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SABIN CENTER FOR CLIMATE CHANGE LAW

April 10, 2023

Via *regulations.gov*

Jomar Maldonado
Director for NEPA
Council on Environmental Quality
730 Jackson Place NW
Washington, D.C. 20503

Re: Council on Environmental Quality: National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change; CEQ-2022-0005

Dear Mr. Maldonado,

Columbia Law School's Sabin Center for Climate Change Law ("Sabin Center") respectfully submits these comments on the Council on Environmental Quality's ("CEQ") interim guidance entitled "National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change" ("Guidance").[1]

The Sabin Center strongly supports adoption of the Guidance, which will improve federal decision-making by ensuring that federal agencies fully and accurately account for climate change in environmental reviews as legally required under the National Environmental Policy Act ("NEPA"). There is currently significant variation in whether and how federal agencies evaluate the climate change effects of proposed federal actions and the ways in which climate change might impact those actions in environmental reviews under NEPA. The Guidance will help to promote greater consistency in environmental reviews and ensure that all federal agencies comply with NEPA's requirements to disclose and consider the climate change implications of their decisions. This will not only improve the quality of federal decision-making, but also help to facilitate public participation in the decision-making process, and thus advance NEPA's goal of "foster[ing] excellent action."[2]

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1 Council on Environmental Quality, National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, 88 Fed. Reg. 1196 (Jan. 9, 2023) [hereinafter "CEQ NEPA Guidance"].

2 40 C.F.R. § 1500.1(1).

Given the above, the Sabin Center urges CEQ to move quickly to finalize the Guidance. In doing so, however, we recommend that CEQ consider making four modifications to further strengthen the Guidance. In particular:

- We urge CEQ to reconsider its decision not to establish a numeric significance threshold for greenhouse gas ("GHG") emissions. If CEQ determines that it cannot establish a numeric threshold, it should, at a minimum, include language in the Guidance acknowledging that GHG emissions from certain types of projects can contribute significantly to climate change. In particular, CEQ should acknowledge that any project that increases fossil fuel production and consumption or results in millions of tons of GHG emissions is likely to have significant impacts.

- We agree with CEQ's recommendation that federal agencies should quantify emissions both "individually by GHG" and in carbon dioxide ("$CO_2$") equivalents "by factoring in each pollutant's global warming potential (GWP)." CEQ should, however, clarify that agencies must use: (1) the most up-to-date GWP figures published by the Intergovernmental Panel on Climate Change ("IPCC"); and (2) a range of GWP figures reflecting both the short- and long-term climate impacts of different GHGs.

- We welcome CEQ's decision to require agencies to monetize climate damages using estimates of the social cost of greenhouse gases ("SC-GHG"). Again, however, CEQ should clarify that agencies must use a range of SC-GHG values to reflect the full range of possible climate damage associated with GHG emissions.

- We urge CEQ to revise the Guidance to clarify that agencies are legally required under NEPA to consider how the impacts of climate change might affect a proposed action, alternatives, and their environmental outcomes. As currently worded, the Guidance could be misinterpreted to mean that consideration of climate change impacts is merely recommended, and not legally required.

These points are further elaborated below.

## 1. CEQ Should Provide Additional Guidance to Federal Agencies on Assessing the Significance of GHG Emissions

The Sabin Center agrees with CEQ that "federal agencies must disclose and consider . . . the extent to which a proposed action and its reasonable alternatives (including the no action alternative) would result in reasonably foreseeable GHG emissions that contribute to climate change."[3] This has been repeatedly confirmed by the courts, with numerous decisions holding that NEPA requires an analysis of both the GHG emissions resulting directly from a proposed action (and alternatives) and indirect emissions from upstream and downstream activities, where those

[3] CEQ NEPA Guidance, 88 Fed. Reg. 1200.

emissions are a reasonably foreseeable consequence of the proposed action.[4] We support CEQ's clear statement, in the Guidance, that indirect emissions "are often reasonably foreseeable" and thus require consideration under NEPA. We urge CEQ to go further and provide additional guidance on how agencies can evaluate the significance of direct and indirect GHG emissions.

It is currently rare for federal agencies to conclude that the GHG emissions from a proposed federal action will have a significant impact on the environment. Even where a proposed action will generate millions of tons of $CO_2$-equivalent, agencies have concluded that: (i) the emissions from the action are not significant, or (ii) they are unable to determine whether emissions are significant.[5] We are aware of only one instance in which a federal agency concluded that proposed action's GHG emissions were significant: for the Keystone XL Pipeline, the Department of State concluded that the estimated emissions (i.e., 37.3 to 120.5 million metric tons $CO_2$-equivalent) "would likely represent a significant impact."[6]

The Sabin Center has previously recommended, and continues to recommend, that CEQ establish a numeric significance threshold for GHG emissions.[7] Establishing a numeric threshold would provide much needed clarity about when the GHG emissions from a proposed action should be considered significant and thus help to promote greater consistency and predictability in NEPA reviews. It would also prevent agencies skirting their NEPA obligations by, for example, avoiding making significance determinations even for proposed actions that have major GHG impacts. While we recognize that it can be difficult to quantify the exact level at which GHG emissions become significant, this should not prevent CEQ from adopting a numeric significance threshold. As we have previously recommended:

> CEQ could specify a high threshold at which GHG emissions will be presumed to be significant (e.g., 100,000 tons per year of $CO_2$-equivalent), while recognizing that GHG emissions below this threshold *may* be significant and should be assessed on a case-by-case basis. Alternatively, CEQ could [adopt] a recommended significance threshold . . . rather than establishing a bright-line regulatory rule. The guidance could direct agencies to provide a rationale in the event that they do not

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4 For a discussion of relevant case law, *see generally*, Michael Burger & Jessica Wentz, Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review, 41 Harv. Envtl. L Rev. 109 (2017); and Michael Burger & Jessica Wentz, Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA, 44 Wm. & Mary Envtl. L. & Pol'y Rev. 423 (2020) [The 2020 Article is included as Attachment 1 to this Comment.]

5 *See, e.g.,* 350 Mont. v. Haaland, No. 20-35411 (9th Cir. Apr. 4, 2022) (DOI "failed to articulate any science-based criteria of significance" in support of a finding of no significant impact for a coal mine expansion that would generate 190 million tons of $CO_2$-equivalent). *See also* Burger & Wentz, *supra* note 4.

6 Department of State, Final Supplemental Environmental Impact Statement for the Keystone XL Project, Volume I 4-76, at 4-81 (2019), https://perma.cc/RHX8-L286 (last visited Apr. 4, 2023).

7 *See* Michael Burger et al., Incorporating Climate Change in NEPA Reviews: Recommendations for Reform (May 2022), https://perma.cc/XMT2-6FM2. [Included as Attachment 2 to this Comment]

adhere to CEQ's recommended threshold. This would provide a framework for citizens and courts to assess the reasonableness of significance determinations.[8]

If CEQ does not include a numeric significance threshold in the final Guidance, it should, at a minimum, incorporate language acknowledging that GHG emissions from certain types of projects can contribute significantly to global climate change. In particular, CEQ should acknowledge that significant GHG impacts are likely to occur as result of actions that increase fossil fuel production and consumption (e.g., coal mining, oil and gas production, and fossil fuel transportation infrastructure that enables upstream production). This is a reasonable assumption in light of scientific consensus that we need to phase out fossil fuels as rapidly as possible in order to meet climate targets.[9] CEQ should also acknowledge that, even if the precise threshold of significance for GHG emissions is unclear, a project that will generate millions of tons of $CO_2$-equivalent surpasses any reasonable threshold of significance. Again, this is a reasonable assumption in light of scientific consensus that the U.S. and other countries need to rapidly achieve net-zero GHG emissions in order to meet climate targets.[10]

A presumption of significance under these circumstances would be consistent with CEQ's recommendation that agencies evaluate GHG emissions in light of climate mitigation goals, including the U.S. Nationally Determined Contribution ("NDC") under the Paris Agreement.[11] Rapid and widespread reductions in fossil fuel use and GHG emissions will be necessary if the U.S. is to meet its target of reducing emissions by 50 to52 percent below 2005 levels by 2030.[12] Indeed, the U.S. has recognized the need to phase out fossil fuel use and achieve carbon-free electricity by 2035 in its NDC.[13] However, the Guidance merely specifies that agencies should evaluate consistency with mitigation targets as a means of providing "context" for the GHG discussion – the Guidance does not explicitly tie this analysis to significance determinations. We thus recommend that CEQ update the Guidance to explicitly instruct agencies to consider consistency with GHG mitigation targets when assessing the significance of project emissions.

Finally, CEQ should instruct agencies to account for cumulative impacts when assessing significance. For example, when evaluating emissions from oil and gas leasing, agencies should consider the cumulative effects of U.S. oil and gas production and whether expanding production (e.g., through a new lease or lease expansion) is consistent with the U.S. NDC and other climate

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8 Burger et al., *supra* note 7, at 12.

9 *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE ("IPCC"), CLIMATE CHANGE 2022: MITIGATION OF CLIMATE CHANGE, WORKING GROUP III CONTRIBUTION TO THE SIXTH ASSESSMENT REPORT OF THE IPCC (2022).

10 *Id.*

11 *See* CEQ NEPA Guidance, 88 Fed. Reg. 1203, which provides that "[a]gencies also should discuss whether and to what extent the proposal's reasonably foreseeable GHG emissions are consistent with GHG reduction goals, such as those reflected in the U.S. nationally determined contribution under the Paris Agreement."

12 U.S. Nationally Determined Contribution, Reducing Greenhouse Gases in the United States: A 2030 Emissions Target, 1 (Apr. 21, 2021), https://perma.cc/2LG8-LKA7 (last visited Apr. 3, 2023).

13 *Id*. at 3.

goals. Agencies should also consider the cumulative effects of fossil fuel transportation projects, such as natural gas pipelines, and assess whether these projects promote dependency on fossil fuels or "carbon lock in,"[14] and whether this is consistent with the energy transition that will be required to meet the U.S. NDC and other climate goals.

### 2. CEQ Should Require Agencies to Evaluate the Climate Impacts of Non-$CO_2$ GHG Emissions Using the Best Available GWPs

The Sabin Center agrees with CEQ that federal agencies should quantify the emissions associated with a proposed action "individually by GHG, as well as aggregated in terms of total $CO_2$ equivalence."[15] As CEQ has recognized, to convert non-$CO_2$ GHG emissions into $CO_2$-equivalent emissions, federal agencies must account for the GWP of the non-$CO_2$ GHG "using the best available science and data."[16] CEQ should clarify that the "best available science" requires: (1) use of the most up-to-date GWP figures published by the IPCC, and (2) use of a range of figures reflecting both the short- and long-term climate impacts of different GHGs.

GWPs offer a way of comparing the climate change impacts of different GHGs. Specifically, GWPs measure the amount of energy absorbed by one ton of a substance over a given time period, relative to the amount of energy absorbed by one ton of $CO_2$ over the same period.[17] In its Sixth Assessment Report, published in 2022, the IPCC calculated three GWPs for each non-$CO_2$ GHG: (1) GWP-20, reflecting the impact of the GHG over a twenty-year time period, (2) GWP-100, reflecting the impact of the GHG over a 100-year time period, and (3) GWP-500, reflecting the impact of the GHG over a 500-year time period. In the Guidance, CEQ "encourages agencies to use the 100-year GWP" in NEPA reviews, primarily because GWP-100 is used in the U.S. NDC and, in CEQ's view, adopting the same value in NEPA reviews will "avoid potential ambiguity."[18] However, the 100-year GWP used in the U.S. NDC is drawn from the IPCC's Fifth Assessment Report published in 2014, and no longer reflects the best available science. CEQ should direct federal agencies to use the GWP figures in the latest IPCC Assessment Report. As the Environmental Protection Agency ("EPA") has noted, GWPs are periodically updated to reflect "updated scientific estimates of the energy absorption or lifetime of" different GHGs.[19] The EPA has concluded that the GWPs in the IPCC's Sixth Assessment Report "reflect the state of the science."[20] Those GWPs should, therefore, be used by federal agencies in their NEPA reviews unless and until updated figures are published by the IPCC.

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14 "Carbon lock-in" occurs when fossil fuel infrastructure delays or prevents the transition to low-carbon alternatives.

15 CEQ NEPA Guidance, 88 Fed. Reg. 1201.

16 *Id*.

17 U.S. Environmental Protection Agency ("EPA"), Understanding Global Warming Potentials, https://perma.cc/8PQM-A69G (last visited Apr. 4, 2023).

18 CEQ NEPA Guidance, 88 Fed. Reg. 1199 (*see* Footnote 32).

19 EPA, *supra* note 17.

20 *Id*.

CEQ should also direct agencies to use a range of GWPs, rather than a single figure (e.g., GWP-100), to evaluate the climate impacts of non $CO_2$ GHGs. We note, as CEQ has, that GWP-100 is used in the U.S. NDC and some other policy documents.[21] Different GWPs are used in other contexts, however. For example, in Maryland, the Climate Solutions Now Act of 2022 directs the state Department of the Environment to develop a plan for reducing statewide GHG emissions and specifies that the department "shall use the global warming potential for methane over a 20-year time horizon . . . to estimate the state's greenhouse gas emissions reductions" in that plan.[22] Given this variation, there is no reason to believe that requiring agencies to use a single figure will "avoid potential ambiguity" as CEQ suggests.[23] There is also no reason to believe that GWP-100 is more accurate than other available GWP figures.[24] In this regard, the IPCC has concluded:

> the choice of [GWP] depends on type of application and policy context; hence, ***no single metric is optimal for all policy goals***. All metrics have shortcomings, and choices contain value judgements, such as the climate effect considered and the weighting of effects over time (which explicitly or implicitly discounts impacts over time).[25]

Recent court decisions have affirmed the value of using a range of GWP figures in environmental reviews under NEPA. For example, in *Western Organization of Resource Councils, et al. v. U.S. Bureau of Land Management* ("BLM"),[26] plaintiffs challenged BLM's decision to revise two Resource Management Plans ("RMPs") that made federal land in the Powder River Basin available for fossil fuel development. The plaintiffs alleged that BLM had violated NEPA by basing its assessment of methane emissions from fossil fuel development on outdated science. Pursuant to NEPA, BLM had prepared two environmental impact statements ("EISs"), one for each RMP. In one EIS ("EIS 1"), BLM used a 100-year GWP to assess methane emissions, while

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21 EPA, *supra* note 17

22 MD. CODE ANN., ENVIR. § 2-1205. Other states also use the 20-year GWP for methane. *See e.g.,* N.Y. ENVTL. CONSERV. § 75-0101(2) (McKinney); California Energy Commission, Time Dependent Valuation of Energy for Developing Building Efficiency Standards: 2022 Time Dependent Valuation (TDV) and Source Energy Metric Data Sources and Inputs, at 64 (May 2020), https://perma.cc/Y339-NSW5.

23 CEQ NEPA Guidance, 88 Fed. Reg. 1199 (*see* Footnote 32).

24 On the contrary, recent research suggests that using the 100-year GWP for methane may significantly understate its climate impacts. *See e.g.*, Sam Abernathy & Robert B. Jackson, Global temperature goals should determine the time horizons for greenhouse gas emission metrics, 17 Envtl. Res. Letters 024019 (2022).

25 IPCC, CLIMATE CHANGE 2014: SYNTHESIS REPORT. CONTRIBUTION OF WORKING GROUPS I, II, AND III OF THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 87 (2014) (boldface and italics supplied); *see also* IPCC, CLIMATE CHANGE 2023: SYNTHESIS REPORT OF THE IPCC SIXTH ASSESSMENT REPORT 4, footnote 9 (2023) (stating "*[t]he choice of metric depends on the purpose of the analysis* and all GHG emission metrics have limitations and uncertainties, given that they simplify the complexity of the physical climate system and its response to past and future GHG emissions" (italics supplied)).

26 W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., CV-16-21-GF-BMM, 2018 WL 1475470, at *15 (D. Mont. Mar. 26, 2018).

in the second EIS ("EIS 2"), it used both 100-year and 20-year GWP figures.[27] The District Court of Montana held that "BLM's decision to note alternate GWP figures in [EIS 2] evidences its awareness [of] the evolving nature of the science regarding carbon emissions. BLM's failure to acknowledge this changing science in [EIS 1] constituted an . . . arbitrary decision that undermined the accuracy and integrity of the GWP analysis."[28] The court further held that an "unexplained decision to use the 100-year time horizon, when other more appropriate time horizons remained available, qualifies as arbitrary and capricious[.]"[29] Consistent with this case law, CEQ should direct agencies to use a range of GWP figures, which reflect both the short- and longer-term climate impacts of different GHG emissions.

### 3. CEQ Should Require Agencies to Quantify the Climate Damage Associated with GHG Emissions using a Range of SC-GHG Values

The Sabin Center supports the recommendation, in the Guidance, that federal agencies use "the best available social cost of GHG (SC-GHG) estimates . . . to translate climate impacts into the more accessible metric of dollars."[30] This will provide valuable information to federal agencies and the public, enabling them to more readily assess the climate impacts of proposed federal actions. Indeed, in Executive Order 13990, President Biden noted that use of the SC-GHG "facilitates sound decision-making" by ensuring that federal "agencies capture the full costs of greenhouse gas emissions as accurately as possible."[31] The courts have repeatedly upheld use of the SC-GHG as a valid means of assessing climate damage in NEPA reviews and others contexts.[32]

Building on the recommendation in the Guidance, CEQ should direct federal agencies to use the full range of SC-GHG values published by the Interagency Working Group on SC-GHG ("IWG"). In February 2021, the IWG published updated interim estimates of the social cost of carbon dioxide ("SCC"), social cost of methane ("SCM"), and social cost of nitrous oxide ("SCNO").[33] For each of those GHGs, the IWG published four estimates—three reflecting the average social cost across models at discount rates of 2.5%, 3.0%, and 5.0%, and the fourth based

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27 *W. Org. of Res. Councils*, 2018 WL 1475470, at *15.

28 *Id*. at *16.

29 *Id.* at *15.

30 CEQ NEPA Guidance, 88 Fed. Reg. 1198.

31 Executive Order No. 13990 of January 30, 2021: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, 86 Fed. Reg. 7037, 7040 (Jan. 25, 2021).

32 *See* 6 Zero Zone, Inc. v. United States Dep't of Energy, 832 F.3d 654 (7th Cir. 2016); Montana Env't Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074 (D. Mont. 2017), amended in part, adhered to in part sub nom. Montana Env't Info. Ctr. v. United States Off. of Surface Mining, No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017); High Country Conservation Advocs. v. United States Forest Serv., 52 F. Supp. 3d 1174 (D. Colo. 2014); WildEarth Guardians v. Zinke, No. CV 17-80-BLG-SPW-TJC, 2019 WL 2404860 (D. Mont. Feb. 11, 2019), report and recommendation adopted sub nom. WildEarth Guardians v. Bernhardt, No. CV 17-80-BLG-SPW, 2021 WL 363955 (D. Mont. Feb. 3, 2021).

33 Interagency Working Group on Social Cost of Greenhouse Gases ("IWG – SC-GHG"), Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, at 23 (2021), https://perma.cc/53W6-VCS4 (last visited Apr. 3, 2023).

on the 95th percentile of the frequency distribution using a 3.0% discount rate.[34] The IWG has recommended that federal agencies use all four values to estimate the full range of possible climate damages.[35] Using multiple average figures with different discount rates is important because the SC-GHG values are sensitive to changes in discount rate, and there is currently no consensus on the proper rate to use to account for intergenerational impacts of GHG emissions. The 95th percentile value may also be used to represent costs for projects that may be exposed to higher impact, lower probability climate outcomes, and which would be pose particular harm and risk to the public.

Expressly directing federal agencies to use all of the SC-GHG figures published by the IWG would help to standardize agency practice. There is currently significant inconsistency in whether and how the SC-GHG is used by agencies in NEPA reviews. Some federal agencies have used multiple SC-GHG figures in previous NEPA reviews. For example, in 2016, the U.S. Department of Agriculture's Forest Service issued an EIS in connection with its Rulemaking for Colorado Roadless Areas, which utilized a range of SCC and SCM values.[36] This is not standard practice across all agencies, however. Indeed, some agencies have refused to use the SC-GHG altogether, pointing to a lack of consensus on the appropriate discount rate.[37] A recommendation in the Guidance to use all of the SC-GHG figures published by the IWG (instead of only one figure) would help to address this uncertainty.

### 4. CEQ Should Clarify that Federal Agencies Have a Legal Obligation to Consider Climate-Related Risks in NEPA Reviews

As CEQ has recognized in the Guidance, "[a]nalyzing reasonably foreseeable climate effects in NEPA reviews helps ensure decisions are based on the best available science and account for the urgency of the climate crisis."[38] The Sabin Center agrees with CEQ that federal agencies

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34 IWG – SC-GHG, *supra* note 33, at 23.

35 *Id*. ("the IWG emphasized previously and emphasizes [again] the importance and value of including all four [social cost] values").

36 U.S. Department of Agriculture – Forest Service, Rulemaking for Colorado Roadless Areas: Supplemental Final Environmental Impact Statement, at 94 (2016), https://perma.cc/9WG5-BGYD (last visited Apr. 3, 2023).

37 *See e.g.,* FERC, Environmental Impact Statement for Midship Pipeline Company, LLC—Midcontinent Supply Header Interstate Pipeline Project, Volume I 4-192 (2018), http://perma.cc/4CAQ-LXAG (arguing that "[t]he SCC tool has methodological limitations—e.g., different discount rates introduce substantial variation in results . . .–that limit the tool's usefulness in the review under NEPA"). *See also* FERC, Dominion Cove Point LNG, LP, Order Denying Rehearing and Stay, 151 FERC ¶ 61095 (May 4, 2015) (expressing FERC's view that "it would not be appropriate or informative to use" the SCC to quantify the climate damages associated with GHG emissions from a proposed liquified natural gas terminal because "no consensus exists on the appropriate discount rate to use for analyses spanning multiple generations and consequently, significant variation in output can result" (internal citations and quotations omitted)). *But see also Vecinos para el Bienestar de la Comunidad Costera* v. FERC, 6 F.4th 1321, 1330 (D.C. Cir. 2021), which required FERC, on remand, to explain why it was not obligated under NEPA Implementing Regulations to use the SCC in an EIS for an liquified natural gas project on the shores of Brownsville Shipping Channel in Cameron County, Texas.

38 CEQ NEPA Guidance, 88 Fed. Reg. 1197.

"should consider the ongoing impacts of climate change and the foreseeable state of the environment" in NEPA reviews.[39] This is not just good practice, but a legal requirement. CEQ should make that clear in the Guidance by expressly stating that agencies must consider climate-related risks in their NEPA reviews. Currently, Part IV of the Guidance provides that "[f]ederal agencies *must* consider and disclose […] the extent to which a proposed action and its alternatives … would result in reasonably foreseeable GHG emissions," but only that agencies "*should* consider the ways in which a changing climate may impact the proposed action and reasonable alternatives and change the action's environmental effects over the lifetime of those effects."[40] This could be read to suggest that only the former—GHG emissions analysis—is legally required under NEPA when, in fact, NEPA also requires an analysis of climate-related risks.

We urge CEQ to review the Guidance to clarify that federal agencies *must* consider climate risks (as well as GHG emissions) in NEPA reviews. As noted in a recent study, jointly published by the Sabin Center and Environmental Defense Fund ("EDF"):

> Agencies can no longer reasonably accomplish [NEPA's] objectives without considering whether and how the present and future impacts of climate change may compromise their activities or worsen any negative environmental and public health effects of those activities.
>
> For example, the calculus of environmental and public health impacts versus benefits for coastal fossil fuel infrastructure should consider the heightened risk of spills due to climate change-induced sea level rise, more intense hurricanes, and heavier precipitation events. Federal agencies should also consider whether a coastal facility may become less productive over time because more frequent and severe extreme weather events interfere with its operation. Weighing these factors could shift the calculus on whether a proposed action should proceed. Moreover, even if the agency does decide to proceed, these considerations will enable it to better assess alternatives or adaptation measures . . . which could make the action more resilient and lessen its adverse environmental impacts.[41]

Numerous court decisions confirm that climate change impacts must be considered in NEPA reviews. For example, in *AquAlliance v. U.S. Bureau of Reclamation*, the 9th Circuit Court of Appeals held that the NEPA analysis for a water transfer program was inadequate because it did not consider how climate change would affect the timing of precipitation and snowmelt in the local area.[42] Similarly, in *National Wildlife Federation v. National Marine Fisheries Service*, the court

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39 CEQ NEPA Guidance, 88 Fed. Reg. 1207.

40 *Id*. at 1200.

41 Romany M. Webb, et al., Evaluating Climate Risk in NEPA Reviews: Current Practices and Recommendations for Reform, at 22 (2022), https://perma.cc/6TEK-LW68 (last visited Apr. 3, 2023). [Included as Attachment 3 to this Comment]

42 AquAlliance v. U.S. Bureau of Reclamation, 287 F. Supp. 3d 969, 1016 (E.D. Cal. 2018) (stating that the requirement to define the affected environment "stems from the uncontroversial proposition that it would be 'simply impossible' to evaluate the effects of a project if an agency fails to gather information on the environmental [baseline]") (quoting LaFlamme v. FERC, 852 F.2d, 389, 400 (9th Cir. 1988)).

held that the Army Corps of Engineers violated NEPA when it used old EISs to issue a new order because the affected environment identified in the old EISs did not reflect new information about climate change.[43] In other cases, the courts have required agencies to consider the potential for cumulative impacts from climate change and proposed federal actions as part of their NEPA analyses.[44] This and other relevant case law should be cited in the Guidance.

Revising the Guidance to direct, rather than merely encourage, federal agencies to consider climate-related risks is essential to standardize agency practice and ensure compliance with NEPA. The previously mentioned Sabin Center / EDF study found that many federal agencies are not currently adequately considering climate risk in their NEPA reviews.[45] The study reviewed all final EISs issued by federal agencies in connection with onshore energy projects in the five years from 2016 through 2020.[46] None of the EISs reviewed were found to contain sufficient analysis of climate-related risks to inform agency decision-makers.[47] Less than fifty percent of the EISs "evaluated whether and how climate change might alter the environmental outcomes of the proposed action, and less than ten percent compared climate-related risks across alternatives."[48] Moreover, "[e]ven where federal agencies did analyze climate impacts, they often relied on outdated or incomplete data, limiting the usefulness of the analysis."[49]

### 3. Conclusion

In all, the Sabin Center welcomes adoption of the Guidance, which appropriately recognizes the need to meaningfully incorporate climate change and GHG emissions considerations into NEPA reviews. The changes and additions recommended in this letter would further strengthen the Guidance and thus help to improve the quality of federal decision-making and advance NEPA's goal of "foster[ing] excellent action."[50]

Sincerely,

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43 National Wildlife Federation v. National Marine Fisheries Service, 184 F. Supp. 3d 861, 875 (D. Or. 2016).

44 See e.g., Southern Utah Wilderness Alliance v. Burk, 981 F. Supp. 2d 1099, 1110–1111 (D. Utah 2013); Friends of the Wild Swan v. Jewell, No. CV 13-61-M-DWM, 2014 U.S. Dist. LEXIS 116788, at *31 (D. Mont. Aug. 21, 2014).

45 Webb, et al., *supra* note 41, at 35-36.

46 *Id*. at 37.

47 *Id*. at 41.

48 *Id*. at iv.

49 *Id*.

50 40 C.F.R. § 1500.1(1).

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**Attachments** (3):

(1) Michael Burger & Jessica Wentz, Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA, 44 Wm. & Mary Envtl. L. & Pol'y Rev. 423 (2020)

(2) Michael Burger, et al., Incorporating climate Change in NEPA Reviews: Recommendations for Reform (2022)

(3) Romany M. Webb, et al., Evaluating Climate Risk in NEPA Reviews: Current Practices and Recommendations for Reform (2022)

# ATTACHMENT 1

Michael Burger & Jessica Wentz, Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA, 44 Wm. & Mary Envtl. L. & Pol'y Rev. 423 (2020)

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# Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA

Michael Burger

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# EVALUATING THE EFFECTS OF FOSSIL FUEL SUPPLY PROJECTS ON GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE UNDER NEPA

MICHAEL BURGER* & JESSICA WENTZ**

ABSTRACT

Despite the high certainty of our looming climate catastrophe, fossil fuel production and consumption, and the greenhouse gas emissions that result, are increasing. In the United States, fossil fuel production reached record levels in 2018, and oil and gas pipelines are being constructed at an unprecedented pace. The National Environmental Policy Act ("NEPA") provides the legal framework for the federal government to evaluate the climate impacts of these supply projects, such as leasing public lands and approving pipelines and export terminals. Yet, while federal agencies have begun to analyze how such projects impact climate change there are major inconsistencies in agency practice as well as questions about the accuracy and integrity of these assessments. Some agencies are seeking to avoid any meaningful analysis of GHG emissions, others are downplaying the significance of GHG impacts, others are claiming that the impacts are too uncertain to inform the agency's decision. There is no programmatic analysis that evaluates the cumulative effects of U.S. fossil fuel policies. The result is a patchwork of project-level analyses that provides fragments of useful information.

*Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change under NEPA* argues that agencies are too often short-changing the public by seeking to limit the scope of their environmental assessments and to elide the central question of the significance of fossil fuel supply projects, and that more comprehensive

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analyses are necessary in order to draw meaningful conclusions about the effect of government decision-making on fossil fuel use and climate change. After a brief introduction, Part I provides a statutory and factual context. Parts II and III examine recent trends in environmental review and NEPA litigation; analyze nuanced questions of the scope and significance of fossil fuel supply projects' climate change impacts, the assumptions and analytical techniques that have factored and should factor into NEPA analysis, as well as the core question of whether and to what extent NEPA requires agencies to look at the cumulative effects of multiple fossil fuel leasing and transportation approvals; and propose best practices for agencies seeking to inform themselves and the public about the climate impacts of our nation's fossil fuel decisions. This Article concludes in the last few paragraphs.

## INTRODUCTION

The world is at a critical juncture in the fight against climate change. When the Paris Agreement was adopted in 2015, the nations of the world agreed that we must limit global warming to "well below" 2°C or preferably 1.5°C above pre-industrial temperatures, recognizing that this would significantly reduce the risks and impacts of climate change.[1] But the window of opportunity for meeting these targets is quickly closing.

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[1] U.N. Framework Convention on Climate Change, *Adoption of the Paris Agreement*, U.N. Doc. FCCC/CP/2015/L.9/Rev.1, annex I, art. 2 (Dec. 12, 2015).

In 2018, the Intergovernmental Panel on Climate Change ("IPCC") published a report in which it found that global greenhouse gas ("GHG") emissions must be reduced by nearly 50 percent by 2030 and reach net zero levels by 2050 to have a reasonable chance of meeting the 1.5°C target.[2] Reducing emissions at this speed and scale would require massive and unprecedented changes in energy infrastructure and most critically a rapid phase out of fossil fuels. Indeed, the vast majority of known fossil fuel reserves must be left unused to have a chance of meeting the Paris Agreement targets.[3]

Despite widespread agreement on the need for immediate and far-reaching action, global GHG emissions and fossil fuel consumption continue to increase and the world remains on track to significantly exceed 2°C of warming.[4] While many jurisdictions have enacted demand-side policies aimed at regulating the end-use of fossil fuels,[5] far less attention has been given to supply-side policies aimed at limiting the production of fossil fuels and the expansion of infrastructure intended to transport those fuels to markets. To the contrary, governments continue to authorize and even subsidize the development of new fossil fuel reserves as well as the expansion of fossil fuel transport infrastructure.[6] This is the

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[2] IPCC, *Summary for Policymakers*, *in* GLOBAL WARMING OF 1.5°C, AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY (V. Masson-Delmotte et al. eds., 2018).

[3] GREG MUTTITT ET AL., THE SKY'S LIMIT: WHY THE PARIS CLIMATE GOALS REQUIRE A MANAGED DECLINE OF FOSSIL FUEL PRODUCTION 20 (Collin Rees ed., 2016); Richard Heede & Naomi Oreskes, *Potential Emissions of $CO_2$ and Methane from Proved Reserves of Fossil Fuels: An Alternative Analysis,* 36 GLOBAL ENVTL. CHANGE 12, 17 (2016); Christophe McGlade & Paul Ekins*, The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C*, 517 NATURE 187, 187 (2015).

[4] Nina Chestney, *Climate policies put world on track for 3.3C warming: study*, REUTERS (Dec. 11, 2018), https://www.reuters.com/article/us-climate-change-accord-warming/climate-policies-put-world-on-track-for-3-3c-warming-study-idUSKBN1OA0Z2 [https://perma.cc/V5ZU-F5ZY]; Kyla Mandel, *World 'not on track' to stop 1.5 degrees of global warming warns UN Secretary General*, THINKPROGRESS (May 12, 2019), https://thinkprogress.org/world-not-on-track-to-stop-dangerous-climate-change-warns-un-secretary-general-58797036970f/ [https://perma.cc/276H-QLBX]; *2011 Warming Projections*, CLIMATE ACTION TRACKER, https://climateactiontracker.org/global/temperatures [https://perma.cc/2E7C-86TQ].

[5] EPA, CUTTING POWER SECTOR CARBON POLLUTION : STATE POLICIES AND PROGRAMS 8, 25, 32 (2016); David Roberts, *It's time to think seriously about cutting off the supply of fossil fuels*, VOX (May 31, 2018), https://www.vox.com/energy-and-environment/2018/4/3/17187606/fossil-fuel-supply [https://perma.cc/9NKP-SF53].

[6] The United States and other governments also continue to subsidize fossil fuels through

case in the United States, where fossil fuel production reached record levels in 2018,[7] and where oil and gas pipelines have been constructed at an unprecedented pace.[8] There is a pressing need for the United States and other governments to re-evaluate their position on fossil fuel supply infrastructure in light of the growing threat of climate change.

In the United States, the National Environmental Policy Act ("NEPA") provides the legal framework whereby the federal government must evaluate the climate impacts of fossil fuel leasing and transport proposals to make informed decisions about whether and how to proceed with these proposals.[9] Driven by litigation and public pressure, federal agencies have analyzed how fossil fuel supply projects affect fossil fuel use and GHG emissions in some of their NEPA reviews, but there are major inconsistencies in agency practice as well as questions about the accuracy and integrity of these assessments. In some instances, agencies have sought to avoid any meaningful analysis of GHG emissions, downplaying the significance of GHG impacts, or claiming that the impacts are too uncertain to inform the agency's decision about whether and how to proceed with individual fossil fuel leasing or transportation proposals. At the same time, the federal government has never conducted a programmatic analysis to evaluate the cumulative effects of its leasing decisions or transport approvals on fossil fuel use and GHG emissions. The result is a patchwork of project-level NEPA documentation that provides only pieces of insight on how federal decisions about fossil fuel supply infrastructure affect fossil fuel use and GHG emissions.

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policies such as tax breaks for fossil fuel exploration and low royalty rates for fossil fuels produced on public lands. *See* David Coady et al., *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates* 23, 35 (IMF, Working Paper No. 19/89, 2019).

[7] EIA, APRIL 2019 MONTHLY ENERGY REVIEW 3 (2019), https://www.eia.gov/totalenergy/data/monthly/archive/00351904.pdf [https://perma.cc/H2K8-7YJF]; EIA, ANNUAL ENERGY OUTLOOK 2019, 12, 16 (2019), https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf [https://perma.cc/X6AK-2CSL].

[8] The United States is outpacing any other country in terms of pipeline development: over 50 percent of all oil and gas pipelines in preconstruction or construction stages are located in the United States. *See* TED NACE ET AL., GLOBAL ENERGY MONITOR, PIPELINE BUBBLE: NORTH AMERICA IS BETTING OVER $1 TRILLION ON A RISKY FOSSIL INFRASTRUCTURE BOOM 3–5 (2019), https://globalenergymonitor.org/wp-content/uploads/2019/04/GFITPipelineBubble_2019_v6.pdf [https://perma.cc/KZ85-J2QA]; *Global Fossil Project Tracker*, GREEN INFO. NETWORK, https://greeninfo-network.github.io/fossil_tracker/ [https://perma.cc/47MS-D5XM] (last visited Dec. 3, 2019).

[9] National Environmental Policy Act, 42 U.S.C. § 4321 (2012); *Summary of the National Environmental Policy Act*, EPA, https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act/ [https://perma.cc/8RCE-SJXB] (last updated Aug. 15, 2019).

Litigation has played a major role in prompting more thorough analysis of GHG emission impacts.[10] Our 2017 article, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review*, analyzed whether NEPA required agencies to account for emissions from activities that occur "upstream" or "downstream" on the fossil fuel supply chain as indirect effects of proposed projects, and concluded that it does.[11] Here, we focus on recent trends in environmental review and NEPA litigation and examine some of the more nuanced questions of scope and significance, related to agencies' assumptions and analytical techniques, as well as the core question of whether and to what extent NEPA requires agencies to look at the cumulative effects of multiple fossil fuel leasing and transportation approvals. We argue that agencies too often short-change the public by seeking to limit the scope of their environmental assessments and to elide the question of significance, and that more comprehensive analyses are necessary in order to draw meaningful conclusions about the effect of government decision-making on fossil fuel use and climate change.

In our view, full compliance with NEPA's requirements matters. Critics may contend that NEPA is merely a "paper tiger" in that it imposes significant procedural obligations without any substantive requirement to mitigate or avoid adverse environmental impacts.[12] But the NEPA review process can lead to improved environmental decision-making, particularly when the statute's procedural mandates are fully implemented and enforced.[13] The disclosure of environmental impacts makes an agency

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[10] There is a growing body of research on what NEPA requires in this context. *See, e.g.*, Michael Burger, *A Carbon Fee as Mitigation for Fossil Fuel Extraction On Federal Lands*, 42 COLUM. J. ENVTL. L. 295, 313, 326 (2017); Arnold W. Reitze, Jr., *The Role of NEPA in Fossil Fuel Resource Development and Use in the Western United States*, 39 B.C. ENVTL. AFF. L. REV. 283, 285 (2012); Jessica Wentz, *Assessing the Impacts of Climate Change on the Built Environment: A Framework for Environmental Reviews*, 45 ENVTL. L. REV. 11,015, 11,017, 11,019 (2015). *See also* James W. Coleman, *Beyond the Pipeline Wars: Reforming Environmental Assessment of Energy Transport Infrastructure*, 2018 UTAH L. REV. 119, 121–22, 126–27 (2018); James W. Coleman, *Pipelines & Power-Lines: Building the Energy Transport Future*, 80 OHIO ST. L.J. 263, 266, 304 (2019).

[11] Michael Burger & Jessica Wentz, *Downstream and Upstream Emissions: The Proper Scope of NEPA Review*, 41 HARV. ENVTL. L. REV. 109, 181 (2017).

[12] *See, e.g.*, Michael C. Blumm & Keith Mosman, *The Overlooked Role of the National Environmental Policy Act in Protecting the Western Environment: NEPA in the Ninth Circuit*, 2 WASH. J. ENVTL. L. & POL'Y 193, 198 (2012).

[13] *See id.* at 195–99; Paul Stanton Kibel, *The Paper Tiger Awakens: North American Environmental Law After the Cozumel Reef Case*, 39 COLUM. J. TRANSNAT'L L. 395, 409, 425 (2001); Raymond Laws, *NEPA and the Northern Integrated Supply Project: Wielding the*

accountable for those impacts, thus placing pressure on the agency to mitigate or avoid adverse impacts which cannot be justified by the project's benefits or are otherwise unacceptable to the public. This appears to be true for the fossil fuel supply proposals discussed in this Article: the fact that agencies have tried to limit their GHG disclosures and downplay the significance of GHG emissions suggests that they are concerned about the potential consequences of such disclosure. But this practice cannot continue. The federal government needs to assess and disclose the emissions impact of the fossil fuel production and transportation infrastructure that it authorizes, not only to support informed decision-making, but also to ensure that the public has access to this information and can meaningfully engage with policymakers on appropriate supply-side policies for fossil fuels.

Part I provides a factual and legal background. It discusses the rationale for critically evaluating fossil fuel supply projects in the context of climate change goals and policies, explains the scope of U.S. federal authority over fossil fuel extraction and transport proposals, summarizes NEPA requirements that are relevant to the U.S. government's review of such proposals, and reviews the evolution of federal practice and policy on fossil fuel development and NEPA reviews. Part II summarizes and synthesizes recent case law on the scope of GHG emissions that must be disclosed as effects of fossil fuel supply projects under NEPA, focusing on emissions which qualify as indirect effects, cumulative effects, and effects of related actions. Part III examines new and emerging legal questions that pertain to GHG emissions analysis under NEPA, particularly the reasonableness of agency assumptions and findings related to (i) the effect of fossil fuel supply projects on energy markets and fossil fuel end-use, and the net emissions impact of the proposal in light of those market impacts; (ii) the significance of GHG emissions impacts; and (iii) the evaluation of alternatives and mitigation measures that would reduce GHG emissions. The Conclusion includes a summary of key points and recommendations on how agencies can best satisfy their NEPA obligations in this context.

## I. BACKGROUND

The Intergovernmental Panel on Climate Change's ("IPCC") special report on *Global Warming of 1.5°C* and the U.S. Global Change Research

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*'Paper Tiger' in the Tenth Circuit*, 27 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 101, 102, 108, 111 (2016).

Program's ("USGCRP") *Fourth National Climate Assessment* recognize that rapid reductions in greenhouse gas emissions will be needed to limit global warming to 1.5°C or "well below" 2°C.[14] Even if we attain this ambitious goal, the world will still experience a wide range of significant and adverse impacts from climate change, but the potential impacts of 2°C or 3°C of warming would be dramatically worse.[15] But despite broad scientific consensus on this imperative and national commitments to address climate change, GHG emissions and atmospheric concentrations continue to increase, breaking records in both 2018 and 2019.[16]

Globally, fossil fuel combustion remains the dominant source of anthropogenic GHG emissions as well as the primary driver of recent emission increases.[17] The growth in fossil fuel emissions actually accelerated in 2017 and 2018 notwithstanding the adoption of the Paris Agreement.[18] In the United States, fossil fuel emissions increased by 2.7 percent in 2018, the second-largest margin in twenty years, after three years of decline.[19] This increase occurred despite a steep drop in coal use because the reductions in coal-related emissions were more than offset by significant increases in oil and gas consumption.[20]

There is still a very narrow window of time in which action could be taken to meet the Paris Agreement. One study found that it may still be possible to limit global warming to 1.5°C if all fossil fuel-powered infrastructure (power plants, factories, vehicles, ships, and planes) are replaced by zero-carbon alternatives at the end of their useful lives and no new fossil fuel–powered infrastructure is constructed, but the world

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[14] IPCC, GLOBAL WARMING OF 1.5°C, AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY v–vi (V. Masson-Delmotte et al. eds., 2018); USGCRP, FOURTH NATIONAL CLIMATE ASSESSMENT VOL. II: IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES 1351 (D.R. Reidmiller et al. eds., 2018).

[15] IPCC, *supra* note 14.

[16] INT'L ENERGY AGENCY, GLOBAL ENERGY & $CO_2$ STATUS REPORT 2018 3 (2018); *Global Carbon Budget 2018*, GLOBAL CARBON PROJECT (Dec. 5, 2018), https://www.globalcarbonproject.org/carbonbudget [https://perma.cc/996P-F43T]; *Global Monthly Mean $CO_2$*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://www.esrl.noaa.gov/gmd/ccgg/trends/global.html [https://perma.cc/2CW2-56XN] (last visited Dec. 3, 2019).

[17] *See* sources cited *supra* note 16.

[18] Travis Houser et al., *Final US Emissions Estimates for 2018,* RHODIUM GRP. (May 31, 2019), https://rhg.com/research/final-us-emissions-estimates-for-2018/ [https://perma.cc/QG94-TGN8].

[19] *Id.*

[20] *Id.*

would likely exceed that target if this phase-out is delayed until 2030.[21] This is in line with the IPCC's findings that limiting global warming to 1.5°C would require "rapid and far-reaching" changes across all sectors, particularly the energy and transport sectors.[22]

### *A. Thinking Critically About Fossil Fuel Supply and Climate Policy*

To accelerate the fossil fuel phase-out, many advocate for supply-side policies aimed at limiting fossil fuel extraction and the expansion of infrastructure to transport fuels to end-users—the central message to governments being to "keep it in the ground."[23] These advocacy efforts are grounded in scientific research on fossil fuels and the global carbon budget, most notably a 2015 study which found that the world would need to leave at least 80 percent of the remaining known fossil fuel reserves unused in order to have a 50 percent chance of limiting global warming to 2°C.[24] It is not just undeveloped reserves that need to be left in the ground: another study on developed reserves found that the potential carbon emissions from the oil, gas, and coal in the world's currently operating fields and mines would take us beyond 2°C if those reserves are fully exploited, and that developed reserves of oil and gas alone are enough to push the world beyond 1.5°C of warming even if coal is phased out immediately.[25]

Governments have been slow to enact supply-side restrictions, in part because fossil fuel extraction and trade are viewed as central to economic development and energy security, and in part because supply-side actions are sometimes viewed as ineffective in a global marketplace.[26] One critical question is whether government approvals of new fossil fuel supply projects are fundamentally at odds with the imperative to phase out fossil fuel use. The answer to this question may seem obvious, but different projects may warrant different conclusions: a proposal

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[21] Christopher J. Smith et al., *Current Fossil Fuel Infrastructure Does Not Yet Commit Us to 1.5 °C Warming,* 10 NATURE COMM. 101 (2019).
[22] IPCC, *supra* note 14.
[23] *See generally* Kate Schimel, *How the Keep it in the Ground movement came to be*, HIGH COUNTRY NEWS (July 19, 2016), http://www.hcn.org/articles/how-the-keep-it-in-the-ground-movement-gained-momentum [https://perma.cc/G4M2-ZXWT].
[24] McGlade & Ekins, *supra* note 3, at 187.
[25] MUTTITT ET AL., *supra* note 3.
[26] For a more in-depth analysis of why supply-side policies have not been widely used to date, see Michael Lazarus & Harro van Asselt, *Fossil Fuel Supply and Climate Policy: Exploring the Road Less Taken*, 150 CLIMATIC CHANGE 1, 1–2 (2018); Michael Lazarus et al., *Supply-Side Climate Policy: The Road Less Taken* 14 (Stockholm Environmental Institute, Working Paper No. 2015-13, 2015).

to exploit new coal reserves may be totally at odds with climate goals, whereas a natural gas pipeline might be justified if there is sound evidence that it will reduce coal use among end-users—but such a justification would need to be supported by an analysis of whether there are alternatives to coal and gas for meeting energy demand, such as renewables or efficiency improvements, and whether the investment in new natural gas infrastructure will "lock in" reliance on natural gas rather than carbon-free energy substitutes. Upon careful assessment, decision makers may find that the expansion of any fossil fuel production or transportation infrastructure is irrational and imprudent in light of the need to immediately and rapidly phase out fossil fuel use and the prospect that such investments may result in stranded assets within the next several decades.[27]

A related question is whether supply-side restrictions are both effective at reducing fossil fuel use and in alignment with other policy goals. Here, again, the analysis is complicated. Critics have argued that such policies may be ineffective, economically suboptimal, and may threaten energy security.[28] But there is a growing body of research suggesting that supply-side policies can and should be integrated into the portfolio of government responses to climate change.[29] For example, one study found that "restrictive supply-side policy instruments (targeting fossil fuels) have numerous characteristic economic and political advantages over otherwise similar restrictive demand-side instruments (targeting greenhouse gases)" including: (i) low administrative and transaction costs, (ii) higher abatement certainty, (iii) comprehensive within-sector coverage, (iv) advantageous price/efficiency effects, (v) the mitigation of infrastructure "lock-in" risks, and (vi) mitigation of the "green paradox"—that is, the risk that policies reducing the value of fossil fuel resources will cause an increase in consumption of those resources.[30] Other studies have found that constraining fossil fuel production and supply can significantly increase fuel prices

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[27] For more information on stranded assets, see BEN CALDECOTT ET AL., STRANDED ASSETS: A CLIMATE RISK CHALLENGE (Ana R. Rios ed., 2016); J.F. Mercure et al., *Macroeconomic Impact of Stranded Fossil Fuel Assetts,* 8 NATURE CLIMATE CHANGE 588 (2019); NACE ET AL., *supra* note 8.

[28] *See, e.g.*, Michael A. Levi, *The Environmental and Climate Stakes in Arctic Oil Drilling,* COUNCIL ON FOREIGN REL. BLOG (May 13, 2015), https://www.cfr.org/blog/environmental-and-climate-stakes-arctic-oil-drilling [https://perma.cc/W97S-Q2U2] (arguing that supply-side restrictions on fossil fuel supply in one jurisdiction are ineffective due to global trade in fossil fuels).

[29] Fergus Green & Richard Denniss, *Cutting With Both Arms of the Scissors: The Economic and Political Case for Restrictive Supply-Side Climate Policies,* 150 CLIMATIC CHANGE 73, 78 (2018).

[30] *Id.* at 73.

thereby reducing consumption vis-à-vis lower carbon energy sources.[31] In particular, a 2018 study found that ceasing the issuance of new leases for fossil fuel extraction on federal lands and waters in the United States would reduce global $CO_2$ emissions by an estimated 280 million tons annually by 2030, which would be comparable to the effects of other major climate policies adopted or considered by the Obama administration.[32]

### *B. Federal Authority Over Fossil Fuel Extraction and Transport*

The U.S. federal government oversees the leasing of coal, oil, and gas reserves on public lands, which contain more than one quarter of the country's known fossil fuel reserves.[33] The Department of Interior ("DOI"), Bureau of Land Management ("BLM"), U.S. Forest Service ("USFS"),

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[31] Peter Erickson & Michael Lazarus, *Would Constraining US Fossil Fuel Production Affect Global $CO_2$ Emissions? A Case Study of US Leasing Policy,* 150 CLIMATIC CHANGE 29, 34 (2018) [hereinafter Erickson & Lazarus]; Taran Fæhn et al., *Climate Policies in a Fossil Fuel Producing Country—Demand Versus Supply Side Policies*, 38 ENERGY J. 77, 83 (2017); Filip Johnson et al., *The Threat to Climate Change Mitigation Posed by the Abundance of Fossil Fuels*, 19 CLIMATE POL'Y 258, 266 (2018); Lazarus & van Asselt, *supra* note 26, at 5; Philippe Le Billon & Berit Kristoffersen, *Just Cuts for Fossil Fuels? Supply-Side Carbon Constraints and Energy Transition,* 0 ENV'T & PLAN. 1, 4 (2019); Georgia Piggot et al., *Swimming Upstream: Addressing Fossil Fuel Supply Under the UNFCCC,* 18 CLIMATE POL'Y 1189, 1190 (2018); Jianliang Wang et al., *The Implications of Fossil Fuel Supply Constraints on Climate Change Projections: A Supply-Side Analysis*, 86 FUTURES 58, 66–67 (2017); Peter Erickson, *Confronting Carbon Lock-In: Canada's Oil Sands,* STOCKHOLM ENV'T INST. 7 (2018); Peter Erickson & Michael Lazarus, *How Limiting Oil Production Could Help California Meet its Climate Goals*, STOCKHOLM ENV'T INST. 2 (2018); *see* Cleo Verkuijl et al., *Aligning Fossil Fuel Production with the Paris Agreement*, STOCKHOLM ENV'T INST. 3 (Mar. 2018); Lazarus et al., *supra* note 26, at 6. Much of this research focuses on the effects of constraining fossil fuel production, but imposing such constraints on fossil fuel transportation infrastructure is also a supply-side approach which would affect fuel prices, demand, and consumption. *See* U.S. DEP'T OF ENERGY, NATURAL GAS INFRASTRUCTURE IMPLICATIONS OF INCREASED DEMAND FROM THE ELECTRIC POWER SECTOR v–vi (Feb. 2015), https://www.energy.gov/sites/prod/files/2015/02/f19/DOE%20Report%20Natural%20Gas%20Infrastructure%20V_02-02.pdf [https://perma.cc/4QVS-CRJS] (discussing how natural gas transmission constraints can increase prices); LESSLEY GOUDARZI & FRANCES WOOD, ONLOCATION.INC, THE IMPACTS OF RESTRICTING FOSSIL FUEL ENERGY PRODUCTION i (Apr. 2017) (finding that a U.S. policy consisting of restrictions on both extraction and transport projects would result in economy-wide emission reductions approximately 10 percent greater than a reference case without that policy).

[32] Erickson & Lazarus, *supra* note 31, at 36–37.

[33] Approximately one-third of known coal reserves, one quarter of crude oil reserves, and one quarter of natural gas reserves are located on public lands and managed by the federal government. MARC HUMPHRIES, U.S. CRUDE OIL AND NATURAL GAS PRODUCTION IN FEDERAL AND NONFEDERAL AREAS 2 (June 22, 2016), https://fas.org/sgp/crs/misc/R42432.pdf [https://perma.cc/DZ72-UG6J]; ROBERT H. NELSON, THE USE AND MANAGEMENT OF FEDERAL COAL 9 (2017).

Bureau of Ocean and Energy Management ("BOEM"), and Office of Surface Mining Reclamation and Enforcement ("OSM") all share authority over fossil fuel leasing on public lands and act as lead agencies in NEPA reviews for these activities.[34] The Mineral Leasing Act and other statutes grant broad discretion to these agencies to decide how and whether to lease federal lands for fossil fuel development, and the agencies can and must account for environmental effects when making decisions about the location and amount of lands made available for leasing.[35]

The federal government also has considerable authority over the construction of infrastructure that is used to transport fossil fuels to domestic and international markets. The Federal Energy Regulatory Commission ("FERC") has authority over the siting, construction, and operation of interstate natural gas pipelines, liquified natural gas ("LNG") export terminals, and associated infrastructure such as liquefaction facilities.[36] In addition, Department of Energy ("DOE") authorization is required for LNG exports.[37] The Surface Transportation Board ("STB") has exclusive licensing authority over the construction and operation of rail lines, which are the primary mode of transport for coal.[38] The federal government does not have equivalent authority over the construction of oil pipelines—however, such pipelines frequently require federal approvals that trigger NEPA requirements.[39] The statutes authorizing these agencies to approve this infrastructure also require consideration of environmental impacts and the responsible agencies have broad discretion to deny approvals based on environmental impacts or other issues pertaining to the public interest.[40]

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[34] Which agency oversees fossil fuel leasing depends on where the leasing occurs. For a more detailed discussion, see ADAM VANN, CONG. RESEARCH SERV., R40806, ENERGY PROJECTS ON FEDERAL LANDS: LEASING AND AUTHORIZATION 4–12 (2012); Burger & Wentz, *supra* note 11, at 116–26.

[35] *See* VANN, *supra* note 34, at 4–12; Burger & Wentz, *supra* note 11, at 116–26.

[36] LAWRENCE R. GREENFIELD, AN OVERVIEW OF THE FEDERAL ENERGY REGULATORY COMMISSION AND FEDERAL REGULATION OF PUBLIC UTILITIES 10 (June 2018), https://www.ferc.gov/about/ferc-does/ferc101.pdf [https://perma.cc/G62N-8U76].

[37] *Liquified Natural Gas (LGE)*, DEP'T ENERGY, https://www.energy.gov/fe/science-innovation/oil-gas/liquefied-natural-gas [https://perma.cc/R2G3-RVWA] (last visited Dec. 3, 2019).

[38] 49 U.S.C. § 10901 (2012) (establishing that a person may construct or add to railroad lines only if authorized by the Board).

[39] *See, e.g.*, 33 U.S.C. § 1344(a) (2012) (requiring a permit under Clean Water Act section 404 for any project that involves the discharge of dredged and/or fill materials into navigable waters, tributaries, and adjacent wetlands); *see also* 33 U.S.C. § 403 (2012) (requiring a Rivers and Harbors Act section 10 permit for projects that involve construction and/or dredge and fill activities in the navigable waters of the United States).

[40] *See* Burger & Wentz, *supra* note 11, at 119–21.

### *C. NEPA Requirements for Assessing Impacts of Fossil Fuel Supply Projects*

NEPA establishes a procedural framework for assessing the environmental impacts of federal proposals and using those assessments to make better-informed decisions about whether and how to proceed with those proposals.[41] The statute recognizes that it is "the continuing responsibility of the Federal Government to use all practicable means" to "improve and coordinate" federal activities such that the nation may "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations."[42] To effectuate this policy, it requires federal agencies to prepare a detailed environmental impact statement ("EIS") for proposals that significantly affect the quality of the human environment, in which the agency must evaluate the environmental effects of the proposal and reasonable alternatives.[43] The statute also establishes a Council on Environmental Quality ("CEQ"), which is responsible for issuing regulations and guidance on the implementation of NEPA.[44] The CEQ regulations and guidance are supplemented by agency-specific rules and procedures for NEPA reviews.[45]

The Supreme Court has interpreted NEPA's mandates as "essentially procedural" because NEPA does not require agencies to adopt any particular course of action based on the outcome of the review,[46] but has

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[41] Much has already been written on NEPA's sweeping environmental policies and review requirements. *See, e.g.*, Ted Boling, *Making the Connection: NEPA Processes for National Environmental Policy*, 32 WASH. U. J.L. & POL'Y 313, 314–20 (2010); Bradley Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance*, 102 COLUM. L. REV. 903, 909–16 (2002).

[42] 42 U.S.C. § 4331(b) (2006).

[43] 42 U.S.C. § 4332(C).

[44] NEPA does not expressly state that CEQ shall develop implementing regulations for NEPA. Rather, CEQ's authority to issue regulations under NEPA is based on the duties and functions outlined in Title II of NEPA, as well as two Executive Orders. *See* 42 U.S.C. § 4344(3) (directing CEQ to "review and appraise" federal programs and activities to determine the extent to which they fulfill the statute's stated policy, and to make recommendations to the President with respect thereto); Exec. Order No. 11,514, 35 Fed. Reg. 4248 (Mar. 7, 1970); Exec. Order No. 11,991, 42 Fed. Reg. 26,967 (May 24, 1977). Courts have consistently deferred to CEQ's interpretation of NEPA. *See, e.g.*, Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 355 (1989) (CEQ regulations are entitled to "substantial deference"); *see also* Andrus v. Sierra Club, 442 U.S. 347, 358 (1979).

[45] *Agency NEPA Implementing Procedures*, CEQ, https://ceq.doe.gov/laws-regulations/agency_implementing_procedures.html [https://perma.cc/7AHP-7X7C] (last visited Dec. 3, 2019).

[46] Strycker's Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223, 227–28 (1980); Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 588 (1978).

also recognized that NEPA serves an "action-forcing" function and its procedural mandates must be interpreted in light of its twin aims of preventing uninformed agency decisions and providing adequate disclosure to allow public participation in those decisions.[47] Thus, when assessing the adequacy of NEPA documentation, courts must consider whether an agency has overlooked or underestimated an important environmental impact that is of consequence to the public's understanding of the proposal and the agency's decision about whether and how to proceed with the proposal.[48]

Below, we summarize NEPA procedures and some of the core requirements pertaining to the scope and adequacy of environmental reviews, highlighting areas that are of particular relevance to the analysis of fossil fuel supply projects and their contribution to climate change. We focus on the requirements outlined in CEQ regulations, as these apply to all federal projects. We also briefly touch on some aspects of CEQ's 2016 guidance on climate change and NEPA reviews,[49] which was rescinded by President Trump,[50] as well as the new draft guidance that CEQ issued in June 2019 to take its place.[51] Although the 2016 guidance is no longer in effect,[52] it provides some useful insights into how CEQ interpreted NEPA requirements in the past and contains relatively specific instructions to agencies on how to meaningfully account for and assess the significance of GHG emissions. The 2019 draft guidance, in comparison, contains a number of provisions which appear aimed at limiting NEPA disclosures of GHG emissions and climate change impacts, but in many cases these provisions are too vague to provide meaningful direction, and in many cases merely restate existing law.[53]

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[47] *Methow Valley Citizens*, 490 U.S. at 349. *See also* Marsh v. Or. Nat. Res. Council, 490 U.S. 360, 371 (1989) (referring to "the Act's manifest concern with preventing uninformed action").

[48] *Methow Valley Citizens*, 490 U.S. at 349.

[49] Memorandum from the Council of Environmental Quality on Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 1, 2016), https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf [https://perma.cc/Y9Z7-FE46] [hereinafter CEQ, Final Guidance Memo].

[50] Exec. Order No. 13,783, 82 Fed. Reg. 16,093 (Mar. 31, 2017).

[51] CEQ, Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emission, 84 Fed. Reg. 30,097 (June 26, 2019) [hereinafter CEQ, 2019 Draft GHG Guidance].

[52] Exec. Order No. 13,783, *supra* note 50.

[53] For example, the draft guidance directs agencies to quantify emissions where they are "substantial enough to warrant quantification" (presumably seeking to curtail quantification)

### 1. NEPA Procedures and Documentation Types

There are three types of documentation that can be used to demonstrate compliance with NEPA. The EIS is the most comprehensive form of documentation and, as provided in the statute, it is required for any major federal action that has significant environmental impacts.[54] If an agency is unsure about whether an action will have significant environmental impacts, it may prepare an environmental assessment ("EA")—a shorter document used to identify potentially significant impacts.[55] Based on the EA, the agency must either proceed with the preparation of a full EIS or issue a finding of no significant impact ("FONSI").[56] The regulations also permit agencies to designate categorical exclusions ("CEs") for categories of actions which the agency has determined "do not individually or cumulatively have a significant effect on the human environment" and thus do not require preparation of an EIS or EA.[57]

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without providing any guidance on what is meant by "substantial enough" in this context. CEQ, 2019 Draft GHG Guidance, *supra* note 51. It also tells agencies that impacts should be "discussed in proportion to their significance" and tells agencies that they "need not give greater consideration to potential effects from GHG emissions than to other potential effects on the human environment." *Id.* This is simply a restatement of NEPA requirements: agencies need not give greater consideration to any particular type of effect as a general matter, but they must conduct a more in-depth analysis of potentially significant impacts. For more on this topic, see Jessica Wentz, *New Draft Guidance on Climate Change and NEPA Reviews Unlikely to Significantly Affect Agency Practice or Judicial Interpretation of NEPA Obligations*, CLIMATE LAW BLOG (June 24, 2019), http://blogs.law.columbia.edu/climatechange/2019/06/24/new-draft-guidance-on-climate-change-and-nepa-reviews-unlikely-to-significantly-affect-agency-practice-or-judicial-interpretation-of-nepa-obligations/ [https://perma.cc/Y92G-ACPU].

[54] 40 C.F.R. §§ 1501.7, 1502.9, 1505.2 (2019) (preparing an EIS involves three steps: a scoping phase, where public input on the scope of the review is solicited; a draft EIS which is made available for public comment; and a final EIS which is published along with a record of decision (ROD) indicating the course of action that the agency intends to take); 40 C.F.R. §§ 1501.4(b), 1501.4(e)(1) (The regulations are less explicit about the process for preparing an EA—they state that the agency "shall involve environmental agencies, applicants, and the public, to the extent practicable" when preparing EAs, and that FONSIs must be made available to the affected public); 40 C.F.R. § 1506.6 (The regulations also contain some general provisions pertaining to public involvement, such as a requirement to "[m]ake diligent efforts to involve the public in preparing and implementing their NEPA procedures.").

[55] *See* 40 C.F.R. § 1508.9; *see also National Environmental Policy Act Review Process*, EPA, https://www.epa.gov/nepa/national-environmental-policy-act-review-process [https://perma.cc/4MU3-YGNN] (last updated Jan. 24, 2017).

[56] 40 C.F.R. §§ 1501.4(e), 1508.13.

[57] 40 C.F.R. § 1508.4.

2. Scope of Analysis: Actions, Impacts, and Alternatives

The CEQ regulations outline the proper scope of analysis for NEPA reviews—that is, the "range of actions, alternatives, and impacts to be considered" in a single impact statement.[58]

a. Scope of Impacts

First, regarding the scope of impacts, agencies must consider three types of impacts: (i) direct effects, which are "caused by the action and occur at the same time and place"; (ii) indirect effects, which are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable"; and (iii) cumulative effects, which result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions."[59]

For proposals that involve fossil fuel supply infrastructure, direct emissions would include emissions from vehicles and equipment used to construct the infrastructure as well as emissions generated from the operation of the infrastructure (e.g., methane emissions from coal mining).[60] Indirect emissions from fossil fuel extraction proposals would include downstream emissions from the eventual transport, processing, and combustion of the produced fossil fuels, and indirect emissions from fossil fuel transport proposals would include not only downstream emissions but also upstream emissions from the production of the transported fuel.[61]

As for the requirement to evaluate cumulative effects—there are two ways that this could be interpreted in the context of a GHG assessment for fossil fuel supply projects. One interpretation is that the impacts of climate change (e.g., sea level rise) qualify as cumulative effects of the proposal, since these impacts will occur when the proposal's GHG emissions are added to all other past, present, and reasonably foreseeable GHG emissions. Certainly, a general description of climate change impacts could be useful to decision makers and the public, but this type of analysis does

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[58] 40 C.F.R. § 1508.25.
[59] 40 C.F.R. §§ 1508.7, 1508.8.
[60] CEQ, Final Guidance Memo, *supra* note 49.
[61] *See* Burger & Wentz, *supra* note 11, at 142–43, 149; *infra* Part II; *see also* CEQ, Final Guidance Memo, *supra* note 49, at 13–14, 16. There are other emissions which may qualify as indirect effects of fossil fuel supply projects, such as the emissions from induced vehicle trips that occur offsite (e.g., worker commutes), but for the purposes of this Article we focus on upstream and downstream emissions.

not provide much insight on the specific action under review.[62] Another interpretation, which would likely generate more useful data for decision-making on fossil fuel supply proposals, is that NEPA requires consideration of the cumulative emissions from other reasonably foreseeable actions affecting fossil fuel supply—for example, the cumulative effects analysis for a coal leasing proposal should encompass cumulative emissions from all federal coal leasing in the state, region, and/or nation. This second interpretation is consistent with the CEQ's guidance on cumulative effects analysis which directs agencies to consider activities that are of a similar nature or that have similar environmental effects when setting boundaries for this analysis.[63]

b. Scope of Actions

Agencies must consider three types of "related actions" when determining the scope of an EIS: connected actions, cumulative actions, and similar actions. Actions are considered "connected" if they: (i) automatically trigger other actions which may require EISs, (ii) cannot or will not proceed unless other actions are taken previously or simultaneously, or (iii) are independent parts of a larger action and depend on the larger action for their justification.[64] Such connected actions are "closely related and therefore *should* be discussed in the same impact statement."[65] Cumulative actions are those that "when viewed with other proposed actions have cumulatively significant impacts" and like connected actions, they should be discussed in the same impact statement.[66] Similar actions are

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[62] CEQ, 2019 Draft GHG Guidance, *supra* note 51. CEQ's 2019 revised draft guidance endorses this approach, stating that agencies may satisfy the requirement to evaluate cumulative effects by: (i) comparing the project's GHG emissions to local, regional, national, or sector-wide emissions, and (ii) providing a qualitative summary of the effects of GHG emissions. This may be sufficient for some types of proposals. However, as discussed in Section II.B, more may be required in the context of fossil fuel supply projects. There are at least two recent decisions in which courts have required quantification of cumulative emissions from federal fossil fuel-related approvals in this context. *See* WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 53 (D.D.C. 2019); Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561, 590 (D. Mont. 2018) (requiring the Department of State to disclose emissions from the Alberta Clipper pipeline as part of its cumulative effects analysis for the Keystone XL pipeline).

