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**HOW DID FEDERAL  
ENVIRONMENTAL IMPACT  
STATEMENTS ADDRESS  
CLIMATE CHANGE IN 2016?**

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**February 2017**

This paper was written by team of students as part of the Columbia University Capstone Workshop on Sustainable Development.

**Student authors:** Saloni Jain, Omri Klagsbald, Giovanna Leigh Crozier-Fitzgerald, Taylor Quinn and Elana Sulakshana

**Client:** Sabin Center for Climate Change Law

**Professor:** Stuart Gaffin

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Sabin Center for Climate Change Law

Columbia Law School

435 West 116<sup>th</sup> Street

New York, NY 10027

**Tel:** +1 (212) 854-3287

**Email:** [columbiaclimate@gmail.com](mailto:columbiaclimate@gmail.com)

**Web:** <http://www.ColumbiaClimateLaw.com>

**Twitter:** @ColumbiaClimate

**Blog:** <http://blogs.law.columbia.edu/climatechange>

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**About the authors:** Saloni Jain, Omri Klagsbald, Giovanna Leigh Crozier-Fitzgerald, Taylor Quinn and Elana Sulakshana are undergraduate students in Columbia University's Sustainable Development program. This paper was their capstone project for the Sustainable Development program, and the Sabin Center was the client. The authors would like to thank Jessica Wentz, Michael Gerrard, Michael Burger, and Stuart Gaffin for their contributions to and feedback on this paper.

## EXECUTIVE SUMMARY

In partnership with the Sabin Center for Climate Change Law, this project surveyed 31 federal environmental impact statements (EISs) published from September through November 2016. The objective was to evaluate how federal agencies were implementing the guidance released in August 2016 by the Council on Environmental Quality (CEQ) on how to account for climate change and greenhouse gas (GHG) emissions in the environmental review process.

The first step of the project was to create a rubric of the most important components of the CEQ guidance. We identified twelve issues that CEQ has recommended for consideration in NEPA reviews, divided into two categories: (i) the effects of the action on climate change (i.e. effects on greenhouse gas emissions), and (ii) the effects of climate change on the action. These considerations were:

<b>Effects of the Action on Climate Change</b>	<ul style="list-style-type: none"><li>• <b>Scope of Action:</b> Did the EIS account for greenhouse gas (GHG) emissions from connected actions and tiered environmental review documents?</li><li>• <b>Direct emissions:</b> Did the EIS quantify or provide a qualitative analysis of direct GHG emissions, such as emissions from construction, operation, and decommissioning of the proposed action, including biogenic emissions /carbon stock changes caused by the action?</li><li>• <b>Indirect emissions:</b> Did the EIS quantify or contain a qualitative analysis of indirect GHG emissions, such as emissions from induced vehicle trips, emissions from energy consumption, and upstream and downstream emissions from fossil fuel projects?</li><li>• <b>Comparison of alternatives:</b> Did the EIS compare GHG emissions from the proposed action and reasonable alternatives?</li><li>• <b>Mitigation measures:</b> Did EISs that identified GHG emissions also discuss mitigation measures for those emissions?</li><li>• <b>Social cost of emissions:</b> Did EISs that identified GHG emissions disclose the social cost of those emissions?</li><li>• <b>Frame of reference:</b> Did EISs that identified GHG emissions discuss relevant federal, state, local, or tribal plans and policies for GHG emission reductions to make clear whether the proposal's GHG emissions were consistent with those plans and policies?</li><li>• <b>Info sources and uncertainty:</b> Did the EIS disclose information used in the GHG analysis along with explanations of assumptions and uncertainties?</li></ul>
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<p><b>Effects of Climate Change on the Action</b></p>	<ul style="list-style-type: none"> <li>• <b>Effects of climate change:</b> Did the EIS describe how climate change may affect the proposed action and the local environment where the action would be implemented, and did it consider the implications for environmental outcomes and project resilience?</li> <li>• <b>Alternatives:</b> Did the EIS compare how the effects of climate change may differ under the proposal and reasonable alternatives?</li> <li>• <b>Adaptation measures:</b> Did the EIS identify possible adaptation measures to eliminate or mitigate any impacts of the proposed action that may be exacerbated by climate change, or to make the action more resilient to the effects of climate change?</li> <li>• <b>Info sources and uncertainty:</b> Did the EIS disclose information used in the climate impact analysis along with explanations of assumptions and uncertainties?</li> </ul>
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These twelve considerations were divided into 26 specific questions. Each question was scored as “Yes,” “No,” or deemed “N/A” if it did not apply to the proposal undergoing review. The pool of EISs was also segmented into three categories, according to project type: fossil fuels, natural resource management, and built environment. All findings were compiled in an excel database, with information on each EIS as well as summary statistics by category.

*Key Findings.* Every EIS in our database acknowledged climate change, either by evaluating the project’s emissions or considering the impacts of climate change on the local environment. However, the extent to which each EIS assessed these issues varied enormously. Some EISs solely discussed how climate change would affect the local environment, whereas others provided in-depth quantifications of emissions across alternatives and discussions of mitigation and adaptation. The survey revealed interesting trends:

*Emissions.* Most of the EISs for proposals involving GHG-generating activities contained quantitative projections of those emissions. This was true even for proposals that were projected to generate relatively small quantities of GHGs. There were only four EISs (13%) that identified but did not quantify their direct GHG emissions – in all four cases, this is because the GHG impact was anticipated to be very small. There were also four EISs (13%) that involved GHG-generating activities but did not quantify or qualitatively discuss the GHG contribution of those activities. Three of these were natural resource management projects that appeared to involve relatively small GHG footprints. But one was for a proposal oil and gas lease which would presumably have

a substantial GHG impact – there, the lead agency briefly recognized that oil and gas leasing generated GHG emissions, but did not discuss GHG impacts from the particular lease under review.<sup>1</sup>

There was considerably more variation in the consideration of indirect emissions. While 16 (52%) of the EISs surveyed did contain some discussion of indirect emissions, the types of emission that were considered (e.g. emissions from induced vehicle trips and energy consumption) varied widely and there was no discernible explanation for the variation. Rather, it appeared that the indirect emissions analysis tended to occur on an ad hoc basis, perhaps due to a lack of guidance about the scope of indirect emissions that should be considered for different types of projects.

There was a noticeable absence of lifecycle emissions from fossil fuel EISs. Only addressed upstream emissions and only two addressed downstream emissions,<sup>2</sup> which parallels the results from a previous survey of EISs prepared from 2012 through 2014.<sup>3</sup>

**Mitigation.** Of the 20 EISs that identified GHG emissions, only 8 (40%) discussed mitigation measures. Where mitigation was not discussed, this decision was often justified on the basis that the overall GHG footprint of the action would be relatively small. None of the EISs that outlined mitigation measures included a mitigation monitoring plan to ensure that those measures were implemented and that they achieved the desired results. Overall, it appeared that GHG mitigation was not a priority for agencies. Many of the EISs discussed how the emissions that their project will produce are not a significant quantity in comparison to global emissions as a justification for disregarding mitigation measures, despite the fact that the CEQ guidance states that such language is merely a statement about the nature of climate change and not useful to decision-makers.

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<sup>1</sup> Bureau of Ocean Energy Management, Gulf of Mexico OCS Oil and Gas Lease Sale: 2017 Central Planning Area Lease Sale 247 Final Supplemental EIS (2016).

<sup>2</sup> Bureau of Reclamation, Navajo Generating Station-Kayenta Mine Complex Project FEIS (2016) (discussing upstream and downstream emissions); Office of Surface Mining, Reclamation and Enforcement, North Cumberland Wildlife Management Area, Tennessee Lands Unsuitable for Mining FEIS (2016) (discussing downstream emissions).

<sup>3</sup> Jessica Wentz et al., *Survey of Climate Change Considerations in Federal Environmental Impact Statements, 2012-2014* (Sabin Center for Climate Change Law 2016).

***Social Cost of GHG Emissions.*** Only 1 EIS used the federal social cost of carbon (SCC) to disclose the economic implications of the GHG emissions that would be generated as a result of the proposed action.<sup>4</sup>

***Climate Change Impacts and Adaptation.*** Though most EISs (81%) discussed the impacts of climate change, only a few considered what implications these impacts might have for the environmental consequences of the proposal (39%) or whether measures were needed to make the proposal more resilient to the effects of climate change (26%). Thus, agencies are recognizing that climate change will affect the local environment of the project, yet they are not proposing possible measures to adapt the project to account for those changes. In many cases, it appeared that the discussion of climate change impacts had very little bearing on decision-making about how to design and implement the proposed action. This is also consistent with findings from the previous EIS survey.

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<sup>4</sup> Bureau of Reclamation, Navajo Generating Station-Kayenta Mine Complex Project FEIS (2016).

## CONTENTS

<b>1. Introduction</b> .....	<b>1</b>
1.1 Overview.....	1
1.2 Legal Context.....	2
1.3 Methodology .....	3
1.3.1 Selection of EISs.....	3
1.3.2 Categorization of EISs.....	3
1.3.3 Compilation of Rubric .....	3
1.3.4 Evaluation of EISs.....	6
1.3.5 Formulation of EIS Database .....	7
<b>2. Key Findings</b> .....	<b>1</b>
2.1 GHG Emissions and Mitigation.....	3
2.1.1 Direct Emissions .....	4
2.1.2 Indirect Emissions .....	8
2.1.3 Comparison to Alternatives.....	14
2.1.4 Mitigation Measures .....	16
2.1.5 Social Cost of Carbon.....	16
2.1.6 Miscellaneous.....	17
2.2 Climate Change Impacts and Adaptation.....	19
<b>3. Findings by EIS Category</b> .....	<b>20</b>
3.1 Natural Resources.....	20
3.1.1 Emissions.....	21
3.1.2 Effects of Climate Change .....	23
3.2 Built Environment .....	24
3.2.1 Emissions.....	25
3.2.2 Effects of Climate Change .....	26
3.3 Fossil Fuels.....	26
3.3.1 Emissions.....	27
3.3.2 Effects of Climate Change .....	29
<b>4. Conclusion</b> .....	<b>31</b>
4.1 Notable Trends.....	31
<b>Appendix: List of Environmental Impact Statements</b> .....	<b>32</b>

## 1. INTRODUCTION

### 1.1 Overview

This project surveyed 31 federal environmental impact statements (EISs) published in September, October, and November 2016. The objective was to evaluate how federal agencies are implementing guidance released in August 2016 by the Council on Environmental Quality (CEQ) of the Executive Office of the President on how to account for climate change and greenhouse gas (GHG) emissions in the environmental review process.<sup>1</sup>

At the heart of the environmental review process is the EIS. Federal law requires that EISs are prepared for any major federal action that will have a significant effect on the environment.<sup>2</sup> These documents are hundreds to thousands of pages and often take multiple years to produce. They are produced to ensure that agencies are thoroughly identifying and considering the environmental consequences of their actions in the decision-making process. They are also external-facing documents that allow the public to observe how the agencies are accounting for environmental impacts in these decisions.

