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SABIN CENTER FOR CLIMATE CHANGE LAW

**Survey of Climate Change
Considerations in Federal
Environmental Impact
Statements, 2012-2014**

By Jessica Wentz, Grant Glovin, and Adrian Ang

February 2016

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EXECUTIVE SUMMARY

Climate change will have a profound effect on humans and our environment. Recognizing this, federal agencies have begun to incorporate a more detailed discussion of climate change considerations into the Environmental Impact Statements (EISs) that they prepare for major federal actions, such as the approval of resource management plans and public infrastructure projects, in accordance with the National Environmental Policy Act (NEPA). The Council on Environmental Quality (CEQ) has also issued draft guidance on how agencies should evaluate greenhouse gas (GHG) emissions and climate change effects in NEPA reviews.¹

To provide insight into how federal agencies are accounting for climate change in the environmental review process, the Sabin Center conducted a survey of federal EISs published from July 2012 through December 2014. First, we divided the EISs into twelve project categories: electric generation; electric transmission; fossil fuel development; mining; forestry; parks and wildlife; other land management; marine management; public works; transportation; buildings and real estate; and military, space and government research. We then evaluated whether the EISs discussed ten topics related to climate change (all emissions refer to GHG emissions):

Mitigation Considerations

1. Direct operational emissions
2. Emissions from construction
3. Emissions from induced trips
4. Emissions from purchased electricity
5. Other emissions
6. Comparison of emissions from alternatives

Adaptation Considerations

7. Impact of climate change on the proposed action
8. Impact of climate change on water resources

Efficiency Considerations

9. Energy efficiency
10. Water efficiency

¹ COUNCIL ON ENVTL. QUALITY, EXEC. OFFICE OF THE PRESIDENT, DRAFT NEPA GUIDANCE ON CONSIDERATION OF THE EFFECTS OF CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS (Feb. 18, 2010), *available at* <https://www.whitehouse.gov/sites/default/files/microsites/ceq/20100218-nepa-consideration-effects-ghg-draft-guidance.pdf>; COUNCIL ON ENVTL. QUALITY, EXEC. OFFICE OF THE PRESIDENT, REVISED DRAFT GUIDANCE FOR FEDERAL DEPARTMENTS AND AGENCIES ON CONSIDERATION OF GREENHOUSE GAS EMISSIONS AND THE EFFECTS OF CLIMATE CHANGE IN NEPA REVIEWS, 79 Fed. Reg. 77,802 (Dec. 24, 2014).

This survey is a follow-up to a prior assessment of climate change considerations in EISs published from January 2009 through July 2012, which found that most federal agencies addressed climate change to some extent in EISs, but that the specific impacts considered and methodology used to evaluate those impacts varied greatly between agencies.² Excel databases with the results from both surveys are available on our website.³

Key Findings

Federal agencies generally do account for climate change when conducting environmental reviews of projects that will generate GHG emissions or be affected by climate-related phenomena such as sea level rise. Of the 238 federal EISs reviewed in this survey, 214 (90%) contained some discussion of GHG emissions or climate change impacts. Notably, considerations related to climate change mitigation and adaptation were addressed in roughly the same number of EISs: 172 (72%) discussed GHG emissions associated with the proposed action, and 167 (70%) discussed how climate change may affect the proposed action and/or the surrounding environment. In contrast, only 91 EISs (38%) discussed energy efficiency, and only 31 (13%) discussed water efficiency.

Agencies frequently cited CEQ's 2010 draft guidance on climate change and NEPA as well as various Executive Orders and agency policies on climate change when discussing these topics. This suggests that the draft guidance and policy documents have prompted a more thorough disclosure of climate change considerations in EISs. However, the scope and depth of the analysis varied substantially—for example, some EISs contained a detailed inventory of GHG emissions, some provided an aggregate estimate of total emissions, and others merely noted that GHG emissions may occur as a result of the project (without quantifying these emissions or identifying specific sources). This variation was partially due to differences in the nature and location of the proposed actions for which these EISs were prepared. But in some instances, there were discrepancies in how climate change considerations were addressed even in EISs that were prepared by the same agency for similar projects. These findings correspond with the results from our initial survey of EISs prepared from 2009 through 2012.

² The results of the first survey are available at: SABIN CTR. FOR CLIMATE CHANGE L., COLUMBIA LAW SCH., *Climate Change Considerations in Environmental Impact Statements*, <http://web.law.columbia.edu/climate-change/resources/nepa-and-state-nepa-eis-resource-center/eis-databases> (last visited Feb. 1, 2016).

³ SABIN CTR. FOR CLIMATE CHANGE L., *Climate Change Considerations in Environmental Impact Statements*, *supra* note 2.

The survey revealed some interesting trends in how federal agencies account for GHG emissions and climate change impacts in the context of different types of activities. These include:

Lifecycle Emissions from Fossil Fuel Extraction and Transportation – The survey included nineteen EISs for proposals related to fossil fuel development, such as the approval of coal, oil and gas leases, and the construction of natural gas pipelines, liquefaction facilities, and export terminals. Only three of these EISs quantified the lifecycle GHG emissions from the fossil fuels that would be extracted or transported as a result of the project (i.e. emissions from the production, processing, transportation, and end use of fossil fuels). These included the Department of State (DOS)’s EIS for the Keystone XL Pipeline,⁴ the Forest Service (USFS)’s review of two federal coal lease modifications,⁵ and USFS’s review of an oil and gas leasing project in Fishlake National Forest.⁶ Some of the other EISs in this category briefly discussed indirect impacts on GHG emissions—for example, the Federal Energy Regulatory Commission (FERC) stated in several EISs that the approval of natural gas pipelines would actually reduce GHG emissions by displacing more carbon intensive coal use—but they did not contain a complete assessment of downstream and/or upstream emissions.

This is one area where we can expect to see considerable change in the future. CEQ issued revised draft guidance in 2014 that specifically calls for the consideration of downstream and upstream emissions in NEPA reviews.⁷ DOS has also recently announced plans to conduct a programmatic review of the federal coal leasing program that will include an assessment of GHG emissions from coal combustion and to develop a public database of annual carbon emissions from fossil fuels developed on federal lands.⁸

Carbon Sequestration and Vegetation Management – There were many EISs in the “forestry” and “parks and wildlife” categories that involved vegetation management activities. USFS—the lead agency on most of these EISs—typically acknowledged that such activities would

⁴ U.S. DEP’T OF STATE, FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE KEystone XL PROJECT 4.14-4 (Jan. 2014).

⁵ U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, DOI-BLM-CO-SO50-2012-0013, FINAL ENVIRONMENTAL IMPACT STATEMENT: FEDERAL COAL LEASE MODIFICATIONS COC-1362 & COC-67232, at 79-81 (Aug. 2012).

⁶ U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: FISHLAKE NATIONAL FOREST OIL AND GAS LEASING ANALYSIS 169-70 (Aug. 2013).

⁷ COUNCIL ON ENVTL. QUALITY, 79 Fed. Reg. 77,802, *supra* note 1, at 77,826.

⁸ BUREAU OF LAND MANAGEMENT, U.S. DEP’T OF THE INTERIOR, FACT SHEET: MODERNIZING THE FEDERAL COAL PROGRAM (Jan. 16, 2016).

affect carbon sequestration but did not attempt to quantify these impacts. In some EISs, USFS explained that a quantitative analysis was not feasible.⁹ USFS referred to CEQ's 2010 draft guidance on climate change (issued in 2010), which stated that there was not yet "any established Federal protocol for assessing [the effect of land management strategies] on atmospheric carbon release and sequestration at a landscape scale."¹⁰ However, in three EISs prepared during the same period, USFS *did* quantify the potential impacts of vegetation management activities on carbon sequestration and GHG emissions.¹¹

This is another area where we will likely see a different approach in future EISs. Unlike the 2010 version, CEQ's 2014 revised draft guidance specifically directs agencies to "include a comparison of net GHG emissions and carbon stock changes that would occur with and without implementation of the anticipated vegetation management practice."¹² Moreover, USFS and other federal agencies have now compiled data and analytical tools that can be used to develop accurate estimates of carbon storage potential for planning and reporting purposes.¹³ So there is no reason that federal agencies cannot quantify the effects of vegetation management projects on carbon stocks and GHG emissions.

Climate Change Impacts and Adaptation – Although 70% of the EISs contained some discussion of how climate change would affect the proposed action or its surrounding environment, the discussion tended to be quite brief and the findings did not typically influence

⁹ U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: RIM-PAUNINA PROJECT 514 (Jan. 2013); U.S. FOREST SERVICE, U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: MCKAY FUELS AND VEGETATION MANAGEMENT PROJECT 331 (May 2013); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: LAKEWOOD SOUTHEAST PROJECT 146 (Aug. 2013); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: BEAVER CREEK PROJECT at L-11 (Jan. 2014); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, EAST RESERVOIR FINAL ENVIRONMENTAL IMPACT STATEMENT 40 (Mar. 2014).

¹⁰ COUNCIL ON ENVTL. QUALITY, DRAFT NEPA GUIDANCE ON CONSIDERATION OF THE EFFECTS OF CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS, *supra* note 1, at 4.

¹¹ U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, R5-MB-258A, FINAL ENVIRONMENTAL IMPACT STATEMENT: WHISKY RIDGE ECOLOGICAL RESTORATION PROJECT 81-88 (May 2013); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE REVISED LAND MANAGEMENT PLAN: KOOTENAI NATIONAL FOREST 111 (Aug. 2013); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, R5-MB-270, RIM FIRE RECOVERY ENVIRONMENTAL IMPACT STATEMENT 69-71 (Aug. 2014).

¹² COUNCIL ON ENVTL. QUALITY, 79 Fed. Reg. 77,802, *supra* note 1, at 77,826.

¹³ See, e.g., U.S. FOREST SERV., *Tools for Carbon Inventory, Management, and Reporting*, <http://www.nrs.fs.fed.us/carbon/tools/> (last updated Feb. 10, 2015) (providing a "toolbox full of basic calculation tools to help quantify forest carbon for planning or reporting"); Leslie Richardson et al., NAT'L PARK SERV., NATURAL RESOURCE REPORT NPS/NRSS/EQD/NRR—2014/880, TERRESTRIAL CARBON SEQUESTRATION IN NATIONAL PARKS: VALUES FOR THE CONTERMINOUS UNITED STATES (Nov. 2014), available at <https://www.nature.nps.gov/socialscience/docs/CarbonSequestration.pdf> (quantifying "the ecosystem service value of carbon sequestration in terrestrial ecosystems within NPS units in the conterminous United States for which data were available").

the agency's decisions about project design, location, environmental mitigation measures, or other aspects of the proposed action. This was true even for some coastal infrastructure projects (e.g., bridges and roads), where the agency would cite sea level rise projections without discussing implications for the design or location of the project.¹⁴ There were a handful of exemplary EISs that contained an in depth analysis of climate change impacts and adaptation options, primarily in the context of decisions about how to manage public lands and parks.¹⁵ Some even provided for continuous monitoring and the implementation of mitigation measures in the event of certain impacts (e.g., if water levels in a river were to fall below a particular threshold, the agency would reevaluate water allocations for park services).¹⁶ These EISs could serve as a guidepost for similar proposals. The Sabin Center has also developed a set of model protocols for evaluating the impacts of climate change on buildings and infrastructure undergoing environmental reviews, and we intend to develop similar protocols for natural resource and land management projects.¹⁷

Report Structure

This report is divided into three sections. Section 1 introduces the project, describes the survey methodology, and summarizes the legal context for evaluating climate change considerations in EISs. Section 2 contains a general analysis of trends and results for all of the EISs that were surveyed. Section 3 contains a more detailed analysis of how climate change

¹⁴ See, e.g., FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP. & TX DEP'T OF TRANSP., CSJ: 0101-06-095, US 181 HARBOR BRIDGE PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT/ SECTION 4(F) EVALUATION 3-97 (Nov. 2014) (failing to discuss the implications of projected sea level rise on the design or location of a bridge in the coastal city of Corpus Christi, TX).

¹⁵ See, e.g., U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, R8-MB 143 A, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE GEORGE WASHINGTON NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN at 3-76 – 3-88 (Nov. 2014) (addressing, directly, the effects of expected climate change and methods for reducing vulnerability to such effects); U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, MALHEUR NATIONAL WILDLIFE REFUGE FINAL COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT at 3-6 – 3-13, app. M (Dec. 2012) [hereinafter MALHEUR EIS] (same); NAT'L PARK SERV., U.S. DEPT. OF THE INTERIOR, MERCED WILD AND SCENIC RIVER FINAL COMPREHENSIVE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT at 9-101, 9-128, 9-137 – 9-138, 9-148, 9-159, 9-169, 9-212 – 9-213, 9-246, 9-262, 9-278, 9-293, 9-309, 9-332 – 9-333, 9-360, 9-371, 9-383, 9-396, 9-407 – 9-408 (Feb. 2014) [hereinafter MERCED MANAGEMENT PLAN] (same); NAT'L PARK SERV., U.S. DEPT. OF THE INTERIOR, TUOLUMNE WILD AND SCIENCE RIVER FINAL COMPREHENSIVE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT at ES-6, 5-42, 5-93, 5-95-5-96, 6-25 (Feb. 2014) [hereinafter TUOLUMNE EIS] (same).

¹⁶ See, e.g., NAT'L PARK SERV., TUOLUMNE EIS, *supra* note 15, at ES-6, 5-42, 5-93-5-96, 6-25 (providing for continuous monitoring of the river's free flowing condition and alternative or enhanced action in the event of adverse impact); U.S. FISH & WILDLIFE SERV., MALHEUR EIS, *supra* note 15, at 3-12-3-13 (detailing climate change adaptation and restoration strategies, including ongoing monitoring of local climate, streamflow, and other environmental factors).

¹⁷ SABIN CTR. FOR CLIMATE CHANGE L., COLUMBIA L. SCH., *Model EIA Protocols*, <http://web.law.columbia.edu/climate-change/resources/nepa-and-state-nepa-eis-resource-center/model-eia-protocols> (last visited Jan. 27, 2016).

considerations were addressed within specific project categories. For each category, we track the number of EISs that discussed the ten topics noted above, we discuss how the EISs tackled these issues (e.g., whether GHG emissions were quantified, whether adaptation measures were considered), and we highlight examples of how specific EISs discuss climate-related issues.

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1. INTRODUCTION

The National Environmental Policy Act (NEPA) requires federal agencies to prepare an Environmental Impact Statement (EIS) for any major federal action “significantly affecting” the environment. The EIS must describe the affected environment and any direct, indirect, and cumulative environmental impacts of the proposed action and reasonable alternatives. The purpose of these requirements is to ensure that agencies: (i) take a “hard look” at the environmental consequences of proposed actions before implementing those actions, and (ii) inform the public about how they accounted for these environmental consequences during the decision-making process.¹

It is now widely recognized that climate change will have a profound effect on humans and the environment. Accordingly, federal agencies have begun to assess how their decisions may contribute to global climate change, and what measures will be needed to adapt to the future effects of climate change. Many EISs now include some discussion of greenhouse gas (GHG) emissions and the impacts of climate change, but questions still remain regarding the scope of an agency’s obligation to address climate change-related considerations under NEPA.

To provide insight into how federal agencies are accounting for climate change in environmental reviews, the Sabin Center has been tracking the consideration of climate change in federal EISs. Several years ago, the Center compiled a database of climate change considerations in federal EISs published from 2009 through 2012, accompanied by a descriptive report.² Due to significant interest in that project, we have completed a follow-up survey of federal EISs published from 2012 through 2014. This report describes the methodology and key findings from the second survey. An excel database of all the EISs discussed in this report is available on our website.³

1.1 Methodology

Whereas the original database of federal EISs (2009-2012) only tracked five climate-related considerations, the updated database EISs (2012-2014) tracks ten different considerations. These

¹ *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983).

² The database and accompanying report are available at: SABIN CTR, FOR CLIMATE CHANGE L., COLUMBIA L. SCH., *Climate Change Considerations in Environmental Impact Statements*, <http://web.law.columbia.edu/climate-change/resources/nepa-and-state-nepa-eis-resource-center/eis-databases> (last visited Feb. 6, 2016).

³ *Id.*

include considerations relating to GHG emissions and mitigation, climate change impacts and adaptation, water efficiency, and energy efficiency. Each topic was assigned a number, as follows:

Table 1 – List of Climate Change Considerations Tracked in this Survey

| | |
|---------------------------|---|
| Greenhouse Gases | 1. Direct operational impacts: GHG emissions from 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. |
| | 2. Construction impacts: GHG emissions from extracting and fabricating construction materials, and from the equipment and vehicles used at the construction site. |
| | 3. Induced trips: GHG emissions from employee, customer, and vendor travel; and the transport of raw materials, manufactured goods, and other freight to / from the facility. |
| | 4. Purchased electricity: GHG emissions from generating electricity that is produced off-site and purchased by the facility. |
| | 5. Other emissions: GHG emissions from any activities not covered in categories 1-4, including downstream or upstream emissions (e.g., from the consumption of fossil fuels produced by a project). |
| | 6. Emissions from alternatives: Discussion of how GHG emissions may vary between the proposed action and alternatives. |
| Effects of Climate Change | 7. Impact of climate change: Discussion of how the impacts of climate change may affect the proposed action and/or its affected environment. Such impacts may include rising sea levels and water tables, increased flooding, greater temperature variations, water shortages, and reduced snowpack. This topic does <u>not</u> include a generalized discussion of global climate change impacts (the discussion must focus on the specific project or region in which it is located). |
| | 8. Impact of climate change on water resources: A subset of category 7, this includes any discussion of how climate change will affect water resources in the affected environment of the project, e.g., water shortages, drought, flooding, water tables, etc. It does not include sea level rise (unless the discussion of sea level rise addresses impacts on freshwater systems), nor does it include the impacts of the project on water (unless these impacts are discussed in the context of climate change). |
| Efficiency | 9. Energy efficiency: Discussion of energy consumption and efficiency in proposed action and alternatives. |
| | 10. Water efficiency: Discussion of water consumption and efficiency in proposed action and alternatives. |

The final two topics (energy efficiency and water efficiency) were included in the survey because they have implications for both climate change mitigation and adaptation. An EIS was considered to have discussed a topic if it included *any* discussion—however brief—about the issue.

In addition to tracking these ten discussion topics, we also examined: (i) Whether the EIS disclosed GHG emissions in quantitative or qualitative terms; (ii) Whether the EIS discussed upstream and downstream emissions, such as emissions associated with the end use of fossil fuels, minerals, and timber extracted as a result of the proposed action (this was tallied as a discussion of “other emissions”); (iii) Whether the EIS considered how climate change may affect the project itself, as opposed to merely discussing the effect of climate change on the surrounding environment; and (iv) Whether the EIS indicated that the discussion of GHG emissions and climate change impacts had any bearing on the final decision.

To facilitate a comparison of projects with similar characteristics, we divided the EISs into twelve categories:

- | | |
|---------------------------------|---|
| 1. Electric generation | 7. Other land management |
| 2. Electric transmission | 8. Marine management |
| 3. Fossil Fuels | 9. Public works |
| 4. Mining | 10. Transportation |
| 5. Forestry | 11. Buildings and real estate |
| 6. Parks and wildlife | 12. Military, space, and scientific research |

For each category, we track the number of EISs that discussed the ten topics noted above, we discuss *how* the EISs tackled these issues (e.g., whether GHG emissions were quantified, whether adaptation measures were considered), and we highlight examples of how specific EISs discuss climate-related issues.

1.2 Legal Context

The National Environmental Policy Act (NEPA) requires federal agencies to review the environmental impacts of major proposed actions and prepare an Environmental Impact Statement (EIS) for any action significantly affecting the environment.⁴ These statements must describe the

⁴ National Environmental Policy Act of 1969 (NEPA) § 102, 42 U.S.C. § 4332 (2012).

affected environment and any direct, indirect, and cumulative impacts accruing from the action and reasonable alternatives.⁵ The agency conducting this analysis must make a draft EIS available for public comment and respond to these comments in the final EIS.⁶ The dual purpose of these requirements is to ensure that agencies take a “hard look” at the potential consequences of their activities and disclose this information to the public—the ultimate goal being to promote better informed decision-making.⁷

In February 2010, the Council on Environmental Quality (CEQ) issued draft NEPA guidance on the consideration of climate change and GHG emissions.⁸ The draft guidance clarified that climate change falls within the scope of the environmental issues that should be addressed under NEPA, and recommended that agencies quantify and disclose estimates of anticipated annual direct and indirect GHG emissions for NEPA proposals if the agency anticipates that the proposal will produce a “meaningful” quantity of GHG emissions.⁹ CEQ recommended that a reference point of 25,000 metric tons of direct CO₂-equivalent GHG emissions could be used to decide whether to disclose and quantify emissions, but ultimately left this issue to the agencies’ discretion.¹⁰ CEQ also referred agencies to specific tools that could be used to quantify and report emissions for most projects. However, CEQ noted that “[l]and management techniques, including changes in land use or land management strategies, lack any established Federal protocol for assessing their effect on atmospheric carbon release and sequestration at a landscape scale” and thus did not identify a protocol for quantifying and disclosing those emissions.¹¹

CEQ also clarified that agencies should consider whether climate change will affect proposed projects and whether these effects warrant discussion in an EIS. CEQ recommended that agencies consider “the specific effects of the proposed action (including the proposed action’s effect on the vulnerability of affected ecosystems), the nexus of those effects with projected climate change effects on the same aspects of our environment, and the implications for the environment

⁵ NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (2012); 40 C.F.R. §§ 1502.14-1502.16 (2015).

⁶ 40 C.F.R. §§ 1502.9, 1503.1, 1503.4, 1506.6 (2015).

⁷ *Balt. Gas & Electric Co.*, 462 U.S. at 97-98.

⁸ COUNCIL ON ENVTL. QUALITY, EXEC. OFFICE OF THE PRESIDENT, DRAFT NEPA GUIDANCE ON CONSIDERATION OF THE EFFECTS OF CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS (Feb. 18, 2010), available at <https://www.whitehouse.gov/sites/default/files/microsites/ceq/20100218-nepa-consideration-effects-ghg-draft-guidance.pdf>.

⁹ *Id.* at 2.

¹⁰ *Id.* at 3.

¹¹ *Id.* at 4.

to adapt to the projected effects of climate change.”¹² CEQ also recommend that agencies consider the effects of climate change on projects that are “designed for long-term utility and located in areas that are considered vulnerable to specific effects of climate change (such as increasing sea level or ecological change) within the project’s timeframe.”¹³

The 2010 draft guidance was available when agencies were drafting the EISs reviewed in this survey, but never published as a final guidance document. Many agencies nonetheless cited the guidance in their NEPA reviews—for example, by referring to the 25,000 tpy threshold when deciding whether or not to disclose and quantify GHG emissions. The land management agencies also frequently cited CEQ’s conclusion about the lack of a protocol for quantifying land management emissions as a justification for not discussing or quantifying those emissions. However, two aspects of the draft guidance were routinely ignored in EISs: (1) CEQ’s recommendation that agencies consider *indirect* as well as direct emissions, and (2) CEQ’s recommendations on how agencies should evaluate the effects of climate change on projects and their affected environment.

In December 2014, CEQ issued revised draft guidance on the topic of climate change and NEPA.¹⁴ (As of this writing, this revised draft has not been issued in final form.) Like the 2010 version, the guidance directs agency to evaluate:

- (1) The potential effects of a proposed action on climate change as indicated by its GHG emissions; and
- (2) the implications of climate change for the environmental effects of a proposed action.¹⁵

CEQ notes that this is not a *new* requirement, but rather a clarification of NEPA’s existing requirements for environmental reviews.

The revised draft guidance once again recommends that agencies quantify GHG emissions for any action that may generate 25,000 metric tons per year (or more) of carbon dioxide equivalent (CO_{2e}).¹⁶ It also contains additional instructions on how agencies should evaluate indirect

¹² *Id.* at 7.

¹³ *Id.*

¹⁴ COUNCIL ON ENVTL. QUALITY, EXEC. OFFICE OF THE PRESIDENT, REVISED DRAFT GUIDANCE FOR FEDERAL DEPARTMENTS AND AGENCIES ON CONSIDERATION OF GREENHOUSE GAS EMISSIONS AND THE EFFECTS OF CLIMATE CHANGE IN NEPA REVIEWS, 79 Fed. Reg. 77,802 (Dec. 24, 2014).

¹⁵ *Id.* at 77,824.

¹⁶ *Id.* at 77,827.

emissions and emissions from connected actions. For example, the guidance also specifies that agencies should evaluate GHG emissions “from activities that have a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for the agency action (often referred to as upstream emissions) and as a consequence of the agency action (often referred to as downstream emissions.”¹⁷ This instruction accords with the existing regulatory requirements for evaluating indirect impacts¹⁸ and impacts from connected actions.¹⁹

Turning to climate change impacts and adaptation considerations, the guidance instructs agencies to consider “the ways in which a changing climate over the life of the proposed project may alter the overall environmental implications of such actions.”²⁰ Such impacts may include “more frequent and intense heat waves, more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems.”²¹ CEQ notes that such considerations are:

“...squarely within the realm of NEPA, informing decisions on whether to proceed with and how to design the proposed action so as to minimize impacts on the environment, as well as informing possible adaptation measures to address these impacts, ultimately enabling the selection of smarter, more resilient actions.”²²

The justification for requiring such analysis during NEPA reviews can be traced back several different statutory and regulatory provisions. These include existing requirements for agencies to: (i) describe the affected environment of a project and how that environment would function under a “no action” alternative²³ (climate change may alter this environment); (ii) describe the environmental impacts of the proposed action²⁴ (climate change may alter the nature, timing, or magnitude of a project’s environmental impacts, as well as the vulnerability of the affected environment to those impacts); and (iii) describe “any irreversible and irretrievable commitments

¹⁷ *Id.* at 77,826.