[63] CEQ, CONSIDERATION OF CUMULATIVE EFFECTS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 13 tbl. 2-1 (1997).

[64] 40 C.F.R. § 1508.25(a)(1).

[65] *Id.* (emphasis added).

[66] *Id.* § 1508.25(a)(2).

those which "have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography."[67] The regulations state that "[a]n agency may wish to analyze these actions in the same impact statement" but that an agency "*should* do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement."[68]

The regulations also prohibit improper segmentation of proposals. One provision specifies that "[p]roposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action *shall* be evaluated in a single impact statement."[69] Reinforcing this point the section of the regulations which deals with significance determinations states that an agency cannot break down an action into "small component parts"—or improperly segment an action—in order to avoid a determination that the action will have a significant effect on the environment.[70]

There is overlap between the requirement to review "indirect impacts" and impacts from "connected actions." Consider a situation where the federal government is simultaneously reviewing a coal lease application and a proposal to construct a railway to transport the coal from the mine to end-users (or an existing rail system). The emissions from the railway would qualify as "indirect effects" of the coal mine and vice versa, and both actions would also qualify as "connected actions" that lack independent utility and should thus be reviewed in a single NEPA document (even if two different agencies are responsible for the approvals). However, if there is no pending federal action for a connected activity, the proper approach would be to analyze the emissions from the nonfederal activity as indirect effects of the federal action.

There is also overlap between the requirement to review "cumulative effects" and the requirement to review impacts from cumulative and similar actions. For example, an agency could treat emissions from multiple fossil fuel leasing decisions as cumulative effects in the EIS for an individual leasing proposal, or it could prepare a single EIS to evaluate those leasing decisions as cumulative and/or similar actions. Again,

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[67] *Id.* 1508.25(a)(3).
[68] *Id.* (emphasis added).
[69] 40 C.F.R. § 1502.4 (emphasis added).
[70] 40 C.F.R. § 1508.27(7). The regulations are not explicit about the relationship between the prohibition on improper segmentation and the requirement to consider "related actions" under section 1508.25. One plausible interpretation is that actions which qualify as "connected actions" under section 1508.25 are "related . . . closely enough to be, in effect, a single course of action."

the best approach depends on whether there are multiple federal proposals simultaneously under review by an agency.

c. Scope of Alternatives

Finally, regarding the scope of alternatives, agencies must consider alternatives which include a no action alternative, other reasonable courses of action, and mitigation measures (not in the proposed action).[71] The regulations further provide that the analysis of alternatives is the "heart of the environmental impact statement" and that this analysis "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public."[72] In addition, agencies must "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[73]

In NEPA reviews for fossil fuel supply projects, the alternatives analysis can and in many cases should be used to evaluate the merits of different fossil fuel development and transportation scenarios. For example, when preparing an EIS for a resource management plan ("RMP") under which federal lands may be opened for fossil fuel development, an agency must consider different leasing scenarios (with different acreage and levels of production) as well as different land uses and approaches to meeting energy demand (e.g., renewable energy development) in addition to the "no action" alternative.[74] This is precisely the sort of analysis that would facilitate an informed decision about the best uses of public lands.

Agencies may also compare fossil fuel production and consumption scenarios under the proposal and the no action alternative to estimate the net impact of the proposal on fossil fuel use and corresponding emissions. The underlying assumption is that energy demand will be met through other sources (energy substitutes) if the proposal is not approved, and these energy substitutes will also generate emissions when they are produced, transported, and consumed. Thus, the emissions from energy substitutes under the no action alternative can be subtracted from the proposal's gross emissions in order to reach an estimate of net emissions.

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[71] 40 C.F.R. § 1508.25(b).
[72] 40 C.F.R. § 1502.14.
[73] *Id.*
[74] 40 C.F.R. § 1508.25.

Alternatively, if an agency finds that there is too much uncertainty to model the effects on energy markets, it could rely on estimates of gross indirect emissions to measure the proposal's contribution to climate change.[75]

3. Significance and Mitigation

The regulations also contain additional instructions on how agencies should go about analyzing environmental impacts and their significance. EISs should be "analytic rather than encyclopedic" and impacts should "be discussed in proportion to their significance."[76] Agencies must discuss the significance of both direct and indirect effects, taking into account the context and intensity of the impact as well as other more specific considerations, such as whether the impact is highly uncertain or controversial and whether the action is related to other individually insignificant but cumulatively significant actions.[77] The regulations also address how agencies should handle missing or incomplete information about potentially significant environmental impacts, including indirect impacts. In these circumstances, agencies are required to obtain any missing information that is essential to a reasoned choice among alternatives, unless the costs of obtaining the information are exorbitant or the information is simply unavailable.[78]

Finally, the regulations call for consideration of mitigation approaches for impacts that are found to be significant. "Mitigation" is defined as:

> (a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and

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[75] *See infra* Section III.A.
[76] 40 C.F.R. § 1502.2.
[77] 40 C.F.R. §§ 1502.16, 1508.27.
[78] 40 C.F.R. § 1502.22(b). If an agency cannot obtain the missing information due to exorbitant costs or infeasibility, it must provide: (i) a statement that such information is incomplete or unviable, (ii) a statement of the relevance of the information, (iii) a summary of existing credible scientific evidence which is relevant to evaluating environmental impacts in the absence of such information, and (iv) the agency's evaluation of such impacts based on theoretical approaches or research methods generally accepted in the scientific community. *Id.*

> maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources or environments.[79]

Notably, while the regulations require *consideration* of such measures, NEPA and its implementing regulations do not contain a substantive requirement to actually implement mitigation measures for significant impacts.[80] Agencies, however, do have the authority to require mitigation of impacts as a condition of agency approvals; agencies also may require mitigation to avoid a determination of significant impacts and thereby avoid preparation of an EIS.[81]

No federal agency has yet established a threshold for what constitutes a "significant" GHG contribution, and the CEQ intentionally omitted such a threshold from the rescinded guidance.[82] That guidance did, however, contain a recommendation against using comparisons to overall GHG emissions as a basis for evaluating significance:

> [A] statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact. When considering GHG emissions and their significance, agencies should use appropriate tools and

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[79] 40 C.F.R. § 1508.20.
[80] *See* 40 C.F.R. §§ 1508.20, 1508.25, 1508.27.
[81] CEQ, Final Guidance for Federal Departments and Agencies on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3843 (Jan. 21, 2011).
[82] CEQ, Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, 79 Fed. Reg. 77,802, 77,807, 77,809–11 (Dec. 24, 2014) [hereinafter CEQ, 2014 Revised Draft Guidance].

> methodologies for quantifying GHG emissions and comparing GHG quantities across alternative scenarios. Agencies should not limit themselves to calculating a proposed action's emissions as a percentage of sector, nationwide, or global emissions in deciding whether or to what extent to consider climate change impacts under NEPA.[83]

There is no reason that the lack of a significance threshold should prevent agencies from reaching significance determinations for GHG emissions. Agencies frequently assess the significance of other impacts in the absence of predetermined significance thresholds.[84] And even if the exact threshold of significance for GHG emissions is unknown, there are circumstances in which an action's emissions obviously surpass any reasonable metric of significance when viewed in terms of social costs.[85]

### *D. Evolving Federal Policy and Practice on Fossil Fuels and NEPA Reviews*

Federal agencies have made important progress towards meaningful evaluation and disclosure of GHG effects in NEPA reviews for fossil fuel supply projects. Litigation has played an important role in driving such disclosures, but executive policies and guidance have also helped to shape agency practice. Here, we summarize some key policy developments that occurred under the Obama and Trump administrations and discuss how federal practice in this area has evolved over the past decade.

#### 1. Policy Developments Pertaining to Fossil Fuel Approvals and NEPA Reviews

The federal government has long supported fossil fuel production on federal lands and the expansion of fossil fuel transportation infrastructure.

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[83] CEQ, Final Guidance Memo, *supra* note 49, at 11. In contrast, CEQ's 2019 guidance recommends that agencies compare the proposal's emissions to local, regional, national, or sector-wide emissions as part of the cumulative effects analysis. *See supra* note 62. While such comparisons can provide useful information to decision makers and the public, agencies should not rely on these exclusively for the reasons articulated in the 2016 guidance.

[84] CEQ, 2014 Revised Draft Guidance, *supra* note 82 (examples of impacts for which agencies lack quantitative significance thresholds include impacts on public health, species and ecosystems, cultural resources, recreational values, and aesthetic values).

[85] *The true cost of carbon pollution: How the social cost of carbon improves policies to address climate change*, ENVTL. DEF. FUND, https://www.edf.org/true-cost-carbon-pollution [https://perma.cc/NHM6-HUFJ] (last visited Dec. 3, 2019).

During the Obama administration, federal agencies approved new coal, oil, and gas leases, as well as numerous oil and gas pipelines and LNG export terminals.[86] During Obama's second term the administration adopted several policies that signaled decreasing support for fossil fuels. First, the administration offered fewer new leases and less acreage for coal, oil, and gas development on federal lands and waters between 2012 and 2016.[87] Second, DOI Secretarial Order 3338 established a moratorium on federal coal leasing in 2016 accompanied by a commitment to prepare a programmatic EIS ("PEIS") for the federal coal leasing program.[88] One of the key issues to be addressed in the PEIS was the effect of the program on GHG emissions (including downstream emissions) and climate change.[89]

In addition to these leasing actions, the administration adopted the CEQ guidance on consideration of climate change in 2016 which, as noted above, directed agencies to account for upstream and downstream emissions in NEPA reviews for fossil fuel supply projects and to quantify those emissions where tools and data were available to do so.[90] The administration also adopted a number of other relevant policies and guidance, including federal metrics for estimating the social cost of GHG emissions,[91] department- and agency-specific guidance on accounting for

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[86] *See, e.g.*, *Oil and Gas Statistics*, U.S. BUREAU LAND MGMT., tbl. 3, https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics [https://perma.cc/62LE-A6FZ] (last visited Dec. 3, 2019) (BLM issued 7,297 oil and gas leases during President Obama's first term, and 3,997 oil and gas leases during his second term.).

[87] *Id. See also Coal Data: National Coal Statistics Table,* U.S. BUREAU LAND MGMT., https://www.blm.gov/programs/energy-and-minerals/coal/coal-data [https://perma.cc/74Q5-AXF7] (last visited Dec. 3, 2019).

[88] DEP'T OF THE INTERIOR, ORDER NO. 3338, DISCRETIONARY PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT TO MODERNIZE THE FEDERAL COAL PROGRAM 1, 8–9 (Jan. 15, 2016).

[89] U.S. BUREAU OF LAND MGMT., FEDERAL COAL PROGRAM PEIS—SCOPING REPORT, 17–23 (2017).

[90] CEQ, Final Guidance Memo, *supra* note 49. Other agencies, such as USFS and BLM, had also published or were developing their own guidance on accounting for climate change in NEPA reviews. *See, e.g.*, *Climate Change Considerations in Project Level NEPA Analysis*, U.S. FOREST SERV. (2009), https://www.fs.fed.us/emc/nepa/climate_change/includes/cc_nepa_guidance.pdf [https://perma.cc/M8A9-9G4X].

[91] *See* INTERAGENCY WORKING GRP. ON THE SOCIAL COST OF GREENHOUSE GASES, TECHNICAL SUPPORT DOCUMENT: TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866 (May 2013, revised Aug. 2016); *see also* INTERAGENCY WORKING GRP. ON THE SOCIAL COST OF GREENHOUSE GASES, ADDENDUM TO TECHNICAL SUPPORT DOCUMENT ON SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866: APPLICATION OF THE METHODOLOGY TO ESTIMATE THE SOCIAL COST OF METHANE AND THE SOCIAL COST OF NITROUS OXIDE (Aug. 2016) (These metrics were developed for cost-benefit analyses in rule-makings,

climate change in public land management,[92] and guidance on compensatory mitigation for adverse impacts arising from fossil fuel development and other extractive uses of public lands.[93]

The election of President Trump signaled a major shift in executive policy. The Trump administration made it a priority to support fossil fuel development and use under the mantra of "energy dominance."[94] In particular, the administration has taken measures to: (i) scale up fossil fuel production on federal lands and waters by expanding the areas available for leasing and removing regulatory barriers to the issuance of leases[95] and (ii) expedite the review of pipelines and other fossil fuel transportation infrastructure.[96] These supply-side actions are paired with actions

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but can also be utilized in project-level emission assessments and, as noted in Part III, some courts have required their use in the NEPA context.).

[92] *See, e.g.*, *Navigating the Climate Change Performance Scorecard*, U.S. FOREST SERV. (2011), https://www.fs.fed.us/climatechange/advisor/scorecard/scorecard-guidance-08-2011.pdf [https://perma.cc/L4WX-V5JS].

[93] *See generally* U.S. BUREAU OF LAND MGMT. MANUAL SECTION 1794—MITIGATION (Dec. 22, 2016); U.S. BUREAU OF LAND MGMT. MITIGATION HANDBOOK H-1794-1 (Dec. 22, 2016).

[94] *See About: Mission*, U.S. DEP'T INTERIOR, https://www.doi.gov/whoweare [https://perma.cc/GA7H-LLFN] (last visited Dec. 3, 2019) ("promot[ing] energy dominance" is the first major goal outlined for DOI).

[95] *See, e.g.*, Notice of Availability of the 2019–2024 Draft Proposed Outer Continental Shelf Oil and Gas Leasing Program and Notice of Intent to Prepare a Programmatic Environmental Impact Statement, 83 Fed. Reg. 829, 830 (Jan. 2018); *2017–2022 Outer Continental Shelf Oil and Gas Leasing: Proposed Final Program,* BUREAU OCEAN ENERGY MGMT. (Nov. 2016), https://www.boem.gov/2017-2022-OCS-Oil-and-Gas-Leasing-PFP/ [https://perma.cc/DU63-6T2D]; *Coastal Plain Oil and Gas Leasing EIS*, U.S. DEP'T INTERIOR (Sept. 2019), https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=152110 [https://perma.cc/74ZQ-E897] (In January 2018, BOEM issued a proposed National Outer Continental Shelf Oil and Gas Leasing Program for 2019–2024, which would make over 90 percent of the outer continental shelf ("OCS") available for future oil and gas exploration and development. In comparison with the 2019–2024 Draft, the 2017–2022 offshore leasing program (which would be superseded by this new program) put 94 percent of the OCS off-limits to oil and gas development. The Draft Proposed Program ("DPP") includes forty-seven potential lease sales in twenty-five of twenty-six planning areas—which, according to DOI, is the largest number of lease sales ever proposed for the OCS five-year lease schedule. The administration also took measures to expand leasing areas in the Arctic, and in December 2018, BLM issued a proposal for a Coastal Plain Oil and Gas Leasing Program in the Arctic National Wildlife Refuge ("ANWR") which would make up to 1.5 million acres of the ANWR open for oil and gas development. In March 2019, BLM lifted restrictions on mineral development on approximately nine million acres of sage grouse habitat, opening these previously protected areas for oil and gas leasing and other extractive uses. Many of these actions were challenged in court, and litigation was, at the time of this writing, still pending.).

[96] *See* JESSICA WENTZ & MICHAEL GERRARD, SABIN CTR. FOR CLIMATE CHANGE LAW,

aimed at lifting "downstream" restrictions on fossil fuel use, such as the emission standards for power plants and motor vehicles originally promulgated under the Obama administration.[97]

Some of the Trump administration's major executive actions affecting NEPA reviews for fossil fuel supply projects include:

- The issuance of multiple executive orders directing agencies to streamline approvals for fossil fuel leasing and energy infrastructure;[98]
- The revocation of the CEQ's 2016 guidance on climate change,[99] and promulgation of new draft guidance;[100]
- The revocation of the federal metrics developed for the social cost of carbon (SC-$CO_2$), methane (SC-$CH_4$) and nitrous oxide (SC-$N_2O$);[101] and
- The termination of the programmatic review of the federal coal leasing and the moratorium that had been put in place pending that review.[102]

Acting pursuant to these directives, DOI and its constituent agencies also adopted more specific policies and guidance aimed at expediting and curtailing reviews of coal, oil, and gas leases. For example, BLM issued an instruction memorandum to its field offices on January 31, 2018, which establishes a BLM policy "to simplify and streamline the leasing process [for oil and gas] to alleviate unnecessary impediments and burdens, to expedite the offering of lands for lease, and to ensure quarterly oil and gas lease sales are consistently held."[103] The instruction

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PERSISTENT REGULATIONS: A DETAILED ASSESSMENT OF THE TRUMP ADMINISTRATION'S EFFORTS TO REPEAL FEDERAL CLIMATE PROTECTIONS (2019); *see also* U.S. DEP'T OF THE INTERIOR, ECONOMIC REPORT: FY 2017 5 (Oct. 19, 2018), https://doi.sciencebase.gov/doidv/files/2017/pdf/FY%202017%20Econ%20Report.pdf [https://perma.cc/XJA2-ZKP7].

[97] WENTZ & GERRARD, *supra* note 96, at 39–40.

[98] Exec. Order No. 13,868, 84 Fed. Reg. 15,495 (Apr. 10, 2019); Exec. Order No. 13,867, 84 Fed. Reg. 15,491 (Apr. 10, 2019); Exec. Order No. 13,807, 82 Fed. Reg. 40,463 (Aug. 24, 2017); Exec. Order No. 13,795, 82 Fed. Reg. 20,815 (May 3, 2017).

[99] Exec. Order No. 13,783, *supra* note 50.

[100] CEQ, 2019 Draft GHG Guidance, *supra* note 51.

[101] Exec. Order No. 13,783, *supra* note 50.

[102] DEP'T OF THE INTERIOR, ORDER NO. 3348, CONCERNING THE FEDERAL COAL MORATORIUM 1 (Mar. 29, 2017).

[103] Instruction Memorandum No. 2018-034: Updating Oil and Gas Leasing Reform from the Deputy Director of the Bureau of Land Mgmt. to all field officials 1 (Jan. 31, 2018),

memorandum reduces the amount of time that BLM field offices have to review environmental impacts and receive public feedback. It limits the time frame for parcel review for a specific lease sale to six months and limits the amount of time allotted for public protest of lease sales to ten days after notice is posted.[104] It also seeks to eliminate opportunities for public review and disclosure of environmental impacts from oil and gas development on public lands.[105]

These policy changes have resulted in more fossil fuel production on federal lands. DOI announced that the revenue generated from oil and gas lease sales on public lands in 2018 was nearly triple that of the next highest grossing year on record.[106] Granted, coal production and use continued to decline in 2018, but the emissions reduction benefits of declining coal use were more than offset by increased emissions from oil and gas, and both oil and gas production are projected to increase significantly over the next decade.[107] The administration also approved several major coal mining leases that could affect coal prices and consumption in the years ahead.[108] This situation seems untenable at a time when fossil fuel use needs to be phased out rapidly. The duration of these leasing plans and anticipated lifetime of these transportation projects range from ten years to several decades or more—considerably longer than the time frame in which fossil fuels need to be phased out.[109]

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https://www.blm.gov/policy/im-2018-034 [https://perma.cc/WH4L-RVVL] [hereinafter BLM, Memo No. 2018-034]. The U.S. Forest Service has also signaled its intent to modify its regulations in order to streamline and expedite the issuance of oil and gas permits on National Forest lands. *See* Oil and Gas Resources, 83 Fed. Reg. 46,458 (Sept. 13, 2018).

[104] BLM, Memo No. 2018-034, *supra* note 103.

[105] *Id.*

[106] Press Release, U.S. Dep't of the Interior, Energy Revolution Unleashed: Interior Shatters Previous Records with $1.1 Billion in 2018 Oil and Gas Lease Sales (Feb. 6, 2019), https://www.doi.gov/news/energy-revolution-unleashed-interior-shatters-previous-records-11-billion-2018-oil-and-gas [https://perma.cc/4YN6-TXDH].

[107] Kate Wheeling, *U.S. Oil Production is Set to Rise As Experts Say Fossil Fuels Need to be Phased Out,* PAC. STANDARD (Jan. 16, 2019), https://psmag.com/environment/us-oil-production-is-set-to-rise-as-experts-say-fossil-fuels-need-to-be-phased-out [https://perma.cc/5942-UUZX].

[108] Press Release, U.S. Dep't of the Interior, The War on Coal is Over: Interior Announces Historic Coal Projects in Utah (Feb. 14, 2019), https://www.doi.gov/pressreleases/war-coal-over-interior-announces-historic-coal-projects-utah [https://perma.cc/W4ZF-LWEH].

[109] Press Release, U.S. Dep't of the Interior, Energy Revolution Unleashed: Interior Shatters Previous Records with $1.1 Billion in 2018 Oil and Gas Lease Sales (Feb. 6, 2019), https://www.doi.gov/news/energy-revolution-unleashed-interior-shatters-previous-records-11-billion-2018-oil-and-gas [https://perma.cc/5Y3X-JGPB].

It is within this policy context that federal agencies must now conduct NEPA reviews for fossil fuel supply projects. As discussed below, agency practice on GHG analysis and disclosures has improved in many respects—in particular, agencies are more transparent about the downstream emissions from combustion of fossil fuels in NEPA reviews for fossil fuel leasing proposals—and there has not been significant "backtracking" during the Trump administration. This is a testament to the power of litigation and the importance of court decisions. The Trump administration's 2019 revised draft guidance on climate change and NEPA reviews is unlikely to significantly affect agency practice or judicial review in this context, in part for reasons noted above (the guidance is very vague and primarily a restatement of existing law) and in part because it would only be entitled to Skidmore deference.[110]

2. Trends in NEPA Practice

Between 2009 and 2016, federal agencies began to account for GHG emissions in NEPA reviews for land management plans and leases authorizing fossil fuel extraction from federal lands and waters.[111] However, many of these proposals were approved without a meaningful assessment of indirect emissions from the transport, processing and use of the produced fuels, or cumulative emissions from multiple leasing decisions.[112] Some agencies did recognize that downstream emissions—particularly emissions from the combustion of produced fuels—qualified as "indirect effects" and quantitative disclosures of combustion emissions became increasingly common during this period.[113] But practice varied considerably both across and within agencies, resulting in inconsistencies across NEPA documentation.[114]

In some documents, agencies would argue that authorizing fossil fuel production on federal lands would have no actual effect on fossil fuel

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[110] When a court reviews agency guidance documents, the agency's interpretation is entitled to "respect proportional to its power to persuade" in light of the agency's "thoroughness, logic, and expertness, its fit with prior interpretations, and any other sources of weight." United States v. Mead Corp., 533 U.S. 218, 235 (2001) (citing Skidmore v. Swift & Co., 323 U.S. 134, 140 (1944)).

[111] See Burger & Wentz, *supra* note 11, for a more detailed discussion of how federal agencies were accounting for indirect GHG emissions in their NEPA documentation during this period.

[112] *Id.*

[113] *Id.*

[114] *Id.*

consumption and downstream emissions because other sources of coal, oil, or gas would be extracted and used at the same rates if the federal proposals were not approved (an argument that is often referred to as "perfect substitution").[115] In effect, agencies were claiming that the GHG impact would be identical under both the proposed action and the no action alternative. The problem with this approach was that it ignored potential effects of production projects on fossil fuel prices and demand.

There were similar inconsistencies in NEPA reviews of fossil fuel transportation infrastructure. The State Department, DOE, and U.S. Army Corps of Engineers ("USACE") discussed upstream and downstream emissions as potential indirect effects in some of the NEPA documentation prepared for these projects.[116] However, FERC—which conducted the largest number of reviews due to its authority over natural gas pipelines and export terminals—consistently maintained that upstream and downstream emissions did not qualify as indirect effects of its approvals because: (i) the approvals were not the legally relevant cause of those emissions, and (ii) even if there was a causal relationship, the emissions were too speculative to estimate.[117] Granted, other agencies made similar arguments in some of their NEPA documentation (and when defending those documents in court)[118] but none had as firm a policy on the issue as FERC.

Even with the inconsistencies in agency practice, there was a clear trend towards greater disclosure of indirect emissions during this period.[119] This up-tick in federal disclosures was driven, at least in part, by litigation. By 2017, over a dozen lawsuits had been filed challenging the approval of fossil fuel leasing and pipeline proposals because the lead agency failed to adequately consider upstream and/or downstream greenhouse gas emissions in its NEPA review.[120] The critical question in most of these cases was whether such upstream and downstream emissions qualified as indirect effects of these proposals.[121] In early decisions involving NEPA reviews for fossil fuel leasing, courts made it clear that downstream emissions from the consumption of the fossil fuels that would be extracted under the lease qualified as indirect effects under NEPA, and that agencies should quantify those emissions wherever tools and

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[115] *Id.*
[116] *See, e.g.*, U.S. DEP'T OF STATE, FINAL SUPPLEMENTAL EIS, KEYSTONE XL (2014) § 1.4 ("Market Analysis"); Burger & Wentz, *supra* note 11, at Part II.
[117] *See* Burger & Wentz, *supra* note 11, at 137.
[118] *See id.*
[119] *See id.*
[120] *Id.*
[121] *Id.*

data were available to do so.[122] Courts also rejected perfect substitution arguments as a basis for ignoring downstream emissions from leasing.[123] The issue was not so clearly resolved in early decisions involving fossil fuel transportation projects—some courts required disclosure of upstream and/or downstream emissions; others did not.[124] That issue continues to be litigated.[125]

The litigation has led to a shift in agency practice, at least for proposals involving fossil fuel production. For the most part, agencies overseeing fossil fuel production no longer argue perfect substitution as the grounds for ignoring downstream emissions.[126] Instead, agencies sometimes provide a quantitative estimate of downstream emissions (often limited to combustion emissions) accompanied by a qualitative statement about how the actual (net) emissions from the proposal will be much lower as a result of energy substitution under the no action alternative.[127] In that context, agencies may conclude that it is impossible to measure the actual effect of the proposal on climate change, and thus there is no significance determination or discussion of mitigation measures.[128] Another approach, more common for major leasing proposals, is to use energy market models to compare emissions from fossil fuels produced under the proposal with emissions from energy substitutes under the no action alternative to generate an estimate of net emissions.[129] While this approach seems reasonable in theory, there are potential problems in practice. The model results are dependent on parameters (i.e., assumptions about

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[122] *See id.*

[123] Burger & Wentz, *supra* note 11, at 152.

[124] *Id.*

[125] See *infra* Section II.A. At the time of this writing, there is no case invalidating an EIS for failure to consider upstream emissions, but there are cases upholding EISs because they properly accounted for upstream emissions. Whether quantification is required under NEPA depends on whether tools and data are available to do so.

[126] *See* Burger & Wentz, *supra* note 11, at 152.

[127] *Id.*

[128] *See, e.g.*, U.S. FOREST SERV., SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT, FEDERAL COAL LEASE MODIFICATIONS COC-1362 & COC-67232 at 128 (2017):

> All that can be gleamed from this analysis is that relative to the alternatives themselves, the no action produces the least amount of incremental GHG increases. This does not however translate directly into climate change impact reductions due to the complexities involved with estimating the coal supply market responses to current demand, current fuel substitution transitions to non-coal fuels (beyond the scope of this analysis), and how other governments and sectors of the global economy implement or fail to implement GHG emissions reduction strategies.

[129] Burger & Wentz, *supra* note 11, at 179.

energy resources, price elasticity, and demand) that are highly uncertain and can be manipulated to achieve an intended result.[130] But these are not necessarily insurmountable problems. Agencies can address uncertainty by using multiple scenarios in their energy market analysis (e.g., with different assumptions about energy prices and elasticity) and they can address concerns about integrity and data manipulation by being transparent about the assumptions underpinning their analysis.

As for transportation infrastructure: starting in 2016, FERC started to include increasing amounts of information on upstream and downstream GHG emissions in its pipeline orders.[131] This appeared to be driven by the Obama administration's policy and guidance on NEPA reviews as well as case law requiring disclosure of downstream emissions in other contexts. But FERC placed caveats on this information and analysis—for example, in one EIS where FERC quantified downstream emissions from a pipeline approval pursuant to a D.C. Circuit Court order, FERC claimed that it could not use the quantified downstream GHG emission estimates to evaluate the proposal "[b]ecause the No Action Alternative could result in lesser, equal, or greater GHG emissions" than the scenario in which the pipeline is approved.[132] FERC has also asserted that natural gas pipelines would likely decrease emissions (due to fuel switching from coal to gas) without conducting any analysis to support this conclusion.[133] In 2018, FERC announced that it would no longer even quantify downstream or upstream emissions for most pipeline orders because the effect of pipeline approvals on upstream and downstream emissions was not reasonably foreseeable and therefore not an indirect or cumulative effect that must be evaluated under NEPA.[134]

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[130] *Id.*

[131] *See* Dominion Transmission, Inc., 163 FERC ¶ 61,128 (LaFleur, dissenting).

[132] FERC, FINAL SUPPLEMENTAL EIS, SOUTHEAST MARKET PIPELINES PROJECT, EIS 0279F at 9 (2018).

[133] *See, e.g.*, Petitioners' Joint Opening Brief at 20, Allegheny Def. Project v. FERC, No. 17-1098 (D.C. Cir. Mar. 9, 2018).

[134] Dominion Transmission, Inc., *supra* note 131; Gavin Bade, *Divided FERC restricts climate impacts in pipeline reviews,* UTILITY DIVE (May 18, 2018), https://www.utilitydive.com/news/divided-ferc-restricts-climate-impacts-in-pipeline-reviews/523892/ [https://perma.cc/7448-HSAX]. FERC came under considerable scrutiny for this policy and many of its pipeline approvals are currently being challenged in court. Moreover, two of the five FERC commissioners—Cheryl LaFleur and Richard Glick—dissented with the order establishing the policy on the grounds that downstream and upstream emissions do qualify as indirect or cumulative impacts of pipeline approvals. Dominion Transmission, Inc., *supra* note 131. Commissioner Glick characterized FERC's position as a "remarkably narrow view of its responsibilities under NEPA" and Commissioner LaFleur

There are also some trends which have become prevalent in NEPA reviews for all types of fossil fuel supply proposals. One example is that federal agencies are refusing to disclose social costs of emissions on the grounds that such a cost disclosure is neither required by NEPA nor helpful to decision makers.[135] Another example relates to significance determinations for GHG emissions.[136] The NEPA documentation for both production and transportation projects often contains no discussion (or only a limited discussion) of the significance criteria outlined in the regulations.[137] Instead, the significance "analysis" may entail a comparison of emissions to state, national, or global totals (contrary to the recommendations in the rescinded CEQ guidance), a statement about uncertainty due to energy market substitution, and/or a statement about how there is no significance threshold for GHG emissions and thus no way of defining significance. Based on this cursory analysis, agencies either conclude that emissions are insignificant or do not reach a conclusion on the matter.[138] We are not aware of *any* EIS in which an agency has concluded that emissions from fossil fuel production or transportation qualify as a "significant" impact, even in the context of proposals that would generate millions of tons of GHGs.[139] It also appears that agencies are heavily relying on EAs and FONSIs for oil and gas lease approvals, and hundreds (possibly thousands) of oil and gas leases have been approved based on FONSIs in the past two years.[140]

As federal policies and agency practice have changed, so too has the focus of litigation on the adequacy of the GHG analysis for fossil fuel

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noted that FERC's position was in direct conflict with the D.C. Circuit's interpretation of what NEPA required. *Id.* Commissioner Cheryl LaFleur announced that she would depart from the commission's policy and consider upstream and downstream emissions in her review and consider the broad climate impacts of new natural gas infrastructure when voting on whether to approve new projects. *Id.*; *see also* ROMANY WEBB, SABIN CTR. FOR CLIMATE CHANGE LAW, CLIMATE CHANGE, FERC, AND NATURAL GAS PIPELINES: THE LEGAL BASIS FOR CONSIDERING GREENHOUSE GAS EMISSIONS UNDER SECTION 7 OF THE NATURAL GAS ACT 4 (2019) (finding that FERC rarely considers climate change effects when deciding whether to approve pipeline projects).

[135] WEBB, *supra* note 134, at 30.

[136] *Id.*

[137] *Id.*

[138] *Id* at 44.

[139] *See* MADELEINE SIEGEL & ALEXANDER LOZNAK, SABIN CTR. FOR CLIMATE CHANGE LAW, SURVEY OF GREENHOUSE GAS CONSIDERATIONS IN FEDERAL ENVIRONMENTAL IMPACT STATEMENTS AND ENVIRONMENTAL ASSESSMENTS FOR FOSSIL FUEL–RELATED PROJECTS, 2017–2018 at 2–3 (2019).

[140] *See id.* at 15–16.

supply projects. There are still many lawsuits involving an agency's failure to disclose certain categories of emissions—particularly indirect emissions, cumulative emissions, and emissions from related actions. We discuss these cases involving the proper scope of analysis in Part II. There are also a number of lawsuits that address questions related to the mode or adequacy of analysis—e.g., whether the analysis itself is technically sound, supported by the record, and consistent with the requirements of NEPA regulations. The critical questions include:

- What are reasonable assumptions about energy market impacts, energy substitutions, the "net" effect of the proposal on fossil fuel production and consumption (and the corresponding emissions)?
- How should an agency go about assessing the significance of emissions? Must agencies use tools such as social cost estimates or a global carbon budget to better understand the severity of the emissions impact?
- What is required in terms of assessing alternatives and mitigation for GHG emissions?

We discuss these questions on the mode of analysis in Part III.

## II. THE REQUIRED SCOPE OF GHG EMISSIONS DISCLOSURE FOR FOSSIL FUEL SUPPLY PROJECTS

In this section we propose answers to various aspects of two key questions: (1) To what extent and under what circumstances must agencies account for upstream and downstream emissions from other activities on the supply chain for the fuels that will be produced or transported as a result of federal approvals? and (2) To what extent must agencies account for cumulative emissions of multiple fossil fuel leasing and/or transportation approvals in their NEPA reviews for fossil fuel supply projects? Most of the case law to date focuses on whether such emissions qualify as indirect or cumulative impacts of federal proposals, but some decisions grapple with other aspects of NEPA, such as whether multiple fossil fuel–related approvals constitute "related actions" that must be reviewed jointly, and whether the required scope of disclosure is different when an agency has prepared an EA and has found no significant impact on GHG emissions.

### *A. Upstream and Downstream Emissions from Fossil Fuel Supply Projects*

There are two regulatory requirements that may provide the basis for evaluating disclosure of upstream and/or downstream emissions in this context: the requirement to evaluate indirect effects and the requirement to evaluate the effects of connected actions. We discuss each approach in turn.[141]

#### 1. Upstream and Downstream Emissions as Indirect Impacts

Indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[142] They include "growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[143] A sufficient causal connection exists if the proposed action is a cause-in-fact of the impact (i.e., the impact would not occur but for the proposed action) and if there is a "reasonably close causal relationship akin to proximate cause in tort law."[144] An impact is "reasonably foreseeable" if it is "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision."[145] Examples of factors relevant to this analysis include the likelihood of the impact, the utility of the information to the decision maker, and whether the absence of such information now would foreclose its consideration later.[146]

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[141] There are also some cases in which agencies, parties, and courts have treated these as "cumulative emissions"—but characterizing upstream and downstream emissions as cumulative effects fails to account for the causal relationship between the production of fossil fuels or expansion of transport infrastructure and the eventual use of those fuels. As discussed below, courts have found that this causal relationship is sufficient to characterize these emissions as indirect rather than cumulative effects, and this appears to be the better approach in light of that causal connection.

[142] 40 C.F.R. § 1508.8(b) (2011).

[143] *Id.*

[144] U.S. Dep't of Transp. v. Pub. Citizen, 541 U.S. 752, 754 (2004) (citing Metro. Edison Co. v. People Against Nuclear Energy, 460 U.S. 766, 774 (1983)) (internal citations omitted).

[145] City of Shoreacres v. Waterworth, 420 F.3d 440, 453 (5th Cir. 2005) (quoting Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992)); *see also* Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549 (8th Cir. 2003).

[146] Sierra Club v. Marsh, 976 F.2d 763, 768 (1st Cir. 1992) (citing Sierra Club v. Marsh 769 F.2d 868, 878 (1st Cir. 1985)); *see also* Massachusetts v. Watt, 716 F.2d 946, 952–53 (1st Cir. 1983).

Although agencies are not required to conduct a "crystal-ball" inquiry to identify potential impacts, they must use "[r]easonable forecasting and speculation" to evaluate impacts even when there is uncertainty about the nature and timing of those impacts.[147] Moreover, the NEPA regulations impose an affirmative obligation on agencies to procure information regarding reasonably foreseeable impacts when possible.[148] The agency must also respond to information when it is provided through public comments.[149] In determining whether an agency has violated NEPA by omitting information from its analysis, a court must consider the "usefulness of any new potential information to the decisionmaking process."[150]

Some courts have used the analogy of "links in a chain" to describe the scope of indirect effects that should be reviewed in NEPA documents.[151] This analogy is helpful for thinking about the scope of NEPA analysis for GHG emissions from fossil fuel supply projects. The various stages of fossil fuel production, transportation, processing, and consumption can also be thought of as "links in a chain" which are inextricably connected and should thus be analyzed together.[152]

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[147] Scientists' Inst. for Pub. Info., Inc. v. U.S. Atomic Energy Comm'n, 481 F.2d 1079, 1092 (D.C. Cir. 1973) (noting that the courts must therefore "reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry'"); *see also* City of Davis v. Coleman, 521 F.2d 661, 675 (9th Cir. 1975) ("The nature and extent of development which the project will induce is still uncertain. Davis' fears may be exaggerated. But currently available information and plain common sense indicate that it was hardly 'reasonable' for CDHW or FHWA to conclude, without further study, that the environmental impact of the proposed interchange will be insignificant.").

[148] 40 C.F.R. § 1502.22 (2012).

[149] *Mid States Coal. for Progress*, 345 F.3d at 537.

[150] U.S. Dep't of Transp. v. Pub. Citizen, 541 U.S. 752, 767 (2004).

[151] Sylvester v. U.S. Army Corps of Eng'rs, 884 F.2d 394, 400 (9th Cir. 1989):

> Environmental impacts are in some respects like ripples following the casting of a stone in a pool. The simile is beguiling but useless as a standard. So employed it suggests that the entire pool must be considered each time a substance heavier than a hair lands upon its surface. This is not a practical guide. A better image is that of scattered bits of a broken chain, some segments of which contain numerous links, while others have only one or two. Each segment stands alone, but each link within each segment does not[.]

*See also* Ocean Mammal Inst. v. Cohen, 164 F.3d 631 (9th Cir. 1998); Fla. Audubon Soc'y v. Bentsen, 94 F.3d 658, 668–70 (D.C. Cir. 1996); Border Power Plant Working Grp. v. U.S. Dep't of Energy, 260 F. Supp. 2d 997, 1013 (S.D. Cal. 2003); Ocean Mammal Inst. v. Cohen, No. 98-cv-160, 1998 WL 2017631, at *8 (D. Haw. Mar. 9, 1998) *aff'd sub nom.*

[152] *See, e.g.*, *Border Power Plant Working Grp.*, 260 F. Supp. 2d at 1013–17 (holding environmental impacts of power plant in Mexico were indirect impacts of decision to construct electric transmission line because neither facility would exist without the other).

a. Fossil Fuel Extraction

In our 2017 article, we explained why downstream GHG emissions from the processing, transportation, and consumption of fossil fuels that are produced as a result of federal management plans and lease sales qualify as "indirect effects" that must be considered in an EA or EIS.[153] These downstream activities and the emissions they generate have a clear causal connection to federal authorizations: but for the authorization, the consumed.[154] These downstream activities are also reasonably foreseeable outcomes of authorizing the extraction of the fuels—indeed, producing fuel for energy supply is the primary purpose of the authorizations.[155] NEPA thus requires agencies to disclose downstream emissions as potential effects of fossil fuel supply projects and to quantify the emissions wherever tools and data are available to do so. In particular, where agencies are able to project the quantity of fuels to be produced, they must also estimate the GHG emissions generated from the combustion of the fuels. This is true whether the lease is for coal, oil, or gas.[156] When quantification is not feasible, this does not mean the emissions can be excluded from the analysis—to the contrary, agencies have a duty to qualitatively disclose and evaluate indirect effects where the nature of the effect is reasonably foreseeable even if the exact magnitude or extent is not.[157]

Arguments that consideration and disclosure of downstream emissions are not required in the NEPA analysis for fossil fuel production have proven unpersuasive. One argument, which we call the "status quo" argument, has arisen in the context of proposals to reauthorize or expand coal mines that were already in operation. In that context, agencies asserted that the continued operation of the mine would not increase the *rate* of coal extraction and thus it would not increase the *rate* of coal consumption.[158] Courts have properly rejected this argument, holding that the continued operation of mines generates additional emissions over

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[153] Burger & Wentz, *supra* note 11, at 112.

[154] For a more in-depth explanation of why upstream and downstream emissions qualify as indirect effects, see generally *id.*

[155] *Id.* at 128.

[156] Whether an agency must quantify processing and transportation emissions may depend on other aspects of the project, such as whether the agency knows the route and mode by which the fuels will be transported to end-users.

[157] 40 C.F.R. § 1502.22 (2012); *see also* Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549–50 (8th Cir. 2003).

[158] S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of the Interior, 588 F.3d 718, 725 (9th Cir. 2009).

time even if it does not change the rate at which those emissions are generated, and this effect must be considered under NEPA.[159]

Another argument, which we call the "perfect substitute" argument, posits that the extraction of fossil fuels will not actually cause an increase in fossil fuel consumption because the same quantity of fuel would be produced elsewhere and eventually consumed even if the agency does not approve the proposal.[160] In *High Country Conservation Advocates v. United States Forest Service*, the first case that specifically examined an agency's obligation to evaluate downstream greenhouse gas emissions from coal production, a district court rejected this argument as "illogical" because increasing coal supply would affect coal prices and the demand for coal relative to other fuel sources.[161] Other courts have adopted the reasoning from *High Country* in cases involving fossil fuel production.[162]

Finally, a third argument, which we call the "It's Not Our Call" argument, posits that the agency approving fossil fuel production lacks jurisdiction over downstream activities such as fossil fuel consumption and is therefore not required to consider the effects of those activities in its NEPA analysis. The primary basis for this argument was the Supreme Court's decision in *Department of Transportation v. Public Citizen*.[163] There, the Supreme Court held that an agency need not consider environmental effects in its NEPA review when it has "no ability" to adopt a course of action that could prevent or otherwise influence those effects.[164] But agencies' reliance on this case in the context of fossil fuel supply projects is misplaced because agencies do have the power to act on information about downstream emissions from leased fossil fuels (specifically, by restricting and limiting fossil fuel leasing from federal lands and waters).[165] Most of

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[159] Diné Citizens Against Ruining Our Env't v. U.S. Off. of Surface Mining, Reclamation & Enf't, 82 F. Supp. 3d 1201 (D. Colo. 2015), *appeal dismissed* (Aug. 18, 2015); *S. Fork Band Council of W. Shoshone of Nev.*, 588 F.3d at 725.

[160] *See* Section III.A for an overview of litigation challenging agency assumptions about energy market substitution.

[161] High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1198 (D. Colo. 2014).

[162] WildEarth Guardians v. U.S. Bureau of Land Mgmt., 870 F.3d 1222, 1228 (10th Cir. 2017); WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *30–31 (D. Mont. Feb. 11, 2019); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, Reclamation & Enf't, 274 F. Supp. 3d 1074, 1098 (D. Mont. 2017), *amended in part, adhered to in part sub nom.*; Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017).

[163] U.S. Dep't of Transp. v. Pub. Citizen, 541 U.S. 752, 770 (2004).

[164] *Id.* at 766–70.

[165] WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 74 (D.D.C. 2019); Diné Citizens

the cases that we reviewed in our 2017 article dealt with whether agencies were required to disclose combustion emissions in the context of federal proposals for coal leasing.[166] At that time, there were five district court decisions on this question, all of which had held that such disclosure was required.[167] Since then, there have been a number of new decisions reinforcing the idea that downstream emissions from fossil fuel processing, transportation, and use qualify as indirect effects of fossil fuel production and clarifying that this basic principle applies regardless of the type of fuel being produced, the type of proposal, the type of NEPA documentation (EIS or EA), or the type of downstream emissions.[168]

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Against Ruining Our Env't v. U.S. Off. of Surface Mining, Reclamation & Enf't, 82 F. Supp. 3d 1201, 1217 (D. Colo. 2015).

[166] Burger & Wentz, *supra* note 11, at 109, 164.

[167] In four of these cases, the courts determined that the responsible agencies failed to take the requisite "hard look" at downstream emissions from the combustion of the coal: *Diné Citizens*, 82 F. Supp. 3d at 1211; WildEarth Guardians v. U.S. Off. of Surface Mining, 104 F. Supp. 3d 1208, 1231 (D. Colo. 2015), *vacated as moot* 652 Fed. Appx. 717 (10th Cir. 2016); WildEarth Guardians v. U.S. Off. of Surface Mining, No. CV-14-13-BLG-SPW-CSO, 2015 WL 6442724, at *7 (D. Mont. 2015); High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1195 (D. Colo. 2014). In the fifth case, the court held that the agency's analysis of downstream emissions was adequate, in part because the agency had already disclosed emissions from the combustion of the leased coal. WildEarth Guardians v. U.S. Forest Serv., 120 F. Supp. 3d 1237, 1276 (D. Wyo. 2015).

[168] Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt., 377 F. Supp. 3d 1223, 1237 (D. Colo. 2019); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 74 (D.D.C. 2019) (BLM must analyze downstream emissions in oil and gas lease EAs); WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *21 (D. Mont. Feb. 11, 2019) (OSM must evaluate indirect and cumulative impacts caused by coal trains beyond the area near the mine, as there was sufficient data to support this analysis); W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. 4:16-cv-00021-BMM, 2018 WL 1475470, at *40 (D. Mont. Mar. 26, 2018) (BLM must quantify emissions from coal, oil, and gas combustion in RMP EISs); Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145, 1156 (D. Colo. 2018) (BLM must disclose emissions from oil and gas combustion in RMP EIS and also evaluate potential impacts of those emissions in light of revised total GHG projections); San Juan Citizens All. v. U.S. Bureau of Land Mgmt., 326 F. Supp. 3d 1227, 1246 (D.N.M. 2018) (BLM must disclose emissions from oil and gas combustion in lease sale EA and also evaluate potential impacts of those emissions in light of revised total GHG projections); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1092, 1094 (D. Mont. 2017), *amended in part, adhered to in part sub nom*. Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017) (non-GHG effects of coal transport and combustion must also be considered); WildEarth Guardians v. U.S. Bureau of Land Mgmt., 870 F.3d 1222, 1234–39 (10th Cir. 2017) (in a coal lease EIS, agency cannot dismiss the significance of downstream emissions from coal combustion by claiming perfect substitution).

1) Type of Fuel

Downstream emissions qualify as indirect effects of oil and gas production for the same reasons that they qualify as indirect effects of coal production.[169] Some agencies have argued against disclosure on the grounds that emissions from oil and gas combustion are more speculative than those from coal combustion because oil and gas are used for purposes other than energy production.[170] As noted above, the inability to quantify indirect effects does not mean that agencies can ignore these in their analysis. Moreover, the fact that agencies are already quantifying downstream emissions (primarily combustion emissions) in EISs for proposals to authorize oil and gas production demonstrates that such quantification is feasible where the agency has also estimated the amount of oil and gas to be produced. Recognizing this, courts have explicitly ordered agencies to quantify combustion emissions in four of the five decisions requiring disclosure of downstream emissions from oil and gas production.[171] In the fourth decision, the court explained that it was not ordering quantification because, unlike coal which has a "single downstream use," oil is sometimes used for plastics or other products that will not be burned.[172] But the court did note that BLM must "consider whether quantifying GHG emissions from that use is reasonably possible" and "thoroughly explain" any decision not to quantify emissions, and that "if BLM receives estimates

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[169] *Citizens for a Healthy Cmty.*, 377 F. Supp. 3d at 1237; *WildEarth Guardians*, 368 F. Supp. 3d at 74; *W. Org. of Res. Councils*, 2018 WL 1475470, at *31–32*; Wilderness Workshop*, 342 F. Supp. 3d at 1156; *San Juan Citizens All.*, 326 F. Supp. 3d at 1242, 1244.

[170] Supplemental Brief at 5–6, WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41 (D.D.C. 2019) (No. 1:16-cv-01822).

[171] *Citizens for a Healthy Cmty.*, 377 F. Supp. 3d at 1237; *W. Org. of Res. Councils*, 2018 WL 1475470, at *40; *Wilderness Workshop*, 342 F. Supp. 3d at 1156; *San Juan Citizens All.*, 326 F. Supp. 3d at 1228. There are also many undecided cases involving failures to quantify indirect GHG emissions in the context of oil and gas production EAs—the key issue being that agencies are dismissing the significance of GHG emissions without a complete assessment of the GHG impact. *See* Complaint at 29–30, WildEarth Guardians v. U.S. Bureau of Land Mgmt., No. 4:18-cv-00073 (D. Mont. May 15, 2018) (failure to quantify downstream emissions in oil and gas leasing EAs); Complaint at 21, 39–40, Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018) (failure to take hard look at indirect emissions from 53 oil and gas lease parcels—"BLM's Determinations of NEPA Adequacy for the lease auctions fail to consider or quantify any site-specific direct, indirect, and cumulative greenhouse gas emissions from leasing and their resulting climate change effects."); Complaint at 25, Ctr. for Biological Diversity v. U.S. Forest Serv., No. 2:17-cv-00372 (S.D. Ohio May 2017) (agency failed to take hard look at GHG emissions and climate impacts of oil and gas leasing in national forest).

[172] *WildEarth Guardians*, 368 F. Supp. 3d at 74.

from outside parties based on the use of [emission estimating] calculators, it must assess those estimates and explain why they are unreliable or otherwise inappropriate to use in its decisionmaking."[173]

2) Type of Proposal

Downstream emissions must be disclosed and analyzed in the context of both project-level leasing decisions and broader management plans and actions that authorize future fossil fuel development.[174] However, the required depth of the analysis and whether emissions must be quantified depends on whether the agency has projected or is capable of projecting the quantity of fuels to be produced. As noted in *High Country Conservation Advocates*, in which the court required quantitative disclosure of GHG emissions in the context of a rule amendment which would allow for coal leasing in previously designated "roadless" areas:

> The agency cannot—in the same FEIS—provide detailed estimates of the amount of coal to be mined . . . and simultaneously claim that it would be too speculative to estimate emissions from "coal that may or may not be produced" from "mines that may or may not be developed." The two positions are nearly impossible to reconcile.[175]

Courts have also required quantification of downstream (combustion) emissions in cases involving resource management plans where the agency had estimated the amount of coal, oil, and/or gas to be produced pursuant to those plans.[176]

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[173] *Id.* at 75.

[174] For examples of decisions requiring disclosure and analysis of downstream emissions in the context of broader planning actions, see *Citizens for a Healthy Cmty.*, 377 F. Supp. 3d at 1237; *W. Org. of Res. Councils*, 2018 WL 1475470, at *40 (BLM must quantify emissions from coal, oil, and gas combustion in RMP EISs); *Wilderness Workshop*, 342 F. Supp. 3d at 1156 (BLM must disclose emissions from oil and gas combustion in RMP EIS and also evaluate potential impacts of those emissions in light of revised total GHG projections).

[175] High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1196–97 (D. Colo. 2014).

[176] *W. Org. of Res. Councils*, 2018 WL 1475470, at *13 (In light of the degree of foreseeability and specificity of information available to the agency while completing the EIS, NEPA requires BLM to consider in the EIS the environmental consequences of the downstream combustion of the coal, oil and gas resources potentially open to development under these RMPs. Without such analysis, the EIS fails to "foster informed decisionmaking" as required by NEPA"); *Wilderness Workshop*, 342 F. Supp. 3d at 1156 ("An agency may not avoid an obligation to analyze in an EIS environmental consequences that

3) Type of NEPA Documentation

Some agencies have justified decisions not to disclose or quantify downstream GHG emissions in fossil fuel leasing EAs on the grounds that the proposals will not generate significant GHG impacts and thus an in-depth analysis of GHG emissions is not warranted.[177] The problem with this argument is that it is impossible for an agency to gauge the significance of the GHG impact without analyzing the full scope of emissions that qualify as direct, indirect, and cumulative effects of the project. Courts have thus properly held that downstream emissions must also be disclosed and quantified in the context of fossil fuel leasing EAs.[178] One case dealt with a particularly egregious situation in which BLM had failed to quantify *any* GHG emissions (direct, indirect, or cumulative) in EAs and FONSIs issued for 282 oil and gas leases encompassing approximately 303,000 acres of land in Wyoming.[179] There, the D.C. district court held that BLM must quantify direct emissions from oil and gas production and also account for downstream emissions.[180] As we discuss in Part III, the failure to account for the full scope of GHG emissions that qualify as impacts of production proposals renders an agency's FONSI arbitrary and capricious.

A related question is whether an agency can ignore downstream emissions in a leasing EA or NEPA adequacy determination that is tiered to a broader PEIS. The answer depends on the level of detail with which GHGs were disclosed in the PEIS. If an agency fully quantified downstream emissions for a leasing area in a PEIS, it could potentially rely on that analysis in its tiered EA or adequacy determination. But if the programmatic analysis is too broad or too course (e.g., a purely qualitative analysis of potential GHG impacts) or out of date, then it would be

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foreseeably arise from an RMP merely by saying that the consequences are unclear or will be analyzed later when an [Environmental Assessment] is prepared for a site-specific program proposed pursuant to the RMP.") (quoting Kern v. U.S. Bureau of Land Mgmt., 284 F.3d 1062, 1072 (9th Cir. 2002) (internal quotation marks omitted)).

[177] We discuss the adequacy and reasonableness of such significance determinations in Part III. Here, we focus on whether the failure to disclose emissions can be justified by a finding of no significant impact.

[178] *WildEarth Guardians*, 368 F. Supp. 3d at 75; WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *11 (D. Mont. Feb. 11, 2019); San Juan Citizens All. v. U.S. Bureau of Land Mgmt., 326 F. Supp. 3d 1227, 1228 (D.N.M. 2018); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1098–99 (D. Mont. 2017), *amended in part, adhered to in part sub nom.* No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017).

[179] *WildEarth Guardians*, 368 F. Supp. 3d at 55.

[180] *Id.* at 85.

necessary for the agency to conduct a more detailed examination of downstream GHG emissions when issuing lease sales.[181]

4) Type of Downstream Emissions

As noted above, transportation and processing emissions (including leakage that occurs during transport) also qualify as indirect effects of federal approvals for fossil fuel production. Unlike with combustion emissions, it is not always possible to quantify processing and transportation emissions even where the agency has projected the amount of fossil fuel production. Estimating transportation emissions, in particular, may be impossible if the agency does not know the route or mode by which the fuels will be transported to end-users. For this reason, agencies sometimes ignore transportation and processing emissions in NEPA documentation even where they acknowledge and disclose combustion emissions as indirect effects of proposals.[182] But NEPA requires more: agencies should discuss these emissions qualitatively at minimum[183] and should conduct a quantitative analysis where tools and data are available to do so. For example, where agencies know the rail routes and shipping destinations for coal that would be mined as a result of federal authorizations, the reviewing agencies must calculate the GHG emissions from rail transport.[184]

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[181] *See id.* There have been at least two instances in which courts have upheld the NEPA documentation (or lack thereof) for oil and gas lease sales that were tiered to programmatic reviews despite plaintiffs' contentions that the sales were issued without adequate analysis of downstream GHG emissions. But neither decision involved a careful analysis of whether such emissions qualified as indirect effects. In one case, the reviewing court did not even address plaintiffs' arguments about climate change. *See* N. Alaska Envtl. Cent. v. U.S. Dep't of the Interior, No. 3:18-cv-00030, 2018 WL 6424680 (D. Alaska Dec. 6, 2018). In the second case, the court held that BLM's very limited analysis of GHG emissions, which did not include downstream emissions, was sufficient because BLM had estimated that the emissions would represent only a small increase in state emissions and were therefore significant. Diné Citizens Against Ruining Our Env't v. Jewell, 312 F. Supp. 3d 1031, 1096 (D.N.M. 2018), *rev'd sub nom* Diné Citizens Against Ruining Our Env't v. Bernhardt, 923 F.3d 831 (10th Cir. 2019) (on appeal, the 10th Circuit did not reach the arguments related to GHG emissions because it concluded that Appellants had not provided a record from which it could assess the adequacy of BLM's air pollution analysis).

[182] *N. Alaska Envtl. Cent.*, 2018 WL 6424680; *Diné*, 312 F. Supp. 3d at 1031.

[183] 40 C.F.R. § 1502.22; *see also* Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549–50 (8th Cir. 2003).

[184] There are two decisions requiring further analysis of impacts from coal transport in the context of federal approvals for coal mining, but in both cases the agencies had already disclosed GHG emissions from transport and thus the decisions focused on the need to disclose other impacts (e.g., conventional air pollutants). These cases thus expand

One scope-related question which has not been directly addressed is whether non-$CO_2$ GHGs such as methane must also be disclosed in the downstream emissions analysis.[185] The answer is an obvious "yes"—there is no rationale for treating these differently than $CO_2$, although there may be instances in which it is not possible to quantify these emissions in the same fashion as $CO_2$.[186] Agencies may also argue against disclosure on the grounds that these emissions are relatively insignificant as compared with $CO_2$, but arguments about insignificance would need to be supported by the sort of quantitative analysis which considers not only the tonnage of non-$CO_2$ GHG emissions but also the global warming potential of those emissions.[187]

In sum: the cases generally support the proposition that downstream emissions fall within the scope of indirect impacts that should be disclosed in NEPA reviews for federal proposals that will result in the extraction of fossil fuels. The decisions also provide insight on the circumstances in which NEPA requires quantitative disclosure of such impacts. We return to questions about the adequacy and reasonableness of the technical assumptions and findings encompassed within the GHG disclosure in Part III.

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the obligation to evaluate transportation-related impacts to include non-GHG emissions. *See* WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *7 (D. Mont. Feb. 11, 2019) (OSM must evaluate indirect and cumulative impacts caused by coal trains beyond the area near the mine, as there was sufficient data to support this analysis); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1098–99 (D. Mont. 2017), *amended in part, adhered to in part sub nom.* No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017) (non-GHG effects of coal transport and combustion must also be considered). There have not yet been any decisions on the failure to disclose or quantify processing emissions, but one can infer from the case law that these should also be disclosed and quantified where possible. There is also a pending lawsuit in which the alleged failure to account for downstream emissions appears to encompass processing as well as transportation emissions. Complaint at 5, S. Utah Wilderness All. v. Bernhardt, 2:19-cv-00266 (D. Utah 2019) (alleging that BLM's analysis of twenty oil and gas leases in Utah was flawed because it failed to address GHG emissions from activities that occur after production, but before combustion, such as fugitive emissions that leak from pipelines).

[185] There is one lawsuit involving BLM's issuance of twenty oil and gas leases in Utah in which plaintiffs have alleged that the NEPA analyses is flawed due to BLM's failure to disclose non-$CO_2$ GHGs, particularly methane. Complaint at 17, S. Utah Wilderness All. v. Bernhardt, No. 2:19-cv-00266 (D. Utah Apr. 19, 2019).

[186] Tools are available to calculate $N_2O$ and methane emissions from combustion, at a minimum. *See* EPA, GREENHOUSE GAS INVENTORY GUIDANCE: DIRECT EMISSIONS FROM STATIONARY COMBUSTION SOURCES, APPENDIX A (2016), https://www.epa.gov/sites/production/files/2016-03/documents/stationaryemissions_3_2016.pdf [https://perma.cc/YDH5-N7L8].

[187] *See* WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 71–74 (D.D.C. 2019).

### *B. Fossil Fuel Transportation*

Both upstream and downstream emissions typically qualify as indirect effects of fossil fuel transportation projects.[188] These emissions are reasonably foreseeable because agencies know that the fossil fuels to be transported via the approved infrastructure will be extracted, and all or most of the fuels will be processed and combusted.[189] These emissions are also causally linked to the approval of the transportation infrastructure because: (i) agencies approve these projects based on findings that additional transportation capacity is needed to transport the fuels to end-users,[190] and one can therefore infer that (ii) without the necessary capacity addition, the same quantity of fuels would not be produced and transported to end-users.

Some agencies (primarily FERC) have argued that the approval of transportation infrastructure does not cause upstream production or downstream consumption because there are other ways in which fuels could be transported to end-users if a project is not approved.[191] The problem with this argument is that it assumes that transportation capacity exists elsewhere to transport the fuels to the market, which undermines the required determination that the project is necessary due to capacity constraints. It also ignores basic market principles of supply and demand. Relatedly, agencies have argued that upstream and downstream emissions are not reasonably foreseeable because of uncertainties about market impacts and energy substitution.[192] But this argument fails as well. As noted by FERC Commissioner Richard Glick in a dissent to a FERC order issuing a certificate for a natural gas pipeline project:

> It is reasonable to assume that building incremental transportation capacity will spur additional production and result in some level of combustion of natural gas, even if the exact details of the method or location are not definite. . . . [W]hen the nature of the effect (end-use emissions) is

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[188] WEBB, *supra* note 134, at 21.
[189] As discussed above, there are multiple end-uses for oil and gas but the vast majority of produced oil and gas is combusted for energy generation (whether in power plants, industrial sources, or vehicles) and agencies have nonetheless been able to estimate combustion emissions for these fuels.
[190] WEBB, *supra* note 134, at 17; Burger & Wentz, *supra* note 11, at 166.
[191] Burger & Wentz, *supra* note 11, at 109, 137.
[192] *Id.* at 132.

> reasonably foreseeable, but its extent is not . . . an agency may not simply ignore the effect.[193]

The case law generally supports the treatment of both upstream and downstream emissions as indirect effects of transportation infrastructure, but courts have not fleshed out or enforced the requirement to analyze these emissions with the same clarity or assertiveness as they have in cases involving fossil fuel production.[194] This may be due to the fact that there are fewer decisions on transportation approvals.[195] It may also be the case that courts are not enforcing NEPA requirements as assertively in this context because they do not think that the approval of transportation infrastructure is as significant a driver of fossil fuel consumption as federal fossil fuel leasing programs.

The early case law on the requirement to evaluate upstream and downstream emissions from authorizations of fossil fuel transportation infrastructure is illustrative. The first two decisions on this question both involved STB's approval of rail lines built to transport coal. In *Mid States Coalition for Progress v. Surface Transportation Board,* the Eighth Circuit Court of Appeals required the STB to evaluate downstream emissions from the combustion of the transported coal, and in *Northern Plains Resource Council, Inc. v. Surface Transportation Board,* the Ninth Circuit Court of Appeals required STB to consider upstream emissions from the mining of the coal.[196] In those cases, the courts confronted and dismissed several of the same arguments related to causation and foreseeability that were raised in the coal extraction cases.[197] In particular, the Eighth Circuit's decision in *Mid States Coalition* found that the development of infrastructure intended to transport coal would affect the price of coal relative to other energy sources and this would affect patterns of coal

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[193] Texas E. Transmission, LP, 164 FERC ¶ 61,037 (2018) (internal quotations omitted).
[194] Burger & Wentz, *supra* note 11, at 142–43.
[195] *Id.* at 143.
[196] Notably, in the case involving the failure to evaluate upstream emissions, petitioners argued that methane emissions and other environmental impacts from the connected coal mines should be analyzed as cumulative effects (these are typically treated as indirect effects). The court's analysis therefore focused on whether these effects were reasonably foreseeable, since a cumulative impact need not be "caused" by the project. N. Plains Res. Council, Inc. v. Surface Transp. Bd., 668 F.3d 1067, 1082 (9th Cir. 2011). But as discussed below, the rationale for concluding that a transport project "causes" downstream emissions applies in equal force to upstream emissions.
[197] *N. Plains Res. Council*, 668 F.3d at 1082; Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549 (8th Cir. 2003).

production and consumption, and thus downstream emissions were an indirect effect of the railway.[198]

However, courts reached different conclusions in early cases involving natural gas and oil pipelines. There were two early decisions finding that an analysis of upstream emissions (from production) was not required in the NEPA review for oil and gas pipelines because those pipelines would not cause upstream production.[199] A third decision which pertained to the scope of review for non-GHG air pollutants upheld FERC's review of a pipeline precisely because "FERC explicitly considered the environmental impact of downstream emissions and imposed what it reasonably believed to be effective measures to mitigate the impact."[200] At that time, neither courts nor agencies had offered a principled basis for why the scope of indirect emissions analysis should differ for coal rail lines and pipelines, nor had they offered a compelling argument for finding that pipelines do not affect natural gas production and consumption in the same fashion that coal railways affect coal production and consumption.[201] We argued then that the reasoning which controlled the outcome of the coal production and coal railway cases should apply in equal force to other forms of transportation infrastructure.[202]

There were also some early decisions on LNG export decisions which held that FERC need not address the indirect effects of natural gas exports in its NEPA review because it was DOE and not FERC that was ultimately responsible for approving those exports.[203] But in those cases, the D.C. Circuit made clear that it was not expressing any opinion on DOE's independent NEPA obligations to address such indirect effects in its review of LNG export authorizations.[204] Those decisions are the result

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[198] *Mid States Coal. for Progress*, 345 F.3d at 549.

