) requirements.[146]

The court properly rejected FWS's contention that the final 10(j) rule was just an interim measure that would not harm the Mexican wolf in the foreseeable future.[147] The court held this "misconstrue[d]" the goal of the recovery plan, which is to focus on long-term viability, not rely on future promises.[148] The Mexican wolf experimental population, which was experiencing genetic decline, was the only one existing in the wild in the U.S.;[149] thus, the presently insufficient FWS action was potentially endangering the genetic health of species.[150]

The court correctly held that the need for management flexibility did not justify

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141 *Id.* at *15–16.
142 *Id.* at *17.
143 *Id.* at *15 n.14.
144 *Id.*
145 *Id.*
146 *Id.* at *15.
147 *Id.* at *16.
148 *Id.*
149 *Id.* at *1.
150 *Id.* at *16.

FWS's failure to further the species' long-term recovery.[151] Section 10(j) was enacted to provide long-term flexibility, which did not displace the conservation mandate.[152] On the contrary, management flexibility facilitates the Secretary's ability to "conserve and recover endangered species."[153] FWS was aware that long-term recovery necessitates the protection of the species' genetic health, so its refusal to implement corrective measures constituted a flagrant mistake.[154]

D. MEXICAN WOLF EXPERIMENTAL POPULATION AREA

The 10(j) regulation abandoned the BRWRA and established the expanded MWEPA to include all of Arizona and New Mexico south of Interstate 40, totaling 153,871 square miles.[155] However, the rule did not allow the occupation of suitable wolf habitat north of I-40.[156] Any wolves found outside the MWEPA would be captured and returned to captivity;[157] FWS asserted such removals would have minimal impact on recovery.[158] From 1998 to 2013, FWS conducted forty-seven boundary related removals outside the BRWRA.[159] FWS explained that any expansion north of I-40 would require coordination with Utah and Colorado and would have to be implemented through a revised recovery plan.[160] FWS acknowledged that the MWEPA was not the final Mexican wolf recovery

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151 *Id.*
152 *See id.*
153 *Id.* (quoting United States v. McKittrick, 142 F.3d 1170, 1174 (9th Cir. 1998)).
154 *Id.* at *17.
155 *Id.* at *9.
156 *Id.*
157 *Id.* at *14 n.13.
158 *See id.* ("citing to the recovery plan as the likely means of addressing the insufficient geographic range that is provided by the present rule").
159 Combined Memorandum in Support of Cross-Motion for Summary Judgment and Opposition to Motion for Summary Judgment at 25, Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651 (D. Ariz. Mar. 31, 2018) [hereinafter Federal Combined Memo].
160 *See Ctr. for Biological Diversity*, 2018 WL 1586651, at *9.

area, which would be determined later in the future recovery plan.[161]

The intervenor Coalition of Arizona and New Mexico Counties for Stable Economic Growth asserted that the I-40 boundary was appropriate, and that any expansion above I-40 would imperil the Mexican wolf subspecies.[162] The Mexican wolf is the rarest and most genetically distinct subspecies of the North American gray wolf.[163] FWS needed to avoid hybridization with Northern Rocky Mountain (NRM) wolves, which would undermine the basis for their listing as a unique subspecies and ignore the § 10(j) statutory requirement that the experimental population be "wholly separate from the nonexperimental population."[164] Further, expanding the Mexican wolf boundary further north would pose a risk to the species. NRM wolves are larger, run in packs of 10 or more, and have territories of up to 500 square miles.[165] NRM wolves would kill Mexican wolves if they crossed paths. They also pointed out that the most suitable Mexican wolf habitat is actually further *south*, in Mexico.[166]

Governors in Arizona, New Mexico, Utah, and Colorado opposed any expansion into the Southern Rockies.[167] They claimed the area was not part of the Mexican wolf's historic range and would decrease state revenues derived from hunting and recreational

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161 Federal Combined Memo, *supra* note 159, at 24–25.

162 Plaintiffs' Memorandum in Opposition to Center for Biodiversity, et al.'s Memorandum in Support of Motion for Summary Judgment at 3–6, Ctr. for Biological Diversity v. Jewell, 2018 WL 1586651 (D. Ariz. Mar. 31, 2018) (No. 4:15-cv-00019-JGZ).

163 *Id* at 3.

164 *Id.* at 3–5.

165 *Id.* at 5.

166 *Id.* at 5–6.

167 Brady McCombs, *Utah Balks at Being Part of Recovery Zone for Mexican Wolf*, KSL.COM (Dec. 6, 2015), https://www.ksl.com/article/37650773/utah-balks-at-being-part-of-recovery-zone-for-mexican-wolf.

activities.[168] Politicians from the region reiterated these arguments.[169] Senator Flake (R-Az.) introduced a bill to prohibit the recovery of wolves above I-40, keeping the wolves out of the Southern Rockies.[170]

These reservations were dubious. The best available science demonstrates that prohibiting dispersal north of I-40 will not conserve the Mexican wolf.[171] Wolves migrate for various reasons, including competition for prey, breeding, environmental changes, and pack dynamics.[172] The benefits of dispersal include greater reproductive success, diminished inbreeding, and less competition for limited prey and habitat.[173]

FWS confined the wolf in the MWEPA, asserting that the area north of I-40 was not part of the Mexican wolf's historic range.[174] FWS relied heavily on an article by J.R. Heffelfinger et al.,[175] which argued the area north of I-40 was not part of the Mexican wolf's historic range.[176] Other scientists had criticized this article because it relied on outdated morphological data instead of more recent genetic analysis, and was based on earlier Mexican wolf deaths when the population was very low.[177] More recent genetic

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168 *Id.*

169 Brian Maffly, *Utah Officials: Mexican Wolf Is 'Bullet' That Could Destroy West*, THE SALT LAKE TRIB. (Dec. 6, 2015), https://www.sltrib.com/news/environment/2015/12/06/utah-officials-mexican-wolf-is-bullet-that-could-destroy-west/.

170 Press Release, Ctr. for Biological Diversity, Arizona Senator Flake Introduces Bill to Supplant Science in Endangered Mexican Wolf Recovery, Suppress Population (Feb. 16, 2017). The bill also aimed to replace science-based ESA criteria for taking determinations by imposing criteria developed by ranchers and states, which precluded judicial review. *Id.*

171 Memorandum of Law in Support of Plaintiffs' Motion for Summary Judgment at 27–31, WildEarth Guardians v. Daniel Ashe, No. CV-15-00285-TUC-JGZ, 2016 WL 3919464 (D. Ariz. Feb. 23, 2016) [hereinafter Ashe Memorandum].

172 *Id.*

173 *Id.* at 28.

174 Earthjustice, *supra* note 113, at 3–4.

175 J.R. Heffelfinger et al., Clarifying Historical Range to Aid Recovery of the Mexican Wolf, J. WILDLIFE MGMT. 766, 766 (2017).

176 *Id.*

177 Earthjustice, *supra* note 113, at 3–4.

analysis indicated that the Mexican wolf had a broader historic range.[178] Scientists pointed out that confining the Mexican wolf to the MWEPA would have both short and long-term negative genetic consequences.[179]

Pre-extinction, the gray wolf existed across the U.S.[180] Strict geographical borders did not exist. Mexican wolves interbred with other gray wolves in the intergradation zone north of I-40, where ample suitable habitat existed.[181] The best available science indicated that northern New Mexico, southern Colorado, northern Arizona, and southern Utah contained federal lands and good Mexican wolf habitat.[182] These areas were placed off-limits because of state opposition, not biological factors.[183]

In fact, allowing the Mexican wolf population to occupy the suitable habitat in the Southern Rockies would have promoted recovery. Mexican wolves could coexist with other wolf subspecies and would not be threatened by larger NRM wolves.[184] NRM and Mexican wolves would have been separated by 500 miles, so any interaction between the species was unlikely.[185] Further, if any interbreeding did occur in the intergradation zone, valuable and much-needed diverse genetic material would have been introduced into the

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178 *Id.* at 5–7.

179 Ashe Memorandum, *supra* note 171, at 27–31.

180 *See* Earthjustice, *supra* note 113, at 5–7.

181 *Id.*

182 *Id.* at 13. The Western Environmental Law Center recommended that the northern MWEPA I-40 barrier be replaced by I-70, and extended westward along highway 50 in Utah to the Nevada border, while the eastern border of the MWEPA should be expanded to I-25. W. Env't L. Ctr., Comment Letter on Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf (Canis lupus baileyi), at 19–21 (June 15, 2020), https:// westernlaw.org/wp-content/uploads/2015/06/2020.06.15-Mexican-Wolf-10j-comments.pdf.

183 Earthjustice, *supra* note 113, at 8–10.

184 *Id.* at 4.

185 *See* The Rewilding Inst. & Project Coyote, Comment Letter on Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf (Canis lupus baileyi), at 18–19 (June 12, 2020), https://www.regulations.gov/comment/FWS-R2-ES-2020-0007-22265.

Mexican wolf population, enhancing its adaptability and long-term survival.[186]

Mexican wolves should have been allowed to disperse into northern areas beyond the MWEPA border.[187] Much of the Mexican wolf's southern habitat has decreased as a result of human activity and climate change, making it insufficient for recovery.[188] Allowing dispersal into the areas north of I-40 would allow the Mexican wolf to adapt to climate change.[189]

Furthermore, Mexican wolves should have been allowed to disperse into suitable habitats beyond the MWEPA border to perform their ecological functions. Wolves play an important role in managing the ecosystem and maintaining biodiversity.[190] FWS's effort to limit the range of the Mexican wolf was contrary to the purpose of the ESA, which does not view individual species as isolated, but rather as vital components of their ecosystems.[191]

E. TAKINGS

The 10(j) regulation modified the circumstances under which lethal and nonlethal takings were authorized. This was designed to provide greater management flexibility and improve the chance of success by preventing reintroduction from interfering with human

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186 *See* W. Env't L. Ctr., *supra* note 182, at 18.

187 *See* John Kostyack & Dan Rohlf, *Conserving Endangered Species in an Era of Global Warming*, *in* ENDANGERED SPECIES ACT: LAW, POLICY & PERSPECTIVES 378–79 (Donald C. Burr & WM. Robert Irvin eds., ABA Section of Environment, Energy, and Resources 2d ed., 2010).

188 *See* Lindsey Botts, *Wildlife Officials Drew a Line at I-40 for Mexican Gray Wolves, but Has it Hurt Recovery?*, AZCENTRAL (Sept. 18, 2021, 6:00 AM), https://www.azcentral.com/story/news/local/arizona-environment/2021/09/18/has-interstate-40-boundary-hurt-recovery-mexican-gray-wolf/8281680002/.

189 *See* Earthjustice, *supra* note 113, at 5.

190 *See* Fitzgerald, *supra* note 2, at 266–72.

191 The ESA states that its purposes "are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved. . . ." 16 U.S.C. § 1531(b). *See also* Earthjustice, *supra* note 113, at 11; H.R. REP. NO. 97-835, at 30 (1982) (Conf. Rep.), *reprinted in* 1982 U.S.C.C.A.N. 2860, 2871.

activities, such as livestock grazing and hunting.[192] If the Arizona Game and Fish Department or New Mexico Department of Game and Fish determined that predation was having an adverse impact on wild ungulates, the respective agency could ask FWS for approval to remove wolves from the affected area.[193]

FWS asserted that new take regulations were unlikely to increase Mexican wolf mortality.[194] Since the wolves' reintroduction, there had been no reported significant adverse impacts from wolf depredation on the ungulate population, which was stable.[195] They argued that this should continue with a wolf population consisting of 300 to 325 members.[196] From 1998 to 2013, FWS only authorized thirty-six removals, with only twelve being lethal, which did not hamper recovery.[197]

The intervenor Arizona and New Mexico Counties for Stable Economic Growth argued that the new 10(j) regulation regarding expanded takings on private land would not endanger the Mexican wolf.[198] The intervenor argued that the new rule, which allowed the taking of a Mexican wolf caught in the act of killing, was like the 1998 regulation, except it permitted a taking for the killing of a pet dog.[199] Take permits were limited and came with many encumbrances, such as limitations on the number of days and maximum number of wolves allowed to be taken.[200] Private taking must be done in conjunction with FWS

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192 *See* Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *9 (D. Ariz. Mar. 31, 2018).
193 *See id.*
194 Federal Combined Memo, *supra* note 159, at 27.
195 *Id.*
196 *Id*. at 24, 27.
197 *Id.* at 35.
198 Plaintiffs' Memorandum in Opposition to Center for Biodiversity, et al.'s Memorandum in Support of Motion for Summary Judgment, *supra* note 162 at 24.
199 *Id.*
200 *Id.*

removals.[201]

The intervenor Safari Club International argued that the § 10(j) regulation was invalid because it did not represent an agreement between federal parties and state and private stakeholders.[202] Consultation with states, tribal, and local interests was required by regulation.[203]

The court correctly held that the expanded take provisions did not provide adequate protection to the valuable Mexican wolves. The court recognized that the issuance of a take permit is governed by § 10(d), which requires that it "will not operate to the disadvantage of such endangered species."[204] The permit must also be consistent with the ESA's conservation purpose and policy.[205] When promulgating the rule, FWS prioritized the need to coordinate its activities with stakeholders—particularly hunting and livestock interests—rather than biological considerations.[206] The expanded take provision would also decrease genetic diversity, which FWS acknowledged was a major impediment to recovery.[207] Thus, the court determined that the regulation was inconsistent with § 10(j) and the ESA conservation mandate.[208]

The court held that the § 10(j) regulation did not have to be the product of an agreement between federal, state, and private stakeholders.[209] Congress did not require such a deal. On the contrary, the legislative history demonstrates that Congress encouraged

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201 *Id.*
202 *See* Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *17 (D. Ariz. Mar. 31, 2018); *see also* Federal Combined Memo, *supra* note 159, at 3.
203 Federal Combined Memo, *supra* note 159, at 3.
204 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *13; 16 U.S.C. § 1539(d)(2).
205 *Ctr. for Biological Diversity*, 2018 WL 1586651, at *6.
206 *Id.* at *15.
207 *Id.*
208 *Id.*
209 *Id.* at *17.

consultation with states and private stakeholders, but gave final authority and management flexibility to the federal agency.[210] FWS consulted with New Mexico hunters and state wildlife agencies, but chose not to adopt their suggestions.[211]

The best available science demonstrated that allowing additional taking in response to unacceptable adverse impacts to the ungulate herd would not conserve the Mexican wolf.[212] State agencies were granted too much leeway to define the management goals needed to determine when unacceptable adverse impacts occur.[213] This has posed a great threat to the Mexican wolf.[214] Science suggests that liberal taking rules encourage illegal killing.[215] Thus, the rule would exacerbate the problem of illegal killing, which is responsible for the greatest number of deaths among the reintroduced wolf population.[216] Finally, the new taking rule was put in place to assuage Arizona and New Mexico's fears of losing revenues from the loss of hunting permits. This provision was driven by economic, not biological, concerns.[217]

A study conducted by Dr. Carroll explained that extinction rates were highly dependent upon assumptions about mortality rates.[218] The study noted that adult mortality rates greater than the 22.9% forecast in the proposed plan substantially increased the likelihood of extinction.[219] The current mortality rate was over 50%.[220] Approximately 112

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210 *Id.* at *15–17 (citing H.R. REP. NO. 97-567 (1982)).
211 *Id.* at *17.
212 Ashe Memorandum, *supra* note 171, at 13–14.
213 *Id*.
214 *Id.* at 13.
215 Francisco J. Santiago-Avila et al., *Liberalizing the Killing of Endangered Wolves Was Associated with More Disappearances of Collared Individuals in Wisconsin, USA*, 10 SCI. REPS. 13,881 (2020), https://doi.org/10.1038/s41598-020-70837-x.
216 Ashe Memorandum, *supra* note 171, at 13–14.
217 *Id.* at 14 n.10.
218 *Id.* at 14.
219 *Id.*
220 *Id.*

of the 200 Mexican wolves released from captivity as of the end of 2013 were either killed by humans (86) or permanently removed from the wild (17).[221] These were only the documented losses; there might be more that went undocumented.[222] Additionally, FWS concluded that the small Mexican wolf population could not sustain such high levels of mortality.[223] Larger population sizes would be necessary to achieve the optimum extinction rate of 5% or less.[224]

F. ESSENTIALITY

The § 10(j) regulation retained the Mexican wolf's status as a nonessential experimental population. There are different management strategies for essential and nonessential experimental populations.[225] Essential experimental populations are treated as a threatened species,[226] thus they are subject to §§ 4(d) or 10(j) regulations, which provide more flexibility for their management.[227] Essential experimental populations are also subject to the consultation requirement of ESA § 7[228] and qualify for the designation of critical habitat.[229] Nonessential experimental populations are also treated as a threatened species and are subject to special § 4(d) or 10(j) regulations.[230] However, solely for the purposes of § 7, nonessential populations are to be treated as a species proposed for listing and no critical habitat is to be designated.[231] FWS asserted that a new essentiality

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221 *Id.* at 13.
222 *Id.*
223 *Id.* at 14–15.
224 *Id.* at 14.
225 "Essential" means that the experimental population's loss "would be likely to appreciably reduce the likelihood of the survival of the species in the wild." 50 C.F.R. § 17.80(b) (2023).
226 16 U.S.C. § 1539(j)(2)(C).
227 *See id.* § 1533(d).
228 *Id.* §§ 1539(j)(2)(C), 1536(a).
229 *Id.* § 1533(a)(3)(A)(i).
230 *Id.* § 1539(j)(2)(C).
231 *Id.* § 1539(j)(2)(C)(i)–(ii).

determination was not required because the 2015 rule was just a revision of the existing rule.[232]

The court correctly held that releasing the Mexican wolf outside its current range into the MWEPA required a new essentiality analysis.[233] The Mexican wolf was introduced into the BRWRA in 1998, which constituted its then-current range.[234] The 2015 regulation expanded the Mexican wolf's range from 6,854 square miles in the BRWRA to 153,871 square miles in the MWEPA.[235] New releases were allowed in Zones 1 and 2 in the MWEPA, which were outside their current range in the BRWRA.[236] The ESA is clear that an essentiality determination is necessary if a population is released outside its current range.[237]

The court found the FWS interpretation to be inconsistent with the plain language of the statute;[238] FWS refused to conduct an essentiality determination even though all statutory conditions were met.[239] In addition, the FWS interpretation frustrated congressional intent that the essentiality determination be conducted through informal rulemaking, which is subject to public comment.[240] Finally, the 2015 regulation was not simply a revision of the earlier regulation.[241]

The court determined that FWS's decision to maintain the nonessential designation

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232 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *19 (D. Ariz. Mar. 31, 2018).
233 *Id.*
234 *Id.* at *21.
235 *Id.*
236 *Id.*
237 *Id.* at *19.
238 *Id.*
239 *Id.*
240 *Id.* at *20.
241 *Id.* at *1, *20 (citing Residents Councils of Wash. v. Leavitt, 500 F.3d 1025, 1034 (9th Cir. 2007)).

was not based on the best available science.[242] FWS's evaluation of the Mexican wolf's current status was based on its 1998 findings.[243] At that time, 11 wolves were released, with the goal of establishing a self-sustaining population of 100 wolves in the wild, while 150 wolves remained in captivity.[244] The new rule changed the Mexican wolf's status in a number of ways: the Mexican wolf was designated as a distinct subspecies; broader releases were permitted in the expanded MWEPA; dispersals were allowed throughout the MWEPA; and the captive population consisted of 250 aging Mexican wolves, which had lost much of their genetic diversity.[245] FWS failed to consider new scientific information generated by these changes.[246]

When FWS first introduced the Mexican wolf into the BRWRA, it had been designated as nonessential;[247] wolves in the wild were not essential because surplus wolves in captivity could be released.[248] This designation provided FWS with management flexibility, which helped to achieve stakeholder cooperation and prevent the intentional killing of wolves.[249] Additionally, FWS at that point had never implemented essential status designation.[250]

ESA § 10(j)(2)(B) required FWS to make a new essentiality determination after authorizing releases outside of the wolf's current range and reclassifying the Mexican wolf as a distinct subspecies.[251] The new determination must have relied on the best available

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242 *Id.* at *20.
243 *Id.* at *21.
244 *Id.*
245 *Id.*
246 *Id.*
247 *Id.*
248 Ashe Memorandum, *supra* note 171, at 5.
249 *Id.* at 9, 15.
250 *Id*. at 16.
251 *Id.* at 14–15.

science and taken into account the Mexican wolf's changed status.[252] The 1998 nonessential designation was based on the need for management flexibility and political considerations, not biological factors,[253] and the 2015 rule simply reaffirmed the earlier rule without any further analysis.[254]

V. RECOVERY PLANNING

Section 4(f) of the ESA directs the Secretary of the Interior to develop and implement recovery plans for the survival and restoration of endangered species.[255] "Recovery" is a process that halts the decline of and eliminates threats to endangered and threatened species.[256] However, recovery includes more than preventing extinction—recovery planning also ensures that the protected species exists in sufficient numbers and is well-distributed in the wild, so that ESA protections will one day no longer be needed.[257] Ultimately, recovery measures are meant to restore the species as a vital component of its ecosystem.[258]

The current conception of recovery planning under ESA § 4(f) "did not arise full-blown from any congressional enactment"—it began as a voluntary agency process.[259] In 1978, Congress added the recovery planning requirement to the ESA.[260] In 1988, FWS and

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252 *Id.*
253 *Id.* at 15.
254 *Id.* at 10.
255 16 U.S.C. § 1533(f)(1); 16 USC § 1532(3) (defining "conserve," "conserving," and "conservation").
256 Federico Cheever, *Recovery Planning, the Courts, & the Endangered Species Act*, 16 NAT. RES. & ENV'T 106, 106 (2001).
257 *Endangered Species Conservation: Recovery of Species Under the Endangered Species Act*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, https://www.fisheries.noaa.gov/national/endangered-species-conservation/recovery-species-under-endangered-species-act (last updated July 20, 2023).
258 *See* H.R. REP. NO. 97-835, at 30 (1082) (Conf. Rep.); H.R. REP. NO. 95-1625, at 5 (1978) (Conf. Rep.); *see also* Trout Unlimited v. Lohn, 559 F.3d 946, 957 (9th Cir. 2009).
259 Cheever, *supra* note 256, at 107–08.
260 *Id.* (citing Endangered Species Act Amendments of 1978, Pub. L. No. 95-632, 92 Stat. 3751, 3766 (1978)).

the National Marine Fisheries Service promulgated regulations that defined "recovery" in terms of "removing species from the list of protected species."[261] The 1988 ESA amendments further specified that recovery plans should contain: site-specific management actions; objective, measurable criteria for delisting; and estimates of the time and costs to restore the species.[262] These amendments also mandated an opportunity for public comment on new or revised recovery plans.[263]

Under current law, recovery planning provides a basic road map that neutralizes threats and halts the species' decline.[264] Nevertheless, "the recommendations contained within a recovery plan are not binding upon the agency, and the Secretary retains discretion over the methods to use in species conservation."[265]

A. HISTORY OF THE MEXICAN WOLF RECOVERY PLAN

FWS completed the first Mexican wolf recovery plan in 1982, which drew a great deal of criticism.[266] The plan recognized the need to address illegal killing to promote recovery, but contained no criteria to assess the threat and no preventative measures.[267] FWS later acknowledged that the 1982 recovery plan was incomplete and violated the ESA,[268] and considered returning wolves to Utah and Colorado in the Southern Rocky

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261 *Id.* (citing Interagency Cooperation — Endangered Species Act of 1973, as Amended, 51 Fed Reg. 19,926, 19,935 (June 3, 1986) (codified at 50 C.F.R. §§ 402.01–402.16)); *see also*, Jason M. Patlis, *Recovery, Conservation, & Survival Under the ESA: Recovering Species, Conserving Resources, & Saving the Law*, 17 PUB. LAND & RES. L. REV. 55, 68–75 (1996).

262 16 U.S.C. § 1533(f)(1)(B).

263 *Id.* §1533(f)(4)–(5).

264 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 75 (D. Ariz. 2021) (citing Ctr. for Biological Diversity v. Kempthorne, 607 F. Supp. 2d 1078, 1088 (D. Ariz. 2009)).

265 *Id.* (citing Conservation Cong. v. Finley, 774 F.3d 611, 620 (9th Cir. 2014)).

266 Plaintiffs' Memorandum of Points and Authority in Support of Motion for Summary Judgment at 8, Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68 (D. Ariz. 2021) (No. 4:18-cv-00047-JGZ) [hereinafter Haaland Memorandum].

267 *Id.*

268 *Id.*

Mountains.[269]

In 2010, FWS warned that the recovery plan was outdated and might fail because of inadequate regulations, illegal shooting, and inbreeding.[270] At the same time, the Arizona Game and Fish Commission voted to oppose the release of any new wolves from captivity until FWS promulgated a new recovery plan, management plan, and 10(j) rule.[271]

FWS put together a team to produce a new recovery plan in 2012, focusing on the development of objective, measurable criteria to address human-caused mortality.[272] Scientific evidence demonstrated that a high rate of human-caused mortality was causing the decline of the species population and that an overall population objective would not address the problem.[273] The 2012 draft plan permitted delisting when "the estimated annual rate of human caused losses averaged over an 8-year period is less than 20% as measured by a statistically reliable monitoring effort."[274] The plan also called for three inter-connected populations in (1) the BRWRA, (2) southern Utah and northern Arizona, and (3) southern Colorado and northern New Mexico, each with at least 250 wolves.[275] FWS eventually abandoned the 2012 proposal, allegedly to revise the regulations for the release

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269 The Associated Press, *Wolf Reintroduction Proposed for Colorado*, THE DENVER POST (Sept. 27, 2008, 9:49 AM), https://www.denverpost.com/2008/09/27/wolf-reintroduction-proposed-for-colo/.

270 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF CONSERVATION ASSESSMENT 14 (2010), https://irp-cdn.multiscreensite.com/4cf33c6f/files/uploaded/2010-mexican_wolf_conservation_assessment_130pgs.pdf.

271 U.S. FISH & WILDLIFE SERV, MEXICAN WOLF RECOVERY PROGRAM: PROGRESS REPORT #15 5–6 (2012), https://nywolf.org/wp-content/uploads/2018/12/2012_MW_Progress_Report_Final_w_Addendum.pdf.

272 Haaland Memorandum, *supra* note 266, at 8–9.

273 *Id.*

274 *Id.*

275 Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf, 80 Fed. Reg. 2,512, 2,517 (Jan. 16, 2015) (codified at 50 C.F.R. § 17.84(k)).

and management of Mexican wolves.[276] Critics, however, asserted that FWS abandoned the effort in the face of political pressure.[277]

In November 2014, environmental groups sued in an Arizona district court, claiming that FWS violated ESA § 4(f) by failing to prepare a new recovery plan.[278] Arizona also sued FWS, demanding a new recovery plan pursuant to § 4(f), and Colorado, Utah, and the New Mexico Department of Game and Fish intervened in the suit.[279] The Arizona Game and Fish Commission also voted again to deny FWS permission to release adult wolves from captivity in the state.[280]

Additionally, there were unsuccessful efforts in Congress to return Mexican wolf management back to the states.[281] The failed Mexican Wolf Transparency and Accountability Act aimed to end the Mexican wolf's threatened species designation[282] and would have blocked parts of FWS's management program from going into effect.[283] The Mexican Wolf Recovery Plan Act required FWS to adopt a new Mexican wolf recovery plan and mandated an opportunity for state and local input.[284] If FWS failed to cooperate,

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276 Cally Carswell, *Endangered U.S. Wolf Denied New Habitat, as Critics Charge That Politics Trumped Science*, PROTECT THE WOLVES (Sept. 27, 2017, 4:10 PM), https://protectthewolves.com/ endangered-u-s-wolf-denied-new-habitat-as-critics-charge-that-politics-trumped-science/.

277 *Id.*

278 *Lawsuit Fights 38 Years of Delay in Recovering Southwest Mexican Gray Wolf*, EARTHJUSTICE (Nov. 12, 2014) https://earthjustice.org/news/press/2014/lawsuit-fights-38-years-of-delay-in-recovering-southwest-s-mexican-gray-wolves.

279 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2015 WL 11120712 (D. Ariz. Aug. 18, 2015).

280 *New Mexico Game Commission Rejects Federal Releases of Mexican Wolves into Gila National Forest*, CTR. FOR BIOLOGICAL DIVERSITY (Sept. 29, 2015), https://www.biologicaldiversity.org/news/press_releases/2015/mexican-gray-wolf-09-29-2015.html.

281 Mexican Wolf Transparency and Accountability Act, H.R. 2910, 114th Cong. (2015); Mexican Gray Wolf Recovery Plan Act of 2016, S. 2876, 114th Cong. (2016).

282 Mexican Wolf Transparency and Accountability Act, H.R. 2910, 114th Cong. (2015).

283 Madeleine Winer, *Rep. Gosar Wants Mexican Gray Wolf off Endangered List*, AZCENTRAL (June 26, 2015), https://www.azcentral.com/story/news/arizona/politics/2015/06/26/paul-gosar-bill-mexican-wolf-off-endangered-list/29375559/.

284 S. 2876.

Arizona and New Mexico would assume management of the recovery process,[285] and the Mexican wolf would automatically be delisted as an endangered species once the conservation goals were met.[286]

In October 2016, FWS settled with environmental groups claiming that the recovery plan was not compliant with § 4(f) of the ESA.[287] FWS agreed to: (1) complete a final recovery plan by November 30, 2017 that would address population objectives and recovery areas; (2) conduct an independent peer review of the plan with the participation of New Mexico, Colorado, Utah, and Arizona; and (3) submit status reports every six months and assume all costs.[288]

Meanwhile, congressional efforts continued to threaten Mexican wolf recovery. House Republicans included a provision in the Interior Appropriation Bill to freeze all wolf recovery efforts across the country.[289] Under this provision, Mexican wolves would retain ESA protections, but no federal expenditures for wolf recovery would be permitted,[290] and FWS would be required to examine Mexican wolf genetics to assess its status as a subspecies.[291] A separate bill proposed to remove ESA protections of the Mexican wolf

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285 *Id.*; *see also* Ken Showers, *Arizona Senators Call for Wolf Plan Revision*, COPPER ERA (June 24, 2020), https://www.eacourier.com/copper_era/news/arizona-senators-call-for-wolf-plan-revision/article_6ce676a8-17c5-11e6-ac16-f3b2dd48982f.html.

286 S. 2876.

287 Defs. of Wildlife v. Jewell, No. CV-14-02472-TUC, 2016 WL 7852469, at *2 (D. Ariz. Oct. 18, 2016).

288 *Id.*

289 Press Release, Ctr. for Biological Diversity, House Republicans Expand War on Wolves in Latest Budget Bill: Legislation Would Halt Wolf Recovery Nationwide Including Southwest's Mexican Wolves, California's Fledgling Population (July 11, 2017), https://www.biologicaldiversity.org/news/press_releases/2017/wolf-07-11-2017.php.

291 The Associated Press, *Federal Spending Proposal Calls for Review of Wolf Genetics*, DURANGO HERALD (July 20, 2017), https://www.durangoherald.com/articles/federal-spending-proposal-calls-for-review-of-wolf-genetics/; Press Release, Ctr. for Biological Diversity, House Republicans Seek Unneeded Mexican Wolf Genetic Review (July 18, 2017), https://www.biologicaldiversity.org/news/press_releases/2017/mexican-gray-wolf-07-18-2017.php.

when there were more than 100 wolves in the U.S.[292] Once this threshold was met, management would be returned to the states.[293]

VI. *CENTER FOR BIOLOGICAL DIVERSITY V. ZINKE*

In June 2017, FWS released the long-awaited draft recovery plan for the Mexican wolf.[294] A final plan was released in November 2017, pursuant to the settlement agreement with the Arizona Game and Fish Department and the organization Defenders of Wildlife in the earlier § 10(j) litigation. The plan established a population objective of an average of 520 Mexican wolves across 8 years, spread over 2 populations in the U.S. and Mexico.[295] The MWEPA extended below I-40 in Arizona and New Mexico to the Mexican border and did not include southern Colorado or southern Utah.[296] The Mexican wolf would be considered for delisting when populations in the U.S. and Mexico met certain criteria.[297] These criteria included: maintaining specific metrics for population growth over an eight-year period, survival of breeding-age wolves from the released captive population to promote gene diversity, and the creation of "regulatory mechanisms . . . to prohibit or regulate human-caused mortality of Mexican wolves."[298]

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[292] To Require the Delisting of Mexican Gray Wolves Under the Endangered Species Act of 1973 on a Determination That the Subspecies Has Been Sufficiently Recovered in the United States, S. 2277, 115th Cong. (2018).

[293] *Id.*

[294] Endangered and Threatened Wildlife and Plants; Mexican Wolf Draft Recovery Plan, First Revision, 82 Fed. Reg. 29,916, 29,918 (July 1, 2017); US. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PLAN: FIRST REVISION 19–20 (2017), https://www.fws.gov/sites/default/files/documents/2017MexicanWolfRecoveryPlanRevision1Final.pdf [hereinafter DRAFT RECOVERY PLAN].

[295] DRAFT RECOVERY PLAN, *supra* note 294, at 19–20.

[296] *Id.* at 11; *see also* Brian Maffly, *Conservationists Blast Long-Awaited Recovery Plan for Mexican Wolves, Which Excludes Utah, Colorado from Lobos' Range*, SALT LAKE TRIB. (June 29, 2017, 11:09 PM), https://archive.sltrib.com/article.php?id=5458639&itype=CMSID. .

[297] DRAFT RECOVERY PLAN, *supra* note 294, at 19–20.

[298] *Id.*

A. STANDARD OF REVIEW

Environmental groups challenged the 2017 recovery plan under § 11 of the ESA, which allows citizens to file lawsuits to compel FWS to perform any nondiscretionary statutory requirements.[299] In *CBD v. Zinke*, CBD alleged that the recovery plan violated the ESA because FWS failed to base its population and genetic goals on the best available science, possibly resulting in a continued decline in genetic diversity.[300] FWS ignored the best available science, which indicated there is a great deal of suitable Mexican wolf habitat in the U.S., instead relying on recovery efforts in Mexico, where there was a lack of suitable habitat and weak program management.[301] The court rejected CBD's arguments, identifying the key issue as whether FWS actions in the recovery plan were discretionary or nondiscretionary.[302] The court, noting that there was little precedent on this distinction, concluded that CBD's allegations were better characterized as disagreements regarding FWS's policy determinations.[303] Because policy determinations fell within the agency's discretion, they were unreviewable.[304]

The court relied on prior judicial decisions, which held that recovery plans were not binding documents and thus not subject to detailed substantive review.[305] ESA § 4(f) instructs the Secretary to include three elements in the recovery plan "to the maximum extent practicable": (1) site-specific management actions necessary to achieve

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299 Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940, 949 (D. Ariz. 2019), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00047-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022); 16 U.S.C. § 1540(g).

300 *Id.*

301 *Id.*

302 *Id.* at 946–47.

303 *Id.*

304 *Id.*

305 *Zinke*, 399 F. Supp. 3d at 947–48; Conservation Cong. v. Finley, 774 F. 3d 611, 614 (9th Cir. 2014); Cascadia Wildlands v. Bureau of Indian Affs., 801 F.3d 1105, 1141 n.8 (9th Cir. 2015).

conservation; (2) objective, measurable criteria; and (3) time and cost estimates to carry out the steps needed to achieve the plan's goals.[306] The use of the qualification "to the maximum extent practicable," coupled with the recurring theme that recovery plans are only roadmaps, suggested that the three requirements were not subject to the same level of scrutiny as other sections of the ESA.[307] This language also limited the public's ability to challenge the recovery plan.[308] Additionally, the court held that the text of the statute did not require FWS to utilize the best available science in making the recovery plan; § 4(f) only required that the best available science be utilized when making listing and delisting determinations.[309] Lastly, review under the APA was precluded because the recovery plan did not constitute final agency action.[310]

The court's decision regarding judicial deference to agency decisions in recovery plans was consistent with prior precedent; however, scholars have questioned judicial temerity regarding the review of recovery plans.[311] Scholars have attempted to link recovery plans to the ESA "duty to conserve" to encourage greater judicial scrutiny of recovery plans.[312] Professor Daniel Rohlf articulated this position:

> Recovery plans in many ways possess the ideal characteristics to act as triggers for agencies' duty to conserve listed species. They are prepared by experts and contain an outline of steps necessary to promote the conservation of listed species. The plans also often identify which federal agencies are responsible for carrying out specific recovery tasks. Defining

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306 *Zinke*, 399 F. Supp. 3d at 944 (citing 16 U.S.C § 1533(f)(1)).
307 *Id.* at 948.
308 *Id.* at 948–49.
309 *Id.*
310 *Id.* at 950.
311 *See* Federico Cheever, *The Road to Recovery: A New Way of Thinking About the Endangered Species Act*, 23 ECOLOGY L. Q. 1, 59–60 (1996); *cf.* J.B. Ruhl, *Section 7(a)(1) of the "New" Endangered Species Act: Rediscovering & Redefining the Untapped Power of Federal Agencies' Duty To Conserve Species*, 25 ENV'T L. 1107, 1140–41, 1140 n.164 (1995) (discussing a trend in litigation attempting to constrict the parameters of the ESA).
312 *See* Cheever, *supra* note 311, at 59.

> agencies' conservation duties by what is set forth in recovery plans would free the courts from sticky problems of attempting to interpret the scope of ESA's conservation mandate on a case-by-case basis.[313]

Despite such arguments, the court in *Zinke* chose to review the challenge to the recovery plan under the citizen suit provision of the ESA, which only allows challenges to nondiscretionary agency actions.[314] The court rejected CBD's challenge as a policy disagreement that fell within FWS's discretion.[315] However, FWS's discretion regarding recovery plans is not unlimited.

The ESA requires the Secretary to perform several nondiscretionary functions regarding recovery plans.[316] The ESA mandates that the Secretary create and implement recovery plans that will conserve endangered and threatened species.[317] Thus, recovery plans that do not provide for species conservation and recovery are reviewable.[318] Furthermore, the ESA requires the Secretary to address the three statutory factors in the plan: site-specific management actions; objective, measurable criteria; and time and cost estimates.[319] These are nondiscretionary functions.[320]

The *Zinke* decision is problematic in that it awarded broad discretion to FWS, and

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313 *Id.* (quoting DANIEL J. ROHLF, THE ENDANGERED SPECIES ACT: A GUIDE TO ITS PROTECTIONS & IMPLEMENTATION 98 (1989)).

314 *Zinke*, 399 F. Supp. 3d at 946 (citing Bennett v. Spear, 520 U.S. 154, 166, 173 (1997)).

315 *Id.* at 949–50.

316 *See* 18 U.S.C. § 1533(f)(1); *Zinke*, 399 F. Supp. 3d at 947 ("[T]he agency has an *obligation* to incorporate site-specific management actions, objective and measurable criteria, and time and costs estimates . . . ." (emphasis added)).

317 16 U.S.C. § 1533(f)(1).

318 *See Zinke*, 399 F. Supp. 3d at 946–47 (noting that FWS concedes that recovery plans are reviewable should they fail to meet the requirements of 16 U.S.C. § 140(f)(1)(B)).

319 16 U.S.C. § 1533(f)(1)(B).

320 *Zinke*, 399 F. Supp. 3d at 946–47; *see also* Sierra Club v. Lujan, No. MO–91–CA–069, 1993 WL 151353, at *17–19 (W.D. Tex. Feb. 1, 1993) (discussing the importance and requirements of recovery plans).

in doing so diminished the importance of public input in the recovery plan.[321] Congress amended § 4(f) to require the Secretary to seek public input and solicit comments from local communities before approving or revising a recovery plan.[322] The amendment was not intended to make the Secretary responsible for generating information, but only to allow those directly affected by the plan to provide information for the Secretary to consider.[323] The final congressional report stated that § 4(f) does not mandate specific rule-making, but does require the Secretary to consider public comments before approving the plan.[324]

Congress developed procedures to allow FWS to make changes to the recovery plan in response to changing conditions. These changes are also subject to public notice, which guarantees early public participation in the process when the agency wishes to consider alternatives.[325] If the elements of the recovery plan can be changed at the Secretary's discretion without following the prescribed process, the public input mandated under § 4(f)(1) becomes superfluous.[326]

For example, the U.S. District Court for the Southern District of California stressed the importance of the recovery plan in *Southwest Center for Biological Diversity v. Bartel*.[327] The court "respectfully disagree[d] with the cases minimizing the importance of recovery plans" and held that the ESA requires FWS to implement provisions in the

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321 *See* Friends of Blackwater v. Salazar, 691 F.3d 428, 446 (D.C. Cir. 2012) (Rogers, J., dissenting) (noting that ESA § 4(f) would be "superfluous" if FWS could delist a species without satisfying all elements of a recovery plan).

322 18 U.S.C. § 1533(f)(4); *see Friends of Blackwater*, 691 F.3d at 444 n.4 (Rogers, J., dissenting) (discussing the legislative history of the provision).

323 *Friends of Blackwater*, 691 F.3d at 444 n.4 (Rogers, J., dissenting).

324 *Id.*

325 *Id.* at 446–47.

326 *Id.* at 446.

327 Sw. Ctr. for Biological Diversity v. Bartel, 470 F. Supp. 2d 1118, 1137 (S.D. Cal. 2006).

recovery plan.[328] The court instructed FWS to reinitiate consultation on the incidental take permit for San Diego's Multiple Species Conservation Plan to determine how the permit would affect vernal pool species.[329] It noted that if the permit terms were inconsistent with the strategies and objectives of the recovery plan, then FWS would need to explain why it reached inconsistent conclusions from the same evidence.[330]

B. Final Agency Action

In *Zinke*, the court should have examined the recovery plan under the APA.[331] Instead, it held that the recovery plan did not constitute final agency action, so was not subject to APA review.[332] This contradicted earlier cases, which held that judicial review of agency action pursuant to the ESA should be governed by the APA,[333] which establishes a presumption of judicial review for all final agency action except for discretionary acts.[334] The Mexican wolf recovery plan should have constituted final agency action under the APA because it marked the end of FWS's decision-making process and established duties that had legal consequences.[335]

The Ninth Circuit has recognized that agency action is final if it has a direct impact

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328 *Id.* at 1137 n.16.
329 *Id.* at 1162.
330 *Id.* at 1136–37.
331 *See* Friends of Blackwater v. Salazar, 691 F.3d 428, 448 (D.C. Cir. 2012) (Rogers, J., dissenting) (analyzing delisting and the related recovery plan under the APA).
332 Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940, 950 (D. Ariz. 2019), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00047-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).
333 *See, e.g.*, Fund for Animals v. Babbitt, 903 F. Supp. 96, 105 (D.D.C. 1995), *amended by* 967 F. Supp. 6; Defs. of Wildlife v. Babbitt, 130 F. Supp. 2d 121, 124 (D.D.C. 2001).
334 *See, e.g.*, Holbrook v. Tenn. Valley Auth., 48 F.4th 282, 287 (4th Cir. 2022); *see also* 5 U.S.C. § 706(2)(A) ("The reviewing court shall . . . hold unlawful and set aside agency action . . . found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."); Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 410 (noting that the exception for action committed to agency discretion "is a very narrow exception").
335 *See* Bennett v. Spear, 520 U.S. 154, 178 (1997); Complaint for Declaratory Relief at 25, Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940 (D. Ariz.) (No. CV-18-00047-TUC-JGZ).

on the daily business of the regulated party.[336] At the time of *Zinke*, FWS had repeatedly asserted in earlier 10(j) litigation that the Mexican wolf recovery plan would play an important role in setting recovery goals, including provisions of the 10(j) regulation.[337] The recovery plan established the metrics for delisting and impacted daily federal and state Mexican wolf management.[338]

Furthermore, when determining whether agency action is final, a court must consider whether the action resulted in legal consequences and if immediate compliance is expected.[339] Recovery plans carry real-world legal consequences. For example, the Ninth Circuit has noted that the National Marine Fisheries Service considered the prospects of a species' recovery as set out in the recovery plan when issuing limitations on commercial fishing.[340] In another case, the Ninth Circuit struck down a biological opinion because it did not adequately consider how the proposed action would affect species recovery.[341] Additionally, the U.S. District Court for Northern California relied, in part, on a recovery plan to determine that the agency's delay in complying with its statutory duty to designate critical habitat was unreasonable.[342]

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336 Or. Nat. Desert Ass'n v. U.S. Forest Serv., 465 F.3d 977, 982, 990 (9th Cir. 2006).

337 Ctr. for Biological Diversity v. Jewell, No. CV-16-00094-TUC-JGZ, 2018 WL 1586651, at *11 (D. Ariz. Mar. 31, 2018).

338 Plaintiffs' Response to Defendants' Motion to Dismiss at 17, Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940 (D. Ariz. 2019) (No. CV-18-00047-TUC-JGZ) (first citing Defs. of Wildlife v. Salazar, 729 F. Supp. 2d 1207, 1210–11 (D. Mont. 2010); then citing Greater Yellowstone Coal., Inc. v. Servheen, 665 F.3d 1015, 1019–21 (9th Cir. 2011)).

339 *Or. Nat. Desert Ass'n*, 465 F.3d at 982.

340 Alaska v. Lubchenco, 723 F.3d 1043, 1053 (9th Cir. 2013).

341 Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 524 F.3d 917, 936 (9th Cir. 2008), *superseded by regulation*, Regulations for Interagency Cooperation, 84 Fed. Reg. 44,976, 45,002 (Aug. 27, 2019) (codified at 50 C.F.R. §§ 402.02, 402.14, 402.16, 402.17, 402.40).

342 Ctr. for Biological Diversity v. Evans, No. C 04-04496 WHA, 2005 WL 1514102, at *4 (N.D. Cal. June 14, 2005). A recovery plan also played an important role in the court's decision in *Defenders of Wildlife v. Hall*, regarding the delisting of the NRM wolves. Defs. of Wildlife v. Hall, 565 F. Supp. 2d 1160,

C. BEST AVAILABLE SCIENCE

The court in *Zinke* held that the recovery plan did not have to be based on the best available science; this requirement only applied to listing and delisting decisions.[343] However, this was contrary to earlier court decisions[344] and the legislative history.[345] Senator Mitchell, referring to recovery plans in the 1988 ESA Amendments, stated: "It is essential to the act's integrity that recovery goals for the number of individuals or populations needed to ensure a species' existence be based solely on the best available scientific evidence."[346]

Scholars support the utilization of the best available science in recovery plans.[347] Professor Doremus noted that Congress intended for recovery plans to be based on the best available science.[348] Even though this was not expressly stated, it is reasonable to assume that FWS is required to utilize the best available science when developing a recovery plan that relies on complex scientific determinations.[349]

1169 (D. Mont. 2008). The recovery plan stressed the need for genetic interchange among three wolf subpopulations to maximize the likelihood of long-term persistence. *Id.* at 1164. Nevertheless, FWS attempted to delist the NRM gray wolf distinct population segment even though "there [was] no evidence of genetic exchange" among the three wolf subpopulations. *Id.* at 1168. The court found the FWS decision arbitrary and capricious because it did not explain why the agency changed the recovery criteria. *See id.* at 1170.

343 Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940, 949 (D. Ariz. 2019), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00047-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

344 *See, e.g.*, Fund for Animals v. Babbitt, 903 F. Supp. 96, 110 n.4 (D.D.C. 1995); Defs. of Wildlife v. Babbitt, 130 F. Supp. 2d 121, 131 (D.D.C. 2001).

345 134 CONG. REC. 19,273 (1988) (statement of Sen. Mitchell).

346 *Id.*

347 *See* Holly Doremus, *The Purposes, Effects, & Future of the Endangered Species Act's Best Available Science Mandate*, 34 ENV'T L. 397, 418–419 (2004). Doremus writes that the benefits of the best available science requirement include: (1) the promotion of more accurate decision-making, (2) an increase in public trust and political credibility, (3) the provision of proper standards for judicial review, and (4) greater public participation in the process. *Id.*

348 *Id.* at 407 n.57 ("It seems unlikely that Congress intended to condone production of recovery plans . . . without reference to the best available science.").

349 *See id.*

Professor Goble noted that recovery plans provide the best available scientific data for the implementation of management actions leading to species recovery.[350] Agency decisions are predicated upon precisely such data.[351] Courts have employed the science in recovery plans to establish basic facts about the biology and status of species.[352] In other cases, courts have relied on recovery plans to provide an independent source of scientific information.[353] The plans are generally evidence of best available science since they are developed outside the context of an individual dispute.[354]

Since the recovery plan is the prelude to delisting, the best available science requirement should apply. Otherwise, a flawed recovery plan that does not provide for the conservation of the Mexican wolf will be implemented, frustrating the goals of the ESA to delist the species. It is better to act early, rather than late.

D. SITE-SPECIFIC MANAGEMENT ACTIONS & OBJECTIVE, MEASURABLE CRITERIA

The *Zinke* court did, however, conclude that FWS failed to include site-specific management actions or objective, measurable criteria to address the illegal killing of Mexican wolves.[355] FWS had identified the problem of human caused mortality, but did not provide any suggestions on how to solve the problem or explanation why it was not practicable to do so.[356] Because FWS had a nondiscretionary duty to address the threats to

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350 Dale D. Goble, *Recovery*, *in* ENDANGERED SPECIES ACT: LAW, POLICY, & PERSPECTIVES 88–89 (Donald C. Burr & WM. Robert Irvin eds., ABA Section of Environment, Energy, and Resources 2d ed., 2010).

351 *Id.* at 89.

352 *Id.*

353 *Id.* at 88.

354 *See id.* ("In other cases, however, the courts turned to the recovery plans to provide an *independent* source of scientific information. . . ." (emphasis added)).

355 Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940, 949–50 (D. Ariz. 2019), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00047-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

356 *Id.*

recovery it identified, the court had jurisdiction under the ESA citizen suit provision to hear the challenge.[357]

The court's decision regarding the lack of site-specific management actions and objective, measurable criteria regarding illegal killing was consistent with earlier cases. In *Fund for Animals (FFA) v. Babbitt,* FFA challenged a recovery plan for the grizzly bear because it failed to include site-specific management actions and objective, measurable criteria.[358] The court acknowledged that Congress did not define specific requirements for site-specific management action.[359] However, the court held that recovery plans that recognize specific threats to the species, but do not provide corrective measures or explain why such measures are unnecessary, violate the ESA.[360] Site-specific management actions in recovery plans must be "as explicit as possible" regarding the steps necessary for recovery.[361] FWS has flexibility, but "[o]bviously, the phrase 'to the maximum extent practicable' does not permit an agency unbridled discretion. It imposes a clear duty on the agency to fulfill the statutory command to the extent that it is feasible or possible."[362]

The *FFA v. Babbitt* court also held that "objective, measurable criteria" must be specific.[363] Explicit congressional commands leave no room for agency discretion.[364] The ESA states that recovery plans "shall" include objective, measurable criteria.[365] The use of

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357 *Id.* at 950; 16 U.S.C. § 1540(g)(1)(c) (allowing citizen suits "against the Secretary where there is alleged a failure of the Secretary to perform any act or duty under section 4 [of the ESA] which is not discretionary with the Secretary").

358 Fund for Animals v. Babbitt, 903 F. Supp. 96, 102–03 (D.D.C. 1995), *amended by* Fund for Animals v. Babbitt, 967 F. Supp. 6 (D.D.C. 1997).

359 *Id.* at 106.

360 *Id.* at 108.

361 *Id.* at 106 (quoting S. Rep. No. 240, 100th Cong., 2d Sess. 9 (1988), *reprinted in* 1988 U.S.C.C.A.N. 2709).

362 *Id.* at 107 (quoting 16 U.S.C. § 1533(f)(1)).

363 *See id.* at 111; 16 U.S.C. § 1533(f)(1)(B)(ii).

364 *Id.*

365 *Id.*

"shall" is "imperative, denoting a definite obligation."[366] The requirement "'to the maximum extent practicable' indicates a strong congressional preference that the agency fulfill its obligation to the extent that it is possible or feasible."[367] The objective, measurable criteria must address each of five statutory delisting factors to determine whether the threats to the species no longer exist.[368] The goal of the objective, measurable criteria requirement is removal of the species from the list of threatened or endangered species.[369]

The court's decision in *FFA v. Babbitt* was consistent with legislative history, which demonstrated the importance of recovery plans. Congress was concerned with flaws in prior recovery plans.[370] The 1988 Senate Report on the ESA amendments noted that many recovery plans had failed to be implemented and lacked essential data to achieve recovery.[371] The ESA was amended to require site-specific management actions and objective, measurable criteria that establish the steps necessary and means to achieve species recovery.[372]

Nevertheless, scientists remained critical of the 2017 recovery plan for Mexican wolves. Dr. Carroll concluded that the recovery plan was based on politics, not science.[373] FWS underestimated the number of captive wolves needed to be released into the wild to address genetic problems and prevented the expansion of the wolf population into new

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366 *Id.* (quoting 16 U.S.C. § 1533(f)(1)(B)(ii)).
367 *Id.*
368 *Id.*
369 *Id.*
370 *See* S. REP. No. 100-240, at 4 (1987), *reprinted in* 1988 U.S.C.C.A.N. 2700, 2703.
371 *Id.*
372 *Id.* at 9–10.
373 Carlos Carroll et al., *Biological & Sociopolitical Sources of Uncertainty in Population Viability Analysis for Endangered Species Recovery Planning*, 9 SCI. REPORTS 10130, 10139 (2019), https://doi.org/10.1038/s41598-019-45032-2.

areas with suitable habitat.[374] An attorney representing CBD also implored FWS "to go back to the drawing board and come up with a science-based plan that will truly put Mexican wolves on the path to recovery."[375]

VII. *CENTER FOR BIOLOGICAL DIVERSITY V. HAALAND*

The court in *Zinke* had determined that the recovery plan failed to include site-specific management actions that address human-caused mortality. In response, FWS amended the plan, but the litigation continued.