¹⁸ 40 C.F.R. § 1508.8 (2015).

¹⁹ 40 C.F.R. §1508.25 (2015).

²⁰ COUNCIL ON ENVTL. QUALITY, 79 Fed. Reg. 77,802, *supra* note 14, at 77,825.

²¹ *Id.*

²² *Id.* at 77,828-29.

²³ 40 C.F.R. §§ 1502.14-1502.16 (2015).

²⁴ 42 U.S.C. § 4332(2)(C)(i)-(iii) (2012).

of resources which would be involved in the proposed action should it be implemented”²⁵ (additional resources may be needed to address damage caused by climate change).²⁶

Federal courts have also played a key role in interpreting how agencies should evaluate climate change considerations under NEPA. These decisions deal primarily with how agencies should address the impacts of a project on climate change through GHG emissions—for example, whether a single action’s GHG emissions are significant enough to warrant quantification or other analysis, given that the individual contribution of one project to global GHG emissions is typically quite small; and whether an agency is required to assess downstream or upstream emissions in a particular project.²⁷ There is only one federal decision requiring an agency to consider the effect of climate change on a NEPA proposal,²⁸ and there are no decisions holding that agencies should *not* consider such impacts.

1.3 Summary of Key Issues and Findings

Based the survey results, there is no question that the contribution of a project to climate change qualifies as the type of “environmental impact” that should be evaluated in an EIS. However, the global nature of climate change has led to some uncertainty about how and whether agencies should disclose GHG emissions for individual actions. Because the NEPA regulations instruct agencies to focus on *significant* impacts in an EIS, agencies will sometimes conclude that a project’s emissions are inevitably insignificant in light of national or global emissions and thus there is no need to include a quantitative GHG assessment in the EIS for that project. There is also

²⁵ 42 U.S.C. § 4332(2)(C)(v) (2012).

²⁶ For a more detailed discussion of why NEPA requires an analysis of climate change impacts on the proposed action and its affected environment, see Jessica Wentz, *Assessing the Impacts of Climate Change on the Built Environment under NEPA and State EIA Laws: A Survey of Current Practices and Recommendations for Model Protocols* (Sabin Ctr. for Climate Change L., Aug. 2015), available at https://web.law.columbia.edu/sites/default/files/microsites/climate-change/assessing_the_impacts_of_climate_change_on_the_built_environment_-_final.pdf.

²⁷ For a complete list of cases that involve NEPA and climate change, please consult the Sabin Center’s climate change litigation chart (<http://web.law.columbia.edu/climate-change/resources/us-climate-change-litigation-chart>) and our publications website (<http://web.law.columbia.edu/climate-change/publications/publications-category#eis>).

²⁸ *Kunaknana v. U.S. Army Corps of Eng’rs*, 23 F. Supp. 3d 1063 (D. Alaska 2014) (requiring the U.S. Army Corps of Engineers [“USACE”] to consider whether it needed to prepare a supplemental EIS [“SEIS”] to evaluate the effects of climate change on its decision to issue a permit to an oil product company to fill wetlands in Alaska). On remand, USACE evaluated the effects of climate change and determined that the SEIS was not necessary. The District Court upheld USACE’s determination, despite finding that USACE had conducted only a “minimalist review” of climate change impacts, noting that the plaintiffs had not identified specific climate change information that would be relevant to the project. *Kunaknana v. U.S. Army Corps of Engineers*, No. 3:13-CV-00044-SLG, 2015 WL 3397150, at *12 (D. Alaska May 26, 2015).

uncertainty regarding the scope of GHG emissions that should be assessed as “indirect” or “cumulative” impacts—for example, should the EIS for a coal mining lease approval disclose potential GHG emissions from the combustion of the coal that will be mined? Some EISs quantify these downstream emissions, others ignore them altogether.

Another set of questions relates to how agencies should assess the impacts of climate change on a proposed action and its affected environment. Climate-related impacts such as sea level rise and increased precipitation may alter the environmental baseline for the project, and this may have implications for the environmental consequences of the project. For example, higher temperatures and drought could make an aquatic ecosystem more vulnerable to any water-related impacts of a project, such as water withdrawals or discharges. Climate-related impacts may also have a direct effect on the project itself. For example, sea level rise or inland flooding could worsen flooding at a hazardous waste management facility, a chemical storage facility, or a nuclear power plant, thus increasing the risk that hazardous materials could be released into the environment.²⁹ Agencies have begun to incorporate these types of considerations into their environmental reviews, but there is substantial variation as to whether and how such issues are addressed in EISs.

Finally, to the extent that agencies are considering climate-related issues in EISs, it is important to determine whether these considerations are actually influencing the decision-making process. A small proportion of the EISs in this survey included mitigation measures aimed at reducing GHG emissions and/or measures intended to make the project more resilient in the face of climate change. However, in the vast majority of EISs, it was unclear how the climate change analysis was actually affecting final decisions about the selection of projects and mitigation measures.

²⁹ For a more detailed discussion of how climate change can affect buildings and infrastructure, and why NEPA requires consideration of such impacts, see Wentz, *supra* note 26.

2. SURVEY RESULTS: GENERAL TRENDS

Of the 238 federal EISs reviewed in this survey, 214 (90%) contained some discussion of GHG emissions or climate change impacts. Notably, considerations related to climate change mitigation and adaptation were addressed in roughly the same number of EISs: 172 (72%) discussed GHG emissions associated with the proposed action, and 167 (70%) discussed how climate change may affect the proposed action and/or the surrounding environment. Table 2.0 summarizes the results of the survey, showing the total number of EISs within each category that discussed considerations related to climate change mitigation, adaptation, and efficiency.

Table 2.0 – Summary of Survey Results

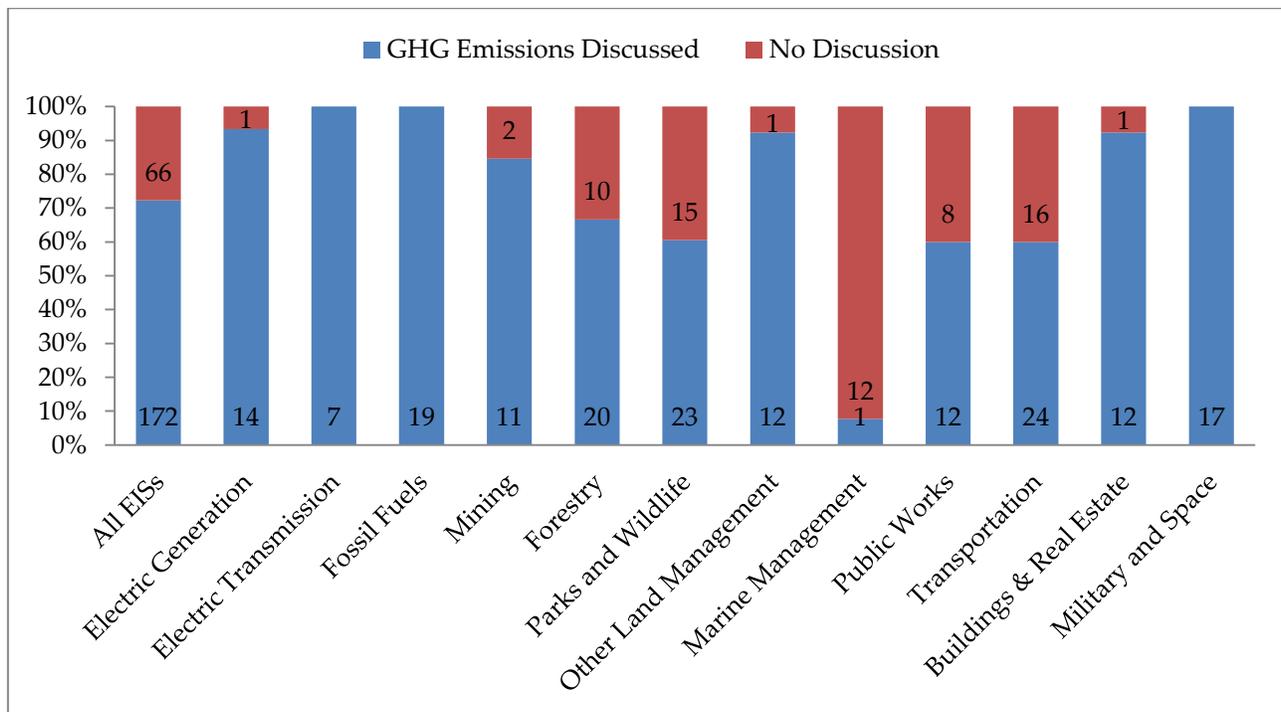
| Category | Total | Discussion Topic | | | | | | | | | | | | | | | | | | | |
|--|--|------------------|-----------|-----------|-----------|-----------|------------|------------|------------|-----------|-----------|-------------------------------|--------------------------------|-------------------------|--|------------------|--|--------------------------|----------------------|--------------------|----------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | | | | | |
| All EISs | 238 | 153 | 92 | 85 | 36 | 44 | 113 | 167 | 109 | 91 | 31 | | | | | | | | | | |
| Electric Generation | 15 | 12 | 9 | 9 | 1 | 9 | 11 | 14 | 9 | 10 | 0 | | | | | | | | | | |
| Electric Transmission | 7 | 7 | 6 | 5 | 1 | 6 | 7 | 3 | 2 | 3 | 0 | | | | | | | | | | |
| Fossil Fuels | 19 | 19 | 15 | 12 | 4 | 11 | 8 | 18 | 12 | 11 | 2 | | | | | | | | | | |
| Mining | 13 | 10 | 4 | 4 | 5 | 3 | 10 | 10 | 7 | 4 | 2 | | | | | | | | | | |
| Forestry | 30 | 20 | 3 | 3 | 0 | 4 | 12 | 26 | 13 | 2 | 7 | | | | | | | | | | |
| Parks and Wildlife | 38 | 20 | 12 | 15 | 6 | 3 | 8 | 29 | 14 | 17 | 5 | | | | | | | | | | |
| Other Land Management | 13 | 11 | 3 | 5 | 0 | 2 | 8 | 12 | 9 | 0 | 1 | | | | | | | | | | |
| Marine Management | 13 | 1 | 1 | 1 | 0 | 0 | 1 | 10 | 10 | 1 | 0 | | | | | | | | | | |
| Public Works | 20 | 0 | 11 | 8 | 2 | 1 | 8 | 17 | 15 | 3 | 2 | | | | | | | | | | |
| Transportation | 40 | 24 | 10 | 3 | 1 | 2 | 15 | 11 | 2 | 16 | 0 | | | | | | | | | | |
| Buildings & Real Estate | 13 | 12 | 8 | 11 | 11 | 3 | 11 | 9 | 9 | 12 | 8 | | | | | | | | | | |
| Military and Space | 17 | 17 | 10 | 9 | 5 | 0 | 14 | 8 | 7 | 12 | 4 | | | | | | | | | | |
| <u>Discussion Topic Key</u> | | | | | | | | | | | | | | | | | | | | | |
| <table> <tbody> <tr> <td>1. Direct operational impacts</td> <td>6. Emissions from alternatives</td> </tr> <tr> <td>2. Construction impacts</td> <td>7. Impact of climate change on project</td> </tr> <tr> <td>3. Induced trips</td> <td>8. Impact of climate change on water resources</td> </tr> <tr> <td>4. Purchased electricity</td> <td>9. Energy efficiency</td> </tr> <tr> <td>5. Other emissions</td> <td>10. Water efficiency</td> </tr> </tbody> </table> | | | | | | | | | | | | 1. Direct operational impacts | 6. Emissions from alternatives | 2. Construction impacts | 7. Impact of climate change on project | 3. Induced trips | 8. Impact of climate change on water resources | 4. Purchased electricity | 9. Energy efficiency | 5. Other emissions | 10. Water efficiency |
| 1. Direct operational impacts | 6. Emissions from alternatives | | | | | | | | | | | | | | | | | | | | |
| 2. Construction impacts | 7. Impact of climate change on project | | | | | | | | | | | | | | | | | | | | |
| 3. Induced trips | 8. Impact of climate change on water resources | | | | | | | | | | | | | | | | | | | | |
| 4. Purchased electricity | 9. Energy efficiency | | | | | | | | | | | | | | | | | | | | |
| 5. Other emissions | 10. Water efficiency | | | | | | | | | | | | | | | | | | | | |

There was a large amount of variation in terms of whether and how EISs discussed the ten topics noted above. In some cases, this was true even for EISs prepared by the same agency for similar proposals.³⁰ The EISs also varied in their treatment of the CEQ’s 2010 draft guidance and other executive documents calling for consideration of climate change in agency decision-making (such as executive orders and agency adaptation plans). Some EISs simply ignored these documents, while others discussed them in great detail. That said, most of the EISs that discussed climate change did at least include some reference to the draft guidance.

2.1 Discussion of GHG Emissions and Climate Change Mitigation

172 of the 238 EISs (72%) discussed one or more sources of GHG emissions associated with the proposed action. GHG emissions were almost always discussed in the context of proposals that involved: (i) significant construction activities, or (ii) fossil fuel combustion. Many of the forestry and land management EISs also discussed the potential impacts of proposed management activities on carbon sequestration.

Figure 2.1 – Discussion of GHG Emissions



³⁰ See, e.g., *infra* Section 3.5 (Forestry), pp. 38-44. Although USFS was the lead agency for all of the forestry EISs, there was considerable variation in how climate change issues were addressed.

Generally speaking, most agencies made an effort to identify potential GHG emissions sources even if they fell beneath the 25,000 tpy threshold. There were two exceptions to this trend. First, nearly half of the transportation EISs (primarily for highway expansion proposals) did not discuss any GHG emissions associated with the construction or operation of the proposed transportation project (although conventional air emissions were often discussed). Second, approximately one third of the public works EISs did not discuss GHG emissions associated with construction activities that would occur as a result of the proposed action.

Agencies typically quantified GHG emissions when they anticipated that the proposed action's direct emissions would be close to or exceed the 25,000 tpy threshold. Some EISs also contained detailed GHG inventories even though the aggregate emissions fell beneath that threshold. Agencies did not typically quantify emissions associated with carbon sequestration changes from land management proposals (and it was unclear whether these changes would result in emissions impacts exceeding the 25,000 tpy threshold).

Among those EISs that did consider GHG emissions, most concluded that these impacts were ultimately insignificant due to the scale of global climate change. There was only one EIS in which the agency explicitly determined that the project's GHG emissions constituted a significant environmental impact.³¹ Despite the lack of significance determinations, a small proportion of the EISs included measures to mitigate the project's GHG emissions.³² There was no clear correlation between the decision to adopt mitigation measures and the scale of the project's GHG contribution—rather, it appeared that mitigation decisions were driven by agency policies and guidelines for specific projects.

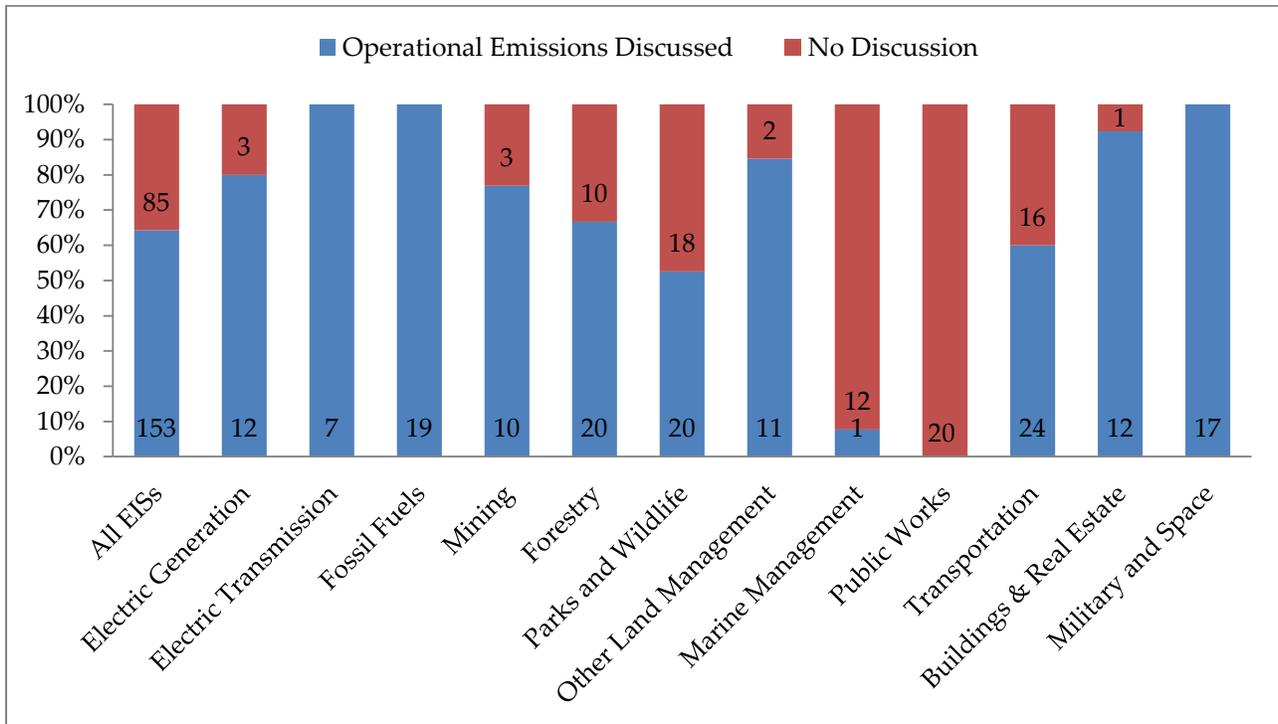
Operational Emissions – 153 of the 238 EISs (64%) discussed direct operational emissions associated with the project. The primary sources of operational emissions included: (i) on-site fossil fuel combustion for electric generation, heat, and equipment; (ii) fugitive emissions from well

³¹ U.S. ARMY CORPS OF ENG'RS, USACE Action ID: SPK-1999-00737, PLACER VINEYARDS SPECIFIC PLAN FINAL ENVIRONMENTAL IMPACT STATEMENT, at 3.5-16 (July 2014) [hereinafter PLACER VINEYARDS FEIS] (509,666 MT CO₂e/year from a mixed-use development project was a significant impact). There was also an EIS for a smaller mixed-use development project in which USACE concluded that 109,627 MT CO₂e/year was a "cumulatively considerable contribution to a significant cumulative impact" on global climate change. CITY OF RANCHO CORDOVA & U.S. ARMY CORPS OF ENG'RS, SUNCREEK SPECIFIC PLAN PROJECT DEIR/DEIS at 3.4-18 (Oct. 2012).

³² See, e.g., ARMY CORPS OF ENG'RS, FEATHER RIVER WEST LEVEE PROJECT: FINAL 408 PERMISSION ENVIRONMENTAL IMPACT STATEMENT (June 2013) [hereinafter FEATHER RIVER FEIS] (discussing GHG mitigation requirements in the context of a public works project).

heads, pipelines, and equipment; (iii) changes in carbon sequestration as a result of land clearing or vegetation management activities; and (iv) changes in vehicle miles travelled (VMT) associated with the construction or expansion of highways (due to the nature of highway projects, emissions from VMT were treated as operational emissions rather than emissions from induced trips).

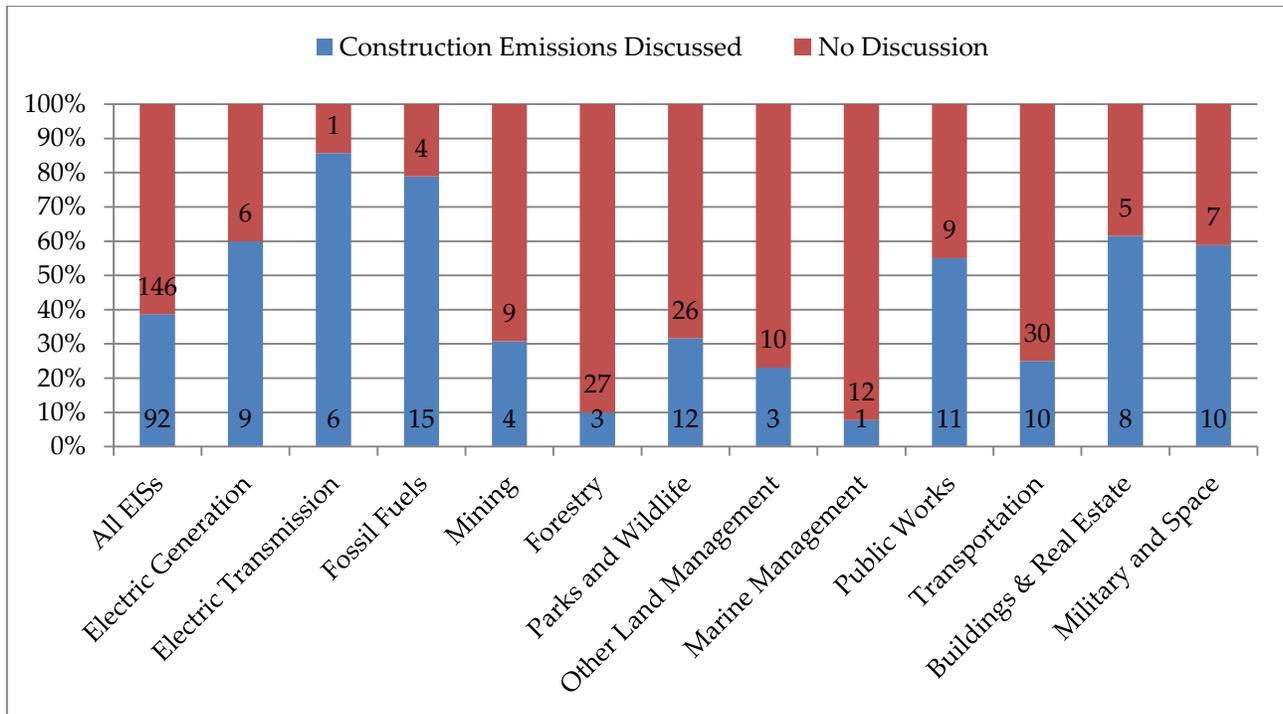
Figure 2.2 – Discussion of Operational GHG Emissions



Operational GHG emissions received a good deal of attention in all fossil fuel extraction projects and all but two of the electric generation projects (both were proposals for the reauthorization of an existing hydroelectric facilities). All of the EISs in the electric transmission category also discussed emissions associated with the operation of the transmission lines and associated infrastructure, as well as the loss of carbon sequestration capacity on affected land. Other projects—such as those in the marine management and public works categories—did not involve the operation of equipment or infrastructure that would emit much (if any) GHG emissions. Transportation was the only category where it appeared that most of the proposed actions would generate direct operational emissions (as a result of increased VMT), but a large proportion of EISs (40%) ignored these emissions. Notably, the EISs that did not mention GHG emissions did typically quantify other air pollutants associated with the increase in VMT.

Construction Emissions – 92 of the EISs (39%) discussed GHG emissions from the use of construction equipment and vehicles on site. A small proportion of these EISs also discussed emissions from the transportation of construction materials and equipment to/from the project site (an issue also captured in topic 3: induced trips). The EISs did not generally discuss GHG emissions associated with the extraction or fabrication of construction materials.