Climate change is already affecting and projected to increasingly affect the environment across the United States. Federal agencies have responded to this by addressing climate change concerns in EISs. The Sabin Center for Climate Change Law has previously produced two reports and databases studying how federal agencies account for climate change in EISs prepared from 2009 through 2014, which found that EISs have increasingly discussed the contribution of proposals to climate change (through GHG emissions) as well as the impacts of climate change on the proposal.<sup>3</sup> Following these previous studies, the aim of this project was to survey EISs that were released, either in draft or final form, after publication of the August 2016 guidance to monitor how agencies were complying with the new guidance on GHGs and

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<sup>1</sup> CEQ, *Final Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews* (Aug. 1, 2016) (CEQ Guidance).

<sup>2</sup> National Environmental Policy Act (NEPA) § 102, 43 U.S.C. § 4332.

<sup>3</sup> See Jessica Wentz et al., *Survey of Climate Change Considerations in Federal Environmental Impact Statements, 2012-2014* (Sabin Center for Climate Change Law 2016); Patrick Woolsey, *White Paper on the Consideration of Climate Change in Federal EISs, 2009-2011* (Sabin Center for Climate Change Law 2012).



climate change. This report discusses the legal context, methodology, and key issues and findings from the third survey. It is accompanied by an Excel database that includes summaries of results for the full survey and each category, as well as a detailed breakdown of findings for each EIS that was surveyed.

## **1.2 Legal Context**

Under the National Environmental Policy Act (NEPA), which applies to a wide range of federal actions, a federal agency is required to prepare an EIS if the action that they propose will “significantly affect the quality of the human environment.”<sup>4</sup> The EIS must address the purpose and need of the action.<sup>5</sup> The most important section is the discussion of alternative ways to address the proposed purpose and need for the action. The agency must identify all reasonable alternatives and evaluate them based on their environmental effects. Environmental effects is a broad term, encompassing “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.”<sup>6</sup>

On August 1, 2016, the CEQ made an important final addition to the NEPA Regulations. The CEQ published new guidelines for accounting for climate change and greenhouse gas emissions (GHGs). The purpose of the guidance, according to the CEQ, is to “assist Federal agencies in their consideration of the effects of GHG emissions and climate change when evaluating proposed Federal actions.”<sup>7</sup> This final guidance follows from a draft guidance document that was originally published in 2010 and revised in 2014.<sup>8</sup> The final version incorporates comments and feedback received on both documents.

The final guidance contains recommendations that fall within two major areas: (i) the impact of the project on climate change (GHG emissions) and (ii) the impacts of climate change

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<sup>4</sup> 43 U.S.C. § 4332; 40 C.F.R. § 1501.7.

<sup>5</sup> 40 C.F.R. § 1502.13

<sup>6</sup> 40 C.F.R. § 1508.8

<sup>7</sup> CEQ Guidance.

<sup>8</sup> CEQ, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (Feb. 18, 2010); CEQ, *Revised Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (Dec. 18, 2014).

on the local environment and the project. The methodology section below describes how we analyzed and categorized the document to create a comprehensive rubric for use in our study.

## **1.3 Methodology**

### **1.3.1 Selection of EISs**

A total of 31 electronic EISs were chosen from the US Environmental Protection Agency's Environmental Impact Statement Database. For the purposes of this project, all 31 of the EISs chosen and evaluated were published after the August 1, 2016 CEQ guidance was released, the goal being to monitor initial implementation of the guidance. It was noted that EISs published only months after the guidance release may have been in the drafting process well before August 2016; however, CEQ's 2014 draft guidance contained very similar instructions, and agencies were on notice that the final guidance was imminent: thus, it was reasonable to monitor agency implementation of the guidance even at this early stage. The 31 EISs evaluated for this project were chosen largely unsystematically to produce a manageable yet sufficiently-sized randomized sample for robust qualitative and quantitative analysis.

The Appendix of this report contains a complete list of EISs that were evaluated, along with information about the lead agency and publication date, as well as a hyperlink to a website where the EIS can be downloaded. The list in the Appendix is numbered in the same fashion as the accompanying excel database to allow users to easily locate the EIS in the database.

### **1.3.2 Categorization of EISs**

Each EIS was placed into one of three categories based on the nature of the action being proposed: (i) fossil fuel infrastructure (9 EISs), (ii) natural resource management (19 EISs), and (iii) built environment (3 EISs). This allowed us to compare trends for similar types of projects.

### **1.3.3 Compilation of Rubric**

In order to evaluate consistency with the guidance, the team compiled a rubric of the key recommendations outlined in the guidance and reframed these as questions that could be answered by "yes", "no", or "not applicable (N/A)" (see Table 1). We also defined some of the key terminology, referring to CEQ guidance and regulations, to ensure a consistent approach to

our review (see Box 1, page 5). For direct and indirect emissions questions, “Quantitative” and “Qualitative” columns were added to note *how* and *to what extent* EISs addressed the subcategories within these topics. The final rubric included two main sections: (i) Effects of Action on Climate Change and (ii) Effects of Climate Change on Action.

**Table 1: EIS Evaluation Rubric**

<b>Effect of Action on Climate Change (GHG Emissions)</b>	<b>Scope of Proposed Action</b>	If the EIS identifies connected actions, are emissions from those actions discussed?
		If the EIS is tiered to a preexisting PEIS, does that PEIS account for the full scope of direct and indirect GHG emissions from the program?
	<b>Direct Emissions</b>	Does the EIS quantify direct GHG emissions or provide qualitative analysis / justification for the lack of quantification? <ul style="list-style-type: none"> <li>• Construction emissions</li> <li>• Operational emissions</li> <li>• Decommissioning emissions</li> <li>• Biogenic emissions &amp; carbon storage impacts</li> </ul>
	<b>Indirect Emissions</b>	Does the EIS quantify indirect GHG emissions or provide qualitative analysis / justification for the lack of quantification? <ul style="list-style-type: none"> <li>• Emissions from induced vehicle trips</li> <li>• Emissions from off-site energy production</li> <li>• Upstream emissions (from project inputs)</li> <li>• Downstream emissions (from project outputs)</li> <li>• Other indirect sources of emissions</li> </ul>
	<b>Alternatives</b>	Does the EIS compare GHG emissions / carbon sequestration impacts from the proposed action and reasonable alternatives?
	<b>Mitigation</b>	Does the EIS identify and assess mitigation measures and reasonable alternatives that will avoid or minimize GHG emissions?
		Does the EIS present a mitigation-monitoring scheme?
	<b>Social Cost of GHGs</b>	Does the EIS disclose the cost of GHG emissions, using the social cost of carbon (SCC) or other tools?
	<b>Frame of Reference</b>	Does the EIS discuss relevant approved federal, regional, state, tribal, or local plans, policies, and laws for GHG emission reductions to make clear whether a proposed project's GHG emissions are consistent with such plans or laws?
	<b>Info Sources &amp; Uncertainty</b>	Does the EIS disclose information used in the GHG analysis along with explanations of assumptions and uncertainties?

**Table 1: EIS Evaluation Rubric (continued)**

<b>Effect of Climate Change on Action</b>	<b>Effects of Climate Change on Proposal and Local Environment</b>	Does the EIS describe how climate change may affect the local environment where the action will be implemented?
		Does the EIS describe the implications of climate change for the environmental outcomes of the proposed action?
		Does the EIS describe whether any elements of the action may need to be reconstructed, repaired, or otherwise restored due to the effects of climate change?
	<b>Alternatives</b>	Does the EIS compare risks from climate change / resilience to climate change between the proposed action and reasonable alternatives?
	<b>Adaptation Measures</b>	Does the EIS identify possible adaptation measures to eliminate or mitigate impacts of the proposed action that are exacerbated by climate change?
		Does the EIS identify possible adaptation measures to make the action more resilient to the effects of climate change?
<b>Info Sources &amp; Uncertainty</b>	Does the EIS disclose the relevant scientific literature, data sources, assumptions and uncertainties underpinning the assessment of climate change impacts and adaptation strategies?	

**Box 1: Terminology Used in Rubric**

Actions are **connected** if they: (i) automatically trigger other actions which may require environmental impact statements; (ii) cannot or will not proceed unless other actions are taken previously or simultaneously, or; (iii) are interdependent parts of a larger action and depend on the larger action for their justification.

**Direct GHG emissions** are generated by the proposed action and occur at the same time and place where the action is located.

**Construction emissions** include emissions from the on-site operation of machinery, equipment, and vehicles used to construct buildings and other physical structures. It also encompasses emissions from the on-site operation of machinery, equipment and vehicles used in landscape restoration and forest thinning activities (these are treated as “construction emissions” due to the similarity between these activities and construction activities – e.g., similar equipment, short-term duration, etc.).

**Operational emissions** include emissions that are generated on-site during the operation or lifetime of the project, such as emissions from smokestacks and on-site generators.

**Decommissioning emissions** include any emissions that are generated on-site during the decommissioning process for proposals such as mines and other facilities that eventually require decommissioning.

**Biogenic GHG emissions** are emissions resulting from the natural carbon cycle as well as those resulting from the combustion, harvest, digestion, fermentation, decomposition, or processing of biologically based materials.

**Box 1: Terminology Used in Rubric (continued)**

**Carbon stock changes** are changes in the quantity of carbon contained in soils, plants, and other GHG reservoirs.

**Indirect emissions** are caused by the action, and are later in time or farther removed in distance, but still reasonably foreseeable.

Emissions from **induced vehicle trips** refer to emissions from any increase in vehicle trips taken by employees and customers as a result of the proposed action (e.g., emissions from worker commutes to a proposed facility), not including emissions from construction vehicles operated on site.

Emissions from **off-site energy production** refer to: (i) emissions from electricity or energy that is produced off-site and used to power the proposed action, (ii) for renewable energy projects, any changes in emissions from off-site energy production caused by the substitution of renewable energy for fossil fuel energy.

**Upstream emissions** are emissions from project inputs (e.g., emissions from the mining of coal that will be transported as a result of a proposed coal rail line that is under review, and emissions from building materials used in major construction projects),.

**Downstream emissions** are emissions from the transportation, processing, or use of project outputs (e.g., emissions from the combustion of coal that is produced as a result of a proposed coal mine that is under review).

**Mitigation measures** are measures undertaken to reduce or eliminate GHGs from the proposed action.

A **mitigation monitoring scheme** is a monitoring program aimed at ensuring mitigation measures are actually implemented and evaluating the effectiveness of those measures.