A. SITE-SPECIFIC MANAGEMENT ACTIONS

In the follow-up case, *CBD v. Haaland*, FWS argued that the amended plan provided numerous and sufficient site-specific management actions in the recovery action table at the end of its recovery plan.[376] The recovery action table listed twenty-four site-specific management actions and threats that the actions were meant to address.[377] Three threats identified were: (1) loss of genetic diversity, (2) "extinction risk/demographic stochasticity," and (3) threshold mortality rate.[378] Each of the actions were assigned a numerical priority (1, 2, or 3), indicating its "relative contribution . . . toward species recovery."[379] Sixteen of the twenty-four actions addressed wolf mortality, but few were related to human-caused mortality.[380]

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374 *Id.* at 7.

375 Press Release, Ctr. for Biological Diversity, Study: Politics Harming Recovery of Endangered Mexican Wolves: Trump Administration's Recovery Plan Based on Politics, Not Science (July 12, 2019), https://biologicaldiversity.org/w/news/press-releases/study-politics-harming-recovery-endangered-mexican-wolves-2019-07-12/email_view/.

376 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 80 (D. Ariz. 2021), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

377 *Id.*

378 *Id.* at 80 n.7.

379 *Id.*

380 *Id.*

FWS carries out site-specific management actions through an implementation strategy, which articulates more detailed site-specific, near-term actions necessary to carry out the provisions in the recovery plan.[381] The implementation strategy is not a statutory mandate, so is not subject to public review.[382] FWS acknowledged that implementation strategies are not substitutes for recovery plans, but argued that the strategy should have been considered as further evidence that the plan adequately addressed human-caused mortality in its site-specific actions.[383]

The court in *Haaland*, following its earlier holding, rejected FWS's assertions.[384] The court held that when a specific threat is recognized in the recovery plan, FWS must recommend corrective action or explain why such action is not practicable.[385] FWS did neither, and failed to show why the management actions identified in the implementation strategy were not included in the recovery plan.[386] FWS had a clear duty to fulfill the statutory mandate, so the plan was remanded to FWS.[387] FWS was ordered to produce a draft plan within six months, which must include site-specific management actions to reduce the number of wolves illegally killed.[388] The plan must be finalized no later than six months after the draft plan.[389]

CBD has noted that FWS has ignored the problem of widespread poaching for a

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381 *Id.* at 81–82.
382 *Id.* at 81–82; 16 U.S.C. § 1533(f)(4) (discussing the requirement of public review for the recovery plan, not the implementation strategy).
383 *Haaland*, 562 F. Supp. 3d at 82.
384 *Id.*
385 *Id.*
386 *Id.*
387 *Id.* at 87.
388 *Id.*
389 *Id.* at 87.

long time.[390] FWS has finally addressed the problem, which should enhance the Mexican wolf's chance of survival.[391] However, environmental groups remain skeptical. CBD has noted that FWS still maintains a persecution mentality regarding the wolf, and stated that the latest management plan is "woefully inadequate for rescuing the Mexican wolf."[392]

Environmental groups have appealed the case to the Court of Appeals for the Ninth Circuit,[393] alleging that the 2017 plan fails to provide for the conservation and survival of the species, and is not based on the best available science.[394] Leading scientists have pointed out that recovery requires three interconnected subpopulations of Mexican wolves in the wild, totaling at least 750 wolves.[395] However, pressure from the states has restricted the Mexican wolf to a single isolated population in Arizona and New Mexico and a small population in Mexico.[396]

B. OBJECTIVE, MEASURABLE CRITERIA

In addition to the lack of site-specific management actions, there are other problems with the court's decision. Objective, measurable criteria must address the five ESA delisting factors in the recovery plan.[397] They also must specifically assess whether the

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390 Peter Aleshire, *Judge Orders USFWS To Come Up with a Plan to Reduce Wolf Poaching*, PAYSON ROUNDUP (Nov. 26, 2021), https://www.paysonroundup.com/government/judge-orders-usfws-to-come-up-with-a-plan-to-reduce-wolf-poaching/article_8e815c7b-2ff7-59f6-b1bc-c877475c6f9f.html.

391 *Id.*

392 Martha Pskowski, *Border Wall Thwarts Mr. Goodbar, a Mexican Wolf, from Crossing into Mexico*, EL PASO TIMES (Dec. 15, 2021, 6:00 AM), https://www.elpasotimes.com/story/news/2021/12/15/ border-wall-prevents-mexican-gray-wolf-mr-goodbar-entering-mexico/8892193002/.

393 *See* WildEarth Guardians v. Haaland, No. 22-15029, 2022 WL 2713350 (9th Cir. Apr. 22, 2022).

394 *Fish & Wildlife Service Sued for Failing in Mexican Gray Wolf Recovery*, NAT'L PARKS TRAVELLER (July 13, 2022), https://www.nationalparkstraveler.org/2022/07/fish-and-wildlife-service-sued-failing-mexican-gray-wolf-recovery.

395 *Id.*

396 *Id.*

397 *See* Fund for Animals v. Babbitt, 903 F. Supp. 96, 111 (D.D.C. 1995). "In considering whether to list a species as 'threatened' or 'endangered', the FWS conducts a formal review in which it must consider the

threats that originally led to the decision to list a species have been remedied, so the species can be delisted.[398]

The court in *Haaland* determined that the objective, measurable criteria in the revised plan addressing human-caused mortality fell within the bounds of agency discretion, and thus were not subject to judicial review.[399] Furthermore, the court found that FWS's objective, measurable criteria regarding the protection of genetic diversity and availability of suitable habitat were reasonable.[400] This allowed the flawed recovery to go forward.

C. HUMAN-CAUSED MORTALITY

FWS addressed human-caused mortality under the predation delisting factor.[401] FWS acknowledged that human-caused mortality posed a continual threat to the species, and addressed this threat through population abundance.[402] The recovery plan's conditions for delisting included a minimum of two populations meeting the following conditions:

> a) The population average over an 8-year period is greater than or equal to 320 wolves (e.g., annual wolf abundance of 200, 240, 288, 344, 412, 380, 355, and 342 averages 320 wolves);
> b) The population [] exceed[s] 320 wolves each of the last 3 years of the 8-year period; [and]
> c) The annual population growth rate averaged over the 8-year period is stable or increasing (e.g., annual averages of 1.2, 1.2, 1.2, 1.2, 1.2, 0.9, 0.9, and 1.0 averages 1.1.).[403]

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species' status according to five statutory factors. Those factors are: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence." *Id.* at 104 (citing 16 U.S.C. § 1533(a)(1)).

398 *Id.* at 111.

399 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 83–84 (D. Ariz. 2021), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

400 *Id.* at 86–87.

401 *Id.* at 82.

402 *Id.* at 83.

403 *Id.*

FWS asserted that population abundance would ensure resiliency and diminish the threat of human-caused mortality.[404] FWS noted that mortality rates, which are the primary indicator of the population's trajectory, must be sufficiently low to facilitate recovery.[405] The plan utilized a population viability analysis, which concluded that population numbers were affected by small changes in the adult mortality rate.[406] The analysis also concluded that the mean adult mortality rate could not exceed 25%, the mean sub-adult mortality rate must be below 33%, and the mean pup mortality rate must be under 13% for the population to meet the population abundance recovery criteria.[407] FWS considered these mortality rates to be an adequate indicator that the threat posed by human-caused mortality had been abated.[408] The court, upholding FWS's analysis, determined that the issue fell within agency discretion, and was thus unreviewable.[409] The fact that a more accurate measure was available was not relevant.[410]

FWS's analysis was dubious. FWS acknowledged that human-caused mortality constitutes the greatest source of wolf deaths during recovery.[411] Illegal human-caused mortality remains a continuous problem. Between 1998 and 2020, 74% of Mexican wolf deaths (119 of 2016) were caused by humans.[412] Fourteen Mexican wolves were killed in

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404 *Id.* at 83.
405 *Id.*
406 *Id.*
407 *Id.*
408 *Id.*
409 *Id.* at 84.
410 *Id.*
411 Plaintiffs' Memorandum of Points and Authority in Support of Motion for Summary Judgment at 6–7, Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68 (D. Ariz. Apr. 17, 2020) (No. 4:18-cv-00047-JGZ).
412 Peter Aleshire, *New Plan Promises Crackdown on Poaching*, PAYSON ROUNDUP (Apr. 29, 2022), https://www.paysonroundup.com/news/new-plan-promises-crackdown-on-poaching/article_6be71bd2-e2f5-5633-97fc-53b7a655cfa7.html.

2020, eight illegally and six by vehicle collisions.[413] FWS recognized that Mexican wolf recovery was progressing, but could be thwarted by human-caused mortality.[414]

Peer reviewers concluded that the recovery plan did not address illegal killing. Dr. Jeff Stetz found that the draft recovery plan lacked any objective, measurable criteria addressing illegal killing.[415] He noted that other recovery plans typically utilize age-class/sex-specific percentages of abundance estimates to clearly express mortality limits.[416] Dr. Carroll also pointed out that the 2017 draft recovery plan lacked any criteria regarding the threat of human-caused mortality, so there was no way to ensure that the target population goal would be adequate to achieve recovery.[417]

Population targets do not ensure species conservation and survival. Dr. Carroll explained that the population targets in the 2017 recovery plan were based on a population viability analysis called the "Vortex" model, which he helped to develop.[418] The model analyzes the factors affecting the demographic and genetic status of the species to predict their impact on the population.[419] The model shows that adult mortality is the most important factor affecting extinction risk.[420]

Dr. Carroll asserted that the FWS population recovery target did not account for the

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413 Adrian Hedden, *Human Killing of Endangered Mexican Wolf Addressed in Federal Plan*, CARLSBAD CURRENT ARGUS (Apr. 18, 2022, 4:02 AM), https://www.currentargus.com/story/news/2022/04/18/killing-mexican-wolf-endangered-federal-plan-conservation-new-mexico-arizona/7306667001/.

414 *See id.* Since reintroduction, only ten individuals have pled guilty for poaching, two of whom possessed tracking devices that allowed them to follow radio collars. Press Release, Ctr. for Biological Diversity, Mexican Gray Wolf Numbers Rose to Just Under 200 Last Year: Recovery Slowed by Killings, Removal, Disease, Genetic Mismanagement (Mar. 30, 2022), https://biologicaldiversity.org/w/news/press-releases/mexican-gray-wolf-numbers-rose-to-just-under-200-last-year-2022-03-30/. CBD insists that these telemetry devices must be taken away from private landowners. *Id.*

415 Haaland Memorandum, *supra* note 266, at 11.

416 *Id.*

417 *Id.*

418 Amended Complaint for Declaratory and Injunctive Relief, *supra* note 121, at 20.

419 *Id.*

420 *Id.*

high level of wolf mortality, but instead assumed an extremely low mortality rate.[421] FWS overestimated the number of females in the breeding pool each year and presumed wolves would be released into the wild according to the designated schedule.[422] However, states that had opposed and delayed releases in the past were granted control over releases, which would frustrate scheduled releases.[423] As a result, FWS had vastly underestimated the number of wolves needed to be released from captivity to conserve the species.[424]

The population goals were not based on the best available science, but were the product of negotiations between state agencies and FWS based on socioeconomic concerns.[425] Dr. Carroll noted that the analysis was manipulated to achieve the desired result.[426] FWS had to meet politically acceptable wolf population numbers, when considering the probability of extinction.[427] However, recovery plans that misrepresent scientific data are unlikely to be successful.[428] A population based on politics, not science, will not survive.[429]

FWS's own recovery planning guidance is critical of utilizing population abundance to address human-caused mortality.[430] The Mexican wolf population could increase due to conservation measures, even if the threat of human-caused mortality does not diminish.[431] For example, FWS currently provides supplementary feeding for 70% of

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421 *Id.*
422 *Id.*
423 *Id.*
424 Complaint for Declaratory and Injunctive Relief, *supra* note 131, at 20.
425 W. Env't L. Ctr., *supra* note 182, at 6 n.29.
426 *Id.*
427 *Id.*
428 *Id.* at 18 n.79.
429 *Id.* at 17–19.
430 NAT'L MARINE FISHERIES SERV. & U.S. FISH & WILDLIFE SERV., INTERIM ENDANGERED & THREATENED SPECIES RECOVERY PLANNING GUIDANCE VERSION 1.3 (2010).
431 Complaint for Declaratory and Injunctive Relief, *supra* note 131, at 20.

denning Mexican wolves to reduce wolf-livestock conflict.[432] This may result in larger litters and greater pup survival—the population would increase, but the threat posed by human-caused mortality would not be alleviated.[433]

FWS's recovery planning guidance specifically warns that "merely increasing a species' numbers, range and abundance does not ensure its long-term health or sustainability; only by alleviating threats can lasting recovery be achieved."[434] The guidance concludes that before a species can be delisted, there must be a specific analysis of threats under the five delisting factors, including human-caused mortality, coupled with an assessment of the population's potential growth.[435]

D. Inadequate Regulatory Mechanisms

Haaland also addressed the threat of human-caused mortality in its analysis of FWS's inadequate regulatory mechanisms.[436] FWS's delisting criteria require states and tribes to establish regulatory provisions that ensure at least 320 Mexican wolves will be maintained in the U.S. after ESA protections are removed.[437] The court found this to be an objective and measurable criterion because, among other reasons, the regulations must be in place prior to delisting.[438]

FWS's evaluation of the adequacy of state management plans must be

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[432] *Id.* at 21.
[433] *Id.*
[434] *Id.*
[435] *Id.*
[436] Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 84 (D. Ariz. 2021), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).
[437] *Id.*
[438] *Id.* at 84–85.

reasonable.[439] Federal courts have insisted that regulatory mechanisms essential to protect a species' viability must consist of specific legal mandates and include some means of enforcement.[440] The D.C. Circuit noted that such state plans must be sufficiently effective to ensure that the threats to the species will not return after delisting.[441]

The transfer of authority over endangered and threatened species from the federal government to state governments has been viewed with great skepticism.[442] Several scholars have cautioned that returning authority over threatened and endangered species to the states is likely to undermine conservation efforts, place numerous species at risk, and frustrate recovery.[443] Other scholars have pointed out that FWS has a dubious record regarding the evaluation of adequate state regulatory mechanisms and their implementation.[444]

The court's finding in *Haaland* that FWS's reliance on states and tribes to put adequate regulations in place prior to delisting was questionable.[445] This criterion was vague and reliance would fail to address the continued illegal killing of Mexican wolves

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439 *See* Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983) (discussing the arbitrary and capricious standard as courts apply it to agency determinations).

440 Or. Nat. Res. Council v. Daley, 6 F. Supp. 2d 1139, 1155 (D. Or. 1998).

441 *See* Defs. of Wildlife v. Zinke, 849 F.3d 1077, 1083 (D.C. Cir. 2017).

442 Alejandro E. Camacho et al., *Assessing State Laws & Resources for Endangered Species Protection*, 47 ENV'T L. REP. NEWS & ANALYSIS 10837, 10843–44 (2017); *see* Holly Doremus, *Delisting Endangered Species: An Aspirational Goal, Not a Realistic Expectation*, 30 ENV'T L. REP. NEWS & ANALYSIS 10434, 10446 (2000); *see also* Federico Cheever, *The Rhetoric of Delisting Under the Endangered Species Act: How To Declare Victory Without Winning the War*, 31 ENV'T L. REP. NEWS & ANALYSIS 11302, 11302 (2001).

443 Camacho et al., *supra* note 442, at 10843.

444 Sandra B. Zellmer et al., *Species Conservation & Recovery Through Adequate Regulatory Mechanisms*, 44 HARV. L. REV. 367, 368 (2020).

445 The court recognized "that there are inherent difficulties in developing objective and measurable criteria to evaluate whether regulations implemented by other governmental bodies will successfully address the threat of illegal killings of wolves after the protections of the ESA are lifted, as the specific threat is inadequate regulations, absent the ESA." Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 85 n.9 (D. Ariz. 2021), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

even while they remain protected by the ESA.[446] No mortality thresholds that would signal threats to the Mexican wolf were identified, like in the 2012 draft plan;[447] neither were any regulatory mechanisms that would be effective to adequately diminish illegal killing.[448] The promise to implement future regulatory actions was not an adequate substitute for objective, measurable criteria to stop illegal killing.[449] In addition, FWS acknowledged that the killing of wolves in the U.S. would likely increase after delisting, because state penalties are weaker than federal penalties.[450]

E. GENETIC DIVERSITY

FWS considered genetic diversity under the other natural factors delisting criteria.[451] FWS acknowledged that the loss of genetic diversity posed a threat to Mexican wolf recovery and survival.[452] However, it concluded that genetic diversity would be achieved when twenty-two Mexican wolves released from the captive population survived to breeding age in the wild population.[453] This means that a pup must live for at least two years after being released.[454]

The court held that FWS provided a rational explanation for protecting the genetic diversity of the Mexican wolf population.[455] An important indicator of genetic representation is the amount of the captive population's genetic diversity that has been

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446 Haaland Memorandum, *supra* note 266, at 20.
447 *Id.* at 20–21.
448 *Id.*
449 *See* Fund for Animals v. Babbitt, 903 F. Supp. 96, 112 (D.D.C. 1995) ("The promise of habitat based recovery criteria some time in the future simply is not good enough.").
450 Haaland Memorandum, *supra* note 266, at 20–21.
451 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 85 (D. Ariz. 2021).
452 *Id.*
453 *Id.*
454 *Id.*
455 *Id.* at 86.

retained in the wild population.[456] Further, FWS's conclusion that the preservation of 90% of the genetic diversity of the captive population in the wild population was reasonable.[457] The court was not persuaded to consider any alternative arguments.[458]

The court's decision was dubious. FWS has acknowledged that inbreeding depression can affect the probability of a breeding pair of wolves successfully producing a litter.[459] Much of the genetic diversity of the founders has been lost; only 83% of the founders' genetic diversity has been retained in the captive population, which is below the 90% retention rate for most captive breeding programs.[460] The wild reintroduced population faces even greater genetic peril. Only 75.48% of the genetic diversity of founders has been retained in the U.S. wild population.[461] In the Mexican population, only 73.88% of the founder's genetic diversity remains.[462] In addition, the current Mexican wolf population only possesses genetic material from approximately two founders.[463] Members of the Mexican wolf population are, on average, related to each other as full siblings.[464] This high relatedness poses the risk of inbreeding depression, which could jeopardize recovery.[465]

FWS estimated that maintaining genetic diversity would require introducing seventy wolves from the captive population, with at least twenty-two released wolves

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456 *Id.*
457 *Id.*
458 *Id.*
459 Plaintiffs' Memorandum in Support of Motion for Interim Injunctive Relief, *supra* note 110, at 5.
460 *Id.* at 1.
461 Complaint for Declaratory and Injunctive Relief at 15, Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940 (D. Ariz. 2018) (No. 4:18-cv-00047-JGZ).
462 *Id.*
463 Earthjustice, *supra* note 113, at 32–33.
464 *Id.* at 34.
465 *Id.*

surviving until breeding age.[466] However, environmental groups questioned this strategy because it disregards whether the released wolves surviving to breeding age actually reproduced.[467] Furthermore, linking the gene diversity goal of the wild population to the aged and already genetically compromised captive population is unlikely to diminish genetic threats.[468]

F. SUITABLE HABITAT

FWS concluded that there was sufficient habitat in MWEPA and Mexico, and the loss of habitat would not constitute a threat to Mexican wolf recovery.[469] The *Haaland* court determined that FWS's conclusion was reasonable, so FWS was not required to develop additional habitat criteria.[470] However, this decision has been critiqued for its failure to recognize the importance of suitable habitat north of I-40.[471] In *Jewell*, the same Arizona district court was skeptical of the regulation's prohibition of Mexican wolf dispersal above I-40, since "FWS acknowledge[d] that territory north of I-40 [would] likely be required for future recovery[,] and recognized the importance of natural dispersal and expanding the species' range."[472] The *Jewell* court did not further elaborate, but experts have noted that the Southern Rockies above I-40 could serve as "the mother lode for

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466 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PLAN: FIRST REVISION 23 (2017), https://downloads.regulations.gov/FWS-R2-ES-2017-0036-9475/content.pdf [hereinafter 2017 FINAL RECOVERY PLAN].

467 Complaint for Declaratory and Injunctive Relief at *19–20, WildEarth Guardians v. Haaland, No. 22-15029, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

468 *See* Ctr. for Biological Diversity v. Jewell, No. CV-16-00094-TUC-JGZ, 2018 WL 1586651, at *11 (D. Ariz. Mar. 31, 2018).

469 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 87 (D. Ariz. 2021), *appeal dismissed sub nom.* WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

470 *Id.*

471 *See Jewell*, 2018 WL 1586651, at *13–15.

472 *Id.* at *23 n.13.

wolves."[473] Studies have shown that the Southern Rockies could support over 1,100 wolves.[474]

VIII. CROSS-BORDER CONSIDERATIONS

Illegal, human-caused mortality poses significant danger south of the border.[475] The 2017 recovery plan's reliance on the reintroduction of wolves into Mexico is problematic because the "physical and social conditions required for recovery likely do not exist."[476] For example, when Mexican wolf reintroduction in Mexico began in 2011 with the release of five Mexican wolves, four were killed within a month.[477] From 2012 to 2016, forty-one Mexican wolves were released into the Sierra Madre Occidental, and eighteen died within a year, many from illegal killing.[478]

While thirty-five Mexican wolves currently inhabit Chihuahua, Mexico in the northern Sierra Madre Occidental, they must be fed by humans to discourage them from roaming into other riskier areas.[479] This supplementary feeding is very expensive.[480] Funding for the program has historically been unreliable, and wolf reintroduction in a second site is unlikely.[481]

There are also problems with land ownership in Mexico that contribute to wolf mortality.[482] Mexico recognizes three types of land ownership: federal, private, and

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473 Michael Robinson et al., *South from Yellowstone, What Remains to Be Done,* 63 INT'L WOLF 8, 9 (2006).
474 *Id.*
475 *Id.* at 14–15.
476 Earthjustice, *supra* note 113, at 7.
477 *Id.*
478 *Id.*
479 *Id.*
480 *Id.*
481 *Id.*14.
482 *Id.* at 15–16.

communal.[483] Most land is private, and most federally protected areas lack management plans and permit extractive industries.[484] Mexico also has higher livestock densities than the U.S., resulting in a higher number of landowner-wolf conflicts.[485] Remaining communal lands are degraded and generally managed for extraction industries, not for sustainability.[486] Overall, Mexico provides an unsuitable habitat, inadequate prey base for recovery, and a weak legal framework to protect the Mexican wolf.[487]

Nevertheless, FWS acknowledges that Mexican wolves in the U.S. should have the opportunity to migrate south where they can join with Mexico's wolf population.[488] The patchy habitat in the border region of Mexico and the U.S. can support low-level Mexican wolf dispersal between high-quality habitat areas in the MWEPA and northern Sierra Madre Occidental.[489] Since reintroduction, however, only two Mexican wolves have crossed the border from Mexico to the U.S.[490] Neither became established in the U.S., one returned to Mexico, and the other was captured and placed in the captive breeding program.[491] FWS concluded that dispersal possibilities are too low (approximately one wolf every twelve to sixteen years) to provide adequate gene flow to avoid genetic threats.[492] Still, FWS has acknowledged that translocation between the two populations will be important to increase the genetic diversity of these two small, inbred populations.[493]

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483 *Id.*
484 *Id.*
485 *Id.* 17.
486 *Id.* at 15–16.
487 *Id.* at 18.
488 2017 FINAL RECOVERY PLAN, *supra* note 466, at 14.
489 *Id.*
490 *Id.*
491 *Id.*
492 *Id.* at 23.
493 *Id.* at 26.

However, the Trump Administration's unfinished border wall poses a substantial impediment to Mexican wolf migration, particularly in Zones 2 and 3.[494] At the same time, the U.S. and Mexico recently signed a letter of intent to proceed with a collaborative bi-national approach to Mexican wolf recovery.[495] Environmental groups have accused the U.S. of duplicity for seeking cooperation with Mexico while simultaneously continuing (even under the Biden Administration) to build a border wall that prevents connectivity between the U.S. and Mexican wolf populations.[496]

IX. 2022 Recovery Plan

FWS released the Second Revision of the Mexican Wolf Recovery Plan in September 2022, which includes most of the elements of the 2017 plan.[497] However, a significant addition in the 2022 plan is two options for downlisting the Mexican wolf to a threatened species.[498] The first option requires that the U.S. population average or exceed 320 Mexican wolves over a 4-year period, and that the genetic diversity of the captive population be preserved in the wild population through the scheduled release and survival

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494 *Border Wall Poses New Problems for Endangered Mexican Wolf*, NM POLITICAL REPORT (Oct. 30, 2019), https://nmpoliticalreport.com/2019/10/30/border-wall-poses-new-problems-for-the-endangered-mexican-gray-wolf/ ("[T]o maintain genetic diversity, which is important to maintain the species, there needs to be genetic connection between those two re-introduced populations. There needs to be breeding. So, they need to be able to find each other, and that means being able to move across the landscape. The wall will prevent that from happening.").

495 Maddie Pukite, *Conservation Agencies Sign Letter of Intent for Mexican Wolf Recovery*, N.M. DAILY LOBO (July 21, 2022, 8:48 PM), https://www.dailylobo.com/article/2022/07/conservation-agencies-sign-letter-of-intent-for-mexican-wolf-recovery.

496 Uriel J. García, *Biden's Latest Border Moves Spur Criticism That He's Continuing Wall Construction*, TEX. TRIBUNE (Feb. 25, 2022, 5:00 AM), https://www.texastribune.org/2022/02/25/ texas-border-wall-biden/ ("Environmental activists are urging the administration to leave the gaps open so wildlife and endangered species can cross the barrier to find food and mates.").

497 U.S. FISH & WILDLIFE SERV., MEXICAN WOLF RECOVERY PLAN: SECOND REVISION (2022), https://ecos.fws.gov/docs/recovery_plan/Final%20Mexican%20Wolf%20Recovery%20Plan%20Second%20Revision%202022%20signed_508%20compliant_1.pdf.

498 *Id*. at 19–20.

of wolves until breeding age.[499] The second option requires both the Mexican and U.S. populations to each equal or exceed 150 wolves over the same 4-year period, with annual increases in the population.[500] The genetic diversity of the captive population must be retained in both populations through scheduled releases and survival until breeding age.[501] For delisting, the populations must meet certain gene growth and diversity objectives, including a population of at least 320 wolves in the U.S. and 200 wolves in Mexico over an 8-year period.[502]

The revised plan also includes several site-specific management actions to address the court's decision in *Haaland*.[503] The annual mortality rate must be consistent with demographic and genetic criteria to support stable population growth.[504] The plan also calls for: (1) increasing law enforcement efforts in areas identified as mortality "hot spots"; (2) building new infrastructure across existing and new roads to facilitate safe wolf crossings and reduce vehicle collisions; (3) funding and implementing wolf-livestock conflict-avoidance measures to decrease wolf removals due to depredation; and (4) expanding education and outreach activities in local communities.[505]

X. FINAL § 10(J) REGULATION

In 2021, FWS considered new § 10(j) regulations in response to the court's decision in *Jewell*.[506] However, the final July 2022 regulations are, for the most part, inconsistent

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499 *Id.*
500 *Id.* at 20.
501 *Id.*
502 *Id.* at 20–21.
503 MEXICAN WOLF RECOVERY PLAN: SECOND REVISION, *supra* note 497, at ii.
504 *Id.* at 31.
505 *Id.* at 30–47.
506 Revision to the Nonessential Experimental Population of the Mexican Wolf, 86 Fed. Reg. 59,953 (Oct. 29, 2021) (codified in C.F.R. § 17.84(k)).

with the court's decision and have been criticized by environmental groups. FWS changed the population objective from 300–325 wolves to 320 or more Mexican wolves in the MWEPA at the end of 8 years. In each of the last three years, there must be a stable population of at least 320 Mexican wolves.[507] This is consistent with the court's decision in *Jewell*, which held that the old population goal of 300–325 wolves was not based on the best available science.[508] Rather, the best available science indicates that a metapopulation consisting of three inter-related populations of 250 Mexican wolves *each* is necessary for Mexican wolf recovery.[509] Scientists have questioned the ability of a small isolated population to avoid extinction.[510]

Under the 2022 regulations, FWS will no longer restrict captive wolf releases to one to two wolves per generation.[511] FWS will also establish an annual schedule of released wolves to ensure genetic diversity, with a goal of preserving 90% of the captive population's genetic diversity in the wild population.[512] This 90% benchmark will be codified and achieved by 2030; at which time FWS will end the tracking of effective migrants.[513] Instead, it will track captive released wolves until they reach breeding age.[514]

Recall that in the *Jewell* court's critique of the 2017 rule, the court recognized that

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507 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg 39,348, 39,349 (July 1, 2022) (to be codified at 50 C.F.R. pt. 17).

508 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *14, *20–21 (D. Ariz. Mar. 31, 2018); *see also* Lindsey Botts, *New Rules Would Lift Limits on Mexican Gray Wolves, but Activists Say Changes Fall Short*, AZCENTRAL (Oct. 30, 2021), https://www.azcentral.com/story/news/local/arizona-environment/2021/10/30/federal-agency-proposes-new-rules-mexican-gray-wolves/6197043001/.

509 *Jewell*, 2018 WL 1586651, at *12.

510 *See* Carlos Carroll et al., *Biological & Sociopolitical Sources of Uncertainty in Population Viability Analysis for Endangered Species Recovery Planning*, 9 SCI. REPS. 10130 (2019).

511 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg. at 39,350.

512 *Id.*

513 *Id.*

514 *Id.*

limiting the number of captive wolf releases posed genetic risks.[515] While FWS relied on twenty-two released wolves surviving to breeding age as its metric of success, there was no requirement that the released wolves actually breed and subsequently increase genetic diversity.[516] Population abundance alone, therefore, is not a sufficient indicator of genetic success, and scientists recommend on-site genetic analysis.[517]

The new rule also temporarily restricts the allowable taking of Mexican wolves on federal and non-federal land, pursuant to unacceptable impacts on ungulate populations.[518] Takings will only be allowed under a permit after meeting annual genetic objectives.[519] However, these temporary restrictions will likely provide inadequate protection to other wild-born wolves with valuable genetic mutations.

The July 2022 final rule did not change the boundaries for Mexican wolf recovery.[520] Only two isolated Mexican wolf populations in Arizona/New Mexico and Mexico are allowed, and Mexican wolves are still not permitted to disperse above I-40.[521] The *Jewell* court was critical of FWS's previous refusal in the 2017 rule to consider areas north of I-40, where suitable habitat is available for dispersal and recovery.[522] However, FWS did not respond to the court's order and continues to rely on the management structure of the 2017 recovery plan, which is not supported by the best available science.[523] The

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515 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *23 n.13 (D. Ariz. Mar. 31, 2018).

516 Botts, *supra* note 508.

517 *Id.*

518 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg. at 39,350–51.

519 *Id.*

520 *Id.* at 39,351.

521 *Id.*

522 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *23 n.13 (D. Ariz. Mar. 31, 2018).

523 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg. at 39,350; *see* Carroll et al., *supra* note 510, at 1–2.

MWEPA boundary is based on political factors,[524] and precluding the Mexican wolf from occupying suitable habitat does not meet the recovery goals of the ESA.[525]

Finally, the July 2022 final rule maintains the Mexican wolf's status as a nonessential experimental population.[526] FWS concluded that any loss of wild Mexican wolves within the U.S. territory would be marginally significant because the captive population is robust and thus can easily replace any missing wolves.[527] In addition, it states, Mexican wolves will still be present in Mexico.[528] This portion of the regulation is also inconsistent with the court's decision in *Jewell*.[529] The *Jewell* court held that FWS must conduct a new essentiality determination because Mexican wolves were being released outside of their current range, and the nonessential status determination relied on outdated data instead of the best available science.[530] Furthermore, the court critiqued FWS's continued focus on wolves in captivity as contrary to the ESA, which stresses wolf recovery in wild.[531]

A. CHALLENGES TO THE 10(J) REGULATIONS

The July 2022 final 10(j) regulations address the *Jewell* court's critiques. CBD and Defenders of Wildlife have challenged the new regulations, alleging NEPA violations.[532] They assert that: (1) the Final Supplemental EIS failed to take a hard look at the

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524 *See* WildEarth Guardians, *Mexican Wolves See Improved but Imperfect Management Rule*, KRWG PUB. MEDIA (Oct. 29, 2021), https://www.krwg.org/local-viewpoints/2021-10-29/mexican-wolves-see-improved-but-imperfect-management-rule.

525 *Jewell*, 2018 WL 1586651, at *13–14.

526 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg. at 39,352.

527 *See id*. at 39,351–53.

528 *See id.*

529 *Jewell*, 2018 WL 1586651, at *19.

530 *Id.*

531 *Id.* at *4.

532 WildEarth Guardians v. Haaland, No. 22-15029, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

environmental impacts of the final 10(j) regulation;[533] (2) FWS did not respond to objections and criticism of the peer reviewers and relied on incorrect assumptions and data;[534] and (3) FWS failed to consider a reasonable range of alternatives in the Final Supplemental EIS.[535]

Other environmental groups also oppose the July 2022 regulations. Environmental Justice Works warned that "the government's new management program threatens failure for the entire Mexican wolf recovery effort."[536] The Western Environmental Law Center intends to sue,[537] alleging: (1) FWS has interpreted the scope of the remand far too narrowly, in violation of the court's March 2018 order;[538] (2) FWS's nonessential experimental determination is arbitrary and capricious;[539] (3) FWS has erroneously relied on the legally deficient 2017 recovery plan, which is not based on the best available science;[540] (4) the genetic objective, population objective, and revised take provisions in the final rule are insufficient;[541] (5) FWS has failed to address human-caused and illegal killings or lethal management removals;[542] and (6) FWS's ESA § 7 consultation violated

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533 Endangered and Threatened Wildlife and Plants; Revision to the Nonessential Experimental Population of the Mexican Wolf, 87 Fed. Reg 39,348, 39,348 (July 1, 2022) (to be codified at 50 C.F.R. pt. 17).

534 Amended Complaint for Declaratory and Injunctive Relief, *supra* note 121, at 40.

535 *Id.* at 37–48.

536 Susan Montoya Bryan, *Rule for Managing Mexican Wolves Spurs Lawsuit*, WASH. POST (July 13, 2022), https://apnews.com/article/lawsuits-arizona-wildlife-wolves-us-fish-and-service-7ab9fc6e5139 7999e82d7026f1ad5d65.

537 Letter from Kelley E. Nokes, W. Env't L. Ctr., to Deb Haaland, Sec'y, U.S. Dep't of the Interior (July 1, 2022), https://westernlaw.org/wp-content/uploads/2022/07/2022.07.01_Notice_MexicanWolf _10j_ Final.pdf; *Wildlife Advocates to Challenge New, Inadequate Federal Mexican Gray Wolf Recovery Rule*, W. ENV'T L. CTR. (July 1, 2022), https://westernlaw.org/wildlife-advocates-to-challenge-new-inadequate-federal-mexican-gray-wolf-recovery-rule/.

538 Letter from Kelley E. Nokes, *supra* note 537, at 5–7.

539 *Id.* at 7–10.

540 *Id.* at 11.

541 *Id.* at 11–12.

542 *Id.* at 12–13.

the ESA.[543]

XI. COMPARING *JEWELL*, *ZINKE*, & *HAALAND*

Mexican wolf recovery remains contentious. The Arizona federal district court in *Jewell* properly determined that the § 10(j) rule violated the ESA and APA on several accounts: (1) the population goal of 300–325 "[did] not further the conservation of the species and [was] arbitrary and capricious";[544] (2) the goal to merely avoid extinction of the population was contrary to the ESA's conservation mandate;[545] (3) FWS's refusal to consider areas north of I-40, where adequate wolf habitat is available, was questionable at best;[546] (4) the expanded take provisions did not "contain adequate protection for the loss of genetically valuable wolves;"[547] (5) the old essentiality determination was insufficient because Mexican wolves were being released outside their current range;[548] and (6) FWS's contention that any problems would be dealt with in the forthcoming recovery plan was rejected.[549]

The same Arizona federal district court in *Zinke* invalidated the 2017 recovery plan because it did not contain site-specific management actions and objective, measurable criteria to address the illegal killing of Mexican wolves.[550] FWS had recognized, but failed to address, the problem. This portion of the court's conclusion was consistent with case law and legislative history.

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543 *Id.* at 13–14.
544 Ctr. for Biological Diversity v. Jewell, No. CV-15-00019-TUC-JGZ, 2018 WL 1586651, at *14 (D. Ariz. Mar. 31, 2018).
545 *Id.*
546 *Id.* at *23 n.13.
547 *Id.* at *15.
548 *Id.* at *19.
549 *Id.*
550 *Id.* at *23.

However, there were other problems with the *Zinke* decision. The court held that the citizen suit provisions in the ESA could only be invoked to challenge FWS's nondiscretionary actions.[551] FWS only needs address site-specific management actions and objective, measurable criteria in a perfunctory manner. Thus, no substantive review of the elements in the recovery plan is permitted. On the contrary, recovery plans do not need to be based on the best available science, which is required in other sections of the ESA. Finally, the court refused to invoke the APA, asserting that the recovery plan was not a final agency action.[552]

The court granted too much deference to FWS. Scholars assert that provisions of the recovery plan should be subject to rigorous judicial review pursuant to the conservation mandate in § 7(a) of the ESA.[553] The court diminished the importance of public input in the recovery plan. Rather, the court should have subjected the recovery plan to review under the APA because it represents final agency action that has legal consequences.[554] In addition, the court should have required FWS to employ the best available science in the recovery plan.

The court in *Haaland* that FWS failed to include site-specific management actions regarding human-caused mortality in the recovery plan.[555] Nevertheless, following prior precedent, the court upheld the objective, measurable criteria regarding illegal human-

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551 Ctr. for Biological Diversity v. Zinke, 399 F. Supp. 3d 940, 946–50 (D. Ariz. 2019), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00047-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

552 *Id.* at 950.

553 *See* Doremus, *supra* note 347, at 418–19; Goble, *supra* note 350, at 88–89.

554 *See, e.g.*, Or. Nat. Desert Ass'n v. U.S. Forest Serv., 465 F.3d 977, 986–90 (9th Cir. 2006).

555 Ctr. for Biological Diversity v. Haaland, 562 F. Supp. 3d 68, 81–82 (D. Ariz. 2021), *appeal dismissed sub nom*. WildEarth Guardians v. Haaland, No. CV-18-00048-TUC-JGZ, 2022 WL 2713350 (9th Cir. Apr. 26, 2022).

caused mortality, the protection of genetic diversity, and the availability of suitable habitat.[556] The court again refused to examine the substance of the flawed recovery plan, which failed to carry out the conservation mandate of § 7(a) of the ESA.

The court's decision in *Haaland* demonstrates the weakness in FWS's wolf recovery plan, which is simply a preliminary procedural document. FWS only needs to address the three statutory requirements in the recovery plan. Rigorous review of the substance of the recovery plan is precluded because the methods required to achieve conservation and survival of the Mexican wolf are policy questions left up to agency discretion.[557] FWS is not required to employ the best available science because the recovery plan is a preliminary document subject to change. Finally, since the recovery plan does not constitute final agency action, it is not subject to APA review.

XII. CONCLUSION

The court's decisions in these cases demonstrate two different positions regarding judicial review of agency decisions.[558] The court in *Jewell* vigorously examined the 10(j) regulation and found violations of both the ESA and APA, and required FWS to utilize the best available science. This same court in *Zinke* and the court in *Haaland* criticized the 2017 Mexican wolf recovery plan because it lacked site-specific standards regarding human-caused mortality. However, both courts employed a more deferential approach regarding the objective management criteria, upholding FWS's flawed analysis. The courts

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556 *Id.* at 82–87.

557 *See, e.g.*, Ctr. for Biological Diversity v. Jewell, No. CV-16-00094-TUC-JGZ, 2018 WL 1586651, at *23 (D. Ariz. Mar. 31, 2018) ("[I]t is not the province of this Court to make policy decisions, but to ensure compliance with statutory requirements.").

558 EDWARD A. FITZGERALD, WOLVES, COURTS, & PUBLIC POLICY: THE CHILDREN OF THE NIGHT RETURN TO THE NORTHERN ROCKY MOUNTAINS 12–19 (2015).

in both cases should have scrutinized and halted the FWS actions that had failed to protect the endangered Mexican wolf. Science, not politics, must guide the Mexican wolf's population recovery.

Lobo is on the road to recovery, but still requires federal protection. Mexican wolves play an important role in ecosystem maintenance and the preservation of biodiversity. Therefore, more Mexican wolves, including adults and pairs with pups, should be released from captivity to improve genetic diversity. Further, the removal and taking of Mexican wolves should be very limited. In addition, Mexican wolves should be allowed to disperse north of I-40. Greater connectivity with wolves in Mexico should be established. Lastly, parts of the southern border wall should be taken down to facilitate this migration.[559] These measures will further conservation of the Mexican grey wolf, fulfilling the charge of the ESA.

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[559] *See* Edward A. Fitzgerald, *San Diego Border Infrastructure Environmental Litigation: Return of the Walking Dead*, 50 ENV'T L. 151, 164 (2020); Edward A. Fitzgerald, *Sierra Club v. Trump, California v. Trump: Border Wall Funding Knocked Down*, 12 ARIZ. J. OF ENV'T L. & POL'Y 179, 205 (2022).

Here Comes the Sun: How the Inflation Reduction Act of 2022 Helps the Solar Industry Emerge from a Decade of Bankruptcy Darkness

By Michael Hamersky

I. INTRODUCTION

Although the United States ratified an international environmental treaty to combat dangerous human interference with the climate over thirty years ago,[1] the U.S. government did not adopt significant federal law to reduce greenhouse gas emissions. This changed on August 16, 2022, when President Biden signed the Inflation Reduction Act of 2022 (IRA) into law.[2] Although unclear from its name, the IRA is a sweeping climate law that contains several measures intended to move the U.S. toward renewable energy.[3] By providing at least $369 billion to support renewable energy and climate resilience, the IRA could be a

1 *See* U.N. Framework Convention on Climate Change, *adopted* May 9, 1992, 1771 U.N.T.S. 107.
2 Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818 (2022).
3 *Inflation Reduction Act: Landmark Legislation Supercharges U.S. Clean Energy Effort*, S&P GLOB. (Oct. 6, 2022), https://www.spglobal.com/en/research-insights/featured/special-editorial/inflation-reduction-act.

boon to the solar industry.[4]

Many solar companies filed for bankruptcy over the past decade.[5] The goal of filing for bankruptcy under Chapter 11 of the U.S. Bankruptcy Code is to emerge from the process as a reorganized entity with an ability to prosper going forward.[6] Both traditional reorganization and court-supervised sales can effectuate these goals under Chapter 11.[7]

Significant incentives contained in the IRA may assist the once-struggling solar industry in its growth.[8] The IRA contains multiple provisions specifically directed at the solar industry, including permitting reform and multiple tax credits for energy investment, advanced manufacturing, clean electricity generation, and residential clean energy.[9] These IRA provisions, when combined with Chapter 11, may allow solar companies to flourish that previously would have been forced to liquidate due to unfavorable political, regulatory, and business conditions.[10] Supplementing the IRA with the Bankruptcy Code will permit fundamentally sound solar companies to emerge in a situation much more conducive to their long-term success. This success should lead to the

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4 *Id.*

5 *See, e.g.*, Nichola Groom, *U.S. Solar Power Plant Backed by Over $700 Million in Government Loans Goes Bust: Filing*, REUTERS (July 30, 2020, 1:29 PM), https://www.reuters.com/article/us-usa-solar-bankruptcy/u-s-solar-power-plant-backed-by-over-700-million-in-government-loans-goes-bust-filing-idUSKCN24V3C4; Catherine Muccigrosso, *Pink Energy Files for Bankruptcy Amid Mounting Complaints Against the NC Solar Company*, THE CHARLOTTE OBSERVER, https://www.charlotteobserver.com/news/business/whats-in-store/article267129171.html (last updated Oct. 11, 2022, 3:40 PM).

6 *See Chapter 11—Bankruptcy Basics*, U.S. CTS.: SERVS. & FORMS, https://www.uscourts.gov/ services-forms/bankruptcy/bankruptcy-basics/chapter-11-bankruptcy-basics (last visited Aug. 15, 2023).

7 11 U.S.C. §§ 101–1532 (2022).

8 *See* John Hensley, *Inflation Reduction Act: It's a Big Deal for Job Growth and for a Clean Energy Future*, AM. CLEAN POWER (Aug. 5, 2022), https://cleanpower.org/blog/its-a-big-deal-for-job-growth-and-for-a-clean-energy-future/.

9 *See* 11 U.S.C. §§ 101–1532.

10 *See id.*

growth of solar energy use, which is beneficial for mitigating climate change.[11]

This Article identifies relevant provisions of the Bankruptcy Code and IRA and examines how they can work synergistically to benefit the solar industry. Identifying reasons for past solar companies' bankruptcies and analyzing recent legal developments will assist solar companies in avoiding similar financial distress in the future.

Specifically, Part II briefly explains Chapter 11 bankruptcy and its goals. Part III summarizes major solar companies' reorganization efforts and identifies material reasons for their bankruptcy filings. Part IV analyzes key Bankruptcy Code provisions that solar companies should utilize to successfully reorganize, including the authority to: (i) assume or reject contracts and leases; and (ii) sell assets free and clear of any liens and interests. Part V summarizes IRA provisions that are beneficial to the solar industry. Part VI concludes by explaining how IRA and Bankruptcy Code provisions can be utilized to solar companies' benefit by maximizing their prospects in a more favorable political, regulatory, and business environment.

The demonstrated synergies between the IRA and Bankruptcy Code are previously unrecognized and suggest that the IRA may have even greater impacts than current modeling suggests.[12] The Bankruptcy Code will allow solar companies to reject unfavorable contracts—including power purchase agreements—and obtain new financing on more favorable terms.

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[11] *See* Matthew Eisenson, *Solar Panels Reduce CO2 Emissions More per Acres Than Trees—and Much More Than Corn Ethanol*, CLIMATE L.: A SABIN CTR. BLOG (Oct. 25, 2022), https://blogs.law.columbia.edu/climatechange/2022/10/25/response-to-the-new-york-times-essay-are-there-better-places-to-put-large-solar-farms-than-these-forests.

[12] *See* JESSE D. JENKINS ET AL., REPEAT PROJECT, PRELIMINARY REPORT: THE CLIMATE AND ENERGY IMPACTS OF THE INFLATION REDUCTION ACT OF 2022 6 (2022), https://repeatproject.org/docs/REPEAT_IRA_Prelminary_Report_2022-08-04.pdf.

II. CHAPTER 11 BANKRUPTCY

Chapter 11 is the business reorganization chapter of the Bankruptcy Code.[13] Unlike Chapter 7 bankruptcy claims, a Chapter 11 claim does not necessarily require liquidation.[14] Instead, a company filing a Chapter 11 claim proposes a plan of reorganization, with the goal of emerging as a reorganized entity.[15] Reorganization is effectuated through restructuring debts, discharging certain liabilities, and allowing for a more manageable balance sheet.[16] The company itself, retaining control after the bankruptcy, may reorganize, or the company may reorganize after it is sold as a going-concern to a third-party pursuant to a court-supervised sale.[17]

However, if a plan is not confirmed, the company cannot continue doing business and its assets are then sold off.[18] Assets can be liquidated under Chapter 11, or more commonly, the bankruptcy case will be converted to a liquidation under Chapter 7.[19] Under a Chapter 7 bankruptcy case, the company is no longer in control, and a trustee is appointed to oversee the liquidation of company assets.[20] Chapter 7 is an unattractive option for any company, because it marks the end of its existence upon the disposition of its assets.[21]

This Article examines how solar companies can benefit from the Chapter 11 process and continue as a going-concern. In the past, potential buyers were incentivized to wait for a solar company to liquidate pursuant to Chapter 7 so that the buyer could acquire

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13 11 U.S.C. §§ 1101–95.
14 *See Chapter 11—Bankruptcy Basics*, *supra* note 6.
15 11 U.S.C. § 1121.
16 *Id.* § 1123.
17 *Id.* § 1129.
18 *See id.* § 1112.
19 *Id.* § 706.
20 *Id.* § 701.
21 *Id.* § 726.

attractive assets at a distressed price. However, as discussed below, the Bankruptcy Code and IRA should assist solar companies in facilitating Chapter 11 reorganizations and orderly sales without the need to resort to a Chapter 7 liquidation.

III. SOLAR COMPANY BANKRUPTCIES

Since 2011, there have been several high-profile solar company bankruptcies.[22] No portion of the solar industry has been immune from this trend.[23] As noted above, this Article focuses on companies that sought to reorganize under Chapter 11 of the bankruptcy code; it does not address the myriad of Chapter 7 bankruptcy filings. The need to seek bankruptcy protection may have been triggered by: (1) lower government-subsidized Chinese production costs; (2) cessation of consumer targeted government subsidies; (3) lack of access to capital; or (4) inability to complete open projects due to inefficient permitting processes.

A. EVERGREEN SOLAR, INC.

Evergreen Solar, Inc. (Evergreen) was one of the first solar bankruptcies to receive mainstream media attention.[24] On August 15, 2011, Evergreen filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the District of Delaware.[25] Evergreen had historically developed and manufactured multi-crystalline silicon wafers that were converted into photovoltaic solar cells, which were used to produce Evergreen-branded

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22 *See infra* Section III.

23 *Id.*

24 *See, e.g.*, Nichola Groom, *Solar Company Evergreen Files for Bankruptcy*, REUTERS: GREEN BUS. NEWS (Aug. 15, 2011, 11:12 AM), https://www.reuters.com/article/us-evergreensolar/solar-company-evergreen-files-for-bankruptcy-idINTRE77E49320110815; Bill Chappell, *Evergreen Files for Chapter 11; State "Clawback" Attempts Loom*, NPR: THE TWO-WAY (Aug. 16, 2011, 12:24 PM ET), https://www.npr.org/sections/thetwo-way/2011/08/16/139672949/evergreen-files-for-chapter-11-state-clawback-attempts-loom.

25 *See In re* Evergreen Solar, Inc., 2011 WL 4380821, No. 11-12590-MFW (Bankr. D. Del. Aug. 15, 2011).

solar panels.[26] These solar panels were then sold using distributors, systems integrators, and other resellers that often added value through system design by incorporating Evergreen's solar panels with electronics, mounting structures, and wiring systems.[27]

To compete with Chinese solar panel companies, Evergreen entered into a series of transactions with a Chinese investment firm, closed its manufacturing facilities in Massachusetts and Michigan, and moved its manufacturing facility to Wuhan, China.[28] Evergreen believed this shift was necessary due to the considerable government and financial support that Chinese companies received from the Chinese government.[29] This assistance—paired with lower Chinese production costs—made it difficult for U.S. companies to compete with China-based operations amidst the precipitously dropping price of solar panels throughout 2010 and into 2011.[30]

Evergreen also argued that the market adversely impacted the solar panel industry through severe cutbacks in available private financing for solar power projects, reductions of state-sponsored subsidies for solar installation in Europe, and the U.S. government's failure to adopt significant renewable energy policies.[31] After unsuccessful attempts to restructure its soon-to-be-maturing debt out of court,[32] Evergreen sought to sell $191.3 million in assets[33] to a variety of purchasers through the Chapter 11 bankruptcy process.[34]

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26 Declaration of Michael El-Hillow, Chief Exec. Officer of the Debtor, in Support of First Day Pleadings ¶ 7, *In re* Evergreen Solar, Inc., No. 11-12590 (Bankr. D. Del. 2011) [hereinafter Declaration of Michael El-Hillow].

27 *See id.* ¶ 8.

28 *See id.* ¶¶ 10–14.

29 *See id.*

30 *See id.* ¶ 42.

31 *See id.*

32 *See id.* ¶¶ 53–55.

33 *See id.* ¶ 41.

34 *See id.* ¶ 56.

Evergreen sold its assets for more than $40 million,[35] including the sale of its intellectual property to Hong Kong-based Max Era Properties for approximately $6 million.[36]

B. SOLYNDRA, LLC

In perhaps the highest-profile solar bankruptcy in history,[37] Solyndra, LLC, and certain of its affiliates (collectively, Solyndra), filed for Chapter 11 bankruptcy on September 6, 2011 in the U.S. Bankruptcy Court for the District of Delaware.[38] Though much of the media coverage focused on the $535 million in federal loan guarantees received by Solyndra,[39] its financial struggles were triggered by the same market forces that impacted other solar panel producers, like Evergreen.

Solyndra was a U.S. manufacturer of photovoltaic solar power systems specifically designed for large commercial and industrial rooftops and certain shaded agriculture applications.[40] Solyndra manufactured all its products in the U.S. but maintained sales presences in multiple European countries and the United Arab Emirates.[41] After an increase in annual sales in each of its first four years, Solyndra received a loan guarantee from the Department of Energy to fund the construction of a second fabrication facility.[42] In the year

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35 *See* Disclosure Statement with Respect to Debtor's Plan of Liquidation Pursuant to Chapter 11 of the Bankruptcy Code, *In re* Evergreen Solar, Inc., No. 11-12590 (Bankr. D. Del. Apr. 30, 2012).

36 *See id.* at 17.

37 *See, e.g.*, Tom Hals, *U.S. Solar Firm Solyndra Files for Bankruptcy*, REUTERS: GREEN BUS. NEWS (Sept. 6, 2011, 3:57 AM), https://www.reuters.com/article/us-solyndra/u-s-solar-firm-solyndra-files-for-bankruptcy-idUSTRE77U5K420110906.

38 Chapter 11 Voluntary Petition, *In re* Solyndra, LLC, et al., No. 11-12799 (Bankr. D. Del. Sept. 6, 2011).

39 *See, e.g.*, Roberta Rampton & Nicola Groom, *House Republicans Step Up Probe into Energy Loans*, REUTERS: BEHIND THE SCENES (Sept. 20, 2011, 7:45 PM), https://www.reuters.com/article/us-solyndra-loans-idUKTRE78J5OR20110921.

40 *See* Rich Pell, *Solyndra: Its Technology and Why it Failed*, EDN (Nov. 21, 2011), https://www.edn.com/solyndra-its-technology-and-why-it-failed/.