[199] In one of those decisions, the court found that the Department of State's administrative record for an oil and gas pipeline contained at least some information to support this finding (e.g., about oil production rates and other transportation options). Sierra Club v. Clinton, 746 F. Supp. 2d 1025, 1045 (D. Minn. 2010). In the other (unpublished) decision, the court simply deferred to FERC's unsupported claim of perfect substitution for a natural gas pipeline without conducting any analysis whatsoever. Coal. for Responsible Growth & Res. Conservation v. FERC, 485 F. App'x 472, 474 (2d Cir. 2012).

[200] S. Coast Air Quality Mgmt. Dist. v. FERC, 621 F.3d 1085, 1093–94 (9th Cir. 2010).

[201] *See generally Coal. for Responsible Growth & Res. Conservation*, 485 F. App'x at 472, 474; *S. Coast Air Quality Mgmt. Dist.*, 621 F.3d at 1093–94; *Sierra Club*, 746 F. Supp. 2d at 1044.

[202] Burger & Wentz, *supra* note 11, at 109, 157.

[203] Sierra Club v. FERC, 827 F.3d 59, 68 (D.C. Cir. 2016); Sierra Club & Galveston Baykeeper v. FERC, 827 F.3d 36, 47 (D.C. Cir. 2016); EarthReports Inc. v. FERC, 828 F.3d 949, 952 (D.C. Cir. 2016).

[204] *Sierra Club & Galveston Baykeeper*, 827 F.3d at 45.

of the unique division of authority between DOE and FERC and are thus of little relevance to interpreting agency obligations in other contexts.

More recent decisions on natural gas pipelines and LNG export terminals have made it clear that downstream emissions typically fall within the scope of indirect impacts that should be evaluated in NEPA reviews for these projects.[205] One of the most important decisions on this issue was a D.C. Circuit case involving FERC's review of an interstate natural gas pipeline: *Sierra Club v. FERC*.[206] There, the D.C. Circuit Court of Appeals found that downstream emissions from natural gas combustion were an indirect effect of the proposed pipeline project, as they were both foreseeable and causally linked to the approval of the pipeline project.[207] In regards to foreseeability, the court noted that the project was intended to transport the gas to power plants in Florida, some of which already existed, others of which were in the planning stages.[208] Thus, the court noted that the combustion of the gas "is not just 'reasonably foreseeable,' it is the project's entire purpose."[209] With regards to causation, the court held that because FERC can act on information about GHG emissions and climate change impacts when deciding whether to issue a pipeline certificate, and because FERC can deny the certificate if it finds that the project would be too harmful to the environment, FERC's approval is a "legally relevant cause" of the downstream effects of combusting the gas.[210]

The court also held that quantification of the downstream GHG emissions was required.[211] FERC had argued that it is impossible to know exactly what quantity of GHGs will be emitted due to the approval of the pipeline because it depends on uncertain variables such as the operating decisions of individual plants and demand for electricity in the region.[212] The court disagreed, noting that NEPA requires "reasonable forecasting" and that FERC had already estimated how much gas the pipelines would transport and had provided no good reason as to why this number could not also be used to estimate combustion emissions.[213] The court explained that quantification was necessary because it would

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[205] Sierra Club v. U.S. Dep't of Energy, 867 F.3d 189, 192 (D.C. Cir. 2017) (Freeport LNG terminal); *Sierra Club*, 827 F.3d at 68; Indigenous Envtl. Network v. U.S. Dep't of State, No. 4:17-cv-00029, 2017 U.S. Dist. LEXIS 164786, at *68 (D. Mont. Nov. 8, 2018).
[206] Sierra Club v. FERC, 867 F.3d 1357, 1357 (D.C. Cir. 2017).
[207] *Id.* at 1374.
[208] *Id.* at 1371
[209] *Id.* at 1372.
[210] *Id.*
[211] *Id.* at 1374.
[212] *Sierra Club v. FERC*, 867 F.3d at 1373–74.
[213] *Id.* at 1374.

"permit the agency to compare the emissions from the project to emissions from other projects, to total emissions from the state or region, or to regional or national emissions-control goals" and "[w]ithout such comparisons, it is difficult to see how FERC could engage in 'informed decision making' with respect to the greenhouse-gas effects of this project, or how 'informed public comment' could be possible."[214]

The D.C. Circuit Court of Appeals decided another case, *Birckhead v. FERC*, in which it sought to clarify its position on FERC's obligation to address downstream emissions in its review of natural gas transportation infrastructure.[215] Plaintiffs alleged that FERC violated NEPA by failing to disclose emissions from the consumption of natural gas when the record contained information about the amount of gas to be transported (200,000 decatherms) and its destination (southeast markets).[216] FERC maintained that the emissions were neither caused by its approval nor reasonably foreseeable and that *Sierra Club v. FERC* was not apposite because FERC did not know the exact power plants at which the natural gas would be used.[217] The court quickly disposed of FERC's causation and foreseeability arguments, just as it had in *Sierra Club v. FERC*, and noted that it was "troubled . . . by the Commission's attempt to justify its decision to discount downstream impacts based on its lack of information about the destination and end use of the gas in question" because FERC had an affirmative obligation to at least attempt to obtain information necessary to fulfill its statutory duties and had made "no effort" to do so in this case.[218] But the court ultimately dismissed the complaint on the grounds that petitioners "failed to raise this record-development issue in the proceedings before the Commission."[219] In doing so, it implicitly accepted FERC's argument that additional information was needed to assess downstream emissions and the court mischaracterized the petitioners' complaint (which alleged a failure to estimate emissions based on information that was already on the record).[220]

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[214] *Id.* The court also rejected FERC's arguments about perfect substitution, which we return to in Part III.

[215] Birckhead v. FERC, 925 F.3d 510 (D.C. Cir. 2019).

[216] Final Opening Brief of Petitioners at 39–40, Birckhead v. FERC, 925 F.3d 510 (D.C. Cir. 2019) (No. 18-1218). Commissioner LaFleur actually performed this very calculation to demonstrate that it was feasible. *Id.* at 12.

[217] *Birckhead*, 925 F.3d at 518.

[218] *Id.* at 519–20.

[219] *Id.* at 520.

[220] One possible explanation for the court's approach is that it wanted to allow this particular project to go forward without formally curtailing NEPA requirements. The project at issue was a compressor station that would enhance the capacity of an existing

The decision in *Birckhead v. FERC* thus raises a number of questions for future litigants seeking to compel FERC disclosures of downstream emissions regarding the manner in which plaintiffs must frame their claims, the extent to which FERC can rely on claims about "uncertainty" or "inadequate information" to avoid disclosing downstream emissions, and the circumstances in which emissions from downstream natural gas combustion are not a reasonably foreseeable outcome of natural gas transportation infrastructure. But it does not disrupt or significantly modify the holding in *Sierra Club v. FERC,* which remains the primary authority on FERC's obligation to evaluate downstream emissions from natural gas pipelines.[221]

The same rationale for requiring analysis of downstream emissions applies to upstream emissions: if a transportation project causes an increase in fossil fuel consumption, then there must be a corresponding increase in fossil fuel production on the other end of the supply chain.[222] Thus, induced natural gas production is as much an "indirect effect" of the transportation infrastructure as induced consumption. As noted above, disclosure of upstream emissions has been explicitly required in the context of a federal approval of a coal railway. Although no decision has yet been issued finding inadequate analysis of upstream (i.e., production) emissions in the context of pipeline projects, there are at least two decisions finding adequate analysis *because* the agency incorporated quantitative analysis of upstream emissions in its review.[223]

First, in *Sierra Club v. U.S. Department of Energy*, the D.C. Circuit Court of Appeals held that DOE had adequately assessed the indirect emissions from LNG exports by incorporating general assessments of lifecycle GHG emissions from LNG exports (which included both upstream and

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pipeline, whereas the project at issue in *Sierra Club v. FERC* was a new multistate pipeline project. Although the court did not hold on what NEPA actually requires for a compressor station, it did state that emissions from downstream natural gas combustion are not "as a categorical matter" always a reasonably foreseeable outcome of natural gas transportation projects. *Id.* at 519. This conclusion is debatable: if the project is intended to meet a need for increased transportation capacity, then it will presumably enable increases in both natural gas production and consumption, and downstream emissions are thus a reasonably foreseeable impact even if there is uncertainty about the extent of the impact.

[221] *Id.*

[222] Burger & Wentz, *supra* note 11, at 113–14.

[223] Sierra Club v. U.S. Dep't of Energy, 867 F.3d 189 (D.C. Cir. 2017) (Freeport LNG terminal); Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561 (D. Mont. 2018).

downstream emissions).[224] Second, on *Indigenous Environmental Network v. U.S. Department of State,* the Montana district court held that the Department of State had adequately considered upstream emissions from tar sands oil production in its review of the Keystone XL pipeline by integrating the Canadian review (which encompassed such production) into its review.[225] Notably, there was no question about whether the Department of State must consider downstream emissions—it had already conducted an in-depth analysis of those as part of its review.[226] These decisions support the idea that *both* upstream and downstream emissions fall within the scope of "indirect effects" that should be considered under NEPA for projects involving fossil fuel transportation, and courts are likely to intervene where such emissions are omitted from the analysis altogether.[227]

However, the D.C. Circuit Court of Appeals upheld FERC's decision not to disclose upstream emissions for a natural gas compressor project in *Birckhead v. FERC*.[228] In that case, FERC justified its decision not to disclose upstream emissions on the grounds that pipeline approvals only cause upstream emissions where "the record demonstrates that the proposed project represents the *only* way to get additional gas from a specified production area into the interstate pipeline system."[229] Petitioners responded that FERC had determined there was a "need" for the project "based on the fact that [the production and shipping company] has executed a binding precedent agreement for . . . 100 percent of the design capacity" and that this was enough to show that the project would cause additional natural gas production.[230] The court held in favor of FERC, asserting that petitioners had identified no record evidence to: (i) "help [FERC] predict the number and location of any additional wells that would be drilled as a result of production demand created by the project" or (ii) prove that the natural gas would not be extracted in the absence of the project.[231] Regarding FERC's public need determination,

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[224] *Sierra Club v. U.S. Dep't of Energy*, 867 F.3d at 202. There are several unpublished opinions that rely on the analysis in this case: Sierra Club v. U.S. Dep't of Energy, 703 F. App'x 1 (D.C. Cir. 2017).
[225] *Indigenous Envtl. Network*, 347 F. Supp. 3d at 580.
[226] *Id.* at 576.
[227] *See, e.g.*, *id.* at 575–76; *Sierra Club v. U.S. Dep't of Energy*, 867 F.3d at 201–02.
[228] Birckhead v. FERC, 925 F.3d 510, 517 (D.C. Cir. 2019).
[229] *Id.*
[230] *Id.*
[231] *Id.* at 517–18. The court noted that it was "dubious of [FERC's] assertion that asking [the natural gas producer and shipper] about the origin of the gas would be futile" but

the court held that "just because [FERC] is satisfied that there is a market need for a given project does not necessarily mean that a shipper/producer would not have the ability to bring the gas to market via another channel were [FERC] to deny a certificate for the project."[232] The court thus held that petitioners had not presented enough evidence to rebut FERC's presumption that the project would not induce natural gas production.[233]

The court thus set an extraordinarily high bar for petitioners seeking to compel disclosure of upstream emissions, without actually deciding whether downstream emissions qualified as indirect effects of the project. The court's differential treatment of upstream emissions as compared with downstream emissions is baffling. As noted above, if a transportation project causes an increase in natural gas consumption then it also causes an increase in natural gas production—these are two sides of the same coin—the additional gas cannot be consumed if it is not produced. And upstream emissions can be estimated in the same fashion as downstream emissions (by multiplying the transported natural gas by an emissions factor).[234] There are also more sophisticated energy market modelling techniques which FERC could use to estimate the net increase in upstream production and emissions (we return to these in Part III).[235]

In our view, the D.C. Circuit has failed to justify its differential treatment of upstream and downstream emissions, and also erred in concluding that a binding precedent agreement for 100 percent of transportation capacity is insufficient to establish a causal link between the project and natural gas production.[236] NEPA requires "reasonable forecasting"

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that this was not dispositive in its ruling because petitioners had not claimed that FERC's failure to seek out additional information violated NEPA.

[232] *Id.* at 518.

[233] *Id.*

[234] *See, e.g.*, *GHG Emissions Associated with Two Proposed Natural Gas Transmission Lines in Virginia*, OUR ENERGY POL'Y 1, https://www.ourenergypolicy.org/wp-content/uploads/2016/02/GHG-Emissions-Associated-with-Proposed-Natural-Gas-Transmission-Lines-in-Virginia_Final-edit5-1.pdf [https://perma.cc/56T5-HFV4].

[235] Rick Glick & Matthew Christiansen, *FERC and Climate Change*, 40 ENERGY L.J. 1, 14 (2019), https://www.eenews.net/assets/2019/05/06/document_gw_02.pdf [https://perma.cc/BQ7F-2ZHA]. Commissioner Glick argued that FERC

> must also consider the secondary effects [of pipelines]. For example, an increase in interstate pipeline capacity may also, by decreasing the price of delivered gas, increase the demand for that gas and, in turn increase its production—which can lead to a significant increase in upstream emissions, through flaring of natural gas, fugitive methane emissions, etc.

[236] *Birckhead*, 925 F.3d at 517–18.

of probable impacts,[237] and it is highly probable that a fully subscribed transportation project will enable additional natural gas production. In sum: there are a number of cases which support the idea that upstream and downstream emissions fall within the scope of indirect impacts from fossil fuel transportation infrastructure.[238] However, there are some judicial interpretations which may pose challenges for plaintiffs seeking to enforce this requirement, especially as it applies to upstream emissions. In particular, the D.C. Circuit's interpretation of FERC obligations in *Birckhead v. FERC* places a significant burden on potential plaintiffs to rebut FERC assumptions that transportation projects do not cause an increase in upstream production[239] and also raises questions about how plaintiffs can adequately frame arguments about the requirement to disclose downstream emissions.

### 1. Upstream and Downstream Emissions as Effects of Connected Actions

Upstream and downstream emissions may also be conceptualized as the effects of "connected actions" when such emissions occur as a result of other federal approvals in the fossil fuel supply chain that must also undergo NEPA review.[240] As discussed in Part I, federal actions are "connected" if they: "(i) automatically trigger other actions which may require EISs, (ii) cannot or will not proceed unless other actions are taken previously or simultaneously, or (iii) are independent parts of a larger action and depend on the larger action for their justification."[241] The requirement to evaluate connected actions in a single NEPA review is often referred to as a rule prohibiting the "segmentation" of actions and their environmental impacts, reflecting the language in section 1508.27 of the CEQ regulations.[242]

The D.C. Circuit Court of Appeals has noted that "[t]he justification for the rule against segmentation is obvious: it prevent[s] agencies from dividing one project into multiple individual actions each of which individually has an insignificant environmental impact, but which

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[237] Scientists' Inst. for Pub. Info. v. Atomic Energy Comm'n, 481 F.2d 1079, 1082 (D.C. Cir. 1973).
[238] *See, e.g.*, Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549 (8th Cir. 2003).
[239] *Birckhead,* 925 F.3d at 518–19.
[240] Burger & Wentz, *supra* note 11, at 113–14.
[241] 40 C.F.R. § 1508.25(a)(1).
[242] 40 C.F.R. § 1508.27; Burger & Wentz, *supra* note 11, at 169.

collectively have a substantial impact."[243] Similarly, the Ninth Circuit has stated that the purpose of NEPA "cannot be fully served if consideration of the cumulative effects of successive, interdependent steps is delayed until the first step has already been taken."[244] Applying the regulatory standards, courts have held that agencies have a mandatory obligation to conduct a joint review of actions that either have no independent purpose or utility,[245] or "the dependency is such that it would be irrational, or at least unwise" to undertake one action if the other(s) were not also undertaken.[246]

Most of the cases involving claims that an agency failed to review connected actions pertaining to fossil fuels involve claims that an agency has improperly segmented its review of a pipeline (and different pieces of the pipeline), thus failing to evaluate all emissions (and other impacts) from the pipeline in a single, comprehensive review.[247] In one noteworthy case, *Delaware Riverkeeper Network v. FERC*, the D.C. Circuit held that four segments of a pipeline project were connected actions because they were physically connected, they were being constructed in relatively the same time period, and they lacked independent utility.[248] The pipeline

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[243] Del. Riverkeeper Network v. FERC, 753 F.3d 1304, 1314 (D.C. Cir. 2014) (citing NRDC v. Hodel, 865 F.2d 288, 297 (D.C. Cir. 1988) (internal quotation marks omitted)).
[244] Thomas v. Peterson, 753 F.2d 754, 760 (9th Cir. 1985).
[245] Custer Cty. Action Ass'n v. Garvey, 256 F.3d 1024, 1037 (10th Cir. 2001).
[246] Trout Unlimited v. Morton, 509 F.2d 1276, 1285 (9th Cir. 1974).
[247] *See, e.g.*, Twp. of Bordentown v. FERC, 903 F.3d 234, 250 (3d Cir. 2018) (two pipelines were not connected actions because they had independent utility); Sierra Club v. U.S. Army Corps of Eng'rs, 803 F.3d 31, 51 (D.C. Cir. 2015) (USACE not required to review multiple pipeline segments as connected actions because the other segments did not require federal approvals); Sierra Club v. Clinton, 689 F. Supp. 2d 1123, 1133 (D. Minn. 2010) (three pipelines were not connected actions because they had independent utility and different approval timelines); Hammond v. Norton, 370 F. Supp. 2d 226, 253 (D.D.C. 2005) (BLM must either review two pipe segments as connected actions or make a more thorough and factually supportable finding of independent utility).
[248] *Del. Riverkeeper Network*, 753 F.3d at 1308–09. That decision can be contrasted to *Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers*, where the D.C. Circuit district court held that different federal approvals that were pending for the Dakota Access Pipeline had "substantial independent utility" as "each would allow a portion of pipeline to proceed as planned, while any denial would result in re-routing—with no apparent impact on the other federally regulated components of the project" and thus they did not constitute connected actions which must be reviewed in the same EIS. Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs, 301 F. Supp. 3d 50, 68–69 (D.D.C. 2018). The court asserted that the "limited federal involvement with [the Dakota Access Pipeline] and the potential for re-routing" distinguished the case from the facts of *Delaware Riverkeeper*—and in particular, because this was an oil pipeline and not a natural gas pipeline, it was "not so beholden to overall federal approval." *Id.* But the

cases help to clarify some of the specific factors that are relevant to the segmentation analysis, such as whether the allegedly connected actions are subject to federal approval, whether they are occurring at roughly the same time, and whether they are physically connected (this last factor being informative but not dispositive in the analysis).[249]

The same factors are relevant when determining whether different types of infrastructure or activities within the fossil fuel supply chain (e.g., production and transport) are connected actions that must be reviewed in the same EIS. But the analysis of whether the supply chain components lack "independent utility" is trickier because these components are, in many cases, more interchangeable than pipeline segments.[250] Consider, for example, a situation in which the federal government is simultaneously reviewing and issuing approvals for a coal mining lease and a rail project that would transport coal from the mine to end-users. Whether these qualify as connected actions would depend on factors such as whether the coal mining "cannot or will not proceed" without the coal rail project, and whether the coal rail project will service other mines (or transport other goods).[251] There are only a handful of decisions that directly address the connected actions requirement in this context,[252] and two of them were dismissed because the allegedly connected action was not a "federal action" under NEPA.[253] The one case that dealt with two federal approvals, *Myersville Citizens for a Rural Community v. FERC*, involved FERC's review of an LNG export terminal and a natural gas storage project which

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court's decision in *Standing Rock* was clearly wrong, as it failed to substantiate its assumption that the pipeline would be re-routed in the absence of federal approvals—an assumption which, if applied to other oil pipelines, would render the prohibition against segmentation meaningless.

[249] *See, e.g.*, *Del. Riverkeeper Network*, 753 F.3d at 1308–09.

[250] Burger & Wentz, *supra* note 11, at 170–71.

[251] 40 C.F.R. § 1508.25.

[252] The complaint in *Diné Citizens* also alleged that OSM had violated the requirement to review connected actions in its review of a coal mining proposal when it failed to consider emissions from a connected power plant that would combust the coal, but the reviewing court held that it was unnecessary to reach that argument because it concluded that the combustion-related impacts were indirect effects of the proposal. Diné Citizens Against Ruining Our Env't v. U.S. Off. of Surface Mining, 82 F. Supp. 3d 1201, 1212 (D. Colo. 2015).

[253] Big Bend Conservation All. v. FERC, 896 F.3d 418, 424 (D.C. Cir. 2018) (holding that a natural gas pipeline which serviced an LNG terminal was not a connected action because it was not an interstate pipeline subject to federal jurisdiction); Wilderness Workshop v. U.S. Bureau of Land Mgmt., 531 F.3d 1220, 1221 (10th Cir. 2008) (holding that the authorization of a natural gas pipeline and "future gas well development" were not connected actions within the meaning of NEPA, because there was no imminent government action to develop natural gas resources that would also require an EIS).

were physically connected and under review by FERC at roughly the same time.[254] FERC asserted that the projects were not connected because the additional natural gas storage and transportation capacity associated with the storage project had been "fully subscribed" to other (domestic) uses.[255] Petitioners countered that the projects were connected because the storage facility would produce "excess natural gas capacity" that was destined for export through the LNG terminal.[256] Relying heavily on FERC's assertions, the D.C. Circuit Court of Appeals held that the projects were not connected actions because "neither depends on the other for its justification" and the two projects were not "financially and functionally interdependent."[257] This decision illustrates the challenge of establishing a lack of "independent utility" for interconnected fossil fuel supply infrastructure as well as the deference granted to agency conclusions on this issue. It does not entirely foreclose on the application of the rule prohibiting segmentation to other federal approvals, but makes clear that the circumstances in which courts will intervene to enforce this rule are relatively narrow.

### *C. Cumulative Emissions from Fossil Fuel Leasing and Transport Approvals*

Another key scoping question confronting federal NEPA reviews of fossil fuel projects is whether agencies must analyze the cumulative effects of decisions involving fossil fuel extraction or transportation. Whereas upstream and downstream emissions analyses look "vertically" at the fossil fuel supply (focusing on emissions associated with the same fuel as it moves from production to transport, processing, and combustion), cumulative emissions analyses look "horizontally" at the aggregate effect of multiple leasing and transportation infrastructure approvals.[258] One key difference between these two axes is that there is a causal relationship between different activities on the vertical axis,[259] but this is not necessarily the case for activities on the horizontal axis.

There are two provisions in the NEPA regulations that would potentially require an analysis of cumulative emissions in this context:

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[254] Myersville Citizens for a Rural Cmty., Inc. v. FERC, 783 F.3d 1301 (D.C. Cir. 2015).
[255] Dominion Cove Point LNG, LP, 148 FERC ¶ 61,244 (2014).
[256] *Myersville Citizens for a Rural Cmty.*, 783 F.3d at 1326.
[257] *Id.*
[258] Burger & Wentz, *supra* note 11, at 128.
[259] Without each "link" in the fossil fuel supply chain, the fuels would never be produced, transported to markets, or consumed.

(i) the requirement to evaluate cumulative effects, and (ii) the requirement to evaluate "cumulative actions" and "similar actions" in a single review. The precise legal obligations are murky under either framework, as the regulatory language is very broad; the case law under both provisions is sparse. We discuss both frameworks below.

1. Cumulative Emissions as Cumulative Impacts

The NEPA regulations require agencies to evaluate cumulative effects, which result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."[260] Cumulative effects "can result from individually minor but collectively significant actions taking place over a period of time."[261] As with other effects, agencies must take a "hard look" at cumulative impacts and the analysis and data presented should be "useful" to decision makers.[262] Such cumulative impacts must be taken into account when assessing the significance of an action's environmental impacts, and the regulations specify that "significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment."[263]

The cumulative emissions from multiple decisions involving fossil fuel supply projects are precisely the sort of cumulative impact that should be evaluated under NEPA to help serve the twin goals of informed decision-making and public disclosure. There has been a series of decisions involving the federal government's responsibility to account for the cumulative emissions from fossil fuel leasing and transport approvals, including at least five cases involving production and one involving transportation (the Keystone XL pipeline).[264] Generally speaking, courts

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[260] 40 C.F.R. § 1508.7.
[261] *Id.*
[262] *See* League of Wilderness Defs.—Blue Mountains Biodiversity Project v. Allen, 615 F.3d 1122, 1135 (9th Cir. 2010); Kern v. U.S. Bureau of Land Mgmt., 284 F.3d 1062, 1075 (9th Cir. 2002).
[263] 40 C.F.R. § 1508.27(b)(7). For more on this point, see *infra* Section III.B.
[264] There are at least four pending cases alleging failures to quantify cumulative emissions in the context of oil and gas leasing and the decisions in those cases may help further shape agency obligations in this context. Complaint at 23–24, S. Utah Wilderness All. v. Bernhardt, No. 2:19-cv-002660RJS (D. Utah Apr. 19, 2019) (failure to consider cumulative effects of multiple oil and gas leases); Complaint at 33, Rocky Mountain Wild v. Zinke, No. 1:18-cv-02468 (D. Colo. Sept. 27, 2018) (BLM failed to take a hard look at cumulative climate impacts "in conjunction with other past, present, and future lease

are deferential to agency decisions about the proper scope of the cumulative impacts analysis because the regulatory requirement is so broadly worded, and agencies must therefore exercise discretion in deciding which past, present, and reasonably foreseeable actions to focus on.[265] But there are some examples of judicial intervention—specifically, where an agency has ignored the cumulative emissions of multiple leasing decisions that are simultaneously pending before the agency. Two more specific trends in these cases are (i) some courts have adopted a very narrow definition of what constitutes a "reasonably foreseeable" action, holding that agencies are not required to consider other pending approvals for fossil fuel production until a final EA or EIS has been issued for those approvals and (ii) in several instances, courts have conflated petitioners' arguments that agencies should evaluate cumulative *emissions* with arguments about the need to evaluate the actual effects of climate change caused by those emissions in the cumulative impacts analysis, and have held that quantification of the cumulative emissions was not required because quantification of actual climate impacts was not feasible. For reasons discussed below, we think courts have erred in both respects.

The D.C. Circuit Court of Appeals addressed the issue of foreseeability in *WildEarth Guardians v. Jewell*. There, plaintiffs argued that BLM's analysis of GHG emissions from a coal lease was inadequate because BLM failed to consider its cumulative impact along with emissions from eleven other pending lease applications in the Powder River Basin.[266] At the time the EIS was prepared, BLM had issued draft EISs for four of the eleven leases; the other seven leases were still in the scoping stage.[267] The D.C. Circuit held that the approval of the eleven other leases was not reasonably foreseeable at this stage and thus BLM was not required to evaluate them in its cumulative effects analysis.[268] This decision thus set a very high bar for what constitutes a "foreseeable" future action.

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sales in the Uinta Basin"); Complaint at 24, WildEarth Guardians v. U.S. Bureau of Land Mgmt., No. 4:18-cv-00073 (D. Mont. May 5, 2018) (BLM "failed to quantify cumulative emissions" in oil and gas leasing EA); Complaint at 4, Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018) (failure to account for cumulative effects of multiple oil and gas leases). There are also cases in which petitioners are primarily relying on the "cumulative effects" framework to argue that agencies should take a harder look at the actual impacts of emissions—that is, the impacts of climate change on human and natural systems. As such claims do not implicate the proper scope of the emissions analysis but rather the mode of analysis, we discuss them in Part III.

[265] Kleppe v. Sierra Club, 427 U.S. 390, 413–14 (1976).

[266] WildEarth Guardians v. Jewell, 738 F.3d 298, 309 (D.C. Cir. 2013).

[267] *Id.* at 310.

[268] *Id.*

This rationale for this standard is questionable, especially as applied to pending actions for which a draft EIS or EA has been prepared. The draft document is the final step in the agency review process before the agency commits to a final action,[269] and preparing this document requires a considerable commitment of time and resources[270]—and such, it is a strong indicator that an agency intends to proceed with the action. To illustrate this point, when *WildEarth Guardians v. Jewell* was being tried, BLM had already published EISs for all of the leases, issued Records of Decisions ("RODs") for three leases, had RODs pending for four leases, and held a sale for one lease.[271] This is such a narrow interpretation of "reasonably foreseeable future actions" that it almost eliminates the requirement to look at future federal actions altogether. If a proposal for which a draft EIS or EA has been prepared does not qualify as a "foreseeable future action," then what does? Only actions that have been approved but not yet implemented? This is too lenient an interpretation to support NEPA's goals of informed decision-making and public disclosure.

That being said, even under this very narrow interpretation, there is ample room for greater disclosure of cumulative emissions from fossil fuel supply projects. This is illustrated by a decision from the D.C. district court in a case involving BLM's failure to look at the cumulative effects of hundreds of oil and gas leases in Wyoming, Utah, and Colorado. In that case, the court found that BLM had violated NEPA by failing to quantify the aggregate emissions from eleven lease sales encompassing 473 oil and gas leases.[272] The court explained that "considering each individual drilling project in a vacuum deprives the agency and the public of the context necessary to evaluate oil and gas drilling on federal land before irretrievably committing to that drilling."[273] There was no question as to whether the 473 lease sales were "reasonably foreseeable" as the sales had already been issued. But the court also noted, consistent with the D.C. Court of Appeals standard, "[t]o the extent other BLM actions in the region—such as other lease sales—are reasonably foreseeable when an EA is issued, BLM must discuss them as well."[274] The court noted that BLM must "consider these cumulative impacts when assessing the contribution of the leasing program to climate change" even if it

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[269] *See* 40 C.F.R. § 1502.1.
[270] *See* 40 C.F.R. § 1502.2–1502.3.
[271] *WildEarth Guardians*, 738 F.3d at 310.
[272] WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 55, 71 (D.D.C. 2019).
[273] *Id.* at 83.
[274] *Id.* at 77.

determined that each individual lease sale would have a "de minimis impact on climate change."[275]

The three other decisions on the required scope of cumulative emissions analysis for fossil fuel production approvals all illustrate how deferential courts are to agencies on this question. Two of these decisions were issued by the same judge in the Colorado district court.[276] In both cases, plaintiffs

> contended that NEPA required BLM to evaluate all emissions from its oil and gas leasing approvals in its cumulative impacts analysis.[277] The judge disagreed, finding that BLM had taken an appropriately hard look at cumulative impacts by providing a qualitative analysis of climate change and its potential impacts.[278] In the later of the two decisions, the judge cited two factors that informed its decision: (i) the general principle of deference to agencies ("it is not the role of the court to decide whether Defendants choices were ideal; I am merely tasked with determining whether Defendants' analyses met the minimum threshold necessary to constitute a 'hard look.'"); and (ii) BLM's determination that it was "impossible to attribute a particular climate impact in any given region to GHG emissions from a particular source" because "tools did not exist that would allow [BLM] to predict how a project's emissions would impact global, regional, or local climate because, at the time, government agencies did not have standardized protocols or specific levels of significance by which they could quantify climate impacts."[279] While this general principle of deference may be true, it appears that the court's deference in this context was misplaced insofar as the court was deferring to BLM's explanation of why it could not quantify climate *impacts* when deciding that BLM was not obligated to quantify cumulative emissions

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[275] *Id.*
[276] Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt., 377 F. Supp. 3d 1223 (D. Colo. 2019); Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145 (D. Colo. 2018).
[277] *See, e.g.*, Plaintiffs' Opening Merits Brief at 16, Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt., 377 F. Supp. 3d 1223 (D. Colo. 2019) (No. 1:17-cv-2519-LTB-GPG).
[278] *Citizens for a Healthy Cmty.*, 377 F. Supp. 3d at 1239.
[279] *Id.* at 1239.

> from BLM leasing. The court's decision did not contain any assessment of whether such quantification would be feasible or and to what extent it was necessary for informed decision-making.

The Montana district court made a similar logical error in an unreported opinion involving BLM's cumulative impact analysis for oil and gas leasing. There, petitioners alleged that BLM should have quantified emissions from the entire mineral estate managed by BLM, or at minimum, eight revised RMPs that were approved by a single ROD on the same date (and thus there was no question about whether they were "foreseeable").[280] Petitioners also alleged that BLM should have used the global carbon budget and/or social cost estimates to evaluate the actual impacts of those cumulative emissions (but this was distinct from their claim that quantification was required).[281] The district court conflated these two arguments in its analysis, finding that "[a]nalysis of the cumulative impacts of climate change would require not only quantification, but a standard by which to measure the impacts," and although plaintiffs presented two possible standards (global carbon budget and social cost metrics), no courts had yet required the use of these tools in that manner.[282] At the same time, the district court stated that GHG emissions can be used as a proxy for the consideration of global climate change effects.[283] The reasoning behind this decision is dubious for several reasons. First, the court never explained why quantification of the cumulative emissions from leasing decisions should not be required as a "first step" in the cumulative impact analysis regardless of whether metrics were available to further evaluate the actual impacts of those emissions. Second, despite acknowledging that GHG emissions could themselves serve as a proxy for impacts, the court still held that quantification was not required. Third, if the court was correct that the cumulative effects analysis required an additional "standard by which to measure the impacts," then should not BLM be required to use the tools that were at its disposal (specifically the global carbon budget and the social cost of carbon) to perform a sound cumulative effects analysis? Ultimately, it

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[280] W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. CV 16-21-GF-BMM, 2018 WL 1475470, at *13 (D. Mont. Mar. 26, 2018), *appeal dismissed*, No. 18-3583618, 2019 WL 141346 (9th Cir. Jan. 2, 2019).
[281] *Id.* at *14.
[282] *Id.* at *13–14.
[283] *Id.* at *18.

appears that the court may have conflated the two arguments presented by the petitioners (that BLM should quantify cumulative emissions from fossil fuel leasing, and that BLM should look at the actual impacts of those cumulative emissions) and thus failed to adequately address the first argument about quantification.

Finally, the one case addressing the requirement to look at cumulative emissions in the transport context was *Indigenous Environmental Network v. U.S. Department of State,* which involved the environmental review for the Keystone XL pipeline.[284] There, the Montana district court found that emissions from two transboundary oil pipeline projects that were being reviewed by the State Department at the same time (Keystone XL and Alberta Clipper) must be considered in the cumulative impacts analysis for Keystone XL.[285] The two pipeline projects shared a geographic nexus in that they originated in the same region (Alberta oil sands) but transported the oil to very different markets in the United States.[286] This decision provides some insight on the minimum requirements for cumulative effects analysis in the pipeline context and suggests that NEPA also requires FERC to consider the emissions from multiple pipeline projects that are undergoing FERC review in its cumulative impacts analysis, particularly pipelines that are located in the same region and/or service the same natural gas production sites or end-user markets.[287]

### 2. Cumulative Emissions as Impacts of Cumulative and Similar Actions

The regulatory requirements for analyzing cumulative and similar actions together also provide a basis for arguing that agencies should look at the aggregated effects of multiple fossil fuel extraction and

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[284] Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561 (D. Mont. 2018).
[285] *Id.* at 577–78.
[286] *Id.* at 577.
[287] Granted, the facts underpinning *Indigenous Environmental Network* were somewhat unique: the State Department had treated the Keystone XL pipeline as a cumulative action in the Alberta Clipper EIS (and had calculated cumulative emissions from the two projects in that EIS), and thus it was irrational to take a different approach in the Keystone XL EIS. *Id.* at 578. But the scope of an agency's cumulative effects (or actions) analysis on one NEPA review should not be a dispositive factor in determining whether an agency has taken an adequately hard look at cumulative effects in another NEPA review. To hold that an agency is *not* required to evaluate certain cumulative effects because it did not evaluate them in a past review would be irrational and would undermine NEPA's core purposes.

transportation proposals. These provisions are useful because they require a more comprehensive review of the combined impacts of multiple federal actions—in effect, a joint EA or EIS that looks at the actions themselves in the aggregate, as opposed to just looking at certain effects in the aggregate.

The CEQ regulations require a joint review of federal actions that "have cumulatively significant impacts and should therefore be discussed in the same impact statement."[288] The regulations also recognize a prohibition of segmentation of reviews for cumulative actions, similar to that recognized for connected actions. Specifically, in the paragraph directing agencies to consider "whether the action is related to other actions with individually insignificant but cumulatively significant impacts," the regulations state that "[s]ignificance cannot be avoided . . . by breaking [the action] down into small component parts."[289]

In contrast, the regulations state that an agency "may wish" to analyze "similar actions" in the same NEPA document—similar actions being defined as those which "have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography" and that an agency "should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement."[290] Due to the more permissive language here, courts have granted considerable deference to agencies' decisions about whether to prepare a single EIS for similar actions.[291]

Decisions striking down agency reviews due to failure to prepare a joint (or programmatic) EA or EIS for cumulative and similar actions are rare.[292] In the 1976 case *Kleppe v. Sierra Club*, the Supreme Court addressed whether the federal government was obligated to prepare a programmatic review for coal leasing in the Great Plains Region.[293] There, the Supreme Court explained that:

> A comprehensive impact statement may be necessary in some cases for an agency to meet [its duty to evaluate environmental impacts]. Thus, when several proposals for coal-related actions that will have cumulative or synergistic

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[288] 40 C.F.R. § 1508.25(a)(2).
[289] § 1508.27(b)(7).
[290] § 1508.25(a)(3).
[291] *See* Burger & Wentz, *supra* note 11, at 173–74.
[292] *See id.* at 171–75.
[293] Kleppe v. Sierra Club, 427 U.S. 390 (1976).

> environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considered together. Only through comprehensive consideration of pending proposals can the agency evaluate different courses of action.[294]

However, in that case, the court held that PEIS for the Great Plains Region was not required because (i) all proposals for coal leasing were either national or local in scope (there was no regional development plan in the works), and (ii) the federal government had prepared a nationwide PEIS for a new national coal-leasing policy as well as EISs for proposed local coal leasing actions.[295] In this context, the Court held that it was appropriate to defer to the federal government's determination that "the appropriate scope of comprehensive statements should be based on basins, drainage areas, and other factors."[296]

The Ninth Circuit addressed the narrower question of whether the federal government had improperly piecemealed its analysis of coal mining operating in a particular leasing area in *Cady v. Morton*.[297] There, the Ninth Circuit Court of Appeals found that DOI had improperly isolated the impacts of coal leasing activities when it approved coal leases covering 30,876 acres of land and up to twenty years of mining but then prepared an EIS for a mining plan which covered only five years of mining on 770 acres.[298] DOI argued that the EIS was appropriate in scope because an EIS need not be prepared covering an entire project when an adequate EIS covering a discrete phase or segment thereof has been prepared, but the court disagreed, explaining that:

> While it is true that each mining plan prepared for tracts within the leased area is to a significant degree an independent project which requires a separate EIS with respect to each, it is no less true that the breadth and scope of the possible projects made possible by the Secretary's approval of the leases require the type of comprehensive study that NEPA mandates adequately to inform the Secretary of the possible environmental consequences of

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[294] *Id.* at 409–10.
[295] *See id.* at 399–401.
[296] *Id.* at 414.
[297] Cady v. Morton, 527 F.2d 786 (9th Cir. 1975).
[298] *See id.* at 794–96.

> his approval. Westmoreland's massive capital investment and extended contractual commitments present a situation in which "it would be irrational, or at least unwise, to undertake the first phase if subsequent phases were not also undertaken." However, even were this not true, it cannot be denied that the environmental consequences of several strip mining projects extending over twenty years or more within a tract of 30,876.45 acres will be significantly different from those which will accompany Westmoreland's activities on a single tract of 770 acres.[299]

This case was decided before the CEQ regulations were promulgated and thus the court did not discuss whether these were "connected," "cumulative," or "similar" actions under 40 C.F.R. § 1508.25—but the analysis here suggests that the actions had some characteristics of connected actions but would best be characterized as "cumulative" or "similar" actions under the current regulations as they had a "significant degree" of independent utility.[300]

Federal approvals for fossil fuel production and transportation can be characterized as both "cumulative" and "similar" actions—most of these approvals have independent utility,[301] but these actions have "similarities which provide a basis for evaluating their consequences together" as well as "cumulatively significant effects" on fossil fuel use and the corresponding emissions. NEPA's twin aims of informed decisionmaking and public disclosure would also be best served through a comprehensive assessment.

However, as noted above, courts tend to be deferential to agency decisions about the scope of their NEPA assessments for cumulative and similar actions. One important factor is whether there is a statutory mandate compelling the agency to prepare and/or periodically update a national or regional program, which would in turn trigger NEPA review of the program. For example, the Outer Continental Shelf Lands Act requires BOEM to prepare five-year programs for offshore leasing covering broad geographic areas, and it would be plainly arbitrary and capricious for BOEM to forgo a programmatic NEPA analysis of those five-year programs.[302]

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[299] *Id.* at 795 (internal citations omitted).
[300] *See id.*; 40 C.F.R. § 1508.25.
[301] As discussed in Section II.B.1, authorized projects which lack independent utility would best be analyzed under the "connected actions" framework.
[302] Outer Continental Shelf Lands Act, 43 U.S.C. § 1344(a).

But there is no comparable requirement for onshore leasing or for fossil fuel transportation infrastructure. Prior to authorizing fossil fuel development on public lands, agencies are required to prepare RMPs,[303] but these plans cover much smaller geographic units than the outer continental shelf ("OCS") five-year program documents (and in many cases have not been updated with an analysis of potential GHG emissions from fossil fuel leasing). The result is that agencies are approving fossil fuel supply projects without any programmatic analysis on the cumulative effect of multiple approvals across broad geographic regions.[304]

Two other lawsuits challenging the federal government's failure to conduct an updated programmatic review of the federal coal leasing program to address climate impacts, among other things, are relevant.

In *Western Organization of Resource Councils v. Zinke*, the D.C. Circuit Court of Appeals held that BLM was not required to update the PEIS for the federal coal leasing program as there was no new proposal requiring NEPA review.[305] The "action" at issue in this case was the 1979 PEIS for the federal coal leasing program, and plaintiffs argued that this needed to be updated to reflect significant new information about climate change.[306] The D.C. Circuit noted that plaintiffs had raised a "compelling argument" for BLM to re-evaluate the federal coal leasing program in light of climate change concerns, but held that the action contemplated in the 1979 PEIS had been completed in 1979 and no new nationwide action had been proposed.[307] The court suggested that the plaintiffs might pursue these claims through an alternate approach:

> Appellants may, when appropriate, challenge specific licensing decisions on the ground that the EIS prepared in support of any such decision fails to satisfy NEPA's mandate to consider the cumulative environmental impacts of coal leasing. Such a claim might challenge any attempt by

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[303] *See* 43 C.F.R. § 1610.

[304] While this may have been understandable at an earlier point in time, when adverse environmental effects were understood to be relatively local, or regional in some instances, at this point agencies understand that the GHG emissions from these approvals have a global effect and can be analyzed on a regional or nationwide basis. Congress could address this gap through legislation requiring programmatic reviews, but in the absence of congressional action, NEPA requirements can play a role in compelling such analysis. *See supra* Section I.C.

[305] W. Org. of Res. Councils v. Zinke, 892 F.3d 1234, 1245–46 (D.C. Cir. 2018).

[306] *Id.* at 1236–37.

[307] *Id.* at 1244–45.

> BLM to rely on (or tier to) the 1979 PEIS on the ground that it is too outdated to support new federal action.[308]

The court noted that such a lawsuit was not foreclosed by its decision in *WildEarth Guardians v. Jewell* (holding that eleven pending coal leases were not reasonably foreseeable), because that case did not involve any allegations about improperly tiering to an outdated PEIS.[309]

In *Citizens for Clean Energy v. U.S. Department of the Interior*, the Montana district court held that the Trump administration's decision to terminate the federal coal leasing moratorium was a major federal action with environmental implications requiring some form of NEPA review.[310] The court did not go so far as to require a PEIS but rather directed DOI to consider what form of NEPA documentation would be required for this action.[311] Granted, neither of these two decisions on the federal coal leasing program address whether there are "cumulative" or "similar" actions that must be reviewed in a joint PEIS—rather, they deal with whether there is a major federal proposal that triggers NEPA requirements—but they do bear on agency obligations to evaluate the cumulative effects of coal leasing decisions on a nationwide basis.

Two notable decisions address agency obligations to review connected, cumulative, or similar actions involving fossil fuel supply in the same EIS,[312] but both decisions were more limited in scope insofar as they dealt with only two potentially related actions of the same sort. In one case, a federal court found that emissions from two oil pipelines must

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[308] *Id.* at 1244.
[309] *Id.* at 1245.
[310] Citizens for Clean Energy v. U.S. Dep't of the Interior, 384 F. Supp. 3d 1264, 1271, 1279 (D. Mont. 2019).
[311] *Id.* at 1281.
[312] There are also at least two pending cases alleging that oil and gas leases sales were "cumulative actions" that should be reviewed in the same EIS due to their cumulatively significant impacts, and that BLM unlawfully segmented its analysis of the sales into multiple EAs thus underplaying the significance of the impacts. These complaints deal with approved oil and gas lease sales, thus avoiding the need to demonstrate that a pending sale is "reasonably foreseeable." The two pending cases alleging improper segmentation of oil and gas leasing EAs also allege inadequate analysis of cumulative effects, and it remains to be seen whether the courts will resolve these under the cumulative impacts framework (requiring supplementation of the existing EAs) or cumulative actions framework (requiring preparation of a comprehensive EIS). Complaint at 27, 30–31, WildEarth Guardians v. U.S. Bureau of Land Mgmt., No. 4:18-cv-00073 (D. Mont. May 15, 2018); Complaint at 76–77, W. Watersheds Project v. Zinke, No. 1:18-cv-00187 (D. Idaho Apr. 30, 2018).

be reviewed as cumulative impacts and also described these two projects as "cumulative actions"—but because the analysis focused on the requirements for assessing cumulative impacts rather than actions and the remedy was to update the cumulative impacts analysis for the one project, the decision does not provide much guidance on the question of when a joint EIS is required for cumulative actions.[313] In another case, a federal court held that BLM had not improperly piecemealed its analysis in a coal lease EA when it failed to prepare a comprehensive EIS encompassing (i) another mining plan modification that would expand the mine by another 498 acres and 48 million tons of coal and (ii) an application for another coal lease at the mine that would add 1,600 acres and 198 million more tons of coal to the mine.[314] The court reasoned that the plan modification was not a "reasonably foreseeable future action" at the time the EA was prepared because there it was only a pending application that had not yet been approved.[315] As discussed above, the rationale for adopting such a narrow definition of foreseeability is questionable—the entire purpose of the provisions directing agencies to review cumulative and similar actions in the same EIS is to facilitate consideration of the combined effects of those actions *before* an agency makes a final decision. Limiting the analysis of cumulative and similar actions to actions which have already been approved completely undermines this purpose.

## III. THE ADEQUACY OF GHG EMISSIONS ANALYSIS FOR FOSSIL FUEL SUPPLY PROJECTS

As questions about the proper scope of review for direct, indirect, and cumulative GHG emissions from fossil fuel supply projects are resolved, new questions naturally arise about the adequacy and reasonableness of agencies' calculations, disclosures, and determinations of the significance of GHG impacts. This section explores four key areas for environmental impact assessment of these projects: (i) the net impact of the proposal on fossil fuel use and corresponding emissions (i.e., the "energy

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[313] Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561, 578 (D. Mont. 2018).

[314] WildEarth Guardians v. Zinke, No. 1:17-cv-0080, 2019 WL 2404860, at *13 (D. Mont. Feb. 11, 2019); Complaint at 17, WildEarth Guardians v. Zinke, No. 1:17-cv-0080 (D. Mont. June 8, 2017).

[315] WildEarth Guardians, No. 1:17-cv-0080, 2019 WL 2404860, at *5, *13. Oddly, the court did not address whether the other coal lease application was reasonably foreseeable, but this narrow definition of "foreseeable future action" would presumably exclude that pending application as well.

market analysis"); (ii) non-$CO_2$ emissions such as methane; (iii) the significance of GHG emissions; and (iv) alternatives and mitigation options to reduce GHG emissions. In reviewing the adequacy of environmental reviews, courts tend to be deferential to agencies, particularly as compared with situations where agencies have wholly omitted an impact from the scope of their review. Yet, judicial discretion to agency expertise only goes so far, and where an agency has clearly stepped outside the realm of reasonable analysis, it is proper for a court to intervene.

### *A. Energy Market Impacts and Net Emissions*

In assessing upstream and downstream GHG emissions of federally approved fossil fuel supply projects, agencies may seek to understand the net emissions impact of the proposal based on an assessment of how the projected increase in fossil fuel production or transport capacity will affect broader patterns of energy production and consumption. The net emissions analysis is essentially a comparison between emissions under the "no action" and "action" alternatives, although it is not always framed as such.[316] One approach to this analysis is to deflect it with a "perfect substitution" argument; that approach is born of faulty logic and has been roundly rejected by the courts. Another approach involves employing energy market models to quantify emissions effects; however, in some instances agencies have concluded that it is impossible to accurately project such effects, in others they have conducted analyses that put a thumb on the scale, and in others they have undertaken more rigorous analyses. The critical question is whether agencies are adequately supporting their findings, one way or the other. The validity of agency findings on energy substitution and net emissions depends on the nature of the proposal. The nationwide federal coal leasing program, for example, presumably has a much larger effect on net emissions than the approval of an individual pipeline. But even a single pipeline or lease approval may have some effect on fossil fuel prices and markets. Recognizing this, courts have flatly rejected "perfect substitution" in the context of coal leases and coal railways, and have made it clear that perfect substitution claims for other types of proposals must be supported by adequate analysis.[317] And

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[316] Courts have held that it is reasonable to use several different scenarios to frame the "no action" alternative where there is uncertainty about energy markets and substitution. *See, e.g.*, Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561, 574–75 (D. Mont. 2018).

[317] *See* Section II.A.1.

this is exactly what many agencies have begun doing: incorporating models and quantitative analysis into their NEPA documentation to support their findings on energy market substitution, and in some cases finding that the project will have little or no net impact on emissions. Agency arguments about energy market substitution can be difficult to parse because (i) the assumptions and calculations often are not fully disclosed in the NEPA documentation and can be easily manipulated to achieve an intended result; (ii) there is so much uncertainty in the results that it is difficult if not impossible to definitively say that an agency reached the wrong conclusion; and (iii) courts are deferential to agencies on such technical issues. There may be instances where the analysis of energy market impacts is so egregiously flawed that a court will remand the issue back to the agency for supplementation or revision of the analysis, but where agencies can show their math they often pass the test.

1. Fossil Fuels and "Perfect Substitution"

Federal courts have rejected perfect substitution arguments as irrational and/or unsubstantiated in a number of cases involving both fossil fuel production and transportation infrastructure. As a threshold matter, agencies cannot rely on unsupported assumptions of perfect substitution as a justification for ignoring downstream GHG emissions.[318] As the court in *High Country Conservation Advocates* explained, this assumption was "illogical" in the context of a coal lease approval because the production of coal resulting from the proposed action would "increase the supply of cheap, low-sulfur coal" and "this additional supply will impact the demand for coal relative to other fuel sources, and coal that otherwise would have been left in the ground will be burned."[319] Similarly, in *Mid States Coalition v. Surface Transportation Board,* the Eighth Circuit Court of Appeals held that downstream emissions must be disclosed in the context of a coal railway because the increase in coal transportation capacity would affect the price of coal relative to other energy sources and this would affect patterns of coal production and consumption.[320] In *Sierra*

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[318] As discussed below, the D.C. Circuit Court of Appeals' decision in Birckhead v. FERC raises questions about whether courts will defer to perfect substitution arguments as a justification for ignoring *upstream* emissions in the context of fossil fuel transportation approvals. *See supra* notes 215–23.

[319] High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1197–98 (D. Colo. 2014).

[320] Mid States Coal. for Progress v. Surface Transp. Bd., 345 F.3d 520, 549–50 (8th Cir.

*Club v. FERC*, the D.C. Circuit Court of Appeals rejected FERC's argument that it need not quantify combustion emissions in the context of a natural gas pipeline review because some of the natural gas would replace dirtier fossil fuels, thus offsetting the project's emissions estimates.[321] The court found that a purely qualitative analysis of substitution was inadequate because "[a]n agency decisionmaker reviewing this EIS would . . . have no way of knowing whether total emissions, on net, will be reduced or increased by this project, or what the degree of reduction or increase will be."[322]

It is also arbitrary and capricious for agencies to estimate downstream emissions for the proposed action but then claim that the emissions impact will be identical under the "no action" alternative due to perfect substitution.[323] In one case involving an EA where OSM estimated downstream emissions from coal leasing but declined to estimate the social costs of those emissions based on its conclusion that the leasing program would have no effect on emissions due to substitution, the reviewing court explained that:

> This conclusion is illogical, and places the Enforcement Office's thumb on the scale by inflating the benefits of the action while minimizing its impacts. It is the kind of "[i]naccurate economic information" that "may defeat the purpose of [NEPA analysis] by impairing the agency's consideration of the adverse environmental effects and by skewing the public's evaluation of the proposed agency action."[324]

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2003). On remand, STB prepared an EIS in which it modelled the effects of the coal railway on coal production and use, and petitioners challenged the supplemental analysis on the grounds that STB continued to rely on the assumption that "not all of the . . . transported coal would represent new combustion, that some would be simply a substitute for existing coal supplies." Mayo Found. v. Surface Transp. Bd., 472 F.3d 545, 556 (8th Cir. 2006). But the Eighth Circuit upheld STB's review as the conclusions about market substitution were supported by quantitative analysis and energy market models. *Id.*

[321] Sierra Club v. FERC, 867 F.3d 1357 (D.C. Cir. 2017) (qualitative discussion of substitution not adequate).

[322] *Id.* at 1375.

[323] WildEarth Guardians v. U.S. Bureau of Land Mgmt., 870 F.3d 1222, 1235–36 (10th Cir. 2017); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 75 (D.D.C. 2019); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1103 (D. Mont. 2017).

[324] Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1098 (D. Mont. 2017) (internal citations omitted). Notably, in an EA prepared on remand, OSM revised its annual production and emissions estimates downwards (from 23.16 million tons to 13.1 million tons $CO_2$ / year) even though the scope and duration of the action had not

Another decision which also involved OSM's review of coal mining impacts held that this rule was also applicable where OSM had declined to estimate the social costs of emissions because it was uncertain whether emissions would actually be reduced under the no action alternative due to the possibility of energy market substitution. While OSM had shifted its position from "no impact" to "uncertain impact" due to substitution, the court found that this was still "arbitrary and capricious" because the "alternative source substitution assumption is not supported by any market data, even though modeling systems exist to evaluate market effects of changes in coal supply."[325]

In addition, agencies cannot justify claims of perfect substitution by relying on incomplete or irrational analysis of energy markets. This was the focus of the Tenth Circuit Court of Appeals' decision in *WildEarth Guardians v. Bureau of Land Management*, which contained one of the most detailed assessments of an agency's perfect substitution argument to date. That case involved BLM's EIS for coal leases that would have extended the life of two coal mines (the "Wright Area" mines) that accounted for nearly 20 percent of U.S. annual domestic coal production.[326] BLM had quantified downstream emissions from combustion of the coal (approximately 382 million tons of annual $CO_2$ emissions—roughly 6 percent of U.S. total 2008 emissions) but concluded that the same amount of coal would be sourced from elsewhere if it did not approve the proposed leases and thus there was no difference between the proposed action and the no action alternative with respect to coal production and consumption.[327] Thus, as noted by the court, the issue was not that BLM had completely ignored the effects of increased coal consumption, but rather that it had analyzed them irrationally.[328]

The court found that BLM's "long logical leap presumes that either the reduced supply will have no impact on price, or that any increase in

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changed and the total projected production of "saleable" coal had actually increased from eighty million tons to 86.8 million tons, and then replaced the statement about perfect substitution with a claim that the proposal would have a "very small impact" on emissions. This illustrates how easily agencies can adjust their quantitative analysis to achieve an intended result. *See* OFF. OF SURFACE MINING, U.S. DEP'T OF THE INTERIOR, BULL MOUNTAINS MINE NO. 1 FEDERAL MINING PLAN MODIFICATION ENVIRONMENTAL ASSESSMENT 2-9, 4-3 (2015); OFF. OF SURFACE MINING, U.S. DEP'T OF THE INTERIOR, BULL MOUNTAINS MINE NO. 1 FEDERAL MINING PLAN MODIFICATION ENVIRONMENTAL ASSESSMENT 18, 57–58 (2018).

[325] WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *11.

[326] WildEarth Guardians v. U.S. Bureau of Land Mgmt., 870 F.3d 1222, 1226–27 (10th Cir. 2017).

[327] *Id.* at 1228.

[328] *Id.* at 1237.

price will not make other forms of energy more attractive and decrease coal's share of the energy mix, even slightly" and found that this assumption lacked any support in the administrative record.[329] The court explained:

> BLM did not point to any information (other than its own unsupported statements) indicating that the national coal deficit of 230 million tons per year incurred under the no action alternative could be easily filled from elsewhere, or at a comparable price. It did not refer to the nation's stores of coal or the rates at which those stores may be extracted. Nor did the BLM analyze the specific difference in price between PRB coal and other sources; such a price difference would effect [sic] substitutability.[330]

The court also noted that BLM's assumption was contradicted by one of the principle resources on which it relied: the EIA's 2008 Energy Outlook. While the report generally predicted an increase in coal production, it also found that different assumptions for coal mining and transportation costs affected delivered coal prices and demand, and that higher coal costs resulted in much lower U.S. coal consumption.[331] Thus, the court found that "the [EIA] report supports what one might intuitively assume: when coal carries a higher price, for whatever reason that may be, the nation burns less coal in favor of other sources."[332] The court held that BLM's "blanket assertion that coal would be substituted from other sources, unsupported by hard data[,]" did not provide sufficient information to permit a reasoned choice between the preferred alternative and the no action alternative.[333] In addition, the court noted that, even if BLM had hard data to support this statement, "we would still conclude this perfect substitution assumption arbitrary and capricious because the assumption itself is irrational (i.e., contrary to basic supply and demand principles)."[334] The court concluded that it was "an abuse of discretion" to rely on such a baseless economic assumption to distinguish between the no action and preferred alternatives.[335]

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[329] *Id.* at 1229.
[330] *Id.* at 1234.
[331] *Id.* at 1234–35.
[332] *WildEarth Guardians*, 870 F.3d at 1235.
[333] *Id.*
[334] *Id.* at 1236.
[335] *Id.* at 1237–38.

Another key takeaway from *WildEarth Guardians v. Bureau of Land Management* is that perfect substitution claims are readily distinguishable from other types of agency assumptions that warrant judicial deference. The primary authority on this issue is the Supreme Court's decision in *Baltimore Gas & Electric Co. v. NRDC*, which upheld the Nuclear Regulatory Commission's ("NRC") conclusion that permanent nuclear waste storage would not have a significant environmental impact, which was based on the Commission's assumption that waste repositories would perform perfectly.[336] There, the Supreme Court deferred to NRC's assumption because (1) it had a limited purpose in the overall environmental analysis (i.e., it was not the key to deciding between two alternatives); (2) overall, the agency's estimation of the environmental effects was overstated, so this single assumption did not determine the overall direction the NEPA analysis took; and (3) courts are most deferential to agency decisions based not just on "simple findings of fact," but in the agency's "special expertise, at the frontiers of science."[337]

Applying those factors to BLM's perfect substitution assumption, the Tenth Circuit Court of Appeals found that:

> Here, the BLM's substitution assumption appears to be quite different from the Commission's zero release assumption under the three factor analysis in *Baltimore Gas*. First, the BLM's perfect substitution assumption was key to the ultimate decision to open bidding on the leases. In each of the four RODs, the "Reasons for Decision" section first discusses the leases' effect on coal combustion in the nation overall, then lists the other facts that influenced its decision in bullet points. In each ROD, the discussion opens with the assertion that: "Denying this proposed coal leasing is not likely to affect current or future domestic coal consumption used for electric generation." Prioritizing the carbon emissions and global warming analysis in the RODs suggests that this question was critical to the decision to open the leases for bidding. Prioritizing the perfect substitution assumption within that analysis suggests it was critical to deciding between two alternatives: whether or not to issue the leases. The perfect substitution assumption

[336] Balt. Gas & Electric Co. v. NRDC, 462 U.S. 87, 103 (1983).
[337] *Id.* at 102–04.

> was more than a "mere flyspeck" in the BLM's NEPA analysis.
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> Second, the BLM's carbon emissions analysis seems to be liberal (i.e., underestimates the effect on climate change). The RODs assume that coal will continue to be a much used source of fuel for electricity and that coal use will increase with population size. We do not owe the BLM any greater deference on the question at issue here because it does not involve "the frontiers of science." The BLM acknowledged that climate change is a scientifically verified reality. Climate science may be better in 2017 than in 2010 when the FEIS became available, but it is not a scientific frontier as defined by the Supreme Court in *Baltimore Gas*, i.e., as barely emergent knowledge and technology. Moreover, the climate modeling technology exists: the NEMS program is available for the BLM to use.[338]

Although the court remanded to the agency to modify and supplement its analysis, it declined to specify the exact approach that BLM must take. The court held that: "NEPA does not require agencies to adopt any particular internal decisionmaking structure"[339] and that "[c]hoosing not to adopt a modeling technique does not render the BLM's EIS arbitrary and capricious; its irrational and unsupported substitution assumption does."[340]

Most of the case law addressing perfect substitution claims as applied to downstream emissions is consistent with the principles described above.[341] In sum, courts have rightfully rejected perfect substitution

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[338] WildEarth Guardians v. U.S. Bureau of Land Mgmt., 870 F.3d 1222, 1236–37 (10th Cir. 2017).

[339] *Id.* at 1238 (citing *Balt. Gas*, 462 U.S. at 100).

[340] *WildEarth Guardians*, 870 F.3d at 1238.

[341] There is one unpublished opinion from the D.C. Circuit Court of Appeals that does not fully reflect these same principles. That case involved a situation similar to that which has arisen in the context of coal leases. FERC quantified downstream emissions for a proposed pipeline project but then stated that: (i) actual emissions would be fully offset by other sources of natural gas, resulting in no change in GHG emissions, and (ii) the downstream effects are "not reasonably foreseeable" and "not indirect impacts" and the commission was merely quantifying downstream emissions "outside the scope of [its] NEPA analysis." Petitioners claimed that this was not an adequate assessment of downstream impacts. The D.C. Circuit, however, held that it was not necessary to consider Petitioner's arguments about whether an increase in downstream emissions was foreseeable

arguments in the context of both fossil fuel production and transportation approvals. However, FERC has nonetheless relied on unsubstantiated perfect substitution arguments as the basis for either excluding upstream and downstream emissions from its environmental reviews or else discounting their importance in its significance analysis. There have been a number of lawsuits pending against FERC due to this practice.[342] FERC's position has been that "a causal relationship sufficient to warrant Commission analysis of the non-pipeline activity [i.e., production and consumption] as an indirect impact would only exist if the proposed pipeline would transport new production from a specified production area and that production would not occur in the absence of the proposed pipeline (i.e., there will be no other way to move the gas)."[343] FERC has simultaneously argued "it is unknown—and virtually unknowable—whether the gas to be transported on [a specific pipeline] will come from new or existing production" and "absent that basic information, it is nearly impossible to assess whether there will be any additional production activities in connection with the gas to be transported on the Project."[344] In addition, FERC maintains that, "even accepting, arguendo, that a specific pipeline project will cause natural gas production, we have

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because "FERC provided an estimate of the upper bound of emissions resulting from end-use combustion." Thus, the court upheld FERC's analysis without really confronting whether FERC's conclusions about perfect substitution were reasonable or supported by the record. *See* Appalachian Voices v. FERC, No. 17-1271, 2019 WL 847199 (D.C. Cir. Feb. 19, 2019).