The **implications of climate change for the environmental outcomes** of a proposal would encompass the following considerations: (i) whether and to what extent climate change will make the affected environment more vulnerable to the proposal's environmental effects, (ii) whether climate change will

### 1.3.4 Evaluation of EISs

The next step was to review each EIS for consistency with the recommendations outlined in the rubric. Each of the 31 EISs was read by two researchers to ensure utmost accuracy in this evaluation. With each EIS often containing upwards of 900 pages, the tables of contents were carefully examined and keyword search tactics were applied to facilitate efficient evaluation. Importantly, an EIS was considered to have discussed a topic if it included *any* discussion—however brief—about the issue. If the topic was not relevant to the proposal under

review – e.g., the proposal did not involve any activities that would generate GHG emissions – then the issue was deemed “N/A” for that EIS.

Certain topics were also deemed “N/A” if the answer to related questions was “no.”

Specifically:

- If the EIS did not include any mitigation measures, then the question of whether it included a mitigation monitoring plan was deemed “N/A.”
- If the EIS did not disclose any GHG emissions (quantitatively or qualitatively), then the following fields were deemed “N/A”: comparison of GHG emissions among alternatives, mitigation and mitigation monitoring, social cost of GHGs, frame of reference, and info sources & uncertainty for the GHG analysis.
- If the EIS did not quantify any GHG emissions, then the following fields were deemed “N/A”: social cost of GHGs, frame of reference for GHGs.
- If the EIS did not discuss any issues pertaining to climate change impacts and adaptation, then the field for “info sources & uncertainty” for the adaptation analysis was deemed “N/A”.

### **1.3.5 Formulation of EIS Database**

The EIS rubrics were combined to form a single Excel database, divided into three sections according to the EIS categories.<sup>9</sup> The first four sheets on the database contain summaries of the overall survey results and results for each of the three EIS categories (natural resources, built environment, and fossil fuels). These are followed by sheets containing the findings for each individual EIS. The sheet tabs are color-coded and numbered to help users navigate the database.

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<sup>9</sup> The database accompanying this report is available at <http://columbiaclimatelaw.com/program-areas/environmental-assessment/eis-surveys/>.

## 2. KEY FINDINGS

This section presents a summary of results and a brief discussion regarding the two main considerations analyzed in the study: (i) GHG emissions and mitigation and (ii) climate change impacts and adaptation. General trends are evaluated throughout the 31 EISs. Trends by project category are discussed in Section 3.

Table 2.1 presents a summary of key findings for all EISs, with comparisons across the three different categories of EISs (natural resource management, built environment, and fossil fuels). Tables 2.2 and 2.3 (see next page) provide a more detailed breakdown of the number and percentage of EISs that addressed each of the 26 questions posed in this survey.

**Table 2.1: Summary of Key Findings**

		All EISs			Nat. Res. (18)			Built Envt. (4)			Fossil Fuels (8)		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A
GHG Emissions	Direct emissions	20	4	7	8	3	7	4	0	0	8	1	0
	Indirect emissions	16	15	0	8	10	0	3	1	0	5	4	0
	Comparison of alternatives	18	7	6	9	4	5	3	1	0	6	2	1
	Mitigation measures	8	15	8	2	9	7	1	3	0	5	3	1
	Social cost of GHGs	1	19	11	0	9	9	0	4	0	1	6	2
Climate Change Impacts	Effects of climate change	25	6	0	15	3	0	3	1	0	7	2	0
	Implications for envtl. outcomes of proposal	12	19	0	9	9	0	2	2	0	1	8	0
	Implications for project resilience	7	17	7	5	6	7	0	4	0	2	7	0
	Comparison of alternatives	10	21	0	8	10	0	1	3	0	1	8	0
	Adaptation measures to address exacerbated impacts	7	20	4	5	9	4	1	3	0	1	8	0
	Adaptation measures to make proposal more resilient	8	23	0	7	11	0	1	3	0	0	9	0

**Table 2.2: Detailed Overview of Findings (Effects of Action on Climate Change)**

Consideration	Question	Yes	%	Quan.	%	No	%	N/A	%
<b>Scope of Proposed Action</b>	If the EIS identifies connected actions, are emissions from those actions discussed?	2	6%	1	3%	2	6%	27	87%
	If the EIS is tiered to a preexisting PEIS, does that PEIS account for the full scope of direct and indirect GHG emissions from the program?	0	0%	0	0%	2	6%	29	94%
<b>Direct Emissions</b>	Does the EIS quantify direct GHG emissions or provide qualitative analysis / justification for the lack of quantification?	20	65%	16	52%	4	13%	7	23%
	Construction emissions	16	52%	11	35%	6	19%	9	29%
	Operational emissions	15	48%	13	42%	3	10%	13	42%
	Decommissioning emissions	0	0%	0	0%	8	26%	23	74%
	Biogenic emissions / carbon stock changes	5	16%	1	3%	14	45%	12	39%
<b>Indirect Emissions</b>	Does the EIS quantify indirect GHG emissions or provide qualitative analysis / justification for the lack of quantification?	16	52%	12	39%	15	48%	0	0%
	Emissions from induced vehicle trips	11	35%	8	26%	18	58%	2	6%
	Emissions from energy consumption	6	19%	6	19%	5	16%	20	65%
	Upstream emissions	2	6%	2	6%	14	45%	15	48%
	Downstream emissions	2	6%	2	6%	11	35%	18	58%
	Other indirect emissions	2	6%	0	0%	0	0%	29	94%
<b>Alternatives</b>	Does the EIS compare GHG emissions / carbon sequestration impacts from the proposed action and reasonable alternatives?	18	58%	15	48%	7	23%	6	19%
<b>Mitigation</b>	Does the EIS identify and assess mitigation measures and reasonable alternatives that will avoid or minimize GHG emissions?	8	26%			15	48%	8	26%
	Does the EIS present a mitigation monitoring scheme?	0	0%			8	26%	23	74%
<b>Social Cost of GHGs</b>	Does the EIS disclose the cost of GHG emissions, using the social cost of carbon (SCC) or other tools?	1	3%			19	61%	11	35%
<b>Frame of Reference</b>	Does the EIS discuss relevant approved federal, regional, state, tribal, or local plans, policies, and laws for GHG emission reductions to make clear whether a proposed action's GHG emissions are consistent with such plans or laws?	8	26%			12	39%	11	35%
<b>Info Sources + Uncertainty</b>	Does the EIS disclose information used in the GHG analysis along with explanations of assumptions and uncertainties?	16	52%			9	29%	6	19%



**Table 2.3: Detailed Overview of Findings (Effects of Climate Change on Action)**

Consideration	Question	Yes	%	Quan.	%	No	%	N/A	%
Effects of Climate Change	Does the EIS describe how climate change may affect the local environment where the action will be implemented and/or the action itself?	25	81%			6	19%	0	0%
	Does the EIS describe the implications of climate change for the environmental outcomes of the proposed action?	12	39%			19	61%	0	0%
	Does the EIS describe whether any elements of the action may need to be reconstructed, repaired, or otherwise restored due to the effects of climate change?	7	23%			17	55%	7	23%
Alternatives	Does the EIS compare risks from climate change / resilience to climate change between the proposed action and reasonable alternatives?	10	32%			21	68%	0	0%
Adaptation Measures	Does the EIS identify possible adaptation measures to eliminate or mitigate impacts of the proposed action that are exacerbated by climate change?	7	23%			20	65%	4	13%
	Does the EIS identify possible adaptation measures to make the action or affected environment more resilient to the effects of climate change?	8	26%			23	74%	0	0%
Info Sources + Uncertainty	Does the EIS disclose the relevant scientific literature, data sources, assumptions and uncertainties underpinning the assesment of climate change impacts and adaptation strategies?	25	81%			0	0%	6	19%

**Note for Tables 2.2 and 2.3:** Percentages are expressed as a percentage of the total EISs (including those EISs for which a particular topic may have been N/A). The “quan.” column refers to the number of EISs that contained a quantitative analysis of direct and indirect GHG emissions.

## 2.1 GHG Emissions and Mitigation

Section III.A of the 2016 CEQ Guidance recommends agencies use the projected GHG emissions associated with proposed actions as a proxy for assessing proposed action's' potential effects on climate change. The CEQ further states that in doing so, agencies should use appropriate tools and methodologies for quantifying GHG emissions (CEQ 10-11). Accordingly, quantification of GHG emissions should be prepared when data inputs are reasonably available to support

calculations, and in the case that they are not, a qualitative description of GHG emissions should be offered along with a rationale for determining that the quantitative analysis is not warranted.

GHG emissions are split into (i) direct emissions and (ii) indirect emissions for significant specificity. According to the *Federal Greenhouse Gas Accounting and Reporting Guidance* (2012), direct GHG emissions are defined as “emissions from sources that are owned or controlled by the reporting organization” (p. 42). The CEQ provides an addendum, defining direct emissions as emissions linked to direct effects where direct effects “are caused by the action and occur at the same time and place” (CEQ NEPA Regulation Section 1508.8 [40 C.F.R. § 1508.8.]).

### **2.1.1 Direct Emissions**

For the purposes of this study, direct emissions were split into four subcategories: (i) construction emissions, (ii) operational emissions, (iii) decommissioning emissions; and (iv) biogenic emissions and carbon stock changes.

Of the 31 EISs covered in this survey, 24 involved construction and/or operational activities that would directly generate GHG emissions. 16 of those EISs quantified the direct GHG emissions, and 4 of those EISs provided a qualitative analysis. The rationale for omitting the quantitative analysis was that the overall GHG impact of those 4 projects was relatively small. In some cases, the agency explicitly cited the small quantity of emissions as a reason to dismiss them from further consideration; in other cases, the scale of the emissions impact could be inferred from the nature of the proposal.

There were 4 remaining EISs that involved emissions-generating activities but did not provide a quantitative or qualitative analysis of the emissions that would be generated as a result of the proposal. Three of these were natural resource management projects that appeared to involve relatively small GHG footprints. But one was for a proposal oil and gas lease which would presumably have a substantial GHG impact – there, the lead agency briefly recognized that oil and

gas leasing generated GHG emissions, but did not discuss GHG impacts from the particular lease under review.<sup>14</sup>

The types of direct emissions that were typically disclosed and quantified included:

- Emissions from equipment and vehicles used for the construction of buildings;
- Emissions from equipment and vehicles used for land management activities;
- Emissions from the on-site use of fossil fuels in buildings and facilities; and
- Emissions from vented or fugitive gases from coal mines and oil and gas wells.

Some EISs also discussed the potential impact of the proposed action on biogenic emissions and carbon stocks, but these emissions were rarely quantified. As discussed in further detail below, none of the EISs discussed emissions from decommissioning processes (which were pertinent to all eight of the fossil fuel projects).