41 Declaration of W.G. Stover, Jr., Senior Vice President and Chief Financial Officer, in Support of First Day Motions ¶ 4, *In re* Solyndra, LLC, et al., No. 11-12799 (Bankr. D. Del. Sept. 6, 2011) [hereinafter Declaration of W.G. Stover, Jr.].

42 *Id.* ¶ 8.

prior to its bankruptcy, Solyndra had annual revenues of $142 million, with a book value of $859 million, and liabilities of approximately $749 million.[43]

Solyndra argued that an oversupply of solar panels had dramatically reduced panel pricing worldwide and was a primary reason for its bankruptcy filing.[44] Solyndra also contended that this oversupply was due to the growing capacity of foreign manufacturers that utilized low-cost capital provided by the Chinese government to expand manufacturing operations.[45] In response, Solyndra reduced its average selling prices to remain competitive.[46] Additionally, the reduction or elimination of governmental subsidies and incentives for the purchase of solar energy in Europe further reduced demand for Solyndra's panels.[47] Finally, Solyndra claimed that foreign competitors offered extended payment terms, which resulted in Solyndra's customers refusing to honor their previously agreed upon payment terms.[48]

These events led to a liquidity crisis at Solyndra, which was unable to find a third-party to fund its increased capital requirements due to the size and structure of its outstanding debt.[49] Even with the assistance of the U.S. Department of Energy, Solyndra could not obtain even short-term funding to finance its operations.[50] Solyndra was forced to suspend operations after its existing lenders were unwilling to restructure its debt.[51] Solyndra sought to sell its company as a going-concern to a potential purchaser through

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43 *Id.* ¶ 9.
44 *Id.*
45 *Id.*
46 *Id.*
47 *Id.* ¶ 23.
48 *Id.*
49 *Id.* ¶¶ 24–25.
50 *Id.* ¶¶ 27–28.
51 *Id.*

the Chapter 11 bankruptcy process,[52] but was ultimately unsuccessful.[53] Instead, Solyndra's assets were sold at auction for approximately $3.4 million.[54]

C. SUNEDISON, INC.

On April 21, 2016, SunEdison, Inc., and certain of its affiliates (collectively, SunEdison), the largest renewable energy developer in the world,[55] filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the Southern District of New York.[56] SunEdison developed, financed, installed, and operated renewable energy power plants, while also serving as an asset manager to its customers' renewable energy asset portfolios.[57]

SunEdison's operations were organized in the following four business segments: (1) Renewable Energy Development Segment, which developed and financed renewable energy systems for sale and manufactured polysilicon and silicon wafers;[58] (2) Renewable Energy Operating Systems Segment, which operated 1,197 renewable energy systems representing 3.4 gigawatts of generating capacity that was sold through long-term power purchase agreements (PPAs);[59] (3) TerraForm Power Segment, a dividend-generating business that owned and operated clean power assets in established markets;[60] and (4)

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52 *Id.* ¶¶ 30–32.

53 *See Solyndra Fails to Garner Bids for Sale*, REUTERS (Jan. 18, 2012), https://www.reuters.com/article/us-solyndra/solyndra-fails-to-garner-bids-for-sale-idUSTRE80G27P20120118.

54 *See* Notice of Auction Results and Auction Report at 106, *In re* Solyndra, LLC, et al., No. 11-12799 (Bankr. D. Del. Feb. 27, 2012).

55 *See* Declaration of Patrick M. Cook Pursuant to Local Bankruptcy Rule 1007-2 and in Support of Chapter 11 Petition and First Day Pleadings ¶ 6, *In re* SunEdison, Inc., et al., No. 16-10992 (Bankr. S.D.N.Y. Apr. 21, 2016) [hereinafter Cook Declaration].

56 Chapter 11 Voluntary Petition, *In re* SunEdison, Inc., et al., No. 16-10992 (Bankr. S.D.N.Y. Apr. 21, 2016).

57 *See* Cook Declaration, *supra* note 55, ¶ 10.

58 *Id.* ¶ 11.

59 *Id.* ¶ 12.

60 *Id.*

TerraForm Global Segment, which both acquired and operated renewable power generation assets for the purpose of generating and paying cash dividends to equity holders.[61]

SunEdison was party to hundreds of PPAs.[62] A PPA is a contract to sell power over long periods of time and at stated prices.[63] Developers are often able to finance the construction of power plants because of their ability to sell power generated by the constructed plant under a PPA.[64] PPAs can be economic or uneconomic depending on whether the contract price is higher or lower than what is currently available on the market.[65]

Despite functioning as a "robust" renewable energy development and operating systems business, SunEdison was a self-proclaimed "deal-making" business at its core.[66] Through various debt and equity raises, SunEdison sought to develop and sell renewable energy projects ranging in size and scale from utility to commercial, industrial, and residential.[67] However, after certain high-profile deals collapsed, SunEdison was no longer

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61 *Id*. ¶¶ 24–26.

62 *See Tear Sheet: SunEdison's Inevitable Restructuring Means Dramatically Different Things for 2 Yieldcos*, REORG (Mar. 29, 2016, 16:48), https://reorg.com/tear-sheet-sunedisons-inevitable-restructuring-means-dramatically-different-things-for-2-yieldcos/.

63 *Id.*; *What Is a Power Purchase Agreement?*, U.S. DEP'T OF ENERGY, https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/power-purchase-agreement (last visited Aug. 15, 2023) ("A Power Purchase Agreement (PPA) is an arrangement in which a third-party developer installs, owns, and operates an energy system on a customer's property. The customer then purchases the system's electric output for a predetermined period.").

64 *See* Cook Declaration, *supra* note 59, ¶ 12 n.12.

65 *See* Liz Hoffman, *SunEdison To Give David Einhorn's Greenlight Capital a Board Seat*, THE WALL ST. J., https://www.wsj.com/articles/sunedison-to-give-david-einhorns-greenlight-capital-a-board-seat-1453659899?ns=prod/accounts-wsj (last updated Jan. 24, 2016) ("SunEdison develops power projects then sells the finished ones to its yieldcos, which manage the projects under long-term contracts with utilities . . . .[This model] was initially rewarded by investors, who were attracted by yieldcos' high dividends, before a sharp decline in oil prices battered energy stocks.").

66 *See* Diane Cardwell, *SunEdison, Becoming So Big it Fails, Prepares for Bankruptcy*, THE N.Y. TIMES (Apr. 15, 2016), https://www.nytimes.com/2016/04/16/business/energy-environment/ sunedison-becoming-so-big-it-fails-prepares-for-bankruptcy.html.

67 *See* Cook Declaration, *supra* note 55, ¶¶ 49, 72.

able to raise funds in capital markets.[68] SunEdison's aggressive attempts at deal-making left it in a precarious liquidity position that forced it to seek bankruptcy protections.[69]

As the result of its questionable business practices,[70] the Department of Justice subpoenaed SunEdison to review the financing of previously proposed acquisitions, audit the board of directors, and investigate certain transactions between its subsidiaries and international project financing.[71] Due to a myriad of lawsuits and lack of cash on hand, the SunEdison bankruptcy was not a successful one. Its assets were ultimately liquidated with its unsecured creditors receiving nothing.[72]

D. SUNIVA, INC.

On April 17, 2017, Suniva, Inc. (Suniva), one of the largest U.S.-based manufacturers of photovoltaic solar cells,[73] filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the District of Delaware.[74] Shortly after announcing the completion of the nearly $100 million expansion of its facilities at its Georgia headquarters, Suniva ceased substantially all its manufacturing operations.[75]

Unlike earlier solar bankruptcies, Suniva blamed the Chinese government for

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68 *See* Cardwell, *supra* note 66 (discussing the collapse of the Vivint deal); Liz Hoffman & Aruna Viswanatha, *SEC Investigating SunEdison's Disclosures to Investors About its Liquidity*, THE WALL ST. J., https://www.wsj.com/articles/sec-investigating-sunedisons-disclosures-to-investors-about-its-liquidity-1459207385 (last updated Mar. 28, 2016, 9:42 PM) (discussing SunEdison's scramble to raise funds and the termination of the Vivint deal).

69 *See* Cook Declaration, *supra* note 55, ¶ 72.

70 *See* Josh Beckerman, *SunEdison Gets Justice Department Subpoena, Confirms SEC Inquiry*, THE WALL ST. J., https://www.wsj.com/articles/sunedison-gets-justice-department-subpoena-confirms-sec-inquiry-1459462581 (last updated Mar. 31, 2016, 7:42 PM) (noting that the Department of Justice identified issues related to improper financing activities and inadequate disclosures to investors).

71 *See* Cook Declaration, *supra* note 55, ¶ 68.

72 *See SunEdison Sees Life Post-Bankruptcy, Creditors Contest Value*, BLOOMBERGNEF (Mar. 30, 2017), https://about.bnef.com/blog/sunedison-sees-life-post-bankruptcy-creditors-contest-value/.

73 *See* Declaration of David M. Baker in Support of First Day Motions ¶ 9, *In re* Suniva, Inc., No. 17-10837-KG (Bankr. D. Del. Apr. 17, 2017) [hereinafter Baker Declaration].

74 *See* Voluntary Petition for Non-Individuals Filing for Bankruptcy at 4, *In re* Suniva, Inc., No. 17-10837-KG (Bankr. D. Del. Apr. 17, 2017).

75 *See* Baker Declaration, *supra* note 73, ¶ 12.

lowering its subsidies for solar energy purchases, which resulted in a drop in demand in China and a glut of solar products on the market.[76] The glut had resulted in a price drop for solar products that coincided with Suniva's expansion and incurrence of significant debt.[77] Suniva contended that Chinese products were evading U.S. tariffs by being manufactured in southeast Asia.[78] As part of its restructuring effort, Suniva prosecuted a petition under § 201 of the Trade Act of 1974[79] seeking a determination that Chinese cells were subject to tariffs regardless of where they were manufactured.[80] Suniva believed that a successful petition could have revived its business and allowed it to compete with the lower-cost imports flooding the U.S. market.[81]

Suniva ultimately prevailed in its petition, and on January 23, 2018, President Trump signed a proclamation placing tariffs on solar cells and modules for a period of four years.[82] While Suniva was able to emerge from bankruptcy,[83] the tariffs adversely impacted the solar industry.[84]

E. CLEAN ENERGY COLLECTIVE LLC

On July 2, 2020, Clean Energy Collective LLC, and certain of its affiliates (collectively, CEC), filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the District of Colorado.[85] The CEC bankruptcy is unique in that the company filed it with the

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76 *Id.* ¶ 13.
77 *Id.*
78 *Id.*
79 *See* 19 U.S.C. § 2251.
80 Baker Declaration, *supra* note 73, ¶ 28.
81 *Id.*
82 The tariff level was set at 30%, with a 5% declining rate per year over the four-year term of the tariff. *See Section 201 Solar Tariffs,* SOLAR ENERGY INDUS. ASS'N, https://www.seia.org/research-resources/section-201-solar-tariffs (last visited Aug. 15, 2023).
83 *See* Document 1194, *In re* Suniva, Inc., No. 17-10837-KG (Bankr. D. Del. Apr. 19, 2019).
84 *See Section 201 Solar Tariffs*, *supra* note 82.
85 *See* Voluntary Petition for Non-Individuals Filing for Bankruptcy at 4, *In re* CEC Dev. Borrower, LLC, No. 20-14573-MER (Bankr. D. Colo. July 2, 2020).

support of each of CEC's secured lenders.[86]

CEC described itself as "the nation's leader in delivering community-shared, clean energy solutions."[87] CEC developed and managed mid-scale solar energy facilities across the country that were collectively owned by participating utility customers.[88] In its development of projects, CEC played many key roles, such as negotiating interconnection services with utility companies, purchasing suitable real estate for solar arrays, and obtaining proper permitting.[89]

Difficulties in completing the sale of current projects led to CEC's bankruptcy.[90] At the time of its bankruptcy, CEC had contracted to sell several projects, though the purchaser imposed many rigorous requirements.[91] Those delays, along with governmental agency delays caused by the onset of the COVID-19 pandemic, resulted in the permitting process being "slowed to a near halt."[92] With the support of its creditors, CEC sold its subsidiary in charge of real estate and construction operations to Consolidated, Edison,[93] Inc. CEC's remaining assets were liquidated.[94]

F. TONOPAH SOLAR ENERGY, LLC

Tonopah Solar Energy, LLC (Tonopah) filed for bankruptcy in the U.S. Bankruptcy Court for the District of Delaware on July 30, 2022.[95] Tonopah owns a 110-megawat solar

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86 *See In re* CEC Dev. Borrower, LLC, No. 20-14573-MER, slip op. at 1 (Bankr. D. Colo. July 30, 2020).
87 *See* Voluntary Petition for Non-Individuals Filing for Bankruptcy at 4–5, *In re* Tonopah Solar Energy, LLC, No. 20-11884-KBO (Bankr. D. Del. July 30, 2020).
88 *Id.* ¶ 9.
89 *Id.*
90 *Id.*
91 *Id.* ¶ 13.
92 *Id*.
93 *In re* CEC Dev. Borrower, LLC, No. 20-14573-MER, slip op. ¶ 14 (Bankr. D. Colo. July 6, 2020).
94 *In re* CEC Dev. Borrower, LLC, No. 20-14573-MER, slip op. at 1 (Bankr. D. Colo. July 30, 2020).
95 *See* Voluntary Petition for Non-Individuals Filing for Bankruptcy at 4–5, *In re* Tonopah Solar Energy, LLC, No. 20-11884-KBO (Bankr. D. Del. July 30, 2020).

energy power plant in Nye County, Nevada.[96] This power plant concentrated sunlight into heat for generating steam, which powered a turbine that created electricity.[97] Unfortunately, the plant experienced a leak in late March 2019.[98] Consequently, the power plant has not produced any electricity since April 2019, and Tonopah has not generated any revenue through the sale of power since that time.[99]

The power plant exclusively sold the electricity it generated pursuant to a PPA. As a result of the leak in the tank, the PPA was terminated for cause.[100] Tonopah's financing was also contingent on the effectiveness of the PPA, which was the sole source of its operating cash flow.[101] Tonopah contended that it would not have received financing without the execution of the PPA and commitment to purchase power generated by Tonopah at a price greater than $135 per megawatt hour (the PPA Purchase Price).[102] In the decade that passed since the execution of the PPA, renewable energy prices had dropped significantly below the PPA Purchase Price. Tonopah asserted that the leak was a convenient excuse for the purchaser to avoid paying an uneconomic price for electricity.[103] As Tonopah contended, "[g]iven the shifts in the market dynamics since the execution of the PPA nearly ten years ago there is not an equivalent PPA available today . . . to satisfy the repayment of [its loans] and satisfy its own operating costs."[104] Accordingly, Tonopah

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96 Declaration of Justin D. Pugh in Support of Debtor's Chapter 11 Petition and First Day Motions ¶ 8, *In re* Tonopah Solar Energy, LLC, No. 20-11884-KBO (Bankr. D. Del. July 30, 2020) [hereinafter Pugh Declaration].

97 *Id.*

98 *Id.* ¶ 27.

99 *See id.*

100 Lesley Clark, *DOE Touts Deal to Recoup $200M from Failed Solar Project*, E&E NEWS: ENERGYWIRE (July 31, 2020, 7:20 AM), https://www.eenews.net/articles/doe-touts-deal-to-recoup-200m-from-failed-solar-project/.

101 Pugh Declaration, *supra* note 96, ¶ 9.

102 *See id*. ¶ 15.

103 *Id.* ¶ 46.

104 *Id*. ¶ 48.

sold the power plant to a third-party free and clear of its pre-petition liabilities.[105]

The above survey of significant solar company Chapter 11 bankruptcy filings identifies common factors for these companies' struggles over the past decade: (1) lower government-subsidized Chinese production costs; (2) cessation of consumer-targeted government subsidies; (3) lack of access to capital; and (4) inability to complete open projects due to inefficient permitting processes. These factors illustrate the challenging political, regulatory, and business conditions that solar companies have had to navigate in the recent past. Part IV discusses key Bankruptcy Code provisions that solar companies could utilize in conjunction with the IRA provisions discussed in Part V to maximize such companies' potential for success going forward.

IV. BENEFICIAL BANKRUPTCY CODE PROVISIONS

The Bankruptcy Code contains many key provisions that allow a company to successfully reorganize. The most important provisions that solar companies can take advantage of during a Chapter 11 bankruptcy are those that authorize: (A) assumption or rejection of contracts and leases and (B) the sale of assets free and clear of any liens and interests.[106]

A. ASSUMPTION OR REJECTION OF CONTRACTS OF UNEXPIRED LEASES

Section 365 of the Bankruptcy Code authorizes a company to "assume or reject any executory contract or unexpired lease of the debtor."[107] Section 365 does not define the

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[105] *See In re* Tonopah Solar Energy, LLC, No. 20-11884-KBO, slip op. ¶ 31 (Bankr. D. Del. July 30, 2020).
[106] *See* 11 U.S.C. §§ 363, 365.
[107] *Id.* § 365(a).

term "executory contract," but Professor Countryman's definition[108] matches legislative history and suggests that the term "generally includes contracts on which performance remains due to some extent on both sides."[109] Additionally, the Bankruptcy Code does not define "lease." However, Black's Law Dictionary defines a "lease" as: "A contract by which a rightful possessor of real property conveys the right to use and occupy the property in exchange for consideration, [usually rent]. The lease term can be for life, for a fixed period, or for a period terminable at will."[110]

Utilizing its business judgment, a bankrupt company may assume a contract it deems to be beneficial to its reorganization efforts.[111] Simply stated, if a company believes a contract to be valuable, it may assume that contract in bankruptcy and each party must continue to perform under such contract. Importantly, in the event of a sale, the bankrupt company may assign such contract to a purchaser upon its assumption.[112] Apart from a few exceptions,[113] the non-bankrupt contract counterparty need not consent, and may not

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108 Vern Countryman, *Executory Contracts in Bankruptcy: Part I*, 57 MINN. L. REV. 439, 446 (1973) ("A contract under which the obligation of both the bankrupt and the other party to the contract are so far unperformed that the failure of either to complete performance would constitute a material breach excusing performance of the other.").

109 H.R. Rep. No. 95-595, at 347, 1978 U.S.C.C.A.N. 5963, 6303 (1977).

110 *Lease*, BLACK'S LAW DICTIONARY (11th ed. 2019).

111 *See, e.g.*, Grp. of Institutional Invs. v. Chi., Milwaukee, St. Paul, & Pac. R.R. Co., 318 U.S. 523, 550, 552 (1943) (equating executory contracts with unexpired leases and stating that "the question whether a lease should be rejected and if not on what terms it should be assumed is one of business judgment"); Orion Pictures Corp. v. Showtime Networks, Inc. (*In re* Orion Pictures Corp.), 4 F.3d 1095, 1099 (2d Cir. 1993) ("Permitting a bankruptcy court to rule conclusively on a decisive issue of breach of contract would render the use of "business judgment" required by *In re Minges* unnecessary. . . ."); Sharon Steel Corp. v. Nat'l Fuel Gas Distrib. Corp., 872 F.2d 36, 39–40 (3d Cir. 1989) (utilizing the business judgment test); Richmond Leasing Co. v. Capital Bank, 762 F.2d 1303, 1308–09 (5th Cir. 1985) ("The parties did not dispute the [business judgment] standard to be applied in § 365 cases, nor could they.").

112 *See, e.g.*, *In re* Eastman Kodak Co., 495 B.R. 618, 625 (Bankr. S.D.N.Y. 2013) (approving the assignment of a lease even though it contained a provision prohibiting assignment without landlord's consent).

113 11 U.S.C. § 365(c)(1) (precluding the assumption or assignment of an executory contract or lease if there is applicable non-bankruptcy law). Section 365 applies to various contracts and licenses. *See, e.g.*, C.O.P.

otherwise prevent, the assumption and assignment of its contract.[114]

Rejecting an unexpired contract or lease is a bit more complex. A company may reject an unexpired contract or lease that it no longer deems beneficial to its restructuring efforts. This includes a contract that is now uneconomic on its terms or is otherwise considered burdensome. Although the rejection of a contract or lease will practically occur after the commencement of a bankruptcy case, rejection of a contract or lease pursuant to § 365 of the Bankruptcy Code has the legal effect of considering the contract breached immediately before the date of the filing of the bankruptcy petition.[115] By placing the time of the breach before the petition, § 365(g) turns any claim for damages that the contract counterparty might have into a pre-petition, generally unsecured claim that is not entitled to priority as an administrative expense of the estate.[116] Section 502 affirms this treatment by specifying that any claim arising from rejection of a contract or lease must be treated the same as if the claim had arisen before the date of the filing of the petition.[117] The practical impact of this is that the bankrupt company is now free from any contractual liability and its contract counterparty will receive a *pro-rata* distribution—often pennies on the dollar—to account for its damages.[118]

Coal Dev. Co. v. C.W. Mining Co. *(In re* C.W. Mining Co.), 422 B.R. 746, 761 (B.A.P. 10th Cir. 2010) (applying § 365(c)(1) to personal services contracts); *In re* West Elecs., Inc., 852 F.2d 79, 82–84 (3d Cir. 1988) (applying § 365 to certain government contracts that expressly require consent); RCI Tech. Corp. v. Sunterra Corp. (*In re* Sunterra Corp.), 361 F.3d 257, 270–71 (4th Cir. 2004) (applying § 365 to copyright licenses); *In re* Kazi Foods of Michigan, Inc., 473 B.R. 887, 890–91 (Bankr. E.D. Mich. 2011) (applying § 365 to nonexclusive trademark licenses).

114 11 U.S.C. § 365(f)(1) (denoting that terms in a contract or lease that prohibit, restrict, or condition the assignment of such contract or lease are not enforceable).

115 *Id.* § 365(g).

116 Jonah Wacholder & Daniel A. Lowenthal, *New SDNY Decision on Administrative Priority for Executory Contracts*, PATTERSON BELKNAP: BANKR. UPDATE (Sept. 30, 2022), https://www.pbwt.com/bankruptcy-update-blog/new-sdny-decision-on-administrative-priority-for-executory-contracts/.

117 11 U.S.C. § 502(g)(1).

118 Jesse M. Fried, *Executory Contracts and Performance Decisions in Bankruptcy*, 46 DUKE L. J. 517, 519 (1996).

Additionally, a recent decision from the United States Bankruptcy Court for the Northern District of California will have major implications for solar bankruptcies going forward. *Pacific Gas and Electric Company ("PG&E") v. Federal Energy Regulatory Commission ("FERC")* addressed whether § 365(g) gives a bankruptcy court sole and exclusive authority to grant or deny motions to assume or reject executory contracts involving PPAs, or whether FERC has concurrent jurisdiction over such motions, such that assumption or rejection of PPAs also requires its approval.[119]

PPAs are generally structured as requirements contracts by which the utility purchases all the power generated from a power plant operated by the producer for a stipulated price or rate.[120] PPAs enhance predictability and ensure the efficient allocation of resources in the marketplace at rates that are deemed presumptively fair to the parties to the contract.[121] By their terms, PPAs are executory contracts subject to the exclusive jurisdiction of bankruptcy courts.[122] However, they are not always treated as such in utility bankruptcy proceedings.[123]

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[119] Pac. Gas & Elec. Corp. v. Fed. Energy Regul. Comm'n *(In re* PG&E Corp.), No. 19-30088-DM, 2019 WL 2477433, at *2 (Bankr. N.D. Cal. June 12, 2019).

[120] *See Power Purchase Agreements (PPAs) and Energy Purchase Agreements*, WORLD BANK, https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements (last visited Aug. 15, 2023).

[121] *See* Stephen L. Teichler & Ilia Levitine, *Long-Term Power Purchase Agreements in a Restructured Electricity Industry*, 40 WAKE FOREST L. REV. 677, 690–91 (2005) ("Recent FERC orders involving reliability policy and capacity markets reform emphasized that role and indicate that FERC views long-term bilateral arrangements as instrumental to encouraging generating capacity expansion.").

[122] *PG&E Corp*., 2019 WL 2477433, at *18. Because the performance of PPAs is usually fixed in the future, by delivery of power by one party, and payment by the other, PPAs meet the definition of executory contracts under the Bankruptcy Code. *Id.* at *9.

[123] *See* Mirant Corp. v. Potomac Elec. Power Co. (*In re* Mirant Corp.), 378 F.3d 511, 518 (5th Cir. 2004). The Fifth Circuit found that the Bankruptcy Code is not preempted because the rejection of a wholesale power purchase agreement "would only have an indirect effect on the filed rate" approved by FERC. *Id.* at 519–20. *But see In re* Cal. Dep't of Water Res. v. Fed. Energy Regul. Comm'n (*In re* Calpine Corp.), 337 B.R. 27, 32–33 (S.D.N.Y. 2006) (holding that FERC has exclusive jurisdiction over the disposition of energy contracts).

In this case, third parties worried that PG&E would reject their PPAs in its imminent bankruptcy case, so they filed an action with FERC seeking a declaration that PG&E could not amend, modify, or reject their PPAs in the bankruptcy proceeding without first obtaining the agency's approval.[124] FERC then issued an order asserting that it had concurrent jurisdiction with the bankruptcy court over PG&E's outstanding PPAs, which would prevent PG&E from rejecting PPAs without prior review and approval from FERC.[125] FERC relied on § 206 of the Federal Power Act, which vests FERC with the sole regulatory authority to approve all rates contained in wholesale electricity agreements, including any subsequent rate modification.[126] In response, PG&E commenced an adversary proceeding against FERC in its bankruptcy case, petitioning the court to assert its exclusive jurisdiction over all of PG&E's liabilities, including the enforceability and rejection of its outstanding PPAs.[127]

Ultimately, the bankruptcy court rejected FERC's assertion of concurrent jurisdiction and held that § 365 of the Bankruptcy Code applies indiscriminately to all outstanding executory contracts once bankruptcy proceedings have commenced, and that the Bankruptcy Code grants the bankruptcy court the exclusive and original authority to approve the rejection of any executory contracts.[128] While there is currently a circuit split,[129] the decision in *PG&E* provides solar companies with a powerful tool in bankruptcy

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[124] NextEra Energy, Inc. v. Pac. Gas & Elec. Co., 167 FERC P61096, 61551–52 (2019), *vacated*, Pac. Gas & Elec. Corp. v. Fed. Energy Regul. Comm'n (*In re* PG&E Corp.), No. 19-30088-DM, 2019 WL 2477433, at *18 (Bankr. N.D. Cal. June 12, 2019).

[125] *Id.* at 61237.

[126] Federal Power Act § 206, 16 U.S.C. § 824e.

[127] *See PG&E Corp.*, 2019 WL 2477433, at *2.

[128] *Id.* at *17.

[129] *See In re* Mirant Corp., 378 F.3d 511, 515 (5th Cir. 2004) (holding that bankruptcy court has exclusive

to either assume and assign favorable PPAs, or to reject uneconomic PPAs outright.[130] This is significant because under a Chapter 11 bankruptcy, solar companies can identify PPAs that are economically beneficial at *this* moment in time, reject those that are not, and go forward with only those that are, as part of its reorganization or sale to a third party.

B. Sale of Assets Free & Clear of Liens and Interests

Section 363 of the Bankruptcy Code authorizes a company in bankruptcy to sell property of the estate free and clear of a third party's interest, including liens, under certain circumstances.[131] Property of the estate includes all legal or equitable interests of the debtor as of the commencement of the case, whether tangible or intangible.[132] A Chapter 11 plan may provide for selling the estate's assets, including selling all or substantially all of the bankrupt company's assets as a going concern business.[133]

Often, however, there are business reasons to sell all or substantially all of the estate's assets as a going concern under the more streamlined procedures of § 363.[134] Those reasons might include a need to dispose of the business quickly before it deteriorates further or runs out of cash, or a desire to monetize the estate's value without the delays inherent in

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jurisdiction over rejection of PPAs); *In re Calpine Corp.*, 337 B.R. 27, 31 (S.D.N.Y. 2006) (holding that bankruptcy court lacks jurisdiction over rejection of PPAs); *In re* FirstEnergy Sols., Corp., 945 F.3d 431, 437 (holding that bankruptcy court has exclusive jurisdiction over rejection of PPAs but that they must consider the public interest and ensure that equity favors rejecting the contracts).

130 *But see* Megan Hirsh, *Creatures of Congress Collide: Defending FERC's Ratemaking Authority in Electric Utility Bankruptcies*, 2021 Colum. Bus. L. Rev. 296 (2021) (arguing that bankruptcy judges should not allow utilities to exploit the rejection power even if bankruptcy courts have exclusive jurisdiction over these rejections).

131 *See* 11 U.S.C. § 363 (stating that a sale is permitted free and clear if applicable non-bankruptcy law permits such a sale, the third-party consents, its interest is a lien and the price for the property exceeds the aggregate value of all liens on the property, the interest is in bona fide dispute, or the entity could be compelled in a legal or equitable proceeding to accept money satisfaction of its interest).

132 *See id.* § 541.

133 *See id.* § 1129.

134 A sale of assets under § 363 precedes a Chapter 11 plan of liquidation, which allows the company to liquidate assets under more economically advantageous circumstances than in a Chapter 7 liquidation, while allowing creditors to take a more active role in constructing the liquidation and distribution of the proceeds. *See generally id.* § 363.

distributing sale proceeds among creditors under a Chapter 11 plan.[135]

To the extent that assets are subject to a security interest, such assets can be sold free of those liens if "the price at which the property is to be sold is greater than the aggregate value of all liens on such property."[136] Accordingly, a solar company is authorized to sell some or all of its assets, free of security interests, and free of burdensome pre-bankruptcy liabilities that are discharged at the conclusion of the Chapter 11 case.[137] This bankruptcy sale results in a fresh start for a solar company with a clean balance sheet. Such a fresh start is particularly appealing considering the favorable political, regulatory, and business environment created by the IRA solar incentives discussed below.

V. IRA SOLAR INCENTIVES

The IRA provisions targeted to reduce fossil fuel emissions run the gamut from clean energy and electric vehicle credits to large-scale investments in domestic energy and environmental justice.[138] Analysts predict that the IRA will cut emissions by one billion metric tons, which represents approximately two-thirds of the U.S.'s climate target to reduce emissions to half of their 2005 levels by 2030.[139] The below provisions seek to assist the solar industry in its potential growth and long-term success as a means to achieve these emissions reductions.

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135 *See In re* GSC, Inc., 453 B.R. 132 (Bankr. S.D.N.Y. 2011) (discussing that sale obviated the need for significant time and litigation that would have the diminished assets' value before a plan could be confirmed).

136 11 U.S.C. § 363(f)(3).

137 *Id.* § 1141.

138 *See* MEGAN MAHAJAN ET AL., ENERGY INNOVATION POL'Y & TECH., UPDATED INFLATION REDUCTION ACT MODELING USING ENERGY POLICY SIMULATOR 1 (2022), https://energyinnovation. org/wp-content/uploads/2022/08/Updated-Inflation-Reduction-Act-Modeling-Using-the-Energy-Policy-Simulator.pdf.

139 *See* Jenkins et al., *supra* note 12, at 6.

A. ENERGY INVESTMENT TAX CREDIT

The IRA extends the existing energy investment tax credits (ITC) for applicable solar projects.[140] ITCs are intended to incentivize individuals and businesses to invest in renewable energy by allowing them to write off a portion of their costs.[141] Under pre-IRA law, the ITC would have begun phasing out for eligible projects beginning construction after 2019, but the IRA extends the ITC to projects beginning construction before January 1, 2025.[142] The ITC will maintain a 30% tax credit for solar energy property development through 2033, when it will then decrease to 22.5% in 2034 and 15% in 2035, before phasing out completely.[143] Importantly, a new ITC was created to include energy storage technology as well.[144] Ten years of ITC certainty should provide comfort to solar companies and predictability to the parties that finance their projects.

To the extent a particular solar project is one that produces under one megawatt of AC power (MWac), the ITC percentages discussed above are automatic.[145] If, however, a particular solar project is one that produces over 1 MWac, it must ensure that certain

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140 Inflation Reduction Act of 2022, Pub. L. No. 117-169, § 13101(c), 136 Stat. 1818 (2022).

141 *See The Inflation Reduction Act*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/green-power-markets/inflation-reduction-act#:~:text=The%20Investment%20Tax%20Credit%20(ITC,systems%20from%20their%20federal%20taxes (last updated Mar. 28, 2023).

142 Inflation Reduction Act § 13102(c); *see also* Prac. L. Fin., *Consolidated Appropriations Act Extends Solar and Wind Tax Credits and Treasury and IRS Extend Safe Harbor for Eligible Renewable Energy Projects*, THOMSON REUTERS PRAC. L. (Jan. 13, 2021), https://content.next.westlaw.com/ practical-law/document/I2e74768d550611ebbea4f0dc9fb69570/Consolidated-Appropriations-Act-Extends-Solar-and-Wind-Tax-Credits-and-Treasury-and-IRS-Extend-Safe-Harbor-for-Eligible-Renewable-Energy-Projects?viewType=FullText&transitionType=Default&contextData=(sc. Default) ("The Omnibus Bill also reduced the amount of the ITC an eligible solar project could claim depending on when the project started construction. Under the Omnibus Bill eligible solar projects that start construction before: January 1, 2020, qualified for a 30% ITC; January 1, 2021, qualified for a 26% ITC; January 1, 2022, qualified for a 22% ITC. Any project that starts construction on or after January 1, 2022, is eligible to receive 10% of the ITC.").

143 Inflation Reduction Act §§ 13302(a)(3)–(5).

144 *See id.* § 13102.

145 *Id.* § 13101(f).

prevailing wage standards are met to receive the full 30% ITC, otherwise it will receive only a 6% ITC.[146] Additionally, solar companies may obtain an additional 10% ITC bonus if the project meets certain domestic manufacturing requirements, as well as another 10% ITC bonus if the project is built in a high unemployment community that lost jobs or tax revenue from the fossil fuel industry.[147]

Of particular importance is the totally new ability of a taxpayer to transfer ITCs. After December 31, 2022, taxpayers are permitted to transfer ITCs to an unrelated third-party taxpayer.[148] This ITC transferability is novel under federal tax law but has previously been done with state credits.[149] The transferable ITC is a valuable financial tool that solar companies should be able to monetize for immediate cash going forward.

B. ADVANCED MANUFACTURING PRODUCTION TAX CREDIT

The IRA creates a new production tax credit (PTC) for the domestic production and sale of solar components for projects beginning construction before January 1, 2025.[150] Prior to the IRA, solar components were not eligible for the PTC after December 31, 2021.[151] The credits apply to a variety of components, with the amount of the credit varying depending on the eligible components.[152] Eligible components include specifically listed items used in solar projects, such as photovoltaic cells, solar grade polysilicon, and solar modules.[153]

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146 *Id.* § 13101(l).
147 *Id.* § 13101(f).
148 *Id.* § 13801(a).
149 *See* Josh Goodman, *Tax Breaks for Sale: Transferable Tax Credits Explained*, THE PEW CHARITABLE TRS. (Dec. 14, 2012), https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2012/12/14/tax-breaks-for-sale-transferable-tax-credits-explained.
150 Inflation Reduction Act § 13502(a).
151 *Id.*
152 *Id.*
153 *Id.*

The PTC is set at an initial base rate of 0.3¢ per kilowatt hour (¢/kWh).[154] Like the ITC, the credit increases to 1.5¢/kWh for projects satisfying the prevailing wage and apprenticeship requirements.[155] These credits will phase out for components sold after December 31, 2029, with the credit for any components sold thereafter being reduced by 25% per year.[156] There will be no credit offered beyond 2032.[157] A solar company can receive a 10% PTC bonus if its project is built in a low-income community adversely affected by the impacts of fossil fuel extraction, or tribal land.[158] After December 31, 2022, taxpayers may transfer PTCs to an unrelated third-party taxpayer.[159] However, a solar company must choose between an ITC or a PTC—it may not avail itself of both for a particular project.[160]

C. Clean Electricity Investment & Production Tax Credits

As discussed above, a project must begin construction before January 1, 2025, to qualify for either the ITC or PTC. However, the IRA still provides clean electricity investment and production credits for the sale of domestically produced energy with zero greenhouse gas emissions, such as solar.[161] Such credits apply to both electricity generation and storage technology facilities in service after December 31, 2024.[162] The amounts of these new clean electricity investment credits largely mirror the ITC and PTC figures discussed above. Accordingly, solar companies and their lenders can expect a substantial

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154 *Id.*
155 *Id.*
156 *Id.*
157 *Id.*
158 *Id.* § 13103(a),
159 *Id.* § 13801(a).
160 *Id.* § 13502(a).
161 *Id.* § 13701(a).
162 *Id.* § 13702(a).

tax credit even if they are not able to commence construction of a project within the next two years.

D. Residential Clean Energy Credits

While the ITC and PTC are focused primarily on investment in, and the production of, solar energy facilities and components, the IRA also creates substantial incentives on the consumer side of solar energy. The IRA extends the personal income tax credit for installation of residential solar energy through 2034.[163] The personal income tax credit is for 30% expended for every year until 2033, when it decreases to 26%, then 22% in 2034, before it is phased out completely.[164] Eligible expenditures can include installation of new solar projects or improvements of existing ones.[165] Though too early to measure the impact that the IRA will have on residential solar installation, industry experts predict that demand will increase.[166]

E. Permitting Reform

Finally, the IRA provided substantial funding to government agencies through 2026 with the aim of streamlining the permitting process for renewable energy projects. The Department of Energy will receive $115 million to facilitate and accelerate the siting of interstate transmission projects,[167] and the Federal Permitting Improvement Steering Counsel's Environmental Improvement Fund will receive $350 million to provide for a timelier environmental review process.[168] Though not specific to solar projects, a more efficient permitting process is sure to benefit the solar industry by shortening the time for

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163 *Id.* § 13302(a).
164 *Id.*
165 *Id*. § 13304(b).
166 *See infra* Section VI.A.2.
167 Inflation Reduction Act § 50301.
168 *Id.* § 70007.

their projects to be completed and profitable.

VI. MAXIMIZING SUCCESS THROUGH THE IRA & BANKRUPTCY CODE

A. IRA

The IRA is tailored to mitigate the negative political, regulatory, and business conditions that have led to past solar companies' difficulties. As noted above, common factors exist among solar companies' Chapter 11 bankruptcy filings over the past decade. Below is a discussion of these factors and an explanation as to how the IRA will help solar companies avoid similar problems going forward.

1. LOWER GOVERNMENT-SUBSIDIZED CHINESE PRODUCTION COSTS

Competition with Chinese solar component manufacturers was the most common factor cited by the distressed solar companies discussed above.[169] The U.S. has attempted to implement federal policy to remain competitive with the Chinese solar industry for several years.[170] Notably, the punitive tariff imposed on Chinese solar panels has not led to the surge in domestic production that prior presidential administrations had hoped for.[171] In contrast to tariffs, the IRA seeks to bolster domestic solar energy component manufacturing relative to China by subsidizing domestic manufacturing.

Both the ITC and PTC provide significant tax incentives for investing in and producing renewable energy such as solar. If eligible for either of these credits, solar

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169 *See supra* Section III.

170 *See., e.g.*, Keith Bradsher & Diane Cardwell, *U.S. Slaps High Tariffs on Chinese Solar Panels*, THE N.Y. TIMES (May 17, 2012), https://www.nytimes.com/2012/05/18/business/energy-environment/ us-slaps-tariffs-on-chinese-solar-panels.html (noting a 31% tariff imposed on Chinese solar panels in 2012); David J. Lynch, *Trump Imposes Tariffs on Solar Panels and Washing Machines in First Major Trade Action of 2018*, THE WASH. POST (Jan. 22, 2018, 6:20 PM), https://www. washingtonpost.com/news/wonk/wp/2018/01/22/trump-imposes-tariffs-on-solar-panels-and-washing-machines-in-first-major-trade-action/ (noting a 30% tariff imposed on Chinese solar panels in 2018).

171 *See* Shannon Osaka, *How "USA-First" Failed the Solar Industry*, GRIST (May 19, 2022), https:// grist.org/energy/solar-tariffs-were-supposed-to-save-the-us-solar-industry-did-they-work-auxin/ (detailing the U.S. solar industry's widespread opposition to tariffs).

companies can receive between 30% to 50% annual savings in the coming years.[172] This significant cost savings will make domestic solar component manufacturing competitive with Chinese manufacturing for at least the next ten years while the credits apply. Further, the clean electricity investment and production credits ensure that domestically-produced solar energy will receive comparable tax subsidies even if production does not begin by January 1, 2025. Multi-year assurances of federal tax incentives are expected to be a growth catalyst for the solar industry, with energy deployment expected to materially increase in the coming years.[173]

2. CESSATION OF CONSUMER-TARGETED GOVERNMENT SUBSIDIES

Multiple solar companies identified the end of consumer-targeted solar incentives by European governments as material factors in their Chapter 11 bankruptcy filings.[174] While certain individual states already offer tax savings for residential solar users,[175] the IRA provides for significant personal income tax credits for residential solar energy at the federal level through 2034.[176] The impact of these credits is expected to lead to a massive surge in residential solar installation in the coming years.[177]

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172 *See* Inflation Reduction Act §§ 13101, 13102.

173 *See, e.g.*, MICHELLE DAVIS ET AL., WOOD MACKENZIE & SOLAR ENERGY INDUSTRIES ASS'N, SOLAR MARKET INSIGHT REPORT 2022 Q3 (2022) (explaining that solar deployment is expected to increase 40% over the next five years); Eduardo Garcia, *U.S. Solar Tax Credits Hike Factory Activity but Supply Lines Limit Growth*, REUTERS (Nov. 10, 2022, 9:56 AM), https://www.reuters. com/business/energy/us-solar-tax-credits-hike-factory-activity-supply-lines-limit-growth-2022-11-10/ (stating that the U.S. is on track to triple solar manufacturing capacity by 2024).

174 *See supra* Section III.

175 *See, e.g.*, N.Y. TAX L. § 606(g-1) (enacting a New York state tax credit of 25% total solar installation cost); MASS. GEN. L. CH. 62, § 6(d) (providing a Massachusetts tax credit of 15% of total solar system cost).

176 *See* Garcia, *supra* note 173.

177 *See* Miguel Yañez-Barnuevo, *Clean Energy Tax Credits Get a Boost in New Climate Law*, ENV'T & ENERGY STUDY INST. (Sept. 9, 2022), https://www.eesi.org/articles/view/clean-energy-tax-credits-get-a-boost-in-new-climate-law (noting that residential solar panel installations are expected to jump to a record 5.6 gigawatts).

3. Lack of Access to Capital

Though there are no IRA provisions that expressly provide for solar companies' increased access to capital, certain aspects of the IRA are likely to have that desired effect. Specifically, the IRA permits solar companies to transfer ITCs and PTCs to third parties with virtually no restriction on transferability.[178] This will allow solar companies to sell their tax credits for immediate cash.[179] Such access to cash will surely help companies avoid the liquidity crises that have hamstrung so many in recent years.[180]

Additionally, the predictability afforded by the myriad of tax credits discussed above should more easily attract potential lenders who are able to forecast such tax savings for the next ten years. In the past, tax credits for solar were only extended for a few years at a time,[181] with some, such as the PTC, having already expired without having been renewed.[182] This long-term assurance will likely make solar companies' portfolios much more attractive to both the debt and equity markets.

4. Inability to Complete Open Projects Due to Inefficient Permitting Processes

As noted above, the IRA provides significant funds to accelerate the permitting and environmental review processes. The inability to monetize open projects due to permitting delays was cited as the determinative factor in the most recent solar bankruptcy filing discussed above.[183] While it is still too early to reliably predict the impact of these reforms,

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178 Inflation Reduction Act of 2022, Pub. L. No. 117-169, § 13801(a), 136 Stat. 1818 (2022).
179 *See id.*
180 *See supra* Section III.
181 *See* Consolidated Appropriations Act, Pub. L. No. 116-260, § 132, 134 Stat. 1182, 3052 (2020) (creating a two-year extension of the ITC that was set to expire on January 1, 2024).
182 *See id.* § 131 (stating that the PTC expired for all renewable energy technology projects commencing construction after December 31, 2021).
183 *See supra* Section III.

these efforts are meaningful steps towards a more efficient permitting process. Regardless, any improvements in the time a solar project may begin or be completed will benefit the industry by being able to monetize those projects either through revenue or financing.

B. Bankruptcy Code

Existing solar companies eager to benefit from the above IRA provisions may be hamstrung by uneconomic contracts entered into before the IRA became law, or prior bad debt. In these instances, it will likely benefit a solar company to file Chapter 11 bankruptcy to utilize the tools that the Bankruptcy Code affords it to successfully reorganize. The key Bankruptcy Code provisions discussed could be particularly beneficial to solar companies considering the more favorable political, regulatory, and business conditions resulting from the IRA.

1. Assuming Economic Contracts & Rejecting Uneconomic Contracts

One of the most powerful tools that the Bankruptcy Code provides to companies is the ability to pick and choose which contracts they want to continue performing.[184] With the passage of the IRA, solar companies will likely be able to enter into new agreements on more favorable terms than before.[185] Accordingly, a solar company should evaluate its entire portfolio of contracts and identify those which are no longer economically beneficial considering current regulatory and business conditions. This is particularly relevant in evaluating the desirability of PPAs following the recent decision in *PG&E v. FERC*.[186]

Once it has identified uneconomic contracts, a company can file for Chapter 11 bankruptcy, reject those agreements it no longer desires, and enter new contracts on terms

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184 *See supra* Section IV.A.
185 *See supra* Section VI.
186 *See supra* Section IV.A.

consistent with current market conditions. Short of outright rejection, a savvy company will be able to leverage the mere threat of rejection to renegotiate its agreements on more favorable terms. On a related note, a company may even leverage the threat of Chapter 11 bankruptcy itself to achieve contractual concessions without the need to seek court intervention.

2. Displacing Bad Debt Through a Bankruptcy Sale

In certain circumstances, it may make sense for a solar company to sell all, or substantially all, of its assets as a going concern business pursuant to Chapter 11 bankruptcy. As discussed above, the Bankruptcy Code authorizes a company in bankruptcy to sell its property free and clear of a third party's interest, including debt and liens securing such debt.[187] Considering the regulatory and business conditions prior to IRA passage, it is likely that any debt incurred by a solar company related to the financing of its operations or major projects was obtained on less favorable terms than are currently available.

Accordingly, if a solar company is unable to consensually renegotiate its debt with its prior lender, it may sell its assets free and clear of that lender's interest and start fresh with financing on more favorable terms, assuming the prior lender's lien is satisfied by the infusion of fresh financing. While it is possible for a new lender to supplant a prior lender as part of a reorganization, the party providing post-bankruptcy funding may find the assets to be more attractive when uncoupled from other assets, and when sold pursuant to a court order affirming that such assets are free and clear of any prior interests.

Additionally, a buyer may purchase such assets with an amount of cash large enough to entirely satisfy the prior debt encumbering the asset. Considering the long-term

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[187] *See supra* Section IV.B.

predictability of the IRA incentives discussed above, solar assets are likely to be more attractive to a potential buyer now than in in the past.

VII. CONCLUSION

The success of the domestic solar industry is crucial to reducing carbon emissions. The IRA is tailored to help solar companies avoid the financial difficulties that stymied their industry over the past decade. As a result, solar companies are well positioned to utilize IRA tax incentives to compete with Chinese manufacturers and maximize access to debt and equity markets. Existing solar companies should not hesitate to file for Chapter 11 bankruptcy to shed bad contracts and debt and generate a fresh start in the more favorable political, regulatory, and business environment created by the IRA. It is imperative that solar companies use all the tools available to them to ensure the long-term success of the industry and, importantly, the health of the climate.

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What Norwegian Sustainability Can Teach the U.S.:

A Comparative Legal & Policy Roadmap Toward Renewable Energy Independence

By David U. Socol de la Osa

I. INTRODUCTION

Abandoning fossil fuels to pursue a renewable energy transition seems to have become a necessity. There is a stabilized scientific consensus,[1] a growing social impulse,[2] and several political considerations[3] that align with increasing national and international sustainability efforts, substantiated by the replacement of oil and gas with renewable energy sources. However, there is little agreement on how to achieve or even pursue this goal. Fossil fuels retain incumbent advantages, while their renewable counterparts are burdened by operational deficits and the difficulties associated with transitioning away from established energy systems.[4] The energy transition seems to simultaneously be an ecological, social, and political necessity,[5] as well as a complex task to accomplish.

Currently, the United States (U.S.) stands as the largest national consumer of fossil fuels, absorbing over 20% of global oil production,[6] while Norway meets 98% of its energy needs with renewable resources.[7] As the U.S. endeavors to make progress towards renewable practices while strengthening energy independence, Norway shines as an

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1 *See The Causes of Climate Change*, NAT'L AERONAUTICS & SPACE ADMIN., https://climate.nasa.gov/causes/ (last updated Apr. 14, 2023); *Causes of Climate Change*, EUR. COMM'N, https://ec.europa.eu/clima/change/causes_en (last visited Apr. 17, 2023).

2 *See* Moira Fagan & Christine Huang, *A Look at How People Around the World View Climate Change*, PEW RSCH. CTR. (Apr. 18, 2019), https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/; ANTHONY LEISEROWITZ ET AL., CLIMATE CHANGE IN THE AMERICAN MIND 3–4 (2017), http://climatecommunication.yale.edu/ publications/climate-change-american-mind-october-2017/.

3 *See* discussion *infra* Sections III.A.1, III.B, IV.

4 *See* Charles Towers-Clark, *Can we Overcome the Last Few Hurdles for Renewable Energy?*, FORBES (Oct. 4, 2019, 10:30 A.M.), https://www.forbes.com/sites/charlestowersclark/2019/10/04/can-we-overcome-the-last-few-hurdles-for-renewable-energy/?sh=1070fb18559b; Samantha Gross, *Why Are Fossil Fuels So Hard to Quit?*, BROOKINGS INST. (June 2020), https://www.brookings.edu/ essay/why-are-fossil-fuels-so-hard-to-quit/.

5 *See The Causes of Climate Change*, *supra* note 1.

6 *See What Countries Are the Top Producers and Consumers of Oil?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=709&t=6 (last updated Dec. 8, 2022).

7 *See* INT'L ENERGY AGENCY, NORWAY 2022: ENERGY POLICY REVIEW 11 (2022), https://iea.blob.core.windows.net/assets/de28c6a6-8240-41d9-9082-a5dd65d9f3eb/NORWAY2022.pdf.

exemplary model of regulatory and economic success on the global stage.

This article first delves into Norway's governing framework for renewable energy generation, analyzing the regulatory structural patterns that have served as cornerstones for Norway's legal and economic achievements in its fossil fuel transition to renewable energy. Then, the article undertakes a comparative analysis of the U.S. and Norway, contrasting key differences and similarities in the two target nations' regulatory frameworks governing energy. Drawing upon the insights gained from multi-jurisdictional examination, the article proposes an adaptable implementation strategy for instituting of some of the most effective foundations and principles of Norway's renewable energy transition success into the U.S. legal and economic landscape. In addition, this article addresses the economic potential and advantages of renewable energy sources, highlighting their potential to create jobs, reduce reliance on imported fossil fuels, and foster long-term energy security.

The article finds that there are specific foundations of Norway's policy design that have been the catalysts of its sustainable energy independence achievements, and proposes policy recommendations for integration into the U.S. regulatory and economic networks, including (i) discouraging intranational consumption of fossil fuels through a strategic reorganization of energy generation systems, (ii) enhancing a system of exports anchored in utilizing oil and gas as commodity trading assets rather than energy sources, and (iii) the establishment of a robust, diversified, and ethically grounded sovereign wealth fund that may reinvest in renewable energy.

II. THE NORWEGIAN MODEL: UTOPIA AND CONTRADICTION

Norway stands as a global leader in renewable energy and sustainability, pioneering advancements in hydropower and green transportation. The country has nearly abandoned

fossil fuels as an energy source—almost all its electric energy production is renewable, and its transportation systems are almost entirely electrically powered.[8] Norway's trajectory toward renewable generation has been made possible through a comprehensive and precise regulatory structure that sustains a relentless pursuit of renewable energy. However, the foundations of this model are not without contradiction. Norway's economy has heavily relied on the export of oil and gas to become the paragon of clean energy that it is today.[9] Its renewable-focused energy network, sustainable infrastructure, and environmentally conscious policies have historically been based upon the externalization of oil and gas through a system of fossil fuel exploitation and exports. This section explores the structure of the Norwegian system: its renewable energy achievements, foundational economic dependency on oil and gas, and the pivotal role played by the sovereign wealth fund in breaking away from fossil fuel economic determinism.

A. NORWAY'S ENERGY TRANSITION MIRACLE: ON THE IMPORTANCE OF POLICY, ELECTRICITY, & TRANSPORTATION

Norway has almost completed its journey toward a fossil-fuel-free energy system and a renewable energy economy. Though the nation was never overly dependent on fossil fuels as direct sources of energy,[10] Norway has stabilized its internal fossil fuel consumption at near-insignificant levels.[11] Two legal-economic cornerstones that underpin the Norwegian energy system transition are its renewable electricity generation capabilities

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[8] *Norway Boosts Hydropower, Challenging Effort To Fill Reservoirs,* REUTERS (Aug. 17, 2022), https://www.reuters.com/business/energy/norway-boosts-hydropower-challenging-effort-fill-reservoirs-2022-08-17/; *Norway: Executive Summary,* INT'L ENERGY AGENCY, https://www.iea.org/reports/norway-2022/executive-summary (last visited Sept. 20, 2023).

[9] Pascale Davies, *Norway's Energy Paradox: How Oil and Gas Are at Odds with Green Tech Start-Ups*, EURONEWS.NEXT (Dec. 7, 2022), https://www.euronews.com/next/2022/12/05/norways-energy-paradox-how-oil-and-gas-are-at-odds-with-green-tech-start-ups.

[10] *See* INT'L ENERGY AGENCY, *supra* note 7, at 19 fig. 2.5.

[11] *See id.* at 20*; see also What Countries Are the Top Producers and Consumers of Oil?*, *supra* note 7.

and its forward-thinking transportation framework.