[342] Several of these lawsuits challenge unsubstantiated assumptions from FERC about the effect of pipeline authorizations on fossil fuel production and consumption, including assumptions that pipeline development does not induce upstream natural gas production (or downstream consumption) and assumptions that pipeline development may actually reduce emissions by offsetting the use of higher carbon emitting fuels such as coal and fuel oil. *See, e.g.*, Del. Riverkeeper Network v. FERC, No. 18-1128 (D.C. Cir. May 8, 2018); Allegheny Def. Project v. FERC, No. 17-1098 (D.C. Cir. Mar. 23, 2017); Catskill Mountainkeeper, Inc. v. FERC, No. 16-345 (2d Cir. Feb. 5, 2016). A lawsuit has also been filed against the U.S. Army Corps of Engineers (USACE) for authorizing activities required for the construction of an oil pipeline without conducting a NEPA analysis to evaluate, among other things, "the climate impacts of 'locking in' future reliance on fossil fuels with a massive infrastructure investment." Complaint at 23, Atchafalaya Basinkeeper v. U.S. Army Corps of Eng'rs, 715 Fed. Appx. 399 (5th Cir. 2018) (No. 18-30257). There are also numerous administrative challenges involving FERC's failure to quantify/disclose. *See* Dominion Transmission, Inc., 163 FERC ¶ 61,128 (2018); Atl. Coast Pipeline, LLC, 161 FERC ¶ 61,042 (2017); Algonquin Gas Transmission, 161 FERC ¶ 61,255 (2017).

[343] Petition for Review at 72, N.J. Div. of Rate Counsel v. FERC, No. 18-1233 (3d Cir. Sept. 4, 2019).

[344] Pamela King, *Climate impacts are 'virtually unknowable'—FERC*, E&E NEWS (Jan. 28, 2019), https://www.eenews.net/stories/1060118701/print [https://perma.cc/GL79-3XNZ].

found that the potential environmental impacts resulting from such production are not reasonably foreseeable."[345]

FERC's position with respect to both upstream and downstream emissions is untenable.[346] Granted, courts have not specifically accepted or rejected perfect substitution claims as applied to *upstream* emissions from natural gas transportation infrastructure,[347] and the D.C. Circuit deferred to FERC's conclusion that it lacked the information necessary to determine whether an increase in natural gas transportation capacity would cause an increase in natural gas production in *Birckhead v. FERC* (which is very similar to arguments that were rejected by other courts).[348] But in that case, the D.C. Circuit also stated that FERC was "wrong to suggest that downstream emissions are not reasonably foreseeable simply because the gas transported by the Project may displace existing natural gas supplies or higher-emitter fuels" and described this position as a "total non-sequitur."[349] The same finding should apply to upstream emissions.

For reasons discussed in Parts I and II, we believe that the differential treatment of upstream and downstream emissions in reviews for fossil fuel transportation projects is illogical: if the project causes an increase in consumption of a fuel, then there must be a corresponding increase in production of that fuel. Courts should therefore apply the same scrutiny to perfect substitution arguments used to justify omitting upstream emissions from the analysis.

### 2. Energy Market Analysis and GHG Emissions

In response to judicial decisions, agencies have also shown some greater reliance on energy market models to quantitatively estimate

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[345] Petition for Review at 73, *N.J. Div. of Rate Counsel*, No. 18-1233.

[346] The effect of natural gas transportation projects and consumption is reasonably foreseeable, and tools are available to estimate the effect of increasing natural gas transport capacity on fossil fuel production and consumption and the corresponding emissions. If FERC uses these tools and finds that a natural gas transportation project will have no impact on natural gas production or consumption because the gas will simply be transported via different channels, then this raises an important question about how FERC can justify a finding of public need for the pipeline project.

[347] The Ninth Circuit Court of Appeals did require consideration of upstream emissions in *Northern Plains Resource Council, Inc.* However, because petitioners argued that upstream emissions should be evaluated as cumulative rather than indirect effects, the court did not confront questions pertaining to causation and perfect substitution. N. Plains Res. Council, Inc. v. Surface Transp. Bd., 668 F.3d 1067, 1082 (9th Cir. 2011).

[348] Birckhead v. FERC, 925 F.3d 510, 515 (D.C. Cir. 2019).

[349] *Id.* at 518.

energy substitution and net emissions impacts. The highly technical nature of these energy market analyses stand in contrast to the blunt instrument of "perfect substitution" arguments and may well warrant more deference from the courts. Thus far, there have been at least three cases in which courts have issued decisions on the adequacy of such analyses,[350] as well as a number of undecided cases which will further reinforce and shape agency obligations in this context.[351]

There are several interrelated questions pertaining to the legal adequacy of agencies' energy market analyses: (i) whether the agency has made reasonable assumptions about the technical parameters used to project energy prices, demand, and consumption; (ii) whether and under what circumstances the agency has a duty to update or supplement its analysis to reflect new developments such as changes in climate policy; and (iii) whether the analysis is sufficiently tailored to the proposal under review. The latter two questions are most likely to arise where an agency has tiered its analysis to an earlier programmatic review.

Regarding the reasonableness of technical parameters, agencies must use parameters that are reasonably close to real-world conditions in their energy market models in order to generate findings that are accurate enough to support informed decision-making. Courts have only begun to define what is "reasonable" in this context with decisions addressing the adequacy of assumptions pertaining to energy substitutes and energy price and demand forecasts.

As a threshold issue, we argue that the inclusion of non–fossil fuel energy resources (particularly renewable energy) as potential energy substitutes is essential for an accurate analysis. Excluding other energy sources from the analysis is tantamount to assuming that we inhabit a world where fossil fuels are the only energy sources, and this assumption inevitably leads to underestimation of the effects of fossil fuel supply. Consider a proposal to increase natural gas supply: such a proposal would almost certainly decrease GHG emissions in a world where fossil fuels are the only energy source (as natural gas displaces higher emitting coal), but may actually increase GHG emissions in a world with other energy

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[350] Sierra Club v. U.S. Dep't of Energy, 867 F.3d 189 (D.C. Cir. 2017); High Country Conservation Advocates v. U.S. Forest Serv., 333 F. Supp. 3d 1107 (D. Colo. 2018); Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561 (D. Mont. 2018).

[351] *See* Complaint, Healthy Gulf v. Bernhardt, No. 1:19-cv-00707 (D.D.C. Mar. 13, 2019) (challenging BOEM's analysis as well); Complaint, Gulf Restoration v. Zinke, No. 1:18-cv -01674 (D.D.C. July 16, 2018) (challenging BOEM's analysis of energy market impacts from Gulf Leasing Program); *see also* challenges to FERC reviews, *supra* note 342 (pending perfect substitution cases noted above).

resources (as natural gas may displace zero-emitting renewable energy sources). There are a number of models available which account for the effects on renewables, many of which have been used by agencies in environmental reviews and regulatory impact analyses,[352] and it would therefore be arbitrary and capricious for agencies to use a model which does not account for those effects.

We recognize that this position is at odds with the only decision on the matter—specifically, the D.C. Circuit Court of Appeals' decision in *Sierra Club v. U.S. Department of Energy*.[353] That case involved DOE's obligation to evaluate and disclose indirect emissions from LNG exports.[354] DOE had relied on EIA studies projecting how LNG exports affect energy markets and also commissioned a report from the National Energy Technology Laboratory ("NETL") on the life-cycle greenhouse gas emissions of LNG exports.[355] The NETL report assessed the life-cycle emissions (production, transportation, consumption) of exported natural gas and compared these with emissions from electricity generated from coal or other sources of gas but did not consider possible substitution by alternative energy sources such as renewables.[356] The plaintiffs contended that the review was fatally flawed due to DOE's failure to account for the possibility that U.S. LNG exports would compete with renewable energy sources which are already quite prevalent in some of the regions where the LNG exports would be consumed (Europe and Asia).[357] The D.C. Circuit barely addressed this aspect of the plaintiff's argument—it merely concluded, in a cursory fashion, that it must defer to DOE's determination that adding other variables to the analysis would be too difficult and the results of the analysis would be too speculative to help inform decision-making.[358] For the reasons noted above, we believe that this is the wrong outcome.

Agencies must also use reasonable forecasts for energy prices and demand. There are two decisions that address what is "reasonable" in this context, both of which also addressed the question of whether and

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[352] *See* PETER H. HOWARD, INST. FOR POL'Y INTEGRITY, THE BUREAU OF LAND MANAGEMENT'S MODELING CHOICE FOR THE FEDERAL COAL PROGRAMMATIC REVIEW 1 (2016), https://policyintegrity.org/files/publications/BLM_Model_Choice.pdf [https://perma.cc/Q7WC-XX3T] (discussing different energy market models that could be used in programmatic analysis of federal coal leasing program).
[353] *Sierra Club v. U.S. Dep't of Energy*, 867 F.3d at 192.
[354] *Id.* at 195.
[355] *Id.* at 195–96.
[356] *Id.*
[357] *Id.* at 196.
[358] *Id.* at 202.

under what circumstances supplementation of an EIS is required to reflect new information. The NEPA regulations require supplementation if an "agency makes substantial changes in the proposed action that are relevant to environmental concerns; or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts."[359]

One decision dealt with the adequacy of the EIS prepared by USFS for coal lease approvals on remand from *High Country Conservation Advocates*.[360] The USFS had conducted a fairly detailed market impact analysis in which it estimated the net emissions increase from additional coal leasing as compared with a no action alternative.[361] Plaintiffs argued that the analysis was flawed because USFS failed to account for potential increases in electricity demand (and usage) in its energy market model (the model assumed fixed electricity demand regardless of how electricity prices changed).[362] The USFS had acknowledged in the EIS that an increase in total electricity production may occur as a result of lower fuel and electricity prices but explained that it believed this effect was too speculative to model because there were numerous factors other than fuel prices which affected electricity consumption (and USFS discussed these factors qualitatively).[363] The court found that USFS had adequately examined the issue of electricity demand and explained the basis for excluding this from its quantitative projections of energy consumption and corresponding emissions.[364]

Plaintiffs also alleged that USFS should have updated its analysis to account for new developments such as the repeal of the Clean Power Plan.[365] The court found that USFS did not need to supplement its analysis to reflect new developments such as the repeal of the Clean Power Plan.[366] With regards to the second point, the court noted that the agencies preparing the EIS had "disclosed and discussed numerous technological, regulatory, and other factors . . . that influence whether other fuels can be substituted for a particular type of coal" and that in light of the overall depth and scope of the analysis, the failure to supplement this

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[359] 40 C.F.R. § 1502.9(c)(1)(i)–(ii).
[360] High Country Conservation Advocates v. U.S. Forest Serv., 333 F. Supp. 3d 1107, 1131 (D. Colo. 2018).
[361] *Id.* at 1121.
[362] *Id.* at 1129–30.
[363] *Id.*
[364] *Id.* at 1130–31.
[365] *Id.* at 1131–32.
[366] *High Country Conservation Advocates*, 333 F. Supp. 3d at 1132.

analysis with new data was not a significant enough deficiency to warrant judicial intervention.[367]

The second case on technical assumptions and the duty to supplement involved the 2014 EIS for the Keystone XL Pipeline. In *Indigenous Environmental Network v. U.S. Department of State*, the Montana district court ordered the Department of State to supplement its analysis to reflect significant new information that had arisen since 2014 about oil markets, rail transportation, and GHG emissions.[368] The original market analysis, which found that the pipeline would have no impact on fossil fuel use and emissions, illustrates just how difficult it is to accurately assess energy market impacts of individual projects and how easy it is for agencies to predicate these assessments on incorrect assumptions and projections.[369] The Department of State had conditioned much of its analysis on the assumption that the price of oil would remain high—specifically, that the price would range from $100 per barrel to $140 per barrel over 20 years.[370] Shortly after the publication of the 2014 EIS, oil prices fell to nearly $38 per barrel, and EIA predicts the price of oil will remain below $100 for decades.[371] The Department itself conceded during litigation that the current price of oil is approximately $60 per barrel, well below the $100 threshold.[372] In presenting these facts, the court noted that the Environmental Protection Agency ("EPA") had even called upon the Department to revisit its conclusions about oil supply in its comments on the 2014 EIS.[373] The court concluded that this new information was significant enough and highly material to the Department's consideration of how Keystone would affect tar sands production (and consumption) and thus ordered supplementation of the 2014 EIS.[374]

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[367] The court also noted that the failure to supplement was not an actionable problem because "plaintiffs do not argue that the expected climate impacts of the lease modifications are anything other than an amount proportionate to the percentage of coal [subject to the lease]" and thus the information in the EIS was "informative of the climate impacts expected to occur under the lease modifications"—in effect, the court accepted the "literalist" approach to calculating indirect emissions here, and relied on this approach in holding that an updated energy market analysis was not required. *Id.*

[368] Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561, 575–79 (D. Mont. 2018).

[369] *See id.* (discussing problems with energy market assumptions).

[370] *Id.* at 576–77.

[371] *Id.* at 577.

[372] *Id.*

[373] *Id.*

[374] The district court enjoined further activity on Keystone pending supplementation of the EIS due to this and other deficiencies. But the Trump administration was able to circumvent this decision by (i) issuing Executive Order 13,867, which revised the permitting

At the time of this writing, there were also two pending cases where plaintiffs are alleging that EISs need supplementation due to technical problems with the energy market analysis, both of which deal with BOEM's NEPA analysis for offshore oil and gas leasing. The first, *Gulf Restoration v. Zinke*, involves a challenge to two oil and gas lease sales in the Gulf.[375] The BOEM prepared a PEIS for the Gulf leasing program and a subsequent EIS for the lease sales in which it projected the potential impacts of oil and gas leasing (incorporating certain assumptions about energy markets from the PEIS) on energy demand and consumption but also concluded that the exact same impacts would occur if it did not issue the two leases because the same activities would inevitably occur in the same manner and magnitude under an unspecified future lease sale.[376] Plaintiffs argue that the energy market projections rely on faulty assumptions—in particular, BOEM used an incorrect royalty rate (assuming royalties would be 18.75 percent instead of the new 12.5 percent rate) and also failed to account for the planned repeal of the Clean Power Plan—and as a result, its projections of oil and gas demand were arbitrarily low.[377] Second, plaintiffs argue that it was irrational for BOEM to assume that the same environmental effects would occur even if it did not hold the lease sales, and that it provided no support for its conclusion that an unspecified lease sale would be held in the future and would sell the same projected number of lease blocks as the proposed lease sale, or that the same manner and degree of impact-producing factors would result.[378] Plaintiffs note that the assumptions of identical future impacts were particularly unreasonable because the lease sales at issue in this case were of an "expansive scope" and BOEM's practice for the past four decades had been to offer smaller, discrete portions during lease sales.[379]

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process for transboundary projects and clarified that "[a]ny decision to issue, deny, or amend a permit under this section shall be made solely by the President" (this provision was aimed at avoiding a situation where the issuance of such permits was "final agency action" subject to NEPA review); and (ii) revoking the previous permit issued by the State Department for Keystone XL and replacing it with a permit issued directly by the President. Exec. Order No. 13,867, 84 Fed. Reg. 15,491 (Apr. 10, 2019). The Ninth Circuit Court of Appeals subsequently held that the litigation over the NEPA review of Keystone XL was moot due to the revocation of the State Department permit. Indigenous Envtl. Network v. U.S. Dep't of State, No. 18-36068, 2019 WL 2542756 (9th Cir. June 6, 2019).

[375] Complaint at 2, Gulf Restoration v. Zinke, No. 1:18-cv-01674 (D.D.C. July 16, 2018).

[376] *Id.* at 32.

[377] *Id.* at 30.

[378] *Id.* at 3.

[379] *Id.* at 32.

The second case, *Healthy Gulf v. Bernhardt*, involves a nearly identical challenge to another lease sale in the Gulf.[380]

As noted above, a third question is whether an agency has sufficiently tailored its energy market analysis to the project under review. This issue arose in *Sierra Club v. U.S. Department of Energy*, the case involving DOE's review of LNG exports.[381] The reports that DOE used in its analysis of life-cycle emissions from LNG exports did not consider the specific effects of the export authorization under review—rather, the analysis was generalized and applicable to all LNG exports (e.g., life-cycle greenhouse gas emissions from LNG exports were estimated per MWh of end-use generation, but there was no estimate of life-cycle emissions for the volume of the exports under review).[382]

One of the plaintiff's primary challenges to DOE's review was that it did not tailor the indirect and cumulative impacts analysis, including the greenhouse gas emission estimates, to the specific volume of exports that would be authorized under the proposal (which the Sierra Club argued should be evaluated as indirect effects of the proposal) or total amount of exports from that terminal as well as other pending and anticipated LNG export facilities (which the Sierra Club argued should be evaluated as cumulative effects).[383] The court agreed that DOE's "generalized impact assessment is not tailored to any specific level of exports," but nonetheless upheld the analysis.[384] It did not articulate a reason why DOE should not be required to estimate the greenhouse gas emissions for the specific exports under review.

The lawsuits filed to date illustrate some of the potential problems with agency energy market analyses and the need for careful scrutiny by courts to ensure that agencies are not relying on faulty assumptions, ignoring important developments, or manipulating the analysis to make the project's impacts appear less substantial. In many respects, the use of energy market models is an important and positive development—and certainly a better approach than relying on unsupported claims of perfect substitution. But focusing on the project's "net emissions" is not the only approach for evaluating upstream and downstream emissions. It would also be reasonable to treat gross downstream and upstream emissions as indirect effects of the proposal. Indeed, this is how most impacts are

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[380] Complaint at 2, Healthy Gulf v. Bernhardt, No. 1:19-cv-00707 (D.D.C. Mar. 13, 2019).
[381] Sierra Club v. U.S. Dep't of Energy, 867 F.3d 189, 192 (D.C. Cir. 2017).
[382] *Id.*
[383] *Id.* at 197.
[384] *Id.* (emphasis omitted).

evaluated under NEPA—agencies focus on the actual impacts of the proposal under review without attempting to project the possible impacts of other activities that may occur if the proposal is not implemented. For example, in NEPA reviews for proposals that involve timber harvests, agencies focus on the impacts of the harvest under review and do not project the extent to which timber would be sourced from elsewhere if the proposal were not approved and then use such projections to derive estimates of "net impacts."[385] Moreover, in NEPA reviews for fossil fuel supply projects, more local environmental impacts (e.g., air and water quality impacts) are also evaluated on gross terms.[386]

The Stockholm Environment Institute ("SEI") describes this approach of focusing on gross emissions as a "literalist" approach to emissions inventorying due to its specific focus on logic: because of a given project, a certain amount of fuel will be produced, transported, processed, and consumed, and this will generate a certain quantity of greenhouse gas emissions.[387] The "literalist" approach accounts for the greenhouse gas impact of the fuel handled by the project without considering how the project affects broader energy markets.[388] As such, it may be viewed as only a partial analysis of impacts. However, the net emissions analysis, which SEI characterizes as the "economist" approach, requires decision makers to "make assumptions about long-term economic responses that are difficult to assess"[389] and thus it is inherently speculative.

One rationale for treating GHG emissions differently than other impacts is that the effect of the emissions is the same regardless of where they are generated and thus it is possible to assess net emission impacts without more precise data about geographic location. But agencies, courts, and the public should question whether this is a strong enough rationale for making decisions based on highly uncertain findings about energy market impacts (or vague statements about possible substitution) as opposed to a straightforward inventory of gross emissions. The "net

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[385] *See, e.g.*, U.S. FOREST SERV., USDA, ENVIRONMENTAL IMPACT STATEMENT, NATIONAL FOREST SYSTEM LAND MANAGEMENT PLANNING vi (2008), https://www.fs.fed.us/emc/nfma/includes/planning_rule/eis.pdf [https://perma.cc/BE9Z-GEQK]; *Proposed RMP/Final EIS*, U.S. BUREAU LAND MGMT., DEP'T INTERIOR, https://www.blm.gov/or/plans/rmpswesternoregon/feis/ [https://perma.cc/9AFP-YAYC] (last visited Dec. 3, 2019).

[386] *See* JAYNI HEIN ET AL., INST. FOR POL'Y INTEGRITY, PIPELINE APPROVALS AND GREENHOUSE GAS EMISSIONS 31 (2019).

[387] PETER ERICKSON & MICHAEL LAZARUS, STOCKHOLM ENV'T INST., ASSESSING THE GREENHOUSE GAS EMISSIONS IMPACT OF NEW FOSSIL FUEL INFRASTRUCTURE 2–3 (2013).

[388] *Id.* at 2–3, 6.

[389] *Id.* at 6.

emissions" analysis may prove too speculative to truly help with decision-making. Granted, energy market models also have the potential to provide highly useful information to inform decision-making about fossil fuel supply proposals so long as the inputs, assumptions, and parameters are sound—particularly in the context of programmatic-level reviews. The critical question going forward is whether agencies are capable of setting reasonable parameters and making reasonable projections, particularly when conducting project-level reviews (as it becomes more difficult to model impacts at a smaller scale). It may be the case that the energy market modelling approach makes the most sense for programmatic reviews and that simply calculating the gross upstream and downstream emissions is sufficient for project-level reviews. Granted, some individual supply projects involve the production or transportation of very large quantities of fossil fuels, and the modelling approach may be warranted for those reviews as well.

As discussed above, there are ways in which agencies using energy market models can improve the accuracy and integrity of their analysis. To summarize, agencies should (i) consider all possible energy substitutes, including renewable energy at minimum (and ideally including nuclear energy and demand-side energy efficiency as well); (ii) consider multiple energy market scenarios, including scenarios consistent with 1.5 and 2°C futures; (iii) use the best available and up-to-date pricing information and projections; and (iv) be transparent about the assumptions and parameters of their analysis.

### *B. Significance of GHG Emissions*

The identification of significant impacts is an essential step in the NEPA process, critical not only to the decision to prepare an EIS but also for the purposes of informed decision-making and public disclosure and analysis of mitigation measures. Courts have begun to flesh out agency obligations with respect to significance determinations for fossil fuel supply projects. Below, we highlight four key principles from the regulations and case law (some of which overlap with themes we have already discussed): (i) agencies must account for the full scope of direct, indirect, and cumulative emissions when evaluating significance; (ii) agencies must use correct technical assumptions to estimate the magnitude of the emissions impact; (iii) agencies must apply the regulatory criteria for evaluating context and intensity; and (iv) agencies must conduct a balanced assessment of costs and benefits.

Notably, the decisions issued to date and the undecided cases all deal with the reasonableness of assumptions and analyses underlying significance determinations; there are no lawsuits directly challenging findings of insignificance on the grounds that the total magnitude of the emissions impact is too large to be viewed as insignificant. Such a challenge may prove difficult, as significance is a highly subjective concept and courts are deferential to agency conclusions on such matters.[390] That being said, while it is true that significance is subjective and it is difficult to draw a clear line between the level of GHG emissions that is and is not significant, there are also instances where the direct and indirect GHGs from a proposal clearly pass any reasonable threshold of significance, and in such contexts, courts should intervene.[391]

### 1. Agencies Must Take a "Hard Look" at the Full Scope of GHG Emissions

Section 1502.16 of the CEQ regulations requires agencies to discuss the significance of both direct and indirect effects, and section 1508.27, which outlines the criteria for assessing significance, makes it clear that cumulative impacts are also relevant to the significance determination.[392] Part II clarifies the potential scope of GHG emissions that must be accounted for in NEPA reviews for fossil fuel supply projects (and quantified where possible). These include direct, indirect, and cumulative emissions, as well as emissions from related actions, which may include connected, cumulative, and/or similar actions. There are a number of cases in which courts have remanded significance determinations—typically FONSIs—on the grounds that the agencies failed to quantify indirect or cumulative emissions.[393]

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[390] "A court's role in reviewing an agency's decision not to prepare an EIS is a limited one, designed primarily to ensure that no arguably significant consequences have been ignored." Mayo v. Reynolds, 875 F.3d 11, 15, 19–21 (D.C. Cir. 2017) (internal quotations omitted).

[391] *See, e.g.*, MONT. DEP'T OF ENVTL. QUALITY, OFF. OF SURFACE MINING, WESTERN ENERGY AREA F: FINAL ENVIRONMENTAL IMPACT STATEMENT 473–91 (2018) (the agency estimated that coal mining proposal would generate 235,355,989 tons of $CO_2e$ over the lifetime of the project but did not reach a conclusion as to whether this was a significant impact).

[392] 40 C.F.R. § 1508.27.

[393] *See, e.g.*, Sierra Club v. FERC, 867 F.3d 1357, 1375 (D.C. Cir. 2017) (remanding to FERC to evaluate significance of indirect emissions); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 83, 85 (D.D.C. 2019) (finding inadequate support for EA/FONSI); WildEarth Guardians v. Zinke, No. 1:17-cv-0080, 2019 WL 2404860, at *12 (D. Mont. Feb. 11, 2019); San Juan Citizens All. v. U.S. Bureau of Land Mgmt., 326 F. Supp. 3d 1227, 1249 (D.N.M. 2018) (finding inadequate support for EA/FONSI); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, No. CV 15-106-M-DWM, 2017 WL 5047901 at *6 (D. Mont. Nov. 3, 2017).

For example, in *San Juan Citizens Alliance v. Bureau of Land Management*, the New Mexico district court found that BLM's FONSI for oil and gas leasing was fatally flawed because BLM had failed to account for both indirect and cumulative emissions.[394] The court specifically emphasized BLM's duty to analyze significance in the context of cumulative effects, pursuant to 40 C.F.R. section 1508.7:

> It is the broader, significant "cumulative impact" which must be considered by an agency, but which was not considered in this case. Without further explanation, the facile conclusion that this particular impact is minor and therefore "would not produce climate change impacts that differ from the No Action Alternative," is insufficient to comply with Section 1508.7.[395]

In at least three other cases involving fossil fuel production, reviewing courts have remanded EAs and FONSIs because the agency did not quantify indirect emissions (and in some cases also cumulative emissions) and therefore failed to take a hard look at the severity of the emissions.[396]

The D.C. Circuit Court of Appeals also addressed FERC's obligations to discuss the significance of indirect and cumulative emissions in *Sierra Club v. FERC,* which involved FERC's failure to account for downstream emissions from a natural gas pipeline project.[397] There, the court held that FERC must amend its EIS to include not only a quantified inventory of indirect emissions but also "a discussion of the 'significance' of this indirect effect . . . as well as 'the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.'"[398] The court noted that quantification would be essential to the evaluation of significance but did not otherwise specify what the significance analysis should include.[399]

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[394] *San Juan Citizens All.*, 326 F. Supp. 3d at 1244.
[395] *Id.* at 1248.
[396] *WildEarth Guardians*, 368 F. Supp. 3d at 59, 85; *WildEarth Guardians*, 2019 WL 2404860, at *7; *Mont. Envtl. Info. Ctr.*, 2017 WL 5047901, at *6.
[397] *Sierra Club v. FERC*, 867 F.3d at 1374.
[398] *Id.*
[399] *Id.* The court also noted that Sierra Club had "asked FERC to convert emissions estimates to concrete harms by way of the Social Cost of Carbon" in its rehearing request, but did not issue a ruling on whether such disclosure was required (as neither party explicitly raised this in their briefs). *Id.* at 1375. Rather, the court directed FERC to explain its position on using the Social Cost of Carbon in the amended EIS. *Id.*

The analysis prepared by FERC on remand from this case is illustrative of how agencies can avoid significance determinations and why further judicial intervention may be needed to ensure meaningful analysis of the significance of indirect and cumulative emissions under NEPA. FERC estimated that the combustion of natural gas from the pipeline would generate 8.36 million tons per year of $CO_2$ emissions, which is roughly equal to the emissions from (i) approximately 1.8 million passenger vehicles driven each year or (ii) approximately 1.25 million homes' electricity use for one year.[400] Nonetheless, FERC quickly dismissed the significance of the emissions on the grounds that it lacked a threshold for assigning significance to GHG emissions, and it further noted that the indirect GHG calculations did not alter its assessment of the project because:

> [T]he No Action Alternative would not result in predictable actions if the SMP Project were not built. For example, the project's shippers may seek to transport the same volumes of natural gas by expanding existing transportation systems or constructing new facilities. Because the No Action Alternative could result in lesser, equal, or greater GHG emissions than the SMP Project, we cannot use the quantified downstream GHG emissions from the SMP Project to meaningfully compare the two.[401]

FERC also declined to estimate the social cost of the emissions.[402] The supplemental analysis and significance determination (or lack thereof) has not been challenged in court, but we note that this analysis is very similar to arguments about possible perfect substitution that have been rejected in the context of production proposals.

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[400] *Greenhouse Gas Equivalencies Calculator*, EPA, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator [https://perma.cc/VX3S-N72Z] (last updated Oct. 15, 2018).
[401] FERC, SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT 9 (2018), https://www.ferc.gov/industries/gas/enviro/eis/2018/02-05-18-FEIS/02-05-18-FEIS.pdf [https://perma.cc/76G4-HHG4].
[402] According to estimates set forth in our comments on the DSEIS, the social costs would be roughly $306 million during the first year of operation and would rise to approximately $492 million per year by 2040. COLUM. SABIN CTR. FOR CLIMATE CHANGE L., COMMENT LETTER ON DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (Nov. 17, 2017), http://columbiaclimatelaw.com/files/2016/05/Sabin_Center_Comments_Southeast_DSEIS.pdf [https://perma.cc/4YCS-46A4].

### 2. Agencies Must Use Sound Technical Assumptions When Measuring the Severity of the Emissions Impact

If the technical assumptions underlying an agency's emission estimates are unreasonable, this would render any significance determination predicated on that analysis arbitrary and capricious. Above, we discuss the legal adequacy of assumptions pertaining to energy substitution and net emissions, as that has been the focus of many lawsuits in recent years. But there are other types of technical assumptions that are also critical to accurate emissions quantification. Here, we focus on two examples which have been the subject of litigation: assumptions about the global warming potential ("GWP") of non-$CO_2$ emissions (which are relevant when converting those emissions to $CO_2$ equivalent ("$CO_2e$")),[403] and assumptions about the amount of methane emissions generated from natural gas wells and pipeline infrastructure.

Agencies frequently rely on estimates of $CO_2e$ to aggregate all types of GHGs, and using the right GWP is necessary in order to accurately estimate $CO_2e$ for non-$CO_2$ emissions. Three lawsuits have been filed against BLM for using an arbitrarily low GWP value to estimate the effects of methane in terms of $CO_2e$. Specifically, plaintiffs have alleged that (i) BLM relied on an outdated 100-year GWP of 21, instead of the IPCC's current 100-year GWP of 36; and (ii) BLM should have calculated methane emissions using the twenty-year GWP of 87, as this more closely corresponded with the anticipated project duration.[404] The consequence of choosing a lower GWP is dramatic: one complaint alleges that BLM underestimated the global warming effect of methane by a factor of four.[405] In *Western Organization of Resource Councils v. Bureau of Land Management*, the Montana district court held that BLM's "unexplained decision to use the 100-year time horizon, when other more appropriate time horizon remained available, qualifies as arbitrary and capricious."[406] There, the

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[403] The GWP is a measure of how much heat a GHG traps in the atmosphere over a specific amount of time (e.g., 100 years), as compared to $CO_2$. *Understanding Global Warming Potentials*, EPA, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials [https://perma.cc/9GY3-KWM2] (last updated Feb. 14, 2017).

[404] Petition for Review at 24, Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145 (D. Colo. 2018) (No. 1:16-cv-01822); Complaint at 35, Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018); Amended Complaint at 41, W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. 4:16-cv-00021 -BMM, 2018 WL 1475470 (D. Mont. Mar. 26, 2018).

[405] Petition for Review at 24, *Wilderness Workshop*, 342 F. Supp. 3d 1145 (No. 1:16-cv-01822 -WYD).

[406] *W. Org. of Res. Councils*, 2018 WL 1475470, at *15.

court noted that BLM had used the twenty-year GWP in other NEPA documentation, which demonstrated that BLM was aware of the evolving nature of the science regarding methane emissions estimation, and BLM had failed to provide a satisfactory explanation for using the 100-year GWP.[407] In contrast, in *Wilderness Workshop v. Bureau of Land Management*, the Colorado district court upheld BLM's use of a 100-year GWP of 21 where the court felt that BLM had adequately explained its basis for doing so.[408] The third case has not yet been decided.[409]

Agencies should also use the best available data to estimate methane emissions from oil and gas infrastructure. There has not been much litigation about this issue to date, but there is a growing body of research suggesting that the federal government has dramatically underestimated methane emissions from oil and gas infrastructure which may give rise to future lawsuits.[410] There is one case which addresses the adequacy of agency methane calculations. In *Wilderness Workshop*, plaintiffs also alleged that BLM made improper assumptions about the magnitude of methane emissions—specifically, that BLM used modeling data to estimate methane emissions that came solely from survey responses of oil and gas operators without confirming those answers, that the data was not based on current or historic emission rates but on forecast emissions in 2028, and that BLM improperly adjusted the emission rates on a faulty assumption about the implementation of control technologies on oil and gas sources.[411] The plaintiffs offered alternative calculations of methane emissions.[412]

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[407] *Id.*
[408] *Wilderness Workshop*, 342 F. Supp. 3d at 1161.
[409] Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018).
[410] Ramón Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCI. 186, 186 (2018), https://science.sciencemag.org/content/361/6398/186 [https://perma.cc/M3QB-34NY]; Megan Geuss, *Study: US oil and gas methane emissions have been dramatically underestimated*, ARS TECHNICA (June 22, 2018), https://arstechnica.com/science/2018/06/study-us-oil-and-gasmethane-emissions-have-been-dramatically-underestimated/ [https://perma.cc/X54J-VPTD]; Ken Paulman, *Study finds EPA vastly underestimating methane emissions*, ENERGY NEWS NETWORK (June 22, 2018), https://energynews.us/digests/study-finds-epa-vastly-underestimating-methane-emissions/ [https://perma.cc/FDT9-2L62]; Bob Weber, *New study suggests oils and greenhouse gas emissions underestimated*, CANADIAN PRESS (Apr. 23, 2019), https://www.citynews1130.com/2019/04/23/new-study-suggests-oilsands-greenhouse-gas-emissions-underestimated/ [https://perma.cc/KBD5-RSL2]; *Major studies reveal 60% more methane emissions*, ENVTL. DEF. FUND, https://www.edf.org/climate/methane-studies [https://perma.cc/XS3F-3QTA] (last visited Dec. 3, 2019).
[411] *Wilderness Workshop*, 342 F. Supp. 3d at 1160–62.
[412] *Id.* at 1161.

However, the court held that the plaintiffs had not adequately supported their own calculations and that this left the court "with no reliable way to sufficiently judge Plaintiff's analysis on the issue" and, in addition, that plaintiffs had not persuasively explained how the use of industry data or assumptions underpinning BLM's analysis resulted in incorrect methane calculations.[413] It thus held that it must defer to BLM's calculations of methane emissions.[414]

3. Significance Must Be Assessed in Light of Regulatory Criteria

The NEPA regulations direct agencies to consider both context and intensity when assessing significance as well as a number of more specific factors relevant to gauging the intensity of the impact.[415] These include, *inter alia*, "[t]he degree to which the proposed action affects public health or safety"; "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial"; "[t]he degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks"; "[t]he degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration"; and "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts."[416] With regards to cumulative impacts, section 1508.27 notes that "[s]ignificance exists if it is reasonable to anticipate a cumulatively significant impact on the environment" and that "[s]ignificance cannot be avoided by terming an action temporary or by breaking it down into small component parts."[417]

The context for federal approvals of fossil fuel supply projects can be framed as follows: climate change is causing and will cause harm to public health and welfare, on scales ranging from the global to the highly local, and to address this problem the United States must rapidly reduce its dependency on fossil fuels. Where fossil fuel production takes place on private lands, the government's ability to address climate impacts is limited. But where the federal government has authority over production on public lands and transportation projects that require federal approval, the government has the opportunity to consider the potential GHG emissions and act on this information. With this in mind, agencies should look at

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[413] *Id.* at 1162.
[414] *Id.*
[415] 40 C.F.R. § 1508.27.
[416] *Id.*
[417] *Id.*

the proposal's impact on fossil fuel consumption and emissions in the context of global, national, regional, or state carbon budgets (or emission reduction targets) with an eye towards understanding whether the proposal can be implemented without undermining progress towards decarbonization. Granted, NEPA does not require an agency to avoid all significant impacts—and thus an agency may proceed with a fossil fuel supply proposal even if it is inconsistent with decarbonization or emission reduction goals—but this sort of analysis is needed in order for decision makers to make informed decisions about how to proceed with fossil fuel–related proposals when decarbonization is a critical social goal.

Agencies must also consider "intensity"—that is, the "severity of the impact."[418] There are several ways that agencies can assess the severity of the emissions impact. One option is to provide a qualitative description of climate change impacts and use the estimated GHG emissions as a proxy for the "severity" of the project's contribution to those impacts. This approach was endorsed in the rescinded CEQ guidance.[419] The one key limitation to this approach is that $CO_2e$ estimates do not, in of themselves, provide a clear picture of the potential magnitude of the impact on humans and ecosystems—and when the estimates are compared to global, national, or state emission totals, they inevitably appear relatively small.

Other tools are available to better understand the magnitude of the emissions impact. These include (i) the Social Cost of Carbon (SC-$CO_2$), Methane (SC-$CH_4$), and Nitrous Oxide (SC-$N_2O$) metrics that were developed through a federal interagency consultation process and approved by the courts, which can be used to assign a dollar value to the potential impacts of these emissions;[420] (ii) the EPA's quantification threshold

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[418] 40 C.F.R. § 1508.27(b).

[419] CEQ, Final Guidance Memo, *supra* note 49, at 4. Such a qualitative description of climate change impacts can also help to satisfy the requirement to look at "cumulative impacts" of the proposal combined with other foreseeable actions.

[420] The Social Cost of Carbon, Methane, and Nitrous Oxide, despite being officially "rescinded" by President Trump, are scientifically credible estimates of the societal costs of greenhouse gas emissions, developed through a lengthy process of interagency consultation and peer review, and that cost is absolutely relevant to assessing the nature and significance of the proposed program's environmental consequences. *See* Zero Zone Inc. v. U.S. Dep't of Energy, 832 F.3d 654 (7th Cir. 2016) (upholding use of methodology for calculating social cost of carbon used by the Interagency Working Group on the Social Cost of Carbon); INTERAGENCY WORKING GRP. ON THE SOCIAL COST OF GREENHOUSE GASES, TECHNICAL SUPPORT DOCUMENT: TECHNICAL UPDATE OF THE SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866 2 (May 2013, revised Aug. 2016); INTERAGENCY WORKING GRP. ON THE SOCIAL COST OF GREENHOUSE GASES, ADDENDUM TO TECHNICAL SUPPORT DOCUMENT ON SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866: APPLICATION OF THE METHODOLOGY TO ESTIMATE THE

of 25,000 tons per year of $CO_2e$ to identify major emitters for the purposes of GHG reporting (as noted by EPA, facilities that surpass this threshold are considered the "largest emitters" in the country);[421] (iii) the EPA's GHG Equivalencies Calculator, which can be used to compare emissions from the proposal with, for example, emissions from household electricity use or vehicle miles driven;[422] and (iv) evaluating the proposal and its emissions in the context of global, national, and (where applicable) state carbon budgets. As climate change attribution science progresses, it may also become possible to link the emissions from a particular proposal to specific impacts (e.g., a certain amount of sea level rise) based on the proportional contribution to global emissions.[423] Such an assessment may already be feasible in the context of a very large action, such as a programmatic review of federal coal leasing, as scientists are already linking very large emission sources to specific impacts, but would prove challenging for more discrete proposals with smaller emissions impacts.[424]

The intensity criteria set forth in section 1508.27 should also be used in this analysis. Many of these factors weigh in favor of a significance finding for GHG emissions from fossil fuel supply projects. For example, one could argue that the effect of these projects—particularly the effects on fossil fuel consumption and GHG emissions—are "highly controversial" because there are substantial disputes about the accuracy of agency assessments and the actual magnitude of the emissions impacts from these proposals. It could also be argued that these effects are "highly uncertain" and "involve unique or unknown risks" due to the level of uncertainty discussed in NEPA documentation as well as broader uncertainty about the potential magnitude and impact of climate change. The approval of fossil fuel extraction and transportation projects (and corresponding NEPA analysis) can also "establish a precedent for future actions with significant effects" and "represents a decision in principle about a future

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SOCIAL COST OF METHANE AND THE SOCIAL COST OF NITROUS OXIDE 2–3 (Aug. 2016). *See also* Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1094–95 (D. Mont. 2017) (requiring disclosure of GHG costs in NEPA review where benefits were also disclosed, and citing the federal Social Cost of Carbon as an available disclosure tool); High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1178, 1187 (D. Colo. 2014) (also requiring disclosure of GHG costs in NEPA reviews where benefits were disclosed).

[421] *Greenhouse Gas Reporting Program (GHGRP)*, EPA, https://www.epa.gov/ghgreporting/key-facts-and-figures [https://perma.cc/ESK5-KP33] (last updated Oct. 1, 2019).

[422] *Greenhouse Gas Equivalencies Calculator*, *supra* note 400.

[423] *See* Michael Burger, Radley Horton & Jessica Wentz, *The Law and Science of Climate Change Attribution*, 45 COLUM. J. ENVTL. L. (forthcoming Jan. 2020) (manuscript at 53–62).

[424] *Id.* at 53.

consideration"—specifically, whether the United States should adopt supply-side constraints on fossil fuels to address climate change and whether the infrastructure will result in fossil fuel "lock in." And finally, there can be no doubt that each of these approvals is "related to other actions with individually insignificant but cumulatively significant impacts"—that is, the approval of other fossil fuel leases, RMPs, and transportation infrastructure—all of which contributes to the ongoing supply of and reliance on fossil fuels. As noted in section 1508.27, this last factor is dispositive: "Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment."

As discussed in Part I, agencies often fail to assess the significance of GHG emissions in light of the regulatory factors, and this has resulted in a number of lawsuits.[425] One decision from the D.C. Circuit district court contained a particularly detailed assessment of the regulatory requirements.[426] The critical question was whether BLM had adequately justified FONSIs that it issued for five oil and gas lease sales covering a total of 282 leases on 303,000 acres of federal lands in Wyoming.[427] The court explained that the key considerations are whether the agency:

> (1) has accurately identified the relevant environmental concern, (2) has taken a hard look at the problem in preparing its [FONSI or Environmental Assessment], (3) is able to make a convincing case for its finding of no significant impact, and (4) has shown that even if there is an impact of true significance, an EIS is unnecessary because changes or safeguards in the project sufficiently reduce the impact to a minimum.[428]

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[425] Sierra Club v. FERC, 867 F.3d 1357, 1375 (D.C. Cir. 2017) (remanding to FERC to evaluate significance of indirect emissions); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 76 (D.D.C. 2019) (finding inadequate support for EA/FONSI); San Juan Citizens All. v. U.S. Bureau of Land Mgmt., 326 F. Supp. 3d 1227, 1247 (D.N.M. 2018) (finding inadequate support for EA/FONSI). *See also* Atchafalaya Basinkeeper v. U.S. Army Corps of Eng'rs, 894 F.3d 692, 697–98 (5th Cir. 2018) (alleging that USACE "failed to assess the climate impacts of 'locking in' future reliance on fossil fuels with a massive infrastructure investment"); Complaint at 27, WildEarth Guardians v. U.S. Bureau of Land Mgmt., No. 4:18-cv-00073 (D. Mont. May 15, 2018) (alleging that agency failed to disclose social costs, and failed to evaluate context and intensity); Complaint at 2, 36, Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018) (alleging that the agency failed to prepare EA or EIS for proposal and thus failed to evaluate significance of emissions in light of regulatory criteria).

[426] *WildEarth Guardians*, 368 F. Supp. 3d at 63–64, 66–67, 69–71.

[427] *Id.* at 55.

[428] *Id.* at 80.

Applying these factors, the court held that BLM could not support its FONSI because it had failed to take a hard look at all indirect and cumulative emissions.[429] However, the court also looked at two other significance factors—whether the action is highly controversial and whether it involves highly uncertain or unique or unknown risks—and found that these factors, standing alone, would not compel preparation of an EIS.[430]

With regards to controversy, the court said it could not conclude that the effects of leasing are highly controversial because controversy in the NEPA context "is not measured merely by the intensity of opposition" but whether there is "a substantial dispute . . . as to the size, nature, or effect of the major federal action" or "scientific or other evidence that reveals flaws in the methods or data relied upon by the agency in reaching its conclusions."[431] If there is opposition from other agencies with "special expertise" or stakes in the decision, this would also support a finding of controversy.[432] Regarding the EA at issue, the court noted that, although plaintiffs had shown that BLM's impact assessment was inadequate, they had not yet showed that there was a significant dispute as to the magnitude of the impact or the methods and data used in the analysis.[433] However, the court recognized that BLM's analysis on remand would "more fully illustrate" its position on the magnitude of the emissions impact.[434] Thus, having a more complete assessment which includes BLM's assessment of the significance of indirect and cumulative emissions may make it easier for plaintiffs to demonstrate controversy, particularly if BLM relies on questionable assumptions about market impacts to discount the significance of the emissions impacts.

With regards to whether the effects were highly uncertain, the court explained that this factor is implicated when an action involves new science or when an action's impact is unknown.[435] However, the court held that uncertainty about the magnitude of the emissions impact in this case was not enough to trigger the type of "uncertainty" contemplated by the regulations because all parties agree that GHGs contribute to climate

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[429] The court emphasized that the potential for cumulative effects was a key consideration in the significance analysis and found that BLM had failed to adequately assess those cumulative effects, pursuant to the criteria set forth in the CEQ regulations. *Id.* at 77.
[430] *Id.* at 80.
[431] *Id.* at 81 (internal citations omitted).
[432] *WildEarth Guardians*, 368 F. Supp. 3d at 82.
[433] *Id.* at 63, 74.
[434] *Id.* at 82.
[435] *Id.*

change and the impacts of climate change are known as a general manner.[436] Thus, the court held that this factor is only triggered where there is uncertainty about the *nature* of the impacts, not the severity.

Some litigants have also challenged agency significance assessments for failure to use some of the tools described above for better understanding the severity and context of emissions impacts. For example, some litigants have argued that agencies should disclose the social cost of emissions as this is an easier metric for decision makers and the public to understand than tonnage of $CO_2e$.[437] But under the Trump administration, agencies have consistently refused to disclose the social cost of GHG emissions.[438] The primary rationales for not disclosing social costs are (i) the metrics were developed for a rule-making context; (ii) NEPA does not require a cost-benefit analysis or monetization of costs; (iii) the metrics do not accurately reflect the incremental emissions impact of the proposal (because there is significant uncertainty about the actual cost of emissions and the social cost metrics do not capture all costs); and (iv) the metrics are not useful to decision makers because they are presented as a range of possible values and there is no criteria or thresholds against which to gauge the significance of those values.[439]

As discussed below, courts have only required use of the social cost metrics where agencies have also disclosed economic benefits,[440] but outside of that context, courts have deferred to agency rationales for not disclosing social costs without evaluating the merits of these arguments.[441] This is unfortunate, as there is good reason to be critical of these rationales.

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[436] *Id.* at 79.

[437] Although these metrics do not provide a way of disaggregating emissions impacts into specific identifiable impacts, they do provide a useful tool for conceptualizing the overall costs to society of the emissions associated with a proposal. FRANK ACKERMAN & ELIZABETH A. STANTON, CLIMATE CHANGE & GLOBAL EQUITY, CLIMATE RISKS & CARBON PRICES: REVISING THE SOCIAL COST OF CARBON 151–86 (2014).

[438] *See* Jessica Wentz, *New Draft Guidance on Climate Change and NEPA Reviews Unlikely to Significantly Affect Agency Practice or Judicial Interpretation of NEPA Obligations*, SABIN CTR. FOR CLIMATE CHANGE LAW, COLUM. L. SCH. (June 24, 2019), http://blogs.law.columbia.edu/climatechange/2019/06/24/new-draft-guidance-on-climate-change-and-nepa-reviews-unlikely-to-significantly-affect-agency-practice-or-judicial-interpretation-of-nepa-obligations/ [https://perma.cc/35HP-JTLY].

[439] *See, e.g.*, U.S. BUREAU OF LAND MGMT., DEP'T OF THE INTERIOR, COASTAL PLAIN OIL AND GAS LEASING PROGRAM DRAFT ENVIRONMENTAL IMPACT STATEMENT VOLUME II: APPENDICES F-2–F-4 (Dec. 2018).

[440] *See infra* Section III.B.4.

[441] *See, e.g.*, EarthReports, Inc. v. FERC, 828 F.3d 949, 956 (D.C. Cir. 2016); Appalachian Voices v. FERC, No. 17-1271, 2019 WL 847199, at *2 (D.D.C. Feb. 19, 2019).

With regards to the first argument, the metrics may have been developed for a rule-making context, but they can readily be used in an environmental analysis to better understand the potential costs associated with greenhouse gas emissions—and those cost estimates are a useful proxy for the actual impacts of climate change. The fact that the metrics were developed for rule-making is irrelevant to the question of whether they would be useful in NEPA analyses.

With regards to the second argument, while it is true that NEPA does not require cost-benefit analysis, the disclosure of social costs is nonetheless useful to decision makers and the public and a relatively easy exercise (as it simply entails multiplying emissions by social cost metrics). Agencies also frequently monetize benefits and should monetize costs for a fair and balanced assessment, even where the EIS does not contain a complete cost-benefit analysis.

With regards to the third argument (that the social cost metrics do not measure the actual incremental impacts of a project on the environment and do not include all damages or benefits from carbon emissions), this statement is partially incorrect. The SC-$CO_2$, SC-$CH_4$, and SC-$N_2O$ measure the actual incremental impacts of a project on the physical and human environment by specifying the incremental costs associated with an incremental increase in GHG emissions. These impacts are expressed as monetary costs rather than specific physical impacts because this is a reasonable and comprehensible way to aggregate many different impacts in a single metric. While it is true that the metrics do not capture all costs associated with GHG emissions, they at least capture a portion of those costs (and the agency can disclose the costs that are not covered).

With regards to the fourth argument (that the metrics are unhelpful because estimates are presented as a range of possible values and there is no threshold for significance), the fact that the estimates are presented as a range of values is actually beneficial, as it addresses uncertainty, and such ranges can be used to define the bounds of possible foreseeable outcomes. This sort of forecasting is common under NEPA. And although it is true that there is no significance threshold defined for GHGs or social costs, this is true for many different types of impacts that are evaluated in NEPA reviews—there are no bright line rules for assessing significance, and agencies typically must use their discretion to determine when impacts pass the threshold of significance. The monetization of climate change impacts, however, is useful in informing significance determinations insofar as it provides a standard metric for comparing different impacts.

The other main disclosure tool that agencies can and should use to evaluate the significance of emissions impacts is a carbon budget.

Estimates have been developed for both the global and national carbon budget, and some states have developed their own carbon budgets as well.[442] At least three of the lawsuits brought to date have also involved allegations that agencies should have examined emissions in light of a carbon budget.[443] The case law on this matter is less well-developed than the case law on social cost metrics. In one decision on this issue, *Western Organization of Resource Councils v. Bureau of Land Management*, the Montana district court held that BLM was not required to use a "global carbon budget" as the standard by which to measure emissions impacts because "Plaintiffs identify no case, and the Court has discovered none, that supports the assertion that NEPA requires the agency to use a global carbon budget analysis."[444] The D.C. district court in *WildEarth Guardians v. Zinke* also deferred to BLM's decision not to use the global carbon budget to evaluate the severity of the emissions, again citing the lack of any precedent requiring such an analysis in the NEPA context.[445] The third case has not yet been decided.[446]

It is unsurprising that courts are reluctant to require the use of a particular analytic tool, but this is one context in which judicial intervention may make sense. Courts in other countries have begun to enforce national emission reduction obligations based on carbon budgets,[447] and this is arguably the best way to understand the context and intensity (and thus significance) of both project- and program-level impacts. There is also a provision in the NEPA regulations which requires agencies to "discuss any inconsistency of a proposed action with any approved State or local plan and laws" which could be interpreted as requiring a disclosure of consistency with state and local carbon budgets or GHG reduction targets, particularly in states that have adopted policies to this effect.[448]

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[442] *See, e.g.*, Daniel J. Hayes & Rodrigo Vargas, *The North American Carbon Budget*, *in* SECOND STATE OF THE CARBON CYCLE REPORT: A SUSTAINED ASSESSMENT REPORT 71 (Cavallaro et al. eds., 2018); Corinne Le Quéré et al., *Global Carbon Budget 2018*, 10 EARTH SYS. SCI. DATA 2141 (2018).

[443] *See* WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41 (D.D.C. 2019); Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018); W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. 4:16-cv-00021-BMM, 2018 WL 1475470, at *1 (D. Mont. Mar. 26, 2018), *appeal dismissed*, No. 18-35836, 2019 WL 141346 (9th Cir. Jan. 2, 2019).

[444] *W. Org. of Res. Councils*, 2018 WL 1475470, at *13–14.

[445] *WildEarth Guardians,* 368 F. Supp. 3d at 79.

[446] *Wilderness Workshop*, No. 1:18-cv-00987 (D. Colo. Apr. 26, 2018).

[447] *See*, *e.g.*, Laura Schuijers, *Climate Change in Court*, PURSUIT (Mar. 3, 2019), https://pursuit.unimelb.edu.au/articles/climate-change-in-court [https://perma.cc/3MTB-3DCP].

[448] 40 C.F.R. § 1506.2(d) (2019).

This provision should be interpreted as requiring agencies to consider the consistency of fossil fuel supply projects not only with state policies in the state(s) where the project is located but also with any U.S. states with GHG reduction targets or carbon budgets. It should also be interpreted as requiring consideration of consistency with global and national carbon budgets, since exceedance of those budgets would undermine state efforts to reduce emissions and adapt to climate change.

4. Agencies Must Conduct Balanced Assessments of Costs and Benefits

Where an agency monetizes the benefits of the proposal, it must also monetize the costs of the proposal, including the costs of GHG emissions. This principle was first articulated by the Ninth Circuit Court of Appeals over a decade ago in *Center for Biological Diversity v. National Highway Traffic Safety Administration*, which held that it was arbitrary and capricious for an agency to ignore the impacts of GHG emissions in a regulatory impact analysis, even when there is uncertainty about those impacts: "[W]hile the record shows there is a range of values, the value of carbon emissions reduction is certainly not zero."[449] Applying this principle, the Colorado district court in *High Country Conservation Advocates v. U.S. Forest Service* held that USFS must monetize climate impacts from coal leasing where it had monetized economic benefits and directed USFS to use the social cost of carbon protocol in its cost-benefit assessment.[450] However, the application of this rule is not as straightforward as it may seem. Since *High Country*, there have been at least six decisions involving claims about agency failures to use the social cost of carbon in NEPA documents where benefits were monetized, all of which involved fossil fuel leasing proposals.[451] The decisions reveal that there is room for

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[449] Ctr. for Biological Diversity v. NHTSA, 538 F.3d 1172, 1200 (9th Cir. 2008).

[450] High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1193 (D. Colo. 2014).

[451] *See* Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt., 377 F. Supp. 3d 1223 (D. Colo. 2019); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41 (D.D.C. 2019); WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860 (D. Mont. Feb. 11, 2019); Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145 (D. Colo. 2018); W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. 4:16-cv-00021 -BMM, 2018 WL 1475470 (D. Mont. Mar. 26, 2018); Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, No. 9:15-cv-00106, 2017 WL 5047901 (D. Mont. Nov. 3, 2017). There are also several pending cases which involve claims about the failure to use the social cost of carbon. *See* WildEarth Guardians v. U.S. Bureau of Land Mgmt., No. 4:18-cv -00073 (D. Mont. May 15, 2018); WildEarth Guardians v. Zinke, No. 2:16-cv-00167 (D.

disagreement on the point at which quantification of benefits rises to the level of a "cost-benefit analysis" requiring quantification of costs. In all cases, the reviewing agencies did quantify certain economic benefits in their NEPA documentation—such as labor income and royalty revenue—but argued that disclosure of social costs was not required because the agency had not conducted a complete "cost-benefit analysis" but rather an "economic impact analysis" (or "regional economic analysis")[452] or the social cost metrics would not provide a sufficiently accurate and precise cost estimate so as to be helpful to decision makers.[453] But in only two of these cases did the reviewing courts require disclosure of social costs.[454] In the other four cases, courts deferred to agency claims that their economic impact analysis was not a full cost-benefit analysis, and thus no quantification of GHGs was required.[455]

The two decisions requiring disclosure of social costs of GHG emissions were both issued by the Montana district court and both involved a relatively detailed analysis of the agency's justification for not disclosing these costs. In *Montana Environmental Information Center v. Office of Surface Mining*, the court scrutinized OSM's argument that it's "economic impact assessment" for a coal lease should be distinguished from a "cost-benefit analysis."[456] The court noted that OSM had disclosed the economic benefits of the proposal, including royalty and tax revenue and local employment impacts—for example, stating that "the proposed project could contribute $23,816,000 million [sic] annually in tax revenues to the states."[457] In this context, the court found that OSM's characterization of its analysis was a "distinction without difference where, as here, the economic benefits of the action were quantified where the costs were not."[458]

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Wyo. Apr. 21, 2017); WildEarth Guardians v. Zinke, No. 2:16-cv-00166 (D. Wyo. Jan. 27, 2017); WildEarth Guardians v. Jewell, No. 2:16-cv-00168 (D. Utah Sept. 11, 2015).

[452] Agencies will refer to quantification of such benefits as a "regional economic analysis" or an "economic impact analysis" to avoid the requirement to treat costs and benefits equally in their analysis. *See, e.g.*, *Citizens for a Healthy Cmty.*, 377 F. Supp. 3d at 1239–40.

[453] *See, e.g.*, Brief for Fed. Gov't, WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860 (D. Mont. Feb. 11, 2019).

[454] *See WildEarth Guardians*, 2019 WL 2404860, at *12; *Mont. Envtl. Info. Ctr.*, 2017 WL 5047901, at *5–6.

[455] *See WildEarth Guardians*, 368 F. Supp. 3d at 79; Wilderness Workshop v. U.S. Bureau of Land Mgmt., No. 1:16-cv-01822-WYD (D. Colo. Oct. 17, 2018); W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., No. 4:16-cv-00021-BMM (D. Mont. Mar. 26, 2018).

[456] Mont. Envtl. Info. Ctr. v. U.S. Off. of Surface Mining, 274 F. Supp. 3d 1074, 1096 (D. Mont. 2017).

[457] *Id.* (internal citations omitted).

[458] *Id.* at 1096 n.9.

In *WildEarth Guardians v. Zinke*, the Montana district court addressed other rationales proffered by OSM for not disclosing social costs.[459] There, the focus of the decision was not whether a cost-benefit analysis was performed (OSM had quantified the benefits of the proposed action, and thus the court's prior decision was controlling), but whether OSM had a reasonable justification for not using the social cost of carbon in light of the fact that benefits were monetized.[460] The OSM's first justification was that "there is no consensus on the appropriate fraction of social cost of carbon tied to electricity generation that should be assigned to the coal producer."[461] The court found that this was not persuasive because "it misapprehends NEPA's mandate"—"[u]nder NEPA, agencies are not required to apportion responsibility for the impacts assessed, but rather, they must consider all reasonably foreseeable direct, indirect and cumulative impacts of a proposed action."[462] Second, OSM argued that it was "uncertain whether [GHG] emissions would actually be reduced if the coal associated with the proposed plan was not mined because power plants have alternative sources for coal."[463] The court quickly dismissed this as an unsupported perfect substitution argument.[464] Third, OSM argued that there were unspecified "uncertainties associated with assigning a specific and accurate social cost of carbon to the Proposed Action."[465] The court responded that, to the extent the uncertainties OSM cited referred to the fact that the social cost of carbon is expressed as a range of values, this was not a valid justification for not quantifying those costs.[466] Finally, OSM argued that, to provide meaningful insight, the broader benefits of coal production would need to be considered.[467] Again, the court found that this was not a persuasive reason for ignoring social costs because OSM had in fact attempted to quantify the economic benefits of the action while ignoring the costs.[468] The court also confronted an argument from the mining company (an intervenor) that the social cost of carbon protocol should not be used because it was rescinded by the Trump administration.[469] It responded that:

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[459] *WildEarth Guardians*, 2019 WL 2404860, at *8.
[460] *Id.* at *9–11.
[461] *Id.* at *11 (internal citations omitted).
[462] *Id.*
[463] *Id.*
[464] *Id.*
[465] *WildEarth Guardians*, 2019 WL 2404860, at *12 (internal citations omitted).
[466] *Id.*
[467] *Id.*
[468] *Id.*
[469] *Id.* at *12 n.7.

> Regardless of administration policies that ebb and flow with the political tides, agencies must nevertheless comply with their obligation to properly quantify costs when they have touted economic benefits of a proposed action. The Court's decision here does not mandate use of the SCC Protocol. But it does require OSM to comply with NEPA by either quantifying the costs associated with greenhouse gas emissions or by reasonably justifying why that cannot be done.[470]

The court's careful scrutiny of OSM's justifications in these two cases contrasted to other cases in which courts have deferred to agency decisions on this matter with relatively little analysis.

For example, in a case involving BLM's approval of an RMP that opened lands for fossil fuel development, the Colorado district court accepted BLM's argument that its economic impact analysis was not necessarily the "benefit" side of a cost-benefit analysis without discussing what exactly that analysis entailed.[471] But in the EIS at issue, BLM had quantified labor income, jobs created, and mineral royalty distributions from oil and gas leasing.[472] The court partially justified its decision on the grounds that BLM had not "expressly relied on anticipated economic benefits in its RMP"—but the economic benefits were discussed and appeared to be an important part of the comparison between alternatives (as evinced by statements about how royalties would be lower under certain alternatives).[473] Similarly, in another case which dealt with BLM's approval of several hundred oil and gas leases in Wyoming, Utah, and Colorado, the D.C. district court deferred to BLM's assertion that it had not conducted a full cost-benefit analysis when it discussed the economic benefits of oil and gas drilling in EAs covering the issuance of 282 oil and gas lease sales over more than 303,000 acres in Wyoming.[474] The court said that *High Country* was not controlling because the EIS at issue in that case predicted economic benefits of nearly a billion dollars, whereas the oil and gas lease sale EAs' discussion of economic benefits was more abbreviated and the quantified economic benefits were much smaller

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[470] *Id.*
[471] Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145, 1159 (D. Colo. 2018).
[472] *Id.*
[473] *Id.*
[474] WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41 (D.D.C. 2019).

(e.g., one EA estimated that a lease sale would yield $152,364 in revenue).[475] The court also deferred to BLM's conclusion that the social cost estimates were "highly speculative" because they represented a "4,000 percent range in potential costs" under different production scenarios, and this would be "less than helpful in informing the public and the decisionmaker."[476] The Colorado district court reached the same conclusion with respect to BLM and USFS's approval of oil and gas leasing in Colorado.[477]

### *C. Alternatives and Mitigation to Address GHG Impacts*

NEPA requires federal agencies to consider and disclose mitigation measures for any impacts which are deemed to be significant.[478] Agencies are not required to discuss mitigation for insignificant impacts.[479] Thus, in the absence of significance determinations for GHG emissions from fossil fuel supply projects, it is not possible to challenge agency failures to discuss mitigation options by relying exclusively on the regulatory provisions pertaining to mitigation. But the regulations also require agencies to "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[480] Plaintiffs have thus relied on this requirement in lawsuits seeking to compel federal agencies to consider ways in which fossil fuel leasing and transport proposals could be modified to reduce or eliminate emissions.

It is our view that agencies should more rigorously evaluate alternatives and mitigation measures aimed at reducing indirect as well as direct GHG emissions from fossil fuel supply projects, including the no action alternative and alternatives that involve smaller increases in fossil fuel supply (either production or transportation capacity). Federal agencies do sometimes consider alternatives that entail fewer emissions in NEPA reviews of fossil fuel supply projects. For example, in a NEPA documentation for a fossil fuel leasing proposal, an agency might consider different leasing scenarios which entail different acreage and levels of fossil fuel production. And in proposals for broader planning actions

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[475] *Id.* at 78.
[476] *Id.* at 79 (internal citations omitted).
[477] Citizens for a Healthy Cmty. v. U.S. Bureau of Land Mgmt., 377 F. Supp. 3d 1223, 1247 (D. Colo. 2019).
[478] 40 C.F.R. § 1503.3(d) (2019).
[479] 40 C.F.R. § 1508.13 (2019).
[480] 40 C.F.R. § 1502.14(a) (2019).

such as RMPs, an agency may compare alternatives with renewable energy production as well as fossil fuel production. But in many instances—particularly where agencies are approving leases or transportation infrastructure—agencies do not give meaningful consideration to alternative approaches for meeting energy demand.[481] Such alternative approaches may be briefly discussed (for thoroughness) but then quickly dismissed from further consideration. This often occurs where the purpose and need of the proposal are framed narrowly—for example, in an EIS for coal leasing, BLM described the need in terms of the public interest ("to meet the nation's future energy needs") and the purpose in terms of the applicant's interest ("to allow the applicant mines access to a continuing supply of low sulfur compliance coal").[482] Notably, in the purpose and need statement, BLM also asserted that "the continued extraction of coal is essential to meet the nation's future energy needs"—effectively foreclosing arguments that the public need for energy could be met through other means.[483] This is a problematic position, as it assumes a need for increasing fossil fuel supply at a time when scientific research clearly indicates that we need to reduce fossil fuel consumption.