Construction Emissions. Construction emissions were defined as GHG emissions from extracting and fabricating construction materials, and from the equipment and vehicles used at the construction site for the construction necessary for the proposed action. 16 EISs (52%) accounted for construction emissions, of which 11 (35%) quantified these, and 5 (16%) qualified them. Six EISs (19%) did not evaluate construction emissions, though the proposed action required construction and would produce emissions. 9 EISs (29%) did not involve construction of any kind, and this category was scored “N/A.”

The EISs that qualified the emissions described the particular construction activities that would result in GHGs. For example, the Angoon Airport Project EIS said that emissions will occur due to “removing vegetation; grading and recontouring the ground surface; paving the runway and road; potential extraction of materials such as gravel, soil, and rock from an on-island material source; and constructing a bridge” (p. 705). Similarly, the Upper Monument Creek Landscape Restoration identified the heavy machinery required. The Forest Service agency then stated in that EIS: “The greenhouse gas emission would only be during project implementation and would be slight. Impacts due to these very slight emissions are unmeasurable” (p. 165). The minor

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<sup>14</sup> Bureau of Ocean Energy Management (BOEM), Gulf of Mexico OCS Oil and Gas Lease Sale: 2017 Central Planning Area Lease Sale 247 Final Supplemental EIS (2016).

contribution of construction to emissions was a common justification for why emissions were not quantitatively analyzed across the 4 EISs that only qualified. It is surprising that 2 built environment projects only qualitatively analyzed emissions, even though the projects (Angeon Airport and Lambert House Redevelopment) involved extensive construction.

Those that quantified emissions did so with varying specificity. At the most comprehensive end of the spectrum, the EA-18G Growler Airfield Operations at Naval Air Station Whidbey Island Complex project provided GHG information regarding many aspects of construction, including worker commutes, deliveries, and equipment. In fact, equipment was further broken down into various tasks, such as demolition, excavation, and paving. Most EISs, however, were not this specific. Otay River Estuary Restoration Project provides a typical example: construction emissions are quantified across three years by two categories: construction equipment and generator.

The EISs that received a “No” were generally natural resource management projects that involved small-scale construction efforts. El Yunque National Forest Plan Revision discusses road and facility construction within the general management plan without citing emissions. Craters of the Moon refers to “small-scale construction” of the livestock rangeland and does not associate this with GHGs. Though construction is not a focus of these projects, the CEQ still requires that the emissions be evaluated, relevant to the scale of the actions. Overall, though, the majority of EISs with major construction needs did quantify or qualify emissions.

Operational Emissions. Operational emissions were defined as GHG emissions resulting from the ongoing or beginning operation of the proposed action facility or project including: facility smokestacks; fugitive emissions such as methane escaping from oil and gas wells; emissions of methane and nitrous oxide from agricultural operations; methane from landfills and wastewater treatment plants; and impacts on carbon “sinks” such as forests, soils, and wetlands. Fifteen EISs (48%) accounted for operational emissions, of which 13 (42%) quantified them. Three EISs (10%) did not quantify or qualify operational emissions, though the proposed action’s operation would produce emissions. 13 EISs (42%) were scored “N/A,” as the proposed action’s operation would not produce GHG emissions.

Thus, the majority of the sample of EISs evaluated for this project did account for operational emissions. For the 3 EISs that failed to evaluate GHG emissions, there were no justifications for why this analysis was left out of the EIS, or why the agency chose not to mention it, thus suggesting general inattention to the operational emissions category in these rare cases.

Decommissioning Emissions. Decommissioning emissions were defined as GHG emissions resulting from the decommissioning process (including relevant demolishing, razing, etc.) of the proposed action. Not a single EIS (0%) quantified or qualified decommissioning emissions associated with the proposed action. Indeed, 8 EISs (26%) did not, though applicable, and the remaining 23 EISs (74%), the bulk of the total sample, were scored “N/A” as facilities associated with the proposed action would not have to be decommissioned.

The 8 EISs that did not address decommissioning emissions were all for fossil fuel infrastructure projects (coal plants, natural gas pipelines, and other fossil fuel facilities are eventually retired, thus producing decommissioning emissions). Of these 5 EISs, 3 projects mentioned decommissioning- or deconstruction-related activities, but did not go the extra step to relate these to resulting emissions and subsequently quantify them, while 2 completely failed to acknowledge the likelihood for eventual decommissioning. Indeed, the OCS Oil & Gas Lease Sale, Kayenta Mine, and Pomona Heights EISs acknowledged ultimate decommissioning of the proposed action’s construction, but provided no qualified or quantified emissions estimate. The Mountain Valley and North Cumberland EISs took neither of these steps, thus underscoring the short-term rather than long-term outlook of many agencies’ final EISs.

One possible reason for why these 8 EISs did not mention decommissioning emissions is because the 2016 CEQ Guidance does not itself mention “decommissioning emissions.” That being said, the guidance does mention that all direct GHG emissions resulting from direct effects of the proposed action must be quantified or qualified, and agencies should know to include decommissioning emissions in this vein. Further, the guidance clearly directs federal agencies toward the *Federal Greenhouse Gas Accounting and Reporting Guidance* (2012) for quantification tools and methodologies, and this publication plainly notes that decommissioning emissions may not be excluded from E.O. 13514 GHG reduction targets, thus signifying the importance of their inclusion in federal EISs (p. 12).

*Biogenic Emissions.* Biogenic impacts refer to land management actions that result in net changes in carbon stocks. This encompasses biogenic emissions and carbon sequestration impacts. The CEQ cites examples of relevant actions: “prescribed burning, timber stand improvements, fuel load reductions, scheduled harvesting, and livestock grazing.” Many (39%) of the EISs did not include land management actions, and so neither biogenic emissions nor carbon sequestration were relevant. However, among EISs that did include actions that would affect carbon storage and sinks, there were very low consistency rates. Of the 19, 5 (16%) did address biogenic emissions and 14 (45%) did not. This indicates that biogenic emissions are not a priority in emissions assessments, even though the CEQ guidelines recommend a specific tool for these calculations.

Most of the EISs that received a “Yes” were not rigorous in their assessment of biogenic emissions. Indeed, only one of them quantified the emissions. The Otay River Estuary Restoration Project San Diego Bay National Wildlife Refuge of the Fish and Wildlife Service discussed how the wetlands are carbon sinks and restoration of the wetlands will reduce emissions. However, it did not quantify emissions due to the fact that it is “an active area of research” (4.2-98). Similarly, the 3 Bars Ecosystem and Landscape Restoration Project discussed prescribed fires as an action that will reduce carbon emissions and compared reduction potentials across alternatives, but they did not quantify this comparison as the CEQ recommends. Craters of the Moon National Monument and Preserve Draft Management Plan Amendment also recognizes that grazing practices will change carbon stocks, but the Bureau of Land Management did not quantify emissions because the changes were considered too small and too difficult to predict. These 3 examples indicate that agencies are struggling to evaluate biogenic emissions with specificity.

EISs that required a change to the landscape but did not address this in the language of emissions received a “No” for this question. Landscape change primarily consisted of deforestation. For example, the Mountain Valley project did not discuss the carbon sequestration implications of preserving forest and thus received a “No.” In these EISs, the biogenic changes occurring are de-emphasized by the agency and not viewed through a lens of emissions.

### **2.1.2 Indirect Emissions**

Indirect emissions are included alongside direct emissions in the CEQ Guidance section “Direct and Indirect Effects,” and indirect emissions are linked to indirect effects that “are caused

by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” (CEQ NEPA Regulation Section 1508.8 [40 C.F.R. § 1508.8.]). Further, indirect emissions are defined by the CEQ as emissions that are accountable to actions of the reporting entity but are “produced by sources owned or controlled by another entity” (Federal Greenhouse Gas Accounting and Reporting Guidance, 2012).

All of the EISs surveyed entailed activities that would result in the generation of indirect emissions – that is, emissions that are caused by the proposed action, but later in time or farther removed in distance. But only 16 (52%) included a qualitative or quantitative analysis of one or more sources of indirect emissions.<sup>15</sup> The indirect emissions that were relevant to projects included:

- Emissions from induced vehicle trips, such as employee or visitor commutes (of all indirect emissions, these were disclosed and quantified most frequently); and
- Emissions from the off-site production of energy that will be consumed as a result of the project (these emissions were disclosed and sometimes quantified for several of the built infrastructure projects, as well as natural resource management proposals that involved the operation of visitor facilities that were powered by external resources).
- For renewable energy projects, changes in emissions from off-site energy production caused by the substitution of fossil fuel-fired energy with renewable energy.
- Upstream emissions (from project inputs) and downstream emissions (from project outputs). These were most relevant in the context of fossil fuel proposals – e.g., for a coal mine, there would be downstream emissions generated from transporting, processing, and consuming the coal; for an oil pipeline, there would be upstream

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<sup>15</sup> This category proved complicated to score in some circumstances. If indirect emissions were not spelled out, then it was difficult to determine what indirect emissions would be in some EISs. In order to address this challenge and better score this section, we further categorized indirect emissions. The five sections of indirect emissions are as follows, each discussed in further detail below: (i) emissions from induced vehicle trips, (ii) emissions from energy consumption, (iii) upstream emissions, (iv) downstream emissions, and (v) other indirect emissions.



emissions generated from producing the oil and downstream emissions generated from processing and consuming the oil.

There was considerable variation in terms of how and whether these emissions were discussed. We could discern no pattern with respect to the reviewing agency or type of project to explain this variation.

*Emissions from Induced Vehicle Trips.* An induced vehicle trip is classified as a component of indirect emissions, because it encompasses emissions from vehicle miles that are traveled as a consequence of the project, but that occur off-site. This category does not include the operation of construction vehicles on-site. It does include employee commutes, the transportation of goods to and from the site, and vehicular trips by visitors. Generally, vehicular trips by visitors were addressed, whereas the transportation of goods and employee commutes were not. Eleven EISs (35%) did account for induced vehicle trips. 18 EISs did not account for induced vehicle trips (58%).

The EISs that were scored as “Yes” addressed additional visitors and employee commutes. Both the EA-18G Growler Airfield Operations at Naval Air Station Whidbey Island Complex and Lambert Houses Redevelopment EISs quantify vehicular trips. The Lambert Houses project evaluated vehicle trips that would be generated by the proposed project. In order to convert this to emissions, the agency used the *CEQR Technical Manual* and mobile GHG emissions calculator. The Whidbey Island Complex project quantified employee commutes.

The Angoon Airport Project EIS, released by the Federal Aviation Administration (FAA), provided a qualitative analysis of emissions from induced vehicle trips. The FAA determined that there would be a 2-5% increase in vehicle traffic due to the project, which they recognize will “increase long-term CO<sub>2</sub>e emissions through additional fuel consumption” (p. 705). However, the FAA decided not to quantify this because they saw it as negligible. In this example, the agency clearly delineated between temporary construction effects and long-term traffic effects. Construction vehicle changes were quantified and discussed under direct emissions.