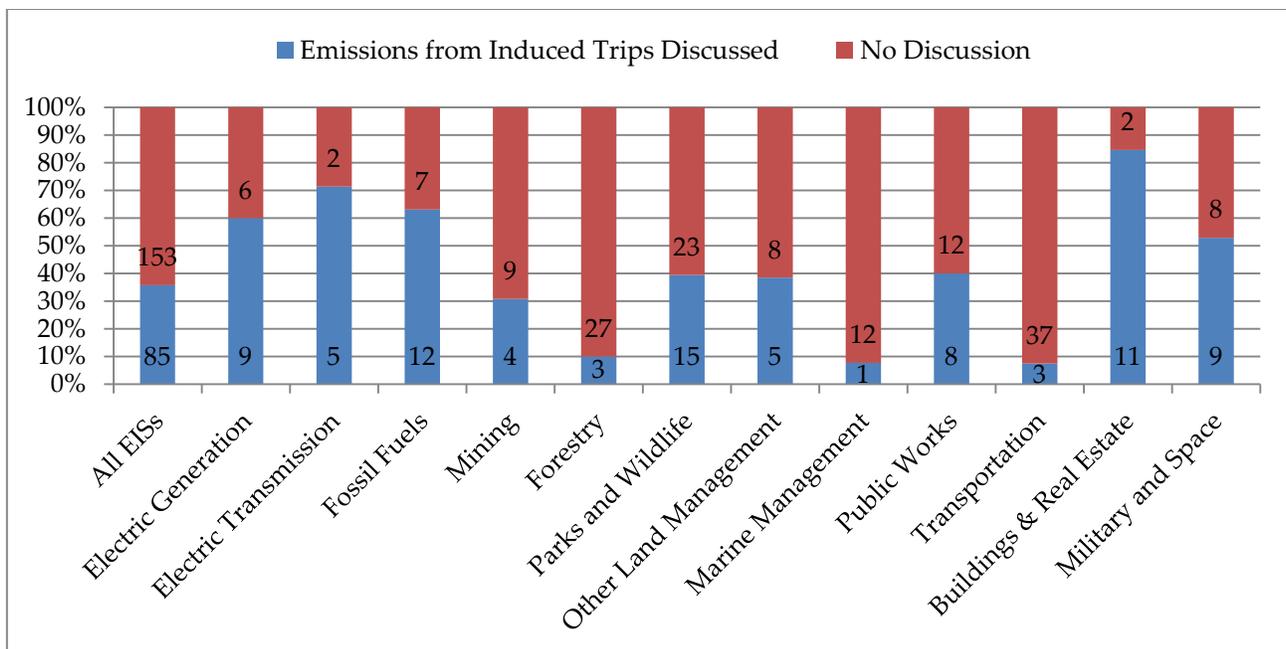
Figure 2.3 – Discussion of Construction GHG Emissions



Construction-related GHG emissions were typically quantified alongside conventional air pollutants for any project that involved major construction activities, but there were some EISs that disclosed conventional air pollutants and ignored GHG emissions. Proposals that involved smaller construction projects typically provided a brief, qualitative statement about GHG emissions from construction (e.g., identifying potential emission sources, but concluding that the emissions would fall below the 25,000 tpy threshold). As was the case with operational emissions, transportation EISs were less likely to disclose GHG emissions from construction equipment and vehicles, even when they disclosed conventional air pollutants from these sources. Many of the public works EISs also failed to consider GHG emissions from the construction of navigation channels, reservoirs, and other infrastructure projects.

Induced Trips – 85 of the EISs (36%) discussed emissions from induced trips. The activities covered in this discussion included employee commutes, visitor trips, and the transportation of goods to/from the project site.³³ Unlike direct operational emissions and construction emissions, it was not clear why agencies choose to discuss emissions from induced trips for some projects and not others. The only discernible pattern was that the EISs with a more detailed inventory of other emissions also tended to disclose (qualitatively or quantitatively) potential GHG emissions from induced trips. In those EISs that did address this topic, the discussion typically focused on trips in close proximity to the project site—e.g., commutes from a neighboring town to the project. The only EISs that discussed emissions from the long-distance transport of resources to or from the project site were those that involved the production of a natural resource (e.g., timber and coal).

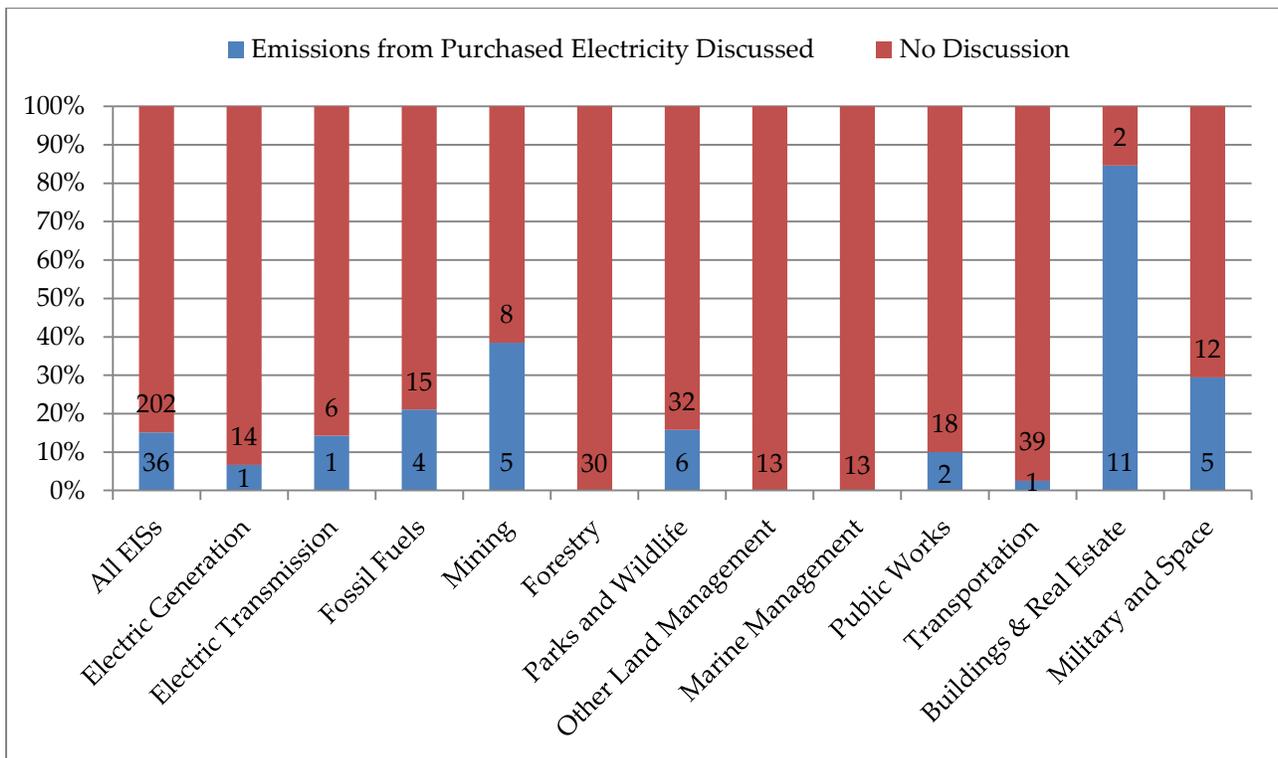
Figure 2.4 – Discussion of GHG Emissions from Induced Trips



³³ As noted above, emissions from increases in VMT associated with highway projects were treated as operational emissions, rather than emissions from induced trips.

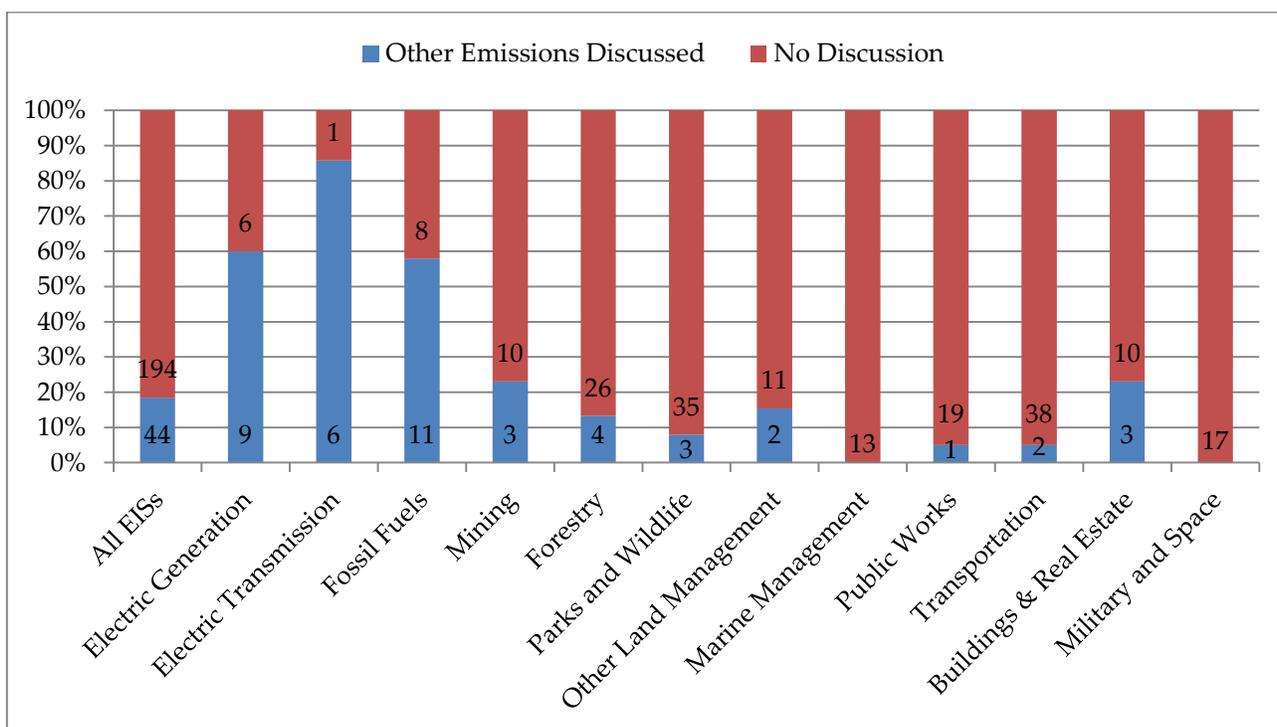
Emissions from Purchased Electricity - Only 36 of the EISs (15%) discussed emissions from purchased electricity. The relatively small proportion of EISs that disclosed these emissions may be due, in part, to the fact that many of these projects did not require electricity from offsite sources. Notably, a large percentage of EISs (85%) in the buildings and real estate category quantified and disclosed GHG emissions from purchased electricity. To the extent that the military projects required electricity from offsite sources, the GHG emissions from that electricity were typically disclosed and quantified. The EISs in other project categories did not typically discuss energy needs in great detail, let alone GHG emissions from purchased electricity.

Figure 2.5 – Discussion of GHG Emissions from Purchased Electricity



Other Emissions – 44 of the EISs (18%) identified other sources of indirect GHG emissions associated with the project. These typically consisted of emissions from downstream activities, such as the processing and/or end use of resources produced as a result of the action. There were several EISs that conducted a relatively thorough life-cycle analysis of GHG emissions associated with a proposed action, which included some consideration of upstream impacts.³⁴ But as a general matter, agencies not discuss emissions associated with the upstream processing of goods that were needed to construct or operate the proposed project. It was also very rare for agencies to discuss GHG emissions from connected, similar, or cumulative actions (e.g., GHG emissions from multiple coal leases in the same region). Indirect emissions were discussed more frequently for projects in the electric generation, electric transmission, and fossil fuel categories due to the interconnected nature of fossil fuel and electric infrastructure.

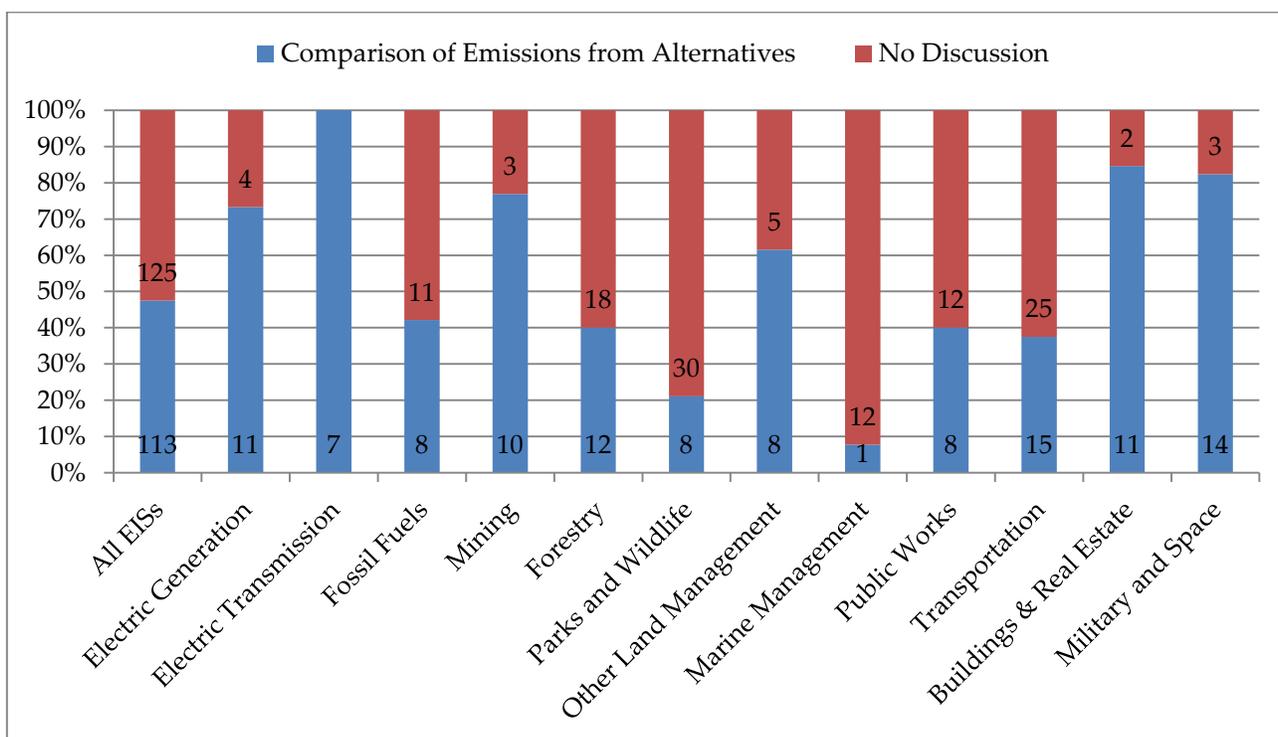
Figure 2.6 – Discussion of Other GHG Emissions



³⁴ See, e.g., U.S. DEP'T OF STATE, FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE KEYSSTONE XL PROJECT at 4.14-4 (Jan. 2014) [hereinafter KEYSSTONE XL FEIS]; NAT'L ENERGY TECH. LAB., U.S. DEP'T OF ENERGY, DOE/EIS-0464, LAKE CHARLES CARBON CAPTURE AND SEQUESTRATION PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT at 4-14 (Nov. 2013) [hereinafter LAKE CHARLES FEIS]; NAT'L PARK SERV., U.S. DEPT. OF THE INTERIOR, MERCED WILD AND SCENIC RIVER FINAL COMPREHENSIVE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT at 9-928 (Feb. 2014).

Discussion of Emissions from Alternatives – 112 of the EISs (46%) included some discussion of how GHG emissions would differ between alternatives. In some EISs, this discussion 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. Other EISs compared the potential for GHG emissions under the primary proposal, all of the reasonable alternatives, and the no action alternative. This information was not always presented in manner that would facilitate easy comparison by decision-makers and the public – e.g., the emissions estimates for different alternatives would be found on different pages of the EIS, without any direct comparisons between the alternatives. But there were some EISs that presented the information quite clearly, by drawing explicit comparisons between alternatives, and presenting all of the data on emissions from alternatives in a single table.

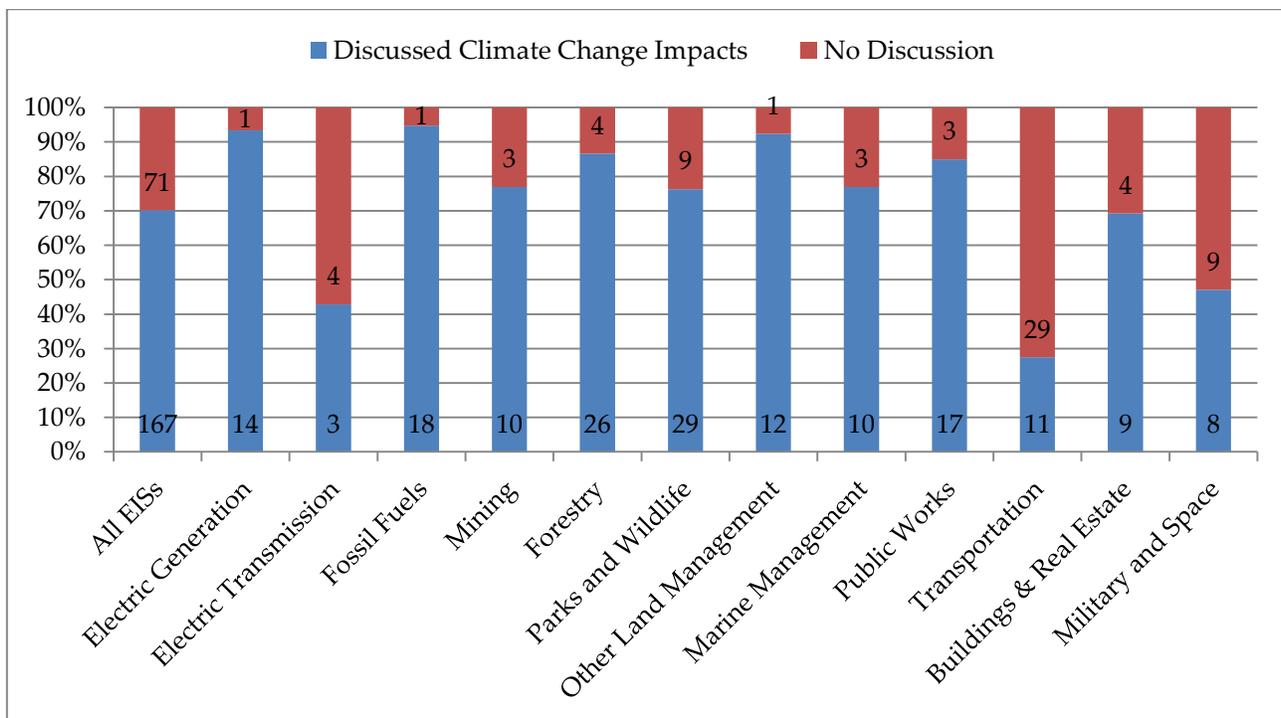
Figure 2.7 – Discussion of Emissions from Alternatives



2.2 Discussion of Climate Change Impacts

167 of the EISs (70%) considered how climate change may affect the project and/or its surrounding environment.³⁵ 109 of the EISs (46%) specifically examined how climate change may affect water resources that were either utilized or affected by the project. The scope and depth of this analysis varied substantially. Some EISs, particularly those prepared for certain land management actions and public works projects, contained a very detailed analysis of how climate change would affect different aspects of the project area and how this might inform the agency's decisions about management strategies and adaptation options. Others simply acknowledged that climate change would affect certain aspects of the project environment and did not discuss the issue further.

Figure 2.8 – Discussion of Climate Change Impacts, Generally

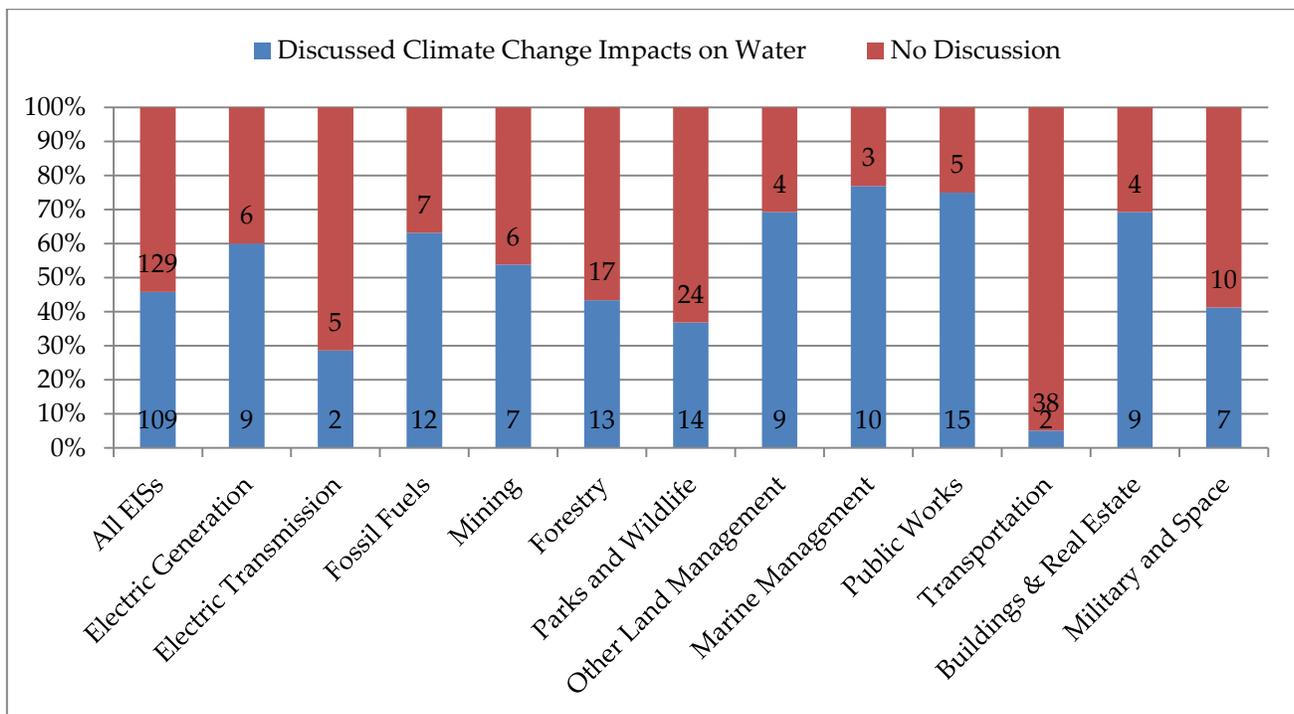


The EISs for projects located in coastal areas were more likely to discuss climate change impacts, primarily the effect of sea level rise on the project and its surrounding environment. Some EISs merely cited future sea level rise projections and included a brief note as to why this would

³⁵ This figure does not include EISs that merely described the general impacts of climate change from a global perspective in the cumulative impacts section. Rather, the EISs included here specifically mentioned how climate change would affect the project itself or certain attributes of the region in which the project was located.

not affect the project, whereas others contained a detailed analysis of how rising sea levels could affect either the physical integrity of proposed structures or specific resources in the local environment (such as coastal water tables). The EISs for proposals involving the management of natural resources such as water, forests, and endangered species were also more likely to discuss climate change impacts, such as increased temperatures, changes in precipitation, and the prospect of inland flooding. As illustrated in Figure 2.8, the vast majority of EISs involving forestry, parks and wildlife, other land management, and public works projects (which primarily consisted of water management projects) contemplated the effect of climate change on the proposal.

Figure 2.9 – Discussion of Climate Change Impacts on Water Resources



In most of the EISs, it was unclear whether the discussion of climate change impacts had any bearing on the agency’s final decisions about the design, location, and operation of the project. However, there were some EISs where project decisions were clearly linked to climate change impacts. For example, there was an EIS for a proposed mixed-use development project located on the coastline that clearly accounted for climate change in decisions about building elevation, the

location of critical infrastructure, and other design decisions.³⁶ There were also a number of EISs for land and resource management projects that discussed the potential impacts of climate change on hydrological resources, habitats, species, and other natural resources, and identified adaptation measures that could be implemented to mitigate adverse impacts.³⁷ Some of the proposed actions were specifically intended to manage natural phenomena related to climate change (such as flooding, wildfire and invasive species) and to improve the resilience of forests and other habitats to these phenomena.³⁸

2.3 Discussion of Energy and Water Efficiency

Only 91 of the EISs (38%) discussed energy efficiency or conservation. This was surprising, as the CEQ regulations implementing NEPA explicitly require agencies to consider “[e]nergy requirements and conservation potential of various alternatives and mitigation measures” in every EIS.³⁹ Notably, energy conservation was discussed in almost every proposal for the construction or ongoing operation of buildings, mixed-development projects, and military bases. But energy conservation was almost never discussed in the context of land and resource management projects, presumably because the agency did not believe that energy demands of the project were large enough to warrant discussion of this issue (but this was not explicitly clear from the EISs).