The Department of State took a similar approach with the Keystone XL pipeline, defining the purpose and need to reflect the developer's interest in developing the pipeline as well as the public interest in energy demand being met. In *Indigenous Environmental Network v. U.S. Department of State*, the Montana district court held that this practice was permitted under Ninth Circuit case law, and that it was therefore reasonable for the agency to dismiss alternatives that did not satisfy both the public and private interests at stake.[484] The court also held that it was not necessary to consider a "more environmentally beneficial alternative" but rather only those alternatives that are "necessary to permit a reasoned choice" in light of the purpose and need.[485] The problem with

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[481] *See, e.g.*, City of Grapevine v. U.S. Dep't of Transp., 17 F.3d 1502, 1506 (D.C. Cir. 1994).
[482] NAT'L SYS. OF PUB. LANDS, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE SOUTH GILLETTE AREA COAL LEASE APPLICATIONS 1–19 (2009).
[483] *Id.*
[484] Indigenous Envtl. Network v. U.S. Dep't of State, 347 F. Supp. 3d 561, 573 (D. Mont. 2018).
[485] *Id.* at 574. Another lawsuit has since been filed challenging the approval of the Keystone XL pipeline which alleges, among other things, that the EIS was flawed because it did not consider an alternative route to avoid the sovereign tribal territory (which was contemplated in the scoping report). That complaint also argues that the Department of State's approval of the Keystone XL Pipeline violates the APA because the Department failed to justify its reversal in light of the previous factors which led it to deny the permit,

this interpretation of NEPA is that it allows agencies to define the project need so narrowly based on private interests that they can avoid any real consideration of alternatives that may better serve the public interest.

The decision in *Indigenous Environmental Network* can be contrasted to several decisions finding that BLM failed to take a hard look at alternatives that would have decreased fossil fuel leasing on federal lands, all of which reflect a more functional interpretation of NEPA requirements for the alternatives analysis.[486] First, in *New Mexico ex rel. Richardson v. Bureau of Land Management*, the Tenth Circuit Court of Appeals held that BLM violated NEPA by failing to consider an alternative in an RMP that would have closed the managed area to future minerals development, since such an option was within the scope of BLM's discretion as well as BLM's statutory mandate to manage lands on a mixed use basis.[487] The case did not entail any claims related to climate change or GHG emissions, but it set the stage for two additional decisions which focused on the need to restrict leasing options in order to reduce the emissions impact. In one case, the Montana district court found that BLM had failed to take a hard look at coal leasing alternatives in two RMP EISs that would have decreased the amount of coal available for leasing based on climate concerns.[488] The BLM had examined a total of nine alternatives in the two EISs, all of which entailed the same acreage available for leasing and the same projected coal production.[489] The court held that BLM had discretion to reduce or eliminate areas from lease sales, and thus the lower production scenarios were reasonable management

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in particular its assessment of climate change impacts, but the NEPA claims focus on the lack of assessment of impacts on and alternatives to the route through tribal lands. Complaint at 51, Rosebud Sioux Tribe v. U.S. Dep't of State, No. 4:18-cv-00118 (D. Mont. Sept. 10, 2018).

[486] There is another pending case, *Diné Citizens Against Ruining Our Environment v. Bureau of Indian Affairs*, in which plaintiffs have alleged that the federal government unlawfully truncated its alternatives analysis for a connected coal mining and coal plant operation. There, plaintiffs are arguing that the purpose and need statement ("to continue operations of the Navajo Mine and the Four Corners Power Plant") is unduly narrow, thus preventing meaningful consideration of lower GHG alternatives. The case was dismissed by a district court due to failure to join an essential party and the Ninth Circuit upheld the dismissal. Diné Citizens Against Ruining Our Env't v. Bureau of Indian Affairs, 932 F.3d 843, 848 (9th Cir. 2019).

[487] N.M. *ex rel.* Richardson v. U.S. Bureau of Land Mgmt., 565 F.3d 683, 703 n.23 (10th Cir. 2009).

[488] W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt., 2018 WL 1475470, at *13–14, *appeal dismissed*, No. 18-35836, 2019 WL 141346 (9th Cir. Jan. 2, 2019).

[489] *Id.* at *19–20.

options which should be considered to provide a reasoned basis for decision-making, particularly in light of the potential emissions from the fossil fuels produced pursuant to the RMPs and public comments outlining concerns about the climate impacts.[490] However, the court did not agree with another claim advanced by plaintiffs with respect to the alternatives analysis—specifically, that BLM must also consider alternatives to reduce methane pollution from oil and gas development contemplated in the RMPs. The court held that consideration of such measures was not required at the RMP stage—it characterized the RMP EISs as "programmatic" reviews—and noted that BLM would retain the ability to impose specific methane mitigation measures at the leasing stage.[491]

Similarly, in *Wilderness Workshop v. Bureau of Land Management*, the Colorado district court held that BLM should have considered an oil and gas leasing alternative that would "meaningfully limit" oil and gas production development.[492] Notably, BLM had considered various alternatives that entailed less oil and gas leasing—but none of them closed more than 25.7 percent of the study area to future leasing—and much of the area left open for leasing under all alternatives had only "moderate or low" potential for oil and gas development.[493] The court held that BLM must consider an alternative in which more of the lands were closed to leasing so that it could better evaluate alternate land management options for the "moderate or low" potential areas—thus, the court's decision was predicated more on the need for BLM to meaningfully implement the principle of "mixed use" on public lands than on the need to evaluate a more environmentally friendly alternative.[494]

These three decisions thus demonstrate that courts may intervene to enforce the requirement that agencies take a "hard look" at alternatives that entail different levels of fossil fuel production at the land use planning stage, but may be more deferential to agencies about the scope of other emission mitigation measures reviewed at this stage. The Colorado district court addressed the obligation to consider methane mitigation measures at the leasing stage in the context of the EIS prepared for coal leasing on remand from *High Country Conservation Advocates*.[495] In the

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[490] *Id.*
[491] *Id.* at *28.
[492] Wilderness Workshop v. U.S. Bureau of Land Mgmt., 342 F. Supp. 3d 1145, 1164 (D. Colo. 2018).
[493] *Id.* at 1166.
[494] *Id.* at 1153.
[495] High Country Conservation Advocates v. U.S. Forest Serv., 333 F. Supp. 3d 1107, 1124 (D. Colo. 2018).

leasing EIS, USFS had briefly discussed methane flaring as a potential mitigation measure, but put off the decision on whether to require methane flaring to a later point in time. The USFS stated that it had not considered methane flaring in detail "because it, like all other methane mitigation measures, requires detailed engineering and economic considerations that would occur later in the process."[496] The USFS also incorporated lease stipulations requiring "additional analysis" of the feasibility of methane use or capture.[497] The court held that USFS's treatment of methane mitigation measures was adequate and that USFS had satisfied its obligation to "briefly discuss" why the option would eliminate from detailed consideration as an alternative.[498]

## CONCLUSION

The contribution of fossil fuel supply projects to GHG emissions and climate change is precisely the sort of environmental impact that requires a "hard look" under NEPA. As detailed in this Article, there are now numerous court decisions fleshing out the required scope and nature of the GHG analysis that must be performed for fossil fuel projects. In particular, courts have made it clear that agencies must carefully evaluate indirect emissions from such proposals, at minimum considering the effect of the proposal on downstream consumption of fossil fuels, and that emissions must be quantified wherever tools and data are available to do so. There are also a number of cases addressing other aspects of the GHG analysis, such as the proper scope of the cumulative emissions analysis, the adequacy of technical assumptions underpinning estimates of net emissions, and the contexts in which the social costs of emissions must be disclosed. These cases show that courts are generally deferential to agencies regarding decisions about how to best analyze GHG impacts, but that courts will intervene as needed to ensure that agencies do not wholly ignore GHG impacts or analyze them in an irrational way. Here, we summarize some recommendations to agencies and courts on the best approach for analyzing GHG emissions from fossil fuel supply projects under NEPA,

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[496] *Id.*
[497] *Id.*
[498] *Id.* at 1120–21 (citing 40 C.F.R. § 1502.14(a)). The Court affirmed USFS's decision to rule out methane flaring and capture as infeasible at the same mine, because the intervening years have provided "additional evidence . . . that flaring operations are safe" and plaintiffs provided a report showing that methane flaring would be economically feasible. *Id.* at 1125. *See also* WildEarth Guardians v. U.S. Forest Serv., 828 F. Supp. 2d 1223, 1239 (D. Colo. 2011).

recognizing that there is not yet judicial consensus that all of these elements are required under NEPA, but that it makes sense to err on the side of greater disclosure for public policy reasons as well as legal reasons.[499]

First, agencies should include a complete inventory of direct and indirect emissions in NEPA documents for fossil fuel supply proposals, including all downstream and (if applicable) upstream emissions from other activities on the supply chain. Emissions should be quantified wherever possible, and in particular, combustion emissions should be quantified using emission factors whenever the agency is able to project the amount of fuel to be produced.[500] For larger proposals, agencies may also supplement this gross GHG inventory with a quantitative or qualitative discussion of energy market substitution and net emissions, provided that the agency uses the best available data on energy markets and substitutes and is transparent about all assumptions, model parameters, and limitations to that analysis. Where agencies model energy market impacts, they should use multiple scenarios to account for uncertainty.[501]

Second, we recommend that agencies consider the effects of other reasonably foreseeable fossil fuel supply projects in their cumulative effects analysis for such proposals. Ideally, this analysis should encompass federal activities at both the regional and national scales (e.g., other federal leases for coal, oil, and/or gas) and should help decision makers and the public understand both the incremental contribution of the proposal under review and the aggregate impacts of federal decision-making on similar projects. One goal of this analysis should be to evaluate whether the proposal is prudent and whether impacts may be significant in light of other federal leases or approvals for fossil fuel supply projects. Agencies should also account for such cumulative impacts when modelling energy market impacts and net emissions (and should consider whether the market impact analysis should be integrated with the cumulative effects analysis).

Third, agencies should carefully evaluate the significance of the emissions impacts in light of the regulatory criteria outlined in the NEPA regulations. Agencies should not avoid reaching a determination on

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[499] Most of these recommendations are written in terms of what agencies should do, but that these are also intended to provide guidance to courts when assessing whether agencies have met their obligations under NEPA.

[500] See Burger & Wentz, *supra* note 11, for more detailed guidance on the preparation of a GHG inventory for direct and indirect emissions, including a list of tools available to quantify upstream and downstream emissions.

[501] See *supra* Section III.A.2 for more detailed recommendations on the use of energy market models.

significance due to a lack of predetermined significance thresholds for GHG emissions. Rather, agencies should use all available tools to evaluate the magnitude of the emissions impact and reach a reasonable conclusion about significance based on that analysis. Although courts have not required agencies to disclose the social costs of emissions except where agencies have conducted a cost-benefit analysis, agencies should consider using the social cost metrics regardless to aid in their evaluation of significance. When determining whether such social costs must be disclosed, courts should closely scrutinize agency claims that the disclosure of key economic benefits (such as government revenue or job creation) does not constitute the "benefits" side of a "cost-benefit analysis." The relevant inquiry is not how the agency has labelled the analysis, but rather whether the agency has put its "thumb on the scale" by inflating or emphasizing benefits and downplaying costs.

Fourth, we recommend that agencies carefully consider alternatives to fossil fuel supply proposals that will help meet energy demand without generating the same amount of GHG emissions in their NEPA analysis. Agencies should not narrowly frame the purpose and need of proposals to exclude such alternatives from consideration, particularly in light of the urgent public need to transition from fossil fuels to alternative energy sources.

# ATTACHMENT 2

Michael Burger, et al., Incorporating climate Change in NEPA Reviews: Recommendations for Reform (2022)

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# Incorporating Climate Change in NEPA Reviews: Recommendations for Reform

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# INCORPORATING CLIMATE CHANGE IN NEPA REVIEWS:

## Recommendations for Reform

By Michael Burger, Romany M. Webb, and Jessica Wentz

May 2022

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The Sabin Center for Climate Change Law develops legal techniques to fight climate change, trains law students and lawyers in their use, and provides the legal profession and the public with up-to-date resources on key topics in climate law and regulation. It works closely with the scientists at Columbia University's Earth Institute and with a wide range of governmental, non-governmental and academic organizations.

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# EXECUTIVE SUMMARY

The National Environmental Policy Act ("NEPA") requires federal agencies to conduct an environmental review prior to moving ahead with any major federal project, plan, or program that could significantly affect the environment. As part of the environmental review, agencies must share information with, and solicit feedback from, the public. The goal is to improve federal decision-making by ensuring that agencies take a hard look at the environmental effects of their actions and fully inform the public about those effects.

In guidance issued in 2016, the Council on Environmental Quality ("CEQ")—the federal body charged with implementing NEPA—identified climate change as a relevant factor to be considered in NEPA reviews. Multiple federal courts have confirmed that, under NEPA, federal agencies must consider both proposed actions' contributions to climate change (i.e., via greenhouse gas ("GHG") emissions) and the effects of climate change on proposed actions and their environmental outcomes. Despite this, however, federal agencies have been slow to integrate climate change considerations into their NEPA reviews.

In October 2021, CEQ announced that it would undertake a two-phase review of NEPA's implementing regulations and consider amendments to, among other things, "ensure that the NEPA process . . . meets environmental, climate change, and environmental justice objectives." Phase 1 of the review was completed in April 2022, when CEQ finalized limited amendments to undo certain regulatory changes made by the Trump administration. CEQ is now embarking on Phase 2, which will involve more extensive regulatory revisions, aimed at ensuring "the NEPA process provides for efficient and effective environmental reviews that are guided by science and are consistent with the statute's text and purpose" and promote improved federal decision-making to advance "climate change mitigation and resilience" goals. This report recommends seven key regulatory reforms that would further those aims:

1. **Assessing the significance of environmental effects in a global context**: CEQ should amend the NEPA regulations to direct agencies to consider global context when assessing the significance of a proposed action's GHG emissions, and to evaluate whether a proposed action is consistent with Federal, State, Tribal, and local GHG emission reduction targets and other climate change mitigation and adaptation policies.

2. **Establishing a significance threshold for GHG emissions**: CEQ should specify, in the NEPA regulations or guidance, a quantitative threshold above which GHG emissions are presumed to be significant while recognizing that GHG emissions below the threshold may be significant and should be assessed on a case-by-case basis.

3. **Accounting for climate change in environmental assessments**: CEQ should amend the NEPA regulations to provide additional instruction to federal agencies on how to account for climate change in environmental assessments, for example, by explicitly requiring consideration of GHG emissions and mitigation measures.

4. **Ensuring appropriate use of programmatic NEPA reviews**: CEQ should amend the NEPA regulations to clarify how agencies can use programmatic reviews and tiering to streamline NEPA implementation without compromising the integrity of the environmental review process.

5. **Accounting for environmental change in NEPA reviews**: CEQ should amend the NEPA regulations to explicitly require agencies to consider changing conditions and foreseeable trends when evaluating environmental impacts and mitigation measures.

6. **Ensuring use of the "best available science" in NEPA reviews**: CEQ should add a new provision to the NEPA regulations, requiring agencies use the "best available science" across all NEPA documents and analyses.

7. **Ensuring balanced consideration of costs and benefits in NEPA reviews:** CEQ should amend the NEPA regulations to specify that, when agencies include a cost-benefit analysis in NEPA documentation, they should present a balanced assessment which does not exclude potentially significant environmental costs if tools and data are available to quantify those costs.

# CONTENTS

# 1. INTRODUCTION

Enacted by Congress in 1969 and signed into law by President Nixon in 1970, the National Environmental Policy Act ("NEPA") makes "environmental protection a part of the mandate of every federal agency."[1] In NEPA, Congress declared a national policy under which the federal government is expected "to use all practicable means and measures . . . to create and maintain conditions under which man and nature can co-exist in productive harmony."[2] Consistent with that goal, NEPA requires federal agencies to conduct an environmental review prior to undertaking any "major federal action[] significantly affecting the quality of the human environment," and consider the findings of that review when deciding whether and how to proceed.[3]

For each action covered by NEPA, federal agencies must prepare, with public input, an "environmental impact statement" ("EIS") that describes:

> (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.[4]

This requirement serves two primary purposes—(1) ensuring that agencies take a "hard look" at the environmental consequences of proposed actions before deciding whether to move forward and (2) enhancing public disclosure of environmental information.[5]

The Council on Environmental Quality ("CEQ")—the federal body charged with implementing NEPA—has identified climate change as "a fundamental environmental issue" and

[1] Calvert Cliffs' Coordinating Comm., Inc. v. U.S. Atomic Energy Com., 449 F.2d 1109, 1112 (D.C. Cir., 1971).
[2] 42 U.S.C. § 4331(a).
[3] *Id*. § 4332(2)(C).
[4] *Id*.
[5] New York Natural Res. Def. Council, Inc. v. Kleppe, 429 U.S. 1308, 1311 (1976); Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 333 (1989); Marsh v. Oregon Nat. Res. Council, 490 U.S. 360, 385 (1989). *See also* CONGRESSIONAL RESEARCH SERVICE, THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA): BACKGROUND AND IMPLEMENTATION (2011), https://crsreports.congress.gov/product/pdf/RL/RL33152/10.

concluded that "its effects fall squarely within NEPA's purview."[6] In guidance issued in 2016 ("Climate Guidance"), CEQ identified two key climate change considerations requiring analysis under NEPA: (1) the "potential effects of a proposed action on climate change" (i.e., via greenhouse gas ("GHG") emissions); and (2) the "effects of climate change on a proposed action and its environmental impacts."[7] The courts have repeatedly confirmed that federal agencies are required to consider both factors in their NEPA reviews.[8]

At the direction of President Trump, CEQ withdrew the Climate Guidance in 2017[9] and two years later issued new draft guidance, focused specifically on the treatment of GHG emissions in NEPA reviews.[10] Also under President Trump, in 2020, CEQ amended the NEPA implementing regulations purportedly to "facilitate more efficient, effective, and timely NEPA reviews by Federal agencies."[11] The Sabin Center, along with many other groups, opposed the 2020 amendments on the basis that the revised regulations "may be used to limit or even eliminate analysis of climate change-related considerations in NEPA reviews."[12]

[6] Memorandum from Christina Goldfuss, Council on Environmental Quality, for Heads of Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 1, 2016), https://perma.cc/4646-8N9A [hereinafter "2016 Climate Guidance"].

[7] *Id*. at 4.

[8] For a discussion of relevant case law, *see* Michael Burger & Jessica Wentz, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Reviews*, 41 HARV. ENV'T L. REV. 109 (2017); Michael Burger & Jessica Wentz, *Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA*, 44 WM. & MARY ENV'T L. & POL'Y REV. 423 (2020), ROMANY M. WEBB ET AL., EVALUATING CLIMATE RISK IN NEPA REVIEWS: CURRENT PRACTICES AND RECOMMENDATIONS FOR REFORM (2022), https://perma.cc/8QC4-6CTW.

[9] Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16,576 (Apr. 5, 2017).

[10] Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 84 Fed. Reg. 30,097 (June 26, 2019).

[11] Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43,304, 43,306 (July 16, 2020) [hereinafter "2020 Amendments"].

[12] Sabin Center for Climate Change Law and Environmental Defense Fund, Comment Letter on Proposed Amendments to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act (Mar. 10, 2020), https://perma.cc/J7Z3-R29Y.

When President Biden took office, CEQ withdrew the 2019 draft guidance and commenced a review of the 2016 guidance, as well as the NEPA implementing regulations.[13] CEQ indicated that it would conduct its regulatory review in two phases. Phase 1 was completed in April 2022, when CEQ finalized limited amendments to the NEPA implementing regulations designed to undo certain changes made during the Trump administration and thereby "help ensure the proper scope of analysis that NEPA requires, including analysis of effects on climate change."[14] CEQ indicated that, in phase 2 of its review, it would consider "more comprehensive" regulatory changes to "advance environmental, climate change mitigation and resilience, and environmental justice objectives."[15]

Changes to the NEPA implementing regulations are needed to ensure federal agencies appropriately integrate climate change considerations into their environmental reviews. Over the last decade, the Sabin Center has conducted multiple surveys of federal EISs, each of which has found major gaps and shortcomings in agencies' climate change analyses.[16] Most recently, a survey of all final EISs issued in connection with onshore energy projects from 2016 through 2020 found that less than half of the EISs considered whether and how climate change would alter the environmental outcomes of the proposed action, and less than ten percent compared climate change impacts across alternatives.[17]

This paper identifies seven key regulatory reforms that, if adopted, would help to ensure federal agencies fully and effectively evaluate climate change in their NEPA reviews. As explained below, the reforms are consistent with prior CEQ guidance and court decisions, and would further NEPA's dual aims of informed decision-making and public disclosure.

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[13] National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 86 Fed. Reg. 10,252 (Feb. 19, 2021). *See also* National Environmental Policy Act Implementing Regulations Revisions, 86 Fed. Reg. 55,757 (Oct. 7, 2021).

[14] National Environmental Policy Act Implementing Regulations Revisions, 87 Fed. Reg. 23,453, 23,463 (Apr. 20, 2022) [hereinafter "2022 Regulatory Revisions"].

[15] *Id*. at 23,456.

[16] *See generally* PATRICK WOOLSLEY, CONSIDERATION OF CLIMATE CHANGE IN FEDERAL EISS, 2009 – 2011 (2012), https://perma.cc/8RPQ-Y24V; JESSICA WENTZ ET AL., SURVEY OF CLIMATE CHANGE CONSIDERATIONS IN FEDERAL ENVIRONMENTAL IMPACT STATEMENTS, 2012 – 2014 (2016), https://perma.cc/C7HE-MJE9; SALONI JAIN ET AL., HOW DID FEDERAL ENVIRONMENTAL IMPACT STATEMENTS ADDRESS CLIAMTE CHANGE IN 2016? (2017), https://perma.cc/M45R-498G; MADELINE SIEGEL & ALEXANDER LOZNAK, SURVEY OF GREENHOUSE GAS CONSIDERATIONS IN FEDERAL ENVIRONMENTAL IMPACT STATEMENTS AND ENVIRONMENTAL ASSESSMENTS FOR FOSSIL FUEL-RELATED PROJECTS (2019), https://perma.cc/3DBE-GXBW; Webb et al., *supra* note 8.

[17] Webb et al., *supra* note 8, at 46-48.

## 2. ASSESSING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS IN A GLOBAL CONTEXT

The NEPA implementing regulations identify various factors that federal agencies must consider in determining whether an action has significant environmental effects and thus requires preparation of an EIS. Under the original, 1978 regulations, agencies were required to consider "both context and intensity."[18] The courts subsequently held that "context" refers to "the scope of the agency's action, including the interests affected," while "intensity refers to the severity of impact."[19]

When CEQ amended the NEPA implementing regulations in 2020, it removed the references to "context" and "intensity." The amended regulations provide that, "[i]n considering whether the effects of [a] proposed action are significant, agencies shall analyze the potentially affected environment and degree of the effects of the proposed action."[20] CEQ's explanation for the regulatory change suggests that it was intended to clarify, rather than alter, how agencies assess significance.[21]

Both the 1978 and 2020 regulations state that "significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the" local area.[22] Multiple federal courts have, however, held that agencies must consider effects occurring outside the local area in some circumstances. Most notably, the courts have required agencies to assess the significance of environmental effects in a global context where the action contributes to a global problem, such as climate change.

In *California v. Bernhard*, the U.S. District Court for the Northern District of California held that "the appropriate context for a nationwide rulemaking that contributes to a global problem is the world as a whole."[23] In that case, the court was considering the adequacy of NEPA analysis undertaken by the Department of the Interior ("DOI") in connection with its decision to rescind the so-called "Methane Waste Prevention Rule," which aimed to control natural gas venting, flaring,

[18] 40 C.F.R. § 1508.27 (1978).
[19] *See generally*, Def. of Animals v. U.S. Dep't of the Interior, 751 F.3d 1054, 1068 (9th Cir. 2014).
[20] 40 C.F.R § 1501.3(b).
[21] *See* 2020 Amendments, *supra* note 11, at 43,322 (The changes are intended "to provide greater clarity as to what agencies should consider in assessing potentially significant effects").
[22] 40 C.F.R. § 1508.27(a) (1978); 40 C.F.R. § 1501.3(b)(1).
[23] Cal. v. Bernhardt, 472 F. Supp. 573, 627 (N.D. Cal. 2020).

and leaks during production on federal lands. Pursuant to NEPA, DOI undertook an environmental assessment ("EA") and determined that rescission of the rule would not have significant environmental effects, and thus did not require preparation of an EIS. The court held that DOI had inappropriately limited its analysis to local and regional environmental effects and that it should have also considered global effects. According to the court, because DOI's action would impact "global greenhouse gas emissions, . . . the appropriate context includes global, national, and regional interests."[24]

While *California v. Bernhardt* concerned a nationwide rulemaking, the courts have taken the same approach to site-specific actions with global implications. For example, in *Barnes v. U.S. Department of Transportation* ("DOT"), the 9th Circuit Court of Appeals approved of DOT's decision to assess the environmental impacts of a proposed airport expansion in a global context.[25] The court noted that the airport expansion would contribute to GHG emissions associated with climate change, which is a "global problem" and thus should be evaluated in a global context.[26] Similarly, in *Montana Environmental Information Center v. U.S. Office of Surface Mining*, a federal district Court in Montana held that DOI was required to consider environmental impacts in a global context when determining whether to prepare an EIS in connection with its approval of a plan of operations for a coal mine.[27] Prior to approving the plan, DOI undertook an EA in which it evaluated possible environmental effects "at the local and regional scale," and determined that such effects were not significant.[28] The court faulted DOI for limiting its analysis to local and regional environmental effects, noting that the mine would result in GHG emissions, and thus have "foreseeable impacts beyond the region."[29] More recently, in *350 Montana v. Haaland*, the Ninth Circuit Court of Appeals remanded an EA for a coal mining lease expansion, finding that DOI had failed to justify a finding of no significant impact ("FONSI") in light of the fact that the expansion would result in the emission of 190 million tons of GHGs. The court characterized DOI's conclusion that these GHG impacts were "minor" as "deeply troubling" and "insufficient" for NEPA purposes.[30]

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[24] *Id*. at 627-628.
[25] Barnes v. U.S. Dep't of Transp., 655 F.3d 1124 (9th Cir. 2011).
[26] *Id*. at 1139.
[27] Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining, 274 F.Supp. 3d 1074 (D. Mont. 2017).
[28] *Id*. at 1101.
[29] *Id*. at 1102.
[30] 350 Mont. v. Haaland, No. 20-35411, 21 (9th Cir. Apr. 4, 2022).

CEQ should codify the above case law in the NEPA implementing regulations by amending 40 C.F.R. § 1501.3(b)(1) to expressly state that significance may need to be assessed in a global, national, regional, or local context. The section could be amended to specifically provide that, where an action contributes to climate change or another global environmental problem, the appropriate context for assessing significance is global.

It should be noted that requiring significance to be assessed in a global context could result in federal agencies comparing the GHG emissions associated with their actions to the global total. In the past, federal agencies have used such comparisons to downplay the effects of proposed actions, for example, by asserting that the GHG emissions associated with a particular action would account for a negligible share of total global emissions. CEQ has previously recognized that this is inappropriate because:

> the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions by the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA . . . Agencies should not limit themselves to calculating a proposed action's emissions as a percentage of sector, nationwide, or global emissions. [31]

CEQ should require federal agencies to assess the significance of GHG emissions in light of climate change laws and policies. The NEPA implementing regulations currently provide that, when evaluating the "degree" of a proposed action's environmental effects, agencies should consider "[e]ffects that would violate Federal, State, Tribal, or local law protecting the environment." [32] Consistent with that directive, where a proposed action will take place in a state that has enacted a GHG emission reduction target or goal into law, the relevant federal agency should be required to consider whether the action is consistent with achievement of that target or goal.

CEQ could amend the NEPA implementing regulations at 40 C.F.R. § 1501.3(b)(2) to also require federal agencies to evaluate proposed actions against GHG emission reduction targets and other climate change mitigation and adaptation policies that are not codified in law. At a minimum, all actions should be evaluated against the U.S. Nationally Determined Contribution ("NDC"), as

[31] 2016 Climate Guidance, *supra* note 6, at 11.
[32] 40 C.F.R. § 1501.3(b)(2)(iv).

submitted to the Secretariat of the United Nations Framework Convention on Climate Change under the 2015 Paris Climate Agreement.[33] Parties to the Paris Agreement, including the U.S., must submit NDCs that they "intend to achieve" and "pursue domestic mitigation measures" consistent with their NDCs.[34] Thus, the U.S. NDC is an authoritative statement of federal government policy with respect to climate change, and should be considered by federal agencies when evaluating the environmental implications of their actions.

## 3. ESTABLISHING A NUMERIC SIGNIFICANCE THRESHOLD FOR GREENHOUSE GAS EMISSIONS

CEQ should also adopt a quantitative significance threshold for GHG emissions to help federal agencies determine the appropriate level of NEPA review. We recognize that this action would be somewhat unusual, as CEQ has not adopted significance thresholds for other types of environmental impacts. However, there is some precedent for this action: federal agencies sometimes rely on quantitative metrics, such as air quality thresholds, to assess the significance of impacts,[35] and local agencies in California have been using significance thresholds to evaluate the significance of GHG emissions for several years.[36] A regulatory threshold that applies across different agencies and project types would also be justified in light of two considerations: (1) unlike many other impacts considered in NEPA reviews, GHG emissions have the same effect on global climate change regardless of local environmental conditions; and (2) many agencies have expressed uncertainty about how to assess the significance of GHG emissions due to the global nature of climate change.

We recognize that CEQ intentionally omitted a significant threshold for GHGs from its 2016 Climate Guidance.[37] In the absence of such a threshold, federal agencies often conclude that

[33] Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.
[34] *Id*. at Art. 4(2).
[35] *See, e.g.,* NPS, *Technical Guidance on Assessing Impacts to Air Quality in NEPA and Planning Documents* (January 2011).
[36] *See, e.g.,* Bay Area Air Quality Management District, *CEQA Thresholds and Guidelines Update,* https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines
[37] 2016 Climate Guidance, *supra* note 6 at 11.

emissions are insignificant (in some cases still drawing comparisons to national or global GHG emissions) or they simply do not reach a conclusion on the issue of significance. This is true even in the context of fossil fuel projects that will generate millions of tons of GHG emissions and thus clearly exceed any reasonable threshold of significance.[38]

We are only aware of one fossil fuel-related proposal—i.e., the Keystone XL Pipeline Project—for which GHG emissions have been found to be significant. The supplemental EIS for the Keystone XL Pipeline Project included six estimates of lifecycle GHG emissions under two scenarios:

- Scenario 1 (assuming the pipeline transports 830,000 barrels per day of West Canadian Sedimentary Basin ("WCSB") heavy crude oil):
    - a lower bound of 2.1 to 33.9 million metric tons of carbon dioxide ("$CO_2$")-equivalent per year if the WCSB heavy crude fully displaces other medium to heavy crude oils;
    - a mid-range of 37.3 to 120.5 million metric tons of $CO_2$-equivalent per year if the WCSB heavy crude partially displaces other crude oils; and
    - an upper bound of 178.3 million metric tons of $CO_2$-equivalent per year if the WCSB heavy crude does not displace other crude oils.[39]
- Scenario 2 (assuming the pipeline transports 730,000 barrels per day of WCSB heavy crude oil and 100,000 barrels per day of Bakken light crude oil:
    - a lower-bound of 1.7 to 30.3 million metric tons of $CO_2$-equivalent per year if the WCSB heavy crude fully displaces other medium to heavy crude oils;
    - a mid-range of 36.3 to 116.9 million metric tons of $CO_2$-equivalent per year if the WCSB heavy crude partially displaces other crude oils; and
    - an upper bound of 174.7 million metric tons of $CO_2$-equivalent per year if the WCSB heavy crude does not displace other crude oils.[40]

The EIS concluded that partial displacement was the most likely outcome and noted that, with partial displacement, GHG emissions from the Keystone XL Pipeline Project would account for 0.6 to 1.8 percent of total U.S. emissions or 0.1 to 0.25 percent of global emissions.[41] Based on these figures, and after "[c]onsidering . . . the long-term nature of [climate] impacts, and widespread recognition of the need to urgently reduce global greenhouse gas emissions," the EIS concluded that

[38] *See generally* Burger & Wentz, *supra* note 8.
[39] Dep't of State, Final Supplemental Environmental Impact Statement for the Keystone XL Project, Volume I S-18 & 4-81 (2019), https://2017-2021.state.gov/releases-keystone-xl-pipeline/index.html.
[40] *Id*.
[41] *Id*. 4-81 & 4-83.

GHG "emissions from the proposed Project would likely represent a potentially significant impact."[42]

Courts are starting to weigh in on agency obligations with respect to significance determinations and GHG emissions. As noted above, the Ninth Circuit Court of Appeals remanded an EA for a coal mine expansion in *350 Montana v. Haaland* due to DOI's failure to provide a convincing statement of reasons why the project's impacts were insignificant.[43] The expansion was expected to result in the emission of 190 million tons of GHGs—roughly 0.44 percent of global annual GHGs emissions. The court noted that DOI had "failed to articulate any science-based criteria of significance in support of its [FONSI] but instead relied on the arbitrary and conclusory determination that the Mine Expansion project's emissions would be relatively minor."[44] Courts have also remanded EAs for failure to justify FONSIs in light of indirect and cumulative emissions.[45] None of these court decisions specify a particular threshold above which GHG impacts should be deemed significant, but the *350 Montana* decision indicates that 190 million tons of $CO_2$-equivalent likely exceeds the threshold.

Adoption of a numeric threshold by CEQ would be useful insofar as it would standardize agency practice and ensure that EISs are prepared and mitigation measures are considered for significant GHG impacts. To address concerns about both administrative burden and legal defensibility, CEQ could specify a high threshold at which GHG emissions will be presumed to be significant (e.g., 100,000 tons per year of $CO_2$-equivalent), while recognizing that GHG emissions below this threshold *may* be significant and should be assessed on a case-by-case basis. Alternatively, CEQ could include a recommended significance threshold in its future guidance on climate change and NEPA reviews, rather than establishing a bright-line regulatory rule. The guidance could direct agencies to provide a rationale in the event that they do not adhere to CEQ's recommended threshold. This would provide a framework for citizens and courts to assess the reasonableness of GHG significance determinations.

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[42] *Id*. at 4-76.

[43] 350 Mont. v. Haaland, No. 20-35411 (9th Cir. Apr. 4, 2022).

[44] *Id.* at 3.

[45] *See, e.g.*, San Juan Citizens All. v. U.S. Bureau of Land Mgmt., 326 F. Supp. 3d 1227, 1244 (D.N.M. 2018); WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 85 (D.D.C. 2019); WildEarth Guardians v. Zinke, No. 1:17-cv-00080, 2019 WL 2404860, at *7 (D. Mont. Feb. 11, 2019).

We note that the above suggestion is consistent with a recent proposal from the Federal Energy Regulatory Commission ("FERC") to apply a significance threshold of 100,000 tons of $CO_2$-equivalent per year in NEPA reviews of natural gas pipeline projects.[46] FERC's proposal noted that "[e]stablishing a threshold for NEPA purposes . . . provides Commission staff, industry, and other stakeholders clarity regarding whether a particular project will result in the preparation of" an EA or EIS and "that such clarity ultimately benefits both the regulated community and the public" by ensuring "transparent, predictable analysis" of projects.[47] In explaining its decision to set the threshold at 100,000 tons, FERC indicated that, because of the "dire effects" of climate change, "even relatively minor GHG emissions pose a significant threat."[48] In FERC's view, a 100,000 ton threshold "is appropriate because it captures . . . projects that may result in incremental GHG emissions that may have a significant effect upon the human environment."[49]

## 4. ACCOUNTING FOR CLIMATE CHANGE IN ENVIRONMENTAL ASSESSMENTS

The NEPA implementing regulations currently state that an EA should be conducted where a proposed federal action "is not likely to have significant [environmental] effects or when the significance of the effects is unknown" (unless a categorical exclusion applies or the agency proceeds directly to prepare an EIS).[50] The regulations provide federal agencies with little guidance on conducting EAs, stating only that EAs must "[b]riefly discuss the purpose and need for the proposed action, alternatives . . . and the environmental impacts of the proposed action and alternatives."[51] CEQ's 2016 Climate Guidance further directs agencies to include, in EAs, an "analysis of potential GHG emissions [associated with a proposed action] and the effects of climate change" on the action.[52]

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[46] Fed. Energy Regulatory Comm'n, Consideration of Greenhouse Gas Emissions in Natural Gas Infrastructure Project Reviews (Feb. 18, 2022), https://perma.cc/LBZ6-BLWN.
[47] *Id*. at 55-56.
[48] *Id*. at 62.
[49] *Id*. at 3.
[50] 40 C.F.R. § 1501.5(a).
[51] *Id*. § 1501.5(c)(2).
[52] 2016 Climate Guidance, *supra* note 6, at 3.

A 2019 Sabin Center survey of EAs issued in connection with fossil fuel projects found significant variation in the nature and extent of climate change analysis.[53] For example:

- While all of the surveyed EAs included a quantitative estimate of GHG emissions generated directly by the project under review, only some quantified indirect emissions (e.g., associated with upstream and downstream activities).[54]
- The surveyed EAs used different methodologies to calculate project-related GHG emissions. When estimating downstream emissions (i.e., from the end use of fossil fuels), most EAs did not account for the effect of proposed fossil fuel production on energy markets, prices, and consumption patterns.[55]
- Most of the surveyed EAs did not compare estimated GHG emissions from the proposed action and reasonable alternatives.[56] None of the EAs discussed mitigation measures or alternative actions to avoid or minimize GHG emissions.[57]

The above findings suggest that, despite the directive in CEQ guidance, EAs often do not include a thorough climate change analysis. Regulatory changes may be needed to ensure such analysis occurs in the future. CEQ should amend 40 C.F.R. § 1501.5(c) to clarify the requirements for evaluating climate change in EAs. To that end, § 1501.5(c) could be amended to expressly require agencies to account for climate change when discussing the purpose and need for a proposed action and its environmental effects. The section could also direct agencies to avoid defining purpose and need so narrowly as to exclude climate-beneficial alternatives (e.g., that reduce GHG emissions) and to consider at least one alternative that lessens climate change impacts.

[53] Siegel & Loznak, *supra* note 16.
[54] *Id*. at 20-22.
[55] *Id*. at 22-24.
[56] *Id*. at 26.
[57] *Id*. at 26-27.

## 5. ENSURING APPROPRIATE USE OF PROGRAMMATIC NEPA REVIEWS

CEQ has previously endorsed the use of programmatic environments reviews and tiering to streamline the NEPA process.[58] As CEQ has recognized, programmatic reviews "should result in clearer and more transparent decision-making, as well as provide a better defined and more expeditious path toward decisions on proposed actions."[59]

In guidance issued in 2014, CEQ recommended that agencies consider preparing programmatic EAs or EISs "when (1) initiating or revising a national or regional rulemaking, policy, plan, or program; (2) adopting a plan for managing a range of resources; or (3) making decisions on common elements or aspects of a series or suite of closely related projects."[60] With respect to (3), the guidance noted that preparation of a programmatic EA or EIS may be appropriate where an agency is making decisions regarding "[s]everal similar actions or projects in a region or nationwide," or a "suite of ongoing, proposed or reasonably foreseeable actions that share a common geography or timing, such as multiple activities within a defined boundary."[61] The guidance specifically identified "long range energy or transportation infrastructure" (e.g., electricity transmission lines and natural gas pipelines) as well suited to programmatic review.[62]

In the past, programmatic EISs have been prepared in connection with the designation of preferred corridors for transmission and similar energy infrastructure on federal land, as well as the designation of federal land suitable for solar and wind generating facilities.[63] Subsequent project-specific reviews can tier to, or incorporate analysis from, the programmatic EIS. Where an individual project does not raise additional issues, beyond those addressed in the programmatic EIS, it may

[58] Memorandum from Michael Boots, Council on Environmental Quality, for Heads of Federal Departments and Agencies on Effective Use of Programmatic NEPA Reviews (Dec. 18, 2014), https://www.energy.gov/sites/default/files/2014/12/f19/effective_use_of_programmatic_nepa_reviews_18dec2014.pdf [hereinafter "2014 Programmatic Reviews Guidance"].
[59] *Id*. at 7.
[60] *Id*. at 15.
[61] *Id*. at 13-14.
[62] *Id*. at 23.
[63] *See generally*, West-wide Energy Corridor Information Center, https://perma.cc/HJX9-3BUQ (last visited Apr. 27, 2022); Solar Energy Development Programmatic EIS Information Center, https://perma.cc/C6WG-927Y (last visited Apr. 27, 2022); Wind Energy Development Programmatic EIS Information Center, https://perma.cc/B8A5-YXXA (last visited Apr. 27, 2022).

require only an EA (rather than a more detailed and longer EIS). In this regard, CEQ has indicated that "[t]iering an EA . . . from a [programmatic EIS] is appropriate where there are no new significant effects or considerations, and the programmatic NEPA review addresses those measures that the tiered proposal can rely on to address and reduce the significance of the site- or project-specific impacts."[64]

Current NEPA implementing regulations confirm that programmatic EISs "may be prepared for programmatic Federal actions, such as the adoption of new agency programs."[65] The regulations further provide that, where an agency has prepared a programmatic EIS for a "program or policy" and then prepares a subsequent EA or EIS on "an action included within the entire program or policy," that latter document may be tiered to the programmatic EIS.[66] Under the regulations, the tiered EA or EIS "needs only to summarize and incorporate by reference the issues discussed in the broader document," and should "concentrate on the issues specific to the subsequent action."[67]

Only programmatic EISs, and not EAs, are expressly authorized under the current NEPA implementing regulations. CEQ has indicated that it "interprets its regulations as allowing for the use of a programmatic approach in developing an EA as well as in an EIS."[68] Nevertheless, to ensure agencies take full advantage of programmatic EAs, their use should be endorsed in the regulations.

The regulations should also make clear that programmatic EAs and EISs may be useful and appropriate in a range of circumstances. The current regulations note that programmatic reviews may be appropriate for "agency programs" but do not identify other circumstances in which they may be used. For example, the regulations do not expressly authorize the use of programmatic reviews to assess the environmental impacts of a suite of similar, repetitive, or connected individual actions. As noted above, CEQ's 2014 guidance endorses the use of programmatic reviews for such actions, and the regulations should do the same. The regulations should also provide additional clarity on tiering, again, consistent with CEQ's 2014 guidance.[69] To that end, CEQ could amend 40 C.F.R. § 1501.11 ("Tiering") to expressly state that tiering may be appropriate where a proposed

[64] 2014 Programmatic Reviews Guidance, *supra* note 58, at 29.
[65] 40 C.F.R. § 1502.4(b).
[66] *Id*. § 1501.11(b).
[67] *Id*.
[68] 2014 Programmatic Reviews Guidance, *supra* note 58, at 12.
[69] *Id*. at 29.

action occurs pursuant to an agency program, or is similar to another action, that is the subject of a previous programmatic EA or EIS. It may also be useful to clarify, in § 1501.11, that agencies may tier an EA from a programmatic EIS where the proposed action does not have new significant environmental effects.

## 6. ACCOUNTING FOR ENVIRONMENTAL CHANGE IN NEPA REVIEWS

CEQ's 2016 Climate Guidance directs federal agencies to consider "the ways in which a changing climate over the life of the proposed project may alter the overall environmental implications of such actions."[70] It clarified that the agency's description of "the reasonably foreseeable affected environment" should include "[t]he current and projected future state of the environment."[71] This guidance was based on agencies' existing legal obligations: it is necessary to consider the future conditions in which a project will be implemented in order to accurately characterize environmental impacts, compare impacts from a reasonable range of alternatives, and consider mitigation measures.[72]

The approach taken in the 2016 Climate Guidance is also consistent with case law. There are a number of decisions holding that an agency acted arbitrarily and capriciously by failing to consider future conditions in the affected environment when evaluating the environmental impacts of a proposed action, as well as one decision affirming that it is proper for an agency to consider future conditions.[73] There have also been several decisions recognizing that an analysis of how climate

[70] 2016 Climate Guidance, *supra* note 6, at 9.

[71] *Id.* at 20. *See also id.* at 20-21 (the future state of the affected environment "should be described based on authoritative climate change reports," which document the impacts of climate change "both globally and at a localized level.").

[72] *See generally* Webb et al, *supra* note 8, at 22-26.

[73] *See, e.g.*, American Canoe Ass'n v. White, 277 F. Supp. 2d 1244 (N.D. Ala. 2003) (agency failed to consider future condition of project); California ex rel. Imperial County Air Pollution Control Dist. v. U.S. Dep't of the Interior, 767 F.3d 781 (9th Cir. 2014) (agency properly considered future conditions when establishing "no action" alternative); Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt., 387 F.3d 989, 34 ELR 20127 (9th Cir. 2004) (agency failed to consider future effects of other actions in cumulative effects analysis); Oregon Natural Res. Council Fund v. Brong, 492 F.3d 1120, 37 ELR 20187 (9th Cir. 2007) (agency failed to consider future effects of other actions in cumulative effects analysis).

change will affect baseline environmental conditions falls squarely within the scope of issues that need to be considered under NEPA.[74]

In 2020, CEQ amended the NEPA implementing regulations to specify that agencies should account for "reasonably foreseeable environmental trends and planned actions in the area" when describing the environment that will be affected by a project.[75] CEQ explained that the purpose of this language was to ensure that agencies consider "predictable environmental trends", including those caused by climate change, "in the baseline analysis of the affected environment rather than as an effect of the action."[76] However, CEQ did not include any new language clarifying that agencies must also account future trends, including the effects of climate change, in their discussion of environmental impacts, alternatives, and mitigation measures.

CEQ should consider amending the regulations to direct agencies to account for changing environmental conditions in their analysis of environmental impacts, alternatives, and mitigation measures, as well as their description of the affected environment. CEQ could amend 40 C.F.R. § 1502.16 ("Environmental consequences") to require agencies to account for "foreseeable trends." "future conditions," "environmental change," or "climate change" in their analysis of both environmental impacts and mitigation measures across alternatives. Alternatively, CEQ could amend 40 C.F.R. § 1502.15 ("Affected environment") to specify that the agency's description of "reasonably foreseeable environmental trends" should inform its analysis of environmental impacts and mitigation measures.

## 7. ENSURING USE OF THE "BEST AVAILABLE SCIENCE" IN NEPA REVIEWS

CEQ should adopt a regulatory provision which requires federal agencies to use the "best available science" in EAs and EISs. Such a requirement would be legally defensible and would ensure that agencies do not disregard high-quality scientific evidence that is relevant to their NEPA analyses.

[74] *See*, e.g., AquAlliance v. U.S. Bureau of Reclamation, 287 F. Supp. 3d 969 (E.D. Cal. 2018); National Wildlife Federation v. National Marine Fisheries Service, 184 F. Supp. 3d 861 (D. Or. 2016).
[75] 40 C.F.R. § 1502.15.
[76] 2020 Amendments, *supra* note 11, at 43,331.

It would be reasonable to introduce a "best available science" mandate even though this is not explicitly required by the NEPA statute. Such a mandate would be consistent with the statutory purpose of informed decision-making and the requirement that agencies take a "hard look" at the environmental consequences of federal actions. There is also precedent for introducing this mandate through regulation in the absence of an explicit statutory requirement or authorization. The U.S. Forest Service ("USFS") has adopted a "best available science" mandate for national forest planning even though this standard does not appear in the National Forest Management Act ("NFMA"). The relevant regulation reads:

> The responsible official shall use the best available scientific information to inform the planning process required by this subpart for assessment; developing, amending, or revising a plan; and monitoring. In doing so, the responsible official shall determine what information is the most accurate, reliable, and relevant to the issues being considered. The responsible official shall document how the best available scientific information was used to inform the assessment, the plan or amendment decision, and the monitoring program as required in §§ 219.6(a)(3) and 219.14(a)(3). Such documentation must: Identify what information was determined to be the best available scientific information, explain the basis for that determination, and explain how the information was applied to the issues considered.[77]

This regulatory provision has been consistently enforced by the courts.[78] As discussed below, CEQ could use similar language in the NEPA implementing regulations to ensure that agencies are transparent about how they use the best available science in NEPA reviews.

Courts have established some parameters for interpreting "best available science" mandates in cases arising under the Endangered Species Act ("ESA") and the NFMA. Courts have held that the purpose of the best available science standard is to "ensure that [the relevant action] not be implemented haphazardly, on the basis of speculation or surmise."[79] The standard "prohibits [an agency] from disregarding available scientific evidence that is in some way better than the evidence

[77] 36 C.F.R. § 219.3.

[78] *See, e.g.,* Utah Env't Cong. v. Troyer, 479 F.3d 1269, 1282 (10th Cir. 2007); Ecology Ctr., Inc. v. U.S. Forest Serv., 451 F.3d 1183, 1193 (10th Cir. 2006); Forest Watch v. U.S. Forest Serv., 410 F.3d 115, 119 (2d Cir. 2005); Utah Env't Cong. v. Richmond, 483 F.3d 1127, 1138 (10th Cir. 2007).

[79] Bennett v. Spear, 520 U.S. 154, 176 (1997).

[it] relies on."[80] It requires that agencies carefully examine available scientific data and analytical tools (e.g., models) and make a rational decision about the reliability and weight of scientific resources.[81] Agencies must also give greater weight to peer reviewed science, as compared with other data sources.[82]

The "best available science" standard does not require an agency to collect new data, conduct independent studies, or otherwise seek information that does not already exist.[83] And it does not preclude agencies from making decisions and projections on the basis of low-quality data if it is the only data available.[84] An agency can comply with the standard "so long as it does not ignore available studies, even if it disagrees with or discredits [those studies]" based on a rational assessment of all available evidence.[85] Ultimately, what constitutes the "best available science" is a scientific determination which warrants some judicial deference.[86]

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[80] Kern Cty. Farm Bureau v. Allen, 450 F.3d 1072, 1080–81 (9th Cir. 2006) (quoting Southwest Ctr. for Biological Diversity v. Babbitt, 215 F.3d 58, 60 (D.C. Cir. 2000). *See also* San Luis & Delta-Mendota Water Auth. v. Locke, 776 F.3d 971, 995 (9th Cir. 2014).

[81] NRDC v. Kempthorne, 506 F. Supp. 2d 322, 360, 362 (E.D. Cal. 2007) (the agency must "carefully examine the available scientific data and models and rationally choose the most reliable [rather than falling back on 'benefit of the doubt'].") *See also* Conner v. Burford, 848 F.2d 1441, 1454 (9th Cir. 1988) ("FWS cannot ignore available biological information or fail to develop projections of oil and gas activities which may indicate potential conflicts between development and the preservation of protected species").

[82] Trout Unlimited v. Lohn, 645 F. Supp. 2d 929, 957 (D. Or. 2007) ("It is contrary to the record and the best available science for NMFS to rely on Oregon's viability conclusion in the face of peer review findings that the viability conclusion had insufficient scientific support."). *See also* Ecology Ctr., Inc. v. U.S. Forest Serv., 451 F.3d 1183, 1193 (10th Cir. 2006) (The Forest Service may satisfy the [best available science] requirements through the use of 'independent peer review, a science advisory board, or other review methods to evaluate to consideration of science in the planning process.'")

[83] *See* Am. Wildlands v. Kempthorne, 530 F.3d 991, 998–99 (D.C.Cir.2008) (holding that an agency's use of available data and test methods was reasonable even though better test methods existed because those test methods had not yet been used on the species in question); San Luis & Delta-Mendota Water Auth. v. Locke, 776 F.3d 971, 995 (9th Cir. 2014) ("The [best available science] standard does not, however, require an agency to conduct new tests or make decisions on data that does not yet exist."); N.M. Farm & Livestock Bureau v. U.S. Dep't of Interior, 952 F.3d 1216, 1226–27 (10th Cir. 2020) ( "the agency need only base its determinations on the 'best scientific data available,' not the best scientific data possible"); Ecology Ctr., Inc. v. U.S. Forest Serv., 451 F.3d 1183, 1194 n.4 (10th Cir. 2006) ("the Forest Service need not collect new data"); Sw. Ctr. for Biological Diversity v. Babbitt, 215 F.3d 58, 60 (D.C. Cir. 2000) ("[t]he 'best available data' requirement makes it clear that the Secretary has no obligation to conduct independent studies").

[84] Greenpeace Action v. Franklin, 14 F.3d 1324, 1336 (9th Cir.1992).

[85] San Luis & Delta-Mendota Water Auth., 776 F.3d at 995.

[86] Miccosukee Tribe of Indians of Fla. v. United States, 566 F.3d 1257, 1265 (11th Cir.2009) (citing Marsh, 490 U.S. at 377–78, 109 S.Ct. 1851).

CEQ could adopt a stand-alone regulatory provision in the NEPA implementing regulations, which expressly requires agencies to use the best available scientific information throughout their NEPA reviews and to document how that information informed their analysis.

## 8. ENSURING BALANCED CONSIDERATION OF COSTS AND BENEFITS IN NEPA REVIEWS

NEPA does not require agencies to conduct a cost-benefit analysis when evaluating the environmental effects of projects. However, when agencies decide to undertake a comparison of costs and benefits, they have an obligation to conduct a fair and balanced assessment. This principle was articulated by the Ninth Circuit Court of Appeals in *Center for Biological Diversity v. National Highway Traffic Safety Administration*. There, the court found that it was arbitrary and capricious for the National Highway Traffic Safety Administration ("NHTSA") to ignore the social costs of GHG emissions in its review of fuel economy standards, as it had monetized the employment and sales impacts of more stringent standards on manufacturers: "[An agency] cannot put a thumb on the scale by undervaluing the benefits and overvaluing the costs of more stringent standards."[87] The court held that NHTSA must attempt to disclose the social costs of emissions even where there was uncertainty about those costs: "[W]hile the record shows there is a range of values, the value of carbon emissions reduction is certainly not zero."[88]

The federal government has since developed metrics for evaluating the social costs of GHG emissions.[89] The Seventh Circuit has affirmed the legality of using these metrics in federal rulemakings and cost-benefit analysis,[90] and some courts have required their use in cases involving cost-benefit analyses for fossil fuel production.[91] For example, in *High Country Conservation Advocates*

[87] Ctr. for Biological Diversity v. NHTSA., 538 F.3d 1172, 1198 (9th Cir. 2008)
[88] *Id.* at 1200.
[89] The social cost of GHG protocol was first introduced under the Obama administration and subsequently re-adopted by the Biden administration. The current protocol includes cost estimates for $CO_2$, nitrous oxide ($N_2O$) and methane ($CH_4$). *See* INTERAGENCY WORKING GROUP ON SOCIAL COST OF GREENHOUSE GASES, UNITED STATES GOVERNMENT, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS OXIDE, INTERIM ESTIMATES UNDER EXECUTIVE ORDER 13990 (2021), https://perma.cc/VL3U-642Y.
[90] Zero Zone, Inc. v. United States Dep't of Energy, 832 F.3d 654, 678 (7th Cir. 2016).
[91] *See, e.g.*, Montana Environmental Information Center, 274 F.Supp.3d at 1098-99; WildEarth Guardians v. Zinke, No. CV 17-80-BLG-SPW-TJC, 2019 WL 2404860 (D. Mont. Feb. 11, 2019), report and recommendation

*v. USFS*, a Colorado district court held that USFS must monetize climate impacts from coal leasing where it had monetized economic benefits, and directed USFS to use the social cost of carbon protocol in its cost-benefit assessment.[92] However, there are also several cases where agencies successfully argued the that disclosure of social costs was not required because the agency had not conducted a complete "cost-benefit analysis" but rather a more narrowly tailored "economic impact analysis" (or "regional economic analysis")[93] or the social cost metrics would not provide a sufficiently accurate and precise cost estimate so as to be helpful to decisionmakers.[94] The distinction between a "cost benefit analysis" and a "economic impact analysis" is unclear, and thus legal questions remain as to the circumstances in which courts will require an agency to disclose the social costs of emissions.

It would be helpful for the NEPA implementing regulations to clarify that: (1) federal agencies should undertake a fair and balanced assessment whenever they are comparing the costs and benefits of a proposal, and (2) it is appropriate for agencies to use metrics such as the federal social cost of carbon and other GHGs in NEPA reviews.[95] CEQ should amend section 1502.22 ("Cost-benefit analysis") to incorporate those considerations.

## 9. CONCLUSION

In April 2022, CEQ completed the first phase of its review of the NEPA implementing regulations, finalizing a limited set of amendments to undo changes made during the Trump administration.[96] In phase two of its review, CEQ will consider "more comprehensive" regulatory

adopted sub nom. WildEarth Guardians v. Bernhardt, No. CV 17-80-BLG-SPW, 2021 WL 363955 (D. Mont. Feb. 3, 2021); Montana Environmental Information Center v. Haaland, No. 1:19-cv-00130 (D. Mont 2022). *See also* Vecinos para el Bienestar de la Comunidad Costera v. FERC, 6 F.4th 1321, 1329 (D.C. Cir. 2021) ("To the extent that the Commission failed to respond to Petitioners' argument that 40 C.F.R. § 1502.21(c) required it to use the social cost of carbon protocol or some other generally accepted methodology to assess of the impact of the projects' greenhouse gas emissions, we agree with Petitioners that the Commission failed to adequately analyze the impact of the projects' greenhouse gas emissions.").

[92] High Country Conservation Advocates v. USFS, 52 F. Supp. 3d 1174, 1193 (D. Colo. 2014).

[93] Agencies will refer to quantification of such benefits as a "regional economic analysis" or an "economic impact analysis" to avoid the requirement to treat costs and benefits equally in their analysis. See, e.g., Montana Environmental Information Center, 274 F.Supp.3d at 1096, FN 9.

[94] *See, e.g.,* WildEarth Guardians v. Zinke, 2019 WL 2404860, at *12.

[95] The Department of Interior has already recognized that the social cost of GHG metrics are an "essential tool" for evaluating costs and benefits in NEPA reviews. *See* DOI Secretarial Order 3399 (Apr. 16, 2021).

[96] 2022 Regulatory Revisions, *supra* note 14.

changes, designed to "advance environmental, climate change mitigation and resilience, and environmental justice objectives."[97] This paper identifies seven key regulatory reforms that, if adopted by CEQ, would help to ensure federal agencies fully and effectively integrate climate change considerations into their NEPA reviews. The proposed reforms are consistent with prior CEQ guidance and court decisions and would further NEPA's dual aims of improving federal decision-making and enhancing public disclosure of information.

[97] *Id*. at 23,456.

# ATTACHMENT 3

Romany M. Webb, et al., Evaluating Climate Risk in NEPA Reviews: Current Practices and Recommendations for Reform (2022)

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2022

# Evaluating Climate Risk in NEPA Reviews: Current Practices and Recommendations for Reform

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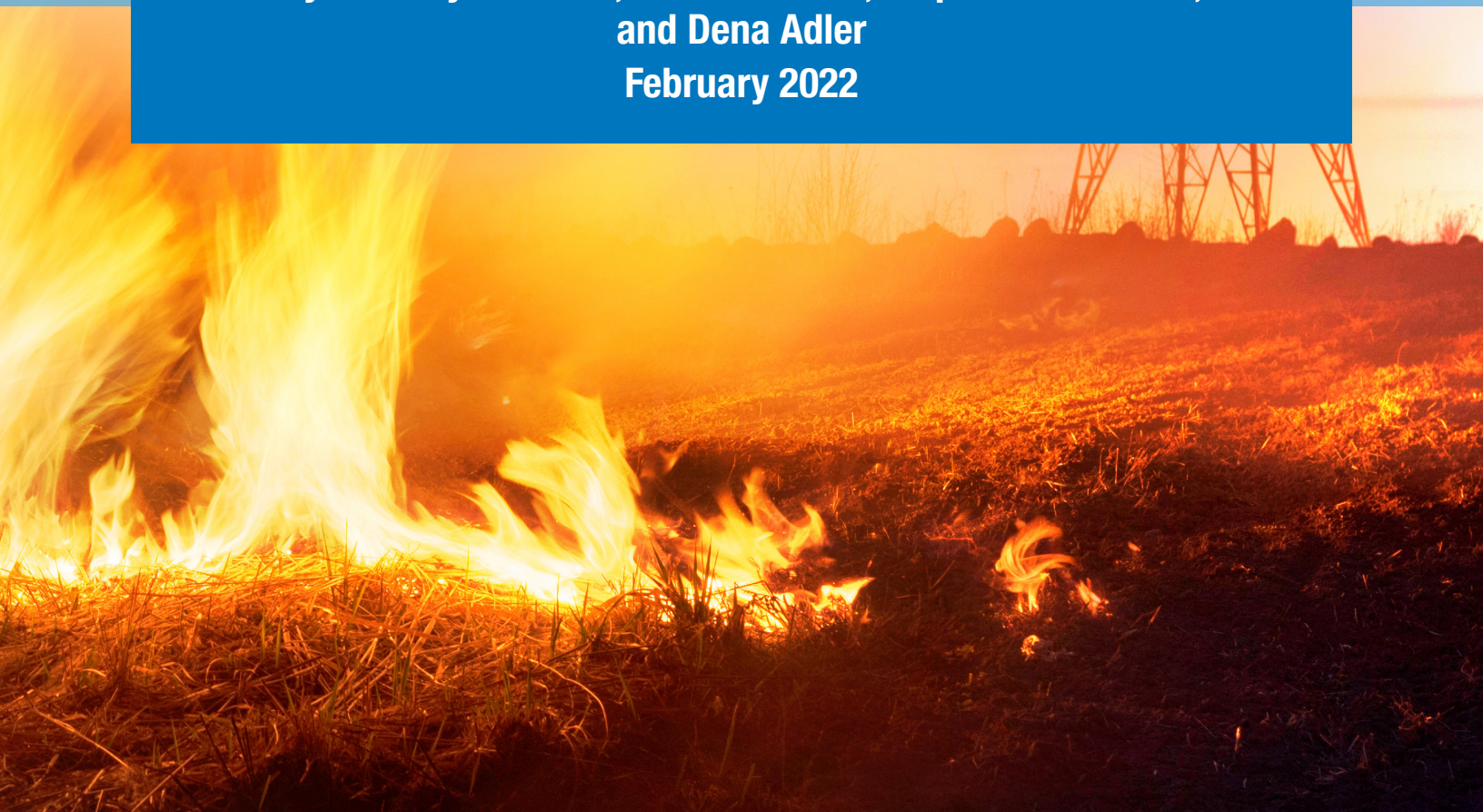
Initiative on Climate Risk & Resilience Law

# EVALUATING CLIMATE RISK IN NEPA REVIEWS: CURRENT PRACTICES AND RECOMMENDATIONS FOR REFORM

By Romany M. Webb, Michael Panfil, Stephanie H. Jones, and Dena Adler

February 2022



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February 2022

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# EXECUTIVE SUMMARY

In recent years, policymakers, practitioners, and scholars have increasingly considered how climate change should factor into existing environmental review obligations, including review of U.S. federal agency actions under the 1969 National Environmental Policy Act ("NEPA").[1] Attention thus far has focused primarily on the critical question of how to account for an action's contribution to climate change via direct, indirect, or cumulative greenhouse gas emissions.[2] However, less focus has been given to the equally critical question of how actions will be affected by, and can prepare for, the impacts of climate change.[3] This paper combines an extensive review of previously conducted Environmental Impact Statements ("EIS") with an examination of the legal framework, current practices, and next steps for integrating that latter category of climate effects—what we term "climate impact analysis"—into NEPA reviews.

The treatment of climate impacts in NEPA reviews is of increasing salience for several reasons. Climate change is now having a marked impact on historic weather patterns and environmental conditions, leading to higher average and extreme temperatures and associated sea level rise, for example. In addition to these slow onset changes, there has also been an increase in the severity of certain extreme weather events, including hurricanes. According to the National Oceanic and Atmospheric Administration, in 2021, "the U.S. experienced 20 separate billion-dollar weather and climate disasters that killed at least 688 people—the most disaster-related fatalities for the contiguous U.S. since 2011 . . . Damages from these disasters totaled approximately $145 billion for all 20 events" which is a "record high."[4] More than "40% of Americans live in counties hit by climate disasters in 2021."[5]

The impacts of climate change are increasingly foreseeable. Recent advances in climate detection and attribution science provide ever-growing information on how climate change

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1 42 U.S.C. § 4321 et seq.

2 *See, e.g., Aaron Flyer, FERC Compliance Under NEPA: FERC's Obligation to Fully Evaluate Upstream and Downstream Environmental Impacts Associated with Siting Natural Gas Pipelines and Liquefied Natural Gas Terminals*, 27 Geo. Int'l Envt'l. REV. 301 (2015); Michael Burger & Jessica Wentz, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review*, 41 Harv. Envt'l. Rev. 109 (2017); James W. Coleman, *Beyond the Pipeline Wars: Reforming Environmental Assessment of Energy Transport Infrastructure, 2018 UTAH L. REV. 119 (2018); Michael Burger & Jessica Wentz, Evaluating the Effects of Fossil Fuel Supply Projects* on Greenhouse Gas Emissions and Climate Change Under NEPA, 44 Wm. & Mary Env't L. & Pol'y Rev. 423 (2020).

3 There is some scholarship on the requirement to consider climate change impacts in NEPA reviews, but it was published prior to significant case law and regulatory developments. *See, e.g.*, Michael B. Gerrard, *Reverse Environmental Impact Analysis: Effect of Climate Change on Projects*, 247 N.Y. L. J., Mar. 8, 2012; Katrina Fischer Kuh, Impact Review, Disclosure, and Planning, in The Law of Adaptation to Climate Change 543 (Michael B. Gerrard & Katrina Fischer Kuh, eds. 2012); Jennifer Klein & Ethan Strell, Legal Tools for Climate Adaptation Advocay: Nepa (2015), https://perma.cc/5Z5E-KQSH; Jessic Wentz, Assessing The Impacts of Climate Change on the Built Environment Under Nepa and State Eia Laws: A Survey of Current Practices and Recommendations for Model Protocols (2015), https://perma.cc/2YNZ-SVQ8 [hereinafter "Wentz 2015"]; Jessica Wentz, *Planning for the Effects of Climate Change on Natural Resources*, 47 ENV'T L. REP. 10220 (2017) [hereinafter "Wentz 2017"].