The National Park Service’s Moose-Wilson Corridor Final Comprehensive Management Plan accounted for induced vehicle trips and induced vehicle idling in Grand Teton National Park. However, the EIS provided contradictory information. On the one hand, it said that the number of



vehicles driving the road would be limited to no more than current average peak use levels, yet on the other hand it quantified emissions from the queuing and idling of an increased number of vehicles.

A significant majority—11 (61%)—of the 18 EISs that received a “No” were categorized under natural resources, as discussed in further detail in the following section of the report. Six fossil fuel EISs did not address induced vehicle trips either. These fossil fuel EISs should have accounted for induced vehicle trips in terms of employee commutes to the facility, vehicles required for maintenance of transmission lines and pipelines, and transportation of equipment and fossil fuels to and from the facilities.

*Emissions from Offsite Energy Production.* This category encompasses two categories of emissions. The first category is emissions from the offsite production of electricity that will be consumed by the proposed action (relevant to buildings). The second category is emissions from any changes in offsite energy production that occur as a result of the proposed action. This second category was relevant in the context of renewable energy projects, where the lead agency will sometimes evaluate the extent to which the renewable energy that is generated will displace other energy sources (typically fossil fuels) and the corresponding implications for emissions.

Across the board, 6 EISs (19%) addressed this category, 5 (16%) did not, and 20 (65%) were deemed not applicable.

In terms of the first category, only 2 EISs quantified energy consumption for outsourced electricity. These 2 EISs were both within the built environment category. Both the EA-18G Growler Airfield Operations at Naval Air Station Whidbey Island Complex and Lambert Houses Redevelopment EISs quantified emissions from the energy used to power the naval air station and housing complex. The former used electricity intensity factors from the 2003 [Commercial Buildings Energy Consumption Survey \(CBECS\)](#). The latter used emission intensity factors from the *CEQR Technical Manual*. It proved a simple matter of multiplication because area values of the buildings had been determined. Many EISs did not consider these emissions, even though their actions included constructing buildings and facilities.

Turning to the second category, there were several EISs for renewable energy projects that considered these emissions.<sup>16</sup> The EISs relating to the allocation of water resources most thoroughly addressed indirect emissions due to their production of hydroelectric power. These projects affected water levels around a dam. Hydroelectric power, produced by dams, is a carbon-free form of electricity generation. The EISs that addressed these emissions evaluated interconnected systems of electricity generation.

The Long-Term Experimental and Management Plan (LTEMP) for the Operation of Glen Canyon Dam provides an apt example of this approach. Under the climate change section, the EIS says: “there are relatively large differences in the monthly and within-day pattern of releases that affect hydropower capacity. These differences in available capacity affect how other power facilities in the region respond to changes in demand, and in this way can affect the total system emission of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHGs).” The agency evaluates the effects of Glen Canyon Dam operations on the power system (which included all surrounding generating facilities). The GHG emissions were then quantified across each alternative by evaluating electricity generation of each facility and electricity traded on the spot market.

The Eagle Rule Revision EIS addressed how new permitting regulations may lead to challenges to implementing wind energy. Decreased wind energy could therefore increase GHG emissions. This analysis was more speculative and described qualitatively, given that the power system evaluated is national, rather than the limited area around the Glen Canyon Dam.

*Upstream and Downstream Emissions.* Upstream emissions are emissions from project inputs (e.g., emissions from the manufacturing of construction materials required for a proposed project or emissions from the production of gas that will be transported via the proposed project). Downstream emissions are emissions from project outputs (e.g., emissions from the transportation and consumption of coal that will be mined as a result of the proposal). The CEQ guidance calls for consideration of these emissions: “Activities that have a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for a proposed agency action or as a consequence of a proposed agency action, should be accounted for in the NEPA analysis.” (p. 13)

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<sup>16</sup> These included the Glen Canyon Dam EIS, the Klamath Basin EIS, and the Eagle Rule Revision EIS (see Appendix for full details).

Two of the EISs addressed upstream emissions (6%). One of these EISs was for a project that involved the operation of both a coal mine and coal-fired power plant (because these activities were viewed as “connected”, the upstream emissions from coal mining were discussed).<sup>17</sup> The other was an EIS for a development project, where the agency quantified “upstream emissions from the production of steel, rebar, aluminum, and cement used for construction” and found that these would be equivalent to approximately 5-10 years operational emissions.<sup>18</sup> Of the remaining EISs, 14 (45%) were scored as “No,” and 15 (48%) were considered not applicable. This follows in line with findings from the Sabin Center’s *Survey of Climate Change Considerations in Federal EISs, 2012-2014*. The report says, “But as a general matter, agencies do not discuss emissions associated with the upstream processing of goods that were needed to construct or operate the proposed project” (p. 16). Those that were scored as “No” primarily fell in the fossil fuel infrastructure category (7, 78%). These are fossil fuel projects that involve the transportation or combustion of fossil fuels. For example, the Mountain Valley Project and Equitrans Expansion Project proposes the construction and operation of natural gas pipelines. However, this EIS does not include an emissions discussion of how the natural gas is extracted. Per CEQ guidelines, this EIS should address methane leakage associated with natural gas extraction and transportation.

2 (6%) of the EISs addressed downstream emissions. 11 (35%) did not address downstream emissions, and it was not relevant for 18 (58%). The two EISs that addressed downstream emissions both involved coal mining activities,<sup>19</sup> and are discussed in greater detail in the “fossil fuel” section below.

These results reveal that there is still uncertainty surrounding whether and how agencies ought to account for upstream and downstream emissions. In some cases, there are simple calculations that can be made in order to address downstream emissions (e.g., emissions factors can be used to determine the amount of CO<sub>2</sub> generated from the combustion of fossil fuels). Additional guidance on this topic might be helpful for agencies.

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<sup>17</sup> Bureau of Reclamation, Navajo Generating Station-Kayenta Mine Complex Project FEIS (2016) (discussing upstream and downstream emissions).

<sup>18</sup> Department of Housing and Urban Development, Lambert Houses Redevelopment FEIS (2016) at 14-7.

<sup>19</sup> Bureau of Reclamation, Navajo Generating Station-Kayenta Mine Complex Project FEIS (2016) (discussing upstream and downstream emissions); Office of Surface Mining, Reclamation and Enforcement (OSMRE), North Cumberland Wildlife Management Area, Tennessee Lands Unsuitable for Mining FEIS (2016) (discussing downstream emissions).

Other Indirect Emissions. This category sought to capture any other source of indirect emissions. Only 2 EISs identified additional indirect emissions. The Long-Term Plan to Protect Adult Salmon in the Lower Klamath River EIS discussed diesel emissions to pump for groundwater as a result of changing water levels due to water diversions. The Vantage to Pomona Heights Transmission Line Project mentioned the corona effect, a phenomenon of transmission lines that produces nitrous oxide. This category is incredibly specific to each EIS, and the high number of not applicable actions (the remaining 29, 93%) indicates that most indirect emissions fell within the other categories outlined above.

### **2.1.3 Comparison to Alternatives**

The CEQ Guidance states “the alternatives analysis is the heart of the EIS under NEPA Section 102(2)(C)” (CEQ 14). Along with a range of reasonable alternatives to the proposed action, the CEQ recommends agencies present a no action alternative that describes the environmental impact if the proposed action is not brought to fruition. Including comparisons of GHG emissions between alternatives ensures that agencies consider alternate methods of carrying out their proposed action. NEPA and the CEQ guidance do not require the decision maker to select the alternative with the lowest net level of emissions. Rather, a comparison of alternatives by GHG emissions allows for a reasoned final decision.

Of the total 31 EISs evaluated, 18 (58%) compared GHG emissions between the proposed action and reasonable alternatives and 7 (23%) did not, even though doing so was applicable. In breaking down the 18 EISs that were scored “Yes” for this consideration, 3 (75%) of the built environment projects compared GHG emissions between the proposed action and reasonable alternatives, while EISs in the fossil fuel infrastructure and natural resource management categories exhibited lower consistency rates (75% and 69%, respectively). Notably, however, the majority of the EISs that did disclose these emissions presented the information quite clearly, by drawing explicit comparisons between alternatives, and presenting all of the quantified data on emissions from alternatives in a clear manner.

For the 18 EISs that scored “Yes,” the alternatives were discussed in a range of manners -- notably, the information was either clearly presented or not, a key difference in evaluating the efficacy of the discussion and findings.

For some, it was limited to a comparison between a facility's baseline operational emissions under the no action alternative and the extent to which the proposed action would increase or decrease emissions over that baseline, typically briefly qualified rather than quantified. This preliminary alternatives discussion proved stronger in other EISs, which compared the potential for GHG emissions under the primary proposal, all of the reasonable alternatives, and the no action alternative. Yet, this information was still not presented in a manner that would facilitate easy comparison by decision-makers and the public—for example, the emissions estimates for different alternatives would be found on different pages of the EIS, without any direct comparisons between the alternatives.

Examples of such EISs included the Lambert House Redevelopment, Effects of Oil and Gas Activities in the Arctic Ocean, Moose-Wilson Corridor, and North Cumberland Wildlife Management projects. The Arctic Ocean EIS provided thorough analyses for direct and indirect emissions across all six alternatives, including the no-action alternative, and included a comparative discussion as well. The EIS failed to present the findings in a summary table for clear comparison, however, thus reducing the efficacy of the analysis. The Lambert Housing, Moose-Wilson, and North Cumberland projects proved even less effective as they included only brief qualitative mentions of emissions across alternatives, failing to analyze these conjunctively or cross-comparatively. These projects noted the general similarities and “nominal impacts” across alternatives and resulting GHG emissions as a justification for a lack of comparison, which may be an explanation.

Notably, however, many of the EISs that did present the alternatives analysis quite clearly, by drawing explicit comparisons between alternatives, and presenting all of the quantified data on emissions from alternatives in a single table. Strong analyses were presented in a variety of ways, emphasizing the relative freedom agencies have in completing this section of the EIS. For example, the Kayenta Mine EIS compared the social cost of carbon (See Section 2.2.1f) across all alternatives as a proxy for GHG emissions impacts, while the Millennium Bulk EIS presented GHG emissions in absolute terms (metric tons of CO<sub>2</sub>e) across all alternatives, breaking down the emissions by source. Using yet another method, the Craters of the Moon National Monument EIS calculated and compared the percentage of annual US greenhouse gas emissions from livestock for each of the alternatives, providing useful emissions share statistics.