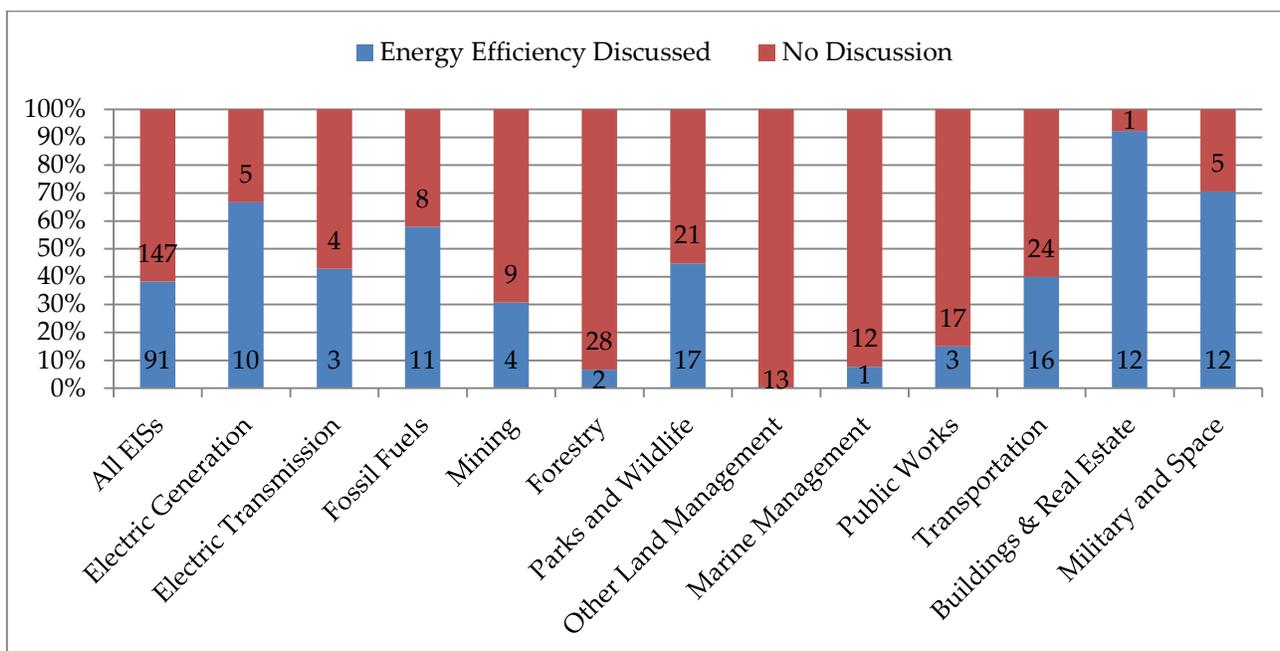
³⁶ CITY PLANNING COMM’N, CITY OF N.Y., CEQR No. 09DCP084Q, HALLETS POINT REZONING FINAL ENVIRONMENTAL IMPACT STATEMENT at 17-9--17-14 (Aug. 2013).

³⁷ See, e.g., U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, R8-MB-143-A, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE GEORGE WASHINGTON NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN at 3-76 – 3-88 (Nov. 2014) [hereinafter GEORGE WASHINGTON FEIS] (addressing, directly, the effects of expected climate change and methods for reducing vulnerability to such effects); U.S. FISH & WILDLIFE SERV., U.S. DEP’T OF THE INTERIOR, MALHEUR NATIONAL WILDLIFE REFUGE FINAL COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT at 3-6 – 3-13, app. M (Dec. 2012) (same) [hereinafter MALHEUR REFUGE FEIS]; NAT’L PARK SERV., U.S. DEPT. OF THE INTERIOR, MERCED WILD AND SCENIC RIVER FINAL COMPREHENSIVE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT at 9-101, 9-128, 9-137 – 9-138, 9-148, 9-159, 9-169, 9-212 – 9-213, 9-246, 9-262, 9-278, 9-293, 9-309, 9-332 – 9-333, 9-360, 9-371, 9-383, 9-396, 9-407 – 9-408 (Feb. 2014) [hereinafter MERCED RIVER FEIS] (same); NAT’L PARK SERV., U.S. DEPT. OF THE INTERIOR, TUOLUMNE WILD AND SCIENCE RIVER FINAL COMPREHENSIVE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT at ES-6, 5-42, 5-93, 5-95-5-96, 6-25 (Feb. 2014) [hereinafter TUOLUMNE RIVER FEIS] (same).

³⁸ See, e.g., U.S. ARMY CORPS OF ENG’RS ET AL., FINAL POST AUTHORIZATION CHANGE REPORT AND REVISED PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT: MORGANZA TO THE GULF OF MEXICO (May 2013) [hereinafter MORGANZA TO THE GULF OF MEXICO FEIS] (responding to increased hurricane damage risk); U.S. ARMY CORPS OF ENG’RS, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE TRUCKEE MEADOWS FLOOD CONTROL PROJECT (Dec. 2013) (identifying and managing increased flood risks); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: BWCW NON-NATIVE INVASIVE PLANT MANAGEMENT PROJECT (Aug. 2013) (managing non-native invasive species); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: MCKAY FUELS AND VEGETATION MANAGEMENT PROJECT 331 (May 2013) [hereinafter MCKAY FEIS] (managing increased wildfire risks).

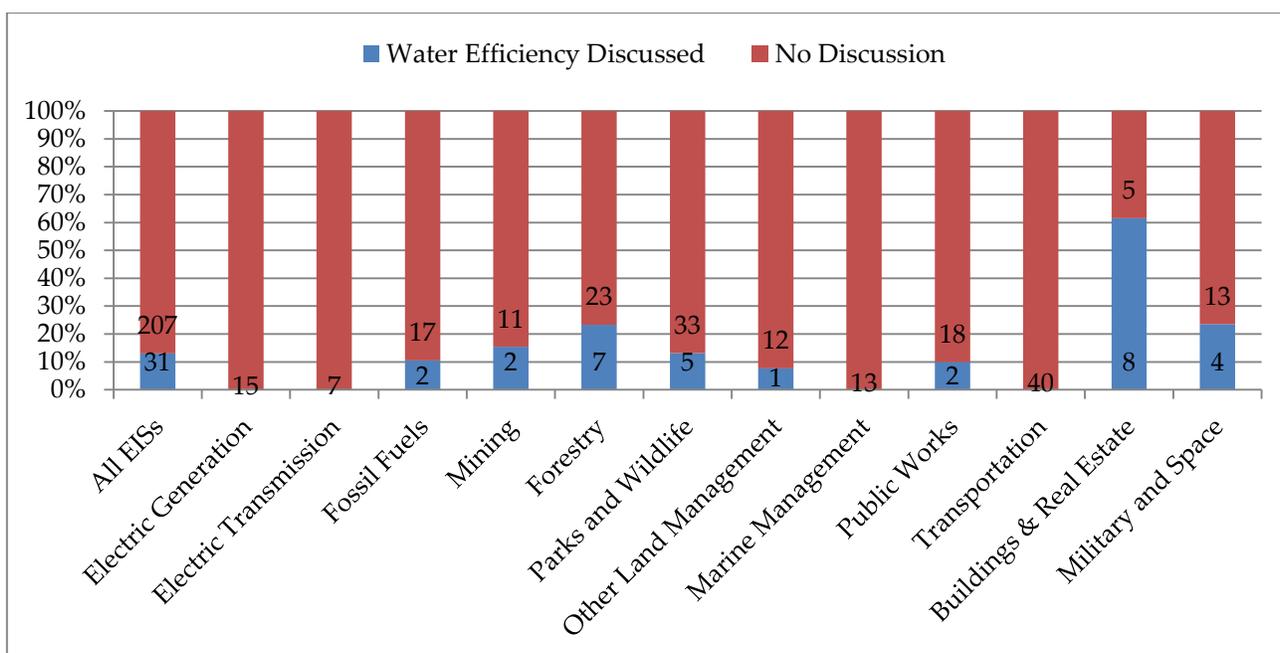
³⁹ 40 C.F.R. § 1502.16 (2015).

Figure 2.10 – Discussion of Energy Efficiency



Only 31 of the EISs (13%) included any discussion of water efficiency or conservation. As with energy efficiency, this topic was most frequently discussed in the context of building proposals (but even then, over half of the EISs did not address the topic). Notably, *many* of the EISs in this survey did disclose the water demands and projected consumption of the project—what was missing was a discussion of measures to improve water use efficiency and reduce demand.

Figure 2.11 - Discussion of Water Efficiency



3. SURVEY RESULTS BY PROJECT CATEGORY

3.1 Electric Generation

Fifteen EISs in this category were analyzed. The projects reviewed included proposals for the construction or renewed operation of solar,⁴⁰ nuclear,⁴¹ hydroelectric,⁴² and wind⁴³ power generation facilities, as well as the construction of a coal-fired power plant with integrated carbon capture and sequestration (CCS) technology,⁴⁴ and the construction of a CCS demonstration project to capture and sequestration carbon from a petroleum coke gasification plant.⁴⁵ Additionally, one EIS for the continued storage of spent nuclear fuel at reactors and off-site was included in this category, due to similarities with the other nuclear EISs.⁴⁶ Lead agencies included: the Nuclear Regulatory Commission (NRC), which prepared six EISs for proposals involving new and existing nuclear power plants; the Bureau of Land Management (BLM), which prepared three EISs for solar

⁴⁰ BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, BLM/CA/PL-2014/015+1793, MODIFIED BLYTHE SOLAR POWER PROJECT, PROPOSED AMENDMENT TO RIGHT-OF-WAY GRANT CACA 048811 – FINAL ENVIRONMENTAL IMPACT STATEMENT, (May 2014); BUREAU OF INDIAN AFFAIRS ET AL., FINAL ENVIRONMENTAL IMPACT STATEMENT: MOAPA SOLAR ENERGY CENTER (Feb. 2014) (hereinafter BLYTHE SOLAR POWER FEIS); BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, BLM/CA/PL-2014-001, STATELINE SOLAR FARM PROJECT: PROPOSED FINAL PLAN AMENDMENT AND FINAL ENVIRONMENTAL IMPACT STATEMENT (Nov. 2013) [hereinafter STATELINE SOLAR FARM FEIS].

⁴¹ The nuclear power EISs included one generic EIS for nuclear power plant license renewable, three supplemental EISs for site-specific nuclear license renewals, and one proposal for the construction of a new nuclear facility. OFFICE OF NUCLEAR REGULATORY RESEARCH, U.S. NUCLEAR REGULATORY COMM'N, NUREG-1437, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS (June 2013); *Id.* at REGARDING LIMERICK GENERATING STATION, UNITS 1 AND 2 (Supp. 49 Aug. 2014); *Id.* at REGARDING GRAND GULF NUCLEAR STATION, UNIT 1 (Supp. 50 Nov. 2014); *Id.* at REGARDING CALLAWAY PLANT, UNIT 1 (Supp. 51 Nov. 2014); U.S. NUCLEAR REGULATORY COMM'N & U.S. ARMY CORPS OF ENG'RS, NUREG-2111, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR COMBINED LICENSES (COLS) FOR WILLIAM STATES LEE III NUCLEAR STATION UNITS 1 AND 2 (Dec. 2013).

⁴² FEDERAL ENERGY REGULATORY COMM'N, DEP'T OF ENERGY, FERC/EIS-F-0245, PROJECT No. 2305-036, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR HYDROPOWER LICENSE: TOLEDO BEND HYDROELECTRIC PROJECT (Dec. 2013) [hereinafter TOLEDO BEND FEIS]; FEDERAL ENERGY REGULATORY COMM'N, DEP'T OF ENERGY, FERC/EIS-F-0242, FERC PROJECT No. 2079-068, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR HYDROPOWER LICENSE: MIDDLE FORK AMERICAN RIVER HYDROELECTRIC PROJECT (Feb. 2013) [hereinafter MIDDLE FORK FEIS].

⁴³ BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, BLM/CA/EIS-2013-011+1793, ALTA EAST WIND PROJECT: PROPOSED PLAN AMENDMENT AND FINAL ENVIRONMENTAL IMPACT STATEMENT, (Feb. 2013) [hereinafter ALTA EAST WIND FEIS]; U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED HABITAT CONSERVATION PLAN AND INCIDENTAL TAKE PERMIT: FOWLER RIDGE WIND FARM, (Dec. 2013) [hereinafter FOWLER RIDGE FEIS] (although this EIS was for a habitat conservation plan and incidental take permit, it discussed the impacts of the wind farm and therefore was included in the electric generation category).

⁴⁴ NAT'L ENERGY TECH. LAB., U.S. DEP'T OF ENERGY, DOE/EIS-0460 FUTUREGEN 2.0 PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT (Oct. 2013) [hereinafter FUTERGEN FEIS].

⁴⁵ For this project, the gasification facility was treated as a “connected action” and thus the facility’s environmental impacts were also reviewed in the EIS. NAT'L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34.

⁴⁶ OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS, U.S. NUCLEAR REGULATORY COMM'N, NUREG-2157, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR CONTINUED STORAGE OF SPENT NUCLEAR FUEL (Sept. 2014).

and wind projects on BLM-managed lands; the Department of Energy (DOE), which prepared two EISs for CCS projects; the Federal Energy Regulatory Commission (FERC), which prepared two EISs for hydroelectric facilities; the US Fish and Wildlife Service (USFWS), which prepared one EIS for a wind farm; and the Bureau of Indian Affairs (BIA), which prepared one EIS for a solar facility.

There was a good deal of variation in how these EISs addressed climate-related issues, in part due to the diversity of agencies and projects that were included in this category. Fourteen of the fifteen EISs (93%) mentioned both greenhouse gas emissions and the impacts of climate change on the project, and twelve of the EISs (80%) included a quantitative analysis of GHG emissions. None of the EISs concluded that GHG emissions would be significant, nor did they determine that the effects of climate change would have important implications for the operation or environmental impacts of the project. BLM and DOE conducted the most thorough analyses of GHG emissions and climate impact considerations. The two EISs prepared by FERC (both for the reauthorization of hydroelectric dams) contained the least detailed analysis of these issues.

Table 3.1 – Climate-Related Considerations in Electric Generation EISs

| Issue Analyzed | # EISs* |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 12 (11) |
| (2) Construction impacts | 9 (7) |
| (3) Induced trips | 9 (8) |
| (4) Purchased electricity | 1 (1) |
| (5) Other emissions | 9 (7) |
| (6) Emissions from alternatives | 11 (5) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action | 14 |
| (8) Impact of climate change on water resources | 9 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 10 |
| (10) Water efficiency | 0 |
| Total EISs | 15 |
| * The parentheticals in this column denote the number of EISs that contained quantified GHG emission estimates. | |

Direct Operational Impacts – Twelve of the fifteen EISs (80%) discussed GHG emissions from the operation of the power generating facility, and eleven (73%) included a quantitative emissions analysis. Operational emissions included: (i) smokestack emissions from CCS projects, (ii) emissions from maintenance equipment, and (iii) emissions from emergency back-up generators.⁴⁷ Notably, several of the EISs also estimated annual emissions associated with the conversion of vegetated land and the associated loss in carbon sequestration capacity.⁴⁸

The three EISs that did not discuss GHG emissions were for the relicensing of (and minor modifications to) two existing hydroelectric facilities, and the relicensing of one existing nuclear facility.⁴⁹ The EIS that discussed operational emissions in purely qualitative terms was for a wind farm, the ongoing operation of which would generate less than 25,000 tpy of GHGs under any of the four alternatives.⁵⁰ The remaining EISs all quantified the operational GHG emissions. The operational emissions for the two CCS emissions were well above the 25,000 tpy threshold.⁵¹ BLM, BIA and NRC also quantified annual operational emissions for wind, solar and nuclear facilities (primarily from diesel-fueled generators and equipment) even though these fell well below the 25,000 tpy threshold.⁵² For the nuclear license renewals, NRC disclosed past annual operating emissions without clearly acknowledging that these emissions would continue for a longer period

⁴⁷ About half of the EISs included induced trips in their operational emissions estimates. These are discussed below.

⁴⁸ NAT'L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34, at 4-14 (820 short tons of CO₂e / year from the land use conversion for gasification plant site and all supply/product pipelines); BUREAU OF LAND MANAGEMENT, ALTA EAST WIND FEIS, *supra* note 43 at 4.3-4 (139 metric tons of CO₂ per year from land clearance and vegetation removal); BUREAU OF LAND MANAGEMENT, STATELINE SOLAR FARM FEIS, *supra* note 40, at 4.3-3 (2,994 MT CO₂e / yr from clearing of land and removal of vegetation).

⁴⁹ FEDERAL ENERGY REGULATORY COMM'N, MIDDLE FORK FEIS, *supra* note 42; FEDERAL ENERGY REGULATORY COMM'N, TOLEDO BEND FEIS, *supra* note 42; OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING LIMERICK GENERATING STATION, UNITS 1 AND 2 (Supp. 49 Aug. 2014).

⁵⁰ U.S. FISH & WILDLIFE SERV., FOWLER RIDGE FEIS, *supra* note 43, at 160.

⁵¹ NAT'L ENERGY TECH. LAB., FUTUREGEN FEIS, *supra* note 44, at 4.1-2 (operation of the project would result in a net release of 169,701 tons per year of new CO₂ emissions, after the CO₂ capture and storage); NAT'L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34, at 4-6 (coal burning would emit 5,840,387 tons of CO₂e/year, but only 8% will be released after carbon capture); *Id.* at 4-14 (operation of the gasification plant will release 642,400 short tons/year of CO₂).

⁵² BUREAU OF LAND MANAGEMENT, BLYTHE SOLAR POWER FEIS, *supra* note 40, at 3.5-7 (direct emissions are 23 metric tons of CO₂e annually, not including worker commutes or vendor trips); BIA, RES Americas Moapa Solar Energy Center at 4-4 (ongoing operational emissions are estimated to be less than 3,500 metric tons of CO₂e, including worker commutes and vendor trips); BUREAU OF LAND MANAGEMENT, ALTA EAST WIND FEIS, *supra* note 43, at 4.3-4 (estimated annual operational emissions are 83 metric tons CO₂e/year, including vehicle emissions, off-road maintenance equipment, emergency generator engines, and equipment leakage); U.S. NUCLEAR REGULATORY COMM'N & U.S. ARMY CORPS OF ENG'RS, *supra* note 41 (operational emissions would be 9,500 metric tons of CO₂ annually, and 380,000 metric tons over the 40 lifetime of the project).

if the plant was relicensed.⁵³ As noted above, one of the nuclear power plant relicensing EISs did not discuss or quantify operational GHG emissions, even though it was prepared during the same period as these other two EISs.⁵⁴

NRC took a different approach for the nuclear relicensing EISs—it cited various estimates for GHG emission rates from nuclear facilities, without tying these to the specific plant that was being relicensed.⁵⁵ But NRC did provide an estimate of annual operating emissions for one proposal to construct a new nuclear facility, as well as an aggregate estimate of emissions over the 40-year lifetime of the project.⁵⁶

None of the EISs concluded that GHG emissions would be significant. Even the coal-fired power plant and petroleum coke gasification facilities stated that their use of carbon capture technology would prevent around 90% of emissions from reaching the atmosphere, thus rendering the impact insignificant (despite operational emissions for both plants being well above the 25,000 tpy reporting threshold, even after carbon capture).⁵⁷

Construction Impacts – Nine EISs (60%) discussed GHG emissions from construction, and seven (47%) quantified those emissions. The six EISs that did not discuss construction emissions were all proposals for the continued operation of facilities (nuclear and hydroelectric), which explains why this topic was not discussed. However, there were some modifications proposed for the existing hydroelectric facility that would entail construction activities—the extent of the construction and corresponding emissions impacts was unclear.⁵⁸

Induced Trips – Nine EISs (60%) discussed potential emissions from induced trips, and all but one of these EISs (53%) quantified GHG emissions from those trips. The EISs generally recognized that emissions would be generated as a result of employee travel and vendor

⁵³ OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING CALLAWAY PLANT UNIT 1 p. 2-24 (Supp. 51 Nov. 2014); *Id.* at REGARDING GRAND GULF NUCLEAR STATION p. 2-22 (Supp. 50 Nov. 2014).

⁵⁴ OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING LIMERICK GENERATING STATION, UNITS 1 AND 2 (Supp. 49 Aug. 2014)

⁵⁵ *See, e.g.*, OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING CALLAWAY PLANT UNIT 1 pp. 6-4 – 6-8 (Supp. 51 Nov. 2014).

⁵⁶ U.S. NUCLEAR REGULATORY COMM'N & U.S. ARMY CORPS OF ENG'RS, *supra* note 41, at pp. 5-66 -- 5-67 (operational emissions would be 9,5000 metric tons of CO2 annually, and 380,000 metric tons over the 40 lifetime of the project).

⁵⁷ NAT'L ENERGY TECH. LAB., LAKE FEIS, *supra* note 34, at 4-6; NAT'L ENERGY TECH. LAB., FUTUREGEN FEIS, *supra* note 47, at 3.2-12 – 3.2-14.

⁵⁸ FEDERAL ENERGY REGULATORY COMM'N, MIDDLE FORK FEIS, *supra* note 42.

commutes during both the construction and operation of the projects. Both of the EISs for CCS projects also disclosed emissions associated with the transportation of fuels and other materials to the facilities as well as the transportation of waste from the facilities.⁵⁹ In some EISs, emissions from induced trips were included in overall estimates of operational or construction emissions, but no independent value was assigned to these emissions.⁶⁰

Purchased Electricity – Only one EISs (7%) discussed emissions from purchased electricity, and the EISs quantified those emissions. The EIS for the Lake Charles CCS demonstration facility and connected gasification plant, which required purchased power to operate pumps, compressors and other equipment (resulting in estimated indirect emissions of 467,000 tpy CO₂e).⁶¹ The other CCS facility also required purchased electricity, but did not discuss or quantify emissions associated with that electricity.

Other Emissions – Nine EISs (60%) discussed other emissions, and seven of them (47%) quantified these emissions. The EIS prepared by DOE for the Lake Charles CCS Demonstration Project contained the most detailed analysis of indirect emissions. It provided quantitative estimates of emissions from cradle-to-grave steel and concrete and CO₂ pipeline construction, in addition to estimates of emissions from the transport of materials to/from the site, worker commutes, and purchased electricity.⁶² DOE explained that its other components required for a complete life-cycle assessment (LCA)—such as emissions estimates for extraction and refining of fuels and other materials—were “not applicable” because they are “commodities (or by-products) produced and sold in a commercial market” and the “production of these items occurs independently of the project and DOE’s decision on the proposed action.”⁶³

Several other types of emissions were discussed. First, the EIS for the new nuclear power plant estimated emissions from decommissioning the plant,⁶⁴ as well as emissions associated with the uranium fuel cycle (e.g., emissions from the electricity needed for fuel enrichment).⁶⁵ The EISs for relicensing of the three nuclear power plants also discussed emissions from the uranium fuel

⁵⁹ NAT’L ENERGY TECH. LAB., FUTUREGEN FEIS, *supra* note 44, at 3.2-13; NAT’L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34, at 4-14.

⁶⁰ See, e.g., BUREAU OF LAND MANAGEMENT, STATELINE SOLAR FARM FEIS, *supra* note 40, at 4.3-2.

⁶¹ NAT’L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34, at 4-14.

⁶² *Id.*, at 4-14.

⁶³ *Id.*, at 4-13.

⁶⁴ U.S. NUCLEAR REGULATORY COMM’N & U.S. ARMY CORPS OF ENG’RS, *supra* note 41, at 6-42.

⁶⁵ *Id.*, at 6-10.

cycle.⁶⁶ Additionally, in five of the EISs for renewable and nuclear facilities, the agencies stated that the proposed project would reduce GHG emissions by displacing the use of fossil fuels. Three of these EISs provided quantitative estimates of GHG emissions that would be displaced.⁶⁷

Emissions from Alternatives - Eleven EISs (73%) performed some sort of analysis of GHG emissions for alternatives other than the proposed action, and seven contained quantitative estimates of GHG emissions from alternatives. At minimum, these EISs compared emissions from the proposal with emissions that would occur under a “no action” alternative. Many of these EISs also conducted a comparison of different fuel sources as alternatives, in which they compared emissions from the proposed action with emissions from other energy options—e.g., natural gas, coal, a new nuclear plant (as compared with a nuclear license renewal, for some projects), solar, biomass, oil and fuel cells. This analysis was typically used to justify the project.

Impacts of Climate Change - Fourteen EISs (93%) discussed impacts of climate change on the project, and nine EISs (60%) discussed the impacts of climate change on local water supply. The level of analysis varied significantly between projects. Seven EISs looked focused on how climate change would affect the state or region in which the project was located, and did not discuss whether these impacts had implications for the environmental consequences or ongoing operation of the project. Of those that did conduct a more thorough examination of implications for the project and its affected environment, two EISs noted that climate change had the potential to compound impacts from the project, particularly with regards to effects on local wildlife.⁶⁸ The two strongest EISs in the category—the Grand Gulf Nuclear Station License Renewal and the Modified Blythe Solar Power Project—contained particularly detailed description of climate change effects

⁶⁶ OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING GRAND GULF NUCLEAR STATION pp. 6-10 – 6-17 (Supp. 50 Nov. 2014); *Id.* at REGARDING CALLAWAY PLANT pp. 6-3 – 6-8 (Supp. 51 Nov. 2014); *Id.* at REGARDING LIMERICK GENERATING STATION, UNITS 1 AND 2 pp. 6-3 – 6-9 (Supp. 49 Aug. 2014).

⁶⁷ OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING GRAND GULF NUCLEAR STATION p. 4-33 (Supp. 50 Nov. 2014); BUREAU OF LAND MANAGEMENT, BLYTHE SOLAR POWER FEIS, *supra* note 40, at 3.5-7; BUREAU OF LAND MANAGEMENT, ALTA EAST WIND FEIS, *supra* note 43, at 4.3-4 – 4.3-5.

⁶⁸ BUREAU OF LAND MANAGEMENT, ALTA EAST FEIS, *supra* note 43, at 4.3-2; U.S. FISH & WILDLIFE SERV., FOWLER RIDGE FEIS, *supra* note 43, at 29.

on the project and on multiple aspects of the affected environment, including socioeconomics and environmental justice.⁶⁹

Energy and Water Efficiency - Energy efficiency was discussed in ten EISs (67%), but its treatment varied significantly. NRC EISs discussed the benefits of on-site equipment efficiency, as well as demand-side energy efficiency and demand reduction programs (this was the case in the four EISs for license renewals and one EIS for construction of a new facility). Other EISs, such as the Modified Blythe Solar Power Project (discussed below) and Lake Charles Carbon Capture and Sequestration Project mentioned efficiency in the context of alternatives selection, or, on a smaller scale, equipment selection.⁷⁰ One EIS briefly noted that the project would comply with California Title 24 Energy Efficiency Standards.⁷¹ Surprisingly, none of the EIS discussed water efficiency.