4 Press Release, Nat'l Oceanic & Atmospheric Admin., U.S. saw its 4th-warmest year on record, fueled by a record-warm December (Jan. 10, 2022), https://perma.cc/CBW2-AD6E.

5 Sarah Kaplan & Andrew Ba Tran, *More than 40 percent of Americans live in counties hit by climate disasters in 2021*, Wash. Post (Jan. 5, 2022), https://perma.cc/XR85-LH57.

is contributing to extreme events and other weather and environmental changes. Advanced modeling techniques have also made highly detailed projections of future climate change impacts more readily available. For example, in recent years, various government and other bodies have published downscaled climate data and projections showing anticipated future conditions in specific local areas.[6]

## Approach

Recognizing the significant and growing risks posed by climate change, in 2016, the Council on Environmental Quality issued guidance directing federal agencies to ensure "[f]ocused and effective consideration of climate change in NEPA reviews."[7] The 2016 guidance emphasized the need for federal agencies to consider "the effects of climate change on a proposed action and its environmental impacts" and noted that "climate change adaptation and resilience . . . are important considerations" in environmental reviews under NEPA.[8] The courts have similarly confirmed that NEPA requires consideration of climate change impacts.[9] Specifically, and at a minimum, federal agencies must analyze climate change impacts when (1) identifying the purpose of, and need for, a proposed action and defining alternative actions that could meet that purpose and need, (2) describing the area affected by the proposed action and alternatives, and (3) evaluating their impacts on the environment and measures to lessen those impacts.

This paper concludes that, in order for federal agencies to fulfill their legal obligations under NEPA, the EISs they prepare must contain a comprehensive climate impact analysis. Drawing on previously identified best practices,[10] we define three key requirements for climate impact analysis, namely that the analysis be:

1. ***Holistic***, meaning that it considers all reasonably foreseeable climate impacts and the risks they pose to all elements of the proposed action and alternatives.

2. ***Specific***, which requires the use of climate data that is tailored to the proposed action's area, timescale, and other relevant characteristics.

3. ***Actionable***, providing the agency with the information it needs to take action to address climate-related risks.

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6 *See generally*, Michael B. Gerrard & Edward McTiernan, *The Perils of Relying on FEMA Flood Maps in Real Estate Transactions*, N.Y. Law J. (Sept. 2020).

7 Memorandum from Christina Goldfuss, Council on Environmental Quality, for Heads of Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews 3 (Aug. 1, 2016), https://perma.cc/BUQ9-99JH.

8 *Id.* at 20-25.

9 *See e.g., AquAlliance, et al., v. U.S. Bureau of Reclamation*, 287 F. Supp. 3d 969 (E.D. Cal. 2018); *National Wildlife Federation v. National Marine Fisheries Service*, 184 F. Supp. 3d 861, 875 (D. Or. 2016); Friends of Wild Swan v. Jewell, No. CV 13-61-M-DWM, 2014 U.S. Dist. LEXIS 116788, at *31 (D. Mont. Aug. 21, 2014); Southern Utah Wilderness Alliance v. Burke, 981 F. Supp. 2d 1099, 1110–1111 (D. Utah 2013).

10 Several U.S. jurisdictions have promulgated rules or issued guidance on incorporating climate change impacts into environmental reviews under laws similar to NEPA, including Massachusetts, New York State, New York City, Washington State, and King County, Washington. Relevant guidance has also been issued by foreign jurisdictions, including Australia, Canada (and the Canadian provinces of British Columbia and Nova Scotia), the European Union, the Netherlands, New Zealand, Spain, the United Kingdom. Legal scholars have also identified best practices for climate impact analysis. *See e.g.*, Kuh, *supra* note 3; Wentz 2015, *supra* note 3; Wentz 2017, *supra* note 3.

## Analysis

**To determine whether federal agencies are conducting holistic, specific, and actionable climate impact analysis as required by NEPA, we reviewed all final EISs issued by federal agencies in connection with onshore energy projects in the five years from 2016 through 2020.** We hypothesized that, because energy infrastructure is highly sensitive to climate change impacts (i.e., due to its place-based nature and condition-sensitive technology), energy-focused EISs should contain particularly high-quality climate impact analyses. Our review found the opposite: **None of the surveyed EISs contained sufficiently holistic, specific, and actionable climate impact analysis to inform agency decision-makers.** Among other things, the review showed that:

- While most EISs acknowledged that climate change would affect the local environment where a proposed action would occur, many did not take the critical next step of analyzing implications for the action or alternatives.
- Less than half of the reviewed EISs evaluated whether and how climate change might alter the environmental outcomes of the proposed action, and less than ten percent compared climate-related risks across alternatives.
- Even where federal agencies did analyze climate impacts, they often relied on outdated or incomplete data, limiting the usefulness of the analysis. Some federal agencies appear to be unaware of existing, publicly available data and tools that could enable a more robust analysis.

## Recommendations

Given the clear relevance of climate change to the requirements of NEPA, **we recommend that CEQ and other federal agencies take immediate steps to ensure sufficiently holistic, specific, and actionable climate impact analysis is conducted in environmental reviews.** Specifically:

1. **CEQ should promulgate NEPA regulations and guidance that ensure climate impacts are considered in a holistic, specific, and actionable manner.** We recommend that CEQ promulgate new regulations to ensure that climate impacts relevant to federal actions are evaluated alongside other existing considerations in environmental reviews. At a minimum, the regulations should require federal agencies to account for climate impacts when defining the affected environment, and evaluating the environmental impacts of the proposed action and alternatives. To complement the new regulations, CEQ should issue updated guidance, identifying best practices for conducting climate impact analysis in NEPA reviews. This paper identifies existing guidelines and other resources that CEQ could use to formulate best practices. It also points to useful tools and data that CEQ could make available to federal agencies for use in the analysis (see recommendation 4 below).
2. **Federal agencies should review their own NEPA regulations and consider ways to improve NEPA implementation to better account for climate impacts.** CEQ

regulations should establish the floor, rather than the ceiling, for integrating climate impact analysis into NEPA reviews. Given the different ways climate change can impact different types of actions in different locations, individual agencies may encounter unique issues when conducting climate impact analysis. These are best addressed through agency-specific NEPA regulations or guidance. For example, agencies that deal with coastal infrastructure (e.g., the Federal Energy Regulatory Commission, Department of Transportation, and Army Corps of Engineers) could develop joint guidance that ensures use of the latest data and projections on sea level rise, as well as consideration of compound risks from that and other climate impacts. To reduce the burden of conducting climate impact analysis, federal agencies could also consider requiring project applicants to submit information on how the impacts of climate change will affect the project and the local area and possible actions to enhance resilience.

3. **CEQ should coordinate across federal agencies and relevant experts.** Multiple federal agencies have expertise relevant to climate impact analysis. CEQ should explore opportunities to coordinate with appropriate federal agencies, for example, through an Interagency Working Group or other mechanism to support coordination and collaboration. Such a mechanism could be convened to examine, among other things, the use of climate scenario analysis in environmental reviews under NEPA. This could in turn help to improve the consistency of NEPA reviews by ensuring all agencies use common scenarios. CEQ could also establish an expert advisory board to provide advice on scenario analysis or other topics.

4. **CEQ should create or support the creation of a publicly accessible centralized database of climate information relevant to NEPA analysis.** Government agencies and the public would benefit from improved access to information about the impacts of climate change. CEQ could help facilitate such access by creating or supporting the creation of a database of data and tools relevant to climate impact analysis. The database could also incorporate recommendations from technical experts, leveraging the work of an expert advisory board, for example (see recommendation 3 above).

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# ACRONYMS

| | |
|---|---|
| **ANWR** | Arctic National Wildlife Refuge |
| **APD** | Application for Permit to Drill |
| **BLM** | Bureau of Land Management |
| **CE** | Categorical Exclusion |
| **CEQ** | Council on Environmental Quality |
| **DEIS** | Draft Environmental Impact Statement |
| **DOE** | Department of Energy |
| **DOI** | Department of the Interior |
| **DOT** | Department of Transportation |
| **EA** | Environmental Assessment |
| **EIS** | Environmental Impact Statement |
| **EPA** | Environmental Protection Agency |
| **FEMA** | Federal Emergency Management Agency |
| **FERC** | Federal Energy Regulatory Commission |
| **FONSI** | Finding of No Significant Impact |
| **GCM** | Global Climate Model |
| **GSA** | General Services Administration |
| **IWG** | Interagency Working Group |
| **LNG** | Liquified Natural Gas |
| **MEPA** | Massachusetts Environmental Policy Act |
| **NASA** | National Aeronautics and Space Administration |
| **NEPA** | National Environmental Policy Act |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **NOI** | Notice of Intent |
| **NPS** | National Park Service |
| **NRC** | Nuclear Regulatory Commission |
| **REA** | Rapid Ecoregional Assessment |
| **RMP** | Resource Management Plan |
| **ROD** | Record of Decision |
| **ROW** | Right of Way |
| **SEQR** | New York State Environmental Quality Review Act |

# 1. INTRODUCTION

Congress passed the National Environmental Policy Act ("NEPA") in 1969 to address growing public concern about environmental degradation and pollution.[11] For decades, NEPA has served as the nation's "basic national charter for protection of the environment,"[12] requiring environmental reviews of major federal actions that could significantly affect the environment.[13] As the dangers posed by climate change continue to grow, they demand increasing attention under the NEPA framework. Recognizing this, some agencies have recently begun considering the greenhouse gas emissions associated with federal actions, and how those emissions could be mitigated, in their NEPA reviews. Such analysis is critical to evaluating the environmental effects of an action, and scholars have rightly devoted increasing attention to how it should be conducted.[14] Another equally important, but less discussed, issue is how **climate-related risks—that is, the risks that the impacts of climate change present for proposed actions, and the implications for those actions' environmental outcomes**—should be addressed under NEPA.[15]

The treatment of climate risk in NEPA reviews is increasingly relevant in part due to the growing severity of certain types of extreme events and shifts in baseline weather and environmental conditions that are already occurring due to climate change. Advances in detection and attribution science have provided new and improved insights on how climate change is affecting weather and environmental conditions. Improvements in climate modeling and downscaling techniques have similarly made highly detailed projections of future climate change impacts more readily available to federal agencies and other decision-makers. Climate impacts are, therefore, increasingly foreseeable.

This paper argues that federal agencies have a legal obligation under NEPA to consider foreseeable climate change impacts when conducting environmental reviews of proposed

11 National Environmental Policy Act of 1969, § 2, 42 U.S.C. § 4321; NEPA.GOV, https://perma.cc/6FE3-KHQ2 (last visited Dec. 9, 2021).

12 40 C.F.R. § 1500.1(a) (2019).

13 42 U.S.C. § 4332(2)(C).

14 *See, e.g.*, Aaron Flyer, *FERC Compliance Under NEPA: FERC's Obligation to Fully Evaluate Upstream and Downstream Environmental Impacts Associated with Siting Natural Gas Pipelines and Liquefied Natural Gas Terminals*, 27 Geo. Int'l Env't L. REV. 301 (2015); Michael Burger & Jessica Wentz, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review*, 41 Harv. Env't L. Rev. 109 (2017); James W. Coleman, *Beyond the Pipeline Wars: Reforming Environmental Assessment of Energy Transport Infrastructure*, 2018 Utah L. Rev. 119 (2018); Michael Burger & Jessica Wentz, *Evaluating the Effects of Fossil Fuel Supply Projects on Greenhouse Gas Emissions and Climate Change Under NEPA*, 44 Wm. & Mary Env't L. & Pol'y Rev. 423 (2020).

15 There is also some scholarship on the legal requirement to consider climate change impacts in NEPA reviews, but it was published prior to significant case law and regulatory developments. *See, e.g.*, Michael B. Gerrard, *Reverse Environmental Impact Analysis: Effect of Climate Change on Projects*, 247 N.Y. L. J., Mar. 8, 2012; Katrina Fischer Kuh, *Impact Review, Disclosure, and Planning*, in The Law of Adaptation to Climate Change 543 (Michael B. Gerrard & Katrina Fischer Kuh, eds. 2012); Jennifer Klein & Ethan Strell, Legal Tools for Climate Adaptation Advocacy: Nepa (2015), https://perma.cc/5Z5E-KQSH; Jessica Wentz, Assessing the Impacts of Climate Change on the Built Environment Under Nepa and State Eia Laws: A Survey of Current Practices and Recommendations for Model Protocols (2015), https://perma.cc/2YNZ-SVQ8 [hereinafter "Wentz 2015"]; Jessica Wentz, *Planning for the Effects of Climate Change on Natural Resources*, 47 Env't L. Rep. 10220 (2017) [hereinafter "Wentz 2017"].

federal actions. Although the paper is designed to be broadly relevant, it grounds analysis in NEPA reviews of energy projects. Those projects were chosen because of the particularly significant and growing risks climate change poses to energy infrastructure and its impacts on the environment. Increasing temperatures, changing precipitation patterns, and other climate change impacts could destroy, damage, or otherwise affect the performance of energy infrastructure.[16] Climate impacts could also heighten the environmental and other risks associated with constructing, operating, and maintaining energy infrastructure.[17] As an example, climate change-induced sea level rise could lead to more frequent flooding of coastal energy storage facilities, increasing the potential for releases causing water or soil contamination that endangers public health. Energy infrastructure projects could also have compounding effects on natural and human systems that are already impacted by climate change. For instance, dredging associated with the construction of a coastal facility might place added strain on nearby wetlands, which are already being impacted from saltwater intrusion due to sea level rise. The loss of those buffering wetlands could further exacerbate the risks faced by surrounding ecosystems, the facility, and nearby communities from climate change-amplified extreme weather events and flooding.

Avoiding these outcomes could require changes in the way energy infrastructure is designed, sited, constructed, and operated. While private parties develop most energy infrastructure, projects often require federal approval. Where that is the case, federal agencies may have an opportunity to assess the climate vulnerabilities of infrastructure projects and support the development of more resilient solutions. NEPA provides one pathway to help accomplish this goal. While NEPA does not require particular substantive outcomes, it does require federal decision-makers to consider relevant information about adverse impacts and ways to reduce or avoid them.

To determine the extent to which climate change impacts on energy infrastructure are considered under NEPA, this paper reviews all final Environmental Impact Statements ("EISs") prepared by federal agencies for onshore energy activities from 2016 through 2020. None of the surveyed EISs addressed climate impacts in a sufficiently holistic, specific, and actionable way to fulfill the requirements of NEPA. While most acknowledged that climate change would affect the local area in which the proposed action would occur, the majority did not take the critical next steps of considering how and to what extent predicted climate impacts would matter to the proposed action, or its potential adverse environmental impacts.

This paper's principal recommendation flows from that finding: the Council on Environmental Quality ("CEQ")—the principal entity tasked with NEPA oversight—should take swift action through regulation, guidance, interagency coordination, and development of resources to ensure that the impacts of climate change are fully considered in environmental reviews as required by NEPA.

This paper proceeds as follows: Part 2 catalogues key climate impacts affecting energy infrastructure. Part 3 explains the history of, and key requirements imposed by, the NEPA

16 *See infra* Part 2.
17 *Id.*

statute and associated regulations. Part 4 explains the relevance of climate change considerations, particularly climate risk, for NEPA reviews. Part 5 analyzes treatment of climate change impacts in recent EISs, presenting and discussing results from our survey of energy EISs. Part 6 offers recommendations for enhancing consideration of climate risk in NEPA reviews. Part 7 concludes.

# 2. CLIMATE RISKS TO ENERGY INFRASTRUCTURE

Climate conditions have a major influence on the design, construction, and operation of many types of energy infrastructure. As the U.S. Department of Energy ("DOE") has noted, "[e] nergy production, transport, and delivery infrastructure and operations are typically tailored either to take advantage of or to address regional differences in climate conditions."[18] Thus, for example, historic precipitation patterns and associated river flows have influenced the siting of hydroelectric generating facilities. Water availability has similarly influenced the siting of thermoelectric power plants that require water for cooling and are, therefore, often located on rivers or in coastal areas. The plants' water intake and effluent systems are designed based on the normal range of water levels and temperatures. Air temperature ranges also affect the need for, and design of, cooling systems at thermoelectric generating plants and other facilities. For instance, according to DOE, electric "utilities typically equip their transformers with cooling systems that are adequate to prevent overheating in regions that historically experience extremely hot weather. Similarly, pipelines constructed on permafrost in Arctic Alaska are designed for an expected range of historic temperatures."[19] Pipeline, electricity transmission line, and other infrastructure developers also consider the prevalence of extreme weather events when constructing and operating facilities. Again, as explained by DOE, the owners of "oil and gas infrastructure along the Gulf Coast . . . typically incorporate the historical likelihood of severe hurricanes into risk management planning."[20]

Climate change is causing significant and growing shifts in historic weather patterns, including more frequent and severe extreme weather events, rising temperatures, and associated environmental changes (e.g., sea level rise), all of which are putting existing energy infrastructure under additional stress and increasing the potential for energy system disruptions.[21] Indeed, in 2021 alone, energy systems were affected by extreme cold weather in Texas, heat waves in California, and hurricanes and flooding in Louisiana and several other states. Without changes in the design and operation of energy infrastructure, the frequency and severity of system disruptions will increase as climate change intensifies.[22] This will, in turn, increase risks to the environment and communities.

While all energy systems are at risk from the impacts of climate change, the nature and extent of climate-related risks vary geographically for at least two reasons. First, as noted above, different regions are home to different types of energy infrastructure with varying vulnerabilities to climate impacts. Second, and relatedly, the nature and extent of climate impacts affecting energy infrastructure will also vary regionally. For example, compared to other parts of the U.S., southwestern states are more likely to experience prolonged drought

18 U.S. Dep't of Energy, Climate Change and the U.S. Energy Sector: Regional Vulnerabilities and Resilience Solutions 1-1 (2015), https://perma.cc/3YEC-NFJ7.
19 *Id.*
20 *Id.* at 1-2.
21 *Id.* at 1-1; see also P.C.D. Milly et al., *Stationarity is Dead: Whither Water Management?* 319 Science 573, 573-574 (2008).
22 U.S. Dep't of Energy, *supra* note 18, at 1-1 – 1-2.

which could affect the operation of oil refineries and thermoelectric generating plants that rely on water for cooling.[23] In comparison, flooding may be a greater risk to refineries and generating plants in the southeast, which is likely to see more intense hurricanes.[24] All regions will, however, be impacted in some ways (see Figure 1).

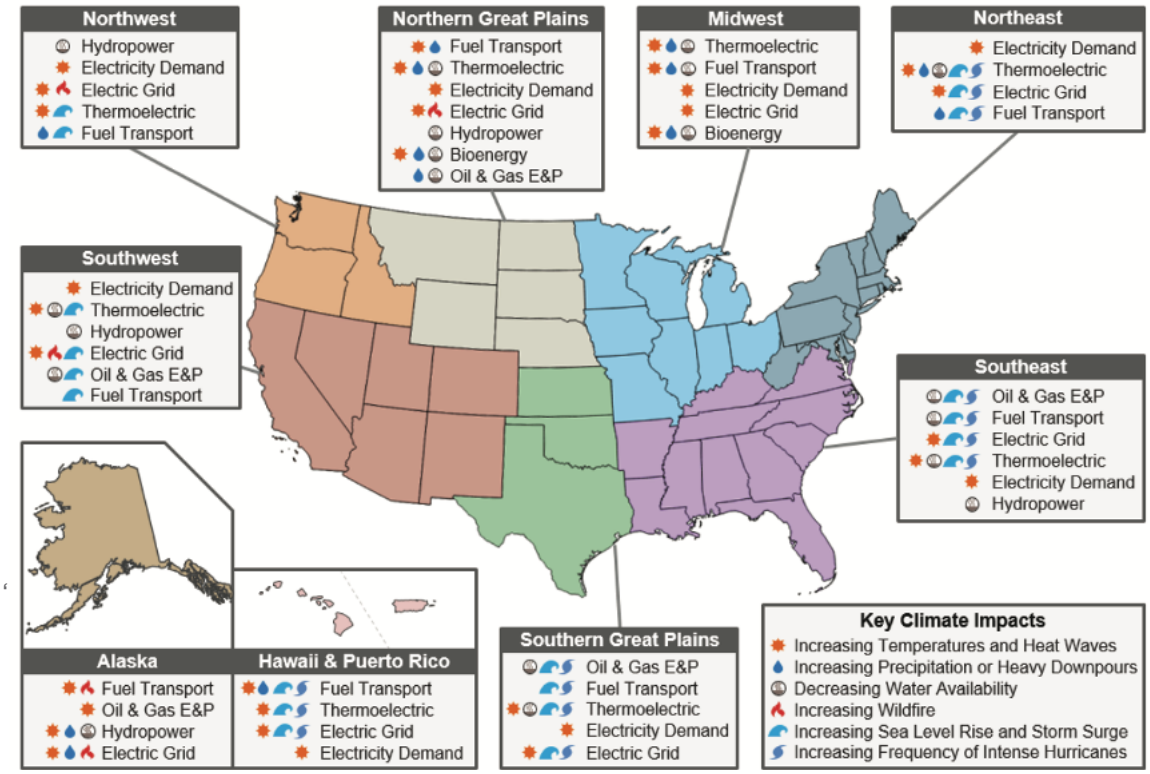
Key climate impacts likely to affect energy infrastructure include:

- ***Increasing temperatures***: According to the Fourth National Climate Assessment, annual average temperatures in the contiguous U.S. have increased by as much as 1.8°F since the start of the 20th century, and are projected to rise a further 2.5°F between 2021 and 2050.[25] The rise could, however, be significantly larger in some regions. In parts of the northeast, for example, maximum summer temperatures are expected to increase by up to 6.7°F.[26]

  Increasing temperatures pose particular risks to electricity generation, transmission, and distribution systems. Higher temperatures reduce the operating efficiency of thermoelectric generating plants, particularly nuclear and fossil fuel plants equipped with steam turbines.[27] High temperatures also accelerate the aging of transmission and distribution equipment, increase line losses, and cause lines to expand and sag, which can spark wildfires.[28] Together, the impacts on generation, transmission, and distribution make electricity more difficult to produce and deliver, which could strain electricity supplies. At the same time, higher temperatures will drive higher demand for electricity, increasing the potential for supply shortfalls.[29] This could lead to outages which pose major risks to public health and the environment. As an example, past outages have forced the discharge of untreated sewage into waterways, leading to contamination and associated public health issues.[30]

23 *Id.* at 3-1.
24 *Id.* at 8-1.
25 R.S. Vose et al., *Temperature Changes in the United States*, in Climate Science Special Report: Fourth National Climate Assessment: Volume I 185, 186 & 195 (D.J. Wuebbels et al. eds., 2017), https://perma.cc/TD85-T3H8.
26 *See, e.g., Rising Temperatures*, Mass. Climate Change Clesringhouse, https://perma.cc/9QMS-BCKE (last visited Sept. 30, 2021) (predicting that maximum summer temperatures in Massachusetts will increase by 2.6 to 6.7°F by 2050).
27 *See generally* Jayant Sathaye et al., Estimating Risk to California Energy Infrastructure from Projected Climate Change 10-11 (2011), https://doi.org/10.2172/1026811 (estimating that the output of natural gas generating plants could decline by up to one percent for each 1.8°F increase in temperatures).
28 *See id.* at 25-28; see also U.S. Dep't of Energy, Climate Change & the Electricity Sector: Guide for Climate Change Resilience Planning 10 (2016), https://perma.cc/29MD-XWEE.
29 Craig D. Zamuda et al., *Energy Supply, Delivery, and Demand*, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II 174, 181 (D.R. Reidmiller et al. eds., 2018), https://perma.cc/ZP2G-JJRK.
30 *See, e.g.*, Erika Martin et al., *17M gallon sewage spill at L.A. treatment plan closes Dockweiler, El Segundo beaches to swimming*, KTLA Local News (Jul. 12, 2021), https://perma.cc/XA7M-33BR.

**Figure 1:** Climate Change Impacts on the Energy Sector by Region[31]




- ***Heat waves and cold waves***: Climate change is increasing both the frequency and severity of extreme heat events, which can adversely affect the operation of energy systems.[32] As noted above, heat waves pose particularly significant risks to certain electricity infrastructure. During a multi-day heat wave in California in August 2020, several natural gas-fueled electricity generating plants experienced forced outages and derates (i.e., a decrease in the plant's maximum available capacity).[33] High temperatures, particularly when combined with high humidity, not only cause electricity demand to soar but also increase electric transmission line resistance and thus reduce the lines' carrying capacity. Again, this could lead to electricity outages and associated impacts on public health, safety, and the environment. Maintaining and repairing infrastructure during "wet bulb" conditions, when both temperature and humidity are high, are also difficult and may expose workers to serious health risks.[34]

31 U.S. Dep't of Energy, *supra* note 18, at i.
32 Id. at 1-1.
33 Cal. Indep. Sys. Operator, Cal. Pub. Utils. Comm'n, & Cal. Energy Comm'n, Preliminary Root Cause Analysis: Mid-August 2020 Heat Storm 50 (2020), https://perma.cc/KAF2-SQWQ.
34 *See generally Best Practices to Protect Utility Workers from Heat Stress*, Powerline Services, https://perma.cc/N83Q-KEXN (last updated July 5, 2018).

Cold waves can similarly disrupt energy systems, particularly if infrastructure has not been appropriately winterized. This occurred during Winter Storm Uri in Texas in 2021, when inadequately winterized oil and gas wells, pipelines, wind turbines, and other generating facilities were forced to shut down.[35] In a survey conducted after the storm, approximately 15% of natural gas producers reported production losses due to "equipment freeze-offs," and 20% of gas pipeline operators reported service disruptions for the same reason.[36] While the scientific understanding of climate change's influence on the frequency and severity of cold weather events continues to develop,[37] researchers have identified potential links between rapid warming in the Arctic and cold waves like Winter Storm Uri in mid-latitude regions.[38]

- ***Changing precipitation patterns***: The higher temperatures associated with climate change will result in more precipitation falling as rain rather than snow.[39] The total amount of precipitation could also change, with increases expected in higher-latitude regions, and declines in lower-latitude regions.[40] In all areas, there is expected to be an increase in heavy precipitation events, with longer dry periods in between.[41] All of these changes could, again, affect energy infrastructure. For example, the shift from snow to rain will impair the operation of hydroelectric generating facilities, particularly in areas that rely on snowmelt to augment stream flows in summer.[42] Other types of electricity generation, particularly thermoelectric facilities that rely on water for cooling, could also be forced to shut down or curtail output during periods of low rainfall.[43] Oil and biofuel refineries could be similarly affected because they too require large amounts of cooling water.[44] Where those or other facilities discharge wastewater into rivers and streams, reduced water flows could increase the potential for contamination (e.g., because the assimilative capacity of waterways is reduced). Similar contamination risks could also arise where flooding caused by heavy downpours impacts facilities; high flows can overwhelm the capacity of treatment plants and cause the discharge of untreated waste.

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35 Benji Jones, *Texas blackouts explained: Arctic weather shut down power plants as demand for heat surged, and the state's grid is on its own*, Business Insider (Feb. 18, 2021), https://perma.cc/4VV3-PPNJ; see The February 2021 Cold Weather Outages in Texas and the South Central United States, Fed. Energy Reg. Comm'n et al. 18-20 (2021), https://perma.cc/4KER-7VXX (recommending improved weatherization practices).

36 Enverus, Winter Storm Uri – Natural Gas Analysis 10, 14 (2021), https://perma.cc/KV6H-WBUL. The survey included natural gas producers representing 51% of production in Texas.

37 See Katharine Hayhoe et al., *Our Changing Climate, in* Impacts, Risks and Adaptation in the United States: Fourth National Cliamte Assessment, Volume II 72, 94 (D.R. Reidmiller et al. eds., 2018), https://perma.cc/52K9-S8TW.

38 *See, e.g.*, Judah Cohen et al., *Linking Arctic variability and change with extreme winter weather in the United States*, 373 Science 1116, 1116-1121 (2021).

39 D.R. Easterling et al., *Precipitation Change in the United States*, in Climate Science Special Report: Fourth National Climate Assessment, Volume I 207, 217 (D.J. Wuebbels et al. eds., 2017), https://perma.cc/MV9S-NMAS.

40 *Id.* at 216.

41 *Id.* at 218–220.

42 *See* U.S. Dep't of Energy, Climate Change & the Electricity Sector: Guide for Cliamte Change Resilience Planning 10, 11 (2016), https://perma.cc/4WHR-EDFJ.

43 Justin Gunderlach & Romany Webb, Climate Change Impacts on the Bulk Power System: Assessing Vulnerabilities and Planning for Resilience 9 (2018), https://perma.cc/A2ZH-BBED.

44 *See, e.g.*, U.S. Dep't of Energy, *supra* note 18, at 3-12, 4-10 (discussing risks to oil refineries in the southwest and biofuel refineries in the northern Great Plains).

- ***Storms, hurricanes, and flooding***: As noted above, climate change is increasing the frequency and severity of heavy rainfall events, as well as the severity of hurricanes. This could lead to more flood events affecting fossil fuel production sites, fuel refineries, fuel storage terminals, pipelines, and electric generating facilities.[45] Facilities located on the coast or along inland waterways are at particular risk.[46] With respect to coastal facilities, sea level rise is already contributing to higher storm surges, meaning that more facilities are at risk of inundation during storms. A 2015 study found that sea level rise could increase the number of energy facilities exposed to storm surge from a weak (category 1) hurricane by up to 67% from 711 to 1,025 by 2060.[47] Another study of just four coastal cities—Houston, Los Angeles, New York, and Miami— identified 315 energy facilities that are at risk of sunny-day or "nuisance" flooding caused by sea level rise alone by 2100.[48] Affected facilities may be forced to shut down; those that continue operating could present significant environmental risks. For example, flooding at energy storage facilities could lead to unplanned discharges of oil into waterways, or natural gas into the atmosphere. At some kinds of facilities, such as coal ash lagoons, flooding continues to present significant environmental risks even when the facilities are no longer in use.[49]

  Flood-related risks to energy infrastructure may be compounded by risks from high winds associated with hurricanes and other storms. During Hurricane Ida in 2021, for example, high winds damaged the eight major transmission lines that deliver electricity to New Orleans.[50] This, combined with damage to the city's electricity distribution system, resulted in outages affecting approximately 1.1 million people.[51] The hurricane also forced the closure of several refineries in Louisiana and Mississippi.[52] Previous hurricanes and storms have resulted in oil spills and other toxic releases from refineries.[53]

- ***Wildfires***: The incidence and severity of wildfires are increasing due in part to higher temperatures associated with climate change. This has been, and will continue to be, a particular problem in the western U.S. where prolonged droughts are becoming more common. Parts of the west are also experiencing changing wind patterns which further increase wildfire risk. For example, in California, climate change is causing extreme

45 *See id.* at xiv.
46 Zamuda et al., *supra* note 29, at 176.
47 James Bradbury et al., Climate Change and Energy Infrastructure Exposure to Storm Surge and Sea-Level Rise 3, 15 (2015), https://perma.cc/3WKY-CVY9.
48 U.S. Dep't of Energy, Effect of Sea Level Rise on Energy Infrastructure in Four Major Metropolitan Areas 13 (2014), https://perma.cc/D23E-768D (predicting that 67 energy facilities in Houston, 29 facilities in Los Angeles, 49 facilities in Miami, and 170 facilities in New York could be inundated by 2100).
49 Brady Dennis et al., *Dam breach sends toxic coal ash flowing into a major North Carolina river*, Wash. Post (Sept. 22, 2018), https://www.washingtonpost.com/energy-environment/2018/09/21/dam-breach-reported-former-nc-coal-plant-raising-fears-that-toxic-coal-ash-may-pollute-cape-fear-river/.
50 Peter Eavis & Ivan Penn, *Why Louisiana's Electric Grid Failed in Hurricane Ida*, N.Y. Times (Sept. 17, 2021), https://perma.cc/KF99-ZN2Z.
51 Jacob Knutson, *Deadly Hurricane Ida leaves over 1 million without power in Louisiana*, Axios (Aug. 30, 2021), https://perma.cc/9EXR-NKM4.
52 Jason Metko, *Gulf coast refiners start shutdown for Ida: Update 2*, Argus (Aug. 27, 2021), https://perma.cc/Z9QC-VVXK.
53 *See, e.g.*, Emily Flitter & Richard Valdmanis, *Oil and chemical spills from Hurricane Harvey big, but dwarfed by Katrina*, Reuters (Sept. 15, 2017), https://perma.cc/8A3Q-3GSZ.

wind conditions (known as "Santa Ana" or "Diablo" winds) to occur later in the year, when vegetation is at its driest and thus poses the greatest fire hazard.[54]

Wildfires can damage, destroy, or force the shutdown of above-ground energy infrastructure. In recent years, electricity transmission and distribution infrastructure has been particularly affected, with flow-on effects on electricity generation. In 2015, for example, a wildfire in Washington state forced the shutdown of a transmission line which, in turn, necessitated the curtailment of output from a hydroelectric generating plant.[55] More recently, in parts of California, transmission and distribution lines have had to be shut down preemptively to mitigate wildfire risk.[56] While undergrounding lines can help to avoid this, there are other wildfire-related risks to below-ground infrastructure. For example, wildfires increase the potential for landslides, which may damage below-ground transmission and distribution infrastructure and pipelines. Landslides and smoke from wildfires can also impair the operation of solar generating systems. For example, in September 2020, wildfire smoke caused a thirty percent decline in solar generation in California (compared to the July 2020 average).[57]

While the above climate impacts are discussed separately, multiple impacts could occur simultaneously. Moreover, each impact could affect multiple parts of the energy system, resulting in compounding risks, and increasing the potential for widespread and prolonged system disruptions. Such disruptions pose a threat to public health, safety, and the environment and could have serious economic consequences.[58] For example, the electricity outages experienced in Texas as a result of Winter Storm Uri forced the shutdown of water treatment facilities, disrupted services at medical facilities, and cost the state approximately $130 billion in lost economic activity.[59]

Changes in the siting, design, construction, and operation of energy infrastructure could significantly reduce its exposure to climate-related risks.[60] For example, elevating coastal generating plants, or building floodwalls around them, can reduce their exposure to storm surge damage. Using high-efficiency cooling systems in refineries and generating plants can reduce their water needs, and thus their susceptibility to drought-induced shutdowns. Taking these and other steps to build in climate resilience at the time new infrastructure is developed will be easier and cheaper than retrofitting facilities in the future. Indeed, a recent study of climate risks to transmission and distribution infrastructure found that designing new

54 *See generally*, Norman L. Miller & Nicole J. Schlegel, *Climate change projected weather sensitivity: California Santa Ana wind occurrence*, 33 Geophysical Research Letters L15711 (2006).
55 *See* Crystal Raymond, Seattle City Light Climate Change Vulnerability Assessment and Adaptation Plan 17, 49 (2015), https://perma.cc/LYQ6-ZT3L.
56 *PG&E Shutdown: 800,000 people to lose power to prevent California wildfires*, The Guardian (Oct. 9, 2019), https://perma.cc/2BTB-MJLV.
57 Energy Info. Admin., *Smoke from California wildfires decreases solar generation in CAISO*, Today in Energy (Sep. 30, 2020), https://perma.cc/T9QV-R29X.
58 *See generally* Romany M. Webb et al., *Climate Risk in the Electricity Sector: Legal Obligations to Advance Climate Resilience Planning by Electric Utilities*, 51 Env't Law 577, 583–84 (2021).
59 *See* Joshua W. Busby et al., *Cascading Risks: Understanding the 2021 Winter Blackout in Texas*, 77 Energy Res. & Soc. Sci. 102106, 1 (2021).
60 For a discussion of actions that may be taken to reduce climate-related risks to energy infrastructure, *see* U.S. Dep't of Energy, *supra* note 18.

infrastructure based on anticipated climate conditions over its useful life "roughly halves the expected costs of climate change experienced in 2090," compared to a scenario in which no changes are made to infrastructure design.[61]

While private companies develop most energy infrastructure the federal government can nevertheless play an important role in ensuring that new infrastructure is climate resilient. Federal government approval is frequently required for energy projects (see Box 4). Before granting such approval, federal agencies must often conduct an environmental review under NEPA, which provides an opportunity to identify climate-related risks to proposed infrastructure and evaluate possible solutions to enhance the climate resilience of that infrastructure.[62]

61 Charles Fant et al., *Climate Change Impacts and Costs to U.S. Electricity Transmission and Distribution Infrastructure*, 195 Energy 116899, 7 (2020).

62 Projects that are not subject to federal review under NEPA are often subject to review under the equivalent state-level environmental statutes, where the best practices for climate impact analysis discussed in this paper could likewise be implemented.

# 3. THE NATIONAL ENVIRONMENTAL POLICY ACT

## 3.1. NEPA Basics

Signed into law on January 1, 1970 by President Nixon, NEPA helped define a new wave of major national environmental statutes passed in the U.S.[63] Its enactment came shortly after the Santa Barbara oil spill and reflected increasing public and Congressional support for enhanced environmental protection.[64] NEPA established a national environmental policy whereby the federal government would "use all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."[65] The law sets forth specific, continuing responsibilities for the federal government, namely to:

> (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.[66]

To further the achievement of those goals, NEPA requires federal agencies to conduct an environmental review of any "major federal action[] significantly affecting the quality of the human environment."[67] For each covered action (see Part 3.1.A below), the federal agency must prepare and publish a "detailed statement" (known as an "environmental impact statement" or "EIS") that includes the following components:

> (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.[68]

63 NEPA.GOV, https://perma.cc/6FE3-KHQ2 (last visited Dec. 9, 2021).
64 Nicholas C. Yost, *The Background and History of NEPA, in* The Nepa Litigation Guide (2012), https://perma.cc/6TW8-QMC9.
65 42 U.S.C. § 4331(a).
66 Id. § 4331(b)(1)–(6).
67 Id. § 4332(2)(C).
68 Id. § 4332(2)(C)(i)–(v).

NEPA is a procedural statute, understood to convey two requirements upon major federal agency actions. First, agencies must "consider every significant aspect of the environmental impact of an action before proceeding with it."[69] Second, the agency must accommodate public participation by sharing information during the decision-making process, providing the public with an opportunity to comment on drafts, and publicizing its ultimate decision.[70] NEPA's purpose and function are thus not prescriptive, and agencies are not required to take any specific action following completion of their environmental reviews. NEPA does, however, require federal agencies to take a "hard look" at the environmental effects of their actions.[71] Importantly, this "hard look" obligates real consideration. The environmental review required by NEPA is not meant to be an "abstract exercise," but rather to be "incorporated as part of the agency's process of deciding whether to pursue a particular federal action."[72] NEPA is thus only "satisfied if Federal agencies have considered relevant environmental information, and the public has been informed regarding the decision-making process."[73] The theory is that improved process should result in better outcomes; the law is designed to "provide for informed decision making and foster excellent action."[74]

### 3.1.A Application of NEPA

Because NEPA requires federal agencies to prepare an EIS for any "major federal action[] significantly affecting the quality of the human environment,"[75] NEPA's application turns on whether an action is "federal" in nature. For the purposes of NEPA, federal actions include "projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by Federal agencies."[76] NEPA implementing regulations clarify that covered actions "tend to fall within one of the following categories":

> (i) Adoption of official policy, such as rules, regulations, and interpretations adopted under the Administrative Procedure Act, 5 U.S.C. 551 et seq. or other statutes; implementation of treaties and international conventions or agreements, including those implemented pursuant to statute or regulation; formal documents establishing an agency's policies which will result in or substantially alter agency programs. (ii) Adoption of formal plans, such as official documents prepared or approved by Federal agencies, which prescribe alternative uses of Federal resources, upon which future agency actions will be based. (iii) Adoption of programs, such as a group of concerted actions to implement a specific policy or plan; systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive. (iv) Approval of specific projects, such as

69 Linda Luther, Cong. Research Serv., RL33152, The National Environmental Policy Act: Background and Implementation 1 (2008), https://perma.cc/UFN3-P7H6.
70 *Id.* at 26.
71 *New York Natural Res. Def. Council, Inc. v. Kleppe*, 429 U.S. 1307, 1311 (1976) (internal quotations omitted).
72 *Baltimore Gas & Electric Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 100 (1983).
73 40 C.F.R. § 1500.1(a). Unless otherwise indicated, all citations to the NEPA implementing regulations (40 C.F.R. § 1500.1 *et seq.*) in this paper are to the current regulations as of the time of publication—that is, the regulations as amended in 2020. CEQ has proposed amendments to these regulations, as further discussed in Part 3.2, *infra*.
74 40 C.F.R. § 1500.1(a).
75 42 U.S.C. § 4332(2)(C).
76 40 C.F.R. § 1508.1(q)(2).

> construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as Federal and federally assisted activities.[77]

Even if an action is found to be federal in nature, an agency need only prepare an EIS if the action "significantly affect[s] the quality of the human environment."[78] To determine whether this is the case, federal agencies must consider a variety of factors, including "the affected area . . . and its resources," and the "degree of the effects," such as "short- and long-term effects," "beneficial and adverse effects," "[e]ffects on public health and safety," and "[e]ffects that would violate Federal, State, Tribal, or local law protecting the environment."[79]

### 3.1.B Environmental Review Process

If the effects of a federal action are known to be significant at the outset, the relevant federal agency may proceed directly to prepare an EIS. This is relatively rare, however. More commonly, agencies begin with more limited processes, known as categorical exclusions ("CEs") or environmental assessments ("EAs").[80]

CEs apply to categories of actions that federal agencies determine, in advance, will not have a "significant effect on the human environment."[81] A CE may also apply to actions where circumstances or conditions reduce impacts to avoid significant effects. While the majority of CEs are established through agency-specific NEPA regulations, there are certain instances where CEs are statutorily designated, the most relevant of these being for certain types of oil and gas production on federal land.[82] Actions covered by a CE require minimal documentation, obligating the agency only to produce a determination that further environmental review is unnecessary.[83]

When an action is not covered by a CE, but is "not likely to have significant effects or when the significance of the effects is unknown," the federal agency may conduct an EA.[84] EAs must include, among other things, a brief discussion of the proposed action's purpose and need, a review of alternatives, and the predicted environmental impacts of the action and its alternatives.[85] On the basis of this information, the federal agency must determine next steps, which typically take one of two forms.[86] First, the agency may issue a Finding of No Significant Impact ("FONSI"), meaning that the action "will not have significant effects" on the

77 *Id.* § 1508.1(q)(3).
78 42 U.S.C. § 4332(2)(C).
79 40 C.F.R. § 1501.3(b)(1)–(2).
80 U.S. Gov. Accountability Off., GAO-14-369, National Environmental Policy Act: Little Information Exists on NEPA Analyses 7 (2014), https://perma.cc/QY2Z-2PVE (finding that "about 95 percent of NEPA analyses are CEs, less than 5 percent are EAs, and less than 1 percent are EISs").
81 40 C.F.R. § 1501.4(a).
82 *See, e.g.*, 42 U.S.C. § 15942; *FEMA Statutory Exclusions*, FEMA, https://perma.cc/585K-GM77 (last visited Dec. 9, 2021).
83 *See* Kristen Alexander, Cong. Research Serv., RS20621, Overview of National Environmental Policy Act (NEPA) Requirements 3 (2008), https://perma.cc/2FYB-23G3.
84 40 C.F.R. § 1501.5(a)–(b).
85 *Id.* § 1501.5(c).
86 *Id.* § 1501.5(c)(1).

human environment, and no further environmental review is required.[87] Alternatively, if the EA concludes that the proposed action may significantly affect the environment, the agency must conduct a second, more detailed review and prepare an EIS.[88]

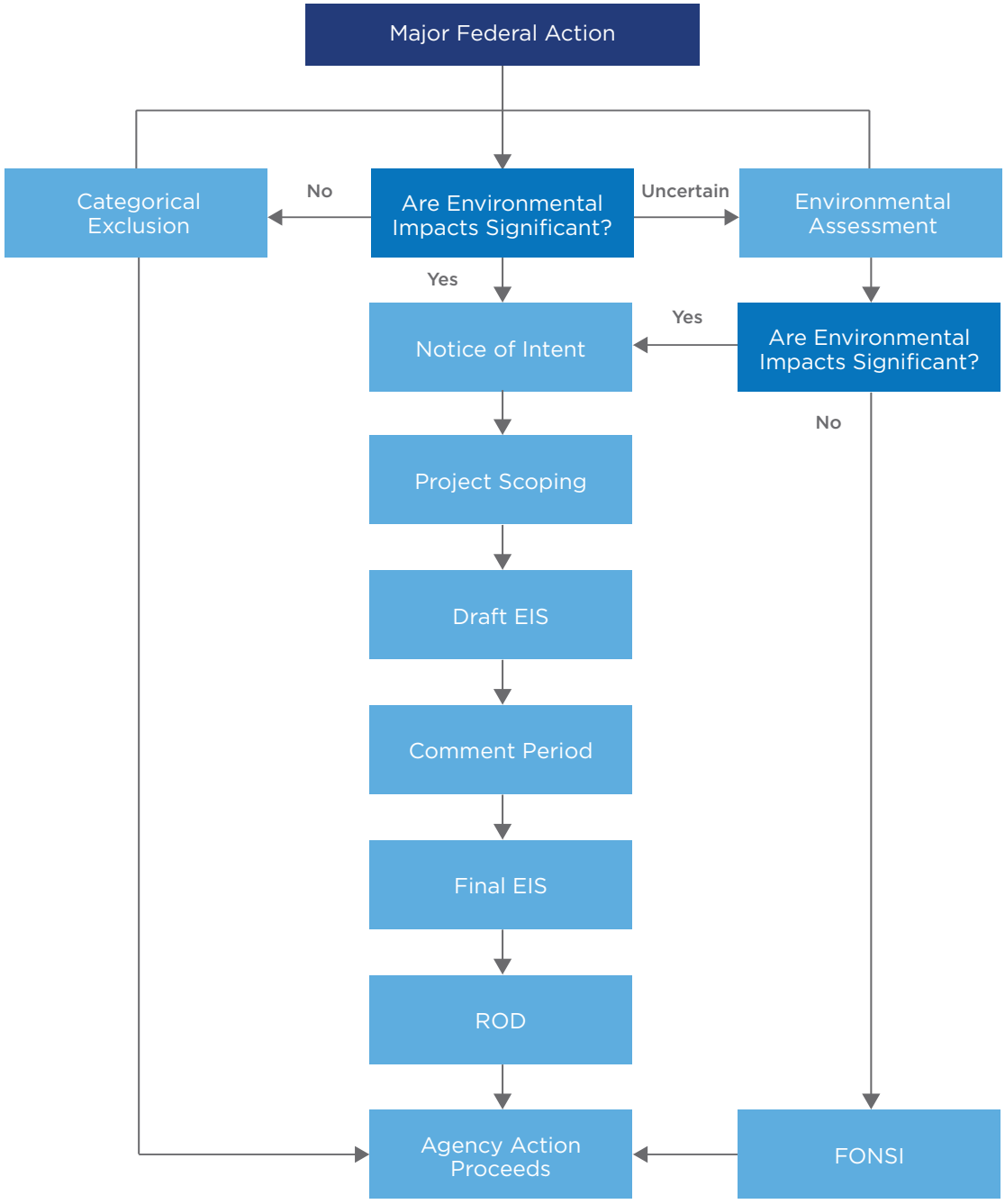
Where a federal agency determines that an EIS is required, it must issue a Notice of Intent ("NOI") in the Federal Register.[89] The NOI signals the agency's intent to proceed with an EIS, describes the proposed action, alternatives, and expected impacts, and provides information on the decision-making process and opportunities for participation.[90] In the project scoping process, the agency invites involvement and information from "likely affected Federal, State, Tribal, and local agencies and governments, the proponent of the action, and other likely affected or interested persons."[91]

The federal agency must next prepare a draft EIS ("DEIS"), make it available to the public, and invite comments.[92] The agency must "consider substantive comments timely submitted during the public comment period" and may respond by making modifications or explaining "why the comments do not warrant further agency response."[93] Following the designated comment period and revision, the agency prepares and makes public a final EIS.[94] If the final EIS departs significantly from the DEIS or if significant new information or circumstances arise, an agency may determine that a supplemental EIS is necessary. This supplemental process follows the same steps as for the primary EIS, except for the scoping step.[95]

Based upon the EIS (and, when applicable, supplemental EIS), the federal agency will issue a Record of Decision ("ROD") in the Federal Register. The ROD is meant to provide a "concise public record" of the agency's decision, including identification of alternatives considered, discussion of all factors "that the agency balanced in making its decision," a statement on "whether the agency has adopted all practicable means to avoid or minimize environmental harm from the alternative selected," and a certification that the agency has considered all commenters' submissions.[96] The agency will then proceed with the selected action, consistent with the ROD. A ROD and the underlying environmental review process are subject to judicial review under the Administrative Procedure Act.

87 *Id.* § 1501.6(a).
88 *Id.* § 1501.3(a)(3).
89 *Id.* § 1501.9(d).
90 *Id.*
91 *Id.* § 1501.9(b).
92 *Id.* § 1502.9(b).
93 *Id.* § 1503.4(a).
94 *Id.* §§ 1502.9(c), 1502.20.
95 *Id.* § 1502.9(d).
96 *Id.* § 1505.2(a)–(b).

**Figure 2:** The NEPA process[97]




97 LUTHER, *supra* note 69, at 22.

## 3.2. NEPA Implementation and Regulatory History

In addition to setting forth requirements for federal agency environmental review, NEPA established CEQ, which is responsible for the law's implementation (among other things).[98] CEQ's responsibility does not supplant individual agency action, and each federal agency is responsible for issuing its own regulations to comply with NEPA.[99] CEQ may, however, issue NEPA-related regulations applicable across federal agencies.[100]

### 3.2.A 1978 Rule Regulatory History

CEQ first promulgated regulations to implement NEPA in 1978 at 40 C.F.R. parts 1500 through 1508.3 ("1978 Rule").[101] CEQ made technical corrections to the 1978 Rule in 1979[102] and promulgated minor amendments in 1986,[103] but otherwise left its regulatory framework largely untouched for over forty years, until 2020 (see Part 3.2.B below). For this reason, agency practice and case law are largely based upon the 1978 Rule.

The 1978 Rule provided federal agencies with guidance on preparing EISs, including setting forth four key components to an EIS. First, the 1978 Rule required the agency preparing the EIS to include a "Purpose and Need Statement" to outline the core purpose of the proposed federal action and the "need to which the agency is responding."[104] This statement is considered foundational in the EIS process and should include a discussion of both "the goals and objective of an action" and "existing conditions that call for some improvement."[105]

Second, the 1978 Rule required the agency to identify the "affected environment" by "succinctly describ[ing] the environment of the area(s) to be affected or created by the alternatives under consideration.[106]

Third, the 1978 Rule obligated the agency to identify alternatives to the proposed federal action.[107] Under the 1978 Rule, alternatives were to be considered from a "technical, economic, and common-sense standpoint," rather than only those "simply desirable from the standpoint of the agency or a potentially affected stakeholder."[108]

Fourth, the 1978 Rule required the agency to analyze the "environmental consequences" of the proposed action and each alternative.[109] As part of this analysis, the agency was required

98 42 U.S.C. §§ 4342, 4344.
99 40 C.F.R. § 1507.3.
100 *See id.* § 1500.3(a); *see also* Cong. Research Serv., *supra* note 69, at 1 (noting that CEQ does not have authority to enforce regulations).
101 *See Regulations* for Implementing the Procedural Provisions of the National Environmental Policy Act, 43 Fed. Reg. 55,978, 55,978–56,007 (Nov. 29, 1978).
102 *See* Implementation of Procedural Provisions; Corrections, 44 Fed. Reg. 873, 873–874 (Jan. 3, 1979).
103 *See* National Environmental Policy Act Regulations; Incomplete or Unavailable Information, 51 Fed. Reg. 15,618, 15,618–15,626 (Apr. 25, 1986) (amending 40 C.F.R 1502.22).
104 40 C.F.R. § 1502.13 (1978); *see also* Cong. Research Serv., *supra* note 69, at 19.
105 Cong. Research Serv., *supra* note 69, at 19.
106 40 C.F.R. § 1502.15 (1978).
107 Id. § 1502.14.
108 *See* Cong. Research Serv., *supra* note 69, at 20.
109 40 C.F.R. § 1502.16 (1978).

to consider "probable beneficial and adverse social, economic, and environmental effects of each alternative."[110]

The 1978 Rule also required that EISs, and indeed all forms of environmental reviews, consider three different types of "reasonably foreseeable" effects: (1) direct, (2) indirect, and (3) cumulative. Under the 1978 Rule, direct effects were defined as those that "are caused by the action and occur at the same time and place."[111] Indirect effects were defined as those that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[112] Indirect effects "may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[113] Lastly, cumulative impacts were defined as those which "result[] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[114] These cumulative impacts "can result from individually minor but collectively significant actions taking place over a period of time."[115]

In addition to setting forth core elements of an EIS and defining different types of reasonably foreseeable effects, the 1978 Rule defined a process for CEQ to "provide further guidance concerning NEPA and its procedures."[116] CEQ has issued such guidance from time to time across a varied set of topics and subjects, ranging from consideration of climate change (see Box 1) to the incorporation of biodiversity considerations under NEPA.[117]

110 Cong. Research Serv., *supra* note 69, at 19.
111 40 C.F.R. § 1508.8(a) (1978).
112 *Id.* § 1508.8(b).
113 *Id.*
114 *Id.* § 1508.7.
115 *Id.*.
116 *Id.* § 1506.7.
117 *See* U.S. Dep't of Energy, *CEQ Guidance Documents*, Office of Nepa Policy and Compliance, *https://perma.cc/77Y2-7ATB* (last visited Dec. 7, 2021).

## Box 1: Guidance on Considering Climate Change in NEPA Reviews

CEQ drafted, but did not finalize, guidance on considering climate change in NEPA reviews in 1997, 2010, and 2014.[118] In August 2016, CEQ issued final guidance ("2016 Climate Guidance") explicitly providing that "[c]limate change is a fundamental environmental issue, and its effects fall squarely within NEPA's purview."[119] The 2016 Climate Guidance was intended to promote greater clarity and consistency in how agencies address climate change in environmental reviews under NEPA.[120] It discussed how agencies should analyze both greenhouse gas emissions associated with proposed federal actions[121] and the climate-related risks to those actions and the surrounding environment.[122]

CEQ withdrew the 2016 Climate Guidance in 2017 at the direction of President Trump.[123] In 2019, CEQ proposed replacement climate guidance, focused specifically on the treatment of greenhouse gas emissions in NEPA reviews ("2019 Proposed Climate Guidance").[124] The 2019 proposal was withdrawn under the Biden Administration without ever being finalized.[125]

Some federal agencies have also developed their own climate guidance or similar documents. For example, in 2009, the National Park Service ("NPS") issued "draft interim guidance" on considering climate change in NEPA analyses.[126] The guidance recommended that NPS staff conducting environmental reviews under NEPA "evaluat[e]

118 *See* Katherine Lee, *CEQ's Draft Guidance on NEPA Climate Analyses: Potential Impacts on Climate Litigation*, 45 Envtl. L. REP. 10925, 10926 n. 17 (2015) (noting that "CEQ issued an earlier version of [the 2010] draft guidance in 1997, but it was never distributed publicly and received very little attention from either agencies or the courts"); Memorandum from Nancy H. Sutley, Chair, Council on Environmental Quality for Heads of Federal Departments and Agencies (Feb. 18, 2010), https://perma.cc/DB97-JLR8; Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, 79 Fed. Reg. 77,802 (Dec. 24, 2014) [hereinafter "2014 Draft Climate Guidance"].

119 Memorandum from Christina Goldfuss, Council on Environmental Quality, for Heads of Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 1, 2016), https://perma.cc/BUQ9-99JH [hereinafter "2016 Climate Guidance"]; See also Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 81 Fed. Reg. 51,866 (Aug. 5, 2016) (announcing issuance of the 2016 Climate Guidance).

120 2016 Climate Guidance, *supra* note 119, at 2.

121 *Id.* at 9–20.

122 *Id.* at 20–25.

123 Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16,576, 16,576–16,577 (Apr. 5, 2017) [hereinafter "2017 Withdrawal"]. *See also* Executive Order 13,783: Promoting Energy Independence and Economic Growth, 82 Fed. Reg. 16,093, 16,094 (Mar. 31, 2017) (directing CEQ to rescind the 2016 Climate Guidance).

124 Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 84 Fed. Reg. 30,097, 30,097–30,099 (June 26, 2019) [hereinafter "2019 Proposed Climate Guidance"].

125 National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 86 Fed. Reg. 10,252, 10,252 (Feb. 19, 2021) [hereinafter "2021 Withdrawal"].

126 Nat'l Park Serv., Draft Interim Guidance: Considering Climate Change in National Park Service Nepa Analysis 1 (2009), https://perma.cc/76SA-7DND.

the issue of climate change" and identified tools and resources that could be used in that evaluation.[127] The Forest Service also issued similar guidance on considering climate change in NEPA reviews in 2009.[128] The Army Corps of Engineers published and has periodically updated guidance on evaluation of, and adaptation to, sea level rise in decision-making, including NEPA processes.[129]

### 3.2.B Recent Regulatory Changes

CEQ departed from roughly four decades of practice in July 2020 when, under the Trump Administration, it finalized new NEPA implementing regulations ("2020 Rule").[130] Among other changes, the 2020 Rule sought to standardize environmental assessments, potentially limiting the ability of agencies to craft their own, more specific regulations that go beyond CEQ's baseline requirements. The 2020 Rule also narrowed a number of definitions, including what constituted a major federal action, purpose and need, reasonable alternative, and effects or impacts. The definition of effects or impacts in the 2020 Rule removed language requiring consideration of direct, indirect, and cumulative impacts[131] and replaced it with a more restrictive definition, as follows:

> Effects or impacts means changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives.[132]

Environmental and other groups opposed the 2020 Rule during rulemaking and in subsequent litigation.[133] When the Biden Administration took office, it signaled interest in revisiting the NEPA regulations.[134] On October 7, 2021, CEQ issued a notice of proposed rulemaking for

127 *Id.* at 1–2.
128 Forest Serv., Climate Change COnsiderations in Project Level Nepa Analysis 1 (2009), https://perma.cc/GK5B-E9AZ.
129 *See* U.S. Army Corps of Engineers, Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation (2019), https://perma.cc/NPY8-PP3G.
130 The rule was finalized on July 15, 2020 and became effective on September 14, 2020. See Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43,304 (July 16, 2020).
131 *Id.* at 43,343–43,344.
132 40 C.F.R. § 1508.1 (2020). Although direct, indirect, and cumulative impacts language was removed, the 2020 Rule did not prohibit the ability for agencies to consider such effects and impacts.
133 *See, e.g.*, Sabin Center for Climate Change Law at Columbia Law School and Environmental Defense Fund, Comment Letter on Proposed Amendments to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act (Mar. 10, 2020), https://perma.cc/P368-FH52; Wild Va. v. Council on Envtl. Quality, 3:20-cv-00045, U.S. Dist. LEXIS 114616, at *3 (W.D. Va. June 21, 2021).
134 *See* Exec. Order No. 13,990, 86 Fed. Reg. 7037, 7042 (Jan. 25, 2021).

a Phase 1 revision ("2021 Proposed Rule").[135] The 2021 Proposed Rule restores two critical features of the 1978 Rule: (1) agencies' flexibility to determine the "purpose and need" of a proposed project and analyze reasonable alternatives; and (2) the express requirement to consider the direct, indirect, and cumulative impacts of a project.[136] The 2021 Proposed Rule also clarifies that CEQ's NEPA regulations "provide a floor for environmental review procedures" and that "agencies have the discretion and flexibility to develop procedures beyond the CEQ regulatory requirements."[137]

CEQ has indicated that it intends to issue a second proposed rule ("Phase 2 Rule") in the near future to "help ensure full and fair public involvement in the environmental review process; meet the nation's environmental, climate change, and environmental justice challenges; provide regulatory certainty to stakeholders; and promote better decision-making consistent with NEPA's goals and requirements."[138]

135 National Environmental Policy Act Implementing Regulations Revisions, 86 Fed. Reg. 55,757, 55,757–55,769 (Oct. 7, 2021).
136 *Id.* at 55,760-55,761.
137 *Id.* at 55,757 & 55,761; *see also* Press Release, The White House, CEQ Proposes to Restore Basic Community Safeguards during Federal Environmental Reviews (Oct. 6, 2021), https://perma.cc/SDU8-UN3M.
138 *Id.*

# 4. CONSIDERING CLIMATE RISK UNDER NEPA

## 4.1. NEPA and Climate Change

Climate change's relevance to the NEPA process is reflected in case law and CEQ activity. With respect to the former, numerous federal court decisions have held that federal agencies have an obligation to consider climate change in environmental reviews under NEPA.[139] As to the latter, CEQ has similarly long recognized that NEPA requires consideration of climate change and has previously issued guidance to assist federal agencies in meeting the statutory requirements (see Box 1). CEQ is currently reviewing the 2016 Climate Guidance but has instructed that, until its review is completed, "agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 [Climate] Guidance."[140]

The 2016 Climate Guidance identifies two broad categories of climate change considerations requiring analysis under NEPA. The first concerns the effects of the project on climate change, or more specifically the greenhouse gas emissions associated with an action and their contribution to worsening climate change. The second, and subject of this paper, concerns how the impacts of climate change will affect a proposed action and its surrounding environment. This is referred to as "climate impact analysis" below. With respect to this second category, the 2016 Climate Guidance explicitly recognizes the need to consider "the effects of climate change on a proposed action and its environmental impacts"[141] and emphasizes that "climate change adaptation and resilience . . . are important considerations" in NEPA reviews.[142]

The requirement to consider greenhouse gas emissions under NEPA has received relatively more scrutiny in the courts, agency guidance documents, and scholarship.[143] Notably, however, several federal court decisions have recognized that NEPA also requires consideration of the impacts of climate change on proposed federal actions.[144] As discussed in Part 4.2 below, courts have held that climate impacts must be considered by federal agencies when defining the local environment affected by the proposed action, and evaluating the environmental consequences of that action and alternatives. It should be noted, however, that successful plaintiffs in the cases have typically prevailed on narrow fact-specific grounds, and thus the decisions do not provide

139 *See infra* Part 4.2.

140 2021 Withdrawal, *supra* note 125, at 10,252.

141 2016 Climate Guidance, *supra* note 119, at 20–25, 24 ("Climate change effects on the environment and on the proposed project should be considered in the analysis of a project considered vulnerable to the effects of climate change such as increasing sea level, drought, high intensity precipitation events, increased fire risk, or ecological change.").

142 *Id.* at 20.

143 *See, e.g., supra* note 14.

144 Our research identified at least sixteen cases in which federal courts have recognized a requirement to consider climate change impacts under NEPA. All of the cases are from the Ninth, Tenth and D.C. Circuits and their district courts. The courts in most cases did not expressly identify the legal basis of the requirement. Some did, however, specify that climate impacts must be analyzed when defining the environment affected by proposed actions and evaluating proposed actions' cumulative impacts. *See infra* Part 4.2.B.

an overarching definition of what constitutes an adequate climate impact analysis. We identify best practices, drawn from scholarship and state and international experience, in Part 4.3 below.

## 4.2. Legal Basis for Considering Climate Impacts Under NEPA

NEPA obligations to consider climate impacts are anchored in multiple, independently valid statutory and regulatory provisions. First, on a planet increasingly altered by climate change, federal agencies can only fulfill the statutory purpose of NEPA by integrating climate change considerations into environmental reviews. Second, in order to conduct environmental reviews that meet the requirements of NEPA and the implementing regulations, federal agencies must consider climate change when defining the affected environment, evaluating the purpose and need, and assessing the environmental consequences of proposed federal actions.

### 4.2.A Statutory Purpose of NEPA

Consideration of climate impacts is essential to achieve the federal policy, declared in NEPA, "to use all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."[145] NEPA further requires all federal agencies to conduct their activities in a manner that will "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings" and "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and intended consequences," among other things.[146] Agencies can no longer reasonably accomplish these objectives without considering whether and how the present and future impacts of climate change may compromise their activities or worsen any negative environmental and public health effects of those activities.

For example, the calculus of environmental and public health impacts versus benefits for coastal fossil fuel infrastructure should consider the heightened risk of spills due to climate change-induced sea level rise, more intense hurricanes, and heavier precipitation events. Federal agencies should also consider whether a coastal facility may become less productive over time because more frequent and severe extreme weather events interfere with its operation. Weighing these factors could shift the calculus on whether a proposed action should proceed. Moreover, even if the agency does decide to proceed, these considerations will enable it to better assess alternatives or adaptation measures, such as relocating or protecting the facility, which could make the action more resilient and lessen its adverse environmental impacts. As the 2016 Climate Guidance recognized:

> Focused and effective consideration of climate change in NEPA reviews will allow agencies to improve the quality of their decisions. Identifying important interactions between a changing climate and the environmental impacts from a proposed action can help Federal agencies and other decision makers identify practicable opportunities to . . . improve environmental outcomes, and contribute to safeguarding communities and their infrastructure against the effects of extreme

145 42 U.S.C. § 4331(a).
146 *Id.* § 4331(b)(2)–(3).

weather and other climate-related impacts.[147]

This is fully consistent with the goals underlying NEPA's environmental review requirement. As noted in the 1978 Rule, that requirement is "intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment."[148] Without first considering the how climate impacts will affect a project and the surrounding environment, agencies cannot possibly hope to make a decision that reflects the most "beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and intended consequences,"[149] and are thus at risk of violating their statutory responsibilities.