### **2.1.4 Mitigation Measures**

Of the 20 EISs that disclosed GHG emissions, only 8 (40%) discussed mitigation measures. A range of mitigation measures were discussed across these EISs, including energy efficiency, biofuel energy, and various approaches to reduce construction emissions. In no EIS was mitigation a central focus of the action or alternatives; instead these proposed measures read as afterthoughts. Furthermore, none of the EISs that outlined mitigation measures included a mitigation monitoring plan to ensure that those measures were implemented and that they achieved the desired results. Where mitigation was not discussed, this decision was often justified on the basis that the overall GHG footprint of the action would be relatively small. Overall, it appeared that GHG mitigation was not a priority for agencies. Many of the EISs discussed how the emissions that their project will produce are not a significant quantity in comparison to global emissions as a justification for disregarding mitigation measures, despite the fact that the CEQ guidance states that such language is merely a statement about the nature of climate change and not useful to decision-makers.

Of the 8 EISs that included mitigation measures, 5 were fossil fuel infrastructure projects (63%). Two were natural resources (25%) and one built environment EISs (12.5%). Built environment projects can naturally and easily address mitigation measures in terms of building energy efficiency, and so it is surprising that only one of the three projects did so (33%).

Also noteworthy was the fact that only 1 EIS used the federal social cost of carbon (SCC) to disclose the economic implications of the GHG emissions that would be generated as a result of the proposed action.<sup>20</sup>

### **2.1.5 Social Cost of Carbon**

The CEQ guidance defines the social cost of carbon (SCC) as “an estimate of the marginal damages associated with an incremental increase in CO<sub>2</sub> emissions in a given year” and presents quantification tools developed by the Interagency Working Group (IWG) on SCC. The SCC allows for a clear socioeconomic translation of the impact of GHG emissions, allowing agencies to incorporate these values into cost-benefit analyses of regulatory actions that impact cumulative

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<sup>20</sup> Bureau of Reclamation, Navajo Generating Station-Kayenta Mine Complex Project FEIS (2016).

global emissions. Agencies can also use other tools to monetize the costs of methane and nitrous oxide emissions.

Of the 20 applicable EISs, only 1 (4%) quantified the SCC. Indeed, the Kayenta Mine fossil fuel infrastructure EIS did so in a notably robust manner. The EIS quantified the SCC by multiplying the annual CO<sub>2</sub> emissions from the continued operation of the Navajo Generating Station coal-fired plant by the federal SCC per metric ton value developed by the IWG on SCC. Further, the EIS recognized uncertainty by using multiple discount rates and summing the discounted values to produce the final estimate. The EIS also compared SCC estimation results between the proposed action, reasonable alternatives, and no action alternative for a reasoned analysis of alternatives.

### **2.1.6 Miscellaneous**

*Scope of Proposed Action.* The scope of proposed action section sought to address the broader framework of the EIS through evaluating associated actions and environmental review processes. The first question asked: “Does the EIS identify connected actions, and if so, are emissions from those actions discussed?” Of the 31, 2 EISs (6%) identified connected actions and discussed their emissions, 2 (6%) identified connected actions and did not discuss emissions, and the majority, 27 (87%), did not identify connected actions, and were thus scored “Not Applicable.”

The second question related to a programmatic EIS (PEIS). A PEIS evaluates the effects of broad proposals or planning-level decisions and is applicable for multiple EISs. Of the 2 EISs with associated PEISs, neither adequately evaluated GHG emissions (100%). One of the “No” EISs in this category was a project from the Bureau of Ocean Energy Management (BOEM), which is notable for failing to consider emissions. There may also be confusion between the PEIS and EIS in terms of which should account for emissions, though in this case, neither the BOEM EIS or PEIS even mentioned emissions. The other non-complying PEIS was from 1976–titled Mississippi River between the Ohio and Missouri Rivers (Regulating Works)—and so it accordingly does not discuss emissions or climate change at all. Given that this is such a small sample size, it is difficult to draw conclusions on PEISs and emissions.



*Info Sources & Uncertainty.* This category asked if agencies “disclose information used in the GHG analysis along with explanations of assumptions and uncertainties.” The language was lifted directly from the Direct and Indirect Effects section of the CEQ guidance. This question sought to evaluate how thorough the agency was in discussing the technical basis for its emissions quantification and qualification.

We were looking for direct citations to tools and text that the agency used to address emissions. Examples of such material includes the CEQR Technical Manual, hydrological models, EPA handbooks, and other credible government or scientific sources, many of which are mentioned in the CEQ guidance itself. Previous EISs or other reports were often cited.

An EIS received a “Yes” if such sources were used and a “No” if not. If a GHG analysis was not present (regardless if it should have been), the EIS received “N/A.” We were generous in this section, in that if the EIS cited any relevant sources that they used in the emissions section, we scored them as “Yes,” even if they did not directly address assumptions and uncertainty. This is reflected in the high consistency rates. Of the 25 EISs that did evaluate emissions, 18 (58%) provided citation and 7 (23%) did not. Those that received “No” skimmed the surface of the emissions section and did not thoroughly evaluate emissions.

*Frame of Reference.* This category refers to the agency’s recognition of how the project fits into a broader frame of GHG emissions standards. Specifically, it asks: “Does the agency discuss relevant approved federal, regional, state, tribal, or local plans, policies, and laws for GHG emission reductions to make clear whether a proposed project’s GHG emissions are consistent with such plans or laws?”

Plans, policies, and laws refers to measures that have been implemented to reduce GHG emissions either within a region, state, nation, or between such entities. In this category, we were looking for the EIS to reference specific policies. An EIS received a “Yes” if it discussed the project in relation to such policies, a “No” if it did not, and “N/A” if there were no emissions associated. Only 8 EISs (26%) received a “Yes,” 12 (39%) received a “No,” and 11 (13%) were N/A. For those that complied, examples of these policies included PlaNYC, California state GHG reduction targets, and the Clean Air Act. They included local, state, and federal policies and laws.

This analysis is important because it grounds the GHG emissions of the project in a relevant frame of reference. Agencies, as discussed in the earlier mitigation section, often minimize the



importance of emissions by placing them in a global context. Evaluating emissions through the lens of local policies, however, forces the agency to more thoroughly evaluate the impact the project has on climate change.

## **2.2 Climate Change Impacts and Adaptation**

A large number, 25 (81%), of the EISs addressed the effects of climate change on the local environment of the proposed action. However, only 12 (39%) of the EISs then took the next step of evaluating the implications of climate change for the environmental outcomes of the proposed action. Even fewer EISs—7 (23%)—discussed elements of the action that may need to be reconstructed, repaired, or restored because of climate change.

Only 10 of the 31 EISs (32%) compared risk/resilience to climate change between the proposed action and reasonable alternatives, suggesting short-term rather than long-term agency perspective. Examples of alternatives' acknowledgement of risk/resilience to climate change juxtaposed with that of the proposed action included comparisons regarding flood damage prevention, hydrologic and sediment inputs, eagle population preservation, prescribed fire management for land restoration, and more. This question exhibited notable nonconsistency across the board for all EISs, with slightly increased consistency in the natural resource management category.

The vast majority of EISs did not address the project's adaptation to climate change, thus marking this consideration as the one with the lowest consistency rate. In part, this is due to the fact that consistency with the adaptation consideration builds on an EIS's climate change analysis, which only about three-fourths of EISs performed. Furthermore, adequately addressing this consideration requires that the agency will perform another layer of analysis that builds on the effect of climate change on the local environment, and connects these effects to the project's strengths and weaknesses. 7 EISs (23%) identified possible adaptation measures to eliminate or mitigate the project's impacts that are exacerbated by climate change. 8 EISs (26%) presented adaptation measures to render the project more resilient to climate change. Five (16%) EISs addressed both adaptation questions.

### **3. FINDINGS BY EIS CATEGORY**

#### **3.1 Natural Resources**

There were 18 total EISs reviewed in the category of natural resource management. Within this category, 6 were land management projects, 4 were fishery management plans, 3 ecosystem restoration plans, 2 were water resource management projects, 1 was a resilience project, 1 was an eagle regulation and protection plan, and 1 was concerned with water resources as a source of energy through dam hydropower. There were 9 agencies responsible for these EISs, National Marine Fisheries Service was the lead agency for 3, the Bureau of Reclamation was the lead agency for 3, and the Forest Service was the lead agency for 3. Four agencies were responsible for 2 EISs each, and 2 agencies were the lead agency for one EIS each. In reviewing general trends in this category, the EISs were evaluated in accordance with how they addressed the areas of emissions (direct and indirect), mitigation measures, emissions from alternatives, effects of climate change, alternatives to climate change, and adaptation considerations. Biogenic emissions were relevant to 10 of the projects (55%) and not applicable to 8 (44%); of these 10 EISs, 4 EIS analyzed emissions biogenic sources while 6 did not.

For the majority of projects in this category, emissions were not a critical component of the proposed actions. Restoration EISs typically included landscape restoration involved with thinning certain forest sections in order to improve the local environment's ecosystem services as well as reducing the risk of fire or natural disaster. Another category of restoration projects, fishery management plans, aim to improve fish stocks by either eliminating overfishing or improving the local ecosystem so it better provides for the fish. These two types of EISs largely did not address GHG emissions.

Resource management and land maintenance plans had minimal construction and operational emissions with impacts more concerned with preservation of the surrounding habitat. This section of the CEQ guidance is important for establishing projects that do not need to be consistently rebuilt and modified as the climate changes; the category of natural resource management projects does not adequately address these considerations by including mitigation measures and alternatives beyond addressing impacts to the project's local environment. With regards to climate change, the vast majority of EISs provided a description of the effects of climate

change on the local environment, nevertheless few went beyond that and discussed what the effects of climate change would mean for the proposed action. Of all 31 EISs, this is the only category that considered making the project more resilient to the effects of climate change by identifying possible adaptation measures.

*Table 3.1. Key Considerations in Natural Resources EISs.*

Consideration	Yes	No	N/A
<b>Effects of Action on Climate Change</b>			
(1) Construction Emissions	7	4	7
(2) Operational Emissions	4	2	12
(3) Mitigation	2	9	7
(4) Alternatives (emissions)	9	4	5
<b>Effects of Climate Change on Action</b>			
(5) Effect on Local Environment	15	3	0
(6) Reconstruction/Repair	5	6	7
(7) Alternatives (climate change)	8	10	0
(8) Adaptation	5	9	4
Total EISs			19

### 3.1.1 Emissions

*Direct Emissions.* In evaluating emissions from the proposed action, 8 of the EISs (44%) addressed direct emissions while 3 (17%) did not and 7 (39%) were not evaluating projects where emissions were applicable. Of the agencies that addressed GHG emissions, 5 EISs provided a quantified analysis of either the construction or operational emissions instead of only qualitatively mentioning the reality of GHG emissions.