Currently, Norway's electric power is generated almost entirely through hydrokinetic resources.[12] Business and politics were intertwined at the inception of Norway's modern infrastructure development wave, pursuing a foundation of renewable energy.[13] This put the State in a globally pioneering position for years to come: A staggering 98% of Norway's energy comes from renewable sources, with 92% being sourced from hydropower.[14] Indeed, its pioneering sustainable energy practices made Norway the first country to generate commercial electricity using sea-bed tidal power in 2003.[15]

To sustain and substantiate its clean energy network and impact, Norway developed a regulatory system aimed at decarbonizing its transportation systems. In a bold move, Norway unveiled an ambitious transportation emissions plan in 2012, declaring that by 2020, new cars would emit under 85 grams of carbon dioxide per kilometer per passenger, surpassing the already challenging European Union (E.U.) goal of 95 grams/kilometer.[16] By December 2017, three years earlier than projected, Norway reached its target; and by 2019, the average emissions for new passenger cars had dropped even lower to 60

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[12] INT'L ENERGY AGENCY, *supra* note 7, at 9 ("[I]ts extensive hydropower resources covered 92% of electricity generation. . . .").

[13] *Id.* at 28–29.

[14] *Id.* at 11.

[15] *See Kvalsund Tidal Turbine Prototype*, TETHYS, https://tethys.pnnl.gov/annex-iv-sites/kvalsund-tidal-turbine-prototype (last visited Sept. 20, 2023); Mårten Grabbe et al., *A Review of the Tidal Current Energy Resource in Norway*, 13 RENEWABLE & SUSTAINABLE ENERGY REVS. 1898, 1904–05 (2009).

[16] GUILLAUME SIMONET, NORWAY: THE PROGRESSIVE ELECTRIFICATION OF LAND AND MARITIME TRANSPORT 4 (2019), https://www.climate-chance.org/wp-content/uploads/2019/11/cp4-2019_transport- norway-vf-en_20191126_complet.pdf.

grams/kilometer.[17] While the U.S. and other developed nations dedicate a significant amount of their petroleum use to the transportation sector,[18] Norway does not.[19] Often, the electric transportation industry faces valid concerns regarding the reliance of its flagship private vehicles on electricity generated from fossil fuels and non-renewable sources.[20] However, this is not the case in Norway, where the vast majority of electric power originates in renewable resources. Other remarkable short-term objectives that position Norwegian transportation in the vanguard of electrification, decarbonization, and sustainability include offering a fleet of exclusively emission-free cabs in Oslo by the end 2023,[21] as well as ensuring all public ground and seafaring public transportation vehicles are electric,[22] developing an emissions-free national system of goods distribution by

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[17] NORWEGIAN MINISTRY OF CLIMATE & ENV'T, PUB. NO. T-1563 E, NORWAY'S SEVENTH NATIONAL COMMUNICATION UNDER THE FRAMEWORK CONVENTION ON CLIMATE CHANGE 107 (2018), https://unfccc.int/sites/default/files/resource/321045_Norway-NC7-BR3-2-Norways_seventh_national_communication.pdf; *Norway Achieves its Transport Emissions Target Three Years Early*, CLIMATE ACTION (Jan. 4, 2018), https://www.climateaction.org/news/norway-achieves-its-transport-emissions-target-three-years-early.

[18] *Oil and Petroleum Products Explained: Use of Oil*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/oil-and-petroleum-products/use-of-oil.php (last updated July 1, 2022).

[19] *See Energy Consumption in Norway*, NORWEGIAN WATER RES. & ENERGY DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.nve.no/energy-consumption-and-efficiency/energy-consumption-in-norway/ (last updated June 27, 2021).

[20] *See generally* Abbas Al-Ghaili et al., *Can Electric Vehicles be an Alternative for Traditional Fossil-fuel Cars with the Help of Renewable Energy Sources Towards Energy Sustainability Achievement?*, 5 ENERGY INFORMATICS 1 (2022); Imran Khan, *Greenhouse Gas Emission Accounting Approaches in Electricity Generation Systems: A Review,* 200 ATMOSPHERIC ENV'T 131 (2019); Anrica Deb, *Why Electric Cars Are Only as Clean as Their Power Supply*, THE GUARDIAN (Dec. 8, 2016), https://www.theguardian.com/environment/2016/dec/08/electric-car-emissions-climate-change; Mike Scott, *Yes, Electric Cars Are Cleaner, Even When The Power Comes From Coal*, FORBES (March 30, 2020) https://www.forbes.com/sites/mikescott/2020/03/30/yes-electric-cars-are-cleaner-even-when-the-power-comes-from-coal/?sh=7de84112320b.

[21] *See* Tarmo Virki*, Oslo To Become First City to Charge Electric Taxis Over the Air*, REUTERS (Mar. 21, 2019, 8:24 A.M.), https://www.reuters.com/article/us-norway-electric-taxis/oslo-to-become-first-city-to-charge-electric-taxis-over-the-air-idUSKCN1R21ED; *see also* Felix Richter, *This Chart Shows How Norway is Racing Ahead on EVs*, WORLD ECON. FORUM (Jan. 6, 2023), https://www.weforum.org/agenda/2023/01/norway-electric-vehicle-energy-transport/.

[22] *See* Victoria Klesty, *E-Bus Deal Puts Oslo On Track for Zero-Emissions Public Transport Goal*, REUTERS (Oct. 14, 2022), https://www.reuters.com/world/europe/e-bus-deal-puts-oslo-track-zero-emissions-

2030,[23] and establishing a fleet of domestic electric flights by 2028.[24]

Norway's pursuit of sustainable transportation extends far beyond public transit, as the nation has embarked on an ambitious journey to revolutionize private mobility as well. Consequent to regulatory design in favor of decarbonization, in 2021, approximately two-thirds of new passenger vehicles sold in Norway were fully electric.[25] In 2022, this number climbed to 80% of all sales.[26] By 2025, Norway aims to have only zero-emissions passenger cars and light vans for sale.[27]

Renewable electric energy generation and a decarbonized transportation system are two of the most influential foundations for the ambitious sustainability goals set by the Norwegian government. The country has pledged to reduce its overall greenhouse gas emissions by 40%, and by a remarkable 90% to 95% by 2050 compared to 1990 levels.[28] With precisely crafted and successful policy interventions, Norway's infrastructure is advancing at an impressive pace, and is well on its way to achieving these targets.[29]

Another defining characteristic of the Norwegian electric generation system is that

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public-transport-goal-2022-10-14/; Angela Symons, *Norway To Slash Pollution with the World's First Zero-Emissions Public Transport Network*, EURONEWS.GREEN (Oct. 14, 2022), https://www.euronews.com/green/2022/10/14/zero-emissions-public-transport-network-could-be-a-reality-in-oslo-by-end-of-2023.

[23] *See Norway Is Electric*, MINISTRY OF TRANSP., KINGDOM OF NOR., https://www.regjeringen.no/en/topics/transport-and-communications/veg/faktaartikler-vei-og-ts/norway-is-electric/id2677481/ (last updated June 22, 2021).

[24] *See* David Nikel, *SAS Aims for Electric Flights in Norway by 2028*, LIFE IN NOR. (Sept. 19, 2022), https://www.lifeinnorway.net/sas-aims-for-electric-flights-in-norway-by-2028/.

[25] *See* Julia Wanjiru Nikiema, *Norway's Environmental Performance: "Are we As Green As we Think we Are?"*, ORG. FOR ECON. COOP. & DEV.: ENV'T FOCUS (Apr. 22, 2022), https://oecd-environment-focus.blog/2022/04/22/norways-environmental-performance-are-we-as-green-as-we-think-we-are/.

[26] *Id.*

[27] *See* Kim Mackrael & William Boston, *EU Lawmakers Vote To Ban Sale of New Gasoline-Powered Cars from 2035*, THE WALL ST. J. (Feb. 14, 2023, 1:40 P.M.), https://www.wsj.com/articles/eu-lawmakers-vote-to-ban-sale-of-new-gasoline-powered-cars-from-2035-d02e2f4e.

[28] *See* INT'L ENERGY AGENCY, *supra* note 10, at 10.

[29] *See Climate Action Plan 2021-2030*, INT'L ENERGY AGENCY, https://www.iea.org/policies/14454-climate-action-plan-20212030 (last updated Mar. 23, 2022).

it has multi-national sustainability potential, given that (1) its grid organization is heavily interconnected with northern European regions, and (2) it is a system that has remained consistently a net exporter of electricity.[30] Through the combination of renewable electricity generation and an electric power export model, Norway both acquires capital through the sale of electricity and contributes to the distribution of clean energy throughout northern Europe. Remarkably, Norway's grand-scale renewable electricity generation exists almost in its entirety without depending on fossil fuels and can satisfy national energy demand and expands its sustainability benefits beyond its borders by way of electricity exports.[31]

Norway's energy model stands as a beacon of sustainability, with its transportation and electricity sectors firmly anchored on renewable energy principles. This noteworthy achievement is a testament to the country's ability to translate ambitious policy goals into tangible realities, standing as a compelling blueprint to other nations seeking to navigate energy and environmental challenges. However, Norway's sustainability success calls into question how the nation has afforded to implement such a pioneering legal and economic design toward sustainability. The answer lies in the very foundation of its economic prosperity: oil and gas extraction and sales. The effective management of fuel resources has provided Norway with the financial strength to invest heavily in renewable energy policies and infrastructure, enabling its sustainable paradigm.

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[30] *See Production and Exports*, NORWEGIAN PETROLEUM DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/production-and-exports (last visited Sept. 20, 2023).

[31] *See generally* INT'L ENERGY AGENCY, *supra* note 10.

B. Economic Reliance on Fossil Fuel Exports: A Renewable Economy with Oil and Gas Roots

Paradoxically, Norway's remarkable strides towards a carbon-free future and its near-complete reliance on renewable energy are rooted in the very resources it seeks to leave behind: oil and gas. Norway is one of the world's leading energy producers: In 2021, Norway ranked thirteenth among all nations in total energy production,[32] a feat largely attributed to the harvesting of its abundant oil and natural gas reserves.[33] This is particularly impressive given the nation's relatively small population, being home to just over five million people—roughly half the size of New York City.[34] Despite its substantial fossil fuel production, Norway's domestic energy consumption is anchored on sustainable energy, with 98% of its energy needs originating from renewable resources.[35] Nearly all oil and gas output is destined for international trade, with exports of around 90% of all fossil fuel production.[36] The quantities that remain in Norway generally go in reserve, as Norway retains the largest crude oil reserves in Western Europe at almost eight billion barrels.[37]

Though not reliant on fossil fuels for intranational energy consumption, the country's economic prosperity is in many ways tethered to the global demand for its energy

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[32] *Total Energy Production 2021*, U.S. Energy Info. Admin., https://www.eia.gov/international/rankings/country/NOR?pa=12&u=0&f=A&v=none&y=01%2F01%2F2021 (last visited Sept. 20, 2023).

[33] *See* British Petroleum, Statistical Review of World Energy 36 (2021), https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report.pdf.

[34] *See Population, Total - Norway*, World Bank, https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NO United States Census Bureau (last visited Sept. 20, 2023); *Quick Facts: New York City, New York*, U.S. Census Bureau, U.S. Dep't of Com., https://www.census.gov/quickfacts/newyorkcitynewyork (last visited Sept. 20, 2023).

[35] *See* discussion *supra* Section II.A.

[36] *See Production and Exports*, *supra* note 30.

[37] U.S. Energy Info. Admin., U.S. Dep't of Energy, Country Analysis Executive Summary 1 (2022), https://www.eia.gov/international/content/analysis/countries_long/Norway/pdf/norway.pdf.

exports: The oil and gas industry amounts to over 73% of Norway's total export value, employs an estimated 200,000 people, and constitutes a third of the country's gross domestic product, half of the government's revenues, and about one-fifth of the nation's total investments—making fossil fuel international transactions an indispensable part of the country's economic success.[38]

Norway's prosperity and renewable energy independence has been historically fueled by the symbiotic combination of a thriving oil and gas industry, astute management of resources, and strategic diversification of investments. Some of the chief legal, economic, and structural connections linking fossil fuel exploitation to national energy and economic success, are its governmental resource exploitation system, its taxation policies, and the nation's sovereign wealth fund; which, among other features and accomplishments, are increasingly shaping Norway's departure from its economic dependency on oil and gas.

C. Legal & Policy Design: State Exploitation of Mineral Resources, Taxes, & the Sovereign Fund as an Antidote

Norway, a nation once synonymous with fossil fuel wealth, has transformed itself into a beacon of renewable energy innovation and sustainability. The country's approach to resource management, characterized by state participation, strategic taxation, and a forward-looking sovereign fund, stands as an antidote to the common pitfalls of unbridled resource extraction and international trade. The legal and economic bonds between fossil fuel activities and net government revenue can be classified into three main categories: (1) direct financial participation in the oil and gas markets, (2) indirect financial gains,

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[38] *See Exports of Oil and Gas*, Norwegian Ministry Of Petroleum & Energy, https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/ (last updated Mar. 29, 2023); *Employment in the Petroleum Industry*, Norwegian Ministry Of Petroleum & Energy, https://www.norskpetroleum.no/en/economy/employment/ (last updated June 10, 2023).

obtained through taxation and the effect created by the success of a robust fossil fuel industry, and (3) financial reinvestment and diversification via Norway's sovereign wealth fund.

The direct financial relationship between Norway and its oil and gas resources began in May 1963, when the Norwegian government asserted full sovereignty and ownership over the mineral resources contained in its continental shelf.[39] The country nationalized the underlying resources that could be extracted from its seabed, proclaiming exclusive proprietorship and regulatory competence over all mineral assets.[40] Through this legal structure, Norway retained ownership of all natural resources and held the exclusive authority to license entities seeking to explore and extract those resources.[41] Once Norway nationalized all recoverable mineral resources, it underwent several iterations of regulatory and economic structuring on how to manage these resources. As a nation without experience in oil and gas extraction, Norway initially adopted a third-party licensing model, and foreign companies dominated the early licensing rounds in the 1960s.[42]

The dynamics of resource exploitation transformed during the 1970s. In 1972, Norway established the Norwegian State Oil Company (or Statoil, later renamed Equinor),[43] a state-owned company designed to be an active participant in mineral resource operations, and directly levy capital for the nation.[44] During this transformative era, Statoil

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[39] *Norway's Petroleum History*, NORWEGIAN PETROLEUM DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/framework/norways-petroleum-history/ (last updated Feb. 27, 2023).

[40] *Id.*; *see also* Helge Ryggvik, *A Short History of the Norwegian Oil Industry: From Protected National Champions to Internationally Competitive Multinationals*, 89 BUS. HIST. REV. 3, 6–7 (2015) (describing the early days of government regulation).

[41] *Norway's Petroleum History*, *supra* note 39.

[42] *See* Ryggvik, *supra* note 40, at 7–8.

[43] *Our History*, EQUINOR, https://www.equinor.com/about-us/our-history (last visited Sept. 20, 2023).

[44] *See* Ryggvik, *supra* note 40, at 8–10.

collaborated with private entities on oil and gas extraction in Norway's offshore continental shelf.[45] Leveraging its ownership not only of the resources but also of a share of the extraction enterprises, the State actively influenced the extraction process and the underlying corporate governance of its projects, investing in production, and receiving a proportional share of the profits.[46]

In 2001, Statoil underwent partial privatization.[47] A fraction of its shares were sold to the public, and the company was listed on both the New York Stock Exchange and the Oslo Stock Exchange.[48] Despite this, the Norwegian government has retained a majority ownership of equity interest in the company, pledging to refrain from interfering in its operations. [49] As of 2023, the Norwegian government remains the majority shareholder of Equinor, the successor company to Statoil, with 67% of its shares.[50]

Equinor is the dominant oil and gas operator on the Norwegian continental shelf, holding a commanding 70% share of total production. [51] This influential position underscores Equinor's status as a leading player in Norway's energy sector. However, this does not mean that Norway's oil and gas ambitions end at its borders: Equinor is also one of the largest offshore oil and gas companies in the world, operating in more than thirty

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45 *See generally id.*

46 *See The Government's Revenues*, NORWEGIAN PETROLEUM, KINGDOM OF NOR., https://www.norskpetroleum.no/en/economy/governments-revenues/ (last updated Dec. 6, 2022) (describing Norwegian government participation in the private market).

47 *See* Ryggvik, *supra* note 40, at 31.

48 *Id.*; Havard Lismoen, *Statoil To Be Listed on Stock Exchange in June 2001*, EUROFOUND (May 27, 2001), https://www.eurofound.europa.eu/publications/article/2001/statoil-to-be-listed-on-stock-exchange-in-june-2001.

49 Ryggvik, *supra* note 40, at 31.

50 *The Norwegian State as Shareholder*, EQUINOR, https://www.equinor.com/about-us/the-norwegian-state-as-shareholder (last visited Sept. 20, 2023).

51 *See Fields and Platforms*, EQUINOR, https://www.equinor.com/energy/fields-and-platforms (last visited Sept. 20, 2023).

countries,[52] and being indexed among Forbes' top 100 public companies, with assets listed at $147.1 billion and profits of $8.9 billion; making it an engaged, active, and significant participant in the energy industry worldwide.[53] Furthermore, in advancing the international renewable energy transformation, Equinor has undergone a reshaping of its goals, incentives, and project structures in recent years. The Norwegian company is actively embracing carbon capture and storage, electrification, and solar and offshore wind initiatives; and has, just in the last year, dedicated around 20% of its gross investments to renewable projects.[54]

Within the context of a still-prevalent fossil fuel economy, the Norwegian government directly receives revenue from the extraction of fossil fuel resources by way of Equinor's extraction partnerships with private companies.[55] Indirectly, the State receives capital through taxes and other fees levied on the oil and gas industries.[56] Norway imposes a flat corporate tax rate of 22%, which act as a baseline for the oil and gas industry.[57] Alongside ordinary and special corporate taxes, Norway also collects tax revenue from this sector through environmental taxes like its carbon or nitrogen oxide impositions among

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[52] *See Where we Are*, EQUINOR, https://www.equinor.com/en/where-we-are.html (last visited Sept.. 20, 2023).

[53] *See Profile: Equinor*, FORBES, https://www.forbes.com/companies/equinor/?sh=3c3f5a00518d (last visited Sept. 20, 2023).

[54] *See Renewable Energy*, EQUINOR, https://www.equinor.com/energy/renewable-energy-and-low-carbon-solutions (last visited Nov. 29, 2023); Sarah Mcfarlane & Nerijus Adomaitis, *Norway Energy Giant Equinor Doubles Share of Investment in Renewables*, REUTERS (Nov. 9, 2022), https://www.reuters.com/business/cop/norway-energy-giant-equinor-doubles-share-investment-renewables-2022-11-08/.

[55] *See The Government's Revenues*, *supra* note 46.

[56] *See The Petroleum Tax System*, NORWEGIAN PETROLEUM DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/economy/petroleum-tax/ (last updated Apr. 17, 2023).

[57] *Id.*

other environmental and industry-adjacent tariffs.[58] Overall, the Norwegian government imposes a 78% combined marginal tax rate on companies' profits generated by oil and gas operating under Norwegian jurisdiction.[59]

Alongside a market-based taxation structure, Norway enforces an emissions trading system where fossil fuel licensees must purchase emissions allowances if their greenhouse gas emissions exceed an allocated amount.[60] Additionally, Norway generates revenue through "area fees," a mechanism that fosters efficient exploration of continental shelf areas by incentivizing companies to assess the commercial viability of potential reserves while simultaneously generating substantial revenue for the government.[61]

Historically, taxation in all its forms has been the main source of income for Norway, doubling the performance of the State's direct interests in mineral resources and Equinor's dividends between 2000 and 2015.[62] However, this paradigm seems to be shifting in recent years: Between 2015 and 2020, taxation and direct interests equalized, and since 2020, direct interests have started to surpass capital attained via taxation as a source of oil and gas income for the Norwegian government.[63] This signals that Norway's financial landscape is evolving, as direct investments in resource extraction and Equinor's dividends from national and international operations in fossil fuels as well as renewable energies, outpace the traditionally dominant revenue stream of taxation.

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[58] *Emissions to Air*, NORWEGIAN PETROLEUM DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/environment-and-technology/emissions-to-air/ (last updated Dec. 20, 2022).

[59] *See The Petroleum Tax System*, *supra* note 56.

[60] *See Emissions to Air*, *supra* note 58.

[61] *Area Fees and Area Fee Exemptions*, NORWEGIAN PETROLEUM DIRECTORATE, MINISTRY OF PETROLEUM & ENERGY, https://www.npd.no/en/regulations/reporting_and_applications/area-fee/ (last updated Feb. 15, 2023).

[62] *See The Government's Revenues*, *supra* note 46.

[63] *Id*.

The last foundational link between the Norwegian economy and the oil and gas industry is the Government Pension Fund Global of Norway (the Fund).[64] The Fund plays an increasingly key role in the long-term viability and resilience of the Norwegian economy, and it has become a crucial component of the financial system's green energy transition. Norway established its sovereign wealth fund in 1990 to manage the surplus revenues from its oil and gas sector, with the first capital transfer taking place in 1996.[65] As of 2023, the Fund's value stands at over $1.4 trillion, allocated among equity, fixed income, real estate, and renewable energy markets.[66] The Fund constitutes an estimated 1.5% of global stocks and shares, and its investments are diversified across 70 countries and over 9,000 companies.[67] The Fund's income is sourced chiefly from (1) cash flow derived from energy and petroleum activities transferred to the Fund by the central government, comprised of direct State financial interests in petroleum extraction and sale, as well as dividends from the majority state-owned company Equinor; (2) the net results of financial transactions associated with petroleum activities, meaning indirect sources of income like taxes received from fossil fuel companies, or payment for licenses to explore and extract said fossil fuels; and (3) returns on the Fund's capital investments.[68]

The breakdown of these capital contributions is a particularly relevant indicator of

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64 *See generally About the Fund*, NORGES BANK: INV. MGMT., https://www.nbim.no/en/the-fund/about-the-fund/ (last updated Feb. 27, 2019).

65 *See id.*; *see also* NORWEGIAN MINISTRY OF FIN., THE GOVERNMENT PENSION FUND 2019 5–6 (2019), https://www.regjeringen.no/contentassets/8996cca30e5741a788218d417762a52c/en-gb/pdfs/stm201820190020000engpdfs.pdf.

66 Sam Meredith, *Norway's Gigantic Sovereign Wealth Fund Loses a Record $164 Billion, Citing a 'Very Unusual' Year*, CNBC (Jan. 31, 2023, 5:29 A.M.), https://www.cnbc.com/2023/01/31/ norways-sovereign-wealth-fund-loses-164-billion-in-2022.html. Equity constitutes over 70% of all investments, fixed income about 25%, real estate 2.5%, and renewable energy less than 1%. *Investments*, NORGES BANK: INV. MGMT., https://www.nbim.no/en/the-fund/investments/#/ (last visited Sept. 20, 2023).

67 *The Fund*, NORGES BANK INV. MGMT., https://www.nbim.no/en/ (last visited Nov. 30, 2023).

68 *About the Fund*, *supra* note 64.

the Fund as a tool for economic progress and development beyond reliance on oil and gas. More than half of the Fund's total value presently derives from returns on investments, approximately doubling net inflows from the government consistently since 2020.[69] This means that, at this time, the Fund derives more revenue from its capital markets investments than it receives directly from the government surplus extracted from the oil and gas industry. In essence, the Fund itself is becoming gradually less reliant on mineral resource exploitation and Equinor's accomplishments, and is beginning to achieve autonomous stability and financial success on its own.

It is through a strategy of diversification and sustainable reinvestment that Norway intends to escape from its fossil fuel dependency, expanding its economic interests and revenue sources into a myriad of other industries. The international core and multi-company basis in which Norway allocates its capital diffuses risk throughout the globe and diverse economic sectors. The Fund stands as a testament to strategic utilization of oil and gas wealth to acquire an investment portfolio that may remain afloat even when fossil fuels reach their peak. With the progressive independent success of the Fund, the Norwegian government is investing out of commodity market risks by financially deploying the very asset that brings the risk they seek to avoid. When the oil wells dry up, or the gas prices drop, or the world's economy transitions away from fossil fuels, it is quite possible Norway will have built a reliable foundation for economic prosperity by way of its Fund, and will have no need for fossil fuels as a commodity trading asset any longer.

Norway's Fund seems to be proving reliable in its structure—both economically, in

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[69] *Market Value*, NORGES BANK: INV. MGMT., https://www.nbim.no/en/the-fund/market-value/ (last updated Mar. 7, 2023).

its direct contribution to government revenue consequent to its performance in capital markets, and ideologically, as it seeks to attenuate the consequences of outsourcing fossil fuels.[70] Operating autonomously, but not inseparable from national fossil fuel income, the Fund provides a dependable source of capital design to (1) withstand potential downturns in the oil and gas industries, (2) provide diversified sources of income for the nation that may contribute to public expenditure and maintain the Norwegian welfare state for future generations, and (3) contribute to a sustainable international future by investing in renewable energy companies internationally and divesting from the oil, gas, and carbon industries.[71] The Fund has the purpose of restructuring oil and gas wealth and converting it into a prosperous sustainable future—and though originating from fossil fuel revenues, it seeks to escape these roots.[72] In this way, the Fund serves as a vision for the future—both economically at a national level, and environmentally at a transnational one. Norway's sovereign fund structure allows for sustainable reinvestment and a democratic redistribution of the nation's fossil fuel wealth, benefitting renewable energy industries across the globe, and a renewable-energy-based system nationally.

It is worth noting that in 2022, Norway's Fund posted record losses of $164 billion.[73] However, this may not be as much of a detrimental indicator of the Fund's integrity as it may appear; in fact, it may signal its resiliency. This is due to, first, the Fund's

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[70] *See The History*, NORWEGIAN MINISTRY OF FIN. (Jan. 2023), https://www.nbim.no/en/the-fund/the-history/; *Act Relating to the Government Pension Fund*, KINGDOM OF NOR. (Jan. 1, 2020), https://www.regjeringen.no/contentassets/9d68c55c272c41e99f0bf45d24397d8c/government-pension-fund-act-01.01.2020.pdf; *The Government Pension Fund*, KINGDOM OF NOR. (Jan. 2020), https://www.regjeringen.no/en/topics/the-economy/the-government-pension-fund/id1441/.

[71] *Id*.

[72] *See* discussion *supra* Section II.

[73] *See* Victoria Klesty, *Norway Wealth Fund Posts Record $164 Billion Loss*, REUTERS (Jan. 31, 2023), https://www.reuters.com/business/finance/norway-wealth-fund-posts-record-164-bln-loss-2023-01-31/; Meredith, *supra* note 66.

dual-purpose nature, and second, the fact it still outperformed the market overall. Regarding the Fund's dual purpose, one of its core components and essential duties is to generate revenue through success in capital markets, but another of its fundamental objectives is to invest ethically and purposefully [74] —to which there are certain acknowledgements and sacrifices to be made at a purely economic level. Secondly, though suffering a substantial reduction in capital via its $164 billion loss, representing 11% of its total value,[75] global capital markets dropped by more than 20%.[76] Further, the Fund still outperformed its 2022 benchmark index by 0.88%, made public a return to form with a $84 billion Q1 2023 quarterly profit, and is currently considering diversifying into non-listed equities, which would be an entirely new asset class for this organization, indicating market expansion.[77]

Norway's international presence as a paragon of sustainability stands as a

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[74] *See Ethical Guidelines: Responsible Investing*, MINISTRY OF FIN., KINGDOM OF NOR., https://www.regjeringen.no/en/topics/the-economy/the-government-pension-fund/responsible-management/ethical-guidelines/id447009/ (last updated Jan. 27, 2022); *Guidelines for Observation and Exclusion of Companies from the Government Pension Fund Global (GPFG)*, MINISTRY OF FIN., KINGDOM OF NOR., https://www.regjeringen.no/contentassets/9d68c55c272c41e99f0bf45d24397d8c/guidelines-for-observation-and-exclusion-of-companies-from-the-gpfg-19.11.2021.pdf (last updated Nov. 19, 2021); Gurneeta Vasudeva, *Weaving Together the Normative and Regulative Roles of Government: How the Norwegian Sovereign Wealth Fund's Responsible Conduct Is Shaping Firms' Cross-Border Investments,* 24 ORG. SCI., no. 6, 2013, at 1662–82, http://www.jstor.org/stable/42002927; *Observation and Exclusion of Companies*, NORGES BANK: INV. MGMT., https://www.nbim.no/en/the-fund/responsible-investment/exclusion-of-companies/ (last updated Apr. 27, 2023).

[75] *Market Value*, NORGES BANK: INV. MGMT., https://www.nbim.no/ (last updated March 7, 2023).

[76] *See* Jan-Patrick Barnert, *This Year's Global Stock Market Rout Cost Investors $18 Trillion—Here's What Worries Experts for 2023*, FORTUNE (Dec. 30, 2022), https://fortune.com/2022/12/30/global-stock-market-rout-cost-investors-18-trillion-experts-predict-2023/; Marc Jones, *How 2022 Shocked, Rocked and Rolled Global Markets*, REUTERS (Dec. 30, 2022), https://www.reuters.com/ markets/global-markets-wrapup-1-pix-2022-12-22/; David Gura*, Stocks Sink, Sending the S&P 500 to a Bear Market*, NAT'L PUBLIC RADIO (June 13, 2022), https://www.npr.org/2022/06/13/ 1104552530/stocks-sink-s-p-500-bear-market.

[77] *See Norway's Wealth Fund Posts $84 Billion Quarterly Profit*, YAHOO FIN. (Apr. 21, 2023), https://finance.yahoo.com/news/norways-wealth-fund-posts-84-083610831.html?; Victoria Klesty, *Norway Wealth Fund To Consider Investing in Unlisted Equities*, REUTERS (Mar. 21, 2023), https://www.reuters.com/business/norway-wealth-fund-consider-investing-unlisted-equities-2023-03-31/.

compelling case study of the transformative power of effective resource management. By judiciously leveraging its oil and gas riches to fuel a burgeoning renewable energy sector, Norway has not only secured energy independence but also charted a course towards a future unburdened by fossil fuels. The Norwegian sovereign wealth fund, once a symbol of its dependence on fossil fuels, has become a driving force in the transition to a greener future—and the foundations of the success of this model are worth international consideration.

III. IMPLEMENTATION INTO THE U.S. SYSTEM

The U.S. is a fossil fuel giant. With the highest oil and gas production in the world,[78] the U.S. has an undeniable capacity to dominate international commodity markets. Where Norway has forged a path toward renewable energy independence through strategic policies and regulations capitalizing on its oil and gas assets, the U.S. faces complex regulatory and economic challenges on its way to a clean energy transition, despite its vast energy potential. This section delves into the opportunities for adapting the most successful and efficient components of Norway's renewable energy independence model into the U.S. normative system. To this end, the section analyzes the legal and economic contrasts between the two countries, finding a pathway to make Norway's policy achievements, and the legal architecture that underlies them, transferable and adaptable to the realities of the U.S. energy system. By identifying and resolving crucial differences in regulatory design, the section aims to discern potential integration opportunities, and develop adaptive policy recommendations. The following subsections will (A) conduct a comparative analysis of the legal-economic architecture governing mineral resources exploitation, international

[78] *See generally* discussion *infra* section III.A.

commodity trading, domestic energy consumption practices, and wealth fund policies, as well as provide a brief examination of non-legal energy considerations; to then (B) present policy proposals on how the U.S. may be able to achieve an effective transition toward renewable energy independence.

A. Key Differences Between the U.S. & Norway

This section explores some of the core regulatory disparities that separate the Norwegian and U.S. legal and economic energy systems, and identifies functional elements for efficient policy translatability. The section analyzes (1) mineral resource and land ownership structures, as well as the public–private dichotomy regarding onshore and offshore mineral rights and fossil fuel extraction; (2) legal-economic export systems, in relationship with consumption patterns; (3) sovereign wealth fund structures, inclusive of sub-national levels; and then briefly examines (4) non-legal energy considerations such as each nation's international role and infrastructural energy generation potential.

1. Mineral Resource Exploitation & the Public–Private Land Ownership Dichotomy

When aiming to effectively translate the Norwegian energy capitalization model to the U.S. system, it would seem unlikely, if not impossible, to emulate Norway's direct resource exploitation model given the two nations' differences in mineral resource ownership structure. As discussed above,[79] fossil fuel resource ownership in Norway is ascribed exclusively to the government—meaning that all exploitable fossil fuel and mineral assets respond to a public structure of ownership. In the U.S., however, fossil fuel ownership is not ascribed directly and comprehensively to the government, responding

[79] *See* discussion *supra* Section II.A.

instead to a dual structure of public and private property.[80] In this way, mineral resource property rights are spread throughout multiple diverse and decentralized owners, with a system that allows private property claims to fossil fuel-productive lands and extraction of its underlying mineral assets.[81]

Because the ownership structure in the U.S. does not follow absolute government proprietorship, any inclusion of Norwegian legal principles for mineral resource management seems, at first glance, unlikely to succeed. However, this dichotomy is not as insurmountable as it may seem, given that (1) substantial portions of U.S. land are under federal and state ownership, and (2) regulations could be implemented to address a dual-prong system, establishing one set of measures that would streamline renewable energy development on public lands, and another that would incentivize renewable energy adoption on private lands.

Federal lands constitute a substantial 27% of the total U.S. surface,[82] and state lands approximately 9%.[83] Additionally, the entirety of U.S. offshore subsurface mineral rights are owned by federal and state governments, fully matching with Norway's oil and gas model in which the entirety of exploitable oil and gas assets are under governmental ownership.[84] Further, despite oil and gas production on federal lands amounting to about a quarter and a tenth of total production within the U.S. respectively, the production under federal control is still substantial at a multinational level, and larger in itself than the total

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[80] CAROL HARDY VINCENT ET AL., CONG. RSCH. SERV., R42346, FEDERAL LAND OWNERSHIP: OVERVIEW AND DATA 1 (2020), https://crsreports.congress.gov/product/pdf/R/R42346/15.
[81] *Id.*
[82] *Id.*
[83] *Id.*
[84] *See* discussion *infra* Section III.A.

of most nations participating in international energy commodity markets.[85]

As noted above, the Norwegian resource exploitation model is based upon a structure of governmental ownership of resources.[86] Norway invests in joint fossil fuel extraction projects with private companies, where the government—by way of the majority State-owned and publicly listed company, Equinor—has an active role and a vested interest in the extraction enterprise.[87] Though ownership of the resources belongs to the State, the active exploitation of said resources is shared in partnership with private corporations; with the legal relationship between these two entities being one of concerted exploitation of resources within the context of leasing State-owned land.[88] In essence, private corporations acquire leases to extract Norwegian mineral resources alongside Equinor through ad hoc agreements.[89]

This structure of exploitation does not seem to be exportable, because it is barred by the U.S.'s principle of private property and its lack of governmental involvement in direct extraction. But after legal refinement, appropriate adjustments may allow a partial adaptation of Norway's success model, pursuing the goals and adopting effective features of the Norwegian system without its direct mineral exploitation dynamics or legal structure.

In the U.S., as aforementioned, resource ownership is closely tied to land

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[85] *See* VINCENT ET AL., *supra* note 80; *see also Oil and Petroleum Products Explained: Offshore Oil and Gas*, U.S. ENERGY INFO. ADMIN. (Oct. 4, 2022), https://www.eia.gov/energyexplained/oil-and-petroleum-products/offshore-oil-and-gas-in-depth.php; Kellie Lunney, *Public Lands, Waters Become Flashpoint in Global Energy Debate*, BLOOMBERG L.: ENV'T & ENERGY (Mar. 23, 2022), https://news.bloomberglaw.com/environment-and-energy/public-lands-waters-become-flashpoint-in-global-energy-debate.

[86] *See Federal Offshore Lands*, U.S. BUREAU OF OCEAN & ENERGY MGMT., https://www.boem.gov/oil-gas-energy/leasing/federal-offshore-lands (last visited Sept. 20, 2023); *Natural Resources Revenue Data: Ownership*, U.S. DEP'T OF THE INTERIOR, https://revenuedata.doi.gov/how-it-works/ownership/ (last visited Sept. 20, 2023).

[87] *See* discussion *supra* Section II.

[88] *Id*.

[89] *Id*.

ownership, and generally whoever owns the land owns the mineral resources underneath it. In contrast, recoverable fossil fuel resources in Norway are nationalized and belong to the government.[90] Determining the translatability of the Norwegian exploitation model thus requires an examination of practical land rights in the U.S., where land ownership is divided into (1) private lands, (2) federal lands, (3) state and local lands, and (4) Native American lands.[91] In the U.S., federal lands share a fundamental characteristic with Norway's ownership model: the government's retention of mineral resource rights stemming from nationalized land ownership.

The significance of federal land ownership and public resource extraction area is considerable, even when contrasted with Norway's model: The federal government controls approximately 615 million acres of U.S. onshore land, which is about 27% of the 2.27 billion acres of total land in the U.S.,[92] making it the largest landowner in the nation.[93] This dimensionality far exceeds that of fossil fuel exploration lands in Norway: The entire Norwegian government ownership over its continental shelf, amounts to about 500 million acres.[94] Offshore, the U.S. Continental Shelf public resource extraction area covers over an additional 1.7 billion acres.[95] Though ownership does not indicate the existence of fossil fuel resources worth exploring and extracting in an area, it does have significant

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90 *See Natural Resources Revenue Data: Ownership*, *supra* note 86.

91 *Id*.

92 *See* VINCENT ET AL., *supra* note 80, at 1.

93 Christopher Ingraham, *American Land Barons: 100 Wealthy Families Now Own Nearly As Much Land As that of New England*, THE WASH. POST (Dec. 21, 2017, 6:00 AM), https://www.washingtonpost.com/news/wonk/wp/2017/12/21/american-land-barons-100-wealthy-families-now-own-nearly-as-much-land-as-that-of-new-england/.

94 *See Activity Per Sea Area*, NORWEGIAN PETROLEUM, https://www.norskpetroleum.no/en/ developments-and-operations/activity-per-sea-area/ (last updated Mar. 29, 2023).

95 MELISSA BATUM, U.S. BUREAU OF OCEAN ENERGY MGMT., BOEM OUTER CONTINENTAL SHELF OVERVIEW 3 (2015), https://netl.doe.gov/sites/default/files/event-proceedings/2015/carbon%20storage/proceedings/08-18_06_BOEM-OCS-Overview.pdf.

implications in understanding U.S. compatibility with Norway's regulatory structure: much of the recoverable fossil fuel potential in the U.S. is already nationalized.

With such extensive amounts of U.S. land being federally owned, there is significant potential for a bifurcated approach to the tailored adaptation and implementation of the Norwegian energy model, addressing public land and private fossil fuel resource ownership differently and independently.

To more fully comprehend how the U.S. system differs from the fully nationalized structure of Norway, it is useful to contextualize the U.S.' land ownership dynamics as a consequence to its legal history. In the late 1800s, U.S. legislation encouraged private exploration and exploitation of mineral resources: The federal government declared mineral deposits in federal lands to be free and open to exploration and purchase, conceding at liberty prospection, and thus incentivizing private citizens to pursue mineral discovery and claim lands for resource extraction.[96] This created a legal framework by which land and its underlying resources became largely requisitioned and owned by citizens and private corporations.[97] In reaction to westward-expanding land privatization, much of the land open to exploration and private claims was reserved by the federal government in the early 1900s, rendering the western U.S. under substantial federal ownership.[98]

Today, federal lands are generally open to private exploitation through a system of leasing. The legal foundations of the modern leasing structure for oil and gas extraction are

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[96] David Gerard, *1872 Mining Law: Digging a Little Deeper*, PROP. & ENV'T RSCH. CTR. (Dec. 1997), https://www.perc.org/wp-content/uploads/2018/02/ps11.pdf.

[97] *Id.*

[98] THOMAS GOONAN, POLICY – A FACTOR SHAPING MINERALS SUPPLY AND DEMAND 41 (2002), https://pubs.usgs.gov/of/2002/of02-418/of02-418.pdf. Federal land reserves exist in Nevada, where the federal government owns more than 80% of the land, as well as in Alaska and Idaho, where federal ownership amounts to approximately 61% of total state surface. *See* VINCENT ET AL., *supra* note 80, at 7–8.

laid out by the Mineral Leasing Act of 1920, the Outer Continental Shelf Lands Act of 1953, and the Federal Land Policy and Management Act of 1976.[99] In essence, this legislative design empowers the government to grant leases to private companies for the extraction of mineral resources in federal lands.[100] Exploration, drilling, and extraction of minerals in federal lands are subject to public agreements governed by the Secretary of the Interior, by way of its principal administrators, the Bureau of Land Management for onshore mineral resources, and the Bureau of Ocean Energy Management for offshore oil and gas.[101] Fundamentally, the leasing structure enables the government to transfer exploitation rights to private entities, thereby monetizing its ownership of natural resources and ensuring mineral extraction.[102] Though very different in its origin and trajectory from the Norwegian legal structure, the U.S. has a functional regulatory system that operates in a very similar way to the traditional Norwegian model developed during the 1960s, which did not include direct participation of the government in mineral extraction activities, limiting its role to that of landowner and lessor.

The compatibility between the U.S. and the Norwegian exploitation models becomes even stronger comparing the geophysical nature of resource extraction: Norway's oil and gas production takes place entirely offshore, on its continental shelf.[103] As aforementioned, the U.S. Oceanic Shelf, as well as its mineral resources, are also fully

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[99] *See* Mineral Leasing Act of 1920, 30 U.S.C. §§ 181–196; Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701–1782; Outer Continental Shelf Lands Act of 1953, 43 U.S.C. §§ 1331 et seq.

[100] *Onshore Oil & Gas*, NAT. RES. REVENUE DATA, https://revenuedata.doi.gov/how-it-works/onshore-oil-gas/ (last visited Sept. 20, 2023).

[101] *See id.*

[102] *See About Natural Resources Revenue Data*, NAT. RES. REVENUE DATA, https://revenuedata.doi.gov/?tab=tab-revenue (last visited Sept. 20, 2023).

[103] *See Background Reference: Norway*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/international/content/analysis/countries_long/Norway/background.html (last updated Jan. 7, 2019).

publicly owned.[104] Jurisdictional control of U.S. submerged land rights is split between the federal government and coastal states: The states generally have ownership competences from 0 to 3 nautical miles, while the federal government has ownership competences from beyond these state boundaries up to 200 nautical miles.[105] Ownership of submerged lands generally encompasses ownership over its underlying mineral resources, and thus the states and federal government enjoy broad exploitation and leasing capabilities over their respective mineral jurisdictional areas.[106] The Secretary of the Interior administers the exploration and development of fossil fuels at the federal level, while leasing is entrusted to the Bureau of Ocean Energy Management.[107]

The Norwegian and American regulatory models for offshore mineral resources therefore share a fundamental attribute: both models retain governmental ownership of offshore mineral resources up to international waters. This legal calibration makes both configurations compatible, as the U.S. could adopt a two-tiered system in adaptation of the Norwegian model: One tier that addresses publicly owned lands by way of enhancing renewable energy leasing and capital reinvestment of fossil fuel revenue into renewable energies; and a second tier that would establish different strategies to incentivize privately owned resources to be extracted, refined, and exported, as well as ultimately transitioned into renewable infrastructure.

While public lands hold vast mineral resources, private lands drive the bulk of U.S.

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[104] *See Federal Offshore Lands*, U.S. BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/oil-gas-energy/leasing/federal-offshore-lands (last visited Sept. 20, 2023).

[105] *Id.*

[106] *See* U.S. COMM'N ON OCEAN POL'Y, REVIEW OF U.S. OCEAN AND COASTAL LAW: THE EVOLUTION OF OCEAN GOVERNANCE OVER THREE DECADES 95 (2004).

[107] *See The Reorganization of the Former MMS*, U.S. BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/about-boem/reorganization/reorganization-former-mms (last visited Sept. 20, 2021).

oil and gas production, accounting for over 75% of oil and over 90% of gas output.[108] This is in heavy contrast with international fossil fuel extraction dynamics, where government-owned companies control over 75% of crude oil production and currently hold approximately 60% of oil and gas reserves.[109] This international trend is mirrored in Norway, where the State-owned company Equinor claims over 70% of all fossil fuels extracted, and Norway owns the resources themselves in their entirety.[110]

Further separating the U.S. from international trends, in the last decade, the relative share of federal lands' contribution to total U.S. crude oil and gas production has been subject to a continuous decline.[111] In the late 2000s, federal lands produced approximately 35% of the nation's total oil yield, and about 25% of total natural gas—a substantial decrease to the aforementioned respective 24% and 10% supply presence they hold today.[112] This does not mean that overall federal land extraction productivity itself has fallen—just that it has not grown as fast as the production output of private enterprises.[113] In fact, oil production has nearly doubled in federal lands in the last decade, with onshore production growing by a factor of almost 3.5, and offshore by a factor of 1.3.[114]

Despite the shrinking market share within the U.S. energy sector, federal

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[108] *U.S. Production of Crude Oil*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS1&f=M (last visited Sept. 20, 2023); *About Natural Resources Revenue Data*, *supra* note 102.

[109] *See* MARC HUMPHRIES, CONG. RSCH. SERV., R42346, U.S. CRUDE OIL AND NATURAL GAS PRODUCTION IN FEDERAL AND NONFEDERAL AREAS (2018).

[110] *See* HUMPHRIES, *supra* note 109.

[111] *Id.*

[112] *See id.*; *see also Oil and Petroleum Products Explained: Offshore Oil and Gas*, U.S. ENERGY INFO. ADMIN. (Oct. 4, 2022), https://www.eia.gov/energyexplained/oil-and-petroleum-products/offshore-oil-and-gas-in-depth.php.

[113] *Oil and Petroleum Products Explained: Offshore Oil and Gas*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/oil-and-petroleum-products/offshore-oil-and-gas-in-depth.php (last updated Oct. 4, 2022).

[114] *See About Natural Resources Revenue Data*, *supra* note 102.

production remains an overall significant contributor to global fossil fuel commodity generation, with an energy output exceeding that of many producing nations.[115] When evaluated independently, federal lands would still rank among the world's top ten global oil and gas producers.[116] In 2018, as the entirety of the Norwegian enterprise produced 1.8 million barrels of oil per day (mbd), extraction on U.S. federal lands alone reached 2.5 mbd.[117] Essentially, though U.S. production in federally owned mineral resources does not rise to the same national market share as it does in many other jurisdictions, this does not mean that this production amount is immaterial. Federal land oil and gas volume yields are still substantial with respect to comparable international operations, and when compounded with private production, the U.S. stands as the largest producer of oil and gas in the world.[118]

2. EXPORTS & CONSUMPTION PATTERNS

Norway's journey to economic prosperity and stability is a story of fossil fuel riches and sustainable aspirations: a tale of balancing economic needs with long-term environmental stewardship. Norway's ascent to renewable energy independence has been, in a seemingly contradictory manner, fueled by deep reliance on its fossil fuel resources. More specifically, much of Norway's economic flourishing and increasing resilience is consequence to a system of fossil fuel extraction and export, deploying fossil fuels as a

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[115] *See What Countries Are the Top Producers and Consumers of Oil?*, *supra* note 6.

[116] *See Natural Gas*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/international/data/world/natural-gas/dry-natural-gas-production? (last visited Sept. 20, 2023); *Petroleum and Other Liquids*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/international/data/world/petroleum-and-other-liquids/ annual-refined-petroleum-products-consumption? (last visited Sept. 20, 2023).

[117] *See* HUMPHRIES, *supra* note 109.

[118] *See* discussion *infra* Section III.A.2; *What Countries Are the Top Producers and Consumers of Oil?*, *supra* note 6.

trading asset rather than a tool to satisfy internal energy demands.[119] Most of the fossil fuels produced in Norway are destined to be exported, and little use is given to oil and gas within the country's borders.[120] The U.S. stands in stark contrast, with fossil fuel utilization primarily driven by domestic energy needs. This domestic focus is characterized by high levels of intranational fossil fuel consumption, traditionally high imports, and the limited role of exports in the U.S. economy.[121] The inertia of this negative trade balance in the U.S. has shifted in recent years as the nation's energy economy has increased its exports of fossil fuels,[122] with accompanying changes to the regulatory regime.[123] Despite this growing functional overlap in commodity trading, the legal architectures that govern intranational consumption patterns and deployment of fossil fuels as energy resources, particularly for electricity and transportation, remain foundationally dissonant between both nations.

The U.S. has traditionally met its energy needs by way of consuming its own fossil fuel production, alongside a steep import bill.[124] This has transformed in the last few decades, as U.S. production of oil and gas has dramatically increased and the nation has opened up its export floodgates.[125] In the late 2000s, the U.S. benefited from a pivotal

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[119] *See* discussion *supra* Section II.

[120] *Id.*

[121] *See Natural Gas Explained: Natural Gas Imports and Exports*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/natural-gas/imports-and-exports.php (last updated Dec. 16, 2022); *Oil and Petroleum Products Explained: Oil Imports and Exports*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/oil-and-petroleum-products/imports-and-exports.php (last updated Nov. 2, 2022).

[122] *See Natural Gas Explained: Natural Gas Imports and Exports*, *supra* note 121; *Oil and Petroleum Products Explained: Oil Imports and Exports*, *supra* note 121.

[123] *See* Frank Rusco, *Crude Oil Markets: Effects of the Repeal of the Crude Oil Export Ban*, U.S. GOV'T ACCOUNTABILITY OFF. (Oct. 2020), https://www.gao.gov/assets/gao-21-118.pdf; PHILIP BROWN ET AL., CONG. RSCH. SERV., R43442, U.S. CRUDE OIL EXPORT POLICY: BACKGROUND AND CONSIDERATIONS (2014), https://www.energy.senate.gov/services/files/dfe108c9-cef6-43d0-9f01-dc16e6ded6b4.

[124] *See U.S. Petroleum Flow*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/totalenergy/data/flow-graphs/petroleum.php (last visited Sept. 20, 2023); *U.S. Natural Gas Flow*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/totalenergy/data/flow-graphs/natural-gas.php (last visited Sept. 20, 2023).

[125] *See* Rusco, *supra* note 123; BROWN ET AL., *supra* note 123.

escalation in production of fossil fuel resources as extraction technology rapidly evolved.[126] Technological developments in spaces like horizontal drilling and hydraulic fracturing, paired with increased demand and improved extraction performance, created an unparalleled explosion in production.[127] U.S. crude oil production almost tripled between 2008 and 2022, from 7.78 mbd in 2008 to 20.21 mbd in 2022.[128] The natural gas industry experienced similar growth, near doubling its total output from 19.24 trillion cubic feet extracted in 1975, to 35.81 in 2022.[129]

Accompanying this increase in production, it is only recently that laws have adapted to support export dynamics. Until the mid-2010s, U.S. legislation heavily restricted exports of fossil fuels: In 1975, U.S. legislators imposed a ban on most crude fossil fuel exports in response to complex geopolitical and energy pricing events.[130] It would not be until 2015 that the U.S. government lifted this ban, elevating the U.S.' role in international fossil fuel commodity markets from a relatively minor actor to an export global leader.[131] In 2017 and 2018, for the first time in its energy trade history, the U.S. exported more oil and gas than it imported—a positive trade balance that has been maintained since.[132] Despite these indicators of export prosperity, total exports still remain proportionally low in the U.S.: only about 28% of the nation's petroleum flow and 13% of total gas flow are exported,

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[126] *See Natural Gas Explained: Natural Gas Imports and Exports*, *supra* note 121; *Oil and Petroleum Products Explained: Oil Imports and Exports*, *supra* note 121.

[127] *See Natural Gas Explained: Natural Gas Imports and Exports*, *supra* note 121; *Oil and Petroleum Products Explained: Oil Imports and Exports*, *supra* note 121.

[128] *Oil and Petroleum Products Explained: Oil Imports and Exports*, *supra* note 121.

[129] *See Natural Gas Explained: Natural Gas Imports and Exports*, *supra* note 121.

[130] *See* Rusco, *supra* note 123; Energy Policy and Conservation Act, Pub. L. No. 94-163 § 103, 89 Stat. 871, 877 (codified at 42 U.S.C. § 6212).

[131] *See* Rusco, *supra* note 123.

[132] *See* David Gaffen, *In Major Shift, U.S. Now Exports More Oil Than it Ships in*, REUTERS (Dec. 6, 2018, 10:13 AM), https://www.reuters.com/article/us-usa-oil-eia/in-major-shift-us-now-exports-more-oil-than-it-ships-in-idUSKBN1O51X7; *Natural Gas Explained: Natural Gas Imports and Exports*, *supra* note 121; *Oil and Petroleum Products Explained: Oil Imports and Exports*, *supra* note 121.

while the rest is mostly internally processed and consumed.[133]

In contrast to the U.S., Norway has historically positioned itself as an exporting nation, with the vast majority of its extraction destined for international trade.[134] Norway is a smaller player than the U.S. in global fossil fuel production, with its wells accounting for 2% of the crude oil and 3% of the natural gas in the world, compared to the U.S. 20% international extraction market share in oil and almost 30% in natural gas.[135] Though not reliant on fossil fuels for internal energy needs, the Norwegian economy has relied on them for its economic prosperity: The Norwegian system does not use oil and gas as an energy tool, but as an economic trading asset.

To understand the deep interconnection between the Norwegian economy and fossil fuels, it is crucial to note that the value of oil and gas exports constitutes a substantial 73% of the nation's goods exports,[136] a third of the national GDP, and about half of the State's revenues.[137] In contrast, in the U.S. from the 1960s to the mid-2000s, fossil fuel exports oscillated around approximately 5% of total merchandise export value.[138] Since the late 2000s, the export market share of fuels has been gradually expanding to reach just over 15%[139]—indicating that, though scaling in market share relevance, oil and gas exports are

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[133] *See U.S. Petroleum Flow*, *supra* note 124.

[134] *Exports of Oil and Gas*, NORWEGIAN MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/ (last updated Mar. 29, 2023).

[135] *See What Countries Are the Top Producers and Consumers of Oil?*, *supra* note 6; *Gas 2020, 2021-2025: Rebound and Beyond*, INT'L ENERGY AGENCY, https://www.iea.org/reports/gas-2020/2021-2025-rebound-and-beyond (last visited Sept. 20, 2023).