### 4.2.B Statutory and Regulatory Requirements for Environmental Review

As discussed in Part 3.1 above, NEPA establishes baseline requirements for federal agencies' environmental reviews, including identifying key components which must be included in all EISs. CEQ's implementing regulations and court decisions have further elaborated on NEPA requirements. The court decisions make clear that, in order to meet the statutory and regulatory requirements, federal agencies must include an analysis of climate change impacts in their EISs. Specifically, and at a minimum, federal agencies must analyze climate change impacts when (1) identifying the purpose of, and need for, a proposed action and defining alternative actions that could meet that purpose and need, (2) describing the area affected by the proposed action and alternatives, and (3) evaluating the impacts of the proposed action and alternatives on the environment and measures to lessen those impacts.

With respect to (1), all EISs must describe the "underlying purpose and need for the proposed action,"[150] and identify a "reasonable range of alternatives" that would also meet that purpose and need.[151] The impacts of climate change could affect the need for a particular action and the available alternatives to that action.[152] For example, climate change is expected to lead to more frequent and longer-lasting droughts in some areas, which could make hydroelectric generation less feasible or even impossible.[153] Anticipated future drought conditions are, therefore, a relevant factor to be taken into account in determining the need for a proposed hydroelectric generating facility. Similarly, climate change might lead to the relocation of communities in areas prone to drought or at risk from sea level rise, thus reducing or

147 2016 Climate Guidance, *supra* note 119, at 3. See also Nat'l Park Serv., *supra* note 126, at 8 (warning that "[f]ailing to consider current and anticipated [climate] impacts may lead to decisions that do not adequately consider changing conditions and changing resources.").

148 40 C.F.R. § 1500.1(c) (1978).

149 42 U.S.C. § 4331(b)(3).

150 40 C.F.R. § 1502.13.

151 *Id.* §§ 1502.14, 1508.1(z) (defining "reasonable alternatives").

152 *See generally*, Forest Serv., *supra* note 128, at 3 (stating that the evaluation of purpose and need should "consider whether climate change may affect the ability to reach a desired condition. For example, the success of the proposal to restore aspen in a particular location may be reduced by expected warmer temperatures or lower rainfall during the next century").

153 *See, e.g.*, Decl. of Javier Dib in Supp. of Ch. 11 Pets. and First Day Mots., 3, *In re Alto Maipo Delaware LLC*, No. 21-11507 (Bankr. D. Del. Nov. 17, 2021) ("[C]limate change has significantly impacted the hydrology of the Maipo Valley, where the Project is being constructed, and lower precipitation levels reduce in turn the amount of power that the Project can produce. As a result, Alto Maipo can no longer rely on its prior revenue projections . . . .").

eliminating the need for additional natural gas pipelines to serve that area. Sea level rise and other climate impacts might also limit where such pipelines can be located and thus constrain the range of alternatives. Additionally, climate impacts could limit the useful life of infrastructure or necessitate additional maintenance or repairs, all of which need to be considered when evaluating purpose and need.

With respect to (2), EISs must also describe the environment of the area affected by the proposed action, as well as any alternatives being considered.[154] Courts have recognized that accurately defining this environmental baseline is integral to an effective evaluation of the proposed action's environmental consequences.[155] It is well accepted that the baseline must account for "reasonably foreseeable environmental trends and planned actions in the area(s)."[156] The 2016 Climate Guidance specifies that "the reasonably foreseeable affected environment" includes "[t]he current and projected future state of the environment."[157] According to the 2016 Climate Guidance, the future state of the affected environment "should be described based on authoritative climate change reports," which document the impacts of climate change "both globally and at a localized level."[158] The Guidance further indicates that federal agencies should consider climate impacts on the affected environment throughout the expected life of the proposed action.[159]

The courts have confirmed that climate impacts must be accounted for in the discussion of the affected environment. In *AquAlliance v. U.S. Bureau of Reclamation*, plaintiffs successfully challenged the NEPA analysis prepared for a water transfer program on the basis that the agency failed to adequately consider how climate change would affect the timing of precipitation and snowmelt in the local area.[160] The court in *National Wildlife Federation v. National Marine Fisheries Service* similarly determined that the Army Corps of Engineers violated NEPA when it used old EISs to issue a new order because the affected environment identified in the old EISs did not reflect new information about climate change.[161]

The courts have similarly held that federal agencies must consider the implications of climate change for the proposed action, alternatives, and their respective environmental outcomes (i.e., point (3) above). Under NEPA, EISs must include a discussion of the "reasonably foreseeable" effects of the proposed action and alternatives on the human environment, including "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic

154 40 C.F.R. § 1502.15.

155 *AquAlliance v. U.S. Bureau of Reclamation*, 287 F. Supp. 3d 969, 1016 (E.D. Cal. 2018) (stating that the requirement to define the affected environment "stems from the uncontroversial proposition that it would be 'simply impossible' to evaluate the effects of a project if an agency fails to gather information on the" environmental baseline) (quoting *LaFlamme v. FERC*, 852 F.2d, 389, 400 (9th Cir. 1988)).

156 40 C.F.R. § 1502.15.

157 2016 Climate Guidance, *supra* note 119, at 20.

158 *Id.* at 20–21; see also Nat'l Park Serv., *supra* note 126, at 9–10 (stating that the description of the affected environment "should . . . describe the shifts that will occur to . . . baseline conditions as a result of climate change" and recommending that the description be based on reports that "address[] predicted impacts of climate change [in the relevant] geographic region.").

159 2016 Climate Guidance, *supra* note 119, at 9, 21.

160 287 F. Supp. 3d at 1028–29, 1032.

161 184 F. Supp. 3d 861, 875 (D. Or. 2016).

(such as the effects on employment), social, or health effects."[162]

CEQ has determined that federal agencies must consider the impacts of climate change as part of their analysis of environmental effects. The 2016 Climate Guidance notes that climate change may exacerbate the effects of a proposed action by increasing the vulnerability of both human communities and natural systems to such effects.[163] It offers the example of how a "proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is already warming due to increasing atmospheric temperatures."[164] It further emphasizes that these climate "considerations are squarely within the scope of NEPA and can inform decisions on whether to proceed with, and how to design, the proposed action to eliminate or mitigate impacts exacerbated by climate change."[165]

The courts have affirmed the above approach. Multiple courts have held that agencies are required to consider climate change when evaluating the cumulative impacts of a proposed action and alternatives. For example, in *Southern Utah Wilderness Alliance v. Burke*, plaintiffs challenged the NEPA analysis conducted for a Bureau of Land Management ("BLM") plan that designated certain areas in Utah for off-highway vehicle use.[166] The court held that, "under NEPA, the BLM must take a 'hard look' at the cumulative impacts of [off-highway vehicle] use and climate change."[167] In *Friends of the Wild Swan v. Jewell*, a challenge to the U.S. Fish and Wildlife Service's issuance of an incidental take permit for bull trout, the court similarly held that the Service was required to consider the cumulative impacts of climate change and the taking of bull trout in its NEPA analysis.[168]

As well as considering how climate change might affect the proposed action's environmental outcomes, federal agencies must also consider the implications of climate change for the environmental outcomes of alternative actions. This is necessary to enable comparison of the proposed action and alternatives as required under NEPA. In this regard, the 2020 Rule states that "[t]he alternatives section [of an EIS] should present the environmental impacts of the proposed action and the alternatives in comparative form," with sufficient detail such "that reviewers may evaluate their comparative merits."[169] The merits of each alternative will depend, at least in part, on how climate change affects it and its environmental outcomes and the availability of mitigation measures. Thus, for example, the 2009 NPS climate guidance stated that the analysis of alternatives should "account[] for known and predicted changes . . . resulting from climate change . . . [I]f an alternative's impact on a [resource] would be of a particular intensity in the present but would become more severe if anticipated climate change impacts came into fruition during the life of the [project] you should disclose this."[170] As noted above, climate change could also reduce the useful life of a project or lead to added

162 42 U.S.C. § 4332(2)(C)(ii); 40 C.F.R. §§ 1502.16, 1508.1(g).
163 2016 Climate Guidance, *supra* note 119, at 21.
164 *Id.*
165 *Id.*
166 981 F. Supp. 2d 1099, 1110–1111 (D. Utah 2013).
167 Id. at 1110.
168 No. CV 13-61-M-DWM, 2014 U.S. Dist. LEXIS 116788, at *31 (D. Mont. Aug. 21, 2014).
169 40 C.F.R. § 1502.14.
170 Nat'l Park Serv., *supra* note 126, at 10.

costs (e.g., for maintenance or repair of facilities), which must similarly be taken into account in evaluating alternatives.[171]

## 4.3. Best Practices for Considering Climate Impacts in NEPA Reviews

As discussed in Part 4.1 above, the 2016 Climate Guidance directs federal agencies to "take into account the ways in which a changing climate may impact the proposed action and any alternative actions, change the action's environmental effects over the lifetime of those effects, and alter the overall environmental implications of such actions."[172] The 2016 Climate Guidance recommends that federal agencies use "authoritative climate change reports," but provides little other detailed advice on how to analyze climate change impacts.[173] Federal agencies can, however, draw best practices from many other sources: recommendations from legal experts;[174] guidance from state, local, and foreign jurisdictions with laws similar to NEPA;[175] and assessment tools made available by other agencies, organizations, and the private sector.[176] A list of key resources is included in Appendix 2 to this paper. Drawing on those resources, we define three requirements for effective climate impact analysis in NEPA reviews (see Box 2), and identify existing data and other resources federal agencies can use to conduct such analysis.

This paper proposes that the central goal for an EIS's climate impact analysis should be that it is sufficiently **holistic, specific**, and **actionable** to improve the agency's decision-making. To that end, the EIS should include an analysis of all reasonably foreseeable climate impacts on the affected environment, the proposed action, and alternatives, and evaluate adaptation measures to address those impacts. Across all areas, the EIS should use high-quality data and information, and should consider intersections with environmental justice communities.

171 *See supra* Parts 2 & 4.2.A
172 2016 Climate Guidance, supra note 119, at 9.
173 *Id.* at 20-21.
174 *See e.g.*, Kuh, *supra* note 15; Wentz 2015, *supra* note 15; Wentz 2017, *supra* note 15.
175 Several U.S. jurisdictions have promulgated rules or issued guidance on incorporating climate change impacts into environmental reviews under laws similar to NEPA, including Massachusetts, New York State, New York City, Washington State, and King County, Washington. Relevant guidance has also been issued by foreign jurisdictions including Australia, Canada (and the Canadian provinces of British Columbia and Nova Scotia), the European Union, the Netherlands, New Zealand, Spain, the United Kingdom. See Appendix 2 for a list of relevant documents.
176 *See infra* Part 4.3.A.

### Box 2: Requirements for Effective Climate Impact Analysis

Each EIS prepared by a federal agency under NEPA should include an analysis of climate change impacts that is:

1. **Holistic**: The analysis should encompass all types of climate impacts that could reasonably foreseeably affect the local environment, proposed action, or alternatives. The analysis of effects on the local environment should consider risks to all natural and human systems and resources required for, or impacted by, the proposed action. Climate-related risks to all elements of the proposed action and alternatives should similarly be considered.

2. **Specific**: The analysis should use climate-related information and data that is tailored to the proposed action's local area, timescale, and other relevant characteristics.

3. **Actionable**: The analysis should enable the agency to take informed action to address climate impacts. To that end, the analysis should be fully integrated into the agency's assessment of baseline environmental conditions, and environmental impacts associated with the action and alternatives. The agency should also consider possible adaptation measures to reduce the environmental impacts of the proposed action that are exacerbated by climate change and enhance the climate resilience of the proposed action.

As discussed in Part 2, climate change is shifting weather baselines (e.g., average temperatures) and increasing the frequency and severity of extreme weather events (e.g., storms). This is, in turn, causing various environmental changes (e.g., sea level rise). To be "holistic," the climate impact analysis in an EIS must thoroughly and accurately assess all reasonably foreseeable climate impacts, both weather-related and environmental. The analysis should take into account climate impacts that are already occurring or anticipated to occur during the lifespan of the proposed action and any associated decommissioning activities. The analysis of anticipated impacts should be based on forward-looking climate projections, reflecting anticipated future conditions in the relevant local area. It is imperative that the analysis not only use historic weather data which, in the age of climate change, is no longer a good predictor of future conditions. Agencies should similarly avoid relying upon flood maps and other tools that are generated using historic weather data unless they are updated or supplemented to account for projected future changes. Thus, for example, some states with NEPA equivalents have recommended that agencies not base their climate impact analysis on flood maps prepared by the Federal Emergency Management Agency ("FEMA"). For example, draft guidance issued under the Massachusetts Environmental Policy Act ("MEPA") (i.e., Massachusetts' equivalent to NEPA) warns that FEMA flood maps "are generally based on

historic observations" and thus "may not sufficiently represent future conditions."[177]

While the trend direction of many climate impacts (such as rising sea levels and increasing temperatures) is clear, their severity may be somewhat uncertain. The latter will depend, to some extent, on the trajectory of future greenhouse gas emissions, which could follow multiple pathways. Given this, the climate impact analysis should be based on multiple climate projections reflecting a range of possible outcomes, including a "worst" case scenario consistent with high greenhouse gas emissions.[178] Federal agencies may benefit from using probabilistic climate projections, which incorporate probability distributions for each climate parameter, and thus provide an indication of the relative likelihood of different climate outcomes.[179] Because future climate impacts will vary regionally, localized or "downscaled" projections should be used to ensure the analysis is "specific" to the proposed action (see Box 3).[180] As recommended by CEQ and others, agencies should "remain aware of the evolving body of scientific information," and use the most up-to-date projections available.[181]

177 Mass. Exec. Off. of Energy & Env't Affairs, Draft Mepa Climate Change Adaptation and Resiliency Policy 6, 8 (2015), https://perma.cc/VV2J-MJRU; *See also* N.Y. Dep't of Env't Conservation, the Seqr Handbook: 4th Edition 125 (2020), https://perma.cc/3Q66-GNDV (recommending that, when reviewing "projects in areas subject to tidal influence[,] [agencies] should incorporate . . . sea level rise projections . . . to assess future flooding and storm-surge risks that may increase over the anticipated lifecycle of the project.").

178 This is supported by both legal scholars and government bodies. *See, e.g.,* Wentz 2015, supra note 15, at 50 (stating that "[d]ue to the uncertainty of the pace and magnitude of climate change, agencies should take a precautionary approach when assessing and disclosing the potential impacts of climate change: they should evaluate impacts by using multiple scenarios, including the most severe climate change projections developed by the IPCC and other authoritative bodies."); Gov't of Canada, Incorporation Climate Change Considerations in Environmental Assessment: General Guidance for Practicioners (2003), https://perma.cc/E632-A2C5 (recommending that, when conducting environmental reviews under the Canadian equivalent to NEPA, agencies "consider the range of possible climate change scenarios.").

179 Use of such projections is, again, supported by both legal scholars and government bodies. *See e.g.,* Wentz 2015, *supra* note 15, at 50 (recommending that agencies disclose "[t]he probabilities of each of the [climate] scenarios" analyzed); Gov't of Canada, *supra* note 177 (recommending that agencies "Identify [and disclose] the level of confidence associated with the applicable climate change projections").

180 *See generally*, Gov't of Canada, *supra* note 177 (recommending that agencies use data region-specific climate data).

181 2016 Climate Guidance, *supra* note 119, at 21. Others have also emphasized the importance of utilizing the most up-to-date projections. See, e.g., Wash. State Dep't of Transp., Guidance for Nepa and Sepa Project-Level Climate Change Evaluations 5 (2017), https://perma.cc/M6LG-ZFUM

### Box 3: Downscaled Climate Projections

Future climate outcomes are projected using global climate models (GCMs) that mathematically simulate key components of the earth's climate system (e.g. atmosphere, land surface, ocean, and sea ice).[182] Using GCMs, scientists can estimate how changes in atmospheric greenhouse gas concentrations will affect key climate variables (e.g., temperature).[183] Most GCMs provide relatively coarse-resolution projections, reflecting conditions within grid cells that may extend thirty miles or more on one side.[184] However, with advanced downscaling techniques, scientists can process and refine GCM projections to estimate climate impacts at finer geographic scales (e.g., 1 square mile or less).[185] There are two main approaches to downscaling: (1) dynamic downscaling, which uses high-resolution dynamical models to estimate the effects of global climate processes at regional or local scales; and (2) statistical downscaling, which uses statistical techniques to determine the relationship between global climate patterns and observed local climate responses.[186]

Federal agencies should evaluate how each climate impact will affect the local environment where a proposed action will take place and include this information in the description of the "affected environment" in the EIS.[187] Detailed guidance on how to approach the analysis has been provided in previous Sabin Center reports including, of particular relevance to this paper, a 2015 report on *Assessing the Impacts of Climate Change on the Built Environment under NEPA and State EIA Laws: A Survey of Current Practices and Recommendations for Model Protocols*.[188] The 2015 report recommended, among other things, that federal agencies consider and disclose "the likelihood and severity of climate change impacts in the affected environment over the duration of the project" and:

> the extent to which specific components of the affected environment are vulnerable and/or resilient to the impacts of climate change. The environmental components that should be reviewed include: i. Natural systems that are affected by the project; ii. Human systems that are affected by the project; and iii. Key resources required for project and systems impacted by project (e.g., water resources).[189]

The EIS should also analyze the implications of climate change for the proposed federal action, alternatives, and their respective environmental outcomes. This requires consideration of three interrelated questions:

182 Hayhoe et al., Climate Models, Scenarios, and Projections, in Climate Science Special Report: Fourth National Climate Assessment, Volume I 133, 141 (D.J. Wuebbles et al., 2017), https://perma.cc/HB9P-F8EL.
183 *Id.*
184 *Id.* at 141-143.
185 *Id.* at 144.
186 *Id.* at 144–146.
187 Wentz 2015, *supra* note 15, at 53.
188 *Id.*
189 *Id.* at 53–54.

1. Will the impacts of climate change damage, destroy, or otherwise impair the operation or performance of the proposed action or any alternative? (e.g., could future sea level rise shorten the useful life of a coastal liquified natural gas ("LNG") facility?)[190]

2. Will the impacts of climate change alter the nature and magnitude of environmental risks associated with the proposed action or alternatives? (e.g., could sea level rise increase the potential for flooding of a coastal LNG facility during storms and thereby lead to unintended discharges causing soil or water pollution?).[191]

3. Will the impacts of climate change make the local environment and/or human populations more vulnerable to adverse environmental impacts from the proposed action or alternatives? (e.g., could longer-lasting droughts and associated water shortages increase the adverse effects of water pollution from unintended discharges?)[192]

Again, detailed recommendations for addressing these issues are provided in the 2015 Sabin Center report, as well as guidance documents published by state and foreign jurisdictions with laws similar to NEPA.[193] Consistent with our recommendation for a "holistic" analysis, it is generally advised that agencies consider climate-related risks to all components of a proposed action. For example, draft guidance issued under the MEPA directs state agencies to consider climate-related risks to "all project elements" including "[e]xisting or proposed structures" and other infrastructure on which the project relies, such as "[p]ublic or private roadways and parking areas" and "[p]ublic or private utilities including stormwater management infrastructure."[194]

When evaluating climate-related risks and resilience, federal agencies should take into account the presence of any environmental justice communities in the impacted area. Environmental justice communities are those with disproportionately high environmental burdens and/or vulnerable populations.[195] Federal agencies should identify any environmental justice communities in range of the proposed action, assess whether the proposed action could have disproportionate effects on those communities, and discuss any nexus between climate change impacts and environmental justice impacts. In this regard, a 2016 interagency working group report on environmental justice in NEPA reviews stated: "Agencies may wish to consider how impacts from the proposed action could potentially amplify climate change-related hazards (e.g., storm surge, heat waves, drought, flooding, and sea level change) in minority populations and low-income populations in the affected environment, and vice versa."[196] The report provides guidance on identifying relevant populations and analyzing impacts,

190 *See id.* at 54.
191 *See id.* at 54–55.
192 *See id.*
193 *See, e.g., id.* at 50–55; Mass. Exec. Off. of Energy & Env't Affairs, *supra* note 176, at 6-7.
194 Mass. Exec. Off. of Energy & Env't Affairs, *supra* note 176, at 6.
195 *See, e.g.*, U.S. Env't. Prot. Agency, Ejscreen: Environmental Justice Screening and Mapping Tool, Frequent Questions about EJSCREEN, https://www.epa.gov/ejscreen/frequent-questions-about-ejscreen (last visited Jan. 21, 2022).
196 Federal Interagency Working Group on Environmental Justice & Nepa Committee, Promising Practices for EJ Methodologies in Nepa Reviews 31 (2016), https://perma.cc/P3DX-KYYG.

mitigation, and monitoring.[197] The working group also developed a National Training Product to improve consideration of environmental justice issues in NEPA reviews by providing "best practices, lessons learned, research, analysis, training, consultation, and other experiences of federal NEPA practitioners."[198]

To provide sufficient information for decision-making, the EIS's discussion of each climate impact on the affected environment, proposed action, and alternatives should be proportional to its risks. This requires not only identifying the possibility of a climate impact but assessing its severity and likelihood. For example, regulations issued under the New York State Environmental Quality Review Act ("SEQR") (i.e., New York state's equivalent to NEPA) require EISs to include a description of potential adverse impacts "at a level of detail that reflects the severity of the impacts and the reasonable likelihood of their occurrence."[199] Wherever possible, the EIS should monetize or otherwise quantify impacts in order to estimate their severity and enable comparison of climate-related risks between the proposed action and alternatives.[200] However, this does not diminish the importance of identifying, describing, and considering types of impacts that are difficult to monetize or quantify.

For any climate impacts identified, the EIS should discuss possible resilience measures that could be employed to manage those impacts.[201] For example, where one or more climate impacts could impair the operation of the proposed action, the EIS should identify possible adaptation measures to enhance the action's climate resilience. The EIS should also discuss possible adaptation measures to lessen any adverse environmental effects of the action that are exacerbated by the impacts of climate change. In this regard, guidance issued under the Washington State Environmental Policy Act (i.e., Washington's equivalent to NEPA) recommends that agencies consider the expected life of each project and ask whether, "[a]s part of its standard design, th[e] project has incorporated features that will provide greater resilience and function with the potential effects brought on by climate change."[202] Guidance issued under the MEPA similarly emphasizes the need to consider climate resilience.[203] The 2021 MEPA Interim Protocol on Climate Change Adaptation and Resilience requires the proponent of any project subject to environmental review under the MEPA to indicate whether they have "considered alternative locations for the project in light of climate change risk."[204] The proponent must also indicate whether "the project [has] taken measures to adapt to climate change" and, if so, describe those measures and the climate projections that informed them.[205] Where no adaptation measures have been taken, the proponent must explain why.[206]

197 *Id.* at 21–50.
198 *Id.* at 51
199 N.Y. Comp. Codes R. & Regs. tit. 6, § 617.9(b)(5)(iii); See also N.Y. Dep't of nvtl. Conservation, *supra* note 176, at 124 (explaining when and how climate impacts should be considered in SEQR reviews and stating that "the depth of analysis required for climate change considerations . . . should be tailored to the magnitude of the action or project").
200 *See* Wentz 2015, *supra* note 15, at 55.
201 *See id.*
202 Wash. State Dep't of Transp., *supra* note 180, at 7.
203 *See* Mass. Exec. Off. of Energy & Env't Affairs, Mepa Interim Protocol on Climate Change Adaptation and Resiliency (2021), https://perma.cc/VC35-RK27
204 *Id.* at 5.
205 *Id.* at 4-5.
206 *Id.* at 4.

When evaluating possible adaption measures, federal agencies should consider the potential for maladaptation. Maladaptation occurs where action taken to address the symptom of a particular risk exacerbates its underlying cause or leads to other unintended and undesirable consequences. According to the World Bank, in the climate context, maladaptive measures include those "that (unintentionally) constrain the options or ability of other decision makers now or in the future to manage the impacts of climate change, thereby resulting in an increase in exposure and/or vulnerability to climate change."[207] Maladaptation may also occur where "adaptation fails or has been conducted in an unsustainable manner."[208] This might occur where, for example, a flood wall built to protect coastal facilities against sea level rise increases erosion.

### 4.3.A Data and Tools Available for Climate Impact Analysis

To implement the practices recommended above, federal agencies will need relevant data (including climate projections) and analytical tools. The NEPA implementing regulations, as amended in the 2020 Rule, require federal agencies to "make use of reliable existing data and resources" and state that "[a]gencies are not required to undertake new scientific and technical research to inform their analyses."[209]

Consistent with this directive, federal agencies can base their climate impact analysis on available climate data. Downscaled climate data and projections, suitable for use by federal agencies in NEPA reviews, have been published by various government, academic, and nonprofit entities (and commercial entities additionally prepare specialized projections on a proprietary basis).[210] For example, DOE, the National Aeronautics and Space Administration ("NASA"), and the National Oceanic and Atmospheric Administration ("NOAA") have jointly published zip code-level temperature projections and county-level precipitation and sea level rise projections.[211] Regional and local climate projections have also been published by other federal agencies, including the U.S. Geological Survey[212] and Bureau of Reclamation,[213] and several regional, state, and local bodies.[214] This data could be used in NEPA reviews to define the likely future state of the affected environment and evaluate how the proposed action and alternatives will be impacted by climate change. The latter is done by comparing anticipated

207 Jane Ebinger & Walter Vergara, World Bank. Climate Impacts on Energy Systems: Key Issues for Energy Sector Adaptation 90 (2011), https://perma.cc/3WVZ-MPJC.
208 Orr Karassin, Mind the Gap: Knowledge and Need in Regulating Adaptation to Climate Change, 22 Geo. Int'l Eng't L. Rev. 383, 389 n.31 (2010).
209 40 C.F.R. § 1502.23.
210 *See generally*, Michael B. Gerrard & Edward McTiernan, *The Perils of Relying on FEMA Flood Maps in Real Estate Transactions*, N.Y. Law J. (Sept. 2020).
211 *Energy Data Gallery*, U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/topics/energy/energy-data-gallery (last updated Sept. 24, 2019).
212 *Regional Climate Change Viewer*, U.S. Geological Survey, http://regclim.coas.oregonstate.edu/visualization/rccv/index.html (last visited Nov. 30, 2021).
213 *Downscaled CMIP3 and CMIP5 Climate and Hydrology Projections*, U.S. Bureau of Reclamation et Al., https://gdo-dcp.ucllnl.org/downscaled_cmip_projections/dcpInterface.html (last visited Nov. 30, 2021).
214 *See, e.g.*, *Great Lakes Regional Climate Change Maps*, GLISA, https://glisa.umich.edu/great-lakes-regional-climate-change-maps/ (last visited Nov. 30, 2021); Climate Tools, CAL-ADAPT, https://cal-adapt.org/tools/ (last visited Nov. 30, 2021); Michael R. Bloomberg et al., *Forewords: Climate Change Adaptation in New York City: Building a Risk Management Response*, 1196 Annals N.Y. Acad. Sci. 1 (2010); *New York City Panel on Climate Change 2019 Report: Executive Summary*, 1439 Annals N.Y. Acad. Sci. 11 (2019).

future climate conditions against the proposed action's design and operating parameters. This can help federal agencies identify climate vulnerabilities—e.g., where a facility is defined to operate at an average temperature that is lower than that anticipated in the future or to withstand flood levels that will likely be exceeded in the future due to climate change—and evaluate possible resilience measures.

In addition to climate data and projections, federal agencies can use a number of other publicly available tools and resources to aid in climate impact analysis. Several tools with particular relevance to evaluating energy projects are listed below:

- The U.S. Climate Resilience Toolkit, developed by NOAA in collaboration with other federal agencies in the U.S. Global Change Research Program, provides a database of over 200 digital tools relevant to climate vulnerability studies and resilience planning.[215] The Toolkit includes resources designed specifically to evaluate the climate vulnerability of energy infrastructure[216] and materials discussing ways to enhance energy system climate resilience.[217]

- The U.S. Department of Transportation ("DOT") has made available a Climate Data Processing Tool that can be used to convert climate projections into statistics relevant to transportation planning (e.g., temperature projections can be used to estimate "changes in the frequency of very hot days . . . that may affect transportation infrastructure").[218] DOT also offers a Transportation Climate Change Sensitivity Matrix, which provides information on the impact of climate stressors including increased temperature, flooding, drought, wildfires, storms, and permafrost thaw on six types of transportation assets: oil and gas pipelines, railways, ports and waterways, airports and heliports, bridges, and roads and highways.[219] For each stressor and asset, the matrix presents analysis of the relationship, thresholds, indicators, key sources, and additional notes and examples.[220] Agencies could use this tool to assess climate risks to transportation elements of energy projects and consider alternatives and adaptation measures.

- The Pacific Northwest National Laboratory Emissions Quantification Tool "estimates the impacts of specific smart grid infrastructure projects on load profile."[221] Modeling a project's impact on load profile could assist an agency in assessing how climate risks to the electricity system could interact with a project and its environment.

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215 *Meet the Challenges of a Changing Climate*, U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/ (last visited Nov. 30, 2021).
216 Energy Data Gallery, U.S. Climste Resilience Toolkit, https://toolkit.climate.gov/topics/energy/energy-data-gallery (last updated Sept. 24, 2019).
217 *Building Resilience in the Energy Sector*, U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/topics/energy-supply-and-use/building-resilience-energy-supply-and-use (last updated Oct. 25, 2019).
218 *Climate Change Adaptation Tools*, https://www.fhwa.dot.gov/environment/sustainability/resilience/tools/ (last visited Jan. 22, 2022).
219 *Id.*
220 *Id.*
221 *Greenhouse Gas (GHG) Accounting Tools*, NEPA.GOV, https://ceq.doe.gov/guidVance/ghg-accounting-tools.html (last visited Dec. 8, 2021); Grid Project Impact Quantification, Gridpiq, https://gridpiq.pnnl.gov/gridpiq-landing-page/ (last visited Dec. 8, 2021).

- The U.S. Department of Agriculture's Forest Service contributes to the i-Tree effort, which produces applications with forest analysis functions.[222] Of relevance to assessment of climate impacts, the i-Tree Eco application includes analysis of extreme weather impacts,[223] and the i-Tree Landscape application offers data on risks including species shifts, droughts, and wildfires.[224] As detailed above, energy infrastructure can both cause and be harmed by wildfires, so that information may be particularly important for proposed energy actions.

- The U.S. General Services Administration's ("GSA") Sustainable Facilities Tool site provides climate resilience planning resources for agencies' assets and supply chains.[225] It includes a model "workshop process" to identify, assess, and address climate risks.[226] The workshop process "combines best practices from the federal adaptation community to help users identify climate risks and develop strategies to secure vulnerable real property investments and supply chains."[227] The process breaks down risk assessment and management into concrete questions and steps; items of particular importance for proposed energy actions include identification of critical thresholds for assets (e.g. temperature thresholds where assets would fail), assessment of the consequences of climate impacts in terms of disruption to services and operations, and consideration of government and private sector partners for implementation of adaptation strategies.[228]

- The Louisiana Coastal Protection and Restoration Authority provides an interactive map for exploring changes to land, flood risk, and coastal vegetation under various scenarios over the next 50 years, as well as the social vulnerability of communities to flood risk.[229] Agencies evaluating proposed energy projects in Louisiana may benefit from considering this information and the accompanying resources to reduce risk.

222 *Learn More About i-Tree*, I-Tree, https://www.itreetools.org/ (last visited Dec. 8, 2021).
223 *i-Tree Eco*, I-Tree, https://www.itreetools.org/tools/i-tree-eco (last visited Dec. 8, 2021).
224 *Welcome to i-Tree Landscape*, I-Tree Landscape, https://landscape.itreetools.org/ (last visited Dec. 8, 2021).
225 *Climate Risk Management*, SFTOOL, https://sftool.gov/plan/430/enhancing-resilience-reducing-vulnerability-observed-expected-climate (last visited Dec. 8, 2021); *Framework for Managing Climate Risks to Federal Agency Supply Chains*, SFTOOL, https://sftool.gov/plan/553/framework-managing-climate-risks-federal-agency-supply-chains (last visited Dec. 8, 2021).
226 *Climate Risk Management*, SFTOOL, https://sftool.gov/plan/430/enhancing-resilience-reducing-vulnerability-observed-expected-climate (last visited Dec. 8, 2021).
227 Wentz 2015, *supra* note 15, 18-19.
228 *Framework for Managing Climate Risks to Federal Agency Supply Chains*, SFTOOL, https://sftool.gov/plan/553/framework-managing-climate-risks-federal-agency-supply-chains.
229 *Master Plan Data Viewer*, LA. Coastal Prot. and Restoration Auth., https://cims.coastal.louisiana.gov/masterplan/ (last visited Jan. 21, 2022).

# 5. TREATMENT OF CLIMATE RISK IN RECENT NEPA REVIEWS

## 5.1. Findings of Previous EIS Surveys

The Sabin Center has been tracking federal agencies' consideration of climate change in NEPA reviews for nearly a decade. In 2012, the Sabin Center published the first of several white papers, analyzing the extent to which climate change considerations are discussed in federal EISs.[230] The 2012 paper identified 227 EISs published between January 2009 and December 2011 (inclusive) that discussed issues relating to climate change.[231] In most of the identified EISs, the discussion centered on how the proposed action would contribute to climate change, for example, by directly emitting greenhouse gases or inducing other emitting activities (e.g., vehicle travel).[232] The 2012 study found that "[w]hile greenhouse gas emissions from [proposed actions] are frequently addressed in EISs, the effects of climate change on the [actions] are considered far less often."[233] The study further found that, even where the effects of climate change were considered in EISs, there was often only a "brief[]" discussion of climate impacts on the affected environment and no analysis of the implications for the proposed action.[234] The study did not report on whether EISs addressed climate impacts in the analysis of alternatives to, or the development of measures to mitigate any adverse effects of, the proposed action.

The 2012 study was updated in 2016 with the publication of a second white paper, which analyzed the extent to which climate change was discussed in 238 EISs issued from July 2012 through December 2014.[235] Ninety percent of the EISs analyzed were found to contain some discussion of climate change, with approximately 72% discussing greenhouse gas emissions associated with the proposed federal action (or induced activities), and 70% discussing how climate-related impacts may affect the proposed action and/or the area in which it will occur.[236] The latter was, however, often very limited. According to the 2016 analysis, many EISs "simply acknowledged that climate change would affect certain aspects of the project environment and did not discuss the issue further."[237] EISs relating to actions in coastal areas were found to be most likely to discuss how climate impacts would affect the action itself (as opposed to the local environment). However, the extent of the discussion varied, and it often was "unclear whether the discussion . . . had any bearing on the agency's final decisions about the design, location, and operation of the project."[238] The 2016 study did not report on whether climate change impacts were considered in the analysis of alternatives or development of mitigation measures.

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230 Patrick Woolsley, Consideration of Climate Change in Federal EISs, 2009 – 2011 (2012), https://perma.cc/8RPQ-Y24V.
231 *Id.* at 3.
232 *See Id.* at 5–8.
233 *Id.* at 8.
234 *Id.*
235 Jessica Wentz et al., Survey of Climate Change Considerations in Federal Environmetnal Impacts Statements, 2012-2014 ii (2016), https://perma.cc/C7HE-MJE9.
236 *Id.*
237 *Id.* at 18.
238 *Id.* at 19–20.

Two smaller studies have examined the treatment of climate change impacts in EISs in greater detail. The first, published by Defenders of Wildlife in 2013, reviewed 154 EISs issued between July 2011 and April 2012 to determine whether they implemented the recommendations in the *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*[239] published by CEQ in 2010.[240] Among other things, Defenders of Wildlife looked at whether the EISs examined how climate impacts would affect the proposed action, alternatives, and their respective environmental outcomes. The majority (68%) of EISs reviewed did not include any analysis of climate impacts, with nearly one-fifth of those (12% of the total reviewed) not even mentioning climate change.[241] Of the EISs that discussed climate impacts, most focused solely on effects on the proposed action and/or its environmental outcomes.[242] Notably, according to Defenders of Wildlife, none of the EISs "fully integrated climate change into the alternatives comparison as envisioned by the [draft CEQ] guidance."[243]

A second study, conducted by Columbia University students in partnership with the Sabin Center in 2017, suggested that federal agencies may have made progress on identifying climate change impacts in the years since the Defenders of Wildlife study, but still found major deficiencies in their EIS analyses.[244] The study assessed the extent to which climate impacts were discussed in thirty-one EISs published from September through November 2016.[245] In contrast to the findings reported by Defenders of Wildlife in 2013, the 2017 Columbia study found that most EISs included some discussion of climate change impacts, though the extent and quality of the discussion varied considerably.[246] While many EISs (81% of the total reviewed) identified likely climate impacts on the affected environment, few discussed how those impacts would affect the proposed action (23%) or alter its environmental outcomes (39%), or compared climate risks across alternatives (32%).[247] Just over a quarter identified adaptation measures to enhance the climate resilience of the proposed action and even fewer discussed measures to mitigate climate change-exacerbated effects of the action.[248] This suggests that, even where climate change impacts are analyzed, the analysis does not end up influencing the design or conduct of federal actions.

The 2017 study attributed the failure to thoroughly consider the impacts of climate change to the fact that federal agencies are "[h]eavily focused on short-term implementation of project plans" rather than "long-term[] resilience."[249] Others have pointed to challenges faced by

239 Memorandum from Nancy H. Sutley, Chair, Council on Environmental Quality, for Heads of Federal Departments and Agencies on Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (Feb. 18, 2010), https://perma.cc/VUM7-E6E9.

240 Defenders of Wildlife, Reasonable Foreseeable Futures: Climate Change Adaptation and the National Environmental Policy Act 3 (2013), https://perma.cc/J8BJ-5AV7.

241 *Id.* at 11–13.

242 *Id.* at 10–11, 13.

243 *Id.* at 10

244 Saloni Jain et al., How Did Federal Environmental Impact Statements Address Climate Change in 2016? (2017), https://perma.cc/M45R-498G.

245 *Id.* at i.

246 *Id.* at iv.

247 *Id.* at 19.

248 *Id.*

249 *Id.* at 31.

federal agencies in evaluating climate impacts. For example, the Sabin Center's 2012 paper noted that "agencies face considerable scientific uncertainty about the severity and exact nature of climate change impacts at the regional level, and projections are even more difficult at the local level."[250] Similarly, in its 2013 report, Defenders of Wildlife concluded that federal agencies may find it difficult to locate and utilize climate projections.[251] While that may have been true at the time, in the almost decade since, the availability of climate data has increased significantly. This raises the question: are federal agencies making use of this data to better evaluate climate-related risks in their NEPA reviews?

## 5.2. 2021 Survey Scope and Methodology

To determine whether and to what extent federal agencies are considering climate risks to energy projects, we surveyed 65 final EISs issued by federal agencies in connection with onshore energy-related activities: coal mining, oil and natural gas-related infrastructure, electricity transmission and generating facilities, and renewable energy development. This reflects all final EISs relating to onshore energy activities that were published by federal agencies in the five years from January 2016 through December 2020 and posted to the U.S. Environmental Protection Agency's ("EPA") EIS database, except those prepared by the federal power marketing administrations.[252]

### Box 4: Federal Oversight of Energy Projects

Federal government approvals are required for many energy-related activities undertaken by private parties. This is particularly true where activities occur on federally-owned land. The federal government owns approximately 650 million acres of land in the U.S., much of which contains fossil fuel resources or is suitable for renewable energy development.[253] Private parties wanting to use federal lands for energy-related purposes may, depending on the nature of the proposed use, require various federal government approvals.

Most federal land is managed by the U.S. Department of the Interior ("DOI"), principally through BLM, which uses resource management plans ("RMPs") to guide its land management decisions.[254] Broadly, each RMP identifies resource goals for a designated area of federal land, and specifies management practices and land uses that are consistent with the achievement of those goals.[255] Energy and other activities can only occur on federal land that has been designated, in the applicable RMP, as suitable therefor.[256] Where

250 Woolsley, *supra* note 229, at 8.
251 Defenders of Wildlife, *supra* note 239, at 15.
252 To identify relevant EISs, we searched the EPA's database using keywords that describe energy sources and energy-related activities ("oil," "natural gas," "liquified natural gas," "coal," "pipeline," "generation," "transmission," etc.). EISs prepared by the four power marketing administrations were excluded from analysis because of the unique nature of those entities. Supplemental EISs were not included in the analysis.
253 *See generally* Adam Vann, Cong. Research Serv., R40806, Energy Projects on Federal Lands: Leasing and Authorization (2012), https://perma.cc/MEE3-9MBK.
254 *See id.* at 1–3.
255 *See generally Planning 101*, Bureau of Land Mgmt., https://perma.cc/38FQ-845F (last visited Oct. 6, 2021).
256 43 U.S.C. § 1712; 43 C.F.R. § 1610.5-3.

an RMP identifies a particular area of land as inappropriate for a particular type of energy development (or another activity), it would need to be amended before such development (or other activity) could take place in the area.

Private parties may develop energy projects on suitable federal land after obtaining authorization from the relevant federal land manager.[257] The required authorizations differ depending on the nature of the project and where it will occur.[258] Wind and solar energy and transmission projects on federal land administered by BLM are generally authorized through rights-of-way ("ROW") issued under the Federal Land Policy and Management Act[259] Oil and natural gas projects on BLM-administered land must be authorized under the Mineral Leasing Act. Pursuant to that Act, BLM issues oil and natural gas leases, which authorize the holder to develop oil and natural gas resources on a specific tract of federal land.[260] Notably, however, prior to undertaking any development on the leased land, the lessee must obtain a separate authorization from BLM in the form of an application for permit to drill ("APD").[261]

Each time BLM adopts or amends an RMP or issues a ROW, lease, or APD for energy development it performs a "federal action" for the purposes of NEPA. As discussed in Part 3, under NEPA, an EIS must be prepared for any major federal action that will "significantly affect[] the quality of the human environment."[262] BLM typically prepares an EIS before adopting or amending an RMP. Separate EISs are sometimes, but not always, prepared in connection with BLM's issuance of ROWs, leases, and APDs. In the past, BLM has sometimes sought to streamline the NEPA process by engaging in "tiering," whereby it uses a programmatic EIS to analyze the effects of multiple similar actions. BLM has, for example, issued programmatic EISs for large-scale solar and wind energy development on federal lands in the western U.S.[263] When specific projects are proposed, BLM must conduct another environmental review, but can "tier" that review to the programmatic EIS.

Other federal agencies, aside from BLM, may also be involved in permitting energy projects and thus required to conduct NEPA reviews thereof. For example, a permit is

257 *See generally* Adam Vann, Congressional Research Service, Energy Projects on Federal Lands: Leasing and Authorization 8 & 16-17 (2012), https://perma.cc/GM5N-6FVD.
258 *Id.*
259 *See* 43 U.S.C. § 1761(a)(4).
260 *See* 30 U.S.C. § 223.
261 *See* 43 C.F.R. § 3162.3-1; Onshore Oil and Gas Order Number 1: Approval of Operations, 83 Fed. Reg. 2906 (Jan. 10, 2017), https://perma.cc/EB3A-FL2T.
262 43 U.S.C. § 4332(2)(C).
263 See Bureau of Land Mgmt., Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States (2005), https://perma.cc/99QC-LNXH; Bureau of Land Mgmt., Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States (2012), https://perma.cc/TVS9-VY3K.

required from the Federal Energy Regulatory Commission ("FERC") to construct an interstate natural gas pipeline,[264] LNG terminal,[265] or hydroelectric generating facility[266] on federal or non-federal lands. Nuclear generating facilities must be permitted by the Nuclear Regulatory Commission ("NRC").[267] Many energy projects require permits from the Army Corps of Engineers under the Clean Water Act for discharges of material.[268] In all cases, the issuance of a permit is a federal action for the purposes of NEPA, meaning that an EIS must be prepared if there is the potential for significant environmental effects.[269]

## 5.2.A EISs Reviewed

A full list of the surveyed EISs, the preparing agency, and publication date is included in Appendix A to this paper. As indicated there, over three quarters of the surveyed EISs were prepared by just two federal entities—DOI (29 EISs or 48% of the total) and FERC (19 EISs or 23% of the total). Of the DOI-prepared EISs, most were issued by BLM (15 EISs or 23% of the total) and the U.S. Fish and Wildlife Service (8 EISs or 12% of the total). Other preparing agencies were the NRC (6 EISs or 9% of the total), U.S. Department of Agriculture's Forest Service (6 EISs or 9% of the total), DOE (2 EISs or 3% of the total), and Air Force, Army Corps of Engineers, and Rural Utilities Service (1 EIS or 1% of the total each).

**Table 1:** Number of EISs Reviewed (by Category)

| | Category | Number of EISs Reviewed |
|---|---|---|
| 1 | Coal mining | 3 |
| 2 | Oil and natural gas development | 9 |
| 3 | Liquefied natural gas (LNG) terminals | 10 |
| 4 | Natural gas pipelines | 6 |
| 5 | Electricity transmission facilities | 11 |
| 6 | Nuclear electric generating facilities | 7 |
| 7 | Hydroelectric generating facilities | 4 |
| 8 | Solar energy development | 6 |
| 9 | Wind energy development | 6 |
| 10 | Geothermal energy development | 3 |

264 15 U.S.C. § 717f(c).
265 *Id.* § 717b(e).
266 16 U.S.C. §§ 797(e) & 817. Permits are required to construct hydroelectric generating facilities "across, along, or in any of the navigable waters of the United States, or upon any part of the public lands or reservations of the United States." See id. § 817.
267 42 U.S.C. §§ 2131 & 2133.
268 33 U.S.C. § 1344.
269 *See* 43 U.S.C. § 4332(2)(C).

Table 1 above categorizes the surveyed EISs based on the type of energy activity involved. The nature of the federal actions under review in the EISs varied between and, in some cases, within categories. Across all categories, the vast majority of EISs related to federal agencies' approval of, or support for, energy activities proposed to be undertaken by non-federal (e.g., private or state) actors. Only one EIS—in the nuclear category—involved a federal government agency itself undertaking energy activities.

## 5.2.B Scope of Evaluation

To ensure consistency in the review, all EISs (regardless of categorization) were evaluated using a standard rubric, comprising fifteen questions designed to reveal whether climate change impacts were analyzed and enable an assessment of the quality of the analysis (if any). The full list of questions is shown in Table 2 below.

**Table 2:** EIS Evaluation Rubric

| | |
|---|---|
| Climate Impacts on the Affected Environment | Does the EIS describe how the impacts of climate change may affect the local environment where the proposed action will take place? If yes, list the climate change impacts described. |
| Climate Impacts on the Proposed Action | Does the EIS describe whether any elements of the action may be damaged or need to be reconstructed, repaired, or otherwise restored due to the impacts of climate change? If yes, list the climate change impacts discussed.<br>Does the EIS monetize or otherwise quantify any of the climate change impacts on the action?<br>Does the EIS describe the implications of climate change for the environmental impacts of the action? If yes, for which environmental impacts are climate change implications described. |
| Alternatives | Does the EIS compare risks from climate change / resilience to climate change between the proposed action and alternatives? |
| Adaptation Measures | Does the EIS identify possible adaptation measures to eliminate or mitigate the environmental impacts associated with the proposed action that are exacerbated by climate change?<br>Does the EIS identify possible adaptation measures to make the action more resilient to the effects of climate change? If yes, do the measures involve changes to infrastructure, operations, monitoring, or other activities?<br>Does the EIS discuss any possible maladaptation of adaption measures?<br>Do any of the recommended measures involve increasing production or use of fossil fuels? |
| Data and Information Quality | On which of the following levels of granularity are climate change impacts discussed: global, national, regional, state, or local?<br>Does the EIS use downscaled climate data or models to predict local climate change impacts?<br>Does the EIS rely on historical data or trends to predict future climate change impacts? |
| Environmental Justice | Does the EIS identify any environmental justice communities within the local area(s) impacted by the proposed action?<br>Does the EIS conclude that the proposed action will have environmental justice impacts?<br>Does the EIS discuss any nexus or overlap between environmental justice communities or impacts and climate change? |

As indicated in Table 2 above, to determine if "climate impacts on the affected environment" were discussed, we looked at whether each EIS identified climate change impacts (e.g., increasing temperatures, sea level rise, more frequent and severe storms, etc.) that are occurring or likely to occur in the affected environment. An EIS was only considered to have identified such impacts if they were discussed at the regional, state, or local level—a general discussion of global climate change impacts was considered insufficient. We also examined whether each EIS analyzed the implications of climate change for the proposed action's environmental outcomes. An EIS was considered to analyze those implications if it discussed (1) the potential for climate change to increase the vulnerability of affected environmental resources and thus make the proposed action more damaging thereto or (2) the potential for compounding effects from the proposed action and climate change that together impact environmental resources (e.g., where both the proposed action and climate change may increase the risk of wildfires that put endangered species at risk).

The review of "climate impacts on the proposed action" focused on whether EISs analyzed the potential for climate change to damage infrastructure or otherwise affect the operation of facilities or related activities. An EIS was considered to include such analysis if it identified potential risks from climate change, even if it ultimately dismissed those risks as insignificant or concluded that no action was required to mitigate or manage them.

To evaluate the extent to which the analysis of climate change impacts (if any) influenced agency decisions about the design, location, or other aspects of a proposed action, EISs were reviewed for any discussion of "adaptation measures" that could make the action more resilient to climate change or lessen any environmental effects that are exacerbated by climate change. As part of this review, we considered whether the EISs discussed any risk of maladaptation—i.e., where a proposed adaptation measure would indirectly increase vulnerability to climate change impacts.

We also tracked whether and to what extent EISs addressed environmental justice considerations. This is important to consider because environmental justice communities are often at disproportionate risk from the impacts of climate change and may experience compounding negative effects from climate change and energy development.

## 5.3. Survey Results

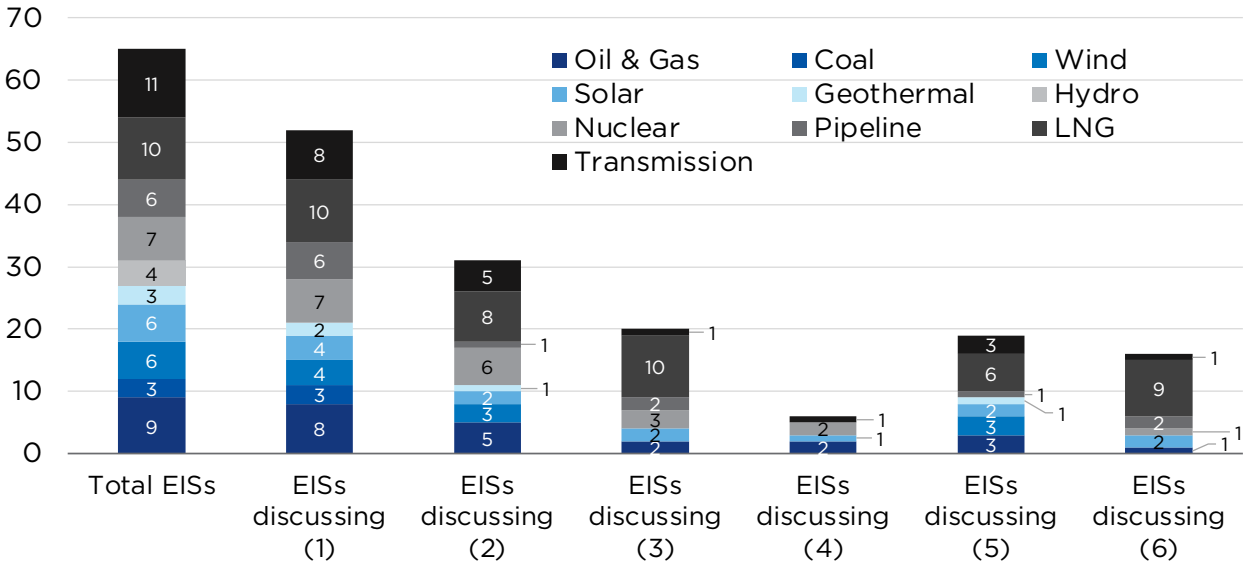
Evaluated against the best practices identified in Part 4.3, none of the surveyed EISs included an effective climate impact analysis that was holistic, specific, and actionable (see Box 2). Each of the components of an effective climate impact analysis was present in some EISs, demonstrating that each component is feasible, but no EIS included all components. A complete climate impact analysis—including comprehensive consideration of impacts on the affected environment, impacts on the proposed action, comparative risks across alternatives, adaptation measures, and environmental justice intersections—is needed for an agency to effectively incorporate climate risk into its decision-making. As our survey focused specifically on climate impact analysis, we make no assessment of the adequacy of any other equally crucial categories of analysis in these EISs, such as consideration of greenhouse gas emissions. Any favorable reference to a particular component of an EIS's analysis should not be taken as an endorsement of the adequacy of that EIS more broadly.

As discussed further below, while most EISs acknowledged that climate change is impacting

the affected environment, many did not go on to analyze the implications for the proposed action or alternatives. Indeed, less than half of the EISs evaluated whether and how climate change might alter the environmental outcomes of the proposed action, and less than 30% discussed other climate-related risks to the action (e.g., the potential for damage to, or early retirement of, infrastructure).[270] Less than 10% compared climate-related risks across alternatives.[271] Even where EISs did discuss climate impacts on the affected environment, the proposed action, and/or alternatives, the discussion was rarely holistic or specific. Many EISs only discussed a subset of potential climate impacts and some did so based solely on national or regional data which may not accurately reflect local climate conditions.[272] Others relied on data and studies that were clearly out of date.[273]

The limited analysis of climate impacts led to equally limited evaluation of possible adaptation measures to lessen climate risks to proposed actions.[274] Adaptation measures were discussed in only a small subset of the surveyed EISs. Notably, and perhaps unsurprisingly, EISs that included a more thorough discussion of climate impacts were more likely to identify adaptation measures. Of the subset of EISs that discussed the potential for climate change to worsen the environmental impacts of the proposed action, 64% also identified some measures to reduce or manage those impacts. Similarly, of the subset of EISs that discussed climate-related risks to the proposed action itself, 80% also identified measures to reduce or manage those risks.

**Figure 3:** Extent of Climate Impact Analysis in Surveyed EISs




*Key: (1) Climate impacts on the affected environment (2) Implications of climate change for environmental outcomes (3) Climate impacts on the proposed action (4) Climate risk / resilience across alternatives (5) Measures to reduce environmental impacts exacerbated by climate change (6) Measures to enhance climate resilience of proposed action*

270 *See infra* Part 5.3.B.
271 *See infra* Part 5.3.C.
272 *See infra* Part 5.3.E.
273 *Id.*
274 *See infra* Part 5.3.D.

These findings are broadly consistent with the results of the previous surveys[275] and suggest that, at least as far as energy projects are concerned, federal agencies have generally made insufficient progress in integrating climate conditions into their NEPA reviews. There are, however, some notable differences between project categories. Significantly more of the EISs issued in connection with nuclear and LNG projects discussed climate impacts on the local environment and the proposed actions (compared to the EISs issued for other projects). The nuclear project EISs were also more likely to compare climate risks across alternatives, but generally did not include a detailed analysis of climate adaptation or resilience measures. Such measures were more commonly discussed in the EISs issued in connection with LNG projects.

At the other end of the spectrum, there was no climate impact analysis in any of the EISs issued for hydroelectric projects. Interestingly, all of the hydroelectric EISs were prepared by FERC, which also prepared the LNG EISs that included a fairly detailed climate impact analysis. In one of the hydroelectric EISs, FERC noted that EPA recommended "includ[ing] a discussion of climate change and its potential effects on the action alternatives," and responded that it is "not aware of any climate-predicting models that have the accuracy to predict resource-specific impacts at the individual project site level."[276] Such data is, however, available from various sources. As one example, for more than a decade, the Bureau of Reclamation has worked with other federal bodies, universities, and private sector entities to downscale global climate projections to local levels.[277] Using local temperature and precipitation data, the project team has projected hydrological conditions at the watershed level.[278] The Bureau of Reclamation has used the hydrological projections to evaluate climate change impacts on water management projects. For instance, in an EIS issued in 2016, the Bureau of Reclamation evaluated how climate change would affect the allocation, release, and delivery of water from the Rio Grande Project in New Mexico and Texas.[279] Using downscaled projections of future climate and hydrological conditions in the Rio Grande Basin, the Bureau of Reclamation identified three "equally likely" climate outcomes—a "drier scenario," a "central tendency or median scenario," and a "wetter scenario"—and evaluated how stream flows, runoff, and reservoir storage would change under each.[280] FERC could employ a similar approach to evaluate the impact of changing water availability on hydroelectric projects.

275 *See supra* Part 5.1.

276 Fed. Energy Regul. Comm'n, Environmental Impact Statement for Hydropower License: Bear River Narrows Project—FERC Project NO. 12486-008-IDAHO E-5 (2016), https://www.ferc.gov/final-environmental-impact-statement-bear-river-narrows-hydroelectric-project-p-12486-008-issued [hereinafter "Bear River EIS"].

277 About, Downscaled CMIP3 and CMIP5: Climate and Hydrology Projections, https://perma.cc/7HPC-FXSQ (last visited Dec. 14, 2021).

278 *Id.* See also Levi Brekke et al., Downscaled CMIP3 and CMIP5 Hydrology Projections (2014), https://perma.cc/G68Q-H6U2.

279 Bureau of Reclamation, Continued Implementation of the 2008 Operating Agreement for the Rio Grande Project, New Mexico and Texas: Environmental Impact Statement (2016), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218219.

280 *Id.* at 60-73.

| Project Category | Total EISs | EISs discussing: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (1) climate impacts on the affected environment | | (2) implications of climate change for environmental outcomes | | (3) climate impacts on the proposed action | | (4) climate risk / resilience across alternatives | | (5) measures to reduce environmental impacts exacerbated by climate change | | (6) measures to enhance climate resilience of proposed action | |
| | | # | % | # | % | # | % | # | % | # | % | # | % |
| Oil & gas | 9 | 8 | 88.9% | 5 | 55.5 | 2 | 22.2% | 2 | 22.2% | 3 | 33.3% | 1 | 11.1% |
| Coal | 3 | 3 | 100.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Wind | 6 | 4 | 66.7% | 3 | 50.0% | 0 | 0.0% | 0 | 0.0% | 3 | 50.0% | 0 | 0.0% |
| Solar | 6 | 4 | 66.7% | 2 | 33.3% | 2 | 33.3% | 1 | 16.7% | 2 | 33.3% | 2 | 33.3% |
| Geothermal | 3 | 2 | 66.7% | 1 | 33.3% | 0 | 0.0% | 0 | 0.0% | 1 | 33.3% | 0 | 0.0% |
| Hydro | 4 | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Nuclear | 7 | 7 | 100.0% | 6 | 85.7% | 3 | 42.9% | 2 | 28.6% | 0 | 0.0% | 1 | 14.3% |
| Pipeline | 6 | 6 | 100.0% | 1 | 16.6% | 3 | 50.0% | 0 | 0.0% | 1 | 16.6% | 2 | 33.3% |
| LNG | 10 | 10 | 100.0% | 8 | 80.0% | 10 | 100% | 0 | 0.0% | 6 | 60.0% | 9 | 90.0% |
| Transmission | 11 | 8 | 72.7% | 5 | 45.5% | 1 | 9.1% | 1 | 9.1% | 3 | 27.3% | 1 | 9.1% |
| **Total** | **65** | **52** | **80.0%** | **31** | **47.7%** | **20** | **30.8%** | **6** | **9.2%** | **19** | **29.2%** | **16** | **24.6%** |

| Agency | Project Category | Total EISs | EISs discussing: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (1) climate impacts on the affected environment | | (2) implications of climate change for environmental outcomes | | (3) climate impacts on the proposed action | | (4) climate risk / resilience across alternatives | | (5) measures to reduce environmental impacts exacerbated by climate change | | (6) measures to enhance climate resilience of proposed action | |
| | | | # | % | # | % | # | % | # | % | # | % | # | % |
| DOI | Oil & gas | 8 | 6 | 75.0% | 4 | 50.0% | 2 | 25.0% | 2 | 25.0% | 3 | 37.5% | 1 | 12.5% |
| | Coal | 2 | 2 | 100.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Wind | 6 | 4 | 66.7% | 3 | 50.0% | 0 | 0.0% | 0 | 0.0% | 3 | 50.0% | 0 | 0.0% |
| | Solar | 5 | 3 | 60.0% | 1 | 20.0% | 1 | 20.0% | 1 | 20.0% | 1 | 20.0% | 1 | 20.0% |
| | Geothermal | 1 | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Transmission | 7 | 6 | 85.7% | 4 | 57.1% | 1 | 14.3% | 0 | 0.0% | 3 | 42.9% | 1 | 14.3% |
| FERC | Hydro | 4 | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Pipeline | 5 | 5 | 100.0% | 1 | 20.0% | 2 | 40.0% | 0 | 0.0% | 1 | 20.0% | 2 | 40.0% |
| | LNG | 10 | 10 | 100.0% | 8 | 80.0% | 10 | 100.0% | 0 | 0.0% | 6 | 60.0% | 9 | 90.0% |
| NRC | Nuclear | 6 | 6 | 100.0% | 6 | 100.0% | 2 | 33.3% | 1 | 16.7% | 0 | 0.0% | 0 | 0.0% |
| USDA (Forest Service) | Oil & gas | 1 | 1 | 100.0% | 1 | 100.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Geothermal | 2 | 2 | 100.0% | 1 | 50.0% | 0 | 0.0% | 0 | 0.0% | 1 | 50.0% | 0 | 0.0% |
| | Pipeline | 1 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Transmission | 2 | 1 | 50.0% | 0 | 0.0% | 0 | 0.0% | 1 | 50.0% | 0 | 0.0% | 0 | 0.0% |
| Other | Coal | 1 | 1 | 100.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| | Solar | 1 | 1 | 100.0% | 1 | 100.0% | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% | 1 | 100.0% |
| | Nuclear | 1 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | Transmission | 2 | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |

## 5.3.A Analysis of Climate Impacts on the Affected Environment

Most of the surveyed EISs (80%) discussed the impacts of climate change on the affected environment but, in most cases, the discussion was neither holistic nor specific. Many of the EISs focused on only a subset of climate impacts. For example, in 2019, BLM issued an EIS in relation to its proposed approval of a transmission line crossing federal land in California and Arizona.[281] The EIS noted that climate change would impact the frequency and severity of storms and other extreme weather events in the area where the transmission line would be constructed.[282] However, it did not discuss other climate impacts that could affect the local environment and the transmission line, such as higher temperatures, drought, and wildfire.

Some EISs only discussed climate impacts in qualitative, and not quantitative, terms. For example, several of the EISs issued by FERC in connection with LNG projects noted the potential for climate change-induced sea level rise to affect coastal property, but did not quantify the extent of future sea level rise.[283] Without such quantification, it is impossible to determine whether coastal facilities are at risk of inundation, or assess the need for changes in design or operational parameters to reduce that risk.

In most EISs, the discussion of climate impacts on the local environment was based on national or regional data (e.g., projecting the increase in average temperatures nationwide or in a multi-state region). For example, in 2017, FERC issues an EIS in connection with the construction of natural gas pipeline infrastructure in parts of Pennsylvania and New Jersey.[284] When describing the "affected environment," the EIS identified climate change impacts expected to occur in the northeastern U.S., but did not focus specifically on the states (or sub-state areas) where construction would occur.[285] This regional focus may have obscured some climate impacts. Pennsylvania and New Jersey (i.e., where the project would take place) are already experiencing different, and in some cases, more severe impacts than the more northern states. As just one example, whereas the northern states saw less than 1 foot of sea level rise between 1901 and 2012, sea level rise was higher (1 to 2 feet) in parts of Pennsylvania and New Jersey.[286] Thus, as this example demonstrates, relying on regional data puts federal agencies at risk of underestimating climate-related risks.

## 5.3.B Analysis of Climate Impacts on the Proposed Action

Thirty percent of the EISs surveyed analyzed how the impacts of climate change might affect the proposed action (e.g., by damaging infrastructure or reducing its useful life). Almost half considered the potential for climate impacts to worsen or exacerbate negative environmental

281 Bureau of Land Mgmt., Final Environmental Impact Statement and Proposed Resource Management Plan Amednments for the Tes West Link Transmission Line Project (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=280737.
282 *See id.* at 4-33–4-34.
283 Fed. Energy Resul. Comm'n, Golden Pass Lng Export Project: Final Environmental Impact Staement 4-253 (2016), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=212821.
284 Fed. Energy Regul. Comm'n, Penneast Pipeline Project: Final Environmental Impact Statement (2017), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=230721.
285 *Id.* at 4-335.
286 *Sea Level is Rising*, U.S. Climate Resilience Toolkit, https://perma.cc/J92K-88Q7 (last visited Nov. 23, 2021).

outcomes associated with the proposed action. Whether and how those issues were addressed differed significantly between project categories, however.

Analysis of the implications of climate change for the proposed action and its environmental outcomes was most commonly found in the EISs relating to LNG and nuclear energy projects. Notably, none of the coal EISs, and only a small subset of the oil / gas EISs discussed risks to the proposed action from the impacts of climate change. This may be due to the fact that, in most of the coal and oil / gas EISs, the proposed action did not involve the approval of any physical work or infrastructure. Rather, most of the EISs related to proposed amendments to RMPs to designate federal land as suitable for coal, oil, or gas development, or the leasing of such land for development. While those activities pave the way for work on federal lands, they do not themselves authorize such work. Thus, for example, additional permits are needed to drill oil and natural gas wells on federal land. At the time land is leased, the exact nature, location, and timing of drilling and other work are generally not known. Without that information, the implications of climate change for such activities and their environmental consequences may be difficult to assess at a site-specific level. However, it is still often possible—and important—for federal agencies to predict impacts in landscape-level terms. One example is in BLM's 2019 EIS relating to oil and gas leasing in the Arctic National Wildlife Refuge ("ANWR"). There, BLM noted that accelerated melting of permafrost in ANWR due to climate change would affect the construction and maintenance of buildings, roads, and other structures needed for oil and gas development.[287] BLM did not consider climate impacts on future infrastructure in EISs prepared in connection with other leasing decisions.