Many of the projects had no direct emissions. Some were dealing with water management plans, such as the Glen Canyon Dam in Colorado and the Rio Grande project in New Mexico. Both bodies of water are critical to the local water supply in addition to diversion points in other states. The Glen Canyon Dam project focused on the generation of electricity from the water source while Rio Grande project focused on the transportation of water from the source, and both failed to include an analysis of direct emissions. Two projects were land management plans intended for livestock grazing including fence construction around the land plots but without an analysis of construction emissions. Two EIS addressed GHG emissions from construction, including a landscape restoration project under the Bureau of Land Management (BLM). Five projects addressed all relevant direct emissions to the project meaning that if emissions were not addressed, they were not applicable to the project's intended action. These projects included the transformation of a floodplain into an intertidal wetland in Otay River in San Diego County, an upgraded water management infrastructure of the Santa Margarita River in California, and the maintenance of a navigation channel through dredging in the Mississippi River. Two Forest Service EISs on landscape restoration did not address direct emissions even though the projects clearly involved operating machinery to thin the landscape.

*Indirect Emissions.* Of the 19 EISs reviewed, 8 EISs (44%) addressed indirect emissions while 10 (55%) did not. One project developing a long-term management plan of the Glen Canyon Dam, evaluated indirect emissions through energy consumption because reduced operation of the dam would lead to increased use of higher polluting energy generation methods; emissions were analyzed both quantitatively and qualitatively. The land management project in Craters of the Moon National Park in Idaho evaluated methane emissions from grazing livestock as indirect emissions. Lastly, one project focused on treating vegetation through manual, mechanical, and biological controls. The 3 Bars Ecosystem EIS proposed for Eureka, Nevada evaluated the indirect emissions of prescribed fire management. Seven projects did not include an analysis of indirect emissions through increased vehicle traffic despite the project's operations causing increased visitor and employee vehicle trips and idling. Only 1 fishery management EISs addressed indirect emissions despite how these projects will affect boat activity affecting induced vehicle trips emissions. Overall, indirect emissions were not a central concern for most of these projects and

were not analyzed thoroughly. Recognition of upstream and downstream emissions through building materials and transportation of resources were key issues that lacked robust analysis.

*Alternatives.* In this section, 9 EISs provided an analysis of emissions across alternative actions. Including this analysis shows that agencies are considering all impacts of a project and how the environment will be affected as a result of its action.

*Mitigation.* Only 2 EISs (11%) addressed the need for mitigation measures while 9 (50%) did not discuss plans to minimize emissions. This is a crucial component of recognizing the impacts that this project's emissions have on climate change, and it was not addressed fully. One EIS that included mitigation measures was the Moose-Wilson Corridor in Grand Teton National Park project. The agency provided options to reduce vehicle idling, using low-emitting vehicles and fuels, alternative transportation that can carry more than one individual, and the use of alternative energy fuels for the visitor center.

### **3.1.2 Effects of Climate Change**

Of the 18 EISs, a significant majority (15, 83%) addressed the impacts of climate change on the local environment. Nine (50%) of these analyzed the effects of climate change one step further and addressed how the environmental outcomes of the project would be affected by climate change. Only five EISs discussed whether any element of the action would need to be reconstructed, repaired, or otherwise restored as a result of these climate change impacts. 8 (44%) addressed climate change impacts and risks across the alternatives.

5 of the EISs (28%) proposed possible adaptation measures to minimize the effects of the action that are exacerbated by climate change, while 7 (39%) discussed possible resilience measures. One project in Craters of the Moon National Park was a land management plan concerned with returning the local area to a functional state, improving or restoring local ecosystem services, and adjusting livestock grazing quantities. The activities of this action are considered to improve the environment's resilience to climate change, and the EIS evaluated the impact of the proposed action on climate change along with how the action would render the alternatives more or less resilient to a changing climate.

In comparing this category to the total number of EISs in this report, natural resource management paid the most attention to adaptation and resilience measures to both reduce the impact on climate change and prepare for the future effects of climate change.

### 3.2 Built Environment

Four EISs were analyzed in this category. The projects reviewed included proposals for one public airport, one military air field, a housing development plan, and a coastal restoration project in an urban area (restoration projects that involved undeveloped areas were categorized as natural resource management projects). When evaluating EISs in this category, we especially looked for construction and decommissioning emissions as well as potential upstream emissions and downstream emissions.

*Table 3.2. Key Considerations in Built environment EISs.*

Consideration	Yes	No	N/A
<b>Effects of Action on Climate Change</b>			
(1) Construction Emissions	4	0	0
(2) Operational Emissions	3	0	1
(3) Induced Vehicle Trips	3	1	0
(4) Indirect Downstream Emissions	0	0	4
(5) Alternatives (emissions)	3	1	0
(6) Mitigation	1	3	0
<b>Effects of Climate Change on Action</b>			
(7) Reconstruct/Repair	0	4	0
(8) Alternatives (climate change)	1	3	0
(9) Adaptation	1	3	0
Total EISs			4

Overall, the built environment EISs did well in accounting for GHG emissions, especially with regards to operational emissions and emissions from induced vehicle trips. Nonetheless, taken as a whole, the EISs in this category did not provide much information regarding upstream and downstream emissions even though at times it was a reasonable calculation to perform. Yet, 2 EISs stand out: The Lambert House EIS provided a detailed description of the measures the agency intends to take to mitigate its GHG emissions, and the EA-18G EIS did well in following the CEQ's guidance and analyzing the project's estimated GHG emissions. Its GHG analysis went beyond CO<sub>2</sub> and included a wide variety of pollutants. With regards to climate change, the EIS analysis is quite detailed and went beyond the effects of climate change on the local environment, addressing the project's vulnerability to climate change as well as how climate change might affect the timing, nature, or magnitude of the project's environmental effects.

### 3.2.1 Emissions

*Direct Emissions.* All 4 EISs (100%) in this category addressed direct GHG emissions and provided a quantitative estimate. All EISs (100%) presented the estimated emissions from construction and operations if applicable, which is to be expected as construction and operations are core activities for these EISs. While 2 EISs (67%) involved significant construction over vegetation areas, no EIS (0%) addressed the impact on the local environment's carbon sequestration capacities.

*Indirect Emissions.* Of the 4 EISs, 3 (75%) also addressed indirect GHG emissions to some extent. Three EISs addressed induced vehicle trips, and two (50%) quantified energy consumption. Only 1 EIS (25%) addressed estimated emissions from upstream sources, even though the building materials used in the construction process would have counted toward upstream emissions for all 4 projects.

*Alternatives.* 3 of the 4 EISs (75%) compared GHG emissions between the proposed action and its alternatives. Two of these provided an elaborate quantitative analysis of GHG emissions from alternatives. Including this analysis shows that agencies are considering all impacts of a project and how the environment will be affected as a result of its action.

*Mitigation.* One EIS (25%), the Lambert House Redevelopment project, presented emissions mitigation measures, including building efficiency through energy-saving insulation and lighting

methods, use of Energy Star appliances, and recycling. This EIS is an anomaly as most evaluated EISs did not present such clear mitigation measures. No EIS (0%) presented a monitoring scheme to evaluate the success of its mitigation plan. To some extent this was expected as most EISs did not present a GHG emission mitigation strategy.

### **3.2.2 Effects of Climate Change**

Three (75%) of the EISs in this category discussed the effects of climate change on the local environment. Only two then evaluated the implications of climate change for the environmental outcomes of the proposed action. None (0%) of the EISs describe whether the action may need to be reconstructed, repaired due to climate change. One EIS (25%) addressed the risks from climate change or resilience to climate change between the proposed action and alternatives.

One of the EISs (25%) identified adaptation measures to eliminate or mitigate impacts of the proposed action that are exacerbated by climate change. However, none of the EISs (0%) identified possible adaptation measures to make the action more resilient to the effects of climate change.

## **3.3 Fossil Fuels**

There were 9 total EISs reviewed within the category of fossil fuel infrastructure. In this category, 3 were oil/gas lease and drilling projects, 2 evaluated the construction of natural gas pipelines, 3 evaluated the mining of coal, and 1 project described the construction and management of a transmission line. In reviewing trends and evaluating analyses by these agencies within this category, the EISs were evaluated in accordance with how they addressed the areas of emissions (direct and indirect), mitigation measures, effects of climate change, and adaptation considerations. There were 8 agencies responsible for these EISs with 1 agency, the Bureau of Ocean Energy Management (BOEM) in charge of 2 projects in the Gulf of Mexico which contained the least detailed analyses of emissions and climate change effects. This category, overall, lacked detailed analyses of indirect greenhouse gas emissions from proposals and alternatives (specifically, they failed to address upstream and downstream emissions).



**Table 3.3. Key Considerations in Fossil Fuel Infrastructure EISs.**

Consideration	Yes	No	N/A
<b>Effects of Action on Climate Change</b>			
(1) Construction Emissions	5	2	2
(2) Operational Emissions	8	1	0
(3) Indirect Downstream Emissions	2	6	1
(4) Alternatives (emissions)	6	2	1
(5) Mitigation	5	3	1
<b>Effects of Climate Change on Action</b>			
(6) Effect on Local Environment	7	2	0
(7) Reconstruction/Repair	2	7	0
(8) Alternatives (climate change)	1	8	0
(9) Adaptation	0	9	0
EISs	Total		9

### 3.3.1 Emissions

*Direct emissions.* Of the 9 EISs, 8 (88%) addressed direct emissions from the proposed action, with 5 (56%) discussing emissions from construction activities and 5 (88%) discussing operational emissions. Both oil and gas lease sale EISs in the Gulf of Mexico did not analyze or quantify the direct emissions that the project would release. There was heavy construction equipment described and required for building of facilities as well as drilling itself and this was deemed not significant

in the EIS by BOEM in relation to the total amount of GHGs released annually. Five EISs failed to include direct emissions through decommissioning activities. These projects did not include an analysis of how the pipeline or mining facilities would be deconstructed once the project was complete. One oil drilling project includes an analysis of the direct emissions through the operation of engines to power the drillships, drilling units, seismic vessels, and other generators. With such a high number of EISs reporting direct emission statistics, it is apparent that the agencies are acknowledging the project's emissions. While most claim to be non-significant emissions, there is a consistent attempt to at least qualitatively analyze the environmental impacts of the project's emissions.

*Indirect emissions.* 5 EISs (22%) addressed indirect emissions in their evaluations while 4 (44%) did not address them where applicable.