[136] *Exports of Oil and Gas*, NORWEGIAN MINISTRY OF PETROLEUM & ENERGY, https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/ (last updated Mar. 29, 2023).

[137] *The Government's Revenues*, *supra* note 46.

[138] *See Refined Petroleum in United States*, OEC, https://oec.world/en/profile/bilateral-product/refined-petroleum/reporter/usa (last visited Feb. 22, 2023); *Crude Petroleum in Norway*, OEC, https://oec.world/en/profile/bilateral-product/crude-petroleum/reporter/nor (last visited Sept. 20, 2023).

[139] *Fuel Exports (% of Merchandise Exports) - United States*, WORLD BANK, https://data.worldbank.org/indicator/TX.VAL.FUEL.ZS.UN?locations=US (last visited Sept. 20, 2023). Note that "fuels" are defined by the World Bank as mineral fuels, lubricants, and related materials.

still not a foundational pillar of the American economy, especially when in contrast with Norwegian fossil fuel trade dependency.[140] This is by virtue of a more diversified system of exports and a broader production base for international goods and commodities in the U.S.; which may be a key indicator of an economy that is better equipped to sustain a transition out of fossil fuel international trade given its lack of structural financial dependency on this sector.

However, the U.S.' considerable volumes of production, when analyzed through the lens of consumption, also expose the precipitous divergence in national reliance of fossil fuels as energy resources: The Norwegian economy may be dependent on oil and gas as a trading asset, but the U.S. has an energetic need for these resources. The U.S leads the world both in oil production, with over 20 mbd, amounting to 20% of the world's production; as well as in consumption, with 19.89 mbd, which represents 21% of the world's total consumption.[141] This is a systemic dependency that Norway has been able to effectively dismantle through targeted and precise regulation discouraging intranational fossil fuel deployment for energy purposes, and encouraging commodity asset trading.[142] The U.S.' recent transition toward establishing robust export networks and practices creates a systemic overlap with Norway, which in turn makes a U.S. fossil fuel transition more compatible with the Norwegian model.

Norway has historically interacted with oil and gas as an export-focused commodity tool by which to create solid foundations that would hold up the nation's economy. Now,

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[140] *See Onshore Facilities*, EQUINOR, https://www.equinor.com/energy/onshore-facilities (last visited Sept. 20, 2023); *Norway Oil Security Policy*, IEA (Oct. 12, 2022), https://www.iea.org/articles/ norway-oil-security-policy; *Background Reference: Norway*, *supra* note 103.

[141] *See What Countries Are the Top Producers and Consumers of Oil?*, *supra* note 6.

[142] *See generally* discussion *supra* Section II.A.

those foundations are the anchors used to stabilize a prosperous and sustainable future, disentangled from oil and gas. By contrast, the U.S.' relationship with fossil fuels began by seeking to satisfy internal consumption and has only in its modern stages of fossil fuel extraction evolving into a nation that pursues international trade as well. The U.S. could use this emerging momentum to utilize mineral assets as the foundation for a renewable energy transition, instead of purely as an energetic or secondary financial instrument.

Determining which economic sectors are absorbing fossil fuels as an energy resource allows us to further explore with precision whether Norwegian policies could be used to reduce oil and gas energy dependency in the U.S. As explained above, Norway has a radically different approach to production and consumption than the U.S. In the U.S., renewable resources contribute a total of 12% to the nation's energy needs, with 36% covered by petroleum, 32% by natural gas, 11% by coal, and the remaining 8% by nuclear energy.[143] Only about 28% of the U.S. petroleum flow and 13% of total gas flow are exported, with the rest mostly internally processed and allocated for intranational consumption.[144] The transportation and electric power generation sectors predominantly use petroleum and natural gas, with approximately 70% of petroleum-sourced consumption dedicated to transportation,[145] and 37% of all natural gas dedicated to the electric power sector.[146] Norway, in contrast, relies on renewable energy for 98% of its energy needs and exports almost the totality of its oil and gas production.[147] By enacting clean energy

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[143] *See U.S. Energy Facts Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energy explained/us-energy-facts/ (last updated June 10, 2022).

[144] *See U.S. Energy Consumption by Source and Sector, 2022*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/us-energy-facts/images/consumption-by-source-and-sector.pdf (last visited Sept. 20, 2023).

[145] *Id.*

[146] *Id*.

[147] *See* discussion *supra* Section II.

policies targeting these sectors in imitation of the Norwegian model, and redirecting internal consumption resources as export assets, fossil fuel consumption could decrease significantly in the U.S., paving the road towards a sustainable energy economy.

In examining the dance between export and consumption patterns in the U.S. and Norway, a compelling narrative emerges: The U.S., a production powerhouse and voracious consumer, contrasts with Norway's paradox of production abundance yet resolute export strategy. By curbing domestic consumption and embracing a strategic export strategy, the U.S. can effectively leverage its plentiful resources to not only meet its own energy needs but also contribute to global energy security, achieve renewable energy independence, and shape a more sustainable economic future. In this nuanced interplay, the potential for the U.S. lies not just in what it produces and consumes, but in the strategic orchestration of what it can export to the world.

3. Sovereign Wealth Fund Structures

This section will examine the disparity in sovereign wealth fund structure among both selected jurisdictions—which has more regulatory and decentralization nuance that may appear at first glance.

The U.S. federal government does not have a sovereign wealth fund, whereas the Norwegian government established its own during the early 1990s.[148] Despite the lack of direct federal involvement in fund formation, this does not mean that the U.S. is not present in the State-driven capital markets space. In fact, the U.S. is represented in the sovereign wealth fund arena by over 20 different state-run funds, which in aggregate contain the largest assets under management capital owned by public entities in the world—over $10

[148] *The History*, Norges Bank: Inv. Mgmt., nbim.no/en/the-fund/the-history/ (last visited Sept. 20, 2023).

trillion, compared to Norway's $1.4 trillion.[149] States, including Texas, Alaska, Wyoming, and Montana, have been conducting fund-driven financial policies for decades.[150] In Texas, for example, the Texas Permanent School Fund amasses funds from mineral-related rentals of offshore submerged land, which it then reinvests into public schools.[151] As of the end of fiscal year 2021, the fund was valued at $55.6 billion.[152] This is not even the only fund in Texas, where the model is imitated by others like the Permanent University Fund,[153] valued in 2022 at over $31.8 billion, up from under $10 billion in 2009.[154] Alaska's state mineral fund, the Alaska Permanent Fund, had a total value of assets under management of over $70 billion in 2020.[155] Other States like New Mexico, Wyoming, North Dakota, Alabama, Utah, Oregon, and Montana all have similar structures and rank among some of the largest "sovereign" wealth funds in the world.[156]

These state funds are generally capitalized through taxes on mineral revenues and

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[149] *See Annual Report 2023*, GLOB. SFW (Jan. 1, 2023), https://globalswf.com/reports/2023annual.

[150] *See* discussion *supra* Section III.A.

[151] TEX. EDUC. AGENCY, TEXAS PERMANENT SCHOOL FUND ANNUAL COMPREHENSIVE FINANCIAL REPORT 29–30 (2022), https://tea.texas.gov/sites/default/files/PSF_Annual_Report.pdf.

[152] *Id.* at 18.

[153] *See The Permanent University Fund (PUF)*, UNIV. OF TEX. SYS., https://www.utsystem.edu/puf (last visited Sept. 20, 2023).

[154] *See* Mitchell Schnurman, *Texas' Giant University Fund Gets Big Payday from Oil and Gas, but Colleges Won't Notice*, THE DALL. MORNING NEWS (June 15, 2022, 1:24 PM), https://www.dallasnews.com/business/energy/2022/06/15/texas-giant-university-fund-gets-big-payday-from-oil-and-gas-but-colleges-wont-notice/.

[155] *See Mid FY-21 at a Glance,* ALASKA PERM. FUND CORP., https://apfc.org/at-a-glance/ (last visited Sept. 20, 2023).

[156] *See History,* N.M. STATE INV. COUNCIL, https://www.sic.state.nm.us/about-the-sic/history/ (last visited Sept. 20, 2023); Will Kenton, *Permanent Wyoming Mineral Trust Fund (PWMTF) Definition*, INVESTOPEDIA (Sept. 7, 2022), https://www.investopedia.com/terms/p/permanent-wyoming-mineral-trust-fund.asp#:~:text=The%20PWMTF%20is%20the%20state's,costs%20of%20running%20the%20state; *North Dakota Legacy Fund,* N.D. OFF. OF STATE TREAS., https://www.treasurer.nd.gov/north-dakota-legacy-fund-0 (last visited Sept. 20, 2023); *Alabama Trust Fund,* ALA. EXEC. OFF. OF THE TREAS., http://treasury.alabama.gov/alabama-trust-fund/ (last visited Sept. 20, 2023); *About Oregon's Common School Fund*, OR. DEP'T OF STATE LANDS, https://www.oregon.gov/dsl/About/Pages/AboutCSF.aspx (last visited Sept. 20, 2023); MONT. BD. OF INVS., ANNUAL REPORT 2021 (2021), https://investmentmt.com/_shared/docs/Annual-Reports/ANNUAL-REPORT-FY21.pdf.

royalties, as well as through leases on lands dedicated to mineral extraction.[157] Income from each fund is then redistributed throughout the state and apportioned to specific goals like education funding, or in pursuit of more general policy objectives, such as plugging budgetary deficits.[158] Though the U.S. may not have a nationwide sovereign wealth fund that represents the federal government's interests in mineral resources, many of its states are already operating under an analogous conceptual system and legal design.

4. NON-LEGAL ENERGY CONSIDERATIONS

Norway and the U.S. occupy vastly separate spaces in transnational geopolitics and international markets. Crucial non-legal differences between the U.S. and Norway include the nations' geophysical capacity for renewable energy generation[159] and international geopolitical roles.[160] With regards to renewable energy potential, Norway's extensive national river network is a tremendous driver for hydrokinetic renewable energy, generating approximately 92% of the national electricity needs.[161] Even though the U.S. does not have the same capacity to pursue concentrated hydropower generation, it has the potential to further capitalize on many other energy sources that are more limited in

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[157] *See History*, *supra* note 156; Kenton, *supra* note 156; *North Dakota Legacy Fund*, *supra* note 156; *Alabama Trust Fund*, *supra* note 156; *About Oregon's Common School Fund*, *supra* note 156; MONT. BD. OF INVS., *supra* note 156.

[158] *See, e.g.*, Kenton, *supra* note 156; *North Dakota Legacy Fund*, *supra* note 156; *Alabama Trust Fund*, *supra* note 156; *About Oregon's Common School Fund*, *supra* note 156.

[159] Ian Palmer, *As Norway and the US Move To Decarbonize Transport, Legacy Energy Sources Are a Key Differentiator*, FORBES (June 22, 2021), https://www.forbes.com/sites/ianpalmer/2021/06/22/ as-norway-and-the-us-move-to-decarbonize-transport-legacy-energy-sources-are-a-key-differentiator/?sh=39b161e7f32f.

[160] *See Population, Total - Norway*, WORLD BANK, https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NO United States Census Bureau (last visited Sept. 20, 2023); *U.S. Population Estimated at 332,403,650 on Jan. 1, 2022*, U.S. DEP'T OF COM. (Jan. 6, 2022), https://www.commerce.gov/news/blog/2022/01/us-population-estimated-332403650-jan-1-2022.

[161] *See* discussion *supra* Section II.

Norway, such as solar, wind, or even tidal power.[162] For example, assuming intermediate efficiency, solar photovoltaic modules covering 0.6% of U.S. land could currently meet national electricity demand.[163] Furthermore, U.S. onshore wind resources alone have the projected capacity to generate 11,000 GW of electricity, which is 113 times more than present installations allow for.[164] Given the potential of U.S. wind and solar energy, a combination of these two resources alone could satisfy national electricity demand.[165] Diversifying energy sourcing further, the U.S. could utilize an array of hydroelectric, nuclear, or biomass and geothermal energy resources. Recent studies suggest that the U.S. has enough geophysical resource potential to achieve sustainable energy independence within decades, if resources were to be allocated to this end.[166]

The countries' geostrategic scales should also be accounted for: Norway has a population of less than 5.5 million people,[167] compared to over 330 million people in the

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[162] *See* CTR. FOR SUSTAINABLE SYSTEMS, U. OF MICH., U.S. RENEWABLE ENERGY (2022), https://css.umich.edu/sites/default/files/2022-09/Renewable%20Energy_CSS03-12.pdf; TRAVIS MADSEN & ROB SARGENT, ENVIRONMENT AMERICA, WE HAVE THE POWER: 100% RENEWABLE ENERGY FOR A CLEAN, THRIVING AMERICA (2016), https://environmentamerica.org/sites/environment/files/reports/We%20Have%20the%20Power-%20100%20Percent%20Renewable%20Energy%20for%20a%20Clean%20Thriving%20America%20-Environment%20America.pdf.

[163] *See* CTR. FOR SUSTAINABLE SYSTEMS, *supra* note 162.

[164] *See id*.; ANTHONY LOPEZ ET AL., NAT'L RENEWABLE ENERGY LAB'Y., U.S. RENEWABLE ENERGY TECHNICAL POTENTIALS: A GIS-BASED ANALYSIS (2012), https://www.nrel.gov/docs/fy12osti/51946.pdf; GREGORY BRINKMAN ET AL., NAT'L RENEWABLE ENERGY LAB'Y., THE NORTH AMERICAN RENEWABLE INTEGRATION STUDY: A U.S. PERSPECTIVE (2021), https://www.nrel.gov/docs/fy21osti/79224.pdf.

[165] Grant Smith & Bill Walker, *Is 100% Renewable Energy for the US Possible? Yes*, UTILITYDIVE (JAN. 30, 2019), https://www.utilitydive.com/news/is-100-renewable-energy-for-the-us-possible-yes/547135/.

[166] *See* Mark Z. Jacobson et al., *Zero Air Pollution and Zero Carbon from All Energy at Low Cost and Without Blackouts in Variable Weather Throughout the U.S. with 100% Wind-Water-Solar and Storage*, 184 RENEWABLE ENERGY 430 (2022); Will Peischel, *90 Percent of U.S. Could Be Powered by Renewables by 2035*, YALE ENV'T 360 (June 12, 2020), https://e360.yale.edu/digest/90-percent-of-us-could-be-power-by-renewables-by-2035; *Clean Energy Future: Developing a Robust and Sustainable Clean Energy Economy*, U.S. DEP'T OF THE INTERIOR, https://www.doi.gov/ priorities/clean-energy-future (last visited Sept. 20, 2023).

[167] Palmer, *supra* note 159.

U.S.—a substantial distinction that requires a completely different dimension of energy infrastructure, vastly different logistics management, and has to attend to discrete and varied stakeholders.[168] The two countries also occupy a different role in international political dynamics—they have contrasting international duties, responsibilities, trade routes and trading partners, and diverging scales in national goals and objectives.[169] Directly transplanting Norwegian legal and policy elements into the U.S. energy plan would therefore not be practical given these geospatial and international contrasts, among other non-legal differences, and would likely result in regulatory and economic performance deficits.[170] Instead, the U.S. should be cognizant, aware, and fluid enough to adapt to Norway's functional goals, harmonized to its context and circumstances. If adapted appropriately to the U.S. sociolegal system, Norway's renewable transition success can provide key insights on capitalizing on the massive fossil fuel potential the U.S. currently enjoys and navigate its energy system towards renewable independence.

B. Policy Recommendations: A Design for the U.S. to Achieve Renewable Energy Independence

The U.S. faces a critical juncture in its energy future. Continued reliance on fossil fuels as energy sources exacerbates environmental concerns and undermines long-term energy security. To chart a path toward renewable energy independence, the U.S. must embrace a comprehensive policy framework that encompasses a series of strategic investments, regulatory reforms, and market-based incentives, all tailored to pursue and accelerate the transition from fossil fuels to clean energy sources. Inspired by Norway's

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[168] *U.S. Population Estimated at 332,403,650 on Jan. 1, 2022*, supra note 160.
[169] *See, e.g.*, *Norway—Country Commercial Guides*, INT'L TRADE ADMIN., https://www.trade.gov/ country-commercial-guides/norway-market-overview (last visited Sept. 20, 2023).
[170] *See* Towers-Clark, *supra* note 4.

remarkable transition to sustainable energy independence, this section proposes a legal and policy reform to guide the U.S. towards a renewable energy future. The framework of this policy proposal is structured on three main pillars: (1) Discouraging intranational consumption of fossil fuels, (2) incentivizing fossil fuel exports, and (3) establishing a sovereign wealth fund for diversified and strategic renewable energy investments.

Following Norway's model, the U.S. should implement measures to discourage the domestic consumption of fossil fuels, promoting energy efficiency and encouraging a shift toward renewable energy sources. This strategy should involve multi-level financial and regulatory adjustments to enhance and incentivize renewable generation infrastructure and strengthen its grid implementation. While reducing domestic fossil fuel consumption, the U.S. should leverage its abundant fossil fuel reserves to generate export revenue, developing and strategically freeing its export networks. By increasing fossil fuel exports, alongside increasing productive land yields and financial efficiency, the U.S. can capitalize on its natural resources and extraction industries while simultaneously financing its transition toward renewable energy independence. To facilitate and build on this transformation, the U.S. should establish a dedicated sovereign wealth fund to finance energy projects nationwide, and internationally promote sustainable practices across various sectors. This fund would be financed by direct and indirect revenue streams derived from the fossil fuel industry, including export taxes, enhanced royalty structures, and other forms of monetization from existing fossil fuel operations. The fund would invest in a range of renewable energy initiatives, including solar, wind, nuclear, and geothermal power generation, as well as the development of energy storage technologies. By implementing these three pillars, the U.S. can emulate Norway's success in achieving renewable energy

independence while ensuring a sustainable and prosperous future. This proposed policy framework provides a roadmap for the U.S. to seize the opportunity to lead the world in the transition to a clean energy future and ensure sustainable energy independence.

The implementation of these policy principles is not devoid of regulatory intricacies and complexities. As discussed in Section III.A, the U.S. and Norwegian legal and economic systems exhibit significant disparities, necessitating thoughtful adaptations for the successful transfer of principles from the Norwegian context to the U.S. legal and economic framework. Chief among these hurdles to overcome is the public–private dichotomy of mineral resources ownership that separates the U.S. and Norway.

In Norway, recoverable fossil fuels are fully under governmental control, and thus respond to an exclusive and centralized system of public proprietorship. In the U.S., ownership operates as a multi-network decentralized system, where resources may belong to federal, state, or Native American governments, as well as private landowners.[171] The legal and sociopolitical context in the U.S. would not allow for a direct implementation of the Norwegian public resource exploitation and sale model. Thoughtful and adaptive implementation could nonetheless allow the U.S. to achieve renewable energy independence in naturalizing Norway's most effective normative principles to U.S. regulatory realities. In the case of recoverable resources ownership disparity, the U.S. could pursue hybrid implementation fulfilling the same renewable energy independence goals via a two-tiered approach that may address public and private lands independently, without any need for further nationalization of resources.

In Norway, the federal government has taken over both direct fossil fuel

[171] *See* discussion *supra* Section III.B.

exploitation and regulation with marked efficiency, transparency, and success. The Norwegian government exploits oil and gas capital in an unmediated manner by participating in both extraction and international commodity trading. In contrast, the U.S. leaves direct oil and gas exploitation to private companies. The American energy and mineral resource extraction system, characterized by private entity dominance, is premised on the notion that government oversight can effectively be delimited to regulatory activities, including environmental impact considerations, property rights, and taxation, among others, while allowing private corporations and market forces to optimize resource extraction and utilization.

While upholding its privatized system, the U.S. can draw inspiration from Norway's regulatory principles to implement targeted adjustments on federal and private lands, that advance its renewable energy independence goals. To foster renewable energy development across all land types, a comprehensive policy framework encompassing both financial incentives and regulatory reforms is essential. Industry-wide tax breaks, such as production and investment tax credits can significantly reduce the upfront costs associated with new renewable energy projects, making them more attractive to investors. Additionally, education and training programs can equip the workforce with the skills necessary to transition to a renewable energy economy, ensuring a successful and efficient labor shift. Furthermore, substantial public investments and grants in research and development can accelerate technological advancements, leading to more efficient and cost-effective renewable energy technologies.

Federal lands, spanning nearly a third of the U.S. territory, hold immense energy wealth, accounting for approximately a quarter of the nation's oil output and over a tenth

of natural gas production.[172] In the U.S., offshore fossil fuel resources are comprehensively under government control, akin to Norway's sole proprietorship over recoverable minerals, underscoring a significant overlap in resource management approaches. While this article does not advocate for a complete overhaul of the U.S. resource exploitation system to incorporate direct governmental activity in mineral extraction, it does propose establishing a comprehensive set of incentives and policy measures, designed to be leveraged over the nation's existing regulatory structures and leasing practices, to accelerate the transition toward renewable energy sources.

With regards to specific and targeted strategies circumscribed to federal lands, streamlining lease programs for renewable energy projects could reduce bureaucratic hurdles and expedite development timelines, improving efficiency and boosting economic and energy activity. Moreover, strategies could be developed and implemented to make lease terms more fiscally attractive, such as offering royalty holidays or reduced royalty rates for renewable energies, further guiding private capital migration toward renewable sustainable projects. Furthermore, reinvesting a portion of the profits generated from oil and gas production on federal lands into renewable energy infrastructure and technological research can create a virtuous cycle of innovation and development.

On private lands, a combination of tax incentives, grants, investments, and subsidies can incentivize landowners and developers to embrace renewable energy technologies. Tax breaks, such as property tax exemptions or deductions for renewable energy installations, can reduce the financial burden of adopting renewable energy, attracting micro- and macro-scale investment and infrastructural development.

[172] *See* discussion *supra* Section III.A.1.

Additionally, grants and direct public investments can provide upfront funding for renewable energy projects, while subsidies can bridge the financial gap of transitioning from traditional fossil fuel energy sources to renewables. Furthermore, implementing progressive and time-staggered tax increases on fossil fuel production—while considering energy needs and stakeholder interests, so as to not starve national energy systems or critically disrupt current energy dynamics and operations—can discourage continued reliance on fossil fuels and encourage a shift towards renewable energy sources.

In addition to intranational policies, and to incentivize renewable energy development and discourage domestic consumption of fossil fuels, the U.S. should also implement policies that promote international exports. Raising taxes on domestically utilized and sold crude oil and unrefined natural gas progressively can deter domestic consumption and encourage producers to focus on exporting refined petroleum products and natural gas. Additionally, lowering corporate expenses for trading refined petroleum and natural gas internationally can make exports more economically attractive and bolster international competitiveness. Streamlining export procedures can further reduce bureaucratic hurdles and facilitate the export process, facilitating the deployment of oil and gas as an international trading asset, and not as a source of domestic energy.

Among this section's financial enhancement and capitalization policy proposals, fossil fuel leases and their associated royalty payments require further attention and precision. As mentioned above, U.S. public entities have the authority to lease public lands for the recovery of mineral estates.[173] The total area of public leases varying throughout

[173] *See* discussion *supra* Section III.A.1.

the decades in response to political priorities, environmental concerns, and economic factors. Two unfavorable elements that have accompanied ebbs and flows of the industry and weighed down the efficiency and capacity for capitalization on leased lands are a lack of efficient land use and low royalty pricing.[174]

Federal lands in the U.S. comprise vast expanses of untapped potential, and also highlight a stark reality—of the 26 million acres allocated for oil and gas leases on federal public lands, a significant 50% have remained unproductive, while offshore, where 12 million acres fall under federal lease management, a substantial 80% of the subsurface remains largely unexplored.[175] This underdevelopment underscores a critical opportunity to unlock valuable resources for the nation's energy portfolio.[176]

A new regulatory system for land utilization would first require that, to encourage lessors to efficiently explore and exploit leased federal lands, exploration takes place within a specific agreed upon and reasonable time. Then, if recoverable assets are located, a lack of exploitation would carry penalties—the magnitude of which would be dependent on macroeconomics indicators, the state of the national energy economy, and negotiated lease agreements. If no recoverable assets are located, exploration leases may be suspended and reassessed for other non-fossil fuel related uses under public management. Additionally, the baseline leasing rate should be increased to ensure efficient land use and discourage

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[174] *See Most Oil Leases on Public Lands Go Unused*, NBC NEWS (June 1, 2004), https://www.nbcnews.com/id/wbna5111184; *Biden Issues Broad Moratorium on Oil and Gas Leases on Federal Lands and Waters*, S&P GLOB. COMMODITY INSIGHTS (Jan. 27, 2021), https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/012721-biden-issues-broad-moratorium-on-oil-and-gas-leases-on-federal-lands-and-waters.

[175] See Josh Axelrod, *Course Correction: Federal Oil and Gas Leasing Needs Fixing*, NAT. RES. DEF. COUNCIL (March 18, 2021), https://www.nrdc.org/bio/josh-axelrod/course-correction-federal-oil-and-gas-leasing-needs-fixing.

[176] *See Energy Facts Norway*, NORWEGIAN MINISTRY OF PETROLEUM & ENERGY (Jan. 4, 2019), https://energifaktanorge.no/en/et-baerekraftig-og-sikkert-energisystem/avgifter-og-kvoteplikt/.

non-productive land occupation for pricing speculation purposes. Next, royalties should be increased to compete with area-specific private sector marketability. Lastly, leases for renewable energy purposes should be incentivized in comparison to oil and gas exploitation enterprises, through reduced leasing rates and tax abatements on infrastructure construction and net profits on the sales of energy. By optimizing resource extraction from productive lands and raising royalty rates on energy production, as well as providing sizeable advantages to renewable energy leases, the federal government could significantly diversify its revenue streams, bolster its renewables financial capacity, and address critical sustainability priorities.

The augmentation of revenue streams derived from enhanced exports, strategic taxation on various facets of the fossil fuel industry, and strengthened land productivity and royalties, holds the potential to diversify and optimize existing government financial sources and increase available funds. Deposited into a sovereign fund, this capital could provide a robust financial foundation to drive the transition towards renewable energy, with both international and national implications. In the international context, foreign sovereign funds continue to gain importance in the global economy,[177] as well as increase their active strategic leverage in the U.S. economic systems by investing in American and other capital markets.[178] Within the last few decades, many nations have developed influential sovereign funds as a response to commodity market fluctuations and as economic and political

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[177] *See* John Lipsky, *Sovereign Wealth Funds: Their Role and Significance—A Speech by John Lipsky, First Deputy Managing Director*, INT'L MONETARY FUND (Sept. 3, 2008), https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp090308; YAEL SELFIN ET AL., THE IMPACT OF SOVEREIGN WEALTH FUNDS ON ECONOMIC SUCCESS (2011), https://www.pwc.co.uk/ assets/pdf/the-impact-of-sovereign-wealth-funds-on-economic-success.pdf.

[178] *See* discussion *supra* Section II.A (explaining that most of the Norwegian sovereign fund capital is invested in U.S. capital markets).

instruments.[179] Nationally, these funds carry colossal potential as a source of targeted sustainable technology and infrastructure development, and are a strategic vehicle by which to invest in capital markets in a diversified, stabilizing, and resilient way.[180]

One of the most significant challenges for fossil-fuel-exporting countries is transforming present competitive advantages into sustainable and stable future income.[181] There are many complexities in compensating for transitory variable revenue and transforming it into an enduring and continuous profit stream.[182] Sovereign funds can perform these functions and others. A well-managed sovereign fund can contribute to the capital protection of national economies by providing intergenerational long-term, non-commodity stability that is autonomous from fossil fuel price fluctuations through market, jurisdictional, and industry diversification. They can also be a tool for the development of specific sectors at national and international levels.[183] Developing a diversified economy through a fund can reduce the impact of potential variations in fossil fuel commodity prices, shielding national economies from volatility, and preparing economic systems for a post-fossil-fuel commodity era.[184]

In addition to monetary stabilization functions and other related benefits like less

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[179] *See* Alvaro Cuervo-Cazurra et al., *A Review of the Internationalization of State-Owned Firms and Sovereign Wealth Funds: Governments' Nonbusiness Objectives and Discreet Power*, J. INT'L BUS. STUD. 78, 79 (2022).

[180] *See generally* RAJIV SHARMA, SOVEREIGN WEALTH FUNDS INVESTMENT IN SUSTAINABLE DEVELOPMENT SECTORS (2017), https://www.un.org/esa/ffd/wp-content/uploads/sites/4/2017/11/ Background-Paper_Sovereign-Wealth-Funds_16-Nov.pdf.

[181] Jeffrey A. Frankel, *The Natural Resource Curse: A Survey of Diagnoses and Some Prescriptions* (John F. Kennedy Sch. of Gov't, Working Paper No. RWP12-014).

[182] *Id.*

[183] *See* KHALID A. ALSWEILEM ET AL., SOVEREIGN INVESTOR MODELS: INSTITUTIONS AND POLICIES FOR MANAGING SOVEREIGN WEALTH 24–75 (2015), http://projects.iq.harvard.edu/files/sovereignwealth/ files/investor_models_final.pdf.

[184] *Id.* at 17–18.

perceived corruption, exchange rate appreciation, and reductions in inflation,[185] a U.S. sovereign fund could have the capacity for targeted national economic development, as well as international geopolitical influence.[186] By depositing money from public land leases and fossil fuel taxes on intranational consumption and exports, the U.S. could develop an international investment tool that would serve multiple functions: (1) international economic leverage, (2) national economic stability, and (3) national reinvestment into renewable energy technology and infrastructure.[187] Like in Norway, a percentage of the returns of the fund could be allocated by the federal government for focalized national project redistribution, with the rest of the funding directed internationally to fund profitable international enterprises that meet the specific ethical standards.[188]

However, this structure is not without risks. Strict governance rules would be necessary to: (1) prevent politization in board composition and investment strategy, (2) ensure and enforce transparency, (3) delineate capacity to appropriate capital from the fund to specific quantities and revenue streams, and (4) measure the degrees of influence that a sovereign fund of such magnitude may have on the companies it invests in.[189] The solutions to these issues would require negotiated and stable political support.[190]

These policy recommendations all work toward one end goal: energy independence based on renewable resources. The exploitation of oil and gas may be justifiable on the

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[185] *Id.* at 14.
[186] *See* SELFIN ET AL., *supra* note 177.
[187] *See* discussion *supra* Section II.C, III.A.3.
[188] *Id.*
[189] *See* ALSWILEM ET AL., *supra* note 183, at 101.
[190] *See* discussion *supra* Section II.C.

basis of incumbent-economy interests and present energy-dynamics at this specific moment in history, but cannot be socioeconomically justified otherwise, especially within the context of long-term sustainability. As such, it is the duty of policymakers to consider the transient nature of fossil fuels and foster an agile transition towards a renewable future, without sacrificing energy independence. There are national and international strategic, economic, and environmental reasons to capitalize on the present state of fossil fuels as a provisional source of energy and an international tool for political and economic leverage via commodity markets.[191] In this context, a sovereign fund that holds the profits from an exploitation model based on fossil fuel exports could both finance the renewable transition and compete in international capital markets with other sovereign wealth funds. This article proposes a rational and balanced transition toward renewable energy resources culminating in an environmentally conscious and sustainable energy-independent economy.

IV. THE ECONOMIC CASE FOR A RENEWABLE ENERGY TRANSITION

In the intricate tapestry of factors shaping the global energy landscape, economic considerations weave together the viability, desirability, and widespread adoption of renewable energy sources. While renewable energy may offer compelling environmental benefits, their current economic viability in comparison to traditional fossil fuels remains a central point of contention. Given the profound influence of economic drivers on energy management and development decisions, a comprehensive understanding of renewable energy's economic potential and implications is not merely an option but a necessity for navigating the transition toward a sustainable energy future. This section posits that

[191] In 2021, more than 30% of the world's total energy consumption was still derived from oil, approximately 27% from coal, and approximately 25% from gas. *See* BRITISH PETROLEUM, *supra* note 33, at 12.

renewable energy, far from being a costly endeavor, represents a sound economic investment that can propel sustainable economic growth and foster a healthier, more resilient economy and society.

Renewable investments saved the global economy $55 billion in energy generation costs alone in 2022.[192] Accompanied by escalating technological advancements in the field, the cost of generating renewable energy has fallen sharply and fast: Between 2020 and 2021, the cost of onshore wind electric generation fell by 15%, offshore wind by 13%, and solar photovoltaic (PV) by 13%.[193] This price differential and its cost-stability can be attributed to a series of factors, including leaps in the technology's generation efficiency, renewable energy infrastructure standardization, and the isolation of energy production from the volatility of fossil fuel prices.[194] On average, the cost of electricity for renewable technologies was $0.033 per kilowatt-hour (kWh) for onshore wind, $0.075 per kWh for offshore wind, $0.048 per kWh for both hydropower and solar PV, $0.067 per kWh for bioenergy, $0.068 per kWh for geothermal, and $0.114 per kWh for concentrated solar power.[195] This is significantly cheaper than its fossil fuel counterparts: The cost of natural gas production—which accounts for over 38% of electric energy generation in the U.S.—averaged between $0.23 per kWh and $0.27 per kWh in 2021, which represented a dramatic increase of 540% and 645% more than in 2020.[196] This is currently four to six times more

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[192] *See Renewable Power Remains Cost-Competitive Amid Fossil Fuel Crisis*, INT'L RENEWABLE ENERGY AGENCY (July 13, 2022), https://www.irena.org/news/pressreleases/2022/Jul/Renewable-Power-Remains-Cost-Competitive-amid-Fossil-Fuel-Crisis; INT'L RENEWABLE ENERGY AGENCY, RENEWABLE POWER GENERATION: COSTS IN 2021 (2022), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jul/IRENA_Power_Generation_Costs_2021.pdf.

[193] *See Renewable Power Remains Cost-Competitive Amid Fossil Fuel Crisis*, *supra* note 192.

[194] *See* INT'L RENEWABLE ENERGY AGENCY, *supra* note 192, at 101.

[195] *Id.* at 16.

[196] *Id.*

expensive than new solar or onshore wind.[197] Certain renewable technologies such as offshore wind, now produce electricity at costs approximately 40% lesser than new coal or gas plants, with this price separation continuing to increase.[198] By 2025, it may be more costly to operate a coal plant in the U.S. than to build replacement wind and solar facilities within thirty-five miles of each plant.[199] Future projections of the cost of electricity in the U.S., inclusive of the cost of storage, further solidify this trajectory. By 2027, combined cycle facilities and facilities for combustion turbines (both reliant on fossil fuels) will cost $37.05 per megawatt hour (mWh), combustion turbines will cost $123.84 per mWh, and the unweighted cost of coal produced in a modern facility will be $82.61 per mWh.[200] In contrast, onshore wind costs are projected at $37.80 per mWh, and standalone solar costs at $36.09 per mWh.[201]

With production costs declining steadily, renewable energy sources are rapidly emerging as a cost-effective alternative to fossil fuels, offering a sustainable and economically sound path towards a greener future. Despite the increasing cost-competitiveness of renewable energies, most electric power in the U.S. is still generated by fossil fuels—predominantly gas and coal, which together represent roughly 60% of total production—while less than 20% of the total electric energy share is sourced from traditional renewables like wind or solar, and roughly 20% derives from nuclear

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[197] *Id*.
[198] *Id*.
[199] *See* Silvio Marcacci, *Renewable Energy Job Boom Creates Economic Opportunity As Coal Industry Slumps*, FORBES (Apr. 22, 2019), https://www.forbes.com/sites/energyinnovation/2019/04/22/renewable-energy-job-boom-creating-economic-opportunity-as-coal-industry-slumps/?sh=7e68a9193665.
[200] *See* U.S. ENERGY INFO. ADMIN., LEVELIZED COSTS OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2022 10 (2022), https://www.eia.gov/outlooks/aeo/pdf/electricity_ generation.pdf.
[201] *Id*.

capabilities.[202]

While the cost-effectiveness of energy production alone is a crucial factor, a comprehensive economic assessment must include the cost of infrastructural transition. An energy conversion to renewable energy resources is feasible, but would be undeniably capital-intensive: According to a 2019 study, "[c]onverting the entire U.S. power grid to 100 percent renewable energy in the next decade is technologically and logistically attainable, and would cost an estimated $4.5 trillion."[203] This transition would require not only a large-scale generation infrastructural reorganization, but also massive investments in electricity storage and expanding the current transmission grid by approximately 50%.[204] The transition to renewable energy would necessarily require significant upfront costs; but these investments may not only lead to long-term cost reductions, they may also open up new opportunities in economic sectors with unrealized potential, creating or strengthening new and valuable industries.

Though the current absence of value chain synergies may increase initial costs of deployment for renewables, making the transition cost-intensive, these challenges also create ample opportunities in diverse new technology sectors such as infrastructural manufacturing, engineering, design, education and training, and research and development just to name a few of the potentially sprouting fields—and all of this in largely untapped

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[202] *Frequently Asked Questions (FAQS): What is U.S. Electricity Generation by Energy Source?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=427&t=3 (last updated Mar. 2, 2023).

[203] *Shifting U.S. to 100 Percent Renewables Would Cost $4.5 Trillion, Analysis Finds*, YALE ENV'T 360: E360 DIGEST (June 28, 2019), https://e360.yale.edu/digest/shifting-u-s-to-100-percent-renewables-would-cost-4-5-trillion-analysis-finds.

[204] Lucas Toh, *Let's Come Clean: The Renewable Energy Transition Will Be Expensive*, COLUM. CLIMATE SCH. NEWS: CLIMATE (Oct. 26, 2021), https://news.climate.columbia.edu/2021/10/26/lets-come-clean-the-renewable-energy-transition-will-be-expensive/ ("This is a conservative projection, because the country will also need 90% more electricity by 2050 to electrify cars, factories, and home heating.").

markets, creating a modernized, resilient, and sustainable industrial and labor landscape.[205] It is worth noting that international markets could benefit from American technology and expertise leading these sectors, unlocking new avenues for long-term growth and expansion in jobs, services, and products, both nationally and internationally.

Despite the currently unexplored potential of these markets, the shift from fossil fuels to renewable energy sources is driving a rapid transformation in the energy sector, and is already creating new job opportunities and reshaping the skills market: In the U.S., approximately 3.1 million jobs (over 41% of all energy sector jobs) were aligned with net-zero emissions goals in 2021.[206] These jobs are in industries that include renewable energy generation, energy storage, renewable fuels, and electric vehicles among other analogous sectors.[207] Renewable energy jobs have increased steadily in recent years, with solar and wind energy leading the way.[208] These jobs provide stable and high-wage employment in some of the country's most fossil-fuel dependent states, while coal and oil jobs continue to decline.[209] Directed federal and state policy within the renewable energy industry could present solutions to soften the impact of the receding economic value of fossil fuel industries, which have negatively impacted labor markets.[210] While the infrastructural and workforce transition to renewable energy presents challenges, it may also unveil a myriad of opportunities, fostering job creation, invigorating existing industries, and giving way to

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[205] *See* Max Wei et al., *Putting Renewables and Energy Efficiency To Work: How Many Jobs Can the Clean Energy Industry Generate in the US?*, 38 ENERGY POL'Y 919, 928 (2010).

[206] U.S. DEP'T OF ENERGY, UNITED STATES ENERGY & EMPLOYMENT REPORT: 2022 2-3 (2022), https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20National%20Report_1.pdf.

[207] *See generally id.*; Marcacci, *supra* note 199.

[208] U.S. DEP'T OF ENERGY, *supra* note 206, at 3.

[209] Marcacci, *supra* note 199.

[210] *Id.*; *see also* Adie Tomer et al., *How Renewable Energy Jobs Can Uplift Fossil Fuel Communities and Remake Climate Politics*, BROOKINGS INST. (Feb. 23, 2021), https://www.brookings.edu/ research/how-renewable-energy-jobs-can-uplift-fossil-fuel-communities-and-remake-climate-politics/.

entirely new economic landscapes.

Despite cost advantages in power-generation costs for renewables, and the industrial and labor succession windfall the infrastructural transition may bring, fossil fuels appear to retain another crucial incumbent advantage: ease of energy storage. Fossil fuels are more easily stockpiled and transported than most renewable energies, given that they can be easily stored in barrels, liquid forms, and other physical states and chemical compositions. Conversely, renewable energy infrastructure is much more irregular in its current state, as it requires specific geographic features and weather variables for energy production, and its more complex storage is not as developed or implemented.[211] Though these energy supply dynamics are undeniable, they may be diminished or resolved by investment in battery and electric storage technology and infrastructure, as well as diversification of energy-generating resources across the U.S.[212]

While fossil fuels offer advantages in storage and transportation, the multi-dimensional complexity of their supply-chains introduces vulnerabilities that elevate the risks and uncertainties associated with relying on them as primary energy sources. At the heart of these risks lie the finite nature of fossil fuel reserves and the inherent volatility of their commodity trading, which deeply jeopardize the economics of long-term energy security. Regarding supply limitations, oil and gas reserves are anticipated to be exhausted

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[211] *See* Tom Melville, *Energy Storage Important To Creating Affordable, Reliable, Deeply Decarbonized Electricity Systems*, MIT NEWS (May 16, 2022), https://news.mit.edu/2022/energy-storage-important-creating-affordable-reliable-deeply-decarbonized-electricity-systems-0516; Reinhard Haas et al., *On the Economics of Storage for Electricity: Current State and Future Market Design Prospects*, 11 WIREs ENERGY & ENV'T 7 (2022), https://doi.org/10.1002/ wene.431; Matthew Hutson, *The Renewable Energy Revolution Will Need Renewable Storage*, NEW YORKER (Apr. 18, 2022), https://www.newyorker.com/magazine/2022/04/25/the-renewable-energy-revolution-will-need-renewable-storage.

[212] Melville, *supra* note 211; Hutson, *supra* note 211.

by the end of this century: Current projections suggest that oil reserves, under present exploitation and consumption patterns, are likely to be depleted by 2050; followed by natural gas within approximately 80 years.[213] In addition, oil and gas prices exhibit greater volatility compared to other asset classes, reflecting their sensitivity to supply disruptions, geopolitical events, and economic conditions: From June 2021 to June 2022, for example, prices for imported natural gas increased 165.5%.[214] In Europe, natural gas prices underwent an astonishing surge, tripling within a single month in March of 2022.[215] As aforementioned, natural gas is the largest source of electricity generation in the U.S., constituting 32% of the total energy input into the electrical grid.[216] Needless to say, choosing a commodity that surrenders to such volatility and price-fluctuation as a core energy-generating asset is inherently sensitive, leading to unpredictable operating costs, hindering long-term planning, and being at the mercy of international commodity markets—which in turn sacrifices energy independence and assumes a vulnerable geostrategic position. Given the volatility of fossil fuel markets and the inherent uncertainties in geopolitical and international economics, it seems prudent and critical to structurally prioritize the strategic selling of these assets rather than their acquisition; and to hasten the transition away from fossil fuels as primary or necessary energy sources for

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[213] *See* Gioietta Kuo, *When Fossil Fuels Run Out, What Then?*, MAHB (May 23, 2019) https://mahb.stanford.edu/library-item/fossil-fuels-run/.

[214] *See U.S. Import Prices for Natural Gas Increase 165.5 Percent for the Year Ended June 2022*, TED: THE ECON. DAILY (July 21, 2022), https://www.bls.gov/opub/ted/2022/u-s-import-prices-for-natural-gas-increase-165-5-percent-for-the-year-ended-june-2022.htm.

[215] Adil Mohommad et al., *Volatile Commodity Prices Reduce Growth and Amplify Swings in Inflation*, INT'L MONETARY FUND (March 28, 2023), https://www.imf.org/en/Blogs/Articles/2023/03/28/volatile-commodity-prices-reduce-growth-and-amplify-swings-in-inflation.

[216] *See Natural Gas Explained: Use of Natural Gas*, *supra* note 121.

long-term economic stability.[217]

A key advantage of renewable energy sources in this regard lies in their insulation from the volatile swings of the fossil fuel market, offering a path towards stable energy costs and enhanced energy independence. This is due, in large part, to the absence of fuel re-stocking, which is the largest expenditure in fossil steam and gas turbine plants.[218] This makes current renewable energy technologies a generally cheaper alternative to operate and protects renewable-based technologies from price fluctuations in the commodity markets. In contrast to the fluctuating costs and supply disruptions inherent in oil and gas, renewable energy sources offer a more secure and economically stable path forward, characterized by lower capital variable intensity, reduced reliance on complex logistics and international commodity markets, and the potential for energy independence.

In addition to reducing and potentially stabilizing the price of energy generation, renewable energies can also become a source of direct public revenue. Just as the oil and gas industries generate revenue for the federal government through lease payments on onshore and offshore lands, renewable energy can provide similar sources of funding by leasing lands suitable for renewable energy production. The already ongoing economic output of offshore wind in the U.S. offers a useful example of this. Between 2009 and 2020, the Bureau of Ocean Energy Management proactively implemented a series of offshore renewable energy programs, issuing 15 active commercial offshore wind energy leases

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[217] *See, e.g.*, Press Release, Int'l Energy Agency, IEA Provides 10-Point Plan to European Union for Reducing Reliance on Russian Supplies by Over a Third While Supporting European Green Deal, with Emergency Options To Go Further (Mar. 3, 2022), https://www.iea.org/news/how-europe-can-cut-natural-gas-imports-from-russia-significantly-within-a-year.

[218] U.S. ENERGY INFO. ADMIN., *supra* note 200.

encompassing 1.7 million acres.[219] These leases generated nearly $500 million in bonus bids alone, without accounting for royalties, lease revenue, or rental fees.[220] In fact, in increasing ties between the Norwegian energy economy and U.S. sustainability efforts, the mostly State-owned company Equinor has become an active participant in U.S. offshore wind infrastructure, having been selected in several state bids including New York[221] and Massachusetts.[222] A proposal to embrace and enhance these renewable leases is not a proposal for the suppression of ongoing fossil fuel leases altogether, but an acknowledgement of the fact that a similar structure of monetization is available for public institutions within the context of green energy. Renewable energy resources could emulate the success of oil and gas lease capitalization, adding to energy diversification and directly contributing to public funds, serving as a financial transition tool.

In examining the economic landscape of fossil fuels, another crucial consideration is the cost of public health externalities consequent to their production and consumption. While often overlooked in conventional economic assessments, the pervasive public health effects associated with fossil fuel dependence pose a significant economic burden. The detrimental environmental consequences of fossil fuel utilization have become increasingly evident in recent decades, as the harmful emissions generated by these non-renewable energy sources continue to degrade ecosystems and adversely impact public

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[219] David Wochner et al., *U.S. Laws and Regulations Shaping Offshore Wind Development*, *in* US OFFSHORE WIND HANDBOOK: 2022 16 (Jonathan Shallow et al. ed., 2022), https://marketing storageragrs.blob.core.windows.net/webfiles/2022_Offshore_Wind_Handbook.pdf.

[220] *Id*.

[221] The projects are expected to generate power for 1.3 million homes and support more than 5,200 direct jobs. *Id.* at 40.

[222] Equinor's winning total bid amounted to $405 million. *Id.* at 37.

health.[223] Illustrating this point, air pollution caused by fossil fuels is estimated to be the cause of premature death for more than eight million people per year globally.[224] In the U.S. alone, the premature fatality rate from fossil fuel pollution is estimated at roughly 350,000 people per year.[225]

Beyond the immeasurable human cost of fossil fuel-related deaths, fossil fuels' detrimental effects on public health can also be quantified in terms of substantial monetary expenditures. [226] It is estimated that air pollution associated with fossil fuels costs the global economy about 3.3% of its annual GDP, or about $8 billion per day.[227] This figure reflects chronic illnesses, preterm births, professional sick leave, child and adult fatalities, and other negative consequences that fossil fuel toxicity may have on individual and community health.[228] In the U.S. alone, research indicates that air pollution has direct costs of well over $600 billion per year,[229] with electric energy generation and transportation contributing over 70% of said pollution.[230] Photochemical modeling quantifies the public

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[223] Johannes Lelieveld et al., *Effects of Fossil Fuel and Total Anthropogenic Emission Removal on Public Health and Climate*, 116 PROC. OF THE NAT'L ACAD. OF SCI. OF THE U.S. 7192, 7193 (2019) (showing excess mortality rate attributed to air pollution); *see also* Brian Straser et al., *Air Quality and Health Benefits from Potential Coal Power Plant Closures in Texas*, 69 J. OF THE AIR & WASTE MGMT. ASS'N 333, 338–39 (2019).

[224] *See* Karn Vohra et al., *Global Mortality from Outdoor Fine Particle Pollution Generated by Fossil Fuel Combustion: Results from GEOS-Chem*, 195 ENV'T RSCH. 110754, at 4 (2021).

[225] *Fossil Fuel Air Pollution Responsible for 1 in 5 Deaths Worldwide*, C-CHANGE (Feb. 9, 2021), https://www.hsph.harvard.edu/c-change/news/fossil-fuel-air-pollution-responsible-for-1-in-5-deaths-worldwide/; *see also* Fabio Caiazzo et al., *Air Pollution and Early Deaths in the United States. Part I: Quantifying the Impact of Major Sectors in 2005*, 79 ATMOSPHERIC ENV'T 198 (2013).

[226] *See* Ben Machol & Sarah Rizk, *Economic Value of U.S. Fossil Fuel Electricity Health Impacts*, 52 ENV'T INT'L 75, 78–80 (2013); NAT'L RSCH. COUNCIL, NAT'L ACAD., HIDDEN COSTS OF ENERGY: UNPRICED CONSEQUENCES OF ENERGY PRODUCTION AND USE 5–11 (2010), https://nap.nationalacademies.org/read/12794/chapter/1.

[227] AIDAN FARROW ET AL., GREENPEACE SE. ASIA, TOXIC AIR: THE PRICE OF FOSSIL FUELS 1 (2020), https://storage.googleapis.com/planet4-southeastasia-stateless/2020/02/21b480fa-toxic-air-report-110220.pdf.

[228] *Id.*

[229] *Id.*

[230] *See* CHAD SHIRLEY, CONG. BUDGET OFF., 58861, EMISSIONS OF CARBON DIOXIDE IN THE TRANSPORTATION SECTOR (Bo Peery ed., 2022), https://www.cbo.gov/publication/58861.

health costs from fossil fuel-based electric generation between a low of $0.10 and $0.41 per kWh depending on the state—reaching a variable national average between $0.24 and $0.46 per kWh.[231] At a macroeconomic level, these added costs establish that fossil fuel electricity in the U.S. represents a financial burden on public health ascending to annual amounts between $361.7 billion and $886.5 billion.[232] Regarding individual decision-making patterns, if these externalities were reflected in the cost of electricity, consumers should be willing to pay up to $0.45 more per kWh to address the health effects of fossil fuels.[233] This is more than the entire cost of a renewable kWh, with the aforementioned costs of $0.033 per kWh for onshore wind, $0.075 per kWh for offshore wind, and $0.048 per kWh for both hydropower and solar PV, $0.067 per kWh, amongst other cost-effective renewable energy alternatives.

The transportation sector is also one of the largest contributors to unhealthy air quality, and significantly contributes to adverse public health expenses.[234] Many of its emissions are linked to respiratory problems, damage to the immune system, reproductive and developmental disorders, and neurological damage, among many other similar pathologies.[235] Emissions from transportation are the cause of more than 50% of air pollutants in American cities, significantly impacting U.S. public health.[236] A study after the 1996 Summer Olympic Games in Atlanta constitutes a revelatory example of the potential damage from air pollution in U.S. communities. During the games, peak morning

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[231] Machol & Rizk, *supra* note **Error! Bookmark not defined.**, at 78 (referencing 2010 nominal dollars).
[232] *Id*.
[233] *Id*.
[234] *See* Joachim Heinrich et al., *Studies on Health Effects of Transport-Related Air Pollution*, *in* HEALTH EFFECTS OF TRANSPORT-RELATED AIR POLLUTION 162 (Michal Krzzyzanowski et al. eds., 2005).
[235] *Id.*
[236] *Where Does Air Pollution Come From?*, U.S. NAT'L PARK SERV., https://www.nps.gov/subjects/air/sources.htm (last updated Jan. 17, 2018).

traffic decreased by 22.5%; concurrently, emergency visits for pediatric asthma events decreased by 41.6%.[237] The results of this study signal that perhaps efforts to reduce transportation emissions are a demonstrable way of improving public health and generating economic efficiency.

The economic case for renewable energy appears to be solidly founded on current and projected prices of renewable power generation, volatility risks, infrastructural and capitalization economics and industry resiliency, and public health costs alone. But there are other burdens that fossil fuels bring upon the economy, including catastrophic weather events, the costs of which have increased more than 400% since the 1980s.[238] Data show that these events keep increasing in both severity and cost. The U.S. has experienced a dramatic intensification in the financial impact of weather disasters, with 373 events costing over $1 billion between 1980 and 2022, predominantly concentrated in the last decade, underscoring an alarming trend of escalating costs.[239] The total costs of these weather and climate disasters ascends to $2.645 trillion, having also taken over 16,000 lives since 1980.[240] In the last five years, 89 extreme weather events have cost Americans almost $125 billion per year—which amounts to approximately 25% of the total costs incurred since 1980.[241] In 2022 alone, these events cost the U.S. economy an estimated

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[237] Michael S. Friedman et al., *Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma*, 285 J. OF THE AM. MED. ASS'N 897, 900, 902 (2001).

[238] Stephen Leahy, *Hidden Costs of Climate Change Running Hundreds of Billions a Year*, NAT'L GEOGRAPHIC (Sept. 27, 2017), https://www.nationalgeographic.com/science/article/climate-change-costs-us-economy-billions-report.

[239] *Id.*; *U.S. Billion-Dollar Weather and Climate Disasters: Overview*, NAT'L CTRS. FOR ENV'T INFO., https://www.ncei.noaa.gov/access/billions/ (last visited Sept. 20, 2023).

[240] *Id.*

[241] *Billion-Dollar Weather and Climate Disasters: Summary Statistics*, NAT'L CTRS. FOR ENV'TL INFO., https://www.ncei.noaa.gov/access/billions/summary-stats (last visited Sept. 20, 2023).