The quality of the analysis of climate impact on the proposed action also varied significantly. The analysis in many EISs focused on only a subset of climate impacts. For example, the EISs prepared by FERC in connection with LNG terminals typically included a robust discussion of risks to the facilities from sea level rise, but little (if any) analysis of other climate-related risks, including the potential for compounding effects from sea level rise and other climate impacts.[288] In some other EISs, climate-related risks were identified, but dismissed with little explanation. For example, a 2019 EIS prepared by the Forest Service for a proposed natural gas pipeline noted that, due to climate change, the project area would see more heavy precipitation events "leading to greater flood risk and stormwater management challenges."[289] While the risks to underground pipelines from flooding have been well documented,[290] the EIS concluded, without explanation, that there was no risk to the project because "the buried pipeline is not anticipated to be impacted."[291]

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287 Bureau of Land Mgmt., Coastal Plain Oil and Gas Leasing Program: Environmental Impact Statement 3-9–3-10 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=281210 [hereinafter "Coastal Plain EIS"]. However, note that plaintiffs including the Gwich'in Steering Committee filed a suit alleging other inadequacies in this EIS, including with regard to its consideration of the proposed action's greenhouse gas emissions, impacts on wildlife, and impacts on subsistence uses and resources and its discussion of mitigation measures for these impacts. *See* Compl., *Gwich'in Steering Comm. v. Bernhardt*, No. 3:20-cv-00294 (D. Alaska Aug. 24, 2020).

288 *See, e.g.*, Fed. Energy Reguk. Comm'n, Annova Lng Brownville Project: Final Environmental Imapact Statement 4-249 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=270641; Fed. Energy Regul. Comm'n, Texas Lng Project: Final Environmental Impact Staement 4-243 – 2-244 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=267820.

289 Forest Service, Final Environmental Impact Statement: Crow Creek Pipeline Project 3-7 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=270664.

290 *See, e.g.*, Jack Nicas, Floods Put Pipelines at Risk, Wall St. J., Dec. 3, 2012, https://perma.cc/Q6HE-52RG.

291 Forest Service, *supra* note 287, at 3-7.

## 5.3.C Comparison of Climate Risks Across Alternatives

The climate risks associated with alternatives to the proposed action were rarely discussed in the surveyed EISs. Overall, less than 10% of EISs compared risks from, or resilience to, climate change across all alternatives. Such comparison only appeared in a small number of EISs issued in relation to oil / gas, solar, nuclear, and transmission projects. None of the EISs issued for other types of projects compared climate risk or resilience across alternatives.

The analysis of climate risks to alternatives (where it did appear) was often neither holistic nor specific. Some of the EISs did not include any analysis and simply concluded, without explanation, that climate risks would not differ materially between alternatives. One exception was a 2016 EIS issued by NRC in connection with its proposed licensing of a new nuclear reactor at an existing nuclear power plant in Pennsylvania.[292] The EIS evaluated the environmental impacts of constructing and operating the reactor at several alternative sites and considered how impacts on water resources, aquatic ecosystems, terrestrial species, human health, and land use might be worsened by climate change.[293]

## 5.3.D Analysis of Climate Adaptation Measures

Less than 30% of the EISs surveyed identified possible adaptation measures to eliminate or reduce the environmental impacts of the proposed action that would be exacerbated by climate change. Less than 25% identified measures to enhance the climate resilience of the proposed action. Notably, however, resilience measures were identified in most (80%) of the subset of EISs that analyzed climate risks to the proposed action. The identified resilience measures generally involving relocating or hardening proposed infrastructure. For example, the EISs issued in connection with LNG projects often discussed the possibility of elevating structures or placing them behind floodwalls to minimize risks from sea level rise.[294] One EIS issued for a solar project similarly discussed the use of drainage channels or systems to reduce flood risk.[295] Some EISs also discussed changes to infrastructure operation to reduce its exposure to climate risks and the adoption of specialized monitoring and maintenance plans.[296]

## 5.3.E Data and Information Quality

In several EISs, the climate impact analysis was based on national or regional data, which may not accurately reflect the specific climate-related risks associated with the proposed action. As discussed in Part 4.2, because the nature and extent of future climate impacts will vary

292 U.S. Nuclear Regul. Comm'n, Final Report: Environmental Impact Statement for the Combined License (COL) for the Bell Bend Nuclear Power Plant (2016), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=207201.
293 *See id.* at 9-64, 9-80, 9-87, 9-108, 9-124, 9-128, 9-151, 9-171, 9-185–9-186, 9-190, 9-205, 9-211–9-212, 9-232 –9-233.
294 *See, e.g.*, Fed. Energy Regul. Comm'n, Rio Grande LNG Project: Final Environmental Impact Statement 4-349–4-353 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=271019; Fed. Energy Regul. Comm'n, Final Environmental Impact Statement for the Jordan Cove Energy Project 4-783 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=284352 [hereinafter "Jordan Cove EIS"].
295 *See, e.g.,* Dep't of Air Force & Kern County Planning & Nat. Res. Dep't, Final Environmental Impact Statement / Environmental Impact Report for the Edwards Afb Solar Project 3.8-35 (2020), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=288175.
296 *See, e.g.*, Jordan Cove EIS, *supra* note 291, at 4-795–4-796.

regionally, it is essential that federal agencies use localized data, showing anticipated climate conditions in the specific area where the proposed action will occur. Some federal agencies appear to be unaware that localized data is available. For example, after EPA recommended that it consider climate impacts in the EIS for a hydroelectric project, FERC stated: "[w]e are not aware of any climate-predicting models that have the accuracy to predict resource-specific impacts at the individual project site level."[297] Similarly, in an EIS issued for a coal project, the Army Corps of Engineers stated that "[e]xisting climate prediction models are global and regional in nature; therefore they are not at the appropriate scale to identify site-specific climate changes."[298] While that is true, downscaling techniques can be used to refine the projections from global climate models and thus estimate climate impacts at finer geographic scales, often on the order of 5 square miles or less.[299] A number of government and other entities have made downscaled climate data publicly accessible online,[300] but that data is seemingly not being used in environmental assessments under NEPA.

Equally concerning, many of the surveyed EISs cited reports or studies that had been superseded, or were otherwise out of date. For example, in a 2018 EIS issued in connection with the leasing of federal land for coal development, BLM relied on the Intergovernmental Panel on Climate Change's Fourth Assessment Report from 2007, despite the fact that an updated Fifth Assessment Report was published in 2014.[301] Similarly, in a 2016 EIS issued in connection with a pipeline project, FERC relied on a 2009 report prepared by the U.S. Global Change Research Program, rather than the updated version of the report published in 2014.[302] In other EISs, FERC relied on out-of-date flood maps, in some cases dating from the 1980s, which do not account for recent or future impacts of climate change.[303]

## 5.3.F Environmental Justice Considerations

All of the surveyed EISs, except those in the hydroelectric project category, included a discussion of environmental justice issues. Most of the EISs identified environmental justice communities that could be affected by the proposed action and some concluded that there would be environmental justice impacts from the proposed action. However, with limited exceptions, the EISs did not discuss any nexus or overlap between environmental justice communities or impacts and climate change. One of the few EISs that did include such a discussion was prepared by BLM in connection with oil and gas leasing in the ANWR coastal plain.[304] The EIS concluded that leasing and subsequent oil and gas development in ANWR

297 Bear River EIS, *supra* note 275, at E-5.
298 S. Army Corps of Engineers, Regional Environmental Impact Statement for Surface Coal and Lignite Minin in Texas 3.7-16 (2016), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=206821.
299 *See* Hayhoe, *supra* note 181, at 144.
300 *See supra* Part 4.3.
301 *See* Bureau of Land Mgmt., Alton Coal Tract Lease by Application: Final Environmental Impact Statement 4-323, 6-12 (2018), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=253488.
302 Fed. Energy Regul. Comm'n, Rover Pipeline, Panhandle Backhaul, and Trunkline Backhaul Projects: Final Environmental Impct Statement 4-291 (2016), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=212837.
303 *See, e.g.,* Fed. Energy Regul. Comm'n, Final Environmental Impact Statement for the Plaquemines Lng and Gator Express Pipeline Project 4-4–4-5, 4-257 (2019), https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=271726.
304 *See* Coastal Plain EIS, *supra* note 286, at 3-278–3-280.

could disproportionately impact Native Americans and Alaska Natives, including members of the Iñupiat, Nuiqsut, and Gwich'in indigenous groups.[305] The EIS noted that those groups are also disproportionately impacted by climate change, including because they engage in subsistence activities that are "particularly dependent on ice, wind, and permafrost conditions."[306] It recognized that:

> [c]limate change is changing the environment of the North Slope and affecting subsistence users' ability to access subsistence resources at appropriate times . . . The reduction of sea ice has worsened coastal erosion, the weather has become less predictable, the shore ice in spring is less stable for whaling, fall travel for caribou is hampered by a late and unreliable freeze up, spring hunting for geese is hampered by an early breakup, and ice cellars provide less reliable food storage. All of these issues create significant concerns for many Iñupiat because they are factors that cannot be controlled and that are threatening their way of life.[307]

There was no similar discussion of a nexus between climate change and disproportionate impacts on environmental justice communities in most other EISs.

305 *Id.*
306 *Id.* at 3-280.
307 *Id.* As previously referenced, supra note 286, plaintiffs including the Gwich'in Steering Committee filed a suit alleging inadequacies in this EIS. See Compl., *Gwich'in Steering Comm. v. Bernhardt*, No. 3:20-cv-00294 (D. Alaska Aug. 24, 2020).

# 6. RECOMMENDATIONS FOR REFORM

CEQ and other federal authorities should take steps to incorporate climate risk and resilience considerations into NEPA processes. In particular, this paper recommends that: (1) CEQ promulgate NEPA regulations and guidance to ensure that climate impacts are considered in a holistic, specific, and actionable manner; (2) federal agencies review their NEPA regulations and consider ways to update and improve NEPA implementation to better account for climate impacts; (3) CEQ coordinate across federal agencies and relevant experts on, among other things, climate scenario analysis; and (4) CEQ create or support the formation of a publicly accessible centralized database of climate information relevant to NEPA analysis.

## 6.1. Recommendation 1: CEQ should promulgate NEPA regulations and guidance that ensure climate impacts are considered in a holistic, specific, and actionable manner

As explained in Part 4 above, in order to fulfill their legal obligations under NEPA, federal agencies must evaluate and disclose relevant climate impacts in their environmental reviews.[308] CEQ should promulgate new regulations to ensure that climate impacts relevant to federal actions are evaluated alongside other existing considerations in environmental reviews. This could occur as part of CEQ's planned Phase 2 rulemaking, which is intended to "promote better decision-making consistent with NEPA's goals and requirements," among other things.[309] As CEQ has already recognized, consideration of climate change "effects fall[s] squarely within NEPA's purview,"[310] and is essential to achieve its goal of "attain[ing] the widest range of beneficial uses of the environment without degradation . . . or other undesirable and unintended consequences."[311]

Any new CEQ regulations should ensure that climate impact analysis is embedded across NEPA and present in all facets of environmental review. Thus, for example, climate impact analysis should not only feature in EISs but also EAs. This is important because, in some cases, an action may only be found to have significant environmental impacts (and thus require preparation of an EIS) after the potential for compounding effects from the action and climate change are considered. Without requirements to consider climate impacts in EAs, agencies may dismiss them, without further consideration.[312]

To ensure holistic, specific, and actionable climate impact analysis appears in all EAs, CEQ could revise its existing regulations at 40 C.F.R. §1501.5 (governing "environmental

308 *See supra* Part 4.2.
309 Press Release, The White House, CEQ Proposes to Restore Basic Community Safeguards during Federal Environmental Reviews (Oct. 6, 2021), https://perma.cc/SDU8-UN3M.
310 2016 Climate Guidance, *supra* note 119, at 2.
311 42 U.S.C. § 4331(b)(3).
312 This has already been demonstrated to be an issue with consideration of greenhouse gas emissions in environmental review. See Institute for Policy Integrity, Comments on the National Environmental Policy Act Implementing Regulations Revisions 21-22 (2021), https://perma.cc/U7BU-ZRNX.

assessments"). That section currently requires EAs to "briefly discuss the purpose and need for the proposed action alternatives . . . and the[ir] environmental impacts."[313] CEQ should consider adding an express requirement for agencies to evaluate how reasonably foreseeable impacts of climate change, including both event-based and non-event-based impacts, will alter the purpose and need for the proposed action, the available alternatives, and their environmental outcomes.[314]

CEQ should also considering revising its existing regulations at 40 C.F.R. Part 1502 (governing "Environmental Impact Statements") to ensure holistic, specific, and actionable climate impact analysis in EISs. Specifically, and among other things, CEQ should consider revising:

- Section 1502.13 (Purpose and need) to direct agencies to *consider whether and how the reasonably foreseeable impacts of climate change, including both event-based and non-event-based impacts, could alter the underlying purpose and need for the proposed action*.

- Section 1502.14 (Alternatives including the proposed action) to direct agencies to *account for climate change when identify alternative actions and evaluating their environmental consequences.* A new sub-section could be added requiring agencies to *include, in the alternatives analysis, a discussion of how the reasonably foreseeable impacts of climate change, including both event-based and non-event-based impacts, will affect each alternative and its environmental consequences over its full useful life, including any decommissioning period*.

- Section 1502.15 (Affected environment) to direct agencies to *account for the reasonably foreseeable impacts of climate change, including both event-based and non-event-based impacts, when evaluating environmental trends in the area(s) to be affected or created by the alternatives under consideration*.

- Section 1502.16 (Environmental consequences) to direct agencies to *account for climate change when evaluating the environmental consequences of the proposed action and alternatives.* Again, a new sub-section could be added requiring agencies to *discuss all reasonably foreseeable impacts of climate change, including both event-based and non-event-based climate impacts, that could alter the environmental consequences of the proposed action and each alternative over their full useful life, including any decommissioning period*. Consideration should also be given to revising existing subsection (a)(5), which requires agencies to discuss "possible conflicts between the proposed action and the objectives of Federal, regional, State, Tribal, and local land use plans, policies and controls." Amending that subsection to expressly require consideration of Federal, regional, State, Tribal, and local climate, clean energy, and other environmental policies could help to guard against maladaptation (see below).

- Section 1502.23 (Methodology and scientific accuracy) to expressly state that *agencies must use forward-looking projections when evaluating the reasonably foreseeable*

313 *See* 40 C.F.R. § 1501.5(c)(2).

314 Here and in the following bulletpoints, italics denote suggested regulatory text.

*impacts of climate change.* A new section could also be added to specify that *climate projections should not be regarded as unreliable merely because they were developed using mathematical or other models that project a range of possible future outcomes*.

Addressing these topics in regulation will best achieve durable and enforceable outcomes. Subsequent guidance would also be useful to highlight best practices.[315] For example, guidance could clarify that mere reference to general climate impacts on the affected area is insufficient and direct agencies to data and tools (e.g., downscaled climate projections and scenarios analysis) that can be used to conduct a holistic, specific, and actionable climate impact analysis. Guidance could also provide agencies with advice on considering adaptation measures to address the impacts of climate change on the proposed action and its environmental consequences. Among other things and given the critical importance of additionally considering greenhouse gas mitigation, agencies should be directed to consider the potential for maladaptation, which occurs where adaptation measures address the symptoms of climate change, while simultaneously contributing to its underlying cause.[316] The CEQ guidance should ensure that climate impact analysis includes consideration of whether particular adaptation measures risk or present maladaptive outcomes.

## 6.2. Recommendation 2: Federal agencies should review their own NEPA regulations and consider ways to improve NEPA implementation to better account for climate impacts

As recognized in the 2021 Proposed Rule, CEQ regulations should establish the floor, rather than the ceiling, for integrating climate impact analysis into NEPA processes.[317] Given the different ways climate change can impact different types of actions in different locations, individual federal agencies may find value in taking additional steps to incorporate climate risk considerations in their own NEPA regulations. We recommend that all federal agencies review their NEPA regulations and consider whether to amend those regulations to better ensure holistic, specific, and actionable climate impact analysis.

Agency-specific NEPA regulations might be best suited to address particular forms of climate risk. For example, DOI could adopt regulations or guidance on how to address climate-related risks at the landscape level to ensure that such risks are accounted for in a holistic way, early on in planning processes (see Part 5.3(B)). FERC, potentially in cooperation with the Bureau of Reclamation, could adopt guidance on accounting for future hydrologic conditions in environmental reviews of hydroelectric projects. Agencies that deal with coastal infrastructure (e.g., FERC, the Department of Transportation, and the Army Corps of Engineers) could develop joint guidance that ensures use of the latest data and projections on sea level rise, as well as consideration of compound risks from that and other climate impacts (e.g., more intense storms).

315 For a discussion of best practices for climate impact analysis, *see supra* Part 4.3.

316 Jane Ebinger & Walter Vergara, World Bank, Climate Impacts on Energy Systems: Key Issues for Energy Sector Adaptation 90 (2011), https://perma.cc/3WVZ-MPJC.

317 National Environmental Policy Act Implementing Regulations Revisions, 86 Fed. Reg. 55,757, 55,757 & 55,761 (Oct. 7, 2021).

To reduce the burden of conducting climate impact analysis, federal agencies could consider requiring project applicants to submit information on how the impacts of climate change will affect the project and the local area, and actions to enhance resilience. Many federal agencies already specify information that applicants must submit in their agency-specific NEPA regulations. For instance, FERC's NEPA regulations require applicants for permits for LNG terminals to submit a "safety and reliability report," which identifies potential hazards to the public from failure of the facility due to accidents or natural catastrophes.[318] In the future, FERC could also require applicants to submit information about risks posed by climate change, and whether and how those risks have been addressed. This is consistent with the approach taken by some states under their little NEPA statutes. For example, Massachusetts requires applicants to complete a "climate adaptation and resilience" form, which asks about the extent to which the applicant has considered climate risks and built-in resilience.[319] Adopting a similar approach at the federal level could help to alleviate the (arguably unfounded) concerns expressed by some federal agencies about the difficulties of obtaining information for climate impact analysis.[320] It should be noted, however, that any information submitted by applicants would need to be carefully scrutinized by federal agencies. Where an applicant uses, or engages third parties who use, proprietary software or confidential information in the analysis, federal agencies' ability to review and verify that analysis may be limited.

## 6.3. Recommendation 3: CEQ should coordinate across federal agencies and relevant experts

CEQ is only one of many agencies across the federal government with a statutory mandate implicated by the impacts of climate change. Likewise, CEQ is only one of many agencies with expertise relevant to the evaluation of climate impacts. A wide array of federal authorities, from financial regulators like the Commodity Futures Trading Commission and Securities and Exchange Commission,[321] to environmental and scientific centers like EPA, NOAA, NASA, and the Federal Acquisition Regulatory Council,[322] to health and work safety regulators like the Occupational Safety and Health Administration,[323] have expertise relevant to the identification and management of climate-related risks.

318 18 C.F.R. §§ 380.3 & 380.12(m).

319 Mass. Exec. Off. of Energy & Env't Affairs, *supra* note 202.

320 Contrary to the claims of some federal agencies, data and tools suitable for use in climate impact analysis are already publicly available. *See supra* Part 4.3 and 5.3.E.

321 *See, e.g.*, Climate-Related Market Risk Subcommittee of the Cftc Market Risk Advisory Committee, Managing Climate Risk in the U.S. Financial System (2020), https://perma.cc/NUD5-3LRE; *SEC Response to Climate and ESG Risks and Opportunities*, SEC. & EXCH. COMM'N, https://perma.cc/K7HJ-7APV (last visited Dec. 9, 2021) (listing SEC initiatives on climate risk including request for public input on climate-related disclosures and examination and enforcement efforts).

322 *See, e.g.*, *Climate Change Adaptation Resource Center* (ARC-X), U.S. Env't Prot. Agency, https://www.epa.gov/arc-x (last visited Dec. 3, 2021); *Climate Change Impacts and Risk Analysis* (CIRA), U.S. Env't Prot. Agency, https://www.epa.gov/cira (last visited Dec. 3, 2021); *Climate Change Impacts*, Nat'l Oceanic & Atmospheric Admin, https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts (last visited Dec. 3, 2021); *Global Climate Change*, Nat'l Aeronautics & Space Admin., https://climate.nasa.gov/ (last visited Dec. 3, 2021); Federal Acquisition Regulation: Minimizing the Risk of Climate Change in Federal Acquisitions, 86 Fed. Reg. 57,404 (Oct. 15, 2021) (Advance Notice of Proposed Rulemaking).

323 *See, e.g.*, Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings, 86 Fed. Reg. 59,309 (Oct. 27, 2021) (Advance Notice of Proposed Rulemaking).

We recommend that CEQ explore ways to coordinate with relevant federal agencies, for example, through an Interagency Working Group ("IWG"). IWGs could be well-suited for situations such as this, where a cohesive regulatory approach can improve technical analysis and reduce regulatory duplication. IWGs have previously been convened primarily through Executive Orders, for purposes including setting a standardized estimate for the social cost of carbon dioxide and other greenhouse gases, and providing guidance on environmental justice issues.[324]

An IWG or other mechanism established to improve agency coordination on climate risk could address a number of issues. One issue that should be addressed as a priority is the use of climate scenario analysis in environmental reviews. Climate scenario analysis refers to the development of a range of hypothetical climate futures, where the consequences of climate change vary from more moderate to more severe, depending upon projected reductions in global greenhouse gas emissions. The assessment of climate impacts on a federal action may diverge significantly depending upon the climate scenario analysis used. Without an IWG or other mechanism to coordinate work across agencies, the decision of which climate scenario(s) to use may be left to individual entities or agencies, leading to diverging, second-best, and/or contradictory approaches.

Relatedly, we recommend that CEQ convene an expert advisory board or similarly structured body to solicit expert recommendation to supplement and complement activities coordinated under an IWG or other mechanism. Expert advisory boards are designed to provide federal agencies with advice and recommendations, creating important communication channels between technical experts and policymakers.[325] Although board duties are solely advisory, establishment of a board could help to ensure CEQ has access to best-practice, industry standard, up-to-date, and critical policy, technical, and scientific expertise.

CEQ should also explore other opportunities to engage with technical experts and interested stakeholders. One important engagement CEQ should undertake is with environmental justice groups and community leaders to solicit their input on, among other things, best practice for evaluating for climate change impacts on environmental justice communities. This would enhance CEQ and other federal agencies' ability to address the potential for compounding impacts on those communities from climate change and any proposed federal action.

## 6.4. Recommendation 4: CEQ should create or support the creation of a publicly accessible centralized database of climate information relevant to NEPA analysis

Both government agencies and the public would benefit from greater access to data, tools, and other resources needed for climate impact analysis. As discussed in Part 5.3(E) above, while many useful resources are already publicly available, some federal agencies appear to be unaware of or unwilling to use them. For example, FERC has argued that it is unable to

324 Madison Condon et al., *Mandating Disclosure of Climate-Related Financial Risk*, 23 N.Y.U. J. Legis. & Pub. Pol'y (forthcoming 2021) (manuscript at 37–38), https://perma.cc/TQ7Y-VH46.

325 *See, e.g.*, Secretary of Energy Advisory Board, Energy.gov, https://perma.cc/Z7KA-R3RQ (last visited Dec. 9, 2021)

perform detailed climate impact analysis for hydroelectric projects because it lacks access to localized climate projections, but useful projections have been published by other government agencies.[326] In the context of their own NEPA reviews, some agencies have also developed analytic tools and other resources, which could be useful to FERC and others. However, because of the structure of NEPA, where each agency individually implements its own NEPA regulation and conducts its own environmental reviews, climate impact analysis data and tools developed by one agency are not necessarily shared with others. The public may be similarly unaware of the data and tools held by different agencies.

CEQ could assist federal agencies in identifying and using existing data, tools, and other resources needed for climate impact analysis. To that end, we recommend that CEQ create or support the creation of a publicly accessible centralized database of climate risk information relevant to NEPA analysis. While CEQ has previously developed a list of tools to account for greenhouse gas emissions in NEPA reviews,[327] no equivalent recommendations have been developed for considering climate risks in such reviews. A climate risk-focused, centralized database would serve as a useful resource for agencies. It would also improve accountability to, and access, for the public, thus furthering a core goal of NEPA.

One avenue to construct a climate-risk database would be through CEQ itself. Another could be through joint effort with other federal agencies. The database could provide (among other things) compiled and synthesized climate data, analytic tools, best practice manuals, training modules, and other guidance documents. (A list of key data, tools, and guidance documents are provided in Part 4.3 and Appendix 2 to this paper.) The database could also identify good examples of climate impact analysis in EISs, and incorporate recommendations from federal agencies that have conducted such analysis and/or technical experts, leveraging the work of an expert advisory board as recommended above.

326 *See supra* Parts 4.3 and 5.3.E.

327 *Greenhouse Gas (GHG) Accounting Tools*, NEPA.GOV, https://perma.cc/WY94-H63S (last visited Dec. 8, 2021); Grid Project Impact Quantification, GRIDPIQ, https://gridpiq.pnnl.gov/gridpiq-landing-page/ (last visited Dec. 8, 2021).

# 7. CONCLUSION

Climate change is already causing, and will increasingly cause, unprecedented shifts in once stable patterns such as temperature, precipitation, and sea-level. This will, in turn, have significant ecological, geological, and societal impacts. Given the pervasive and increasing ways that climate change influences the environment, ignoring climate change impacts in environmental reviews is inconsistent with NEPA's purpose and requirements.

Despite the salience of climate risk to NEPA, our review of recent EISs for energy projects uncovered that, while many agencies recognized that climate change will affect the local environment in which a proposed action would occur, most failed to consider the implications of climate change for the action itself or alternatives. Compounding this issue, EISs often relied upon data that was outdated, incomplete, or insufficiently tailored to the proposed action's location or timeframe. Moreover, most EISs recognized the presence of environmental justice communities in the area of the proposed action, but failed to consider the cumulative impacts of climate change and other environmental harms on those communities.

Holistic, specific, and actionable climate impact analysis is a necessary precursor for informed climate adaptation and resilience actions. To ensure U.S. federal agencies conduct such analysis in NEPA reviews, CEQ should develop regulations, guidance, and accessible resources on climate impact analysis. Agency-specific regulations and guidance can build on this foundation and thereby ensure that NEPA reviews continue to serve their intended purpose in the face of a changing climate.

# **APPENDIX 1:** ENVIRONMENTAL IMPACT STATEMENTS SURVEYED

| | Lead Agency | Title | Publication Date |
|---|---|---|---|
| **Coal Mining** | | | |
| 1 | Department of the Interior, Bureau of Land Management | Alton Coal Tract Lease by Application | 07/20/2018 |
| 2 | Department of the Interior, Office of Surface Mining | Western Energy Company's Rosebud Mine Area F | 11/30/2018 |
| 3 | U.S. Army Corps of Engineers | Surface Coal and Lignite Mining | 04/29/2016 |
| **Oil and Natural Gas Development** | | | |
| 4 | Department of the Interior, Bureau of Indian Affairs | Osage County Oil and Gas | 10/16/2020 |
| 5 | Department of the Interior, Bureau of Land Management | Monument Butte Area Oil and Gas Development Project, Duchesne and Uintah County, Utah | 06/24/2016 |
| 6 | Department of the Interior, Bureau of Land Management | Previously Issued Oil and Gas Leases in the White River National Forest | 08/05/2016 |
| 7 | Department of the Interior, Bureau of Land Management | Proposed Resource Management Plan Amendment and Final Environmental Impact Statement for Oil and Gas Leasing and Development | 05/10/2019 |
| 8 | Department of the Interior, Bureau of Land Management | Coastal Plain Oil and Gas Leasing Program | 09/20/2019 |
| 9 | Department of the Interior, Bureau of Land Management | Converse County Oil and Gas Project | 07/31/2020 |
| 10 | Department of the Interior, Fish and Wildlife Service | National Wildlife Refuge System Revision of Regulations Governing Non-Federal Oil and Gas Rights | 08/19/2016 |
| 11 | Department of the Interior, National Park Service | Revision of 9B Regulations Governing Non-Federal Oil and Gas Activities | 09/02/2016 |
| 12 | Department of Agriculture, Forest Service | Oil and Gas Leasing in Portions of the Wyoming Range in the Bridger-Teton National Forest | 12/16/2016 |
| **LNG Terminals** | | | |
| 13 | Federal Energy Regulatory Commission | Golden Pass LNG Export Project | 08/05/2016 |
| 14 | Federal Energy Regulatory Commission | Driftwood LNG Project | 02/01/2019 |
| 15 | Federal Energy Regulatory Commission | Texas LNG Project-Texas LNG Brownsville LLC | 03/22/2019 |
| 16 | Federal Energy Regulatory Commission | Eagle LNG Partners Jacksonville, LLC Jacksonville Project | 04/19/2019 |
| 17 | Federal Energy Regulatory Commission | Annova LNG Brownsville Project | 04/26/2019 |

| | Lead Agency | Title | Publication Date |
|---|---|---|---|
| **LNG Terminals (cont.)** | | | |
| 18 | Federal Energy Regulatory Commission | Gulf LNG Liquefaction Project | 04/26/2019 |
| 19 | Federal Energy Regulatory Commission | Rio Grande LNG Project | 05/03/2019 |
| 20 | Federal Energy Regulatory Commission | Plaquemines LNG and Gator Express Pipeline Project | 05/10/2019 |
| 21 | Federal Energy Regulatory Commission | Jordan Cove Energy Project | 11/22/2019 |
| 22 | Federal Energy Regulatory Commission | Alaska LNG Project | 03/13/2020 |
| **Natural Gas Pipelines** | | | |
| 23 | Federal Energy Regulatory Commission | Rover Pipeline, Panhandle Backhaul, and Trunkline Backhaul Projects | 08/05/2016 |
| 24 | Federal Energy Regulatory Commission | Nexus Gas Transmission Project and Texas Eastern Appalachian Lease Project | 12/09/2016 |
| 25 | Federal Energy Regulatory Commission | PennEast Pipeline Project | 04/14/2017 |
| 26 | Federal Energy Regulatory Commission | Atlantic Coast Pipeline and Supply Header Project | 07/28/2017 |
| 27 | Federal Energy Regulatory Commission | Midcontinent Supply Header Interstate Pipeline Project | 06/29/2018 |
| 28 | Department of Agriculture, Forest Service | Crow Creek Pipeline Project | 04/26/2019 |
| **Electricity Transmission Facilities** | | | |
| 29 | Department of Energy | Northern Pass Transmission Line Project | 08/18/2017 |
| 30 | Department of the Interior, Bureau of Land Management | Energy Gateway South Transmission Project | 05/13/2016 |
| 31 | Department of the Interior, Bureau of Land Management | Vantage to Pomona Heights 230kV Transmission Line Project | 10/21/2016 |
| 32 | Department of the Interior, Bureau of Land Management | Boardman to Hemingway Transmission Line Project | 11/25/2016 |
| 33 | Department of the Interior, Bureau of Land Management | Ten West Link Transmission Line Project | 09/13/2019 |
| 34 | Department of the Interior, Fish and Wildlife Service | Proposed Habitat Conservation Plan for the Endangered American Burying Beetle for American Electric Power in Oklahoma, Arkansas, and Texas | 10/19/2018 |
| 35 | Department of the Interior, Fish and Wildlife Service | Issuance of an Incidental Permit and Implementation of Habitat Conservation Plan for the R-Project Transmission Line | 02/08/2019 |
| 36 | Department of the Interior, Fish and Wildlife Service | Authorization of Incidental Take and Implementation of the LCRA Transmission Services Corporation Habitat Conservation Plan | 09/06/2019 |

| | Lead Agency | Title | Publication Date |
|---|---|---|---|
| **Electricity Transmission Facilities (cont.)** | | | |
| 37 | Department of Agriculture, Forest Service | Kake to Petersburg Transmission Line Intertie Project | 07/01/2016 |
| 38 | Department of Agriculture, Forest Service | Bordertown to California 120kV Transmission Line | 06/22/2018 |
| 39 | Rural Utilities Service | Cardinal-Hickory Creek 345-kV Transmission Line Project | 10/25/2019 |
| **Nuclear Electric Generating Facilities** | | | |
| 40 | Department of Energy | Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling at the Idaho National Laboratory | 10/07/2016 |
| 41 | Nuclear Regulatory Commission | Combined License for the Bell Bend Nuclear Power Plant | 04/29/2016 |
| 42 | Nuclear Regulatory Commission | License Renewal of Nuclear Plants Supplement 56 Regarding Fermi 2 Nuclear Power Plant, NUREG-1437 | 09/30/2016 |
| 43 | Nuclear Regulatory Commission | Combine Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7 | 11/04/2016 |
| 44 | Nuclear Regulatory Commission | License Renewal of Nuclear Plants, Supplement 58, Regarding River Bend Station, Unit 1 | 11/16/2018 |
| 45 | Nuclear Regulatory Commission | Early Site Permit at the Clinch River Nuclear Site | 04/12/2019 |
| 46 | Nuclear Regulatory Commission | License Renewal of Nuclear Plants, Supplement 10, Second Renewal, Regarding Subsequent License Renewal for Peach Bottom Atomic Power Station Units 2 and 3 | 01/31/2020 |
| **Hydroelectric Generating Facilities** | | | |
| 47 | Federal Energy Regulatory Commission | Bear River Narrows Hydroelectric Project P-12486 | 05/06/2016 |
| 48 | Federal Energy Regulatory Commission | Sweetheart Lake Hydroelectric Project | 06/10/2016 |
| 49 | Federal Energy Regulatory Commission | Grant Lake Hydroelectric Project | 05/10/2019 |
| 50 | Federal Energy Regulatory Commission | Don Pedro Hydroelectric Project and La Grange Hydroelectric Project | 07/17/2020 |
| **Solar Energy Development** | | | |
| 51 | Department of the Interior, Bureau of Indian Affairs | Aiya Solar Project | 06/10/2016 |
| 52 | Department of the Interior, Bureau of Indian Affairs | Eagle Shadow Mountain Solar Project | 12/20/2019 |
| 53 | Department of the Interior, Bureau of Land Management | Desert Quartzite Solar Project | 09/27/2019 |

| | Lead Agency | Title | Publication Date |
|---|---|---|---|
| **Solar Energy Development (cont.)** | | | |
| 54 | Department of the Interior, Bureau of Land Management | Gemini Solar | 12/27/2019 |
| 55 | Department of the Interior, Bureau of Land Management | Yellow Pine Solar Project | 09/04/2020 |
| 56 | United States Air Force | Edwards AFB Solar Project | 01/24/2020 |
| **Wind Energy Development** | | | |
| 57 | Department of the Interior, Bureau of Indian Affairs | Campo Wind Project with Boulder Brush Facilities | 01/31/2020 |
| 58 | Department of the Interior, Bureau of Land Management | Borderlands Wind Project | 04/10/2020 |
| 59 | Department of the Interior, Fish and Wildlife Service | Na Pua Makani Wind Project and Habitat Conservation Plan | 07/22/2016 |
| 60 | Department of the Interior, Fish and Wildlife Service | Eagle Take Permits for the Chokecherry and Sierra Madre Phase I Wind Energy Project | 12/09/2016 |
| 61 | Department of the Interior, Fish and Wildlife Service | Skookumchuck Wind Energy Project Proposed Habitat Conservation Plan and Incidental Take Permit for Marbled Murrelet, Bald Eagle, and Golden Eagle Lewis and Thurston Counties, Washington | 05/31/2019 |
| 62 | Department of the Interior, Fish and Wildlife Service | Incidental Take Permits for Four Wind Energy Projects in Hawai'i | 08/02/2019 |
| **Geothermal Energy Development** | | | |
| 63 | Department of the Interior, Bureau of Land Management | Haiwee Geothermal Leasing Area | 01/24/2020 |
| 64 | Department of Agriculture, Forest Service | Big Creek Geothermal Leasing Project | 03/02/2018 |
| 65 | Department of Agriculture, Forest Service | Santa Fe National Forest Geothermal Leasing | 05/11/2018 |

# **APPENDIX 2:** RELEVANT GOVERNMENT GUIDANCE DOCUMENTS

**Table 1:** Guidance on Integrating Climate Impact Analysis into Environmental Reviews under NEPA or Equivalent Statutes

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. Federal Agency Guidance** | | |
| Council on Environmental Quality | Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and Effects of Climate Change in National Environmental Policy Act Review (2016)[328] | Instructs federal agencies to consider "the ways in which a changing climate may impact the proposed action and any alternative actions, change the action's environmental effects . . . and alter the over-all environmental implications of such actions." Provides recommendations for evaluating climate impacts on the affected environment, the proposed action, and alternatives. |
| Department of Transportation, Federal Highway Administration | Climate Change in NEPA Case Studies (undated)[329] | Provides examples of how climate change impacts were addressed in the NEPA reviews of four transportation projects. Identifies lessons learned and offers recommendations for future reviews of transportation projects. |
| Department of Agriculture, Forest Service | Climate Change Considerations in Project-Level NEPA Analysis (2009)[330] | Identifies "two types of climate change effects" that should be considered in NEPA reviews: (1) "the effects of a proposed project on climate change" and (2) "the effect of climate change on a proposed project." With respect to (2), provides guidance on considering the effects of climate change on natural resource management, and identifies relevant tools and resources. |
| Department of the Interior, National Park Service | Draft Interim Guidance: Considering Climate Change in National Park Service NEPA Analysis (2009)[331] | Recommends that "(1) climate change stemming from greenhouse gas emissions and (2) certain impacts to park resources and values resulting from climate change should be . . . considered during the . . . [NEPA] planning process." With respect to (2), recommends that climate impacts be considered when assessing the purpose and need for a proposed action, defining the affected environment, and evaluating the environmental impacts of the proposed action and alternatives. Provides a check-list of key issues to address in each area. |

328 2016 Climate Guidance, *supra* note 119.
329 U.S. Dep't of Transp., Fed. Highway Admin., Climate Change Adaptation Case Studies, https://perma.cc/Q4Z8-QRVH (last visited Dec. 15, 2021).
330 Forest Serv., *supra* note 128.
331 Nat'l Park Serv., *supra* note 126.

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. Federal Agency Guidance (cont.)** | | |
| U.S. Army Corps of Engineers | Procedures to Evaluate Sea Level Change: Impact, Responses, and Adaptation (2019)[332] | Provides guidance on evaluating and adapting to the "direct and indirect physical effects of projected future sea level rise . . . on USACE projects" in NEPA and other planning processes. Indicates that, when evaluating the effects of climate change on projects in NEPA reviews, "methods are needed to compare project performance across a range of possible futures." Identifies data and tools that can be used for such comparison. |
| **U.S. State and Local Government Guidance** | | |
| Massachusetts Executive Office of Energy and Environmental Affairs | Draft MEPA Climate Adaptation and Resiliency Policy (2015)[333] | Provides guidance on assessing climate impacts in environmental reviews under MEPA. Establishes a framework for assessing "the risk and vulnerabilities of a project or action under reasonably foreseeable scenarios and conditions associated with climate change." Focuses on "impacts associated with sea level rise, [changes in] the amount, frequency and timing of precipitation, and increases in average temperatures and the frequency of extreme temperature events." |
| | Interim Protocol on Climate Adaptation and Resiliency (2021)[334] | Requires the proponents of projects subject to environmental review under MEPA to provide specified information "to assist in evaluation of a project's climate risks and adaptation strategies." States that project proponents should "utilize the best available climate science data and projections for Massachusetts in evaluating risks and impacts associated with sea level rise, [changes in] the amount, frequency and timing of precipitation, and increases in average temperature [and] frequency of extreme events." |
| Minnesota Environmental Quality Board | Environmental Review Advisory Panel Report (2018)[335] | Recommends that environmental reviews under the Minnesota Environmental Policy Act assess "the project's adaptation planning and emission mitigation opportunities." Further recommends that project proponents be required to "provide climate impact information" to inform the assessment. |
| | Revised Environmental Assessment Worksheet (EAW) Guidance: Developing a Carbon Footprint and Incorporating Climate Adaptation and Resilience (2022)[336] | Provides guidance on assessing "[h]ow climate change may influence [the] environmental effects [of a project] and potential adaptations to reduce risk and increase resilience" in environmental reviews under the Minnesota Environmental Policy Act. Identifies key climate change trends that should be considered and recommends using "historic climate trends data for conditions at the start of the project, and projected (future) climate data for conditions during the life of the project." Identifies tools and data for use in the analysis. |

332 U.S. Army Corps of Engineers, *supra* note 129.
333 Mass. Exec. Off. of Energy & Env't Affairs, *supra* note 176.
334 Mass. Exec. Off. of Energy & Env't Affairs, *supra* note 202.
335 Minn. Envtl. Quality Bd., Environmental Review Advisory Panel (2018), https://perma.cc/L9QX-HZAB.
336 Min. Envtl. Quality Bd., Revised Environmental Assessment Worksheet (EAW) Guidance: Developing A Carbon Footprint and Incorporating Climate Adaptation and Resilience (2022), https://perma.cc/N5BW-QDBY.

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. State and Local Government Guidance (cont.)** | | |
| New York State Department of Environmental Conservation | Chapter 5: Environmental Impact Statements, in The SEQR Handbook (4th edition) (2020)[337] | Notes that regulations implementing SEQR require "climate change impacts [to] be considered in" environmental reviews. Identifies key climate impacts that should be analyzed in environmental reviews and offers recommendations for conducting the analysis. Identifies resilience measures to reduce the impacts of climate change on projects. |
| New York City Mayor's Office of Environmental Coordination | Chapter 18: Greenhouse Gas Emissions and Climate Change, in CEQR Technical Manual (2020)[338] | States that "[t]he City has determined that consideration of [greenhouse gas] emissions is appropriate" in environmental reviews. States that it may also "be appropriate to provide a qualitative discussion of the potential effects of climate change on a proposed project in environmental review." Offers specific recommendations for evaluating risks from sea level rise, increases in storm surge, and coastal flooding and links to relevant datasets and mapping tools. |
| Washington Department of Transportation | Guidance for NEPA and SEPA Project-Level Climate Change Evaluations (2017)[339] | Directs staff "to examine available information about climate trends and use the results of [the Department's] assessment of vulnerable infrastructure" when conducting environmental reviews of transportation projects under the Washington State Environmental Policy Act. Identifies key climate impacts that should be considered and provides a checklist for assessing how those impacts will affect the project under review. Provides specific guidance on evaluating "whether the effects of a proposed project on environmental resources and on vulnerable populations will be exacerbated by climate change related vulnerabilities." |

337 N.Y. Dep't of Env't Conservation, *supra* note 176.
338 N.Y.C. Mayor's Office of Evntl. Coordination, City Environmental Quality Review Technical Manual (2020), https://perma.cc/H7Z8-GMLY.
339 Wash. State Dep't of Tranp., *supra* note 180.

**Table 2:** Guidance on Assessing Climate Risks in Infrastructure Planning, Design, Construction, Operation, and Maintenance (select materials published by government entities since 2015)

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. Federal Agency Guidance** | | |
| Department of Energy | Climate Change & The Electricity Sector: Guide for Climate Change Resilience Planning (2016)[340] | Provides a step-by-step guide for as-sessing the vulnerability of electricity infrastructure to climate change and evaluating measures to enhance the infrastructure's climate resilience. |
| | Vulnerability Assessments and Resilience Planning Guidance (2021)[341] | Outlines a climate change vulnerability assessment and resilience planning process that can be used to identify and manage climate-related risks to Depart-ment assets and operations. |
| Department of Energy, National Renewable Energy Laboratory | Power Sector Resilience Planning Guidebook: A Self-Guided Reference for Practitioners (2019)[342] | Provides guidance on evaluating climate and other risks to the energy system and identifying and prioritizing responses. |
| Department of Defense | Regional Sea Level Scenarios for Coastal Risk Management: Managing the Uncertainty of Future Sea Level Change and Extreme Water Levels for Department of Defense Coastal Sites Worldwide (2016)[343] | Provides guidance on using scenario analysis to assess the vulnerability of coastal facilities to sea level rise. Discusses approaches to planning for, and managing, vulnerabilities in the context of uncertainty. |
| Department of the Interior, National Park Service | Planning for a Changing Climate: Climate-Smart Planning and Management in the National Park Service (2021)[344] | Outlines a six-step process for identifying climate-related risks to, and developing climate adaptation strategies for, National Park Service resources and assets. Includes a discussion of climate-related risks to National Park Service facilities infrastructure (e.g., buildings and roads) and examples of adaptation strategies to mitigate and manage those risks. |

340 U.S. Dep't of Energy, *supra* note [16].
341 U.S. Dep't of Energy, Vulnerability Assessments and Resilience Planning Guidance (2021), https://perma.cc/W5ZU-R2AW.
342 U.S. Dep't of Energy Ntl. Renewable Energy Lab. & U.S. Agency for Int'l. Dev., Power Sector Resilience Planning Guidebook: A Self-Guided Reference for Practitioners (2019), https://perma.cc/8QAP-QHNU.
343 U.S. Dep't of Defense, Regional Sea Level Scenarios for Coastal Risk Management: Managing the Uncertainty of Future Sea Level Change and Extreme Water Levels for Department of Dfefense Coastal Sites Worldwide (2016), https://perma.cc/64YP-J9BH.
344 U.S. Dep't of the Interior, Nat'l Park Serv., Planning for a Changing Climate: Climate-Smart Planning and Management in the National Park Service (2021), https://perma.cc/WPD5-D986.

| Issuing Body | Document Title | Description |
|---|---|---|
| U.S. Federal Agency Guidance (cont.) | | |
| Department of Transportation, Federal Highway Administration | Highways in the Coastal Environment (3rd edition) (2020)[345] | Identifies tools for evaluating risks to coastal highways from sea level rise and extreme events and guidance on addressing those risks in highway planning, design, and operation. |
| | Vulnerability Assessment and Adaptation Framework (3rd edition) (2020)[346] | Provides guidance on assessing the vulnerability of transportation infrastructure to climate impacts and integrating climate adaptation considerations into transportation decision-making. |
| | Transportation Infrastructure Resiliency: A Review of Practices in Denmark, the Netherlands, and Norway (2017)[347] | Discusses international best practice for integrating climate projections into highway planning, with a particular focus on approaches for managing uncertainty. |
| | Synthesis of Approaches for Addressing Resilience in Project Development (2017)[348] | Provides guidance on using climate change data in transportation project planning and engineering assessments. |
| | Highways in the River Environment: Floodplains, Extreme Events, Risk, and Resilience (2016)[349] | Provides guidance and tools for assessing climate-related risks to transportation facilities in riverine environments. |
| | Climate Change Adaptation Guide for Transportation Systems Management, Operations, and Maintenance (2015)[350] | Provides guidance and tools on evaluating how the impacts of climate change will affect transportation management, operations, and management and options for enhancing the resilience of transportation infrastructure. |
| Department of Transportation – John A. Volpe National Transportation Systems Center | Integrating Climate Change in Transportation and Land Use Scenario Planning: An Example from Central New Mexico (2015)[351] | Provides an example of the use of sce-nario analysis to evaluate the impacts of climate change in transportation and land use planning processes. Focuses on climate impacts on transportation and land use in the Albuquerque region of New Mexico. |

345 Dep't of Transp., Fed. Highway Admin., Highways in the Coastal Environment (3rd Ed.) (2020), https://perma.cc/3BAL-BNSZ.

346 Dep't of Transp., Fed. Highway Admin., Vulnerability Assessment and Adaptation Framework (3rd Ed.) (2017), https://perma.cc/UH8F-GEZQ.

347 Dep't of Transp., Fed. Highway Admin., Transportation Infrastructure Resiliency: A Review of Practices in Denmark, the Netherlands, and Norway (2017), https://perma.cc/6M5Z-7FZ2.

348 Dep't of Transp., Fed. Highway Admin., Synthesis of Approaches for Addressing Resilience in Project De (2017), https://perma.cc/7ECQ-NZQB.

349 Dep't of Transp., Fed. Highway Admin., Highways in the River Environment – Floodplains, Extreme Events, Risk, and Resilience (2016), https://perma.cc/X6DH-D7PJ.

350 Dep't of Transp., Climate Change Adaptation Guide for Transporation Systems Management, Operations, and Maintenance (2015), https://perma.cc/2VXM-ZTD3.

351 Dep't of Transp., John A. Volpe Nat'l Transp. Systems Center, Integrating Climate Change in Transportation and Land Use Scenario Planning: An Example from Central New Mexico (2015), https://perma.cc/6WYG-7ZFD.

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. Federal Agency Guidance (cont.)** | | |
| Environmental Protection Agency | Planning Framework for a Climate-Resilient Economy (2016)[352] | Provides guidance to local governments on assessing how community assets will be affected by climate change and the associated economic impacts. |
| | Being Prepared for Climate Change: Checklists of Potential Climate Change Risks (2021)[353] | Explains how different climate impacts could affect different environmental resources and provides a check-list for evaluating effects. |
| General Services Administration | Climate Risk Management: Workshop Process (undated)[354] | Outlines a process for using workshops to assess climate-related risks to, and develop strategies to enhance the climate resilience of, government-owned property and supply chains. |
| U.S. Agency for International Development | Climate Vulnerability Assessment: An Annex to the USAID Climate-Resilient Development Framework (2016)[355] | Provides guidance on conducting climate vulnerability assessments and identifies publicly accessible repositories of historical climate data and climate projections. |
| **U.S. State and Local Government Guidance** | | |
| California Public Utilities Commission | Climate Adaptation in the Electric Sector: Climate Vulnerability Assessments and Resilience Plans (2016)[356] | Provides guidance on assessing the vulnerability of electricity infrastructure to climate change and evaluating measures to enhance the infrastructure's climate resilience. |
| California Natural Resources Agency & Ocean Protection | State of California Sea-Level Rise Guidance (2018)[357] | Outlines a methodology for state and local governments to assess the risks associated with sea level rise in their planning, permitting, and investment decisions. |
| California Office of Emergency Services | California Adaptation Planning Guide (2020)[358] | Outlines a four-phase process for local governments to assess vulnerabilities to climate change and develop resilience plans. |

352 Envtl. Protection Agency, Planning Framework for a Climate-Resilient Economy (2016), https://perma.cc/W382-23QN.
353 Envtl. Protection Agency, Being Prepared For Climate Change: Checklists of Potential Climate Change Risks (2021), https://perma.cc/NL8H-2WQC.
354 General Services Administration, *Climate Risk Management*, https://perma.cc/R7PC-UEK2 (last visited Dec. 15, 2021).
355 U.S. Agency for Int'l Dev., Climate Vulnerability Assessment: An Annex to the Usaid Climate-Resilient Development Framework (2016), https://perma.cc/ERW5-XFTB.
356 Kristin Ralff-Douglas, Cal. Pub. Utils. Comm'n, Climate Adaptation in the Electric Sector: Vulnerability Assessments and Resilience Plans (2016), https://perma.cc/29MD-XWEE.E
357 Cal. Nat. Res. Agency & Ocean Prot. Council, State of California Sea-Level Rise Guidance (2018), https://perma.cc/Y6UH-69D4.
358 Cal. Office of Emergency Mgmt., Cal. Adaptation Planning Guide (2020), https://perma.cc/84GK-X2UW.

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. State and Local Government Guidance (cont.)** | | |
| Colorado Department of Local Affairs, Resiliency Office | Colorado Resiliency Playbook (2019)[359] | Identifies processes through which state agencies can integrate climate resilience considerations into their planning and decision-making and identifies relevant tools and other resources. |
| Delaware Department of Natural Resources and Environmental Control | Avoiding and Minimizing Risk of Flood Damage to State Assets: A Guide for Delaware State Agencies (2016)[360] | Outlines a set of principles and step-by-step instructions for integrating flood risk, including new risks posed by climate change, into project planning. |
| Florida Department of Environmental Protection | Florida Adaptation Planning Guidebook (2018)[361] | Provides guidance to local governments on assessing the vulnerability of com-munity infrastructure to sea level rise and developing resilience plans. |
| Massachusetts Department of Transportation | A Proposed Method for Assessing the Vulnerability of Road-Stream Crossings to Climate Change: Deerfield River Watershed Pilot (2018)[362] | Provides a framework for identifying and ranking climate-related risks to road-stream crossings. Focuses on risks to in-frastructure in the Deerfield River Watershed but concludes that the framework could "be implemented beyond the original study area." |
| Massachusetts – City of Boston | Climate Resilience Review Policy (2017)[363] | Provides a checklist for determining whether climate impacts have been adequately considered and addressed in the planning and design of construction projects. |
| New Jersey Department of Environmental Protection | Resilient NJ: Local Planning for Climate Change Toolkit (undated)[364] | Provides a step-by-step guide for local governments to assess their vulnerability to climate change and evaluate solutions to enhance resilience. Includes links to climate data, mapping tools, worksheets, templates, and other resources. |

359 Co. Dep't of Local Affairs, Resiliency Office, Colorado Resiliency Playbook (2019), https://perma.cc/ALU2-XRYK
360 De. Dep't of Natural Res. and Envtl. Control, Avoiding and Minimizing Risk of Flood Damage to State Assets: A Guide for Delaware State Agencies (2016), https://perma.cc/Q4XC-HB4D.
361 Fl. Dep't Envtl. Conservation, Florida Adaptation Planning Guidebook (2018), https://perma.cc/ZK52-L73Y.
362 Mass. Dep't of Transp., A Proposed Method for Assessing the Vulnerability of Road-Stream Crossings to Climate Change: Deerfield River Watershed Pilot (2018),
363 Boston Planning & Dev. Agency, Climate Resiliency Review Policy (2017), https://perma.cc/K8YV-TQDB.
364 N.J. Dep't of Env't Prot., *Resilient NJ: Local Planning for Climate Change Toolkit*, https://perma.cc/7TS8-V5CG (last visited Jan. 22, 2022).

| Issuing Body | Document Title | Description |
|---|---|---|
| **U.S. State and Local Government Guidance (cont.)** | | |
| New York Department of Transportation | Climate Vulnerability and Economic Assessment for At-Risk Transportation Infrastructure in the Lake Champlain Basin, New York (2015)[365] | Provides a framework for assessing the vulnerability of transportation infrastructure to climate change. |
| Oregon Department of Land Conservation and Development | State Agency Climate Adaptation Framework (2021)[366] | Identifies key risks posed by climate change and outlines a framework through which state and local agencies can identify and evaluate resilience strategies. |
| Wisconsin Department of Natural Resources | Coastal Resilience Issues / Impacts / Strategies Table (2018)[367] | Lists key climate impacts occurring or expected to occur in Wisconsin, explains how each climate impact will affect different types of coastal infrastructure, and identifies strategies to enhance infrastructure resilience. |

365 N.Y. Dep't of Transp., Climate Vulnerability and Economic Assessment for At-Risk Transportation Infrastructure in The Lake Champlain Basin, New York (2015), https://perma.cc/UNY9-HQFH.

366 Or. Dep't of Land Conservation & Dev., 2021 State Agency Climate Change Adaptation Framework (2021), https://perma.cc/DW3P-5HGD.

367 Wisconsin Department of Natural Resource, Initiative on Climate Change Impacts, Wicci Coastal Resilience Issues / Impacts / Strategies Table (2018), https://perma.cc/2GED-5T8V.

# **APPENDIX 3:** CHECKLIST OF CLIMATE RISK CONSIDERATIONS FOR ENERGY INFRASTRUCTURE

The table below lists key climate impacts that could affect the construction or operation of energy projects and/or alter their environmental outcomes. The table provide a useful starting point for federal agencies to identify climate-related risks that require evaluation in environmental reviews under NEPA. The tables may be incomplete and thus we recommend that federal agencies also consult with scientists and other stakeholders to ensure they are conducting a comprehensive analysis.

| Climate Impact | Effect on Project and Environmental Outcomes |
|---|---|
| **Coal, Oil, and Gas Development** | |
| **Water stress**: Changes in temperature and precipitation will affect hydrologic conditions, water temperature, and water quality. Water stress may occur due to drier and hotter conditions. Increases in water demand from other sources may exacerbate water stress. | • Potential reduction in water resources available for mining/drilling operations<br>• Cumulative effects of project, other water uses, and climate change on watershed |
| **Extreme precipitation, storms, flooding**: Increases in the frequency and/or severity of extreme precipitation and storms may exacerbate flood risk. | • Damage to infrastructure<br>• Accidents/release of hazardous substances<br>• Risk to workers |
| **Extreme heat:** Climate change will increase the frequency of heat waves and high temperature days. | • Effect on mining/drilling operations<br>• Risk to workers |
| **Extreme cold:** Climate change may increase the frequency and/or severity of cold waves. | • Effect on mining/drilling operations<br>• Risk to workers |
| **Arctic impacts:** Rising temperatures will melt snow, ice, and permafrost and cause land subsidence in the Arctic. | • Damage to infrastructure<br>• Accidents/release of hazardous substances |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape[368]<br>• Cumulative risk to endangered species |
| **LNG Terminals** | |
| **Coastal risks and extreme weather**: Sea level rise can contribute to flooding, coastal erosion, and saltwater intrusion. Climate change will also cause increases in the frequency and/or severity of hurricanes and severe coastal weather. Storm surge will be higher due to combined effects of sea level rise and more intense storms. | • Damage to infrastructure<br>• Accidents/release of LNG<br>• Cumulative effects of project, other land uses, and climate change on coastline |

368 The analysis of cumulative landscape effects should take place early in the planning process, ideally when agencies are developing resource and land management plans.

| Climate Impact | Effect on Project and Environmental Outcomes |
|---|---|
| LNG Terminals (cont.) | |
| **Extreme heat:** Climate change will increase the frequency of heat waves and high temperature days. | • Effect on mining/drilling operations<br>• Risk to workers |
| **Extreme cold:** Climate change may increase the frequency and/or severity of cold waves. | • Effect on mining/drilling operations<br>• Risk to workers |
| **Arctic impacts:** Rising temperatures will melt snow, ice, and permafrost and cause land subsidence in the Arctic. | • Damage to infrastructure<br>• Accidents/release of natural gas |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources in project area. | • Cumulative effects of project, other land uses, and climate change on coastline<br>• Cumulative risk to endangered species |
| Natural Gas Pipelines | |
| **Extreme precipitation, storms, flooding:** Increases in the frequency and/or severity of extreme precipitation and storms may exacerbate flood risk. | • Damage to pipeline infrastructure<br>• Accidents/releases of natural gas |
| **Extreme cold:** Climate change may increase the frequency and/or severity of cold waves. | • Pipeline "freeze offs" and associated shutdowns |
| **Arctic impacts:** Rising temperatures will melt snow, ice, and permafrost and cause land subsidence in the Arctic. | • Damage to pipeline infrastructure<br>• Accidents/releases of natural gas |
| **Coastal risks and extreme weather:** Sea level rise can contribute to flooding, coastal erosion, and saltwater intrusion. Climate change will also cause increases in the frequency and/or severity of hurricanes and severe coastal weather. Storm surge will be higher due to combined effects of sea level rise and more intense storms. | • Damage to pipeline infrastructure<br>• Accidents/releases of natural gas |
| Electricity Transmission and Distribution Facilities | |
| **Extreme winds:** Climate change may affect the timing and severity of extreme wind events, tornadoes, and hurricanes, which can topple power infrastructure. | • Damage to infrastructure<br>• Power outages<br>• Potential for ignition of wildfires |
| **Increases in average temperatures, extreme heat, and humidity:** Climate change will increase average temperatures as well as the frequency of heat waves and high temperature days. Increases in temperature will also cause increases in peak electricity demand. | • Effect on infrastructure<br>• Effect on power supply and outages<br>• Risk to workers, especially during high "wet bulb" temperature conditions |
| **Extreme cold:** Climate change may increase the frequency and/or severity of cold waves, ice storms, and other severe winter conditions. | • Effect on infrastructure<br>• Effect on power supply and outages<br>• Risk to workers |
| **Extreme precipitation, storms, and flooding:** Climate change will increase the frequency and/or severity of extreme precipitation and exacerbate flood risk. | • Effect on infrastructure<br>• Effect on power supply and outages<br>• Risk to workers |

| Climate Impact | Effect on Project and Environmental Outcomes |
|---|---|
| Electricity Transmission and Distribution Facilities (cont.) | |
| **Wildfires:** Changing temperature and precipitation patterns will contribute to drier conditions and heightened wildfire risk. | • Effect on infrastructure<br>• Power outages compounding wildfire risk (e.g., impaired notification systems) |
| **Coastal risks and extreme weather:** Sea level rise can contribute to flooding, coastal erosion, and saltwater intrusion. Climate change will also cause increases in the frequency and/or severity of hurricanes and severe coastal weather. Storm surge will be higher due to combined effects of sea level rise and more intense storms. | • Effect on infrastructure and operation<br>• Effect on power supply and outages<br>• Risk to workers |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape<br>• Cumulative risk to endangered species |
| Nuclear Electric Generating Facilities | |
| **Extreme precipitation, storms, and flooding:** Climate change will increase the frequency and/or severity of extreme precipitation and exacerbate flood risk. | • Damage to infrastructure (including waste storage)<br>• Effect on electric generation<br>• Potential for nuclear accidents |
| **Increases in average temperatures, extreme heat, and humidity:** Climate change will increase average temperatures as well as the frequency of heat waves and high temperature days. Increases in temperature will also cause increases in peak electricity demand. | • Reduced operating efficiency<br>• Effect on cooling facilities<br>• Other effects on plant operation (e.g., due to higher electricity demand) |
| **Water stress:** Changes in temperature and precipitation will affect hydrologic conditions, water temperature, and water quality. Water stress may occur due to drier and hotter conditions. Increases in water demand from other sources may exacerbate water stress. | • Effect on electric generation and cooling<br>• Cumulative effects of project, other wa-ter uses, and climate change on water-shed |
| **Coastal risks and extreme weather:** Sea level rise can contribute to flooding, coastal erosion, and saltwater intrusion. Climate change will also cause increases in the frequency and/or severity of hurricanes and severe coastal weather. Storm surge will be higher due to combined effects of sea level rise and more intense storms. | • Damage to infrastructure (power generation or waste storage)<br>• Effect on electric generation<br>• Accidents/release of hazardous substances |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on lanscape<br>• Cumulative risk to endangered species |

| Climate Impact | Effect on Project and Environmental Outcomes |
|---|---|
| **Hydroelectric Generating Facilities** | |
| **Hydrologic changes:** Changes in temperature and precipitation patterns will affect hydrologic conditions, potentially causing:<br>• Drier conditions and water stress<br>• Wetter conditions, increases in flow, and flooding<br>• Changes in the timing of water flows<br>• Increases in erosion and sediment loading<br>• Evaporative loss from water bodies<br>• Power outages compounding wildfire risk (e.g., impaired notification systems) | • Potential impacts on reservoir and hydroelectric production:<br>- Drier conditions: Reduced reservoir volume and hydroelectric production<br>- Wetter conditions: Possible need to increase discharges; possible downstream effects; risks to infrastructure<br>- Shift from snow to rain: Reduced hydroelectric production at facilities that rely on snowmelt<br>• Cumulative effects of hydroelectric project, other water uses, and climate change on affected water bodies |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape<br>• Cumulative risk to endangered species |
| **Solar Energy Development** | |
| **Increases in average temperatures, extreme heat, and humidity:** Climate change will increase average temperatures as well as the frequency of heat waves and high temperature days. Increases in temperature will also cause increases in peak electricity demand. | • Reduced operating efficiency<br>• Other effects on operation (e.g., due to changes in electricity demand) |
| **Wildfires:** Changing temperature and precipitation patterns will contribute to drier conditions and heightened wildfire risk. | • Damage to solar infrastructure<br>• Impact of smoke on solar generation |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape<br>• Cumulative risk to endangered species |
| **Wind Energy Development** | |
| **Increases in average temperatures, extreme heat, and humidity:** Climate change will increase average temperatures as well as the frequency of heat waves and high temperature days. Increases in temperature will also cause increases in peak electricity demand. | • Effects on operation (e.g., due to chang-es in electricity demand) |
| **Extreme cold:** Climate change may increase the frequency and/or severity of cold waves, ice storms, and other severe winter conditions. | • Effect on infrastructure<br>• Effect on power supply and outages |
| **Extreme wind:** Climate change may affect the timing and severity of extreme wind events, tornadoes, and hurricanes. | • Damage to infrastructure<br>• Power outages |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape<br>• Cumulative risk to endangered species |

| Climate Impact | Effect on Project and Environmental Outcomes |
|---|---|
| Geothermal Energy Development | |
| **Water stress:** Changes in temperature and precipitation will affect hydrologic conditions, water temperature, and water quality. Water stress may occur due to drier and hotter conditions. Increases in water demand from other sources may exacerbate water stress. | • Effect on operations (e.g., reduction in water available to inject into depleted geothermal reservoirs)<br>• Cumulative effects of project, other water uses, and climate change on watershed |
| **Increases in average temperatures, extreme heat, and humidity:** Climate change will increase average temperatures as well as the frequency of heat waves and high temperature days. Increases in temperature will also cause increases in peak electricity demand. | • Effect on operation (e.g., due to changes in electricity demand) |
| **Habitat stress:** Changing bioclimatic conditions may put stress on natural ecosystems and biotic resources. | • Cumulative effects of project, other land uses, and climate change on landscape<br>• Cumulative risk to endangered species |


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