3.2 Electric Transmission

This category included seven proposals for the construction or rehabilitation of electric transmission lines and associated infrastructure (such as substations). Despite the similarities between the projects, there were several different lead agencies for these EISs: the U.S. Forest Service (USFS), Bureau of Land Management (BLM), the Department of Energy (DOE), and Rural Utilities Service (RUS).

All of the EISs in this category acknowledged that GHG emissions would be generated as a result of the proposed action, but there was a good deal of variation in terms of the types of emissions that were discussed and the manner in which these were (or were not) quantified. Only three of the EISs (43%) discussed how climate change might affect the project or its surrounding environment (and even then, the discussion was quite limited). Notably, six of the EISs (86%) included some discussion about the emissions that would be generated (or displaced) from connected power plants.

⁶⁹ OFFICE OF NUCLEAR REGULATORY RESEARCH, GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR LICENSE RENEWAL OF NUCLEAR PLANTS, *supra* note 41, at REGARDING GRAND GULF NUCLEAR STATION pp. 4-43 – 4-44 (Supp. 50 Nov. 2014); BUREAU OF LAND MANAGEMENT, BLYTHE SOLAR POWER FEIS, *supra* note 40, at app. A pp. 4.3-6 – 4.3-10.

⁷⁰ NAT'L ENERGY TECH. LAB., LAKE CHARLES FEIS, *supra* note 34, at 2-52; BUREAU OF LAND MANAGEMENT, BLYTHE SOLAR POWER FEIS, *supra* note 40, at 2-8.

⁷¹ BUREAU OF LAND MANAGEMENT, ALTA EAST WIND FEIS, *supra* note 43, at 4.3-2.

Table 3.2 - Climate-Related Considerations in Electric Transmission EISs

| Issue Analyzed | # EISs |
|---|----------|
| GHG Emissions | |
| (1) Direct operational impacts | 7 (4) |
| (2) Construction impacts | 6 (4) |
| (3) Induced trips | 5 (3) |
| (4) Purchased electricity | 1 (1) |
| (5) Other emissions | 6 (2) |
| (6) Emissions from alternatives | 7 (3) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action | 3 |
| (8) Impact of climate change on water resources | 2 |
| Efficiency of action and alternatives | |
| (9) Energy efficiency | 3 |
| (10) Water efficiency | 0 |
| Total EISs | 7 |

Direct Operational Impacts – These impacts included emissions from maintenance equipment and vehicles, emissions from associated infrastructure (such as substations), and emissions from the removal of vegetation and the loss of carbon sequestration potential. All of the EISs discussed operational emissions to some extent, but only 4 (57%) provided quantitative estimates of annual operating emissions. The EISs did not take a standard approach to assessing these emissions—e.g, some quantified the potential effects on vegetation and carbon sequestration,⁷² others did not even consider such emissions.

Construction Impacts – Six of the EISs (86%) discussed emissions from construction equipment and vehicles used on site, and four (57%) quantified them. Construction activities were generally viewed as a larger source of emissions than operational emissions, to the point where one EIS justified not discussing operational emissions because they were nominal compared to

⁷² See e.g., RURAL UTILITIES SERV., U.S. DEP'T OF AGRICULTURE, ANTELOPE VALLEY STATION TO NESET TRANSMISSION PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-46 – 3-47 (May 2014) (assessing the potential effects of action alternatives on vegetation and carbon sequestration).

construction emissions.⁷³ Again, there was significant variation—some EISs included relatively detailed projections of emissions from construction equipment and vehicles,⁷⁴ others merely concluded that such emissions would be insignificant.⁷⁵

Induced Trips – Five of the EISs (71%) discussed emissions from induced trips (employee travel and transportation of goods), and three (43%) quantified those emissions. In two of these three, emissions from induced trips were incorporated in direct operational emissions.⁷⁶

Purchased Electricity – Only one EIS discussed (and quantified) emissions from purchased electricity. Specifically, in the EIS for a transmission line project, DOE determined that the electricity needed to power cooling stations would result in 1,026 tpy CO_{2e}.⁷⁷

Other Emissions – Six of the EISs (86%) discussed emissions and energy use at the power generation facilities that the transmission lines would serve. Five of these projects stated that the lines are meant to serve facilities using either a mix of renewable energy sources or entirely renewable energy sources. Three of these EISs (43%) quantified the displaced GHG emissions from these power plants, although one stated the result in terms of the yearly efficiency of energy, instead of a total amount of GHG emitted. The one EIS that did not claim the project would support renewables was the Teckla-Osage-Rapid City Transmission Line Project EIS, which stated that the relevant power plant could use any source of energy, and thus upstream emissions were impossible to project.⁷⁸ No other upstream or downstream emissions were discussed.

Emissions from Alternatives – All of the EISs discussed emissions from alternatives, and three (43%) provided a quantitative comparison of emissions. These three EISs all also quantified

⁷³ CALIFORNIA PUBLIC UTILITIES COMMISSION & U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, , TEHACHAPI RENEWABLE TRANSMISSION PROJECT (TRIP): FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT (SEIR/SEIS) at 4.2-15 (Oct. 2013).

⁷⁴ BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, APS SUN VALLEY TO MORGAN 500/230kV TRANSMISSION LINE PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED RESOURCE MANAGEMENT PLAN AMENDMENT 4-10 (June 2014) [hereinafter APS SUN VALLEY FEIS]; BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, BLM/NM/PL-13-04-1610, FINAL ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED RESOURCE MANAGEMENT PLAN AMENDMENTS FOR THE SUNZIA SOUTHWEST TRANSMISSION PROJECT at app. F (June 2013) [hereinafter SUNZIA FEIS].

⁷⁵ U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: JACK RABBIT TO BIG SKY MEADOW VILLAGE 161 kV TRANSMISSION LINE 3-374 (Mar. 2013) [hereinafter JACK RABBIT FEIS].

⁷⁶ BUREAU OF LAND MANAGEMENT, APS SUN VALLEY FEIS, *supra* note 74, at 2-71; RURAL UTILITIES SERV., *supra* note 72, at 3-46 – 3-47.

⁷⁷ 1 OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, U.S. DEP'T OF ENERGY, DOE/EIS-0447, FINAL CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMENT at 189 (Aug. 2014).

⁷⁸ U.S. FOREST SERV. & BUREAU OF LAND MANAGEMENT, TECKLA-OSAGE-RAPID CITY 230 kV TRANSMISSION LINE PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-437 (Nov. 2014).

direct operational impacts. In most cases, differences between alternatives were limited to route differences, which, without accounting for vegetation removal, may have led agencies to conclude that substantive differences between alternatives did not exist.

Impacts of Climate Change – Only three of the EISs (43%) discussed climate change impacts on the project, and two (29%) mentioned water-related impacts specifically. Even among EISs that did discuss these impacts, analysis was limited, and none of the EISs contained a detailed examination of how climate change might affect the operation of the transmission lines. One EIS briefly noted the global impacts of climate change and potential impacts on a local bat species.⁷⁹ The other two EISs included a more comprehensive discussion of regional effects, including those affecting local water supply.⁸⁰ One of EISs mentioned heat impacts—specifically, that heat waves will lead to greater demand for air conditioning and subsequently increase stress on the regional electric grid, leading to more blackouts and brownouts.⁸¹ But it did not discuss whether increased temperatures or heat waves could directly affect the proposed transmission line.

Energy and Water Efficiency – Three of the EISs (43%) discussed energy efficiency. One EIS discussed prospects for improving the transmission efficiency of voltage lines,⁸² one project discussed demand side efficiency as a possible alternative to the project,⁸³ and one project discussed both of these efficiency considerations.⁸⁴ None of the EISs discussed water efficiency.

3.3 Fossil Fuel Development

There were a total of 19 EISs in this category. The proposed actions included lease authorizations for coal, oil, and gas extraction, as well as the construction of infrastructure to transport natural gas to markets, such as pipelines, liquefaction facilities, and liquefied natural gas (LNG) import/export terminals. FERC conducted seven environmental reviews for natural gas infrastructure; USFS conducted four environmental reviews for coal, oil, and gas leases (with BLM as a cooperating agency); and the Bureau of Ocean and Energy Management (BOEM) conducted

⁷⁹ RURAL UTILITIES SERV., *supra* note 72, at 3-41, 4-32.

⁸⁰ BUREAU OF LAND MANAGEMENT, APS SUN VALLEY FEIS, *supra* note 74, at 3-12 – 3-16; BUREAU OF LAND MANAGEMENT, SUNZIA FEIS, *supra* note 74, at 3-13, 4-309.

⁸¹ BUREAU OF LAND MANAGEMENT, SUNZIA FEIS, *supra* note 74, at 4-309.

⁸² CALIFORNIA PUBLIC UTILITIES COMMISSION & U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, *supra* note 73, at 1-25.

⁸³ U.S. FOREST SERV., JACK RABBIT FEIS, *supra* note 75, at 2-40.

⁸⁴ BUREAU OF LAND MANAGEMENT, SUNZIA FEIS, *supra* note 74, at 2-41, 2-43.

four environmental reviews for offshore oil and gas drilling. Several other agencies took the lead in conducting environmental reviews for projects with unique features—BLM reviewed an oil shale and tar sands development proposal, USFWS reviewed a proposal for natural gas development within a wildlife refuge; the US Army Corps of Engineers (USACE) reviewed a proposed gas pipeline that required a Section 404 permit; and the Department of State (DOS) reviewed the Keystone XL pipeline.

All of the EISs recognized that the operation of these projects would generate GHG emissions, and most of the EISs also contained a relatively thorough analysis of other emission sources. Several of the EISs even contained relatively comprehensive life-cycle assessment (LCA) of GHG emissions from the production, processing, transportation, and end use of fossil fuels that would be extracted or transported as a result of the project. Eighteen of the EISs (90%) also included some discussion of how climate change would affect the project and/or its surrounding environment, and some of the coastal projects explicitly discussed how the project was designed in a manner to withstand future sea level rise. Energy efficiency considerations were addressed in over half of the EISs (55%), but only two of the EISs discussed water efficiency.

Table 3.3 – Climate-Related Considerations in Fossil Fuel EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 19 (17) |
| (2) Construction impacts | 15 (14) |
| (3) Induced trips | 12 (11) |
| (4) Purchased electricity | 4 (2) |
| (5) Other emissions | 11 (5) |
| (6) Emissions from alternatives | 8 (4) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action | 18 |
| (8) Impact of climate change on water resources | 12 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 11 |
| (10) Water efficiency | 2 |
| Total EISs | 20 |

Direct Operational Impacts – All of the EISs in this category recognized that there would be direct operational emissions from the projects, such as fugitive and vented emissions from oil and gas wells and pipelines, and emissions from ancillary equipment used in the process of extracting and transporting the fossil fuels. These were typically viewed as “negligible” or “insignificant” due to their small size in relationship to national and global totals.

There were only two EISs that did not quantify these emissions: a programmatic EIS for proposed oil and drilling in the Atlantic Ocean,⁸⁵ and a programmatic EIS for oil shale and tar sands development in Colorado, Wyoming and Utah.⁸⁶ Both agencies justified this decision on the grounds that these were programmatic EISs and there was too much uncertainty at this stage to calculate emissions from future oil and gas development activities.⁸⁷ BLM also asserted, in its review of the oil shale and tar sands development, that the decisions to be made on the basis of the EIS were “land allocation decisions, which do not themselves result in emissions of any GHGs.”⁸⁸ BLM did acknowledge that specific lease authorizations “are likely” to result in GHGs, but did not commit to evaluating GHG emissions at the leasing stage.⁸⁹

Construction Impacts – Fifteen of the twenty EISs (75%) explicitly discussed construction-related emissions, and fourteen (70%) included quantitative estimates of such emissions. It is possible that construction-related GHG emissions were included in aggregate estimates of project emissions in the other EISs, but the agencies did not provide a detailed breakdown that explicitly identified emissions from construction activities. The BLM’s review of oil shale and tar sands development was the only EIS that mentioned construction-related emissions without quantifying them.⁹⁰ Again, these were typically viewed as “negligible” due to their small size in relationship to national and global totals.

⁸⁵ BUREAU OF OCEAN ENERGY MANAGEMENT, U.S. DEP’T OF THE INTERIOR, OCS EIS/EA BOEM 2014-001, ATLANTIC OCS: PROPOSED GEOLOGICAL AND GEOPHYSICAL ACTIVITIES, MID-ATLANTIC AND SOUTH ATLANTIC PLANNING AREAS, FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (Feb. 2014).

⁸⁶ BUREAU OF LAND MANAGEMENT, U.S. DEP’T OF THE INTERIOR, DOI No. FES 12-41, BLM/WO/GI-12/013+3000, PROPOSED LAND USE PLAN AMENDMENTS FOR ALLOCATION OF OIL SHALE AND TAR SANDS RESOURCES ON LANDS ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT IN COLORADO, UTAH, AND WYOMING AND FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (Nov. 2012) [hereinafter OIL SHALE AND TAR SANDS FINAL PROGRAMMATIC EIS].

⁸⁷ For example, the Bureau of Land Management (“BLM”) stated that “that there is no commercially proven technology for extracting liquid fuels from oil shale or tar sands.” *Id.* at 4-56.

⁸⁸ *Id.*

⁸⁹ *Id.* BLM stated that “[w]hen project applications are submitted to the BLM and more specific information is known...an appropriate air resource analysis would be conducted and could include an emission inventory.”

⁹⁰ BUREAU OF LAND MANAGEMENT, OIL SHALE AND TAR SANDS FINAL PROGRAMMATIC EIS, *supra* note 86, at 4-57.

Induced Trips – Twelve of the EISs (60%) mentioned emissions from vehicles used to transport materials to/from/within the project area, and eleven (55%) quantified these emissions. As with construction emissions, it is possible that some induced trips were included in the aggregate emissions estimates for the remaining EISs, but this was not clearly stated in the documents. BLM’s review of oil shale and tar sands development was the only EIS that mentioned these emissions without quantifying them.⁹¹

In addition, there were five EISs that discussed emissions from the transportation of the extracted resource via rail or ship. These included two EISs prepared by USFS for a coal lease modification and an oil and gas leasing project,⁹² and three EISs prepared by FERC for LNG export facilities.⁹³ FERC’s calculation of emissions from the operation of ships, tugs, and escort vessels was limited to the operation of these vessels within the project area and state waters.

Purchased Electricity – Four of the EISs (20%) discussed emissions would or could be generated as a result of purchased electricity, but only two (10%) quantified these emissions. For the Keystone XL project and the Cameron Liquefaction Project, the reviewing agencies (DOS and FERC) quantitatively estimated the amount of electricity that would be purchased to operate the infrastructure as well as the emissions that would be generated.⁹⁴ The possibility of GHG emissions from electricity consumed on sites was also noted, but not quantified, in USFS’s EIS for Federal Coal Lease Modifications,⁹⁵ and BLM’s EIS for Oil Shale and Tar Sands Development.⁹⁶

⁹¹ *Id.*

⁹² U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, DOI-BLM-CO-SO50-2012-0013, FINAL ENVIRONMENTAL IMPACT STATEMENT: FEDERAL COAL LEASE MODIFICATIONS COC-1362 & COC-67232 (Aug. 2012) [hereinafter FEDERAL COAL LEASE MODIFICATION FEIS]; U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: FISHLAKE NATIONAL FOREST OIL AND GAS LEASING ANALYSIS (Aug. 2013) [hereinafter FISHLAKE FEIS].

⁹³ FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket Nos. CP12-509-000, CP12-29-000, PF11-2-000, FERC/EIS-0250F, DOE Docket Nos. FE10-161-LNG, FE11-161-LNG, FREEPORT LNG LIQUEFACTION PROJECT AND PHASE II MODIFICATION PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT (June 2014) [hereinafter FREEPORT LNG LIQUEFACTION]; FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket Nos. CP12-507-000 & CP12-508-000, DOE FE 12-97-LNG, FERC/EIS-0252F, FINAL ENVIRONMENTAL IMPACT STATEMENT: CORPUS CHRISTI LNG PROJECT (Oct. 2014); FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket No. CP07-52-000, CP07-53-000, CP07-53-001, FERC\EIS: 0231F, DOWNEAST LIQUEFIED NATURAL GAS (LNG) PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT (May 2014) [hereinafter DOWNEAST FEIS].

⁹⁴ U.S. DEP’T OF STATE, KEYSTONE XL FEIS, *supra* note 34, at 4.14-4; FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket Nos. CP13-25-000, CP13-27-000, FERC/EIS-248F, DOE/EIS-0488, CAMERON LIQUEFACTION PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-25 (Apr. 2014) [hereinafter CAMERON LIQUEFACTION PROJECT].

⁹⁵ U.S. FOREST SERV., FEDERAL COAL LEASE MODIFICATION FEIS, *supra* note 92, at 79.

⁹⁶ BUREAU OF LAND MANAGEMENT, OIL SHALE AND TAR SANDS FINAL PROGRAMMATIC EIS, *supra* note 86, at 4-57.

Other Emissions – Eleven of the EISs (58%) discussed other types of indirect emissions, primarily downstream emissions that could be attributed to the proposed project. Five of these EISs (25%) included quantitative projections of how the project may influence downstream emissions. Both the nature and the depth of the indirect emissions analysis varied substantially between projects.

There were only three EISs that contained a full LCA of GHG emissions, including quantified emissions from the transport, processing, and combustion of the fossil fuels: DOS’s review of Keystone XL,⁹⁷ USFS’s review of federal coal lease modifications,⁹⁸ and USFS’s review of an oil and gas leasing project in Fishlake National Forest.⁹⁹ USFS also noted that two other oil and gas leasing projects would result in downstream emissions associated with the combustion and other uses of oil and gas, but did not attempt to quantify these emissions.¹⁰⁰ USFS explained that the end-use of these fuels was too uncertain for a quantitative analysis:

“[I]t is not possible to determine what the volume or quality of extracted oil and gas will be or which types of products will ultimately be derived from the oil and gas. It is also not possible to forecast where, how, or when products extracted from the project area will be used. Oil, for example, can be used to produce many types of products, including diesel fuel, gasoline, aircraft fuel, kerosene, motor oils, plastics, solvents, lubricants, tires, asphalt, and a myriad of other possible end products. Natural gas could be used for electrical generation, home heating, home cooking, as a vehicle fuel, in fertilizer production (via the Haber–Bosch process), and for other uses.”¹⁰¹

Notably, USFS did quantify emissions from transportation, refining and end-uses of oil and gas in the Fishlake EIS, and these downstream emissions constituted over 80% of the project’s total estimated emissions.¹⁰²

The remaining five EISs that discussed “downstream” effects on emissions involved the development of natural gas production or transport infrastructure, and took a very different approach to describing downstream impacts. Specifically, each EIS claimed that that the project

⁹⁷ U.S. DEP’T OF STATE, KEYSTONE XL FEIS, *supra* note 34, at 4.14-4.

⁹⁸ U.S. FOREST SERV., FEDERAL COAL LEASE MODIFICATION FEIS, *supra* note 92, at 79-81.

⁹⁹ U.S. FOREST SERV., FISHLAKE FEIS, *supra* note 92, at 169.

¹⁰⁰ U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, WHITE RIVER NATIONAL FOREST OIL AND GAS LEASING: FINAL ENVIRONMENTAL IMPACT STATEMENT 139 (Dec. 2014); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, PAWNEE GRASSLAND OIL AND GAS LEASING ANALYSIS: FINAL ENVIRONMENTAL IMPACT STATEMENT 188 (Dec. 2014) [hereinafter PAWNEE GRASSLAND FEIS].

¹⁰¹ U.S. FOREST SERV., PAWNEE GRASSLAND FEIS, *supra* note 100, at 188.

¹⁰² U.S. FOREST SERV., FISHLAKE FEIS, *supra* note 92, at 169.

would ultimately reduce emissions by displacing the use of other fossil fuels (coal and oil).¹⁰³ Notably, only 1 of these EISs (prepared by USACE) actually calculated downstream emissions associated with the combustion of the natural gas.¹⁰⁴ Another EIS (prepared by FERC) estimated that the proposed pipeline would displace fuel oil use resulting in a reduction of 11,357 MT CO₂eq daily, without providing an estimate of downstream emissions from natural gas combustion.¹⁰⁵ The other 3 EISs, all conducted by FERC, did not provide any quantitative estimates to support their assumptions about the downstream effects of natural gas pipelines on GHG emissions.

Emissions from Alternatives – Eight of the EISs (40%) compared emissions from alternatives, such as alternate routes, different design features, or the “no action” alternative. Only four of these EISs (20%) actually included a quantitative comparison of emissions, others simply included qualitative statements about whether certain alternatives would increase or reduce emissions. The analysis of emissions from alternatives also tended to be sporadic (emissions considerations were noted with respect to some but not all alternatives, and there was no table or other tool summarizing emissions from each alternative). There were only 2 EISs that contained a comprehensive emissions assessment for all alternatives: DOS’s review of Keystone XL,¹⁰⁶ and USFS’s review of the Federal Coal Lease Modifications.¹⁰⁷

Impacts of Climate Change – Eighteen of the EISs (90%) included some discussion of how climate change would affect the project or its surrounding environment. For most of the extractive projects and pipelines, there was little or no discussion of direct impacts on the project—the analysis focused on how climate change might affect the surrounding environment and species located therein. The one exception was the Keystone XL EIS, which contained a very thorough

¹⁰³ U.S. ARMY CORPS OF ENG’RS, FINAL ENVIRONMENTAL IMPACT STATEMENT ALASKA STAND ALONE GAS PIPELINE at 5.20-74 (Oct. 2012) [hereinafter ALASKA GAS PIPELINE FEIS]; Federal Energy Regulatory Comm’n, U.S. Dep’t of Energy, Docket Nos. CP13-73-000, CP13-74-000, and PF12-11-000, FERC/EIS-0247F, SIERRITA PIPELINE PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 4-224-4-225 (Mar. 2014); FEDERAL ENERGY REGULATORY COMM’N, DOWNEAST FEIS, *supra* note 93, at 3-4-3-5; FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket Nos. CP13-36-000, CP13-132-000, FERC/EIS-0246F ROCKAWAY DELIVERY LATERAL AND NORTHEAST CONNECTOR PROJECTS: FINAL ENVIRONMENTAL IMPACT STATEMENT at 4-215-4-217 (Feb. 2014) [hereinafter ROCKAWAY DELIVERY FEIS]; FEDERAL ENERGY REGULATORY COMM’N, U.S. DEP’T OF ENERGY, Docket Nos. CP13-499-000, CP13-502-000, PF12-9-000, FERC EIS 0249F, FINAL ENVIRONMENTAL IMPACT STATEMENT: CONSTITUTION PIPELINE PROJECT AND WRIGHT INTERCONNECTION at 4-256 (Oct. 2014).

¹⁰⁴ U.S. ARMY CORPS OF ENG’RS, ALASKA GAS PIPELINE FEIS, *supra* note 103, § 5.20.6.2.

¹⁰⁵ FEDERAL ENERGY REGULATORY COMM’N, ROCKAWAY DELIVERY FEIS, *supra* note 103, at 4-169 (Feb. 2014).

¹⁰⁶ U.S. DEP’T OF STATE, KEYSTONE XL FEIS, *supra* note 34, § 2.2.

¹⁰⁷ U.S. FOREST SERV., FEDERAL COAL LEASE MODIFICATION FEIS, *supra* note 92, at 40, 70.

analysis of how climate change would affect the regions where the pipeline would be located and how this might affect the construction and operation of the pipeline.¹⁰⁸

The EISs for the coastal LNG facilities typically mentioned sea level rise and implications for flooding. Some discussed design elements would protect the project from these impacts. For example, FERC identified the following risk mitigation measures for two LNG terminals:

- The Cameron Liquefaction Project would include a “design allowance of 1 foot for sea level rise and subsidence in the finished grade elevations, including protected berms,”¹⁰⁹ and that equipment would be situated 12.5 feet above the maximum sea level (MSL) to account for potential increases in storm surge as a result of sea level rise (which was predicted to increase storm surge to 12.4 feet above MSL).¹¹⁰
- The Freeport LNG Liquefaction Project would be protected by levees that “provide a significant barrier to even a 100-year climate-change-enhanced storm surge.”¹¹¹

Other EISs merely noted the prospect of sea level rise and coastal flooding without discussing implications for project design and location.

Twelve of the EISs (60%) discussed the potential effects of climate change on water resources within the project area, but they did not analyze whether these effects would have any implications for the environmental impacts of the project (on water resources) or the continued operation of the project. Some of the EISs also discussed how climate change would affect habitats and biodiversity, but this discussion tended to be very brief, and there was very little analysis of whether climate change would make the surrounding environment, resources, and species more vulnerable to the effects of the project.