$165 billion.[242] If present scientific evidence is accurate, and these events are connected to anthropogenic climate change to which fossil fuels are a contributing factor, a transition towards renewable energy would constitute an economic imperative.[243]

All the advantages that renewable energy presents to economic prosperity and resilience have made many governments revise decades of oversight and follow the path that nations like Norway have taken. Foreign administrations are increasingly turning their attention and focusing investment and regulatory efforts toward a renewable energy transition. There is recent international inertia toward bolstering renewable energy infrastructure, and the U.S. risks falling behind in the economic opportunities and energy independence this presents. Development and implementation of renewable energies are expanding internationally in the form of large-scale infrastructure projects and ambitious climate objectives: China has pledged to have 33% of its energy needs covered by renewables by 2025,[244] the European Union has created a regulatory framework including goals such as a minimum of 32% renewable energy usage and a reduction of 40% of greenhouse gas emissions by 2030,[245] and Mexico has committed to generate at least 35% of its power through renewables by 2024 as well as to emission reductions of 50% by 2050 compared to 2000.[246] This international evolution into the massive yet unrealized potential of renewable energies is receiving governmental support in the form of direct fund

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[242] *Id*.

[243] *See Climate Change Indicators: Weather and Climate*, U.S. ENV'T PROT. AGENCY (Aug. 1, 2022), https://www.epa.gov/climate-indicators/weather-climate.

[244] *China Says a Third of Electricity Will Come from Renewables by 2025*, REUTERS (June 1, 2022), https://www.reuters.com/business/sustainable-business/china-says-third-electricity-will-come-renewables-by-2025-2022-06-01/.

[245] *See National Energy and Climate Plans (NECPs)*, EURO. COMM'N (Jan. 2023), https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en.

[246] *General Law of Climate Change (Mexico)*, INT'L ENERGY AGENCY, https://www.iea.org/policies/ 8683-general-law-of-climate-change-mexico (last updated Aug. 12, 2022).

disbursement, tax breaks, and other regulatory advantages. The U.S. assumes certain risks without adherence to similar initiatives, including market share considerations inclusive of loss of first-mover advantages, with potential consequent losses in the export markets; technology stagnation, potentially leading to long-term reliance on foreign technological solutions; fossil fuel energetic dependency, alongside its associated geostrategic, resource-based, and commodity markets vulnerabilities; and global standing considerations, risking international reputation, influence, and soft power effects. Veering toward renewables opens both political and economic leadership opportunities. An increased American commitment could cause a snowball effect that would make renewable energy a priority and a new global frontier to strive for, both economically and politically.

Regulatory frameworks play a crucial role in shaping the economic landscape of energy production. Policies have historically been foundational sponsors of certain energetic trends, with tools such as tax breaks and subsidies. These tools traditionally directed at supporting the oil and gas industries in the U.S. can be redirected toward renewable energy and can accelerate the transition to a clean energy economy, while carbon pricing mechanisms can internalize the environmental costs of fossil fuels, leveling the playing field and making renewable energy more economically attractive.

Burning fossil fuel for electricity has an impact on climate change, air quality, and public health—three areas that have become inextricably linked. This is not just a social, but an economic, concern that must be confronted by bringing renewable energy to the forefront of the legal and policy conversation. The true cost of energy extends beyond the direct expenses of production and includes significant elements such as associated environmental externalities, public health economics, and the uncertainties and volatility

inherent in climate and market dynamics,[247] that often remain unaccounted for in traditional economic analyses. Fossil fuels, despite their perceived lower upfront costs and incumbent advantages, impose significant burdens stemming from their operational deficiencies and environmental ramifications, which lead to substantial societal and economic costs.[248] In contrast, renewable energy sources, such as solar, wind, and geothermal power, offer a cleaner and more sustainable energy option, devoid of many of these costly byproducts. While the initial investment costs for renewable energy projects may be higher at this specific time in technological and infrastructural development history, the long-term operational costs of renewables are significantly lower, and their sustainable nature allows for a reduction in environmental externalities which translates into substantial economic efficiency. Overall, transitioning toward a renewable energy economy presents a compelling economic opportunity on its own—offering long-term energy generation cost savings, job creation, reduced public health expenditures, and economic and technological diversification, increasing energy security and independence in an economically efficient manner.

V. CONCLUSION

Norway's energy model is not without contradictions. The country is one of the most influential international commodity traders, exporting considerable amounts of oil and gas across Europe and the world; yet, its national energy system functions almost entirely on renewable energy. By instituting a well-functioning sovereign fund, Norway has been able to not only set the foundations for escaping its reliance on oil and gas as

[247] *See generally* discussion *supra* Section IV.
[248] *Id.*

sources of energy and revenue, but also contribute to an international renewable future, by utilizing its capital to invest in sustainable companies and divest from those focused on fossil fuel development.

The U.S., on the other hand, is a nation at a crossroads. America is a titan in both oil and gas production and consumption, positioning itself as the largest global fossil fuel producer, and boasting almost a fifth of the world's total oil and gas extraction as well as its utilization. Despite aggressive oil and gas output, the U.S. continues to import large amounts of non-renewable energy resources to sustain its huge deployment patterns.

The path toward renewable energy independence in the U.S. lies not solely in its abundant renewable resource potential, but also in its policy choices. Drawing inspiration from Norway's pioneering transition, the following series of strategic policy decisions—focused on leveraging fossil fuel and renewable energy assets, effective resource management, and the implementation of adaptive market mechanisms—offer a practical blueprint to guide the nation towards a more sustainable and energy-secure future.

First, the U.S. can discourage intranational consumption of fossil fuels through a strategic reorganization of energy generation systems. This can be achieved by limiting domestic fossil fuel usage through targeted policy measures such as a revitalization of the lease and royalty system for federal lands to favor renewable infrastructure and energy generation, establishing tax and grant incentives for renewable energy development stimulating private investment, and implementing market-based and progressive time-staggered taxation on extraction and utilization of fossil fuels. Second, the U.S. could enhance a system of exports anchored in utilizing oil and gas as commodity trading assets rather than primary energy sources. By streamlining export processes, improving financial

and regulatory support for international trade and its infrastructure, and strategically enhancing crude and unrefined export markets, the U.S. could capitalize on its existing fossil fuel reserves while generating federal revenue—and incentivizing private capital—redirected to support renewable energy investments. Third, the U.S. could establish a diversified and ethically grounded sovereign wealth fund for reinvestment into renewable energy. Strategic management of fossil fuel asset revenue via a sovereign wealth fund dedicated to renewable energy investments could provide a long-term and stable source of financing for renewable energy projects. This fund could be capitalized by revenues from general fossil fuel taxation initiatives, exploration and exploitation leases on public lands, and other levied associated revenues, ensuring the financial foundations toward a sustainable energy future. Examples of the success of this formula can already be seen in oil-producing states within the U.S., like Texas or Alaska among others, where large funds financed by the sale of oil and gas help bolster essential public programs.

While these measures may seem challenging, the U.S. has the economic and technological capabilities to implement them successfully. Tailored adjustments to existing policies and regulations can guide the nation towards more sustainable energy and economic systems. By adapting Norway's most successful energy policy principles and implementing these three key pillars, the U.S. can not only achieve renewable energy independence but also position itself as a global leader in the transition to a low-carbon economy. To do this, the U.S. has a choice to make: Continue down its current path of production and consumption despite looming environmental or commodity disaster, or capitalize on this moment in history and build something new, sustainable, and better.

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Cryptocurrency Mining and Grid Stabilization in Texas: ERCOT's Opportunity for Redemption

By Leigh Cummings

I. INTRODUCTION

In February 2021, a winter storm hit Texas, knocking out power and heat for more than four million people as the electric grid failed; hundreds died.[1] Across the state, stakeholders blamed the instability of the Electric Reliability Council of Texas (ERCOT), as decades of warnings from agencies and experts that the independent system operator (ISO) would be unprepared for a weather emergency went unheeded by legislators and regulators.[2]

In the summer of 2022, during one of the hottest Julys on record, Riot Blockchain, a large cryptocurrency mining operation in central Texas, received power credits from ERCOT to temporarily stop operations.[3] The corporation ultimately reported that they made more money from this arrangement with ERCOT than they would have had they continued to mine Bitcoin.[4]

Can we reconcile these two events? It may seem inherently unfair that corporations who use exorbitant amounts of energy be paid a windfall not to operate. However, the nature of cryptocurrency mining operations might effectively allow them to contribute significantly to stabilizing the grid. If ERCOT were to continue to utilize a system of offering power credits to large cryptocurrency mining operations to stop operations during times of peak demand, supported by incentives for individual consumers to curtail their energy usage, the ISO may be able to make up for the previous failures of Texas regulators and lawmakers to stabilize the decentralized electric grid.

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1 *See infra* note 27 and accompanying text.
2 *See infra* note 17 and accompanying text.
3 *See infra* note 66 and accompanying text.
4 *See infra* note 68 and accompanying text.

II. ERCOT

The U.S. electric grid carefully balances supply and demand for energy to power homes and businesses.[5] The grid is comprised of thousands of power plants, transmission lines, and distribution centers, separated into three distinct grids in the lower forty-eight states: the Eastern, Western, and Texas interconnections.[6]

ERCOT is a state agency that runs the grid covering 90% of Texas, or 26 million customers.[7] ERCOT was founded in 1970 and is overseen by the Public Utility Commission of Texas (PUC) and the state legislature.[8] As electric power development grew and connections between cities began to form, the passage of the Federal Power Act in 1935 established federal jurisdiction over power in interstate commerce via the Federal Power Commission, now the Federal Energy Regulatory Commission (FERC).[9] By isolating its grid within the state's borders, Texas has intentionally remained outside of federal regulatory jurisdiction.[10]

ERCOT is responsible for overseeing the transmission of power from distribution companies to homes and businesses.[11] According to ERCOT, its mission is to "serve the public by ensuring a reliable grid, efficient energy markets, open access[,] and retail

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5 James McBride & Anshu Siripurapu, *How Does the U.S. Power Grid Work?*, COUNCIL ON FOREIGN RELS. (July 5, 2022, 11:53 AM), https://www.cfr.org/backgrounder/how-does-us-power-grid-work.

6 *Id.*

7 Kate Galbraith, *Texplainer: Why Does Texas Have its Own Power Grid?*, THE TEX. TRIB. (Feb. 8, 2021), https://www.texastribune.org/2011/02/08/texplainer-why-does-texas-have-its-own-power-grid/; Jennifer Prohov, *FAQ: ERCOT and the Texas Power Grid,* WFAA (June 15, 2021), https://www.wfaa.com/article/news/local/texas/faq-ercot-texas-power-grid/287-9b3514af-8ad2-49b5-aa35-1b6bb238b47e.

8 Prohov, *supra* note 7.

9 CAREY W. KING ET AL., THE UNIV. OF TEX. AT AUSTIN: ENERGY INST., THE TIMELINE AND EVENTS OF THE FEBRUARY 2021 TEXAS ELECTRIC GRID BLACKOUTS 82 (2021), https://www.puc.texas.gov/agency/resources/reports/utaustin_(2021)_eventsfebruary2021texasblackout_(002)final_07_12_21.pdf.

10 *Id.*

11 Prohov, *supra* note 7.

choice."[12]

When demand for electricity gets dangerously close to the amount available, ERCOT sometimes sends out alerts to Texans asking them to conserve energy.[13] Such actions may include lowering the thermostat in the winter or raising it in the summer, turning off nonessential appliances and lights, or avoiding using large appliances such as ovens and washing machines.

A. EXTREME WINTER WEATHER IN TEXAS & CALLS FOR REGULATORY ACTION

Legislators and regulators, including the PUC, have repeatedly failed to address weaknesses in the grid.[14] In 2011, Texas was hit with a winter freeze that led to power outages across the state.[15] An official report from FERC and the North American Electric Reliability Corporation found that "winterizing" power infrastructure could have prevented the outages, and recommended implementing new winter practices as soon as possible.[16] However, Texas was not bound to the recommendations because its grid is outside of FERC jurisdiction, and the recommendations were not implemented.[17] Another issue compounded the problem—because Texas' grid is not connected to other states, it is difficult for other areas to send power to Texas in an emergency.[18]

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12 *Vision and Mission,* ELEC. RELIABILITY COUNCIL OF TEX., https://www.ercot.com/about/profile/ vision (last visited Aug. 10, 2023).

13 *See* Prohov, *supra* note 7.

14 *See* Erin Douglas et al., *Texas Leaders Failed To Heed Warnings That Left the State's Power Grid Vulnerable to Winter Extremes, Experts Say*, THE TEX. TRIB. (Feb. 17, 2021), https://www.texastribune.org/2021/02/17/texas-power-grid-failures/.

15 *Id.*

16 *Id.*; FED. ENERGY REGUL. COMM'N & N. AM. ELEC. RELIABILITY CORP., REPORT ON OUTAGES AND CURTAILMENTS DURING THE SOUTHWEST COLD WEATHER EVENT OF FEBRUARY 1-5, 2011, at 8–9 (2011), https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf (executive summary of electricity recommendations).

17 Jeremy Schwartz et al., *"Power Companies Get Exactly What they Want": How Texas Repeatedly Failed To Protect its Power Grid Against Extreme Weather*, THE TEX. TRIB. (Feb. 22, 2021, 5:00 PM), https://www.texastribune.org/2021/02/22/texas-power-grid-extreme-weather/.

18 *Id.*

After a cold snap in 2014, the PUC again had the opportunity to require energy companies to identify and address all potential failure points, but after pushback from the industry, only required power companies to address previously known issues—not to anticipate future problems.[19] Despite investigations and repeated warnings from agencies and experts, Texas lawmakers have failed to pass legislation requiring ERCOT to ensure adequate reserves to shield against blackouts.[20] Legislation providing for greater accountability of state agencies has been consistently rejected, including a 2015 bill that would have required state agencies, including the PUC, to use state climatologist data to plan for severe weather events.[21]

Advocates and experts have blamed these failures on the heavy influence of power companies over energy regulation; laws in Texas continue to favor large electricity providers.[22] There is currently no requirement for power companies in Texas to produce enough electricity to safeguard against potential emergencies.[23] Power companies are instead motivated to increase generation only by high demand driving up prices for consumers.[24] In 2014, a CenterPoint Energy executive was even reported saying on an earnings call that CenterPoint "benefited significantly" from the 2014 polar vortex and planned to "be opportunistic and take advantage of those conditions" in the event of another extreme weather emergency.[25]

While some generators voluntarily worked to better their winter practices, in

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19 *Id.*
20 *See id.*
21 *Id.*
22 *See id.*
23 Schwartz et al., *supra* note 17.
24 *Id.*
25 *Id.* In 2021, it was reported that this executive's division was no longer part of the company and had "no role in responding" to the February 2021 winter storm. *Id.*

February 2021, regulation to mandate preparation for extreme weather events was still nonexistent, and Texas was hit with another devastating winter storm for which the grid was unprepared.[26] Winter Storm Uri showed the instability of ERCOT's grid, as more than four million homes and businesses lost power and heat, causing hundreds of people to die from extreme cold exposure or the failure of medical equipment, and costing the state of Texas between $80 and $130 billion.[27]

B. ERCOT LIABILITY, PROPOSED LEGISLATION, AND SUNSET REVIEW

Following the winter storm failure, ERCOT was sued by over 100 insurers and is facing dozens of other lawsuits.[28] Although litigation is still pending, ERCOT's claims of sovereign immunity have been rejected by Texas courts, leaving ERCOT potentially liable for damages caused by the failure to properly plan and prepare for severe weather events.

A proposal was introduced in November 2022 with the goal of making the Texas power market more reliable.[29] Recommended by the PUC, the proposal would require power providers to buy "performance credits" from generators in order to hold power companies responsible for meeting demand, even in high-demand periods that stress the grid.[30] However, this proposal has faced criticism for being inadequately analyzed, and it is still unknown if this framework would be enough to stabilize the grid in the event of

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26 *See id.*

27 Garrett Golding et al., *Cost of Texas' 2021 Deep Freeze Justifies Weatherization*, FED. RSRV. BANK OF DALL. (Apr. 15, 2021), https://www.dallasfed.org/research/economics/2021/0415.

28 Robert Bryce, *Texas Grid Operator Sued by 131 Insurers, Now Facing 'Dozens' of Lawsuits over Blackout*, FORBES (Jan. 14, 2022, 8:50 AM), https://www.forbes.com/sites/robertbryce/2022/01/14/texas-grid-operator-sued-by-131-insurers-now-facing-dozens-of-lawsuits-over-blackout/?sh=6265586922b4.

29 Joshua Fechter, *State Agency Proposes Changes to Power Market Aimed at Averting Mass Blackouts*, THE TEX. TRIB. (Nov. 10, 2022, 6:00 PM), https://www.texastribune.org/2022/11/10/ texas-power-grid-market-reform/.

30 *Id.*; Emily Foxhall, *State Regulators Approve Controversial Texas Electricity Market Reform*, THE TEX. TRIB. (Jan. 19, 2023), https://www.texastribune.org/2023/01/19/texas-electricity-market-reform-puc-grid-vote/.

unexpected severe weather.[31]

A bipartisan bill filed during the 88th Texas Legislative Session would have required the Texas Grid Security Commission to evaluate all hazards to the ERCOT electric grid, including, for the first time, potential future threats in addition to prior hazards.[32] The bill authorized an administrative penalty for entities that operate critical components of the ERCOT electric grid that fail to comply with the resilience standards established by the Texas Grid Security Commission.[33] The findings of this bill included the consideration that "current market incentives and regulations are not sufficient for electric utilities to: (A) prioritize grid security and resilience; and (B) protect the grid against hazards[.]"[34] This bill would have required the Security Commission to prepare and deliver a plan to the Texas Legislature by January 1, 2024.[35] The plan outlined in the bill focused on weatherizing and protecting against cyber-attacks.[36]

In 2023, ERCOT, alongside PUC, faced the sunset review process, where the state of Texas assesses the efficiency of state agencies.[37] The Texas Legislature moved up the sunset review dates for these entities by two years in response to February 2021's Winter

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31 Foxhall, *supra* note 30; *see* Fechter, *supra* note 29.
32 Tex. S.B. 330, 88th Leg., R.S. § 44.005(a) (2023).
33 *Id.* §§ 44.002, 44.012(a).
34 *Id.* § 1(9).
35 *Id.* § 44.008.
36 *See id.* §§ 44.001(A), 44.001(D), 44.008.
37 *ERCOT Sunset Review*, ELEC. RELIABILITY COUNCIL OF TEX., https://www.ercot.com/about/sunsetreview (last visited Aug. 10, 2023). The 1977 Texas Sunset Act sets an expiration date in law for state agencies. *Frequently Asked Questions*, TEX. SUNSET ADVISORY COMM'N, https://www.sunset.texas.gov/about-us/frequently-asked-questions (last visited Aug. 10, 2023). When this date passes, an agency will be abolished unless the Texas Legislature passes a bill to continue it after an examination of the priorities and performance of the agency. *Id.* This process occurs for state agencies roughly every 12 years. *Id.*

Storm Uri.[38] The Sunset Advisory Commission Staff Report with Commission Decisions was published on January 19, 2023, with the final version of the report including the Legislature's final actions on the proposed statutory recommendations published in June.[39] This report highlights the need for additional resources and better processes, including transparency and public communication efforts.[40]

Despite recent attempts for legislative reforms made in response to the February 2021 winter storm, the Public Utility Regulatory Act, the law governing the electric market in Texas, has not been updated in over twenty years, failing to incorporate changes recognizing the significant transformation of the electric grid and industry.[41] No specific recommendations were made regarding cryptocurrency mining in the Sunset Advisory Commission Staff Report, but cryptocurrency mining is cited as an example of how "[a]dvancing technologies are creating never-before-seen market participants[.]"[42] The drastic evolution of the electric market and industry has rendered the Public Utility Regulatory Act in need of major updates.[43] Nevertheless, the report also acknowledged that "[u]ltimately, evaluating the final outcomes and benefits of ongoing changes . . . is a task for the future."[44]

As the consequences of ERCOT's potential liability hang in the balance, and without new regulatory framework in place to stabilize the grid should Texas be hit with

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38 PUB. UTIL. COMM'N OF TEX. ET AL., TEXAS SUNSET ADVISORY COMMISSION: STAFF REPORT WITH COMMISSION DECISIONS 79 (2022), https://www.ercot.com/files/docs/2023/01/20/PUC-ERCOT-OPUC-Staff-Report-with-Commission-Decisions_1-19-23.pdf.

39 *Id.*

40 *Id.*

41 *Id.* at 36.

42 *Id.* This report estimates that "[c]ryptocurrency mining could account for 17,000 MW of new demand by 2030, which is enough to power 3.4 million homes." *Id.*

43 *Id.*

44 *Id.* at 1.

another extreme freeze or heat wave, there is one thing ERCOT can count on to help: paying cryptocurrency miners to stop operations in times of high demand.

III. THE NEW GOLD RUSH: CRYPTOCURRENCY MINING OPERATIONS MAKE THEMSELVES AT HOME IN TEXAS

A. ENERGY USED BY CRYPTOCURRENCY MINING

Mining cryptocurrency is a unique business operation because the amount of power available essentially directly correlates to how much money can be made. Mining cryptocurrency can be likened to Formula 1 racing: the faster your engine, the faster you will go.[45]

Cryptocurrency mining has become one of the world's most energy-intensive industries.[46] The process of mining requires powerful computer systems to solve complex mathematical algorithms, which requires an enormous amount of energy and computational power.[47] The more energy available to a miner, the more Bitcoin the miner can acquire.[48] Concerned about the amount of electricity Bitcoin mining consumes and the fast rate at which mining has grown in popularity, scholars have called for more regulation to minimize Bitcoin mining's environmental impact.[49] In 2018, Bitcoin mining was projected to consume more electricity than the entirety of the United States by the end of 2019.[50] However, due in part to Bitcoin's volatile price and the rise of mining costs for

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45 Interview with Jason Comis, Strategic Alliances Analyst, HP, in Hous., Tex. (Nov. 16, 2022).

46 Jennifer Hiller, *The U.S. Electric System Is Leaning on Customers to Avoid Blackouts*, WALL ST. J. (Nov. 12, 2022), https://www.wsj.com/articles/the-u-s-electric-system-is-leaning-on-customers-to-avoid-blackouts-11668205522.

47 Arya Taghdiri, *The Cost of Innovation: Why Bitcoin Mining Requires International Regulation*, 50 TEX. ENV'T L. J. 181, 183 (2020).

48 *Id.* at 184.

49 *See id.*

50 *Id.*

individuals, these fears have not yet been realized.

B. RIOT BLOCKCHAIN COMES TO TEXAS

In addition to the availability of land, large crypto mining operations are drawn to Texas because of crypto-mining-friendly Texas laws, cheap energy, and wide, open spaces.[51] While some states like New York have begun passing legislation to quell the rise of large-scale mining corporations,[52] states like Texas have welcomed the operations with mining-friendly laws. Texas was one of the first states to pass a law recognizing cryptocurrency in the state's commercial code.[53]

Riot Blockchain, Inc. is, according to its website:

> . . . a Bitcoin mining company, supporting the Bitcoin blockchain through rapidly expanding large-scale mining in the United States. We are focused on expanding our operations by increasing our Bitcoin mining hash rate and infrastructure capacity. Riot believes the future of Bitcoin mining will benefit from American operations and endeavors to be the driver of that future.[54]

Riot Blockchain has certainly maintained its goal of rapidly expanding in the past few years, reporting an increased total revenue from $12.1 million in 2020 to $213.2 million in 2021—a 1,762% increase.[55]

Riot Blockchain's Whinstone mining facility is not much to look at for the untrained eye: a series of metal warehouses full of computer servers in central Texas.

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51 *See* Judith Lewis Mernit, *Bitcoin's Intensive Energy Demands Are Sparking a Crypto Backlash*, YALE ENV'T 360 (June 21, 2022), https://e360.yale.edu/features/bitcoins-intensive-energy-demands-spark-a-crypto-backlash.

52 *See infra* note 97–102 and accompanying text.

53 *See* Jennifer Taylor, *Texas Uniform Commercial Code Updated To Recognize Cryptocurrency*, O'MELVENY (Sept. 9, 2021), https://www.omm.com/resources/alerts-and-publications/alerts/texas-uniform-commercial-code-updated-to-recognize-cryptocurrency/.

54 *Bitcoin Mining for America*, RIOT, https://www.riotplatforms.com (last visited Aug. 10, 2023). The language seems to include a level of virtue-signaling that the company believes, or wants customers to believe, that it truly exists for a higher, almost altruistic purpose—*supporting* Bitcoin technology in order to *benefit* the *future* of Bitcoin mining.

55 *Bitcoin Mining*, RIOT, https://www.riotblockchain.com/bitcoin-mining (last visited Aug. 10, 2023).

Located in Rockdale, a rural Texas town with a population of under 6,000 people,[56] the facility is believed to be the largest single facility in North America for Bitcoin mining, as measured by developed capacity.[57] Riot recently broke ground on a new mining facility in Corsicana, and a secondary planned expansion project for the original Rockdale facility has the potential to make Whinstone the largest Bitcoin mining facility in the world, taking it from 450 megawatts to 700 megawatts.[58]

Riot Blockchain's vice president said of the operation: "[w]e turn energy into opportunity."[59] But not all are equally inspired by the possibilities Bitcoin mining holds, particularly when considered at the expense of the massive quantities of electricity consumed by the mining process.[60] In May 2022, the annual energy budget of all the Bitcoin mining operations across the globe was equal to that of the entire country of Argentina—or, for perhaps a more relatable visual, all the tea kettles in England boiling water for twenty-six years.[61]

Citizens of Corsicana, Texas, the site of Riot's planned facility expansion, are concerned about the potential of paying increased electricity bills to allow the grid to

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56 *Demographics*, ROCKDALE TEX., https://www.rockdalecityhall.com/154/Demographics (last visited Aug. 10, 2023).

57 *Bitcoin Mining*, *supra* note 55.

58 *Id.* Power is measured in units called watts, which describe the rate at which electricity is used at a specific moment. *How is Electricity Measured?*, UNION OF CONCERNED SCIENTISTS, https://www.ucsusa.org/resources/how-electricity-measured (last updated Oct. 22, 2013). One megawatt is equivalent to one million watts. *Id.* An average coal plant uses about 600 megawatts. Zach Stein, *Megawatt (MW)*, CARBON COLLECTIVE (June 27, 2022), https://www.carboncollective.co/ sustainable-investing/megawatt-mw (last updated Mar. 1, 2023). Watts were so named to honor James Watt, the inventor of the steam engine. *Measuring Electricity*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/electricity/measuring-electricity.php (last updated Nov. 29, 2022).

59 *See* Mernit, *supra* note 51.

60 For a more complete discussion of the cost and quantity of energy that bitcoin mining consumes, *see* Taghdiri, *supra* note 47.

61 Mernit, *supra* note 51.

accommodate large mining operations, as well as the possibility that the miners will destabilize the grid altogether and cause power outages.[62] However, fears of grid destabilization might not be realized—not in spite of, but because of, the nature of the operation of cryptocurrency miners. Riot Blockchain recently made a deal with ERCOT to operate a demand response program during periods of unexpected extreme weather events: In emergency situations, ERCOT can utilize reserves on the sidelines controlled by miners.[63] While Texas has been criticized for decades for failing to pass legislation to prevent widespread blackouts during severe weather, ERCOT's choice to pay Riot not to operate in July 2022 was perhaps the most significant thing ERCOT had ever done to prevent future failures due to extreme weather events.

C. SUMMER 2022 HEATWAVE: ERCOT PAYS RIOT TO TEMPORARILY STOP OPERATIONS

Summer 2022 saw record-breaking temperatures and record-breaking power demand in Texas. On July 20, 2022, power demand within ERCOT exceeded 80,000 megawatts for the first time in history during the hottest July on record.[64] Nearly half of this power demand came from air conditioning units.[65]

Eager to avoid another massive failure due to extreme temperatures, ERCOT finally acted preemptively and made a deal with Riot to essentially pay the corporation to cease operating during the heat wave. Riot earned energy credits from ERCOT in July 2022 for

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62 *See id.*

63 Sabrina Toppa, *Crypto Miners Are Being Paid To Take Pressure off the Texas Electric Grid*, THE ST. (Aug. 18, 2022, 6:38 AM), https://www.thestreet.com/crypto/news/crypto-miners-are-being-paid-to-take-pressure-off-texas-electric-grid.

64 Shelby Webb, *ERCOT Breaks Demand Record for 11th Time This Summer, Reaching 80,000 Megawatts*, HOUS. CHRON. (July 20, 2022), https://www.houstonchronicle.com/business/energy/ article/ERCOT-breaks-demand-record-for-11th-time-this-17317722.php.

65 *Id.*

curtailing its energy consumption and pausing Bitcoin mining.[66] Riot produced 28% less Bitcoin in July 2022 compared to July 2021, decreasing from 443 Bitcoin to 318 Bitcoin.[67] However, Jason Les, CEO of Riot, reported that "power credits and other benefits from curtailment activities totaled an estimated $9.5 million, significantly outweighing the reduction in [Bitcoin] mined."[68] That amount of money in power credits is the equivalent value of 439 Bitcoin, calculated using the July 2022 average Bitcoin price of $21,634.[69]

Texans were shocked to learn that while the rest of the state was struggling through a brutal heat wave, one of America's largest Bitcoin miners generated more money by being paid *not* to use electricity than it would have made actually mining cryptocurrency.[70] Riot claimed that it "voluntarily curtailed its energy consumption in order to ensure that more power would be available in Texas."[71] The president of the Texas Blockchain Council remarked that in times of grid stress, miners "turn off both because it is the right thing to do, and because they are incentivized by market mechanisms within ERCOT."[72] For these large facilities to coexist with others who share the grid, incentives must be in place for them to avoid operating during peak demand to prevent overloading the grid.

Overall, Riot Blockchain benefitted from ERCOT's instability and the threat of record temperatures potentially causing power failures like in the February 2021 freeze. When Riot "voluntarily" shuts down when electricity supply is tight, it earns credits for

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66 Alexis Brock & Phil McPherson, *Riot Blockchain Announces July 2022 Production and Operations Updates*, RIOT (Aug. 3, 2022), https://www.riotplatforms.com/news-media/press-releases/detail/135/riot-blockchain-announces-july-2022-production-and.

67 *Id.*

68 *Id.*

69 *Id.*

70 *See* Toppa, *supra* note 63.

71 Brock & McPherson, *supra* note 66.

72 Toppa, *supra* note 63.

power that it can apply toward future bills.[73] This benefits Riot hugely because when the price of electricity rises, as it did during the 2021 winter storm, mining Bitcoin might no longer be profitable.

IV. MINERS AND THE PRICE OF POWER

Due to the volatility of the price of Bitcoin (and other cryptocurrencies), whenever the price of Bitcoin drops, it can be unprofitable to mine—even when the price of electricity stays constant. Individuals who mine cryptocurrency in their homes are faced with the same dilemma as large mining corporations like Riot Blockchain. However, they do not currently have the option to get paid to stop using electricity for mining during times of peak demand.

Cryptocurrency mining has already evolved significantly in its short history. As originally intended, people could mine Bitcoin with just a personal computer because of how easy the algorithm was to solve.[74] Now, Bitcoin mining requires much more, including graphics cards, high-end motherboards, advanced operating systems, and an external power supply.[75] Mining also typically requires at least a basic knowledge of programming.[76] The more people mining and increasing the speed, the harder the algorithm is to decipher, which increases the currency value but also steadily heightens the barrier to entry.[77]

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73 *Id.*; *see* Brock & McPherson, *supra* note 66.

74 *See* Carla Tardi, *Application-Specific Integrated Circuit (ASIC) Miner*, INVESTOPEDIA (Sept. 27, 2022), https://www.investopedia.com/terms/a/asic.asp.

75 *See* Nathan Reiff, *How To Start Mining Cryptocurrency*, INVESTOPEDIA, https://www.investopedia.com/news/how-get-established-cryptocurrency-miner/ (last updated July 14, 2022). Today, application-specific integrated circuit (ASIC) miners provide this hardware, which has very high hash rates. *See* Tardi, *supra* note 74. However, ASIC miners are specifically manufactured to mine crypto, and could not also be used as a computer. *See id.*

76 Michael Kurko, *Best Bitcoin Mining Software*, INVESTOPEDIA, https://www.investopedia.com/best-bitcoin-mining-software-5095403#:~:text=While%20most%20mining%20software%20requires,power%20and%20the%20linked%20pool (last updated May 17, 2023).

77 Interview with Jason Comis, *supra* note 45.

When people mine cryptocurrency, they are investing in the technology. It may not be instantly profitable to mine certain coins all the time, but coins certainly have a roadmap to potentially becoming extremely valuable; even mining a newer altcoin can be worth it to a miner who believes the coin has applications in the future.[78] Analogously, one would not want to be paid exclusively in stock by a company they do not believe in, but would be more likely to take that option if they had faith in the company's future. Nevertheless, after investing in hardware, knowledge, and space, making efforts to keep the miners running and cool, and managing the ongoing safety risk,[79] heightened power costs can be the final straw that makes mining cryptocurrency no longer economically rational, no matter how much one believes in its future value.

A. Considering Incentives to Mine and Curtail Energy Usage During Periods of High Demand

Bitcoin is a decentralized system that relies on miners all over the world.[80] Without miners, no transactions would be possible and Bitcoin would be valueless.[81] The more Bitcoin that is mined, the harder the algorithm becomes to solve, and the higher the value of Bitcoin rises.[82] While the emergence of large cryptocurrency mining operations such as Riot Blockchain has likely contributed heavily to the value of Bitcoin, the blockchain network still relies on individuals.[83] As different jurisdictions begin to pass laws restricting

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78 *Id.*

79 For example, cryptocurrency mining can present a fire hazard due to improper wiring or a cooling failure. *Id.* Users could also accidentally shock themselves. *Id.*

80 *See What Will Happen if Miners Stop Mining?*, BUS. MATTERS (Oct. 15, 2021), https://bmmagazine.co.uk/business/what-will-happen-if-miners-stop-mining/.

81 *See id.*

82 *See id.*; Andrew Bloomenthal, *What Determines Bitcoin's Price?*, INVESTOPEDIA (May 11, 2022), https://www.investopedia.com/tech/what-determines-value-1-bitcoin/.

83 *What Influence Do Bitcoin Miners Have over the Network?*, RIVER, https://river.com/learn/what-influence-do-bitcoin-miners-have-over-the-network (last visited Aug. 10, 2023).

the operations of large-scale cryptocurrency miners due to environmental concerns,[84] it is becoming clear that the Bitcoin network cannot rely on large-scale operations alone. The major perk of a decentralized system is that it compensates the individual while making the system practically immune to attacks because it is so spread out.

Similarly, while large mining operations temporarily ceasing operations in times of high demand can help stabilize the grid, it may not be enough without the help of individuals throughout the state curtailing their power usage during peak times as well. While individuals are often urged by power companies to curtail energy usage during periods of high demand, there is no real direct benefit to doing so, outside of the hope that others will do their part as well to avoid a massive power outage and spike in electricity prices. This could be likened to the prisoner's dilemma: if all your neighbors participate, there would be no consequences for you if you did not reduce your own energy usage; however, if everyone thought that way and no one reduced their energy usage during peak demand, the grid would indeed fail, causing power outages for everyone.

ERCOT has been widely criticized for its instability and lack of reliability during periods of extreme temperature stress.[85] While changes to ERCOT may materialize after the 88th Texas legislative session and ERCOT's sunset review, implementing these changes will take years and their true impact will not be tested until Texas experiences another extreme weather event. Due to ERCOT's potential accountability for failures, Texas is a great place to start to test a program to pay individuals for reducing their energy

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84 *See infra* note 98 and accompanying text.

85 *See, e.g.*, David Blackmon, *In Texas, ERCOT Still Can't Guarantee Grid Reliability*, FORBES (Dec. 1, 2022), https://www.forbes.com/sites/davidblackmon/2022/12/01/in-texas-ercot-still-cant-guarantee-grid-reliability/?sh=24549f0b7bbf.

consumption during peak times to stabilize the grid and lower electricity costs.

Large-scale cryptocurrency mining corporations, including Riot, should support this. Additionally, such a program would allow individual cryptocurrency miners to continue mining without being dissuaded from spikes in electricity prices. Another potential benefit of a demand-response program is that it will encourage the use of intermittent renewable energy resources such as wind and solar energy, as opposed to on-demand sources.[86]

B. DEMAND RESPONSE PROGRAMS IN ACTION

This concept of demand-response, or asking customers to voluntarily curtail energy use when the system is under stress, is starting to be used in California in an attempt to avoid rolling blackouts during heat waves.[87] However, voluntary consumer participation is not enough to keep the grid from failing, particularly as conservation requests become more common.[88] Even in environmentally-conscious California, without real cost-incentives, consumers are not generally motivated to continue to participate after extended demand-response events.[89] For businesses, cost incentives are often not enough to make the cost of business interruption worth it.

1. THE UNITED KINGDOM NATIONAL GRID

The United Kingdom (UK) recently recognized that big corporations are not the only ones who should benefit from curtailing energy consumption. The UK is beginning

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86 For further discussion, *see* Frank Wolak et al., *Paying Consumers To Increase Their Consumption Can Reduce the Cost of Integrating Wind and Solar Electricity Production into the Grid*, VOXEU (Apr. 26, 2019), https://cepr.org/voxeu/columns/paying-consumers-increase-their-consumption-can-reduce-cost-integrating-wind-and.

87 *See* Hiller, *supra* note 46.

88 *Id.*

89 *See id.*

to shift toward paying individual consumers to use less electricity at peak times, with the goal of reducing the risk of blackouts during winter and eventually making power cheaper for everyone by increasing grid flexibility.[90] It can be in everyone's best interest to reward individuals for reducing their electricity usage.

This concept has been tested on a small scale. Through the National Grid's "Demand Flexibility Service," energy suppliers who signed up were paid £3 for every kilowatt-hour saved during a test period.[91] Energy suppliers decided how specifically to pay out their customers, but overall, households in the UK were offered discounts on their electricity bills if they limited electricity use on twelve test days between November 2022 and March 2023.[92] Expanding this project requires a smart electricity meter, which fewer than half of households in England, Scotland, and Wales already have.[93]

The success of this project and its public reception could have a significant impact on the way energy providers and regulators strategize to offset power demand. The National Grid intends to establish a system that will act as an "insurance policy" during times of high demand during the winter.[94]While the current high cost of living and rising energy bills are major motivators behind this idea, the National Grid has also been motivated by the ever-growing threat of climate change leading to harsher winters, as well as Russia's 2022 invasion of Ukraine, which created "unprecedented turmoil and

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90 Alex Lawson, *National Grid Will Pay Households To Shift Electricity Use to Avoid Blackouts*, THE GUARDIAN (June 27, 2022), https://www.theguardian.com/business/2022/jun/27/national-grid-will-pay-households-to-shift-electricity-use-to-avoid-blackouts.

91 Michael Race & Emma Simpson, *Money-Off Energy Scheme Launches To Avoid Blackouts*, BBC (Nov. 4, 2022), https://www.bbc.com/news/business-63483668.

92 *Id.*

93 *Id.*

94 *Id.*

volatility" in energy markets.[95]

V. THE FUTURE OF CRYPTOCURRENCY MINING AND DEMAND-RESPONSE REWARD PROGRAMS

While one significant benefit of cryptocurrency mining in Texas is that it can add flexibility to the grid system, the underlying concern is that miners are consuming vast amounts of resources while performing a function that is seen by many to have no real value.[96] Other states have recently rejected integrating cryptocurrency miners into their markets.

On November 22, 2022, New York Governor Kathy Hochul signed into law a bill banning certain proof-of-work[97] cryptocurrency mining operations that run on carbon-based power sources for the next two years.[98] This law is intended to support New York's goal of reducing greenhouse gas emissions, but it has been met with mixed criticism concerning its actual effects on the transition to more sustainable energy.[99] Many have remarked that the mining industry actually has the potential to lead compliance with climate goals.[100] John Warren, CEO of GEM Mining, observed that the harsh regulatory environment of New York will "likely discourage new, renewable-based miners from

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95 *See id.* While both major issues are beyond the scope of this Note, for further discussion of the war in Ukraine's effect on winter blackouts, *see* Haley Ott, *U.K. Warned of Possible Winter Power Blackouts if Ukraine War Cuts Energy Supplies*, CBS NEWS (Oct. 7, 2022, 7:08 AM), https://www.cbsnews.com/news/uk-possible-winter-power-blackouts-russia-ukraine-war-energy-supplies/. For further discussion of the connections between climate change and energy supply, *see* Victor Flatt, *Adapting Energy and Environmental Policy for Climate Change*, 11 VT. J. ENV'T L. 655 (2010).

96 *See* Toppa, *supra* note 63.

97 For further background on proof-of-work cryptocurrency, see generally Taghdiri, *supra* note 47, at 183–84.

98 MacKenzie Sigalos, *New York Governor Signs First-of-its-Kind-Law Cracking Down on Bitcoin Mining—Here's Everything That's in it*, CNBC (Nov. 23, 2022), https://www.cnbc.com/2022/11/23/new-york-governor-signs-law-cracking-down-on-bitcoin-mining.html.

99 *See id.*

100 *Id.*

doing business with the state due to the possibility of more regulatory creep."[101] Some have pointed out that due to New York's cooler climate and the availability of abandoned industrial infrastructure, the state should have been considered an ideal location for miners.[102]

Despite the warmer climate, Texas remains perhaps the most ideal destination in the U.S. for cryptocurrency mining. The absence of FERC jurisdiction over the power grid is a major draw. Through its current laws, Texas has already bought into the idea of cryptocurrency mining—mining is here to stay for the foreseeable future. For example, Texas has shown commitment to furthering blockchain technology[103] by establishing the Texas Work Group on Blockchain Matters with the goal of "develop[ing] a master plan for the expansion of the blockchain industry in this state and recommend[ing] policies and state investments in connection with blockchain technology."[104] This sixteen-member work group released a master plan on November 14, 2022.[105] In the report, the group proposed a tax incentive for the purchase of electricity used to power a bitcoin mine or similar large flexible load, provided that the purchaser falls into a new proposed large flexible load category within ERCOT or voluntarily agrees to curtail power usage at periods of high demand.[106]

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101 *Id.*

102 *Id.*

103 Blockchain is the technology behind cryptocurrencies. While other applications for blockchain technology have been utilized and explored across industries, Bitcoin is largely considered to have initiated the interest in blockchain technology worldwide. *See Beyond Bitcoin: Emerging Applications for Blockchain Technology: Hearing Before the H. Comm. on Sci., Space and Tech.*, 110th Cong. 2 (2018) (statement of Chris Jaikaran, Analyst in Cybersecurity Pol'y).

104 Tex. H.B. 1576, 87th Leg., R.S. (2019).

105 *See* TEX. WORK GRP. ON BLOCKCHAIN MATTERS, A REPORT TO THE MEMBERS OF THE TEXAS LEGISLATURE 2 (2022).

106 *Id.* at 7.

Some may see cryptocurrency miners as contributing nothing of value. However, miners can completely shut down operations in a moment's notice, which, according to Riot Blockchain, "contributes to grid stability by ensuring a supply of electricity during times of unusually high demand."[107] The only cost of stopping operations is less mining output during the pause, which can be almost instantly made up for through power credits.

To support the goals of increasing grid reliability and communication, ERCOT announced a new voluntary curtailment program for approved large customers in December 2022.[108] Large flexible customers, such as bitcoin mining facilities, can register to participate in the program and receive an automated notification by phone call, text message, and email requesting curtailment of consumption during periods of low availability and high demand.[109] The program is strictly voluntary, with no penalty for failure to follow the curtailment requests and no included monetary incentive for participating customers.[110] For now, the program is temporary as ERCOT continues to "develop a permanent reliability framework for large flexible loads."[111]

VI. CONCLUSION

ERCOT benefits from offering miners credits for stopping energy usage during peak demand. Instead of outrage and cries of unfairness over this apparent windfall, there

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107 Hiller, *supra* note 46.

108 *ERCOT Creates Voluntary Curtailment Program for Large Flexible Customers During Peak Demand*, ELEC. RELIABILITY COUNCIL OF TEX. (Dec. 6, 2022), https://www.ercot.com/news/release/ 2022-12-06-ercot-creates-voluntary.

109 *Id.*

110 *See id.*

111 *Id.* One bill introduced in the 88th Texas legislative session would have given Texas consumers the right to participate in residential demand-response programs. It would have required each retail provider in the ERCOT power region to create a program for reducing the average total residential load by 1% of peak summer and winter demand per year for the next 5 years. Tex. S.B. 114, 88th Leg., R.S. (2022). However, the bill did not include requirements for offering compensation or incentives to customers for participating in these programs. *Id.*

should instead be a call to action for ERCOT to compensate individuals for limiting energy usage during peak times as well.

Energy companies make attempts to incentivize customers to limit their usage during peak demand, such as through rebates or reduced electricity rates.[112] However, outside of competition and capitalizing on the current importance of green-sounding initiatives to consumers, energy companies do not stand to gain anything from customers using less energy. However, electricity network operators, such as National Grid and ERCOT, do: a more sustainable, stable, and flexible grid system, with less liability for failures.

The February 2021 winter storm highlighted ERCOT's instability. Facing potential liability, ERCOT finally acted preemptively to prevent future failures when it offered power credits to Riot Blockchain in exchange for its temporary ceasing of operations during the July 2022 heat wave. While legislation has been proposed to help stabilize the grid, the reality is that no change can be guaranteed to solve or improve the problem until the grid is tested again by a severe weather event. While relying on miners will help, ERCOT should incentivize individual consumers to reduce demand as well during periods of grid stress. In addition to the potential to help prevent another grid failure, offering these incentives will help facilitate goodwill with Texans and offset public concern with miners like Riot Blockchain's perceived unfair compensation from ERCOT. Both large cryptocurrency mining corporations and individual consumers stand to benefit from a system of compensating consumers for curtailing their energy use.

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[112] *Reducing Electricity Use and Costs*, U.S. DEP'T OF ENERGY, https://www.energy.gov/energysaver/reducing-electricity-use-and-costs (last visited Aug. 10, 2023).

Blockchain technology initially relied on individuals. However, increased electricity demand by large-scale mining operations has simultaneously increased grid strain and created an electricity-price-barrier for individual miners. Compensating individuals as well as large cryptocurrency miners for curtailed energy usage works to further both the principles behind cryptocurrency and the stability of Texas' grid. Against the backdrop of previous regulatory failures, Texas should implement such a demand-response program to ensure energy security during the next period of high demand.

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It's the Transmission Lines: Why Transmission Infrastructure is the Achilles' Heel in our Fight Against Climate Change and What the Federal Government Can Do About it

By Justin Davenport

I. INTRODUCTION

Climate change is one of the biggest threats to humanity and national security.[1] To address this threat, the United States must drastically reduce its greenhouse gas emissions.[2] Electricity production is a major source of these emissions.[3] Because of this, President Biden set a goal to decarbonize the U.S. energy grid by 2030.[4] To meet this goal and other international climate goals, the U.S. electric grid must run on 100% clean energy by 2050.[5] While clean energy sources—such as wind and solar—are growing in use and becoming

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1 Press Release, Security Council, Climate Change 'Biggest Threat Modern Humans Have Ever Faced', World-Renowned Naturalist Tells Security Council, Calls for Greater Global Cooperation, U.N. Press Release SC/14445 (Feb. 23, 2021), https://www.un.org/press/en/2021/sc14445.doc.htm; *see also* Press Release, U.S. Dep't of Def., Statement by Secretary of Defense Lloyd J. Austin III on Tackling the Climate Crisis at Home and Abroad (Jan. 27, 2021), https://www.defense.gov/News/Releases/Release/Article/2484504/statement-by-secretary-of-defense-lloyd-j-austin-iii-on-tackling-the-climate-cr/.

2 Rebecca Hersher, *A Major Report Warns Climate Change Is Accelerating and Humans Must Cut Emissions Now*, NPR: ENV'T (Aug. 9, 2021, 4:00 AM), https://www.npr.org/2021/08/09/1025898341/major-report-warns-climate-change-is-accelerating-and-humans-must-cut-emissions-.

3 *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, ENV'T PROT. AGENCY, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (last updated Apr. 18, 2023).

4 Press Release, The White House, Fact Sheet: President Biden Signs Executive Order Catalyzing America's Clean Energy Economy Through Federal Sustainability (Dec. 8, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/08/fact-sheet-president-biden-signs-executive-order-catalyzing-americas-clean-energy-economy-through-federal-sustainability/.

5 Shelley Welton, *Rethinking Grid Governance for the Climate Change Era*, 109 CAL. L. REV. 209, 238 (2021).

more affordable,[6] reaching net-zero emissions will require a more drastic investment in energy infrastructure.[7] This is because the largest population centers in the U.S. are located too far away from the best wind and solar resources.[8] To remedy this problem, developers in the U.S. could construct new long-distance, interstate transmission lines to connect renewable energy sources to densely populated areas around the country.[9]

There are several steps involved in constructing a transmission line. These include conducting extensive planning and research, completing the siting and permitting processes, obtaining all the necessary rights-of-way (ROW) for the line, and financing the line's construction.[10] Each of these steps contains potential problems that can derail a project.[11] Sometimes, developers may find themselves overcoming one hurdle only to fall face first into the next.[12]

This Note outlines the problems and solutions related to building new interstate transmission lines. First, it briefly explains the way the electric grid functions. Then, it

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6 *See* Steve Cicala, *Decarbonizing the U.S. Economy with a National Grid*, *in* U.S. ENERGY & CLIMATE ROADMAP: EVIDENCE-BASED POLICIES FOR EFFECTIVE ACTION 78, 80 (2021), https://epic.uchicago.edu/wp-content/uploads/2021/02/EPIC-Energy-and-Climate-Roadmap.pdf (discussing the recent cost competitiveness and increased use of renewable energy).

7 Molly Seltzer, *Big but Affordable Effort Needed for America to Reach Net-Zero Emissions by 2050, Princeton Study Shows*, PRINCETON U. (Dec. 15, 2020, 3:23 P.M.), https://www.princeton.edu/news/2020/12/15/big-affordable-effort-needed-america-reach-net-zero-emissions-2050-princeton-study.

8 Cicala, *supra* note 6, at 79–81.

9 *Id*. at 79.

10 Matthew H. Brown & Richard P. Sedano, Nat'l Council on Elec. Pol'y, Electricity Transmission: A Primer 13 (2004), https://www.energy.gov/oe/articles/electricity-transmission-primer.

11 *See id.* at 11 ("The process to build transmission lines often is fairly long and, at times, may entail controversy.").

12 For example, Clean Line Energy proposed to connect Oklahoma wind resources to Tennessee. Developers worked for years, secured all necessary environmental impact statements, acquired all the federal permits, entered into agreements with hundreds of landowners for easements, and fought with politicians at the local and national level. Unfortunately, the project was squashed after eight years and $200 million dollars because the developers could not reach a deal with the Tennessee Valley Authority—the company that supplies power to Tennessee—to purchase Clean Line's electricity. *See generally* RUSSELL GOLD, SUPERPOWER: ONE MAN'S QUEST TO TRANSFORM AMERICAN ENERGY (2019) (outlining the rise of Clean Line Energy and its attempts to construct HVDC transmission lines).

explores the various policy reasons for building more transmission. Finally, it discusses the numerous obstacles to accomplishing this task and analyzes the most promising solutions to these obstacles.

II. HOW WE GET POWER

In a power grid, consumers receive electricity in the following manner: First, generators produce electricity through methods such as wind, solar, hydroelectricity, geothermal, nuclear fission, or burning fossil fuels.[13] Next, generators send this electricity to local substations via high-voltage transmission lines.[14] Substations convert the power to a lower voltage and then deliver it to nearby commercial and residential areas through distribution lines.[15] Within the continental U.S., there are about 7,700 power plants, 3,300 utilities, and millions of miles of power lines, including around 160,000 miles of high-voltage transmission lines.[16]

The most effective high-voltage transmission lines are high-voltage direct current (HVDC) lines.[17] HVDC lines have many advantages over alternating current (AC) lines.[18] Some of these advantages include better reliability, less power loss, smaller right-of-way requirements, and lower costs at long distances, as well as other advantages related to the asynchronous interconnections possible with HVDC technology.[19] HVDC lines can also

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13 James McBride & Anshu Siripurapu, *How Does the U.S. Power Grid Work?*, COUNCIL ON FOREIGN RELS., https://www.cfr.org/backgrounder/how-does-us-power-grid-work (last updated July 5, 2022, 11:53 AM).

14 *Id.*

15 *Id.*

16 *Id.*

17 *See generally* U.S. ENERGY INFO. ADMIN., ASSESSING HVDC TRANSMISSION FOR IMPACTS OF NON-DISPATCHABLE GENERATION (2018), https://www.eia.gov/analysis/studies/electricity/hvdctransmission/pdf/transmission.pdf.

18 When this Note references the advantages of "high-voltage transmission," it is usually referring to HVDC lines.

19 U.S. ENERGY INFO. ADMIN., *supra* note 17, at 9–10.

handle longer periods of overloads and are better equipped to manage instabilities.[20]

III. WHY WE NEED MORE TRANSMISSION

A. ELECTRICITY PRODUCTION AND CLIMATE CHANGE

The way we produce energy connects directly to climate change. The primary driver of climate change is greenhouse gas emissions.[21] According to the Environmental Protection Agency, as of February 2023, electricity production constitutes 25% of all U.S. emissions, followed by transportation at 27%, industry at 24%, residential and commercial use at 13%, and agriculture at 11%.[22]

Decarbonizing the grid would have a dramatic effect on greenhouse gas emissions. While a carbon-free grid would obviously decrease electricity-related emissions, emissions from other sectors would also fall.[23] For example, if energy is produced carbon-free, "we could shift away from burning hydrocarbons (which emits carbon dioxide) for fuel," and instead use "electric cars and buses; electric heating and cooling systems in our homes and businesses; and energy-intensive factories [could use] electricity instead of natural gas to make their products."[24] By 2030, there will be an estimated 18.7 million electric vehicles

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20 Some disadvantages of HVDC lines include greater complexity in components, higher costs at short distances, and limited control between terminals. *Id.* at 11–12.

21 *The Causes of Climate Change*, NAT'L AERONAUTICS & SPACE ADMIN., https://climate.nasa.gov/causes/ (last updated Apr. 14, 2023).