The most relevant types of indirect emissions for these projects were upstream and downstream emissions. There was only one fossil fuel EIS that addressed upstream emissions (in many cases, these were N/A, because the proposal involved production rather than transportation or consumption of the fuels), and two fossil fuel EISs that addressed downstream emissions.<sup>21</sup> The most comprehensive lifecycle emissions analysis was for a proposal that involved the ongoing operation of a coal mine that was directly connected to a coal-fired power plant – the EIS treated the mine and the power plant as connected actions, and contained a thorough analysis of GHG emissions from the production, transportation, processing, and use of the coal.<sup>22</sup> It also disclosed the social cost of the carbon emissions generated, using the federal social cost of carbon. Interestingly, this EIS was not prepared by one of the agencies that typically manages fossil fuel development on federal lands (these include the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the Bureau of Ocean Energy Management (BOEM)). Rather, it was prepared by the Bureau of Reclamation (due to a water supply approval that was required for the project).

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<sup>21</sup> These included the Navajo Generating Station-Kayenta Mine Complex Project FEIS (discussing upstream and downstream emissions) and the North Cumberland Wildlife Management Area, Tennessee Lands Unsuitable for Mining FEIS (2016) (discussing downstream emissions). See the Appendix for complete details about the EISs.

<sup>22</sup> Navajo Generating Station-Kayenta Mine Complex Project FEIS.

In comparison, the Millennium Bulk Terminals-Longview EIS did not address the combustion of coal, despite the fact that the project is a coal export facility. The emissions quantification does not include the end-use of this coal, and the analysis stops at the operational emissions and hazardous waste cleanup of the export facility.

*Alternatives.* Six (67%) of the 9 EISs included an analysis of the emissions of alternatives to the proposed action, showing that more than half of the agencies addressed alternative plans of action to the proposed project. To have the majority of EISs recognizing the need for alternative analyses is a positive trend. We also assume that with stronger evidence of researching alternative plans of action, mitigation measures and commitments to sustainability will be included more frequently.

*Mitigation.* Of the 9 EISs, 5 (55%) included mitigation measures to the proposed action while 3 EISs (33%) did not mention possibilities for mitigation and reduction of emissions. As mentioned in the previous section, no EIS includes a monitoring scheme to track changes in the possible mitigation measures. Two EISs, one concerning maintenance and decommissioning of a coal-firing plant in Arizona and the other concerning construction of a transmission line in Pomona, New York, provided ways to reduce emissions in the construction phase of the project through required design features but not in the day-to-day operations of the project. Both of these components are important in evaluating mitigation and must be included in equal measure. One project concerning construction of a pipeline through West Virginia and Virginia offers a list of mitigation measures that were suggested by FERC with an explanation of the reasons for implementing these specific steps in relation to the affected environment.

### **3.3.2 Effects of Climate Change**

Most EISs (7, 78%) in this category addressed the local impacts of climate change. However, only 1 (11%) EIS took the next step in evaluating the project's implications of climate change for the environmental outcomes of the action. Acknowledging the relationship between the project's action and climate change impacts makes the agency responsible for its action and forces them to evaluate possible mitigation measures to reduce these impacts. Only 2 (22%) EISs discussed if the action may need to be reconstructed, repaired, or otherwise restored due to climate change.

Two projects did not address the effects of climate change in any capacity in their evaluation of the proposed action, one concerning construction of a transmission line and the other concerning a coal export terminal in Washington. Both of these EISs included a description of what climate change is and how it will change the global environment but failed to include a direct relationship to the proposed action. 2 EISs (22%) addressed the possibility of reconstruction or repair of the project structures while 7 (78%) did not; this is a direct application of how climate change will impede the proposed action which would be hindered or re-envisioned by the need to reconstruct or repair during the action process. The effects of climate change were deemed applicable for all EISs, because all of the the proposals were located in areas that would undergo changes due to climate change.

Only 1 EIS (11%) addressed alternatives of climate change risks and adaptations to the proposed action. This was an oil-drilling project in the Arctic Ocean and it addressed the effects of warming temperatures on the thickness and expanse of sea ice. The 8 remaining EISs failing to include this analysis and make a strong connection between the project's impact and the effects of climate change. In most cases, especially in this category, the two components are intertwined and this relationship needs to be addressed and analyzed.

With regards to adaptation measures: only 1 (11%) of the fossil fuel EISs considered adaptation measures. The project was a construction and operational plan of liquefaction facilities and natural gas pipeline system in Magnolia near Lake Charles, Louisiana. The agency considered the rise in sea level and the environment in which the pipeline is being built. The EIS mentions that the terminal facilities should be built to be able to withstand damage from at least a Category 3 storm.

## 4. CONCLUSION

### 4.1 Notable Trends

In concluding this survey, we posit two notable trends regarding EIS consistency and broader agency outlook. Despite boasting high consistency rates in assessing GHG emissions--specifically the comprehensive quantification of direct emissions--as a proxy for assessing the effects of proposed actions on climate change, the 31 evaluated EISs largely failed to address two significant climate considerations: (i) GHG emissions mitigation and (ii) adaptation to climate change.

First, less than 30% of the EISs addressed mitigation measures to avoid or minimize GHG emissions. Indeed, in no EIS was mitigation a central focus of the action or alternatives; instead these proposed measures read as afterthoughts. This pronounced gap in such a significant climate consideration demonstrates that agencies are not prioritizing emissions mitigation over project-related (often economic) benefits. To begin to explain this trend, we posit a much too limited scope on the part of agencies. By justifying project GHG emissions as forming a relatively 'insignificant' share of regional, national, or even global emissions, agencies circumvent the greatly important task of situating their projects within the broader scope of concurrent and cumulative actions in order to work toward emissions mitigation in tandem.

Second, more than 80% of the EISs assessed the impacts of climate change on the local environment of the proposed action, demonstrating a broad-based understanding of shifting climate dynamics. Yet, adaptation proved the climate consideration with the lowest consistency rate in our evaluation--less than 30% of EISs discussed possible adaptation measures to make the project more resilient to climate change. This paradox should not be overlooked: why are agencies acknowledging local impacts of climate change without attempting to find adaptive solutions? Ultimately, we chalk this up to short-term agency outlook, in place of much needed long-term, resilience-motivated assessment and action. Heavily focused on short-term implementation of project plans, EISs are largely failing to situate their proposed projects within broader timelines and assess the implications of and consequent resilient solutions to potential project issues.

## APPENDIX: LIST OF ENVIRONMENTAL IMPACT STATEMENTS

### Built Environment:

	Title (Date)	Lead Agency	Link
1	Angoon Airport Project (9/2)	Federal Aviation Administration	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=216501">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=216501</a>
2	Lambert Houses Redevelopment (9/30)	Department of Housing and Urban Development	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217801">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217801</a>
3	EA-18G Growler Airfield Operations at Naval Air Station Whidbey Island Complex (11/1)	United States Department of the Navy	<a href="http://whidbeyeis.com/CurrentEISDocuments.aspx">http://whidbeyeis.com/CurrentEISDocuments.aspx</a>
4	South Shore of Staten Island Coastal Storm Risk Management Final Environmental Impact Statement (9/16)	Army Corps of Engineers	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217403">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217403</a>

### Natural Resources:

	Title (Date)	Lead Agency	Link
5	Amendment 18 to the Northeast Multispecies Fishery Management Plan (10/14)	National Marine Fisheries Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219023">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219023</a>
6	Amendment 5b to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan (10/21)	National Marine Fisheries Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219246">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219246</a>
7	Amendment 37 to the Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region, Modification to the Hogfish Fishery Management Unit, Fishing Level Specifications for the Two South Atlantic Hogfish Stocks, Rebuilding Plan for the Florida Keys/East Florida Stock, and Establishment/Revision of Management Measures for Both Stocks (11/28)	National Marine Fisheries Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219548">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219548</a>
8	Programmatic - Eagle Rule Revision (11/10)	Fish and Wildlife Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220791">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220791</a>
9	Coeur d'Alene Basin Natural Resource Restoration Plan (11/10)	Forest Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220695">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220695</a>

10	Upper Monument Creek Landscape Restoration (11/4)	Forest Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220145">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220145</a>
11	3 Bars Ecosystem and Landscape Restoration Project (10/28)	Bureau of Land Management	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219559">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219559</a>
12	Long-Term Plan to Protect Adult Salmon in the Lower Klamath River (10/21)	Bureau of Reclamation	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219169">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219169</a>
13	Moose-Wilson Corridor Final Comprehensive Management Plan (9/9)	National Park Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217122">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217122</a>
14	El Yunque National Forest Plan Revision (9/30)	Department of Agriculture	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217775">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217775</a>
15	Craters of the Moon National Monument and Preserve Draft Management Plan Amendment (9/30)	Bureau of Land Management	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217763">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217763</a>
16	Long-Term Experimental and Management Plan (LTEMP) for the Operation of Glen Canyon Dam (10/14)	Bureau of Reclamation,	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218701">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218701</a>
17	Otay River Estuary Restoration Project San Diego Bay National Wildlife Refuge (10/21)	Fish and Wildlife Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219274">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219274</a>
18	Upper Green River Area Rangeland Project (10/7)	Forest Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218319">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218319</a>
19	Draft Fire Island Wilderness Breach Management Plan (10/28)	National Park Service	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=21975">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=21975</a>
20	Continued Implementation of the 2008 Operating Agreement for the Rio Grande Project (10/7)	Bureau of Reclamation	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218219">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218219</a>
21	Santa Margarita River Conjunctive Use Project (10/14)	Marine Corps	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218776">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218776</a>
22	Mississippi River between the Ohio and Missouri Rivers (Regulating Works) (11/4)	Army Corps of Engineers	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220090">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=220090</a>

**Fossil Fuels:**

23	Magnolia LNG and Lake Charles Expansion Projects (9/30)	Department of Energy	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218016">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218016</a>
24	Gulf of Mexico OCS Oil and Gas Lease Sale: 2017 Central Planning Area Lease Sale 247 Final Supplemental Environmental Impact Statement (9/16)	Bureau of Ocean Energy Management	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217421">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217421</a>
25	Gulf of Mexico OCS, Proposed Geological and Geophysical Activities (9/30)	Bureau of Ocean	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217962">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217962</a>
26	Mountain Valley Project and Equitrans Expansion Project (9/23)	Federal Energy	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217698">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217698</a>
27	Navajo Generating Station – Kayenta Mine Complex Project (9/30)	Bureau of Reclamation	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217901">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=217901</a>
28	Millennium Bulk Terminals – Longview (10/7)	Army Corps of Engineers	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218354">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=218354</a>
29	North Cumberland Wildlife Management Area, Tennessee Lands Unsuitable for Mining (9/30)	Office of Surface Mining, Reclamation and Enforcement	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219763">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219763</a>
30	Effects of Oil and Gas Activities in the Arctic Ocean (10/21)	National Oceanic and Atmospheric Administration	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219321">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=219321</a>
31	Vantage to Pomona Heights 230kV Transmission Line Project (10/21)	Bureau of Land Management	<a href="https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=21921">https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=21921</a>