Energy and Water Efficiency – Eleven of the EISs (55%) discussed energy efficiency, typically as a form of mitigating on-site environmental impacts, or as a possible alternative to the project. When energy efficiency was discussed as an alternative to fossil fuel development, it was always quickly dismissed. Surprisingly, only two EISs (10%) discussed water efficiency when discussing the design and operation of these projects.

¹⁰⁸ U.S. DEP’T OF STATE, KEYSTONE XL FEIS, *supra* note 34, at Section 4.14.

¹⁰⁹ FEDERAL ENERGY REGULATORY COMM’N, CAMERON LIQUEFACTION PROJECT, *supra* note 94, at 4-8.

¹¹⁰ *Id.* at 4-9.

¹¹¹ FEDERAL ENERGY REGULATORY COMM’N, FREEPORT LNG LIQUEFACTION, *supra* note 93, at 4-8.

3.4 Mining

This category encompassed thirteen EISs for the approvals of mining projects (not including coal mining) and one tailings disposal facility. The lead agencies on these EISs included BLM, USFS, USACE, and DOE. The discussion of GHG emissions and climate change impacts tended to be more limited for this category, as compared with other categories dealing with natural resource management and extraction. Ten of the thirteen EISs (77%) discussed GHG impacts, and ten (77%) discussed the impact of climate change on certain aspects of the affected environment, but the analysis was typically quite brief. Most of the EISs did not address considerations related to water efficiency or energy efficiency.

Table 3.4 – Climate-Related Considerations in Mining EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 10 (10) |
| (2) Construction impacts | 4 (4) |
| (3) Induced trips | 4 (4) |
| (4) Purchased electricity | 5 (4) |
| (5) Other emissions | 3 (2) |
| (6) Emissions from alternatives | 10 (9) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action | 10 |
| (8) Impact of climate change on water resources | 7 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 4 |
| (10) Water efficiency | 2 |
| Total EISs | 13 |

Direct Operational Impacts – Ten of the thirteen EISs (77%) identified GHG emissions from direct operations, and all of those ten EISs included quantitative projections of such emissions. Most of the EISs in this category provided quantitative emissions estimates without providing a detailed breakdown of emissions sources (and thus it was difficult to determine whether these operational emissions include vehicle emissions). This may be because most of the

projects fell below the 25,000 tpy threshold, and the GHG emissions were considered “de minimis” or “negligible.” Even for those with larger quantities of emissions, ranging from 180,000-688,000 thousand tons per year, the agencies did not conclude that the project would have a significant impact on climate change.¹¹²

Construction Impacts – Four of the EISs (31%) discussed (and quantified) emissions from mine construction activities, including the on-site use of construction equipment and vehicles, and the movement of construction materials to the site.

Induced Trips – Four of the EISs (31%) discussed (and quantified) emissions from vehicle trips. These included trips to haul materials to the mine sites (e.g., for construction) and trips to haul materials from the sites.

Purchased Electricity – Five of the EISs (38%) acknowledged that there would be emissions from electricity purchased to operate the mines, and four (21%) quantified these emissions.

Other Emissions – Three of the EISs (23%) discussed the possibility of indirect emissions that could occur as a result of the project, and two (15%) quantified these emissions. In the EIS for a limestone mine, USACE noted that the project may displace timber harvesting and thus result in a reduction of GHG emissions from deforestation.¹¹³ In the EIS for a uranium mine, BLM noted that a connected wastewater treatment facility would be powered by natural gas, and this would generate additional emissions (by an unspecified amount).¹¹⁴ And in a programmatic EIS for a uranium leasing program, DOE noted that the eventual reclamation process could emit anywhere from 1,400 – 2,200 tpy of CO₂e.¹¹⁵

Emissions from Alternatives – Ten of the EISs (77%) compared emissions from alternatives, and nine (69%) included a quantitative comparison among alternatives. Unlike some of the other EIS categories discussed in this report, these quantitative comparisons were typically summarized

¹¹² See U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, MB-R3-05-6, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE ROSEMONT COPPER PROJECT (Dec. 2013) [hereinafter ROSEMONT COPPER FEIS]; BUREAU OF LAND MANAGEMENT, U.S. DEP’T OF THE INTERIOR, BLM/WY/PL-13/033+1330, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE GAS HILLS IN-SITU RECOVERY URANIUM PROJECT (Oct. 2013) [hereinafter GAS HILLS FEIS]; BUREAU OF LAND MANAGEMENT, U.S. DEP’T OF THE INTERIOR, BLM/NM/PL-14-02-3500, OCHOA MINE PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT (Feb. 2014).

¹¹³ U.S. ARMY CORPS OF ENG’RS, FINAL TARMAC KING ROAD LIMESTONE MINE ENVIRONMENTAL IMPACT STATEMENT at 3-70 -- 3-71 (Aug. 2013) [hereinafter TARMAC KING ROAD LIMESTONE MINE FEIS].

¹¹⁴ BUREAU OF LAND MANAGEMENT, GAS HILLS FEIS, *supra* note 112, at 4.1-11.

¹¹⁵ U.S. DEP’T OF ENERGY, DOE/EIS-0472, FINAL URANIUM LEASING PROGRAM PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT at 4-73, 4-194 (March 2014).

in a relatively accessible fashion (e.g., there would be a single table summarizing all emissions from 3 or 4 project alternatives).

Impacts of Climate Change – Ten of the EISs (77%) discussed how climate change may affect certain aspects of the local environment, and seven (54%) discussed impacts on water resources specifically. The discussion was typically brief and generalized, and there was very little analysis of how climate-related effects might interfere with mine operation or exacerbate environmental impacts from the mine.

However, there were two EISs (prepared by USACE and USFS) that contained a very thorough analysis of climate change effects and environmental implications.¹¹⁶ One of these EISs also included a mitigation plan with specific measures to address the impacts of climate change on the surrounding environment – e.g., “the [mitigation plan] will provide potential replacement habitat for salt marsh and coastal hydric hammock in the event of continued climate change and sea level rise.”¹¹⁷ In contrast, USFS’s EIS for an expansion of a tailings mine, located on a small island off the coast of Alaska, briefly mentioned climate impacts but concluded that it was unnecessary to analyze these in the context of the project.¹¹⁸

Energy and Water Efficiency – Only four of the EISs (31%) discussed energy efficiency in project design and operations, and only two (15%) discussed water efficiency. The efficiency measures discussed included specific technologies that could be utilized in the mining process, as well as operational procedures (such as recycling freshwater).

3.5 Forestry

This category included thirty forestry EISs all conducted by the USDA Forest Service (USFS). BLM was a cooperating agency for many of these EISs. Most of the projects were classified as “vegetation management projects” that involved proposals relating to timber harvests and ecological management of forests. There were also several proposals that considered a broader

¹¹⁶ U.S. FOREST SERV., ROSEMONT COPPER FEIS, *supra* note 112; U.S. ARMY CORPS OF ENG’RS, TARMAC KING ROAD LIMESTONE MINE FEIS, *supra* note 113.

¹¹⁷ U.S. ARMY CORPS OF ENGINEERS, *supra* note 113, app. G: Mitigation Plan 2.

¹¹⁸ U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, R10-MB-744c, GREENS CREEK MINE TAILINGS DISPOSAL FACILITY EXPANSION: FINAL ENVIRONMENTAL IMPACT STATEMENT AND RECORD OF DECISION at 3-201, 3-301 -- 3-302 (Sept. 2013).

array of potential uses of forest lands, including oil and gas development,¹¹⁹ and the construction of renewable energy facilities.¹²⁰

Table 3.5 – Climate-Related Considerations in Forestry EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 20 (6) |
| (2) Construction impacts | 3 (1) |
| (3) Induced trips | 3 (0) |
| (4) Purchased electricity | 0 (0) |
| (5) Other emissions | 4 (1) |
| (6) Emissions from alternatives | 12 (6) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action | 26 |
| (8) Impact of climate change on water resources | 13 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 2 |
| (10) Water efficiency | 7 |
| Total EISs | 30 |

One of the stated goals of many of these proposals was to improve forest resilience with respect to external shocks and stressors that can be exacerbated by climate change, such as wildfire, invasive species, drought, and flooding. As a result, many of the EISs contained a relatively detailed discussion of how climate change would affect the project area. However, the EISs were less thorough in their evaluation of GHG impacts associated with carbon sequestration in forests. While two-thirds of the EISs acknowledged that forest management does affect GHG emissions, they did not typically quantify the effect of proposed management activities on carbon sequestration and GHG releases, nor did they consider whether the operation of vehicles and

¹¹⁹ BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF INTERIOR & U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE SAN JUAN NATIONAL FOREST AND PROPOSED TRES RIOS FIELD OFFICE LAND AND RESOURCE MANAGEMENT PLAN (Sept. 2013) [hereinafter SAN JUAN NATIONAL FOREST FEIS]; U.S. FOREST SERV., GEORGE WASHINGTON FEIS, *supra* note 37; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, LAND MANAGEMENT PLAN, 2014 REVISION, SHOSHONE NATIONAL FOREST (Jan. 2014) [hereinafter SHOSHONE LAND MANAGEMENT PLAN REVISION].

¹²⁰ U.S. FOREST SERV., GEORGE WASHINGTON FEIS, *supra* note 37.

equipment in the project area may result in the direct release of emissions or may consume electricity that generates emissions off-site. Most of the EISs did not discuss energy efficiency or water efficiency.

Direct Operational Impacts – Twenty of the thirty EISs (67%) acknowledged that the proposed forest management activities would generate GHG emissions and/or affect carbon sequestration, but only six EISs (20%) quantified these emissions. The primary sources of operational emissions were: (i) emissions from prescribed burns and expected forest fires, (ii) emissions either released or sequestered as a result of vegetation and soil management practices (other than burning). One EIS also calculated emissions from the potential construction and operation of oil and gas infrastructure, where oil and gas development was one of the alternative uses of the forest under consideration.¹²¹ There was almost no discussion of operational emissions from buildings, vehicles, or equipment (apart from those that might be involved in oil and gas development)—there were only two EISs that identified these as potential GHG emission sources, and neither provided quantitative estimates of emissions from those sources.¹²² Notably, some EISs did estimate conventional air pollutants from equipment and burning even when GHG emissions were not quantified for these activities.¹²³

Although the EISs were all prepared by the same agency (USFS), they contained different justifications for not quantifying emissions from forestry management activities. Some EISs contained language asserting that a quantitative analysis of the proposed action's effect on climate change was not feasible.¹²⁴ To justify this conclusion, USFS cited the following factors: (i) the tools for estimating carbon sequestration are not fully developed enough at the time for project-level analysis, (ii) without meaningful thresholds against which to weigh any project-related GHG

¹²¹ BUREAU OF LAND MANAGEMENT & U.S. FOREST SERV., SAN JUAN NATIONAL FOREST FEIS, *supra* note 119, at 364--65, 372.

¹²² U.S. FOREST SERV., SHOSHONE LAND MANAGEMENT PLAN REVISION, *supra* note 112, at 108--112; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: AP LOBLOLLY PINE REMOVAL AND RESTORATION PROJECT 113 (May 2013) [hereinafter AP LOBLOLLY REMOVAL FEIS].

¹²³ See, e.g., U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, R5-MB-258A, FINAL ENVIRONMENTAL IMPACT STATEMENT: WHISKY RIDGE ECOLOGICAL RESTORATION PROJECT (May 2013) [hereinafter WHISKY RIDGE FEIS]; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: TULE RIVER RESERVATION PROTECTION PROJECT 107 (Aug. 2014).

¹²⁴ U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: RIM-PAUNINA PROJECT 514 (Jan. 2013) [hereinafter RIM-PAUNINA FEIS]; U.S. FOREST SERV., MCKAY FEIS, *supra* note 38, at 331; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: LAKEWOOD SOUTHEAST PROJECT 146 (Aug. 2013) [hereinafter LAKEWOOD SOUTHEAST FEIS]; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: BEAVER CREEK PROJECT at L-11 (Jan. 2014); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, EAST RESERVOIR FINAL ENVIRONMENTAL IMPACT STATEMENT 40 (Mar. 2014) [hereinafter EAST RESERVOIR FEIS].

emissions, it would not be possible to determine the project's effects on global climate change; (iii) the effects of the action would be very small at a global scale.¹²⁵ Other EISs acknowledged that it is (or "may be") possible to quantify the project's direct effects on carbon sequestration and GHG emissions, but declined to conduct a quantitative analysis because: (i) "there is no certainty about the actual intensity of an individual project's indirect effects on global climate change" and (ii) the scale of the impact would be so small on a global scale that a quantitative analysis would not provide a practical or meaningful effects analysis for project decisions."¹²⁶ Several EISs also cited the CEQ's 2010 draft guidance on climate change and NEPA analysis, in which CEQ declined to issue guidance on calculating GHG emissions from land management proposals, as a reason for not quantifying or otherwise discussing these emissions.¹²⁷

Notably, the idea that it is not possible to conduct a quantitative analysis of effects on carbon sequestration potential is refuted by the fact that three EISs did include a quantitative analysis of carbon storage under different forest management alternatives.¹²⁸ Some of the other EISs also provided a very detailed, qualitative discussion of potential carbon storage impacts under different alternatives to help decision-makers and the public understand which alternatives would maximize carbon sequestration.¹²⁹ These EISs illustrate how an analysis of carbon storage impacts can help inform forestry decisions.

Construction Impacts – Three EISs (10%) acknowledged that there would be GHG emissions from construction activities, and one (3%) quantified these emissions. These included two EISs acknowledging that the construction of roads would generate emissions (without

¹²⁵ U.S. FOREST SERV., EAST RESERVOIR FEIS, *supra* note 124.

¹²⁶ U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: BLACK MESA VEGETATION MANAGEMENT PROJECT at 3-113 (Mar. 113) [hereinafter BLACK MESA FEIS]; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, SMITHS FORK VEGETATION RESTORATION PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT 16 (Mar. 2014); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, CUMBRES VEGETATION MANAGEMENT PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT 115 (May 2014) [hereinafter CUMBRES VEGETATION MANAGEMENT FEIS].

¹²⁷ *See, e.g.*, U.S. FOREST SERV., LAKEWOOD SOUTHEAST FEIS, *supra* note 124, at 146.

¹²⁸ U.S. FOREST SERV., WHISKY RIDGE FEIS, *supra* note 123, at 81-88; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE REVISED LAND MANAGEMENT PLAN: KOOTENAI NATIONAL FOREST 111 (Aug. 2013) [hereinafter KOOTENAI FEIS]; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, R5-MB-270, RIM FIRE RECOVERY ENVIRONMENTAL IMPACT STATEMENT 69--71 (Aug. 2014) [hereinafter RIM FIRE RECOVERY FEIS].

¹²⁹ *See, e.g.*, U.S. FOREST SERV., AP LOBLOLLY REMOVAL FEIS, *supra* note 122, at 118--122 (qualitative comparison of carbon storage impacts from management practices such as slash disposal, site preparation, and regeneration techniques; forest thinning; prescribed burning; and simply doing nothing).

quantifying those emissions).¹³⁰ In addition, the EIS that contemplated oil and gas development among the alternative uses of the forest included oil and gas *drilling* in its GHG emissions estimate, but did not account for the GHG emissions associated with the construction of the drilling rigs and associated infrastructure.¹³¹

Induced Trips – Three EISs (10%) recognized that GHG emissions would be generated as a result of vehicle trips undertaken as a part of vegetation management activities¹³² or to transport timber from the forest to processing facilities.¹³³ None of the EISs quantified these emissions.

Purchased Electricity – None of the EISs mentioned the potential for GHG emissions as a result of purchased electricity. This was likely due to the fact that none of the proposals involved significant electricity demand (most energy would presumably be produced via on-site equipment and generators). There was a comment on one EIS specifying that “energy requirements and CO₂ emissions should be calculated or estimated for contribution to climate change from this project.”¹³⁴ USFS responded by saying that CEQ’s NEPA regulations “make no mention of calculations for either energy requirements and/or Carbon Dioxide emissions.”¹³⁵

Other Emissions – Four EISs (13%) noted that “forestry products” (i.e., biofuels) can reduce downstream GHG emission when they are substituted for fossil fuels.¹³⁶ One of the EISs even provided quantitative estimates of the GHG emission reductions from using biomass for bioenergy instead of biomass for wood products or open burning.¹³⁷ A different EIS further noted that the substitution of timber products for other materials (e.g., cement and steel) can also reduce GHG emissions.¹³⁸

Emissions from Alternatives – All six of the EIS that quantified operational GHG emissions (from prescribed burns, other vegetation management practices, and oil and gas development)

¹³⁰ *Id.*, at 113; U.S. FOREST SERV., SHOSHONE LAND MANAGEMENT PLAN REVISION, *supra* note 119, at 108.

¹³¹ BUREAU OF LAND MANAGEMENT & U.S. FOREST SERV., SAN JUAN NATIONAL FOREST FEIS, *supra* note 119, at 364-5.

¹³² U.S. FOREST SERV., AP LOBLOLLY REMOVAL FEIS, *supra* note 119, at 113, 126; U.S. FOREST SERV., SHOSHONE LAND MANAGEMENT PLAN REVISION, *supra* note 119, at 108.

¹³³ U.S. FOREST SERV., BLACK MESA FEIS, *supra* note 126, at 3-73.

¹³⁴ U.S. FOREST SERV., RIM-PAUNINA PROJECT FEIS, *supra* note 124, app. p. 185.

¹³⁵ *Id.*

¹³⁶ U.S. FOREST SERV., AP LOBLOLLY REMOVAL FEIS, *supra* note 122, at 118; U.S. FOREST SERV., LAKEWOOD SOUTHEAST FEIS, *supra* note 124, at 148; U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: HARRIS VEGETATION MANAGEMENT PROJECT 255 (Sept. 2013); U.S. FOREST SERV., RIM FIRE RECOVERY FEIS, *supra* note 128, at 69--71.

¹³⁷ U.S. FOREST SERV., RIM FIRE RECOVERY FEIS, *supra* note 128, at 69--71.

¹³⁸ U.S. FOREST SERV., LAKEWOOD SOUTHEAST FEIS, *supra* note 124, at 148.

provided quantitative estimates under different alternatives. The FEIS for the Kootenai National Forest Land Management Plan Revision provided a particularly helpful table for comparing these emissions:¹³⁹

Table 20. Thousand Metric Tons of Carbon Sequestered in the 5th Decade by Alternative

| | Alt. A | Alt. B Modified | Alt. C | Alt. D |
|---|----------------|--------------------|----------------|----------------|
| Results with Unconstrained Budget | | | | |
| Carbon sequestered in inventory of forested acres | 175,219 | 174,640 | 175,273 | 172,529 |
| Carbon sequestered in wood products | 1,718 | 1,641 | 1,553 | 1,942 |
| Carbon sequestered in acres burned by wildfire | 1,405 | 1,319 | 1,312 | 1,331 |
| Total Carbon | 178,342 | 177,600 | 178,138 | 175,802 |
| Results with Current Budget Level | | | | |
| Carbon sequestered in inventory of forested acres | 179,830 | 177,709 | 178,457 | 177,987 |
| Carbon sequestered in wood products | 999 | 946 | 841 | 955 |
| Carbon sequestered in acres burned by wildfire | 1,365 | 1,341 | 1,325 | 1,349 |
| Total Carbon | 182,194 | 179,996 | 180,623 | 180,291 |

Impacts of Climate Change - Twenty-six of the EISs (87%) included some discussion of how climate change would affect the project area and/or management practices, and thirteen (43%) discussed the impacts of climate change on water resources specifically. The lack of discussion of how climate change would affect water resources was likely due to the focus on vegetation and soil management, and the fact that these proposals did not entail extensive water withdrawals. The primary impacts that were discussed included wildfire, drought, flooding, invasive species, and the effect of these impacts on the distribution of key tree species in the area. EISs that considered climate change impacts on water resources discussed potential changes in watershed health in terms of the health of aquatic species, stream flow, and soil moisture. Changes in precipitation and temperatures were recognized as the key drivers of these impacts.

Fourteen of the EISs (47%) drew an explicit link between the effects of climate change and the proposed management strategies. Specifically, these EISs: (i) justified the proposed action as a means of improving forest resiliency and otherwise responding to the effects of climate change;¹⁴⁰

¹³⁹ U.S. FOREST SERV., KOOTENAI FEIS, *supra* note 128, at 111.

¹⁴⁰ See, e.g., U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: LONESOME WOOD VEGETATION MANAGEMENT 2 at 160 (Oct. 2012); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: GALENA PROJECT 77 (Sept. 2013); U.S. FOREST SERV., SHOSHONE LAND MANAGEMENT PLAN REVISION, *supra* note 119, at 31; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, MB-R3-07-19, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE KAIBAB NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN 34–36 (Feb. 2014); U.S. FOREST

(ii) identified specific climate change adaptation measures;¹⁴¹ and/or (iii) compared how different vegetation management strategies would be more or less resilient in the face of climate change.¹⁴² The analysis was typically conducted with respect to the region or state in which the forest was located—and even without more downscaled climate projections, the agencies were able to discuss the effects of climate change on forests in great detail.

Notably, two of the EISs that did not evaluate climate change effects contained language asserting that NEPA “does not specifically require analysis of how environmental factors, such as global climate change, might impact a proposed action.”¹⁴³

Energy and Water Efficiency – 2 EISs contained a very brief discussion of energy efficiency, and 7 EISs discussed water efficiency. Of the 2 EISs that discussed energy efficiency, one outlined a variety of energy efficiency opportunities (such as car car-pooling, electric communications, energy efficiency equipment, and energy efficiency management strategies);¹⁴⁴ the other merely noted that NEPA requires consideration of energy use and conservation, and concluded that energy use for the project would be “regular.”¹⁴⁵ The 7 EISs that discussed water efficiency all referred to a set of best management practices (BMPs) for water conservation which would be adhered to during the implementation of the proposed action.¹⁴⁶

3.6 Parks and Wildlife

This category included thirty-eight EISs for proposed actions involving the management of national parks and wildlife reserves. Most of the proposed actions fell within one of the following categories: (i) wildlife and vegetation management plans, (ii) habitat conservation plans and

SERV., U.S. DEP’T OF AGRICULTURE, LOST CREEK--BOULDER CREEK LANDSCAPE RESTORATION PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT 33 (Mar. 2014).

¹⁴¹ See, e.g., U.S. FOREST SERV., LAKEWOOD SOUTHEAST FEIS, *supra* note 124, at 149--50; U.S. FOREST SERV., SHOSHONE LAND MANAGEMENT PLAN REVISION, *supra* note 119, at 21--2; U.S. FOREST SERV., EAST RESERVOIR FEIS, *supra* note 124, at 338.

¹⁴² See, e.g., U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, MB-R3-01-5, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE RIM LAKES FOREST RESTORATION PROJECT 62 (Apr. 2013); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, R5-MB-273, FINAL ENVIRONMENTAL IMPACT STATEMENT: SUGARLOAF HAZARDOUS FUELS REDUCTION PROJECT at 2-42 (June 2014); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: CHESTER COUNTY STREAM AND RIPARIAN RESTORATION/ ENHANCEMENT PROJECT 93--95 (Nov. 2014); U.S. FOREST SERV., GEORGE WASHINGTON FEIS, *supra* note 37, at 2-60.

¹⁴³ U.S. FOREST SERV., BLACK MESA FEIS, *supra* note 126, at 3-112--3-113; U.S. FOREST SERV., CUMBRES VEGETATION MANAGEMENT FEIS, *supra* note 126, at 115.

¹⁴⁴ U.S. FOREST SERV., GEORGE WASHINGTON FEIS, *supra* note 37, at 3-411.

¹⁴⁵ U.S. FOREST SERV., RIM-PAUNINA PROJECT FEIS, *supra* note 124, at 521.

¹⁴⁶ See, e.g., U.S. FOREST SERV., WHISKY RIDGE FEIS, *supra* note 123, app. G.

incidental take permits for specific endangered species, and (iii) proposals for the improvement of facilities and roads within public parks.¹⁴⁷ Some of the projects in this third category entailed minor construction activities, but construction was not a major component of any of the proposed actions in this category. The National Park Service (NPS) was the lead agency for approximately half (19) of the EISs. Other lead agencies included USFS, USFWS, and the Bureau of Reclamation (BR). The Valles Caldera Trust was the lead agency for one EIS to provide public access to trust lands.

Table 3.6 – Climate-Related Considerations in Parks and Wildlife EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 20 (8) |
| (2) Construction impacts | 12 (3) |
| (3) Induced trips | 15 (5) |
| (4) Purchased electricity | 6 (4) |
| (5) Other emissions | 3 (3) |
| (6) Emissions from alternatives | 8 (6) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 29 |
| (8) Impact of climate change on water resources | 14 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 17 |
| (10) Water efficiency | 5 |
| Total EISs | 38 |

Twenty-three of the EISs (61%) in this category included some discussion of GHG emissions that would occur as a result of the proposed action. Notably, none of the proposed actions in this category involved the construction or operation of major GHG emission sources (e.g., sources emitting more than 25,000 tpy). Where GHG emissions were not discussed, it was typically because the project involved a specific proposal for species or vegetation management

¹⁴⁷ These included some proposals for the construction of buildings, roads, and canals. As such, there was some overlap with other project categories (Buildings and Real Estate, Transportation, Public Works).

that would only have a “negligible” impact on GHG emissions.¹⁴⁸ Some EISs reached this same conclusion after a very brief discussion of activities that might generate or sequester GHG emissions—to the extent that these EISs identified (but did not quantify) potential emission sources, they were included in the tallies below.¹⁴⁹ There were also several EISs that contained a *very* thorough emissions inventory, despite the relatively small contribution of the project to global climate change.¹⁵⁰ But in most of the EISs, the discussion of climate change centered on how climate change would affect the project, rather than the project’s effect on climate change. Twenty-nine of the EISs (76%) discussed the potential effects of climate change on wildlife, park facilities, and other key resources within the project environment.