22 *Greenhouse Gas Inventory Data Explorer*, ENV'T PROT. AGENCY, https://cfpub.epa.gov/ghgdata/inventoryexplorer/ (last updated Mar. 13, 2023).

23 Cicala, *supra* note 6, at 81 ("[T]he primary means of decarbonizing the transportation system[,] . . . industrial processes[,] . . . and residential use is through electrification.").

24 BILL GATES, HOW TO AVOID A CLIMATE DISASTER 55 (2021); *see generally* Alexander E. MacDonald et al., *Future Cost-Competitive Electricity Systems and Their Impact on US CO2 Emissions*, NATURE CLIMATE CHANGE, Jan. 25, 2016, at 1,5, https://www.vibrantcleanenergy.com/wp-content/uploads/2016/09/Future_cost-competitive_electricity_syst.pdf ("[I]f the electricity sector is decarbonized, there are good prospects that electrical vehicles, heat pumps, and other electricity-based technologies can similarly reduce CO_2 across the entire energy sector.").

on the road, representing 20% of new vehicle sales.[25] If clean energy becomes more affordable, this will drive producers and consumers to use more electric methods for transportation, heating, and production.[26] Thus, if the U.S. decarbonizes its energy grid, greenhouse gas emissions would fall dramatically.

B. Building New Interstate Transmission Lines will Promote Renewable Energy and Decarbonize the Grid

In 2008, a report from the Government Accountability Office found that increasing the use of interstate transmission lines would facilitate the development of renewable energy.[27] This is simply a matter of geography. Just as natural gas and coal deposits exist in varying places throughout the U.S., renewable sources of energy are also distributed unevenly throughout the country.[28] However, unlike coal and natural gas, energy producers cannot ship the wind or sun along a railroad or pipeline to the areas that need it the most.[29] Renewable energy producers must convert wind and solar energy to electricity "the moment it is harvested."[30]

The old transmission grid was not equipped to move large percentages of the country's electricity from rural areas—where most renewable resources are—to the rest of the nation.[31] In some parts of the country, solar and wind power are the cheapest forms of

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25 Glen Andersen et al., *Modernizing the Electric Grid: State Role and Policy Options*, NAT'L CONF. OF STATE LEGISLATURES, https://www.ncsl.org/energy/modernizing-the-electric-grid (last updated Sept. 22, 2021).

26 Cicala, *supra* note 6, at 82 ("Ultimately the decision to electrify cars, trucks, industrial processes and residential heating is made by households and firms. The cheaper green electricity is relative to the price of gasoline and natural gas, the more electrified other sectors will become.").

27 U.S. GOV'T ACCOUNTABILITY OFF., GAO-08-347R, TRANSMISSION LINES ALONG TRANSPORTATION RIGHTS OF WAY 3 (2008), https://www.govinfo.gov/content/pkg/GAOREPORTS-GAO-08-347R/pdf/GAOREPORTS-GAO-08-347R.pdf.

28 Cicala, *supra* note 6, at 79.

29 *Id*.

30 *Id.*

31 *Id.*

electricity, but consumers will not see economic benefits unless new transmission lines connect generators to these markets.[32] New transmission infrastructure could effectively connect consumers to this energy.[33] Moreover, this infrastructure would also "signal to investors and developers that they will be able to interconnect to the grid and participate in the electricity marketplace."[34]

However, another problem stands in the way of deploying more renewable energy: grid congestion.[35] Because both wind and solar energy benefit from economies of scale, projects are often large and constructed in remote locations where cheap land is available.[36] These projects usually need larger transmission upgrades.[37] Current transmission infrastructure cannot handle this influx of wind and solar energy.[38] A recent report found that 245 midwestern wind and solar projects in advanced stages of development were withdrawn between 2016 and 2020, in part due to "congestion and related grid upgrade costs."[39] New high-voltage transmission will decrease congestion and improve grid reliability by increasing access to additional sources of generation and paths

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32 Robinson Meyer, *Unfortunately, I Care About Power Lines Now*, THE ATLANTIC: PLANET (July 28, 2021), https://www.theatlantic.com/science/archive/2021/07/america-is-bad-at-building-power-lines-lets-fix-that-transmission-climate/619591/.

33 *See* MacDonald et al., *supra* note 24, at 1 ("The key enabling technology for the large geographic domains favoured for wind and solar power is a network of high-voltage direct-current (HVDC) transmission lines.").

34 AVI ZEVIN ET AL., BUILDING A NEW GRID WITHOUT NEW LEGISLATION: A PATH TO REVITALIZING FEDERAL TRANSMISSION AUTHORITIES 12 (2020), https://www.energypolicy.columbia.edu/sites/default/files/file-uploads/GridAuthority_CGEP_Report_121120-2.pdf.

35 *See generally* JAY CASPARY ET AL., DISCONNECTED: THE NEED FOR A NEW GENERATOR INTERCONNECTION POLICY (2021), https://cleanenergygrid.org/wp-content/uploads/2021/01/Disconnected-The-Need-for-a-New-Generator-Interconnection-Policy-1.pdf.

36 *Id.* at 8.

37 *Id.*

38 *See id.* ("[U]ntil the network capacity is expanded to accommodate the resources, the projects must wait in an 'interconnection queue.' At the end of 2019, 734 gigawatts of proposed generation were waiting in interconnection queues nationwide.").

39 Kari Lydersen, *Grid Congestion a Growing Barrier for Wind, Solar Developers in MISO Territory*, ENERGY NEWS NETWORK (Sept. 29, 2020), https://energynews.us/2020/09/29/grid-congestion-a-growing-barrier-for-wind-solar-developers-in-miso-territory/.

for electricity.[40] Therefore, the U.S. must increase transmission infrastructure to address grid congestion and decarbonize electricity generation.

Finally, new interstate transmission infrastructure could combat intermittency.[41] Wind and solar energy are at the mercy of nature.[42] However, increasing wind and solar development may combat issues related to intermittency.[43] Many mid-latitude weather systems affect the continental U.S., so even when wind or solar power is not available in one area, it will likely be available in another.[44] Building new transmission infrastructure throughout the areas of the country with wind and solar energy could greatly reduce the intermittency problem.[45] In addition, increasing electrical storage may be another tool to address intermittency. [46] Potential forms of storage include lithium-ion batteries, compressed-air energy storage, and pumped storage hydropower.[47] While these storage methods are becoming more affordable,[48] they still cost more than HVDC transmission lines.[49] Even if generators used these storage systems, they would still need transmission

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40 TRANSMISSION LINES ALONG TRANSPORTATION RIGHTS OF WAY, *supra* note 27, at 3.

41 Robert Fares, *Renewable Energy Intermittency Explained: Challenges, Solutions, and Opportunities*, SCI. AM.: PLUGGED IN (Mar. 11, 2015), https://blogs.scientificamerican.com/plugged-in/renewable-energy-intermittency-explained-challenges-solutions-and-opportunities/ ("Intermittent renewables are challenging because they disrupt the conventional methods for planning the daily operation of the electric grid.").

42 *See* Matt Simon, *The Grid Isn't Ready for the Renewables Revolution*, WIRED (Oct. 6, 2021), https://www.wired.com/story/the-grid-isnt-ready-for-the-renewable-revolution/ ("Gas and coal power plants generate continuous power by burning fuel, and how much they burn can be modulated based on the demand for electricity. But the generation of solar and wind energy fluctuates. The sun doesn't shine at night, and turbines don't turn without wind.").

43 *See* MacDonald et al., *supra* note 24, at 1 ("Because Earth's mid-latitude weather systems cover large geographic areas, the average variability of weather decreases as size increases.").

44 *Id.*

45 *Id.*

46 *See id.* ("Electrical storage can also reduce the intermittency of wind and solar.").

47 Wayne Hicks, *Declining Renewable Costs Drive Focus on Energy Storage*, NAT'L RENEWABLE ENERGY LAB'Y: NEWS (Jan. 2, 2020), https://www.nrel.gov/news/features/2020/declining-renewable-costs-drive-focus-on-energy-storage.html.

48 *Id.*

49 MacDonald et al., *supra* note 24, at 1.

lines to send the power to consumers.[50]

C. THE ECONOMIC BENEFITS OF ENERGY INFRASTRUCTURE

Consumers pay more for electricity because of the inability to connect renewable energy to large populations.[51] However, new high-voltage lines could lower costs for end users.[52] For example, a 2016 report found that building out transmission could save consumers about $47.2 billion annually when compared to the current system.[53] Another study by Americans for a Clean Energy Grid showed that increasing transmission infrastructure within the Eastern Interconnection would "cut consumers' electric bills by $100 billion and decrease the average electric bill rate by more than one-third," saving the average household more than $300 per year.[54] The analysis further demonstrated that infrastructure investment could lead to "as much as $7.8 trillion in investment in rural America" and could create more than 6 million jobs, all while providing Americans with cleaner air to breathe.[55] Finally, a study by the National Renewable Energy Laboratory—which analyzed four transmission designs in eight different scenarios—determined that for every dollar spent towards transmission expansion, consumers could see a return of up to $2.90.[56]

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50 *See id.*

51 Cicala, *supra* note 6, at 80.

52 TRANSMISSION LINES ALONG TRANSP. RIGHTS OF WAY, *supra* note 27, at 3; *see, e.g.*, Aaron Bloom et al., The Value of Increased HVDC Capacity Between Eastern and Western U.S. Grids: The Interconnections Seam Study 1 (Oct. 2020) (unpublished manuscript), https://www.nrel.gov/docs/fy21osti/76850.pdf.

53 This is about three times the yearly cost of HVDC transmission. MacDonald et al., *supra* note 24, at 3.

54 Caspary et al., *supra* note 35; CHRISTOPHER T.M. CLACK ET AL., CONSUMER, EMPLOYMENT, AND ENVIRONMENTAL BENEFITS OF ELECTRICITY TRANSMISSION EXPANSION IN THE EASTERN U.S. 4 (2020), https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/EIC-Transmission-Decarb.pdf.

55 CLACK ET AL., *supra* note 54, at 26.

56 *See, e.g.*, Aaron Bloom et al., *supra* note 52, at 1.

IV. PAYING FOR INTERSTATE TRANSMISSION PROJECTS

There is no getting around it, building large scale infrastructure is incredibly expensive, and it is difficult to accurately estimate the cost of large infrastructure projects.[57] Several factors impact the cost of building transmission systems, including environmental considerations, ROW easement access, associated equipment costs, the transmission medium, and power capacity requirements.[58] Recent large-scale transmission projects are few and far between in the U.S., which makes it hard to predict a standard project cost.[59] According to a 2018 report for the U.S. Energy Information Administration, projects can cost anywhere between $1.17 million and $8.62 million per mile.[60]

However, various legal and regulatory hurdles bog down the process and increase the cost of constructing transmission lines.[61] But, once new transmission lines begin to free up grid congestion, the cost of new construction will also fall.[62] Addressing these problems could decrease the overall costs associated with building new transmission lines, and the U.S. government could take specific steps to help the process.

A. THE FEDERAL GOVERNMENT'S ROLE IN COST ALLOCATION AND LONG-TERM PLANNING

As explained in Part III, building new transmission lines could save consumers billions of dollars.[63] However, many developers are not currently building valuable

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57 *See generally* Ralph Vartabedian, *Years of Delays, Billions in Overruns: The Dismal History of Big Infrastructure*, THE N.Y. TIMES (Nov. 28, 2021), https://www.nytimes.com/2021/11/28/us/infrastructure-megaprojects.html.

58 U.S. ENERGY INFO. ADMIN., *supra* note 17, at 26.

59 *Id.*

60 *Id.*

61 *See* discussion *infra* Part IV.

62 *See* discussion *infra* Part IV.

63 *See* discussion s*upra* Part III.C.

interregional projects because they are dissatisfied with current cost allocation.[64] For example, Federal Energy Regulatory Commission (FERC) Order 1000 states that "cost allocation methods for potential interregional facilities are largely nonexistent."[65] There are even examples of fully—or almost fully—permitted interregional projects that are not being built because developers will not assume the cost of construction.[66] To address this issue, costs can be allocated back to consumers that use the transmission lines in a pro rata fashion.[67] FERC is currently addressing these issues with a recent Notice of Proposed Rulemaking, but the process is still ongoing.[68]

In its Notice, FERC also addressed concerns that the existing regional transmission process "may not be planning on a sufficiently long-term, forward-looking basis . . . leading to the piecemeal and inefficient development of new transmission facilities in a manner that is not more efficient or cost-effective."[69] Seemingly drawing inspiration from other successful regional planning systems—such as Competitive Renewable Energy Zones

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64 Herman K. Trabish, *Transmission Troubles? A Solution Could Be Lying Along Rail Lines and Next Generation Highways*, UTIL. DIVE: DEEP DIVE (Nov. 12, 2020), https://www.utilitydive.com/news/transmission-troubles-a-solution-could-be-lying-along-rail-lines-and-next/587703/; *see also* JIM MCCALLEY ET AL., POWER SYS. ENG'G RSCH. CTR., TRANSMISSION DESIGN AT THE NATIONAL LEVEL: BENEFITS, RISKS AND POSSIBLE PATHS FORWARD 42 (2012), https://documents.pserc.wisc.edu/documents/publications/papers/fgwhitepapers/McCalley_PSERC_White_Paper_Transmission_Overlay_May_2012.pdf ("The question of cost allocation is often cited as one of the greatest barriers to transmission investment.").

65 Transmission Planning and Cost Allocation by Transmission Owning & Operating Public Utilities, Order No. 1000, 76 Fed. Reg. 49,842 (Aug. 11, 2011); *see also* MCCALLEY ET AL., *supra* note 64, at 42 (discussing Order 1000).

66 Trabish, *supra* note 64.

67 *See* MCCALLEY ET AL., *supra* note 64, at 43 ("The general idea is to allocate investment costs pro-rata through a mechanism such as general grid access that would not distinguish between existing and new users or local and external users. In theory, a simple grid charge that funds a general investment pool could greatly streamline proceedings tasked with measuring and allocating costs and benefits of specific projects.").

68 Press Release, Fed. Energy Regul. Comm'n, FERC Issues Transmission NOPR Addressing Planning, Cost Allocation (Apr. 21, 2022), https://www.ferc.gov/news-events/news/ferc-issues-transmission-nopr-addressing-planning-cost-allocation.

69 Building for the Future Through Electric Regional Transmission Planning & Cost Allocation & Generator Interconnection, 179 FERC ¶ 61028, at paragraph 64 (2022).

(CREZ) in Texas—FERC now supports long-term, regional planning for new transmission projects.[70]

CREZ was a highly successful Texas program that could serve as a national model for planning and funding transmission.[71] CREZ facilitated the buildout of transmission lines that connected renewables-rich areas of West Texas to the major population centers of Texas.[72] During the planning of CREZ, the Public Utility Commission of Texas collaborated with stakeholders to identify the areas that most needed transmission, elicited extensive input, and eventually sought bids from contractors to construct the lines.[73] The program produced 3,500 miles of high-voltage transmission lines, used mostly for wind power.[74] Notably, this transmission expansion—which added over 18 gigawatts of wind energy to the Texas grid—saves consumers $1.7 billion per year and has added $5 billion in "incremental economic development," all for a one-time cost of $6.8 billion.[75] This cost was paid for over time by ratepayers in Texas.[76] By using a similar approach within various geographic zones of the U.S., "FERC may be able to boost economic activity—and, by proxy, grid reliability—in less dense parts of the country while serving the overarching goal of transmission infrastructure expansion."[77]

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70 Daniel Hagan et al, *Turning to Transmission: A Critical Connection in the Energy Transition*, WHITE & CASE (Oct. 8, 2021), https://www.whitecase.com/publications/alert/turning-transmission-critical-connection-energy-transition.

71 *Texas as a National Model for Bringing Clean Energy to the Grid*, AMS. FOR A CLEAN ENERGY GRID: BLOG POSTS (Oct. 13, 2017), https://cleanenergygrid.org/texas-national-model-bringing-clean-energy-grid/.

72 *Id.*

73 *Id.*

74 Hagan et al., *supra* note 70.

75 *Texas as a National Model*, supra note 71.

76 Jim Malewitz, *$7 Billion Wind Power Project Nears Finish*, THE TEX. TRIB. (Oct. 14, 2013, 6:00 AM), https://www.texastribune.org/2013/10/14/7-billion-crez-project-nears-finish-aiding-wind-po/.

77 Hagan et al., *supra* note 70.

B. FEDERAL FUNDING OF INTERSTATE TRANSMISSION

The federal government can also help fund the construction of transmission lines. The Infrastructure Investment and Jobs Act (IIJA), which President Biden signed into law in November 2021, allocates more than $65 billion in investments to energy infrastructure.[78] More specifically, the Act establishes a $2.5 billion revolving loan fund, which is used by the Department of Energy (DOE) to act as an anchor tenant for transmission line projects.[79] It also allows the DOE to buy up to 50% of a line's planned capacity for 40 years, which it can then sell after ensuring the project has long-term financial viability.[80] Congress appropriated $10 billion to the Secretary of the Treasury for each year between 2022 and 2026 to fund this program.[81] Additionally, outside of this $10 billion, the Secretary can recover costs from rates charged for the transmission capacity, as well as "from eligible entities receiving the benefit of the applicable facilitation activity."[82]

Collectively, this program could help finance new transmission projects through direct loans and the pre-purchasing of electricity. Moreover, the cost recovery mechanism represents a good cost-allocation model where ratepayers and entities that benefit from the line's construction end up paying for the project over time.[83] The federal government will likely use this fund to connect renewables-rich areas to high-load centers because it

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78 Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat 429 (2021); Press Release, The White House, Fact Sheet: The Bipartisan Infrastructure Deal (Nov. 6, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal/.

79 Allison B. Rumsey et al., *2021 Year End Round Up: What Is in the Infrastructure Investment and Jobs Act?*, ARNOLD & PORTER KAY SCHOLER LLP (Dec. 17, 2021), https://www.arnoldporter.com/en/perspectives/blogs/environmental-edge/2021/12/what-is-in-infrastructure-investment-and-jobs-act.

80 42 U.S.C § 18713(f) (2021).

81 *Id.* § 18713(d)(3).

82 *Id.* § 18713(d)(4).

83 *Id.*

prioritizes projects that emphasize interregional transfer capacity and lower greenhouse gas emissions.[84]

Additionally, the federal government has other loan programs in place for transmission infrastructure. For example, 42 U.S.C. § 16421a grants the Secretary of the Treasury the authority to loan the Western Area Power Administration (WAPA) up to $3.25 billion for various planning, financing, construction, and operation of new or improved transmission lines, as long as one terminus of a transmission line exists in a WAPA-serviced area and facilitates the delivery of renewable energy.[85] Moreover, the financing available from the IIJA is separate from this program, though no one project may accept a loan from both federal programs.[86]

The Build Back Better Act (BBB) originally proposed an $8 billion fund to finance transmission projects that connect clean energy sources through grants and direct loans.[87] The bill also set aside $800 million for grants to facilitate the siting of interstate transmission lines.[88] Unfortunately, the bill did not advance in the Senate.[89] In its place, Congress passed the Inflation Reduction Act (IRA) in 2022.[90] The IRA trimmed the BBB's $8 billion loan program to $2 billion and reduced the siting and permitting grants to $760 million.[91] While these appropriations are not as robust as in the BBB, the IRA and IIJA

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84 *Id.* §§ 18713(j)(8)(C)–(D) (emphasis added).
85 *Id.* § 16421a(b)(1)(B).
86 42 U.S.C. § 18713(j).
87 *See* H. R. 5376, 117th Cong. §§ 30461–62 (as engrossed by House, Nov. 19, 2021) [hereinafter Build Back Better Act].
88 *Id.* § 30462.
89 Sahil Kapur & Benjy Sarlin, *Manchin Says Build Back Better Is 'Dead.' Here's What he Might Resurrect.*, NBC NEWS (Feb. 3, 2022), https://www.nbcnews.com/politics/congress/manchin-says-build-back-better-dead-here-s-what-he-n1288492.
90 Inflation Reduction Act of 2022, Pub. L. No. 117–169, 136 Stat. 1818 (2022).
91 *Id.* §§ 50151– 50152.

still provide billions of dollars for new transmission development.

The federal government could help finance these projects with another method, one that has proven highly successful for solar projects: an investment tax credit (ITC).[92] A recent study by the American Council on Renewable Energy looked at the impact and benefits of an ITC for constructing transmission infrastructure and found that a 30% ITC could create up to 650,000 good-paying jobs, add an additional 30,000 megawatts of renewable energy capacity, spur over $15 billion in near-term private capital investment, and save $2.3 billion in energy costs for the lower 80% of income brackets.[93] Another report found that at least twenty-two high-voltage transmission projects could already begin construction if they secured the necessary funding.[94] An ITC could have helped fund these projects. The BBB had sought to give transmission projects an ITC of upwards of 30%,[95] but the IRA did not include such a tax credit. Still, future legislation could include this type of ITC to help fund transmission projects.

Through existing federal financing programs, and by pursuing new funding through ITCs and new federal loans, the federal government could greatly aid in the construction of interstate transmission. Furthermore, if the federal government engaged in more long-term transmission planning and solved the issues of cost allocation, more lines would likely be built. Therefore, the government should pursue these methods to ensure that new

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92 *Solar Investment Tax Credit (ITC)*, SOLAR ENERGY IND. ASS'N, https://www.seia.org/initiatives/solar-investment-tax-credit-itc (last visited Aug. 13, 2023) ("The ITC has proven to be one of the most important federal policy mechanisms to incentivize clean energy in the United States.").

93 Press Release, Am. Council on Renewable Energy, Report: Transmission Investment Tax Credit Would Create 650,000 Jobs, Spur $15.3B in Investment (May 13, 2021), https://acore.org/news/report-transmission-itc-would-create-650000-jobs-spur-15-3b-in-investment/.

94 MICHAEL GOGGIN ET AL., TRANSMISSION PROJECTS READY TO GO: PLUGGING INTO AMERICA'S UNTAPPED RENEWABLE RESOURCES 4 (2021), https://cleanenergygrid.org/wp-content/uploads/2019/04/Transmission-Projects-Ready-to-Go-Final.pdf.

95 Build Back Better Act § 136105.

interstate transmission projects move forward.

V. SITING AND PERMITTING INTERSTATE TRANSMISSION

Some of the biggest obstacles to building interstate transmission relate to the permitting and siting process, particularly when acquiring ROWs.

A. THE PROBLEM OF SPLIT JURISDICTIONS

In the U.S., federal and state governments regulate different aspects of the grid.[96] Nationally, FERC exercises jurisdictional authority "over all interstate and wholesale electricity commerce," while states have the power to regulate the retail sales of electricity and all aspects of intrastate electricity transmission, and are able to approve and operate power plants and transmission infrastructure.[97] The Federal Power Act (FPA) granted the federal government the authority to regulate the selling and transmitting of "electric energy in interstate commerce."[98] Because the FPA was silent on which entity controlled the siting of electrical facilities, state authority retained this power.[99] This means that "[d]espite the interstate nature of the electric grid and electricity markets, the states have virtually complete authority over the siting and permitting of interstate transmission lines."[100] Any developer building an interstate transmission line must get both siting permission and eminent domain authority from each state it passes through.[101] The states have not

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96 *See* ILYA CHERNYAKHOVSKIY ET AL., U.S. LAWS AND REGULATIONS FOR RENEWABLE ENERGY GRID INTERCONNECTIONS 2–7 (2016), https://www.nrel.gov/docs/fy16osti/66724.pdf.

97 *Id.* at 2.

98 16 U.S.C. § 824; *see generally* CHERNYAKHOVSKIY, *supra* note 96, at 2.

99 *See, e.g.*, Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 310 (4th Cir. 2009) ("[S]tates have traditionally assumed all jurisdiction to approve or deny permits for the siting and construction of electric transmission facilities.").

100 Alexandra B. Klass, The Electric Grid at a Crossroads: A Regional Approach to Siting Transmission Lines, 48 U.C. DAVIS L. REV. 1895, 1897 (2015).

101 Alexandra B. Klass, *Takings and Transmission*, 91 N.C. L. REV. 1079, 1101 (2013), https://scholarship.law.umn.edu/faculty_articles/18.

standardized the permitting process across the nation, and to complicate matters further, local or municipal authorities in many states also have some siting control.[102]

The federal government does still have some authority in the area. The Energy Policy Act of 2005 granted federal agencies limited authority to supplant states in siting transmission projects.[103] However, this power was almost immediately curtailed by lower courts and has gone unused.[104] Recently—as will be examined more closely in Part V—Congress clarified FERC's power to exercise siting authority in certain circumstances.[105]

B. OBSTACLES ABOUND IN THE STATE PERMITTING AND SITING PROCESS

As noted above, there is not a uniform standard for the state permitting and siting process. However, in most states, the process can be generalized as follows:[106] First, a state's public utility commission (PUC) reviews and approves the construction of transmission lines.[107] A PUC will usually need to grant authority to a developer of proposed projects to own and operate the planned transmission line as if it was a public utility.[108] The developer will also need to obtain a Certificate of Public Convenience and Necessity (CCN), or equivalent certificate, which allows a transmission operator to exercise the power of eminent domain over the required easements, assuming no voluntary agreement can be reached.[109] To be issued a CCN, a facility must be "in the public interest."[110]

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102 *Id.*

103 Energy Policy Act of 2005, Pub. L. No. 109-58, § 1221, 119 Stat. 594, 963–67.

104 ZEVIN ET AL., *supra* note 34, at 22 ("Unfortunately, since its passage in 2005, section 216 has failed to spur further investment in transmission projects as a result of adverse court decisions. . . .").

105 *See infra* Part V.

106 *See* JOSEPH H. ETO, BUILDING ELECTRIC TRANSMISSION LINES: A REVIEW OF RECENT TRANSMISSION PROJECTS 3–6 (2016), https://eta-publications.lbl.gov/sites/default/files/lbnl-1006330.pdf; Klass, *supra* note 101, at 1101–03.

107 Klass, *supra* note 101, at 1101–03. Other states may instead give this power to one or more state agencies. ETO, *supra* note 106, at 3.

108 ZEVIN ET AL., *supra* note 34, at 15.

109 Klass, *supra* note 101, at 1102.

110 ZEVIN ET AL., *supra* note 34, at 16.

Importantly, the "public interest" in question here is typically the interest of residents and businesses solely within the state.[111] This means the relevant agency may ignore the broader, national reasons for constructing the line;[112] in fact, this practice is often codified in state law.[113] This can be a large problem during the construction of interstate transmission lines because a line passing through a state may not deliver any electricity to that state.[114] Thus, administrators could easily determine that an interstate line was not in the public interest.[115] This essentially gives a single state the power to destroy a continent-sized project.[116] Moreover, merchant lines, which are lines constructed by private companies that compete with PUCs, may not fall within the public interest in some states.[117] For example, some states allow merchant lines to use the power of eminent domain, while other states expressly forbid this by statute.[118] Virtually all the other states have statutes that *may* be broad enough to give merchant lines this power, but no caselaw in these states currently exists on the subject.[119] The end result is that those who want to privately develop an interstate transmission line may choose not to due to the uncertainty

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111 *Id.*

112 *Id.*

113 ENERGY & INFRASTRUCTURE PROGRAM, BIPARTISAN POL'Y CTR., CAPITALIZING ON THE EVOLVING POWER SECTOR: POLICIES FOR A MODERN AND RELIABLE U.S. ELECTRIC GRID 29 (2013), https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2019/03/Energy_Grid_Report1.pdf ("In some states, regulators might even be required by law to reject a project that does not serve load within the state's boundaries, even in cases where the project delivers broader benefits to the region at large that the state would share in over time.").

114 *See id.* ("Siting processes are particularly problematic for interstate projects that involve long-distance [HVDC] lines.").

115 *See id.* ("[A] project that transmits power generated in one state, passes through a second state, and serves load in a third state could have difficulty winning approval from regulators in the second state.").

116 Cicala, *supra* note 6, at 84. ("Although this is an inter-state project, the leading role state regulators have historically played in the electricity sector means that any individual state can effectively veto the project.").

117 *See* Klass, *supra* note 101, at 1123–26.

118 *Id.*

119 *Id.* at 1126.

of current state laws and regulations.

Assuming a project is granted a CCN, a developer moves on to the routing, siting, and permitting of the project.[120] During this phase, one or more environmental impact studies (EIS) will be prepared to assess the project's effects.[121] Like the previous step, "[m]eaningful public involvement" is necessary during the EIS process, and can involve the feedback and coordination of agencies, the public at large, and the relevant developer.[122] If this process proves successful, the developer will still need to obtain the necessary financing and ROWs for its line.[123] Additionally, the developer would need to repeat this process for each state the transmission line crosses through.[124] Likewise, any new development must also obtain all required federal approvals, such as environmental permits.[125]

This process for constructing new transmission lines is thus "rife with opportunities for parochial interests and anticompetitive forces to block construction."[126] To get a project approved, developers must traverse a PUC's administrative process, and may have to deal with various municipal authorities.[127] Moreover, developers must successfully defend against any litigation or legislative threats.[128] With every state that a transmission line travels through, the odds of successfully completing the project diminish.[129] Given this, it

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120 *See* ETO, *supra* note 106, at 4.
121 *Id.*
122 *Id.*
123 *See* BROWN & SEDANO, *supra* note 10, at 22–23 (discussing the financing of transmission lines).
124 Klass, *supra* note 101, at 1101.
125 Capitalizing on the Evolving Power Sector, *supra* note 113, at 28.
126 Cicala, *supra* note 6, at 84.
127 ZEVIN ET AL., *supra* note 34, at 16.
128 *Id.*
129 *See id.* ("Multiplying these steps by however many states a project traverses yields a rough accounting of both the number of different procedural timelines that can govern a single project and the number of formal opportunities opponents have to impede it.").

is not surprising that transmission projects frequently take a decade or more to develop.[130] If the U.S. has any hope of building out its transmission infrastructure on a national level, the federal government must take a larger role in the siting process.

VI. SOLUTIONS TO STATE SITING AND PERMITTING PROBLEMS

A. USING FEDERAL LANDS

One solution that could reduce the problems associated with eminent domain, obtaining ROWs, and state siting requirements would be to run transmission lines through federal lands. The Federal Lands Policy and Management Act gives the Forest Service and the Bureau of Land Management the power to issue ROW permits on federal land,[131] and these permits can be granted to transmission lines.[132] Section 368 of the Energy Policy Act of 2005 further developed this power.[133] One goal of § 368 was to "improve the delivery of energy, while enhancing the electric transmission grid for the future, by establishing a coordinated network of Federal energy corridors on Federal lands in the West."[134] Section 368 directed agencies to designate these corridors and to conduct environmental reviews in case they were used.[135] This resulted in the creation of environmental impact statements for around 6,000 miles of federal land that could be used as energy corridors.[136]

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130 *Id.*; *see also* ETO, *supra* note 106, at 10–11 (discussing the long process of several transmission projects, including Champlain Hudson Power Express line, which began the permitting process in 2010); *About the Project*, CHAMPLAIN HUDSON POWER EXPRESS, https://chpexpress.com/project-overview/ (last visited Aug. 13, 2021) (showing that as of January 2022, construction has not started on the project).

131 ZEVIN ET AL., *supra* note 34, at 21 (citing 43 U.S.C. § 1761).

132 *See* 43 U.S.C. § 1761(a)(4) ("[The Secretaries] are authorized to grant, issue, or renew rights-of-way over, upon, under, or through such lands for . . . systems for generation, transmission, and distribution of electric energy. . . .").

133 ZEVIN ET AL., *supra* note 34, at 21.

134 Notice of Availability of the Final Programmatic Environmental Impact Statement for the Designation of Energy Corridors on Federal Land in the 11 Western States, 73 Fed. Reg. 72,521, 75,522 (Nov. 28, 2008).

135 ZEVIN ET AL., *supra* note 34, at 21.

136 *Id.*

There are large areas of federal land in the western U.S. that overlap with ideal locations for interstate transmission line construction, giving promise to this solution.[137] However, it is far from a complete answer. For one, transmission projects that wanted to obtain federal ROWs and build on public land would—of course—still need to go through the federal siting process.[138] While this could prove successful in western states, federal lands in the eastern U.S. are fragmented and overseen by multiple agencies, complicating the siting process.[139] Still, by combining this solution with those discussed later, the process of building new interstate transmission lines would be faster and less expensive.

B. TRANSMISSION CORRIDORS AND "BACKSTOP" SITING

The Energy Policy Act of 2005 (EPAct) added section 216 to the FPA.[140] This new section, titled "Siting of Interstate Electric Transmission Facilities," gave FERC the power to site and permit transmission projects in specific and limited circumstances.[141] Essentially, if a transmission line received a federal permit, it could circumvent the separate permitting requirements of the state(s) it passed through.[142] Because of this, the permitting process became known as "backstop siting."[143] Recently, the IIJA made important changes to the backstop siting process, which could allow for a more streamlined approach to

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137 *See* J. KRUMMEL ET AL., ENERGY TRANSPORT CORRIDORS: THE POTENTIAL ROLE OF FEDERAL LANDS IN STATES IDENTIFIED BY THE ENERGY POLICY ACT OF 2005, SECTION 368(B) 5-1 (2011) ("[D]esignated energy transport corridors on federal lands provide logical pathways for extending new transmission lines and pipelines across the [western] landscape.").

138 *Id.* at 5-4.

139 *See id.* at 5-1 ("[F]ragmented federal land jurisdiction in the East provides few obvious beacons to attract energy transport infrastructure.").

140 Energy Policy Act of 2005, Pub. L. No. 109-58, § 1221, 119 Stat. 594, 946–51.

141 *See id.*

142 ZEVIN ET AL., *supra* note 34, at 22.

143 *Id.* at 9.

building interstate transmission lines.[144]

The broad steps required for a project to qualify for backstop siting remain largely the same between the EPAct and the IIJA.[145] First, a proposed project must be in a "national interest electric transmission corridor."[146] Next, the project itself must meet certain minimum criteria related to energy transmission, construction, and project development.[147] Finally, the state or entity tasked with approving the project must have frustrated the siting process in one of a few specified ways.[148] The following subsections look at each of these steps, and examine how key statutory changes from the IIJA may make it easier for the federal government to exercise backstop siting authority for interstate transmission projects.

1. DESIGNATING TRANSMISSION CORRIDORS

To qualify for backstop siting, a transmission project would have to be in a transmission corridor.[149] The EPAct described these transmission corridors as "any geographic area experiencing electric energy transmission capacity constraints or congestion that adversely affects consumers."[150] Section 216(a) of that Act outlined the process for designating such areas.[151] The DOE was required to conduct an electric transmission congestion study every three years; it could then issue a report based on that

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144 *See* Robert Shapiro, *Infrastructure Bill and Transmission*, NORTON ROSE FULBRIGHT: PROJECT FIN. NEWS (Dec. 8, 2021), https://www.projectfinance.law/publications/2021/december/infrastructure-bill-and-transmission/ (discussing the various changes in the Act and the impact on transmission infrastructure).

145 *Compare* Energy Policy Act of 2005, Pub. L. No. 109-58, § 1221, 119 Stat. 594, 946–51 *with* 16 U.S.C. § 824p.

146 16 U.S.C. § 824p(a).

147 *Id.* § 824p(b).

148 *See id.* § 824(b)(1)(C).

149 *Id.* § 824p(a).

150 Energy Policy Act of 2005, Pub. L. No. 109-58, § 216(a)(2), 119 Stat. 594, 946.

151 *Id.* at 946–47.

study and designate a particular area as a transmission corridor.[152] The Act gave the DOE many factors to look at to determine whether an area qualified. These factors included whether the economic development, vitality, or growth of an area (including end markets) would be constrained absent new energy access; whether designating the area as a transmission corridor would serve the energy independence of the U.S.; and whether designation would be in the "interest of national energy policy."[153]

In 2007, the DOE issued its first report and designated two transmission corridors: the Mid-Atlantic Area and the Southwest Area National Interest Electric Transmission Corridors.[154] However, because the DOE failed to perform the required state consulting and environmental studies, the Ninth Circuit Court of Appeals vacated the designations.[155] More specifically, before the DOE completed its study, it did not consult with the states affected by the designation of the corridors, and therefore violated the Act's consulting requirement.[156] The Court also concluded that under the National Environmental Policy Act (NEPA), the DOE should have issued a more thorough EIS before designating these transmission corridors.[157] Because the DOE failed on both accounts, the Court vacated the studies—along with the designations of the transmission corridors.[158] Since this ruling, the DOE has yet to designate another corridor.[159]

With the passing of the IIJA, Congress explicitly amended how the DOE may designate transmission corridors. First, the IIJA not only describes corridors as areas

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152 *Id.* at 947.
153 *Id*. at 946–47.
154 National Electric Transmission Congestion Report, 72 Fed. Reg. 56,992 (Oct. 5, 2007).
155 Cal. Wilderness Coal. v. U.S. Dep't of Energy, 631 F.3d 1072, 1107 (9th Cir. 2011).
156 *Id.*
157 *Id.*
158 *Id.*
159 Klass, *supra* note 101, at 1136.

experiencing capacity constraints or congestion, but also as areas that are "expected to experience such energy transmission capacity constraints or congestion" in the future.[160]

Additionally, thanks to the IIJA, the DOE may now consider other factors in determining whether an area should be designated a transmission corridor.[161] Specifically, the DOE can look at whether designation would benefit facilities that generate or transmit intermittent energy—like wind and solar—and whether designation would result in cost reduction for electricity consumers.[162] Because wind and solar energy are both intermittent in nature and building new transmission would reduce the price of energy for consumers, the DOE would likely be able to designate the renewables-rich regions of the U.S. as transmission corridors.

2. Meeting the Specific Project Development Criteria to Obtain a Construction Permit

When a project is located within one of these newly designated transmission corridors, FERC may be able to exercise backstop siting authority if the project has all of the following characteristics: The project must transmit energy in interstate commerce, align with the public interest and national energy policy, significantly reduce transmission congestion, protect or benefit consumers, and enhance energy independence.[163] Additionally, if the project proposes modifying existing transmission, it is required to reasonably maximize transmission capabilities.[164] The IIJA left these characteristics intact.[165] A large-scale interstate transmission project that promotes clean energy should

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160 16 U.S.C. § 824p(a)(2)(ii).
161 *Id.* § 824p(a)(4).
162 *Id.* §§ 824p(a)(4)(F)–(H).
163 *Id.* § 824p(b)(2)–(5).
164 *Id.* § 824p(b)(6).
165 *See id.* § 824p(b)(2)–(6).

satisfy these conditions fairly easily.[166]

3. STATE FAILURE TO ACT

Lastly, for FERC to exercise its backstop siting authority, a state must have failed to act on a proposed project within one year of either the date the project application was filed or the date on which a relevant transmission corridor was designated, whichever occurs last.[167] Regarding "failing to act" on a project, the statutory language originally read that a permit may be granted if "a State commission or other entity that has authority to approve the siting of the facilities ha[d] *withheld* approval for more than 1 year after the filing of an application."[168] According to FERC's interpretation, if a state rejected an application outright, that was a form of "withholding approval."[169] Unfortunately for FERC, the Fourth Circuit Court of Appeals disagreed.[170] It held that when a state denies an application, that could not be considered "withholding" under the meaning of the statute.[171] Essentially, so long as a state formally denied a project application within a year, backstop siting could never occur. This ruling, combined with the decision to vacate the DOE's only designated transmission corridors, greatly restricted the federal government's power to

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166 For example, interstate lines, by nature, transmit energy in interstate commerce. Moreover, national energy policy favors these projects. *See* Building a Better Grid Initiative to Upgrade and Expand the Nation's Electric Transmission Grid to Support Resilience, Reliability, and Decarbonization, 87 Fed. Reg. 2,769 (Jan. 19, 2022) (discussing policies related to transmission improvements and facilitating the growth of clean energy).

167 Energy Policy Act of 2005, Pub. L. No. 109-58, § 1221(b)(1)(C), 119 Stat. 594, 946. There are other ways to trigger this, such as a state lacking the authority to permit, or a state not being able to look at interstate benefits in its decision. *Id.*

168 *Id.* (emphasis added).

169 ZEVIN ET AL., *supra* note 34, at 24.

170 *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 313 (4th Cir. 2009).

171 *See id.* ("We conclude that FERC's interpretation is contrary to the plain meaning of the statute. Simply put, the statute does not give FERC permitting authority when a state has affirmatively denied a permit application within the one-year deadline.").

perform backstop siting.[172]

However, just as the IIJA changed the process of designating transmission corridors, the Act also modified the method of granting federal backstop authority.[173] Specifically, with respect to whether a state issuing a denial counts as "withholding approval," Congress seems to have circumvented this argument entirely and amended the Act to say that if "a State commission or other entity . . . has *denied* an application seeking approval pursuant to applicable law," then, assuming the other requirements are met, FERC can issue a permit.[174] Given the complete language of the IIJA, the federal government can now grant a permit to a transmission project if the state does not make a determination within one year, approves the project in such a way that renders the construction economically infeasible and non-helpful, or denies an application outright.[175]

Now that the IIJA has strengthened federal backstop siting authority, the DOE can designate more transmission corridors, focusing on intermittency, national energy policy, and savings to consumers. Of course, given previous challenges, the DOE should be careful to consult with all affected states and issue the appropriate environmental reports before designating such corridors. Once the DOE designates these transmission corridors, project developers within them should vigorously pursue FERC's backstop siting authority if a state denies a project or otherwise fails to act on the project within one year.

4. PROBLEMS WITH THIS APPROACH

Recent political developments may signal that the federal government is ready to

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[172] *See* Klass, *supra* note 101, at 1136 ("the result [of the rulings] being that the DOE has not successfully designated a [transmission corridor], and FERC has not exercised its backstop siting authority.").
[173] *See* 16 U.S.C. § 824p(b)(1)(C).
[174] *Id.* (emphasis added).
[175] *Id.*

exercise federal backstop siting authority. First, President Biden made siting transmission infrastructure a key part of his election campaign.[176] Second, since the last DOE report was made in 2020,[177] the DOE must conduct a study and issue a report potentially designating a new transmission corridor in 2023.[178] Additionally, in the wake of the BBB's failure, Biden and the DOE launched the Building a Better Grid Initiative, which prioritizes studying and building more long-distance transmission.[179]

However, while FERC theoretically now has the power to issue backstop siting permits, many barriers still stand in the way of building more interstate transmission. As mentioned above, the DOE's designation of a transmission corridor would invoke NEPA and require a lengthy state consultation process. Moreover, FERC's use of backstop siting authority would also likely trigger NEPA and could require environmental reports that may take years to complete.[180]

By far the biggest barrier to using backstop siting lies with the fact that a federal permit may only be issued for private property, not for state-owned property.[181] If a state opposes a project, that state can kill it by refusing to grant a right-of-way for the portion of

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176 *The Biden Plan To Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*, BIDENHARRISDEMOCRATS, https://joebiden.com/clean-energy/ (last visited Aug 13, 2023) ("To build the next generation of electric grid transmission and distribution, Biden will . . . cut red-tape to promote faster and easier permitting.").

177 U.S. DEP'T OF ENERGY, NATIONAL ELECTRIC TRANSMISSION CONGESTION STUDY (Sept. 2020), https://www.energy.gov/oe/articles/2020-national-electric-transmission-congestion-study.

178 *See* 16 U.S.C. § 824p(a)(2) (outlining the timeline of issuing studies and reports).

179 *See* Building a Better Grid Initiative To Upgrade and Expand the Nation's Electric Transmission Grid To Support Resilience, Reliability, and Decarbonization, 87 Fed. Reg. 2,769, 2,769 (Jan. 19, 2022) ("Under the Building a Better Grid Initiative, DOE will identify critical national transmission needs and support the buildout of long-distance, high-voltage transmission facilities. . . .").

180 *See* Piedmont Env't Council v. Fed. Energy Regul. Comm'n, 558 F.3d 304, 317 (4th Cir. 2009) ("Once FERC receives a permit application, it will be required under NEPA to assess the environmental effects of the project. The assessment will likely prompt the preparation of an EIS or an [environmental assessment].").

181 *See* 16 U.S.C. § 824p(e)(1).

the line that crosses such state land. Practically speaking, "it is impossible to construct a high-voltage transmission line of any significant length without crossing state-owned lands."[182] This is because states have vast landholdings in parks, forests, and highways.[183] Furthermore, according to the equal footing doctrine, states own the bottoms of navigable waters within their territories.[184] Since rivers define the boundaries of forty-four of the lower forty-eight states, nearly every interstate transmission line would likely still need state approval.[185]

There could be a limited way around this lack of eminent domain authority over state land: 42 U.S.C. § 16421 may give the DOE federal siting authority and the power of eminent domain in states where WAPA and Southwestern Power Administration (SWPA) operate.[186] This includes most of the continental U.S. west of the Mississippi River, save the Pacific Northwest.[187] However, this authority is untested, and would not apply to many parts of the country.[188] Furthermore, there is a debate as to whether the law really grants eminent domain authority, as the specific language only grants the federal government the power to "design, develop, construct, operate, maintain, or own" a project within a state where WAPA or SWPA operate.[189] Still, given the need for new transmission, and the improbability of new legislation further addressing federal siting, the federal government

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182 Michael Wigmore et al., *Feds May Need Power To Take State Lands for New Grid*, LAW360 (Oct. 20, 2021, 4:12 PM), https://www.law360.com/articles/1432198/feds-may-need-power-to-take-state-lands-for-new-grid.

183 *Id.*

184 *Id.*; *see also* PPL Mont. LLC v. Montana, 565 U.S. 576, 589–93 (2012) (explaining the concept of the equal footing doctrine).

185 Wigmore et al., *supra* note 182.

186 42 U.S.C. § 16421.

187 Wigmore et al., *supra* note 182.

188 *Id.*

189 42 U.S.C. § 16421(b). In the only case where a court looked at this issue, it concluded that the dispute was not yet ripe and the issue could not be decided because the DOE had not yet tried to condemn any land. Downwind LLC v. U.S. Dep't of Energy, 2017 WL 6542747, at *3 (E.D. Ark. Dec. 21, 2017).

may choose to exercise this siting power, along with the IIJA's siting power, where appropriate.[190]

C. USING EXISTING RIGHTS-OF-WAY

Another solution that holds promise is co-locating transmission lines along existing ROWs.[191] Across the country, millions of miles of ROWs exist in the form of highways, railroads, and pipelines.[192] In 2008, the Government Accountability Office studied the potential benefits of co-locating transmission lines with existing ROWs.[193] The benefits included "the ease of construction and maintenance of the transmission lines and the reduction of environmental and visual impacts."[194] Additionally, developers could avoid building on "undisturbed lands."[195] Likewise, the Office found it would probably be less expensive to obtain "the right to add a new transmission line to an existing right-of-way from a single owner—such as a pipeline, highway, or railroad—than it would be to acquire the needed rights from multiple property owners."[196] This addresses the long and difficult

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190 For a more thorough analysis of this argument, see generally ZEVIN ET AL., *supra* note 34.

191 *See* John D. Porcari et al., *A Transportation, Infrastructure and Climate Priority*, THE HILL (Dec. 28, 2020) ("High voltage direct current transmission, or HVDC, installed underground alongside America's world-class networks of roads and highways, is the key to unlocking a clean, prosperous, and secure energy future.").

192 *See General Pipeline FAQs*, PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN. (November 6, 2018), https://www.phmsa.dot.gov/faqs/general-pipeline-faqs (noting that the U.S. has "more than 2.6 million miles of pipelines"); *Highway Finance Data Collection*, OFF. OF HIGHWAY POL'Y INFO., https://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter1.cfm (last updated Nov. 7, 2014) ("Over 164,000 miles of highways in the National Highway System form the backbone of our 4-million-mile public road network."); *The Freight Rail Overview*, U.S. DEP'T OF TRANSP.: FED. R.R. ADMIN., https://railroads.dot.gov/rail-network-development/freight-rail-overview (last updated Jul. 8, 2020) ("Running on almost 140,000 route miles, the U.S. freight rail network is widely considered the largest . . . in the world.").

193 TRANSMISSION LINES ALONG TRANSPORTATION RIGHTS OF WAY, *supra* note 27, at 2–4.

194 *Id.*

195 *Id.*

196 *Id.*

process of seizing land and relying on eminent domain.[197]

Additionally, because the previous ROW owners already went through an approval process, the land has likely been studied, and environmental impacts may have been assessed. [198] Furthermore, when building along highways, the Federal Highway Administration and the various state Departments of Transportation already have compliance practices in place to work with transmission developers and utilities, streamlining the process.[199] Finally, this solution already has support at the federal level. President Biden endorsed the idea on the campaign trail[200] and included it in his Building a Better Grid Initiative,[201] and the IIJA promotes designating transmission corridors that maximize existing ROWs.[202]

The notion of co-locating new infrastructure along existing ROWs has worked in the past.[203] For example, developers used existing transportation ROWs to install fiber-optic cables and help expand broadband internet.[204] In fact, an HVDC transmission project that uses existing ROWs is already moving forward.[205] The SOO Green Renewable Rail

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197 *See* Porcari et al., *supra* note 191 ("Highways and rail lines already hold 'rights of way' that allow agencies to greenlight road-side and track-side infrastructure projects like power lines. That means no fights over land-seizures and no ugly arguments over eminent domain.").

198 *See id.* (noting that the composition of land along existing ROWs is "well-studied").

199 Trabish, *supra* note 64.

200 *See The Biden Plan To Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*, *supra* note 184. ("To build the next generation of electric grid transmission and distribution, Biden will prioritize re-powering of lines that already exist with new technology. He will take advantage of existing rights-of-way—along roads and railways—and cut red-tape to promote faster and easier permitting.").

201 Building a Better Grid Initiative to Upgrade and Expand the Nation's Electric Transmission Grid To Support Resilience, Reliability, and Decarbonization, 87 Fed. Reg. 2,769, 2,769 (Jan. 19, 2022).

202 16 U.S.C § 824p(a)(4)(G)(i).

203 ZEVIN ET AL., *supra* note 34, at 20; *see also* Jeffery M. Heftman, *Railroad Right-of-Way Easements, Utility Apportionments, and Shifting Technological Realities*, 2002 U. ILL. L. REV. 1401, 1401–02 (2002) (discussing the various approaches to collocating telecommunication lines along rail lines).

204 ZEVIN ET AL., *supra* note 34, at 20.

205 *Id.*

project will run nearly 349 miles of HVDC transmission line from Mason City, Iowa to the Chicago, Illinois area, largely along existing rail corridors.[206] The developers hope to "meet America's growing demand for affordable, zero-carbon electricity" by uniting the two largest power markets in the nation.[207]

The SOO Green Renewable Rail project also benefits from a related solution: undergrounding—or the burying of transmission lines underground.[208] Unlike other high-voltage lines, HVDC lines have the ability to function while buried or submerged underwater.[209] There are many positive features of undergrounding. Buried lines experience fewer outages because accidental or purposeful damage is less likely,[210] which would save money over time.[211] Additionally, there is "aesthetic value" in burying lines because property values benefit from keeping lines out of sight.[212] However, burying transmission lines increases construction and maintenance costs,[213] and digging up land to install lines could present environmental concerns.[214] Still, planners could use undergrounding strategically throughout the grid.

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206 *About*, SOO GREEN HVDC LINK, https://soogreen.com/about/ (last visited Aug. 13, 2023); Iulia Gheorghiu, *Independent Developer Proposes $2.5B Underground Transmission Line, To Bring Iowa Wind to PJM, MISO*, UTIL. DIVE (Mar. 13, 2019), https://www.utilitydive.com/news/independent-developer-proposes-25b-underground-transmission-lineadding/550399/.

207 *About*, *supra* note 206.

208 *Id.*

209 U.S. ENERGY INFO. ADMIN., *supra* note 17, at 9.

210 Peter H. Larsen, *A Method To Estimate the Costs and Benefits of Undergrounding Electricity Transmission and Distribution Lines*, 60 ENERGY ECON. 6 (2016).

211 *See id.* at 10 (discussing the savings associated with undergrounding).

212 *See id.* at 22 (showing that above ground transmission lines can reduce property value by 5%–20%).

213 *See* KENNETH L. HALL, OUT OF SIGHT, OUT OF MIND 2012: AN UPDATED STUDY ON THE UNDERGROUNDING OF OVERHEAD POWER LINES 20 (2013) ("Underground systems are normally more expensive to install" and have "[h]igher operations and maintenance costs.").

214 *See* Janet Wilson, *Why Not Bury California's Fire-Prone Power Lines Underground? The Reason is Sky High*, DESERT SUN (Oct. 11, 2019, 12:29 PM), https://www.desertsun.com/story/news/environment/2019/10/11/cost-to-bury-california-fire-prone-power-lines-why-not/3937653002/ (discussing the prospects of digging thousands of miles of trenches throughout California's brushland); PUB. SERV. COMM'N OF WIS., ENVIRONMENTAL IMPACTS OF TRANSMISSION LINES 6 (July 2013) ("Underground transmission lines can [lead to] [a]n increase in the area of environmental disturbance.").

Another practical reason for co-locating transmission lines along transportation ROWs is that—much like the nation's highways and rail lines—the transmission infrastructure needed to transform the grid would run throughout the country and connect to major population centers. Because of this, there is a great deal of overlap in the location of existing ROWs and proposed transmission lines.

While the solution of using existing ROWs has promise, there are still problems with this method. The same Governmental Accountability Report that analyzed the potential benefits of this solution also determined that co-locating transmission lines with existing ROWs "increased [the] likelihood of safety and security incidents due to the proximity of the transmission lines and the transportation infrastructure."[215] For example, a major car wreck or train derailment could damage transmission lines and create hazards.[216] Transmission lines co-located with pipelines could also become terrorist targets.[217] However, federal and state officials believe the likelihood of these incidents to be low.[218] Moreover, by taking steps "such as adhering to required clearance distances for infrastructure maintenance and conducting risk assessments," developers can mitigate the risks of co-location.[219]

Furthermore, using existing ROWs does not remove state permitting risks.[220] Developers will still need to obtain a CCN and federal and state land and water permits. They may also have to obtain surrounding land if certain areas of a ROW are not big

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215 TRANSMISSION LINES ALONG TRANSPORTATION RIGHTS OF WAY, *supra* note 27, at 4.
216 *Id.*
217 *Id.*
218 *Id.*
219 *Id.*
220 ZEVIN ET AL., *supra* note 34, at 20.

enough to hold both the transmission infrastructure and the corresponding rail line or highway,[221] though developers could solve this last problem with undergrounding, where applicable.