Direct Operational Impacts – Twenty of the thirty-eight EISs (53%) contained some analysis of the expected impacts of the project on climate change, and eight EISs (21%) provided quantitative estimates of emissions. In all cases, annual emissions were estimated to be less than the 25,000 tpy CO₂e reporting limit by the EPA. Sources of operational emissions included: (i) direct combustion to provide heat and power to park facilities, (ii) the operation of equipment and vehicles as part of park management or recreational activities, (iii) carbon sequestration impacts associated with vegetation management decisions, and (iv) emissions from prescribed burns.

Some of the EISs included quantitative estimates of GHG emissions despite the fact that these emissions would be *very* small. For example, one EIS noted that emissions associated with

¹⁴⁸ See, e.g., NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, FORT MATANZAS NATIONAL MONUMENT FINAL GENERAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT 20 (June 2014); NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, CANAVERAL NATIONAL SEASHORE FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 112 (July 2014).

¹⁴⁹ See, e.g., NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, OZARK NATIONAL SCENIC RIVERWAYS FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 32 (Dec. 2014); NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, BIG THICKET NATIONAL PRESERVE FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 32 (Oct. 2014); NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, ANTIETAM NATIONAL BATTLEFIELD, MONOCACY NATIONAL BATTLEFIELD, MANASSAS NATIONAL BATTLEFIELD PARK FINAL WHITE-TAILED DEER MANAGEMENT PLAN 33 (Aug. 2014), NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, GULF ISLANDS NATIONAL SEASHORE FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 271 (July 2014); U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: OCHOCO SUMMIT TRAIL SYSTEM 352--53 (Mar.2014).

¹⁵⁰ VALLES CALDERA TRUST, VALLES CALDERA NATIONAL PRESERVE ADMINISTRATIVE FINAL PUBLIC ACCESS AND USE PLAN ENVIRONMENTAL IMPACT STATEMENT at 3-202 – 3-208 (Oct. 2012); U.S. FISH & WILDLIFE SERV., U.S. DEP’T OF THE INTERIOR, IZEMBЕК NATIONAL WILDLIFE NATIONAL WILDLIFE REFUGE LAND EXCHANGE/ROAD CORRIDOR: FINAL ENVIRONMENTAL IMPACT STATEMENT 4-1 – 4-475 (Feb. 2013); NAT’L PARK SERV., MERCED RIVER FEIS, *supra* note 37, at 9-923 -- 9-963; NAT’L PARK SERV., TUOLUMNE RIVER FEIS, *supra* note 37, at 9-250 -- 9-256; NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, 2 GOLDEN GATE NATIONAL RECREATION AREA AND MUIR WOODS NATIONAL MONUMENT FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 200--03 (Apr. 2014) [hereinafter GOLDEN GATE AND MUIR WOODS FEIS].

different trout harvests could range from 8 to 42 metric tons, depending on the alternative.¹⁵¹ Several also contained an extensive inventory of operational (and other) GHG emissions. The EIS for public access to the Valles Caldera National Preserve contained a particularly thorough inventory of operational (and other) GHG emissions. The sources included in its calculation of “direct GHG emissions” included stationary combustion sources (boilers, furnaces, burners, turbines, heaters, inventors, engines, and flares) used to provide electricity for 38 visitor and employee facilities, as well as mobile combustion sources (motor vehicles used to maintain the facility and provide tours to visitors).¹⁵² The EIS also calculated emissions from staff commutes and visitor trips within the facility as part of its direct emissions analysis (these are accounted for as emissions from “induced trips”).¹⁵³ In addition, the EIS noted that there would be fugitive emissions from stationary combustion sources, as well as refrigerators, air conditioning units, and wastewater treatment, but it did not quantify these emissions.¹⁵⁴

Notably, most the EISs that discussed GHG emissions also discussed mitigation measures to reduce emissions, despite the “negligible” contribution of these projects to global climate change. The measures included: the construction of more energy efficient buildings, the use of solar panels and other small renewable energy installations to offset fossil fuel use, and the use of more fuel efficient buildings.¹⁵⁵

Construction Impacts – Twelve of the EISs (32%) discussed construction-related climate change impacts in some capacity, and three EISs (8%) quantified these emissions. These impacts included tail-pipe emissions from heavy construction vehicles required for project features such as

¹⁵¹ BUREAU OF INDIAN AFFAIRS, U.S. DEP’T OF THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT: PROPOSED STRATEGIES TO BENEFIT NATIVE SPECIES BY REDUCING THE ABUNDANCE OF LAKE TROUT IN FLATHEAD LAKE 123 (2014) (“[a]lternative A is the status quo and will not increase carbon emissions over current levels unless there is substantially increased participation in fishing contests. Action alternatives are anticipated to include the use of netting to meet harvest targets for lake trout. Netting would require the use of power boats and would result in substantial increases in fuel consumption relative to Alternative A. Alternative B is projected to require the netting of 14,000 lake trout, resulting in the release of 8 metric tons [MT] of carbon dioxide [www.boatcarbonfootprint.com]. Alternative C is projected to require the netting of 42,000 lake trout resulting in the release of 24 MT of carbon, and Alternative D is projected to require the netting of 73,000 lake trout resulting in the release of 42 MT of carbon.”).

¹⁵² VALLES CALDERA TRUST, *supra* note 150, at 3-205.

¹⁵³ *Id.* at 3-205 – 3-206.

¹⁵⁴ *Id.* at 3-206.

¹⁵⁵ See, e.g., NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, EFFIGY MOUNDS NATIONAL MONUMENT: FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 186 (Feb. 2013); NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, BIG THICKET NATIONAL PRESERVE FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 32 (Feb. 2013); BUREAU OF RECLAMATION, U.S. DEP’T OF THE INTERIOR, FINAL RESOURCE MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT: CONTRA LOMA RESERVE AND RECREATION AREA 4-82-- 4-83 (Sep. 2014).

parking lots or dock facilities, were presented in the same manner as the operational impacts described above, with emissions being dismissed as negligible contributors to climate change. Therefore, most of the EISs did not provide quantitative estimates of construction-related emissions.

Induced Trips – Fifteen of the EISs (39%) discussed GHG emissions that would result from increased transportation, and five EISs (13%) quantified these emissions. These emissions were generally attributed to increased visitor travel to parks, altered modes of transportation within parks, and increased vehicle trips for the operation and maintenance of park projects.

Purchased Electricity – Six of the EISs (16%) noted that increased (or decreased) demand for electricity from park facilities would affect the project’s overall carbon footprint, and four EISs (11%) quantified these emissions. These EISs all concluded that the impacts of increased electricity demand would be insignificant. One EIS also noted that solar panels would be installed on site to help meet the increased demand for energy.¹⁵⁶

Other Emissions – Three of the EISs (8%) discussed and quantified other sources of emissions. These included two EISs that included the following emissions when calculating the overall carbon footprint of park facilities: (i) upstream and downstream emissions from solid waste disposal, cement production, and food production,¹⁵⁷ and (ii) downstream emissions from wastewater treatment and solid waste.¹⁵⁸ The third EIS included a quantitative estimate of emissions associated with the construction of a pipeline that would be partially built on park land and would thus contribute to cumulative GHG emissions in the park, but which was not a component of the proposed action.¹⁵⁹

Emissions from Alternatives – Eight of the EISs (21%) included comparisons of the GHG emissions that were expected for the alternative actions, and six EISs (16%) provided quantitative estimates of emissions from alternatives. Several of these EISs did an excellent job presenting the comparative contribution to climate change in a manner that would be helpful for decision-

¹⁵⁶ BUREAU OF RECLAMATION, *supra* note 155, at 4-32.

¹⁵⁷ NAT’L PARK SERV., MERCED RIVER FEIS, *supra* note 37, at 9-928.

¹⁵⁸ NAT’L PARK SERV., 2 GOLDEN GATE AND MUIR WOODS FEIS, *supra* note 150, at 21.

¹⁵⁹ NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, GATEWAY NATIONAL RECREATION AREA: FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 326 (Apr. 2014) [hereinafter GATEWAY FEIS].

makers.¹⁶⁰ For example, the Gateway National Recreation Area EIS included a simple table describing whether project actions unique to each alternative would result in beneficial or adverse contributions to climate change.¹⁶¹ The EIS for the Merced Wild and Scenic Comprehensive Management Plan also contained a particularly useful and thorough evaluation of GHG emissions from alternatives, in which the emissions from each alternative were quantified, compared to the no action baseline, and then assigned an impact intensity (e.g., an alternative that reduced emissions by 12,815 tons per year as compared with the baseline were considered “moderate, beneficial” and an alternative that slightly increased emissions by 1,422 tons per year over the baseline was “minor, adverse”).¹⁶²

Impacts of Climate Change – In general, the impacts of climate change on parks and wildlife projects were considered in far more detail than their individual contributions to climate change, with twenty-nine of the EISs (76%) containing some discussion or analysis of how vegetation, wildlife, and geomorphological features would be impacted by long term climate trends. Apart from discussions of regional climate trends such as increasing temperatures and more intense precipitation, significant focus was given to climate change impacts on flora and fauna, including changes in habitat extent and wildfire risk. Adaptive measures such as wildlife population controls and prescribed vegetation burns were proposed in the face of these impacts.¹⁶³ Several EISs discussed coastal resilience in the face of sea level rise, recommending adaptive measures such as wetland restoration and breakwater installation.¹⁶⁴ In some instances, climate impact considerations were even used to justify the selection of the proposed alternative.¹⁶⁵

¹⁶⁰ NAT'L PARK SERV., TUOLUMNE RIVER FEIS, *supra* note 37, at 9-255 – 9-256; NAT'L PARK SERV., GATEWAY FEIS, *supra* note 159, at 135; NAT'L PARK SERV., MERCED RIVER FEIS, *supra* note 37, at 9-940 -- 9-959; NAT'L PARK SERV., 2 GOLDEN GATE AND MUIR WOODS FEIS, *supra* note 151, at 177--178.

¹⁶¹ NAT'L PARK SERV., GATEWAY FEIS, *supra* note 151, at 135.

¹⁶² NAT'L PARK SERV., MERCED RIVER FEIS, *supra* note 37, at 9-940, 9-944, 9-949, 9-954, 9-959.

¹⁶³ The Cuyahoga Valley and Upper North Fork EISs provide examples of wildlife population controls and prescribed burning, respectively. NAT'L PARK SERV., U.S. DEP'T OF THE INTERIOR, CUYAHOGA VALLEY FINAL WHITE-TAILED DEER MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT at 4-12 – 4-19 (Dec. 2014); U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: UPPER NORTH FORK HFRA ECOSYSTEM RESTORATION PROJECT 6 (June 2014).

¹⁶⁴ *See, e.g.*, NAT'L PARK SERV., GATEWAY FEIS, *supra* note 159, at 371--73.

¹⁶⁵ *See, e.g.*, NAT'L PARK SERV., U.S. DEP'T OF THE INTERIOR, CANAVERAL NATIONAL SEASHORE: FINAL GENERAL MANAGEMENT PLAN/ ENVIRONMENTAL IMPACT STATEMENT 4 (Jul. 2014) (justifying its final decision, stating, "[e]lements of this alternative will support the resilience of the seashore to expected impacts from climate change, such as sea level rise, coastal erosion, and higher storm surges, all of which may affect cultural and natural resources as well as visitor experience at the seashore").

Fourteen of the EISs (37%) included analyses of climate change impacts to water resources, acknowledging changes in water supply due to changing intensities of precipitation, snowpack accumulation, and corresponding changes in stream-flow. Estimated impacts from these long term trends include lower summer stream flows and increased drought risks.¹⁶⁶ Overall, there was less of a focus on how climate change would affect water resources (as compared with wildlife, vegetation, and park facilities) because the projects did not involve significant water withdrawals or discharges, nor did most projects involve the management of aquatic wildlife.

Energy and Water Efficiency – Seventeen of the EISs (45%) contained some discussion of energy efficiency. For the most part, this discussion consisted of the identification of measures that could be used to reduce energy consumption by park facilities, equipment, and vehicles. Examples of measures discussed suggestions included energy efficient building design, the reduction of vehicle idling, the phasing in of fuel-efficient vehicles, and the construction of facilities with low water consumption.¹⁶⁷ But overall, energy efficiency was not a significant issue, because the proposed activities did not require large amounts of energy inputs.

Water conservation and efficiency measures were only mentioned in five EISs (13%), and in most of those EISs the discussion of water efficiency was quite brief. There was, however, one exemplary EIS that specifically discussed water conservation measures in the context of climate change. Specifically, the EIS for the Tuolumne Wild and Scenic River Comprehensive Management Plan acknowledged that climate change could affect stream flows in the Tuolumne Meadows area, and outlined the following water conservation measures: (i) future water withdrawals would be restricted no more than 10% of lowest flow or 65,000 gallons per day, whichever is less, (ii) water conservation measures, such as the replacement of leaking water lines and installation of low-flow fixtures would be included under all alternatives; and (iii) long-term monitoring would be used to detect future decreases in river flows, and the findings would be used to impose additional restrictions on water use.¹⁶⁸ In addition to these measures, the EIS also noted that one of the alternatives (which would have increased visitor activity in the area) was rejected because it would increase water demand and this demand likely could not be met in the context of future climate

¹⁶⁶ The Malheur National Wildlife Refuge EIS provides an example of the analysis of climate change impacts on water resources. U.S. FISH & WILDLIFE SERV., MALHEUR REFUGE FEIS, *supra* note 47 ch. 3, at 7-10.

¹⁶⁷ See, e.g., NAT'L PARK SERV., GATEWAY FEIS, *supra* note 159, at 320--21, 550.

¹⁶⁸ NAT'L PARK SERV., TUOLUMNE RIVER FEIS, *supra* note 37, at ES-6. See also *Id.* at 5-42, 5-93, 5-95-5-96, 6-25.

change.¹⁶⁹ Notably, the same EIS also contained an exemplary discussion of energy consumption and efficiency considerations for all alternatives.¹⁷⁰

3.7 Other Land Management

The thirteen EISs in this category included proposed grazing plans, multi-use land management plans, one road access project with a possible land exchange, and a proposal for geothermal leasing in a national forest. The geothermal leasing project was included in this category (as opposed to the electric generation category) due to the programmatic scope of the EIS and similarities with other land management projects.¹⁷¹ One of the multi-use land management projects also contemplated the construction of oil, gas and renewable energy facilities in the project area, but was included in this category due to the various land management alternatives contemplated as alternatives in the EIS (which also included recreational uses, grazing, and habitat protection, among others).¹⁷² The lead agencies were BLM, USFS, and the Bureau of Reclamation (BR).

Most of the EISs in this category discussed both the effect of the project on climate change and the effect of climate change on the project. Twelve of EISs (92%) included some discussion of GHG emissions, primarily emissions associated with the effects of grazing and other land management decisions on carbon sequestration and storage. And all but one of the EISs discussed how climate change may affect the lands that would be managed under the proposed action.

¹⁶⁹ *Id.* at 8-137 – 8-138.

¹⁷⁰ *Id.* at 9- 253 – 9-256.

¹⁷¹ Specifically, this EIS did not involve the construction of a specific geothermal power plant, but rather the leasing of federally managed lands for exploration and future development. USFS was the lead agency. U.S. FOREST SERV., U.S. DEP'T OF THE AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR GEOTHERMAL LEASING ON THE HUMBOLDT-TOIYABE NATIONAL FOREST (Sept. 2012) [hereinafter HUMBOLDT-TOIYABE GEOTHERMAL LEASING FEIS].

¹⁷² BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, COLORADO RIVER VALLEY PROPOSED RESOURCE MANAGEMENT PLAN/ FINAL ENVIRONMENTAL IMPACT STATEMENT (Apr. 2014) [hereinafter COLORADO RIVER FEIS].

Table 3.7 – Climate-Related Considerations in Land Management EISs

| Issue Analyzed | # EISs |
|---|--------|
| GHG Emissions | |
| (1) Direct operational impacts | 11 (4) |
| (2) Construction impacts | 3 (1) |
| (3) Induced trips | 5 (1) |
| (4) Purchased electricity | 0 |
| (5) Other emissions | 2 (2) |
| (6) Emissions from alternatives | 8 (3) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 12 |
| (8) Impact of climate change on water resources | 9 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 0 |
| (10) Water efficiency | 1 |
| Total EISs | 13 |

Direct Operational Impacts – Eleven of the thirteen EISs (85%) acknowledged that the proposed land management activities would directly produce GHG emissions, but only four (31%) provided quantitative estimates of GHG emissions. Most of these EISs discussed the effects of grazing and other land management decisions on soil carbon sequestration. Some of the other operational sources of GHG emissions included livestock, prescribed burns, on-site equipment and generators, and emissions from oil and gas development.¹⁷³ GHG estimates ranged from the order of hundreds or thousands of tons for three grazing management projects, one road management project, and one wetland land-use planning project, to the order of hundreds of thousands of tons per year for a mixed-use natural resource management project.

¹⁷³ See, e.g., The Sherman Cattle and Fall River Allotment grazing projects provide estimates of methane emissions, while the Colorado River Valley Resource Management project provides estimates of GHG emissions from oil and gas development. U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT: SHERMAN CATTLE AND HORSE ALLOTMENT GRAZING AUTHORIZATION AND MANAGEMENT PROJECT app. F (Oct. 2013) [hereinafter SHERMAN CATTLE FEIS]; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR ALLOTMENT MANAGEMENT PLANNING IN THE FALL RIVER WEST AND OGLALA GEOGRAPHIC AREAS ch. 3 at 40 (Sep. 2013); BUREAU OF LAND MANAGEMENT, COLORADO RIVER FEIS, *supra* note 172, at 4.2.2.

The depth of the analysis varied substantially, with some EISs concluding that quantification of the emissions impact from soil carbon sequestration, livestock, and other sources was not possible, and others providing a relatively detailed quantitative analysis of these emissions. In all cases, emissions were either deemed as negligible in their contribution to climate change, speculative in nature, or not useful in determining incremental changes to the global climate that can be directly attributed to the project. One of the grazing EIS did not estimate or analyze the importance of GHG emissions that would occur under different grazing scenarios, citing a NEPA handbook that does not require emissions to be considered a significant issue if “a clear cause-and-effect relationship” cannot be established between the project and “a specific amount or type of changes in climate.”¹⁷⁴

Construction Impacts – Most of the proposed actions in this category did not entail significant construction. There were three projects that included the potential for mineral and/or energy development among the alternatives, and each of these three EISs noted that the construction of mineral and/or energy facilities would generate GHG emissions. Only one EIS quantified these emissions. Specifically, the Colorado River Valley Project, noted above, included quantitative projections of GHG emissions from the construction of oil and gas and renewable energy facilities in the project areas (as these were among the alternative land uses being considered). The other two EISs discussed but did not quantify GHG emissions from construction for mineral and energy development projects.

Induced Trips – Five of the EISs (38%) noted that GHG emissions would be generated as a result of increased vehicular traffic, and 1 EIS quantified these emissions. The sources of vehicular emissions identified in the EISs included: (i) increased vehicle use associated with on-site management of lands and resources, (ii) an increase in the number of people visiting the area for recreational purposes, (iii) an increase in the use of off-road vehicles in the area, and (iv) transport of construction materials and natural resources to/from the site. Notably, most of the EISs that did not discuss emissions from induced trips did not entail any significant increase in vehicle miles

¹⁷⁴ BUREAU OF LAND MANAGEMENT, U.S. DEP’T OF THE INTERIOR, EIS No. DOI-BLM-ID-B030-2012-0014-EIS, JUMP CREEK, SUCCOR CREEK, AND COW CREEK WATERSHEDS GRAZING PERMIT RENEWAL FINAL ENVIRONMENTAL IMPACT STATEMENT 77 (Oct. 2013) (citing BLM’s 2008 NEPA handbook, H-1790-1 for its cause-and-effect criteria).

travelled (e.g., because the proposed action was the continuation or modification of grazing practices, but not the allotment of new grazing permits).

Purchased Electricity – None of the EISs considered the issue of upstream emissions from purchased electricity. Notably, none of the proposed actions involved infrastructure or construction that required significant amounts of electricity (although emissions from on-site generators were occasionally discussed as part of the operational emissions).

Other Emissions – Two of the EISs (15%) discussed other sources of indirect emissions and both of these EISs quantified those emissions. In the Colorado River Valley EIS, BLM compared the GHG emissions from the combustion of natural gas (which would be produced under one of the land management alternatives) with GHG emissions from other fossil fuels, the goal being to illustrate the potential benefits of additional natural gas production. This was the only EIS that discussed downstream emissions associated with the end-use of natural resources. The AFS also considered indirect emissions in its EIS for a road access project and possible land swap—specifically, emissions from induced residential and commercial development on private lands that would occur as a result of the action. This was the only EIS that discussed induced development associated with land management decisions.

Emissions from Alternatives – Eight of the EISs (62%) discussed how GHG emissions may differ among alternatives, and 3 (23%) provided quantitative estimates of emissions from different alternatives. The West Eugene Wetlands Proposed RMP EIS contained an exemplary analysis of emissions impacts from alternatives that accounted for soil carbon storage potential and direct emissions from prescribed burning.¹⁷⁵ The Colorado River Valley RMP EIS also contained a good qualitative analysis of emissions from various activities under different alternatives (e.g., grazing, minerals management), although it only provided quantitative estimates of emissions from oil and gas development under the various alternatives.¹⁷⁶

Impacts of Climate Change – Twelve of the EISs (2%) discussed the impacts of climate change on the region in which the project was located. This was generally done through a summary of temperature and precipitation predictions for the next 50-100 years. Specific impacts

¹⁷⁵ BUREAU OF LAND MANAGEMENT, U.S. DEP'T OF THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT WEST EUGENE WETLANDS PROPOSED RESOURCE MANAGEMENT PLAN 194–96 (Nov. 2014).

¹⁷⁶ BUREAU OF LAND MANAGEMENT, COLORADO RIVER FEIS, *supra* note 172, at 4-49 – 4-56.

included changes in peak snowmelt and water supply, as well as changing distributions of vegetation suitable for grazing. Despite this analysis, the resilience of the project areas to climate change was not considered a significant decision-making factor, and was therefore not used to justify the recommendation of project alternatives.

Nine of the EISs (69%) discussed the specific impacts of climate change on water resources. This discussion was generally limited to overviews of regional trends in streamflow and water supply, and it was unclear whether these trends influenced the decision making process. Some extra detail was observed in EIS's dealing with grazing permits, where attention was paid to the combined impact of grazing activity and climate change on riparian areas.¹⁷⁷

Energy and Water Efficiency – None of the EISs discussed energy efficiency, presumably due to the nature of the projects (which did not involve significant demand for electricity or other energy sources). Only one of the EISs discussed water efficiency—specifically, in the EIS for geothermal leasing, USFS discussed water efficiency as a strategy to mitigate the impact of geothermal development on water resources in the area.¹⁷⁸

3.8 Marine Management

The EISs in this category included thirteen proposed projects, conducted by a variety of federal agencies, including NOAA, EPA, NMFS, and DOI. Most of these projects proposed amendments to marine wildlife population or habitat conservation programs, and involved actions such as habitat expansions, fishery management, and incidental-take permits. In addition, there was one proposal for the designation of an offshore waste disposal project near Jacksonville, FL, and a proposed restoration plan for the Deepwater Horizon oil spill. The discussion and analysis in these EISs was generally limited to the impacts of climate change on the project and its water resources. Only one of the EISs deemed it necessary to analyze the proposed action's contribution to climate change. Water efficiency and energy efficiency were not discussed in any of the EISs.

¹⁷⁷ U.S. FOREST SERV., SHERMAN CATTLE FEIS, *supra* note 173, app. F; U.S. FOREST SERV., U.S. DEP'T OF AGRICULTURE, BAILEY, AENEAS, REVIS AND TUNK LIVESTOCK GRAZING ANALYSIS: FINAL ENVIRONMENTAL IMPACT STATEMENT 159 (Aug. 2014).

¹⁷⁸ U.S. FOREST SERV., HUMBOLDT-TOIYABE GEOTHERMAL LEASING FEIS, *supra* note 171, § 5.3.8.