D. TREATING TRANSMISSION LINES LIKE PIPELINES

New legislation could streamline the process of building more interstate transmission lines. Congress could give permitting, siting, and eminent domain authority directly to the federal government for constructing the lines.[222] The power to preempt state authority and site interstate energy infrastructure is not new. The Natural Gas Act allows developers to apply to FERC for a certificate of public convenience (similar to a CCN).[223] If FERC grants it, the developer may exercise eminent domain when necessary.[224] Furthermore, FERC will grant these certificates to private companies, and it rarely ever denies issuing one.[225] Natural gas pipelines and interstate transmission lines serve a similar purpose of ultimately supplying energy to consumers. Both require constructing long-distance infrastructure, siting, permitting, and obtaining ROWs. Yet, the federal government treats pipelines and transmission lines in drastically different ways.

A bill proposed by Senator Joe Manchin aimed to resolve this discrepancy. The Energy Independence and Security Act of 2022 proposed giving FERC the final power to

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221 *Id.*

222 *See* Klass, *supra* note 101, at 1135 ("If Congress were to expand the Department of Energy's ("DOE") and FERC's authority in this area, or grant plenary authority to FERC to site interstate transmission lines, the public use question would be quite different.").

223 15 U.S.C § 717f.

224 *Id.* § 717f(h) ("When any holder of a certificate of public convenience and necessity cannot acquire by contract, or is unable to agree with the owner of property to the compensation to be paid for, the necessary right-of-way to construct, operate, and maintain a pipe line or pipe lines for the transportation of natural gas, and the necessary land or other property, in addition to right-of-way, for the location of compressor stations, pressure apparatus, or other stations or equipment necessary to the proper operation of such pipe line or pipe lines, it may acquire the same by the exercise of the right of eminent domain.").

225 *See* James W. Coleman & Alexandra B. Klass, *Energy and Eminent Domain,* 104 MINN. L. REV. 659, 683 (2019) ("In fact, FERC has only denied a certificate for two pipelines in the last thirty years.").

issue construction permits for transmission projects that the Secretary of Energy determined to be in the national interest.[226] It also solved the state land discrepancy discussed with the IIJA by giving FERC the authority to exercise eminent domain over private *and* state land.[227] However, Manchin included more controversial NEPA and gas pipeline reforms in the bill, which limited its support. As the two houses of Congress are divided between Republicans and Democrats, there is no indication that new transmission legislation will be passed soon.

VII. CONCLUSION

By decarbonizing the energy grid, the U.S. can greatly reduce its greenhouse gas emissions. To accomplish this, the U.S. needs to rely more on cleaner energy sources such as wind and solar. However, current transmission infrastructure cannot efficiently deliver these sources of energy to consumers. By constructing more interstate transmission infrastructure, the U.S. can connect consumers to cleaner energy sources, increase grid efficiency, and lower consumer prices. There are several obstacles standing in the way of this goal, most notably financial barriers and siting constraints. Solutions such as increasing the use of federal lands in siting, co-locating transmission lines along existing ROWs, using federal backstop siting authority, and advocating for new legislation could streamline the process of siting and permitting processes for new transmission lines across the country. Additionally, by solving issues of cost-allocation and financing transmission projects through various federal loans and tax credits, the government could encourage the

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[226] *Energy Independence and Security Act of 2022*, SENATE COMM. ON ENERGY & NAT. RES. 6 (Sept. 21, 2022), http://email.capitolenews.com/q/kRK-QxbgbfyfOR0XNeXDM96rL0dY2J2GZ8mZcOJZXJpbl9oZWV0ZXJAbLWFuY2hpbi5zZW5hdGUuZ292w4gQeHr7k86fKPd8Jtvlea2Q0bh6g.

[227] *Id.* at 7.

construction of these much-needed projects. Therefore, the federal government should vigorously pursue its options to ensure that the U.S. energy grid meets its national and international climate change goals and promote a future of cleaner energy production.

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Coastal Pipe Dreams: Natural Gas Infrastructure, Federal Eminent Domain, and The Limiting Power of the Coastal Zone Management Act

By Michael Robinson

I. INTRODUCTION

The Supreme Court's decision in *PennEast Pipeline Co. v. New Jersey* is a significant setback to a state's ability to limit natural gas infrastructure.[1] The Court held

[1] PennEast Pipeline Co. v. New Jersey, 141 S. Ct. 2244 (2021).

that 1) the Federal Energy Regulatory Commission (FERC) is authorized under § 7 of the Natural Gas Act to grant federal eminent domain power to private natural gas project developers to condemn state-owned lands, and 2) these condemnation actions against a state are not barred by state sovereign immunity under the Eleventh Amendment.[2] In the aftermath of *PennEast Pipeline*, there are few limits on the exercise of federal eminent domain, whether wielded by the federal government or private natural gas project developers who have received this power by grant. If a state does not allow the development of natural gas infrastructure on state-owned lands, the project developer can bring a condemnation proceeding against the state to compel a right-of-way.[3]

As worldwide demand for U.S. natural gas continues to rise, there is pressure to increase infrastructure for exporting liquefied natural gas (LNG), particularly along U.S. coastal lands.[4] *PennEast Pipeline* supports natural gas project developers facing state opposition, but that support is severely limited when the project involves U.S. coastal lands due to the Coastal Zone Management Act (CZMA).[5] The CZMA declares it a national policy to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations" while "balanc[ing] competing land and water issues."[6]

The CZMA grants coastal states the opportunity to object to proposed federal

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2 *Id.* at 2263.

3 *Id.*

4 Victoria Zaretskaya, *U.S. Liquefied Natural Gas Export Capacity Will Be World's Largest by End of 2022*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Dec. 9, 2021), https://www.eia.gov/todayinenergy/detail.php?id=50598#; Ethan Howland, *Sens. Manchin, Barrasso Slam FERC's 'Political Agenda' on Natural Gas, Say It Will Stifle Development*, UTIL. DIVE (Mar. 4, 2022), https://www.utilitydive.com/news/manchin-barrasso-ferc-gas-infrastructure-pipeline-review/619816/.

5 *See* Coastal Zone Management Act of 1972, 16 U.S.C. §§ 1452–1465 (1990).

6 *Id.* § 1452(1)–(2); *Coastal Zone Management Act*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., https://coast.noaa.gov/czm/act/ (last visited Mar. 31, 2023).

coastal activity through a federal consistency review—a critical limiting power on what the federal government can do, directly or indirectly, on or near U.S. coastal lands.[7] This process allows a coastal state to deny private parties access to federal licenses and permits, such as the FERC § 717f certificate of public convenience and necessity at issue in *PennEast Pipeline*, when such licensed or permitted action would be inconsistent with the state's coastal management program (CMP).[8] Federal consistency review gives coastal states the ability to exercise much-needed oversight of natural gas-related infrastructure on or near their coastal zones, which they otherwise would not possess after *PennEast Pipeline.*[9]

II. THE COASTAL ZONE MANAGEMENT ACT

Congress enacted the CZMA in 1972, largely in response to a report stressing the need for a national program to address threats of degradation of U.S. coastal lands from increasing populations, development, and commercial and recreational uses.[10] Through the CZMA, states and the federal government created a partnership to balance conservation with responsible economic and cultural development.[11]

The CZMA is a voluntary program that recognizes the need to incentivize states to steward U.S. coastal lands.[12] A state can join the National Coastal Zone Management

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7 *Federal Consistency*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://coast.noaa.gov/czm/consistency/ (last visited Mar. 31, 2023).

8 31 Tex. Admin. Code § 30.12(a)(2)(E)(i) (Tex. Gen. Land Off. 2023); *see, e.g.*, CAL. COASTAL COMM'N, CAL. COASTAL MGMT. PROGRAM: LIST OF FED. LICENSES AND PERMITS SUBJECT TO CERTIFICATION FOR CONSISTENCY (2015), https://www.coastal.ca.gov/fedcd/listlic_2015.pdf [hereinafter LIST OF FED. LICENSES AND PERMITS].

9 16 U.S.C. §§ 1452–1465.

10 U.S. COMM'N ON OCEAN POL'Y, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY 153–54 (2004), https://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/000_ocean_full_report.pdf.

11 *Id.* at 153.

12 OFFICE FOR COASTAL MGMT., NAT'L OCEANIC AND ATMOSPHERIC ADMIN., FEDERAL CONSISTENCY OVERVIEW 3 (2020), https://coast.noaa.gov/data/czm/consistency/media/federal-consistency-overview.pdf.

Program by submitting a CMP to the National Oceanic and Atmospheric Administration (NOAA) that indicates how the state plans to balance competing land and water uses along its coast.[13] To be approved, filed, and effective, a state's CMP must contain "the [coastal] uses subject to the management program, the authorities and enforceable policies of the management program, the boundaries of the state's coastal zone, the organization of the management program, and related state coastal management concerns."[14] Currently, all U.S. coastal states participate in the National Coastal Zone Management Program, with the exception of Alaska, which withdrew from the program in 2011.[15] These state programs are credited with effectively "facilitat[ing] public access to ocean and coastal areas, protect[ing] people and property from coastal hazards, conserve[ing] critical natural resources, and stimulat[ing] economic development by revitalizing urban waterfronts and promoting coastal-dependent industries."[16]

After NOAA approves a state's CMP, the state conducts a federal consistency review—a "primary incentive for states' participation."[17] Federal consistency review regulates federally licensed, permitted, or financially assisted activities both within and outside a state's coastal zone that have "reasonably foreseeable effects" on any coastal land use or coastal natural resource.[18] These federal activities should be consistent with a state's enforceable policies surrounding its coastal management program.[19] Federal consistency review applies to both the activities of federal agencies and of non-federal applicants

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13 *Id.*
14 *Id.*
15 *Coastal Zone Management Programs*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., https://coast.noaa.gov/czm/mystate/ (last visited Mar. 31, 2023).
16 AN OCEAN BLUEPRINT FOR THE 21ST CENTURY, *supra* note 10, at 153.
17 FEDERAL CONSISTENCY OVERVIEW, *supra* note 12, at 3.
18 *Federal Consistency*, *supra* note 7.
19 *Id.*

seeking federal authorization, licenses, permits, or funding for their activities.[20]

The CZMA is an important artifact of cooperative federalism, which provides states with flexibility to tailor their CMP to reflect their own individual needs, desires, and coastal stewardship visions.[21] Some describe this characteristic as the Act's greatest triumph, while others consider it a defect that produces incohesive state programs with contradictory views of proper coastal management.[22] Regardless of the contents of a state's CMP, it requires federal agencies to notify a state whenever they plan to take action—directly or indirectly through authorized private parties—that would affect the state's coastal zone.[23] This partnership has largely been successful, with 93–95% of state federal consistency reviews resulting in approved federal action.[24] On the other hand, the 5–7% of proposed federal activities that are rejected occasionally generate contentious disputes.[25]

III. SITING NATURAL GAS INFRASTRUCTURE PROJECTS

Under § 3 of the Natural Gas Act (NGA), FERC has "exclusive authority to approve or deny an application for the siting, construction, expansion, or operation of an LNG terminal."[26] While FERC has exclusive authority, states are not completely shut out of the process. First, § 3 is explicit that FERC's authority does not detract from the rights delegated to coastal states in the CZMA.[27] Second, FERC must give states reasonable notice of hearings when deciding on project applications.[28] As part of FERC's decision,

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20 FEDERAL CONSISTENCY OVERVIEW, *supra* note 12, at 3.
21 AN OCEAN BLUEPRINT FOR THE 21ST CENTURY, *supra* note 10, at 153–154, 158.
22 *Id.*
23 FEDERAL CONSISTENCY OVERVIEW, *supra* note 12, at 8.
24 *Id.*
25 *See* discussion *infra* Part V.
26 15 U.S.C. § 717b(e)(1) (2005).
27 *Id.* § 717b(d)(1).
28 *Id.* § 717b(e)(2).

and before approving any proposed LNG project, the National Environmental Policy Act (NEPA) requires FERC to prepare an environmental assessment or impact statement describing the project's potentially harmful environmental effects.[29]

In addition to LNG terminal approval authority, FERC has authority under § 7 of the NGA to issue certificates of public convenience and necessity (CCNs) for the construction of pipelines that transport natural gas in interstate markets.[30] FERC's § 717f CCN is unique because, if an agreement cannot be reached with a landowner, it entitles the holder to exercise federal power of eminent domain to obtain "necessary land or other property, in addition to [a] right-of-way, for the location of compressor stations, pressure apparatus, or other stations or equipment necessary to the proper operation of such pipe line or pipe lines."[31]

The U.S. District Court for the Eastern District of Texas decided in 2017 that the § 717f CCN does not empower its holder to condemn state-owned land.[32] The court in *Sabine Pipe Line* considered whether a natural gas company that held a § 717f CCN could subject the Texas Parks and Wildlife Department (TPWD) to a condemnation suit in federal court.[33] The company owned an existing pipeline on a tract of land covered by a right-of-way agreement entered into with the previous landowner during construction roughly fifty years prior.[34] However, TPWD purchased the land and refused to renew the agreement.[35] In response, the company filed a condemnation suit against TPWD for the right-of-way,

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29 *Natural Gas: LNG*, FED. ENERGY REG. COMM'N, https://www.ferc.gov/natural-gas/lng (last updated June 29, 2022).
30 *Id.*; 15 U.S.C. § 717f(c) (1998).
31 15 U.S.C. § 717f(h) (1998).
32 Sabine Pipe Line, LLC v. A Permanent Easement, 327 F.R.D. 131, 141 (E.D. Tex. 2017).
33 *Id.* at 135–36.
34 *Id.*
35 *Id.*

and TPWD replied with a motion to dismiss, arguing it had sovereign immunity under the Eleventh Amendment.[36]

The court agreed with TPWD, holding that the agency, as an arm of the State of Texas, did not consent to waive its immunity, nor did the NGA grant private parties the right to subject states to condemnation proceedings.[37] The court reasoned that the federal government's power to exercise eminent domain and its right to sue states in federal court are distinct from one another, with the federal government only entitled to condemn state-owned land because of its additional right to bring condemnation suits against states.[38] While the court doubted the right to sue states in federal court could be delegated to a private party, even if it could be, the NGA did not and could not contain such a delegation.[39] The NGA only delegated the federal government's power to exercise federal eminent domain.[40] Therefore, the court granted TPWD's motion to dismiss based on its Eleventh Amendment sovereign immunity, blocking the natural gas company from exercising federal eminent domain with FERC's § 717f CCN against state-owned land.[41]

Later, the 3rd Circuit heard a similar case in *In re PennEast Pipeline Co.*—later to be reversed and remanded by the Supreme Court in *PennEast Pipeline*.[42] PennEast had applied to FERC for a § 717f CCN to construct a 116-mile pipeline from Pennsylvania to

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36 *Id*. at 136.
37 *Id*. at 139, 141–43.
38 *Id.* at 140.
39 *Id.* at 140–43.
40 *Id*. ("[T]he Fifth Circuit has held that 'the United States cannot delegate to non-designated, private individuals its sovereign ability to evade the prohibitions of the Eleventh Amendment. Only 'responsible federal officers,' or those who act at their instance and under their control, may exercise the authority of the United States as sovereign.'") (quoting United States v. Tex. Tech Univ., 171 F.3d 279, 294 (5th Cir. 1999)).
41 *Id*. at 145.
42 *In re* PennEast Pipeline Co., 938 F.3d 96 (3d Cir. 2019), *rev'd sub nom.* PennEast Pipeline Co., LLC. v. New Jersey, 141 S. Ct. 2244 (2021).

New Jersey.[43] Pursuant to NEPA, FERC issued a draft environmental impact statement (EIS) for the project and approved PennEast's application for the CCN.[44] Continuing to develop the project, PennEast filed numerous actions to condemn land along the intended path of its pipeline to obtain necessary rights-of-way from private land owners.[45] New Jersey, however, intervened and indicated it held possessory and nonpossessory interests in several parcels of land.[46] Further, due to its sovereign immunity under the Eleventh Amendment, PennEast could not subject the state to condemnation proceedings unless it consented and waived its immunity, which it did not.[47]

The 3rd Circuit agreed with the *Sabine Pipe Line* court, holding that the federal government's ability to condemn state-owned land is the product of its power to exercise eminent domain and, separately, its right to sue states in federal court.[48] The court held the two should not be conflated and, while the federal government delegated the power to exercise federal eminent domain to private parties in the NGA, it did not and could not delegate its right to sue states in federal court.[49]

However, the Supreme Court reversed course on appeal, deciding that FERC's § 717f CCN *does* entitle its holder to condemn state-owned land.[50] The Court held that 1) § 7 of the NGA authorizes the holder of a § 717f CCN to condemn "all necessary rights-of-way, whether owned by private parties or States," and 2) condemnation suits directed at

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43 PennEast Pipeline Co. v. New Jersey, 141 S. Ct. 2244, 2253 (2021).
44 *Id.*
45 *Id.*
46 *Id.* at 2253.
47 *Id.*
48 *In re* PennEast Pipeline Co., 938 F.3d 96, 104 (3d Cir. 2019), *rev'd sub nom.* PennEast Pipeline Co. v. New Jersey, 141 S. Ct. 2244 (2021).
49 *Id*. at 106–07.
50 *PennEast Pipeline Co.*, 141 S. Ct. at 2263.

states under this provision do not violate state sovereign immunity under the Eleventh Amendment.[51]

First, the Court determined that the history of federal eminent domain supports the proposition that condemnation proceedings may be brought equally against private and state-owned land, regardless of whether the power is exercised by the federal government or private parties.[52] Further, Congress granted complete federal eminent domain power to any holder of FERC's § 717f CCN through § 717f(h) of the NGA entitling its holder to exercise all and not a limited form of the power.[53] The Court explained that "eminent domain power is inextricably intertwined with the ability to condemn," and "authorization to take property interests impl[ies] a means through which those interests can be peaceably transferred."[54] In other words, federal eminent domain should not be viewed as the product of a distinct power and right since "[a]n eminent domain power that is incapable of being exercised amounts to no eminent domain power at all."[55]

Given Congress granted full federal eminent domain power to holders of FERC's § 717f CCN, the Court then considered whether a state's sovereign immunity under the Eleventh Amendment is violated when subjected to a private party's condemnation suit[56]—and held that it is not.[57] In short, the Eleventh Amendment is not violated when states waive it by consent and all states knowingly consented to the full scope of federal eminent domain power, including the condemnation proceedings necessary to exercise it, when each ratified

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51 *Id.*
52 *Id.* at 2255–57.
53 *Id*. at 2255–57, 2263.
54 *Id.* at 2260.
55 *Id*. at 2260–61.
56 *Id.* at 2257–63.
57 *Id.* at 2263.

the Constitution.[58] The Framers, the court described, had a vision to "create a cohesive national sovereign," and the exercise of federal eminent domain was meant to support that vision by "connecting our country through turnpikes, bridges, and railroads—and more recently pipelines, telecommunications infrastructure, and electric transmission facilities."[59] Thus, the Court struck down New Jersey's attempt to evade PennEast's condemnation suits on sovereign immunity grounds.[60]

According to the Court, the correct characterization of the issue had not been whether the NGA had delegated or even could delegate the federal government's right to sue states, but rather whether federal eminent domain power in its full scope could be delegated through the NGA to private parties.[61] The Court answered the latter, properly characterized issue in the affirmative, indicating 1) federal eminent domain power applies equally to private and state-owned land even when wielded by private parties, 2) includes an inseparable, non-distinct power to effectuate it, and 3) the necessary condemnation suits by private parties directed at states do not violate state sovereign immunity under the Eleventh Amendment. [62]

After *PennEast Pipeline*, the holder of a FERC § 717f CCN is entitled to condemn "all necessary rights-of-way, whether owned by private parties or States."[63] There are, however, two important limitations to the *PennEast Pipeline* holding as it relates to U.S. coastal lands. First, the case did not involve coastal lands, which would implicate both the

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58 *Id.* at 2258.
59 *Id.* at 2263.
60 *Id.*
61 *Id.* at 2262–63.
62 *Id.* at 2260–61, 2258.
63 *Id*. at 2263.

CZMA and the public trust doctrine, likely changing the Court's analysis.[64] Second, even if *PennEast Pipeline* were to apply equally to U.S. coastal lands, the CZMA has the power to subject natural gas project developers seeking federal eminent domain power to federal consistency review before they can obtain FERC's § 717f CCN.[65] Through federal consistency review, a state could prevent FERC from authorizing the project developer's application if the state found the project inconsistent with its CMP.[66]

IV. GROWING DEMAND FOR U.S. NATURAL GAS INFRASTRUCTURE

While the CZMA grants coastal states the power to block natural gas infrastructure projects in or near their coasts through federal consistency review, it does not mitigate the demand for LNG infrastructure. As of January 2023, the U.S. has eight operational LNG export terminals: three in Louisiana, two in Texas, one in Alaska, one in Georgia, and one in Maryland.[67] Five more are actively under construction in Louisiana and Texas.[68] Additionally, FERC has approved eleven LNG export terminals that have yet to begin construction: four in Louisiana, four in Texas, one in Alaska, one in Florida, and one in Mississippi.[69] There is a clear concentration of these facilities along the Gulf of Mexico.[70] Even without the eleven additional terminals, the U.S. surpassed every other country in

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64 *But see* United States v. 32.42 Acres of Land, 683 F.3d 1030, 1032 (9th Cir. 2012) (holding the Federal Government's exercise of federal eminent domain to acquire coastal lands for the Navy's use extinguished California's public trust rights to the land so that the rights would not re-emerge if the Federal Government subsequently transferred the property to a private party).

65 *See, e.g.*, 31 Tex. Admin. Code § 30.12(a)(2)(E)(i) (Tex. Gen. Land Off. 2023) (stating that § 717f certificates have an inherently adverse effect on Texas' coastal natural resource areas); LIST OF FED. LICENSES AND PERMITS, *supra* note 8, at 2 (listing FERC's § 717f certificate as automatically triggering federal consistency review).

66 *See* discussion *supra* Part II.

67 *North American LNG Export Terminals – Existing, Approved Not Yet Built, and Proposed*, FED. ENERGY REG. COMM'N, https://cms.ferc.gov/media/north-american-lng-export-terminals-existing-approved-not-yet-built-and-proposed-8 (last updated Dec. 14, 2022).

68 *Id.*

69 *Id.*

70 *See id.*

both LNG export capacity and actual exports during the first half of 2022.[71] By 2025, the LNG export capacity of the U.S. is expected to increase by 51% as 3 of the 5 current LNG export terminal projects under construction are completed.[72]

Despite this historic growth in export capacity, global demand for U.S. natural gas has outstripped supply due to lack of exportation infrastructure.[73] In February 2022, the U.S. faced significant congestion at its LNG export terminals, with almost thirty ships anchored near Gulf Coast terminals waiting for the opportunity to load LNG.[74] During the month, all operational LNG export terminals were docked, compressing, and loading LNG for the first time, maxing out U.S. export potential in the process.[75] While much of the congestion was due to a sudden uptick in demand from European countries avoiding Russian natural gas following its invasion of Ukraine, there is no indication that increased European demand for U.S. LNG will dissipate in the near-future.[76] Europe overtook Japan and China to become the largest customer in the global LNG market in 2022 and is looking to import even more in 2023, as it hopes to completely eliminate any use of Russian natural

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71 Zaretskaya, *supra* note 4; *Calcasieu Pass, the Seventh U.S. Liquefied Natural Gas Export Terminal, Begins Production*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Apr. 29, 2022), https://www.eia.gov/todayinenergy/detail.php?id=52238; *The United States Became the World's Largest LNG Exporter in the First Half of 2022*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (July 25, 2022), https://www.eia.gov/todayinenergy/detail.php?id=53159.

72 *U.S. LNG Export Capacity to Grow as Three Additional Projects Begin Construction*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Sept. 6, 2022), https://www.eia.gov/todayinenergy/detail.php?id=53719. The projects to be completed first are Golden Pass LNG and Corpus Christi Stage III in Texas, and Plaquemines LNG in Louisiana. *Id.*

73 Sergio Chapa, *U.S. Is Exporting Every Molecule of LNG Possible*, BLOOMBERG (Feb. 12, 2022), https://www.bloomberg.com/news/articles/2022-02-12/full-house-u-s-exporting-every-molecule-of-lng-possible; Marcy de Luna, *LNG Tanker Congestion Forms Outside U.S. Export Terminals*, REUTERS (Feb. 28, 2022), https://www.reuters.com/business/energy/lng-tanker-congestion-forms-outside-us-export-terminals-2022-03-01/.

74 de Luna, *supra* note 73.

75 Chapa, *supra* note 73.

76 Sara Schonhardt & Scott Waldman, *The U.S. Will Increase Natural Gas Exports to Europe to Replace Russian Fuel*, SCI. AM. (Mar. 25, 2022), https://www.scientificamerican.com/article/the-u-s-will-increase-natural-gas-exports-to-europe-to-replace-russian-fuel; Theo Leggett, *EU Signs US Gas Deal To Curb Reliance on Russia*, BBC NEWS (Mar. 25, 2022), https://www.bbc.com/news/business-60871601.

gas to replenish its storage facilities after the winter.[77]

In response to U.S. LNG export capacity constraints, members of Congress have called for increased investment in natural gas infrastructure and for FERC to immediately approve permits for LNG export facilities and natural gas pipelines.[78] Facing similar calls and demands from the Senate Energy and Natural Resources Committee, FERC Chairman Richard Glick was criticized for allowing greenhouse gas emission considerations into project review and for "further polticiz[ing] energy development in our country."[79] In his written testimony, Glick acknowledged the importance of reducing international dependence on Russian natural gas and noted that FERC has already approved many natural gas pipelines and LNG export facility projects.[80] Courts, however, have vacated several of these approvals. According to Glick, this is because the agency "cut corners" in its implementation of the NGA, which he had expressed concerns about.[81]

Amid pressure to streamline and drastically increase the development of natural gas infrastructure, coastal states that are unwilling to host the infrastructure may face

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77 Shotaro Tani, *Europe Leads Pack on LNG Imports as Global Competition for Fuel Heats Up*, FIN. TIMES (Jan. 7, 2023), https://www.ft.com/content/3b48c327-978d-4a82-9349-c4228fdf99bd; Anmar Frangoul, *Energy Markets Are Facing 'One or Two Years of Extreme Volatility,' Enel CEO Says*, CNBC (Nov. 29, 2022), https://www.cnbc.com/2022/11/29/energy-markets-facing-one-or-two-years-of-extreme-volatility-ceo.html.

78 Robert Walton, *Republicans Use EV Hearing to Knock Biden's Clean Energy Policy as U.S. Bans Oil and Gas Imports from Russia*, UTIL. DIVE (Mar. 9, 2022), https://www.utilitydive.com/news/republicans-use-ev-hearing-to-knock-bidens-clean-energy-policy-as-white-ho/620080.

79 Howland, *supra* note 4 (quoting Senator Joe Manchin).

80 *Hearing To Review FERC's Recent Guidance on Natural Gas Pipelines Before the Comm. on Energy and Nat. Res. Before the S. Comm. on Nat. Res.*, 117th Cong. 3 (2022), https://cms.ferc.gov/media/testimony-chairman-richard-glick-hearing-review-fercs-recent-guidance-natural-gas-pipelines [hereinafter *Glick Testimony*] (written testimony of Richard Glick, Chairman of the Federal Energy Regulatory Commission).

81 *Id.*

backlash.[82] While federal consistency review under the CZMA can help block developers from exercising federal eminent domain against coastal states, it does not give those states absolute power. Federal consistency review has its own limitations.

V. FEDERAL CONSISTENCY APPEALS: OVERRIDING STATE OBJECTIONS TO PROPOSED FEDERAL ACTIVITY

The CZMA provides an appeals process for private parties who have been denied a federal permit or license due to a state objection during federal consistency review.[83] Private parties can make an administrative appeal to the Secretary of Commerce, who may override the state's objection, on one of two grounds.[84] The party must show either that the federally permitted or licensed activity is consistent with the objectives of the CZMA (Ground I), or that the federally permitted or licensed activity is otherwise necessary in the interest of national security (Ground II).[85]

There are three elements of an appeal on Ground I: 1) the proposed activity must further the national interest, as articulated in the CZMA, in a significant or substantial manner; 2) the furthered national interest must outweigh the activity's adverse coastal effects when considered separately or cumulatively; and 3) there must not be any reasonable alternative available that would be consistent with the state's CMP.[86] On the

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82 *See, e.g.*, Sarah Chasis, *Coastal Management Process Under Threat*, NAT'L RES. DEF. COUNCIL: EXPERT BLOG (May 16, 2019), https://www.nrdc.org/experts/sarah-chasis/coastal-management-process-under-threat; Chelsea Harvey & Chris Mooney, *Trump's Proposed NOAA Cuts Would Disarm Our Coasts in the Face of Rising Seas, Scientists Say*, WASH. POST (Mar. 10, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/03/10/proposed-noaa-cuts-would-disarm-our-coasts-in-the-face-of-rising-seas-scientists-say/.

83 *See* 16 U.S.C. §§ 1456(c)(3)(A)–(B), (d) (1992); FEDERAL CONSISTENCY OVERVIEW, *supra* note 12, at 18–19 (summarizing the statute).

84 *See* 15 C.F.R. §§ 930.125, 930.130(e)(1) (2023) (delineating the process to file the notice of appeal and the Secretary's ability to override the state's objection).

85 *Id.* § 930.120; FEDERAL CONSISTENCY OVERVIEW, *supra* note 12, at 18 (defining Ground I and Ground II).

86 15 C.F.R. § 930.121 (2023).

other hand, to satisfy Ground II, the private party need only show that the proposed activity is necessary in the interest of national security.[87] If either Ground I or Ground II is satisfied, the Secretary of Commerce can override the state's objection and the federal agency may proceed with issuing the permit or license.[88]

Since 1984 and as of January 2023, the Secretary has issued fifty appeal decisions, twenty-two of which have been related to energy activity (fourteen for oil and gas plans, two for natural gas pipelines, four for LNG terminals and related pipelines, and two for Outer Continental Shelf geological and geophysical seismic surveys).[89] All but three appeal decisions related to energy activity took place before 2010, and none occurred between 2010 and 2019.[90] This period of inactivity came to an end in 2020 with two appeals to conduct Outer Continental Shelf geological and geophysical seismic surveys, followed by a 2021 appeal by an LNG export terminal developer.[91] This suggests that appeals to the Secretary of Commerce may increase in frequency and once again become active venues for project developers to seek relief from state federal consistency review objections.

A. THE APPEAL OF AES SPARROWS POINT LNG

Before the shale gas revolution, during which the U.S. found itself with an abundant supply of natural gas, the U.S. sought to import LNG rather than export it.[92] Before 2010,

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87 *Id.* § 930.130(e)(1).

88 U.S. DEP'T OF COM., *supra* note 10, at 18-19.

89 OFF. FOR COASTAL MGMT., NAT'L OCEANIC & ATMOSPHERIC ADMIN., APPEALS TO THE SECRETARY OF COMMERCE UNDER THE COASTAL ZONE MANAGEMENT ACT 2 (2022), https://coast.noaa.gov/data/czm/consistency/media/appealslist.pdf.

90 *See id.* at 7–8.

91 *Id.*

92 *See Natural Gas Explained: Where Our Natural Gas Comes From*, U.S. ENERGY INFO. ADMIN, https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php (last updated Oct. 3, 2022) (chart explaining U.S. net exports of LNG over time).

the Secretary of Commerce heard three appeals to overturn federal consistency review decisions that barred LNG import projects.[93] Of those appeals, one overrode a state finding that the project was inconsistent with its CMP.[94]

In 2007, AES Sparrows Point LNG, LLC and Mid-Atlantic Express, L.L.C. (collectively AES) sought permits from FERC and the U.S. Army Corps of Engineers (Corps) to build an LNG import facility and 88-mile natural gas pipeline to deliver the natural gas to domestic interstate markets once gasified.[95] The project's proposed location was in a heavily industrialized area of the Port of Baltimore where a former steel manufacturing and shipbuilding facility sat next to the interstate.[96] After reviewing the project proposal, Maryland rejected the project as inconsistent with its CMP denying the project access to FERC permits.[97] In response, AES submitted a Ground I appeal to the Secretary of Commerce, arguing that its project was consistent with the objectives of the CZMA and that Maryland wrongfully objected to its request for federal permits.[98] On appeal, the Secretary sided with AES, overturning Maryland's objection and removing that barrier to permits.[99]

First, the Secretary indicated development of coastal resources—not just protection of them—is a national interest under the CZMA.[100] This project would further the national

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93 OFFICE FOR COASTAL MANAGEMENT, *supra* note 89, at 8.
94 *See id.*
95 U.S. SEC'Y OF COM., DECISION AND FINDINGS BY THE U.S. SECRETARY OF COMMERCE IN THE CONSISTENCY APPEAL OF AES SPARROWS POINT LNG, LLC AND MID-ATLANTIC EXPRESS, L.L.C. FROM AN OBJECTION BY THE STATE OF MARYLAND 2 (2008), https://coast.noaa.gov/data/czm/consistency/appeals/fcappealdecisions/mediadecisions/aes.pdf [hereinafter AES CONSISTENCY APPEAL].
96 *Id*.
97 *Id*. at 3.
98 *See id.*
99 *Id.* at 3–4.
100 *Id*. at 10–11.

interest in development by "facilitat[ing] the importation of natural gas to meet anticipated regional energy needs."[101] Additionally, the project's furtherance of the development objective would be significant because, at the time: 1) demand projections indicated a substantial need for increased supplies of natural gas by 2020, 2) supply projections indicated declining Gulf Coast and Canadian natural gas reserves, and 3) it was President George W. Bush's policy to accelerate the development and expansion of LNG importation infrastructure.[102]

Second, the Secretary of Commerce determined the project's furtherance of the national interest in development outweighed its adverse coastal effects.[103] Even though there would be adverse environmental impacts from dredging and construction through wetlands, the Secretary found those impacts minimal, geographically isolated, and only temporary during the construction phase of the project.[104] The Secretary pointed to existing industrial and commercial activity in the area and indicated that the project would utilize existing rights-of-way, would not materially increase vessel traffic in the area, and would not significantly impact any endangered or threatened species.[105]

Lastly, the Secretary stated that Maryland had the burden of identifying an available reasonable alternative consistent with its CMP, and since it did not provide one, no reasonable alternative to the project existed.[106] Thus, since AES satisfied all the elements of their Ground I appeal, Maryland's objection was overridden and AES could continue to

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101 *Id.* at 13.
102 *Id*. at 14–15.
103 *Id*. at 41.
104 *See id.* at 39–41.
105 *Id*.
106 *Id*. at 42.

seek FERC permits for its project.[107]

Critical to the Secretary's decision was the existing industrial and commercial use of the project site and the U.S.' perceived energy needs. The Secretary emphasized these factors when explaining the need to develop the coast outweighed the project's environmental impacts and the state's wishes that the project not proceed.[108] This reasoning was based on pre-shale-gas-revolution projections of declining domestic natural gas reserves, which ultimately did not materialize; instead, the U.S. became a net exporter of natural gas.[109] Since then, only one LNG project appeal has come before NOAA, the agency delegated authority to make appeals decisions on behalf of the Secretary of Commerce.[110]

B. THE APPEAL OF JORDAN COVE ENERGY PROJECT

In 2017, Jordan Cove Energy Project, L.P. and Pacific Connector Gas Pipeline, LP (collectively Jordan Cove) applied to FERC for authorization to construct a 229-mile natural gas pipeline and an LNG terminal to export LNG to overseas markets.[111] Jordan Cove planned to build the terminal in Coos Bay, Oregon, while the pipeline would extend

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107 *Id.* at 42–43.

108 *Id.* at 41.

109 *See Natural Gas Explained: How Much Natural Gas is Left*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/natural-gas/how-much-gas-is-left.php (last updated Jan. 20, 2022) ("U.S. proved reserves of natural gas increased nearly every year since 2000. Major advances in natural gas exploration and production technologies . . . contributed to increases in natural gas production and reserves."); *Natural Gas Explained: Where Our Natural Gas Comes From*, *supra* note 92.

110 *See* OFFICE FOR COASTAL MANAGEMENT, *supra* note 93 ("The Secretary has delegated CZMA appeal decision authority to the NOAA General Counsel regarding threshold issues . . . and to the Under Secretary for Oceans and Atmosphere for substantive appeal decisions."); DEPUTY UNDER SEC'Y FOR OPERATIONS, PERFORMING THE DUTIES OF UNDER SEC'Y OF COM., DECISION AND FINDINGS BY THE DEPUTY UNDER SECRETARY FOR OPERATIONS PERFORMING THE DUTIES OF U.S. UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE IN THE CONSISTENCY APPEAL OF JORDAN COVE ENERGY PROJECT, L.P., AND PACIFIC CONNECTOR GAS PIPELINE, LP, FROM AN OBJECTION BY THE OREGON DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT (2021), https://coast.noaa.gov/data/czm/consistency/appeals/fcappealdecisions/mediadecisions/jordancove.pdf [hereinafter JORDAN COVE CONSISTENCY APPEAL].

111 JORDAN COVE CONSISTENCY APPEAL, *supra* note 110, at 3–4.

to natural gas supplies in the U.S. Rocky Mountains and western Canada.[112] To make the Coos Bay LNG export terminal accessible to vessels, the project development plan included dredging that would overlap with a separate, more robust plan to widen and deepen all of Coos Bay for increased commercial and shipping activity.[113] Oregon had listed the FERC permits Jordan Cove sought as part of its CMP, requiring the project to submit an application for federal consistency review.[114] Upon receipt and evaluation, Oregon rejected the application as inconsistent with its CMP on the grounds it would have "adverse effects to Oregon's scenic and aesthetic resources, endangered and threatened species, critical habitats and ecosystems, fisheries resources, commercial and recreational fishing and boating, commercial shipping and transportation, and cultural resources."[115] In response, Jordan Cove filed a Ground I appeal to NOAA.[116]

In its 2021 appeal decision, NOAA indicated Jordan Cove failed to satisfy its burden of providing sufficient information to allow the agency to balance the project's adverse coastal effects against the national interest furthered by the project.[117] Additionally, NOAA criticized FERC's EIS, agreeing with Oregon that the statement only described the cumulative effects of the project in general terms and was inadequate to create a sufficient record.[118] NOAA characterized the EIS as "hastily conclude[d]," as it provided only "cursory information" in a single paragraph determining no cumulative adverse effects existed.[119] Especially concerning to NOAA was the fact that FERC

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112 *Id.* at 4.
113 *Id*. at 32.
114 *Id*. at 5.
115 *Id*. at 1.
116 *Id*. at 5–6.
117 *Id.* at 1.
118 *Id*. at 4–5, 32–35.
119 *Id*. at 33.

recognized there would be increased mortality rates of fish and other wildlife without fully analyzing the impact that mortality rate would have on threatened and endangered species present in the project area.[120]

Conducting what analysis it could with the limited record, NOAA found the project had the ability to impact over thirty threatened or endangered species and disturb an Essential Fish Habitat described as "those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity."[121] The project also had a high probability of causing a substantial negative effect on cultural and historical tribal uses and resources that were within the scope of the CZMA.[122]

Without sufficient information about the project's potential adverse effects, NOAA concluded it could not find the project consistent with the objectives or purposes of the CZMA.[123] Because Jordan Cove neither provided sufficient information nor appealed on Ground II, NOAA stated it did not need to analyze the strength of the national interest furthered by the project or determine if any other alternative would be consistent with Oregon's CMP.[124] Jordan Cove's Ground I appeal was denied.[125]

The Jordan Cove appeal exemplifies why the CZMA is critical to coastal states. FERC had a duty to conduct an EIS pursuant to NEPA, but that was found to be woefully inadequate upon review.[126] Without the CZMA, Oregon likely would not have been able to issue its own determination on the environmental impacts of the project before FERC's

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120 *Id.* at 33–34.
121 *Id*. at 11–12.
122 *Id*. at 20, 31–32.
123 *Id.* at 35.
124 *Id*. at 9, 11, 35.
125 *Id*. at 35.
126 *Natural Gas: LNG*, *supra* note 29.

approval. In the meantime, Jordan Cove would have been empowered through a § 717f CCN to exercise federal eminent domain power and bring condemnation proceedings against private landowners and arguably, after *PennEast Pipeline*, state-owned lands.[127] Perhaps the Jordan Cove EIS is an example of FERC "cut[ting] corners" in its implementation of the NGA.[128] Regardless, the CZMA gave Oregon the power to exercise critical oversight over FERC's permitting activity and halt it in the face of potentially substantial harm to its coastal zone.

In the Jordan Cove appeal, NOAA did not discuss how it would have analyzed the national interest in constructing an LNG export terminal.[129] The energy needs and dynamics of the U.S. have changed radically since the AES appeal concerning the construction of an LNG import terminal.[130] Because of this difference, it is difficult to determine how NOAA might analyze the national interest in a future LNG export terminal appeal. What could be an indicator, however, is how NOAA evaluated the national interest in a 2020 appeal decision relating to Outer Continental Shelf natural gas and oil exploration.[131]

C. THE APPEAL OF WESTERNGECO

In 2014, WesternGeco submitted an exploration permit application to the Bureau

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127 *See* 15 U.S.C. § 717f.

128 *Glick Testimony*, *supra* note 80.

129 JORDAN COVE CONSISTENCY APPEAL, *supra* note 110, at 35.

130 *AES Wins LNG Appeal on Law Blocking Sparrows Point Terminal*, MD. THE DAILY REC. (May 19, 2008), https://thedailyrecord.com/2008/05/19/aes-wins-lng-appeal-on-law-blocking-sparrows-point-terminal/.

131 U.S. UNDER SEC'Y OF COM., DECISION AND FINDINGS BY THE U.S. UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE IN THE CONSISTENCY APPEAL OF WESTERNGECO FROM AN OBJECTION BY THE STATE OF SOUTH CAROLINA (2020), https://coast.noaa.gov/data/czm/consistency/appeals/fcappealdecisions/mediadecisions/westerngeco-scappeal.pdf [hereinafter WESTERNGECO CONSISTENCY APPEAL].

of Ocean Energy Management (BOEM) to conduct a seismic survey along the Outer Continental Shelf off the coast of the Mid- and South Atlantic.[132] BOEM denied WesternGeco's pending application along with all applications like it in 2017, as it had been the agency's approach for several decades to refuse permits to applicants intending to use air guns and there was little need, at the time, for the information to be generated.[133] BOEM, however, rescinded its rejections in 2017 after President Donald Trump issued Executive Order 13795, Implementing an America-First Offshore Energy Strategy, which called on BOEM to expedite seismic survey applications.[134] After receiving notice from BOEM that the denial of its permit application had been rescinded, WesternGeco submitted a consistency certification to South Carolina for its proposed seismic survey which South Carolina rejected as inconsistent with its CMP.[135] In response, WesternGeco filed a Ground I appeal to NOAA in 2019.[136]

First, NOAA determined WesternGeco's proposed seismic survey was consistent with the CZMA's objectives and national interests because it would provide necessary data "to inform potential policy decisions regarding further exploration and development" of the Outer Continental Shelf.[137] In addition to the national interest in coastal development, the agency indicated the survey would help advance the interest in greater energy self-sufficiency.[138] NOAA pointed to Executive Order 13795, Implementing an America-First Offshore Energy Strategy, as establishing the policies of aiming to be a global energy

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132 *Id*. at 4.
133 *Id*. at 4-5.
134 *Id*. at 5.
135 *Id*. at 1, 5.
136 *Id.* at 7.
137 *Id.* at 13–14.
138 *Id*. at 14–15.

leader, increasing domestic energy production, and ensuring energy security.[139] Data generated from WesternGeco's seismic survey would help to identify extractable oil and natural gas supplies and site major energy projects to support these policies.[140]

Second, NOAA determined the impacts to commercial and recreational fishing and behavioral harassments to sea turtles from the seismic survey would only result in "localized, minor, and temporary" adverse coastal effects.[141] BOEM and NOAA's National Marine Fisheries Service both found the acoustic sounds emitted from air guns during the seismic survey would have predominately negligible effects on fish species in the area.[142] NOAA's National Marine Fisheries Service additionally submitted information showing that while there was limited analysis on the effects of these acoustics on sea turtles, there was enough information to support the premise they were unlikely to result in population-level consequences.[143] On balance, NOAA determined the benefits to national interests outweighed the potential "[s]hort-term, minor, limited, and localized" adverse coastal effects.[144]

Finally, NOAA indicated that while South Carolina identified alternatives to WesternGeco's proposed seismic surveys, it failed to analyze whether those alternatives would be both suitable substitutes and consistent with its own CMP.[145] As a result, NOAA concluded no reasonable alternative existed that would be consistent with South Carolina's CMP and WesternGeco's Ground I appeal was approved.[146] NOAA overrode South

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139 *Id*.
140 *Id*. at 15–16.
141 *Id.* at 26–27.
142 *Id*. at 21–24.
143 *Id.* at 24–26.
144 *Id*. at 27.
145 *Id*. at 27–28.
146 *Id.*

Carolina's objection, allowing WesternGeco access to BOEM's exploration permit to conduct seismic surveys along the Outer Continental Shelf, contrary to South Carolina's wishes.[147]

D. Evaluating the National Interest in an Era of U.S. Natural Gas Exportation

In comparing the WesternGeco and AES appeal decisions, two important similarities exist. First, NOAA found that both projects posed little harm to the already established use patterns of the project sites. In *WesternGeco*, NOAA deferred to BOEM and NOAA's National Marine Fisheries Service findings that neither recreational and commercial fishing nor sea turtles in the area would be materially impacted.[148] Similarly, the Secretary of Commerce in *AES* emphasized the pre-existing industrial and commercial activity surrounding the proposed LNG terminal project site and did not find the project would materially increase harm to the Port of Baltimore ecosystem.[149] In addition, the LNG terminal project would need no new rights-of-way.[150]

By contrast, in the *Jordan Cove* appeal, Coos Bay did not have a robust pre-existing use pattern of commercial and industrial activity.[151] This suggests that NOAA is perhaps less likely to overturn a state's federal consistency objection when the natural gas project is the first in an area that has historically resisted industrial and commercial development. It is likely not by accident that almost all of FERC's currently approved LNG export projects are in Gulf Coast states. Unlike Oregon, Gulf Coast states have large amounts of

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147 *Id*.
148 *See id.* at 21–26.
149 *See supra* note 85 and accompanying text.
150 *See supra* note 85 and accompanying text.
151 *See Stop the LNG Terminal in Coos Bay*, SURFRIDER FOUND. (Dec. 1, 2021), https://www.surfrider.org/campaigns/stop-the-lng-terminal-in-coos-bay (describing the Jordan Cove project as "the largest development threat" to the bay).

pre-existing industrial and commercial infrastructure along their coasts, establishing historical use patterns which signal low resistance to natural gas project siting.[152]

More importantly, both appeal decisions that overturned states' objections took place during presidencies with strong policies against states blocking these types of federal actions. Indeed, in both decisions the Secretary of Commerce pointed to the presidential policies of Presidents George W. Bush and Donald Trump, respectively, in evaluating the national interests furthered by the project.[153] President Bush stressed accelerating LNG importation infrastructure to meet the future energy needs of the U.S., while President Trump issued an executive order calling for an acceleration in Outer Continental Shelf seismic surveys.[154] One takeaway is that while the Secretary of Commerce and NOAA did not minimize the potential adverse coastal effects of the projects, both heavily leaned into and relied upon the desires of the sitting president. In their appeal decisions, they emphasized that the CZMA objectives and purposes do not only include protecting the coasts, but also allowing for development to utilize its resources.

Unique to the *WesternGeco* appeal is the fact that NOAA considered the policy goal of the U.S. being a global energy leader as a national interest. While it did not evaluate the full extent to which the ability to export natural gas and oil implicates the national interest, the importance of the U.S.' position as a global energy leader could play a more

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[152] *See* discussion *supra* Part IV.

[153] AES CONSISTENCY APPEAL, *supra* note 95, at 14; WESTERNGECO CONSISTENCY APPEAL, *supra* note 131, at 13.

[154] *See* AES CONSISTENCY APPEAL, *supra* note 95, at 14; WESTERNGECO CONSISTENCY APPEAL, *supra* note 131, at 13.

prominent role in future national interest analyses.[155] In March 2022, Toby Rice, the President and CEO of EQT Corp.—the largest U.S. producer of natural gas—called on the Biden Administration to streamline the approval process for natural gas pipelines and to recognize the U.S. natural gas industry as "a strategic powerhouse."[156] He indicated that while the U.S. has the potential to quadruple current natural gas output by 2030 to help end European reliance on Russian natural gas, it lacks the pipelines and LNG terminals necessary for export. He argues this lack is due to political opposition arising from environmental concerns, though figures such as U.S. Energy Secretary Jennifer Granholm appear to welcome at least some level of increased output.[157]

Should President Biden or another future president adopt a policy promoting acceleration of natural gas exportation infrastructure, NOAA could rely heavily on that policy to overturn a state's federal consistency objection. One current complication in adopting such a policy, however, is navigating rising domestic natural gas prices.[158] In October 2022, the White House assessed the impact of limiting natural gas exports amid

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155 *See* Procedural Changes to the Coastal Zone Management Act Federal Consistency Process, 84 Fed. Reg. 8,628, 8,632 (Mar. 11, 2019) (to be codified at 15 C.F.R. pt. 930) (explaining that "[i]n accordance with Executive Order 13795, [the National Oceanic and Atmospheric Administration] seeks the public and regulated community's input on what changes could be made to [the federal consistency determination appeals process] to make the consistency process more efficient across all stages," including, but not limited to, allowing past appeal decisions to function as precedent in future determinations to increase outcome predictability).

156 *See* Michelle Fleury, *Energy Boss: U.S. Gas Exports Can 'Easily' Replace Russian*, BBC NEWS (Mar. 16, 2022), https://www.bbc.com/news/business-60729898.

157 *Id*.

158 *See* Jarrett Renshaw & Trevor Hunnicutt, *White House Rules Out Ban on Natural Gas Exports This Winter*, REUTERS (Oct. 4, 2022), https://www.reuters.com/business/energy/exclusive-white-house-rules-out-ban-natural-gas-exports-this-winter-2022-10-04; Corey Paul & Bill Holland, *Surging US LNG Exports to Europe Heighten Focus on US Inflationary Pressures*, S&P GLOB. COMMODITY INSIGHTS (Nov. 15, 2022), https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/111522-feature-surging-us-lng-exports-to-europe-heighten-focus-on-us-inflationary-pressures; John Kemp, *U.S. Gas Exports Squeeze Domestic Supply*, REUTERS (Sept. 29, 2022), https://www.reuters.com/business/energy/us-gas-exports-squeeze-domestic-supply-kemp-2022-09-29.

rising domestic prices heading into winter. Ultimately, it concluded the need to foster relations with Europe and further promote the U.S. as a reliable LNG supplier exceeded the risk of consumer harm from higher-than-expected energy bills.[159] However, should domestic natural gas prices become overly burdensome to U.S. consumers, there may be calls from U.S. lawmakers to limit natural gas exports to prioritize domestic welfare.[160]

VI. CONCLUSION

A state's power through the CZMA's federal consistency review, while strong, is not unlimited. With rising calls to increase natural gas infrastructure, it is possible NOAA will be called upon to settle disputes more frequently than it has during the last decade. What remains to be seen is how NOAA will evaluate the national interest during a period where the U.S. has become a net exporter of natural gas and lacks the infrastructure to satisfy substantial global demand.[161] For many, all that stands between alleviating recent congestion at LNG export terminals and fully satisfying global demand are coastal states unwilling to host the infrastructure.[162]

The CZMA and federal consistency review power are important safeguards for coastal states because they allow them to exercise much-needed oversight of natural gas infrastructure projects in or near coastal zones. Without the CZMA, coastal states may have

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159 Renshaw & Hunnicutt, *supra* note 158; Paul & Holland, *supra* note 158; Stanley Reed, *A Parade of Tankers Has Eased Europe's Energy Crisis*, N.Y. TIMES (Nov. 16, 2022), https://www.nytimes.com/2022/11/16/business/europe-energy-natural-gas.html (citing Daniel Yergin, an energy historian, as saying "U.S. L.N.G. has become a foundation for European energy security.").

160 Renshaw & Hunnicutt, *supra* note 158; Paul & Holland, *supra* note 158 ("The US' increasingly intertwined role in global gas markets has driven some concerns over whether continuing to build out LNG export capacity will ultimately translate to higher domestic natural gas prices."); Kemp, *supra* note 158 ("U.S. gas production will need to increase significantly to continue growing exports while ensuring fuel remains affordable for domestic power producers, households and industrial users. . . . The challenge for the industry is to overcome supply chain constraints and scale up output profitably in order to satisfy domestic demand as well as to remain the primary supplier of the world's fast growing gas market.").

161 *See* discussion *supra* Part IV.

162 *See* discussion *supra* Part IV.

lacked the ability to properly steward U.S. coastal lands, which Congress stated was their unique responsibility.[163] After *PennEast Pipeline*, one threat to this responsibility could have been an unchecked ability of natural gas project developers to exercise federal eminent domain over private and state-owned lands. Instead, the CZMA acts as an incredible limiting power on what the federal government can allow directly or indirectly on or near U.S. coastal state lands. Given the shortcuts taken in the FERC EIS in *Jordan Cove*, it is imperative that coastal states retain this ability to exercise oversight of natural-gas-related infrastructure projects in or near their coastal zones. While not every federal consistency review decision by a state will or should be upheld on appeal, the process created under the CZMA allows for increased review of federal actions and a venue to evaluate competing state and federal concerns. The CZMA remains an important artifact of cooperative federalism with an ongoing and critical role to play in its mission to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations."[164]

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[163] 16 U.S.C. § 1452(1)–(2) (1992).
[164] *Id.*