Table 3.8 – Climate-Related Considerations in Marine Management EISs

| Issue Analyzed | # EISs |
|---|--------|
| GHG Emissions | |
| (1) Direct operational impacts | 1 (1) |
| (2) Construction impacts | 1 (1) |
| (3) Induced trips | 1 (1) |
| (4) Purchased electricity | 0 (0) |
| (5) Other emissions | 0 (0) |
| (6) Emissions from alternatives | 1 (1) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 10 |
| (8) Impact of climate change on water resources | 10 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 1 |
| (10) Water efficiency | 0 |
| Total EISs | 13 |

Direct Operational Impacts – Only one of the thirteen EISs discussed and quantified operational emissions. Specifically, the programmatic EIS for the Deepwater Horizon Oil Spill Restoration Plan contained a detailed analysis of GHG emissions from equipment and vehicles used for the restoration of marine and coastal habitats. The analysis included a quantitative breakdown of emissions from different sources for each of the planned restoration activities.¹⁷⁹ The EIS also identified minimization measures to reduce or eliminate GHG emissions from the project.¹⁸⁰ Notably, these mitigation measures were proposed even though the estimated GHG emissions would not exceed 25,000 metric tons per year. Finally, the EIS also briefly noted that proposed

¹⁷⁹ U.S. DEP'T OF THE INTERIOR, DEEPWATER HORIZON OIL SPILL: FINAL PROGRAMMATIC AND PHASE III EARLY RESTORATION PLAN AND EARLY RESTORATION PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT ch. 8 at 17, 42, 66, 93, 125, & ch. 9 at 64 (June 2014) [hereinafter DEEPWATER HORIZON FEIS].

¹⁸⁰ These included shutting down idling construction equipment when feasible, locating staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites, encouraging the use of proper sized equipment for the job, and encouraging the use of alternative fuels for generators at construction sites, such as propane or solar, or using electrical power where practicable. *Id.* ch. 8, at 17, 41, 66, 92--3, 124.

habitat restoration measures could increase carbon absorption in the area.¹⁸¹ The other proposed actions did not appear to entail activities with significant emissions (e.g., with 25,000+ tons per year), but they did entail the use of vessels and equipment for some of the management activities. GHG emissions from these management activities were not discussed or quantified.

Construction Impacts – The Deepwater Horizon restoration project was the only EIS that discussed construction-related emissions. It provided quantitative estimates of emissions from vehicles and equipment used in the construction of beaches, dunes, and back-barrier marsh habitats. The mitigation measures identified in the EIS included measures to reduce construction-related emissions.

There was one other EIS that quantified emissions of *conventional* pollutants from project construction, but said nothing about GHG emissions. Specifically, the Jacksonville Offshore Waste Disposal Site EIS noted that the use of dredging equipment and the tug engines used in the transport of dredged materials (from the entrance of a channel to each alternative site) would generate VOC, CO, NO_x, SO₂, and PM.¹⁸² The other EISs did not appear to entail extensive construction activities.

Induced Trips – The Deepwater Horizon restoration project was the only EIS that discussed emissions from induced trips. It quantified emissions from boats and trucks used for construction and restoration. However, the estimates did not appear to include any trips outside of the project area—e.g., the transport of construction materials to the site, or induced employee trips. The other EISs did not discuss or quantify GHG emissions from induced trips. In most of these EISs, the impact of the proposed action on boat and vehicle traffic was unclear. The one exception was the Jacksonville Disposal Site EIS, where the proposed action (designating a new offshore disposal site) would clearly cause an increase of vessel traffic to and from the disposal site.

Purchased Electricity – None of the EISs discussed emissions from purchased electricity, nor was there any discussion of electricity purchases in general.

Other GHG Emissions – None of the EISs discussed other sources of emissions.

¹⁸¹ *Id.* ch. 6, at 109.

¹⁸² EPA, Pub. No. 904K14002, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR DESIGNATION OF AN OCEAN DREDGED MATERIAL DISPOSAL SITE OFFSHORE OF JACKSONVILLE, FLORIDA 202--204 (Oct. 2014).

Emissions from Alternatives – The Deepwater Horizon EIS provided a qualitative comparison of GHG emissions for the no action alternative, as well as three alternatives. The EIS also quantified emissions from each potential component of the alternatives.¹⁸³

Impacts of Climate Change – Ten of the thirteen EISs (77%) discussed the potential impacts of climate change on environmental resources in the project area, such as marine wildlife habitats and populations, and coastal ecosystems that are vulnerable to sea level rise. Because the project area was a marine environment, all of these ten EISs also specifically considered impacts on water resources. The discussion was generally quite thorough, and included a detailed analysis of how climate change would affect marine habitats as a whole and individual species in the area. Many of the EISs noted that the proposed management activities would help to offset the impacts of climate change by improving the condition of habitats and reducing other stressors, but no measures were specifically proposed to address the impacts of climate change on habitats or species within the management areas. The Deepwater Horizon remediation EIS provided the most direct acknowledgement of the importance of climate resiliency, citing the recommendations of the CEQ to encourage preemptive planning in the face of climate change in its effort to “[anticipate] a range of environmental changes [in] the development of Early Restoration projects that would be more resilient over time.”¹⁸⁴

Energy and Water Efficiency – The Deepwater Horizon Restoration EIS was the only EIS that mentioned energy efficiency. It noted that one way to reduce GHG emissions would be to “encourage the use of the proper size of equipment for the job to maximize energy efficiency.”¹⁸⁵ None of the EISs discussed water use or efficiency, presumably because they did not entail significant levels of water consumption.

3.9 Public Works

The twenty EISs in this category encompassed proposals for water management, flood protection, shoreline restoration, and navigation projects. Some of the specific infrastructure components included dams, reservoirs, levees, navigation channels, and water pumping stations.

¹⁸³ U.S. DEP’T OF THE INTERIOR, DEEPWATER HORIZON FEIS, *supra* note 179, tbl. 6.6, tbl. 8.11.

¹⁸⁴ *Id.* at 145–46.

¹⁸⁵ *Id.* at 17, 41, 66, 93, 124.

USACE was the lead agency for most of these projects (sixteen EISs). BR was the lead agency for two water supply projects, and the Natural Resources Conservation Service (NRCS) was the lead agency for two water management projects. Most of the EISs in this category (85%) discussed how climate change may affect the proposed action, with the discussion typically focusing on how water supplies and flood conditions could be affected by changes in precipitation patterns and/or sea level rise. Approximately half of the EISs indicated that the consideration of climate change effects had influenced final decisions about the need for and/or design of the project. Due to the nature of the projects, GHG emissions received far less attention in these EISs, and only a handful of the EISs discussed energy or water efficiency.

Table 3.9 – Climate-Related Considerations in Public Works EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 0 (0) |
| (2) Construction impacts | 11 (8) |
| (3) Induced trips | 8 (7) |
| (4) Purchased electricity | 2 (1) |
| (5) Other emissions | 1 (0) |
| (6) Emissions from alternatives | 8 (7) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 17 |
| (8) Impact of climate change on water resources | 15 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 3 |
| (10) Water efficiency | 2 |
| Total EISs | 20 |

Direct Operational Impacts – None of the proposed projects entailed the construction or ongoing operation of large GHG emission sources, and thus none of the EISs in this category discussed direct operational emissions. Notably, several of the projects *did* involve the construction and operation of water treatment facilities, which can generate N₂O and CH₄ when anoxic or anaerobic treatment processes are used, but these emissions were not discussed or quantified in

any of the EISs. However, as noted below, there were two EISs that discussed emissions from the electricity required to operate water pumping and treatment facilities.

Construction Impacts – Although all projects involved construction, only eleven of the EISs (55%) discussed GHG emissions from construction, and eight (40%) quantified construction-related emissions (from equipment and vehicles). Several of these EISs contained a particularly detailed breakdown of construction-related emissions from different project alternatives, as well as measures to mitigate those emissions.¹⁸⁶ For example, USACE outlined the following mitigation measures in an EIS for a levee project in California:

- Use biodiesel fuel to fuel a substantial portion of the diesel-powered equipment and vehicles (e.g., 15% of the vehicles, as proposed by the Bay Area Air Quality Management District).¹⁸⁷
- Encourage construction workers to carpool.
- Recycle at least 50% of construction waste and demolition debris.
- Purchase at least 10% of the building materials and imported soil from sources within 100 miles of the project site.
- Use electricity from utility power lines rather than fossil fuel, where appropriate.
- Purchase GHG offset for project GHG emissions (direct emissions plus indirect emissions from on-road haul trucks plus commute vehicles) exceeding future Federal, state, or local significance thresholds applicable at the time of construction. If no GHG significance thresholds have been formally adopted at the time of permitting, a presumptive GHG threshold of 7,000 MT per year of CO₂e (amortized over the 50-year life of the levee project) should be used to define the offset requirement. The 7,000 MT/year presumptive threshold matches the lowest industrial project threshold that has been proposed by any air quality agency in California as of the date of this study. All purchased offsets must be verifiable under protocols set by the California Climate Action Registry, the Chicago Climate Exchange, or comparable auditing programs.¹⁸⁸

¹⁸⁶ U.S. ARMY CORPS OF ENG'RS, SUTTER BASIN PILOT FEASIBILITY FINAL REPORTS—FINAL ENVIRONMENTAL IMPACT REPORT / SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT at 4-49 -- 4-54 (OCT. 2013); U.S. ARMY CORPS OF ENG'RS ISABELLA DAM SAFETY MODIFICATION FINAL EIS at 4-8 (Oct. 2012); U.S. ARMY CORPS OF ENG'RS, FEATHER RIVER FEIS *supra* note 32, at 3.6-14 – 3.6-18. The Berryessa Creek FEIS also included mitigation measures for construction-related CO₂ emissions. U.S. ARMY CORPS OF ENG'RS, BERRYESSA CREEK ELEMENT FINAL GENERAL REEVALUATION REPORT/ ENVIRONMENTAL IMPACT STATEMENT at 5-15 – 5-16 (Dec. 2013) [hereinafter BERRYESSA CREEK FEIS].

¹⁸⁷ With respect to this measure, the Feather River EIS also noted: “However, it is important to note that according to a recent EPA report (U.S. Environmental Protection Agency 2009), some renewable fuels (e.g., ethanol, recycled vegetable oil biodiesel) could result in less GHG emissions than petroleum fuels, while some renewable fuels (e.g., soy-based biodiesel) might increase GHG emissions. Therefore, the construction contractors should be cautious with the use of appropriate biodiesel fuels and should avoid using soy-based biodiesel as an attempt to reduce GHG emissions.” U.S. ARMY CORPS OF ENG'RS, FEATHER RIVER FEIS *supra* note 32, at 3.6-14 – 3.6-15.

¹⁸⁸ *Id.* at 3.6-14 – 3.6-18.

The same EIS also included a detailed discussion of state and local GHG emission targets, which prompted the selection of GHG emission mitigation measures.

Induced Trips – Eight of the EISs (40%) discussed emissions from induced trips, and seven (35%) quantified those emissions. For the most part, the discussion centered on induced trips during the construction phase (and thus there was considerable overlap between the EISs that discussed construction emissions and those that discussed emissions from induced trips).

Purchased Electricity – Only two of the EISs (10%) discussed emissions from electricity consumption, and one EIS (5%) quantified these emissions. Specifically, one EIS for a water management project noted that there would be emissions associated with the energy use at water pumping stations, and included these emissions in its overall estimates of operational emissions.¹⁸⁹ Another EIS for a proposed reservoir storage reallocation project noted that there would be GHG emissions associated with the consumption of coal used to meet energy requirements for pumping water, but did not quantify these emissions.¹⁹⁰ There were several other projects that involved water pumping infrastructure that would presumably consume electricity, but no emissions from electricity purchases were discussed.

Other Emissions – One of the EISs (5%) discussed another source of indirect GHG emissions. Specifically, in an EIS for the construction of levees and other water control structures, USACE noted that project would also result in the improvement of adjacent wetlands, and that the improved wetlands may release more methane.¹⁹¹ There was no quantification or in-depth analysis of this, likely because it was viewed as an indirect and highly uncertain impact of the project.

Impacts of Climate Change – Seventeen of the EISs (85%) discussed how climate change would affect the local or regional environment of the projects, and fifteen EISs (75%) discussed how climate change would affect the water resources that would be managed by the projects. The discussion of climate change impacts was relatively thorough as compared with other EIS

¹⁸⁹ BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, ARKANSAS VALLEY CONDUIT AND LONG-TERM EXCESS CAPACITY MASTER CONTRACT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 4-8 (Aug. 2013).

¹⁹⁰ U.S. ARMY CORPS OF ENG'RS, CHATFIELD RESERVOIR STORAGE REALLOCATION: INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT at 4-112 (July 2013) [hereinafter CHATFIELD RESERVOIR EIS].

¹⁹¹ "Potential indirect impacts would be related to very minor air quality improvements from maintaining/improving vegetated wetlands provided by the project. Marshes can have a positive impact on air quality by removing gaseous and particulate air pollutants. While the generation of methane from bacterial decomposition of organic matter in marshes can contribute to greenhouse gas effects and resultant climate change, the effects from the proposed project are considered negligible." U.S. ARMY CORPS OF ENG'RS, MORGANZA TO THE GULF OF MEXICO FEIS, *supra* note 38 at 6-27.

categories, and climate impact considerations more frequently factored into the agency's discussion of the purpose and need for the project and decisions about how the project would be designed.¹⁹² That said, about half of the EISs that discussed how climate change would alter the affected environment did not follow-up with a specific analysis of implications for the project and/or recommended adaptation measures.¹⁹³ For projects located on the coastline, USACE would typically conduct a sea level rise analysis in accordance with Engineer Circular 1165-2-212, which directs the agency to consider three possible SLR scenarios and to evaluate "potential timing and cost consequences" for each alternative that is sensitive to SLR.¹⁹⁴

Energy and Water Efficiency – Energy efficiency was only discussed in three EISs (15%) in the context of water supply projects with energy requirements (e.g., from pumping stations). Water efficiency was only discussed in two of the EISs (10%). The lack of attention to energy efficiency was likely due to the fact that most projects did not require much or any energy for ongoing operation. The lack of attention to water efficiency was likely due to the fact that the projects were geared towards managing and supplying water, and but did not themselves entail water consumption.

3.10 Transportation

This category encompassed forty EISs, the majority of which were undertaken by various agencies within the Department of Transportation (DOT), including the Federal Transit Administration (FTA), Federal Railroad Administration (FRA), Federal Aviation Administration (FAA), National Highway Traffic Safety Administration (NHTSA), and Federal Highway Administration (FHWA). This category also included several transportation sector projects undertaken by USACE and the United States Coast Guard (USCG) in the Department of Homeland Security (DHS). The majority of these projects (80%) were highway improvement or

¹⁹² See, e.g., *Id.* at 4-17; U.S. ARMY CORPS OF ENG'RS, FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT COASTAL STORM DAMAGE REDUCTION: BOGUE BANKS, CARTERET COUNTY NORTH CAROLINA 103 (Aug. 2014) [hereinafter BOGUE BANKS FEIS]; U.S. ARMY CORPS OF ENG'RS, VILLAGE OF BALD HEAD ISLAND SHORELINE PROTECTION PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-22--3-23 (Aug. 2014); U.S. ARMY CORPS OF ENG'RS, CHATFIELD RESERVOIR EIS, *supra* note 190, at 2-83.

¹⁹³ See, e.g., U.S. ARMY CORPS OF ENG'RS, BERRYESSA CREEK FEIS, *supra* note 186, at 4-21 (recognizing potential for significant impacts, but giving no detailed analysis or follow-up regarding project specific considerations).

¹⁹⁴ See, e.g., U.S. ARMY CORPS OF ENG'RS, BOGUE BANKS FEIS, *supra* note 192, at 56--57.

construction projects. Other site-specific projects included the construction of railways (four EISs), a ferry terminal, an airport runway, and a bus line (one EIS each). Additionally, one EIS dealt with the establishment of fuel economy standards for passenger cars and light trucks.

Table 1.10 – Climate-Related Considerations in Transportation EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 24 (17) |
| (2) Construction impacts | 10 (4) |
| (3) Induced trips | 3 (2) |
| (4) Purchased electricity | 1 (0) |
| (5) Other emissions | 2 (1) |
| (6) Emissions from alternatives | 15 (13) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 12 |
| (8) Impact of climate change on water resources | 2 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 16 |
| (10) Water efficiency | 0 |
| Total EISs | 40 |

Only twenty-four of the EISs in this category (60%) contained any discussion of GHG emissions associated with the construction and operation of proposed transportation infrastructure. The level of detail in the assessment of GHG emissions varied, as projects emission levels fell both above and below the 25,000 tpy threshold for quantifying GHG emissions. None of the EISs concluded that GHG emissions represented a significant adverse environmental impact. For highway projects, the primary sources of GHG emissions included construction, maintenance, and the additional vehicle miles travelled (VMT) as a result of the project. Emissions from VMT were counted as part of the project’s operational emissions, whereas emissions from vehicular trips to/from the project site (e.g., to transport construction materials) were counted as emissions from induced trips. For rail projects, the primary sources (and sinks) of GHG emissions included train operation and power generation, and changes in VMT as a result of the proposed rail project.

The impacts of climate change were discussed in thirteen of the EISs (30%), usually in the context of sea level rise and flooding. Other possible impacts—such as the impact of increased temperatures on roads and railways—were never discussed.

Sixteen EISs (40%) discussed considerations related to energy efficiency, such as the development of more efficient traffic patterns to reduce traffic congestion and GHG emissions, the use of energy efficient lighting as another GHG mitigation measure, and the phasing in of more efficient vehicles as an external factor that would reduce GHG emissions. None of the EISs discussed water efficiency.

Direct Operational Impacts – Twenty-four of the forty EISs (60%) discussed direct operational emissions, and seventeen (43%) quantified operational GHG emissions.¹⁹⁵ The EISs that discussed operational emissions included eighteen of the thirty-two highway projects (ten of which quantified emissions), two of the four rail projects, and all other projects in this category. The primary source of operational emissions was the change in VMT as a result of the proposed project. Several EISs also noted that maintenance activities would generate GHG emissions. Some of the highway EISs concluded that the proposed expansion of roadways would actually reduce GHG emissions by alleviating congestion.¹⁹⁶ For those EISs that predicted an increase in GHG emissions, this was often expressed as a fraction of global CO₂ emissions in order to justify the agency's conclusion that the emissions would be minimal.¹⁹⁷

Construction Impacts – Although all of the proposed projects involved construction, only ten of the EISs (25%) identified construction activities as a potential source of GHG emissions, and only four of those EISs (10%) quantified construction-related emissions.

Induced Trips – Three of the EISs discussed emissions from induced trips, and 2 quantified these emissions. As noted above, emissions generated from an increase in vehicle miles travelled (VMT) on proposed highway projects were included in the operational emissions category, and not

¹⁹⁵ EISs that quantified a change in VMT and said that a change in GHG would be proportional are not counted as having quantified GHG emissions. EISs that state a change in global or regional emissions but do not give an absolute value of GHG emissions are counted as having quantified GHG emissions.

¹⁹⁶ See, e.g., FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP., 75TH STREET CORRIDOR IMPROVEMENT PROJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-101 (Oct. 2014).

¹⁹⁷ See, e.g., FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP. ET AL., ILLIANA CORRIDOR: TIER TWO FINAL ENVIRONMENTAL IMPACT STATEMENT at 3-192 (Sep. 2014); FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP. & AZ DEP'T OF TRANSP., FHWA-AZ-EIS-14-01-F, SOUTH MOUNTAIN FREEWAY (LOOP 202): FINAL ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F)EVALUATION at 4-86 (Sep. 2014).

as induced trips (because they occur on-site as a direct consequence of the operation of the highway). The emissions that were included in the “induced trips” category included: (i) for highway projects, emissions estimates from induced trips associated with the construction and maintenance of the project; and (ii) for non-highway projects, any emissions from induced automobile trips to the airports and train stations.

There were 2 highway EISs that discussed emissions from construction and maintenance-related trips. Both of these EISs were highway projects in New York, and both factored induced trips into calculations for operational and construction emissions.¹⁹⁸ In addition, there was one railway EIS that also accounted for induced trips. Specifically, the South Coast Rail EIS computed regional VMT based on transit oriented development, which would presumably include “first/last mile” trips from residences to train stations. The emissions estimates also included local trips that result from induced growth—such as trips to schools, retail, and local jobs.¹⁹⁹

Purchased Electricity – Only one EIS (3%) discussed purchased electricity, and only in a qualitative way: the Downtown San Francisco Ferry Terminal Expansion Project EIS noted the project would not require purchased electricity due to the installation of onsite solar panels, resulting in a net reduction of emissions compared to the existing terminal.

Other Emissions – Only two EISs (5%) discussed any additional emissions sources: the South Coast Rail Project EIS (for a commuter rail project in Massachusetts) calculated the emissions caused by additional residential development that a rail expansion would spur, and the Virginia Avenue Tunnel Reconstruction EIS noted that trucking emissions would be displaced by the increased use of freight trains.

Emissions from Alternatives – Most of the EISs that discussed operational impacts also discussed emissions under at least one alternative scenario. Specifically, fifteen of the EISs (38%) discussed emissions from alternatives, and thirteen (33%) quantified these emissions. This was

¹⁹⁸ FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP. & NY STATE DEP’T OF TRANSP., PIN 5760.80, NEW YORK GATEWAY CONNECTIONS IMPROVEMENT PROJECT TO THE US PEACE BRIDGE PLAZA FINAL DESIGN REPORT/ENVIRONMENTAL IMPACT STATEMENT at 4-84, 4-85 (Apr. 4, 2014); FED. HIGHWAY ADMIN., U.S. DEP’T OF TRANSP. & NY STATE DEP’T OF TRANSP., PIN 1721.51, FINAL DESIGN REPORT/ENVIRONMENTAL IMPACT STATEMENT: INTERSTATE 87 (I-87) EXIT 4 ACCESS IMPROVEMENTS at 4-70 (Aug. 2014).

¹⁹⁹ U.S. ARMY CORPS OF ENG’RS, FINAL ENVIRONMENTAL IMPACT STATEMENT/ FINAL ENVIRONMENTAL IMPACT REPORT ON THE SOUTH COAST RAIL PROJECT PROPOSED BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION at 5-35, 5-56 (Aug. 2013).

frequently a comparison between one proposed build alternative (or multiple with similar emissions projections) and the no-build alternative.

Impacts of Climate Change – Twelve of the EISs (30%) discussed how climate change could affect the project and/or its surrounding environment. Only two (5%) specifically considered the impact of climate change on water resources that would be affected by the project.²⁰⁰ The EISs for coastal projects typically included some discussion of sea level rise and flooding, but other climate-related phenomena received very little attention. When sea level rise was discussed, it was often unclear how or whether the projections of future sea level rise had influenced decisions about the location and design of the transportation project.²⁰¹ Notably, none of the EISs discussed how rising temperatures and changing precipitation patterns would affect the ongoing maintenance of highways, bridges, or railways.

Energy and Water Efficiency – Sixteen of the EISs (40%) discussed energy efficiency.²⁰² Three measures were frequently discussed: reduction of traffic congestion, the use of energy efficient lighting, and the use of alternative fuels and vehicle fuel efficiency. The first two were discussed as mitigation measures, and the latter was discussed as an external factor that would naturally mitigate future emissions (except in the CAFE standards EIS, in which mandating increased fuel efficiency was the proposed project). None of the EISs discussed water efficiency (because they did not involve significant water use).

3.11 Buildings and Real Estate

This category included thirteen EISs for proposals related to the construction of new buildings and the promulgation of real estate development plans.²⁰³ The projects were undertaken by a variety of agencies, including the BIA, USFS, USACE, the Department of Health and Human

²⁰⁰ See, e.g., FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP. & STATE OF CA DEP'T OF TRANSP., INTERSTATE 5 NORTH COAST CORRIDOR PROJECT: FINAL ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F) EVALUATION (Oct. 2013) (analyzing the impact of sea level rise on each proposed bridge and on the lagoons that would be affected by the construction and operation of those bridges).

²⁰¹ See, e.g., FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP. & TX DEP'T OF TRANSP., CSJ: 0101-06-095, US 181 HARBOR BRIDGE PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT/ SECTION 4(F) EVALUATION 3-97 (Nov. 2014).

²⁰² This figure does not include EISs that discussed transportation efficiency or efficiency of the transportation network without connecting this efficiency to energy use or greenhouse gas emissions.

²⁰³ There were relatively few projects in this category, because most building and real estate projects do not constitute “major federal actions” with “significant environmental impacts” requiring preparation of a full EIS (either because they do not require federal approval or funding, their impacts are too small, or some combination of these factors).

Services (HHS), and the Department of Housing and Urban Development (HUD). The proposed projects consisted of five casinos, four mixed-use development projects, two ski area resorts, a rezoning plan, and a federal agency campus.

Table 3.11 – Climate-Related Considerations in Buildings and Real Estate EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 12 (12) |
| (2) Construction impacts | 8 (7) |
| (3) Induced trips | 11(11) |
| (4) Purchased electricity | 11 (11) |
| (5) Other Emissions | 3 (3) |
| (6) Emissions from alternatives | 11 (10) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 9 |
| (8) Impact of climate change on water resources | 9 |
| Water and Energy Efficiency | |
| (9) Energy efficiency | 12 |
| (10) Water efficiency | 8 |
| Total EISs | 13 |

The analysis of GHG emissions, climate change impacts, and efficiency for this category was generally quite thorough. All but one of the EISs (92%) discussed and quantified GHG emissions, and three of the EISs (23%) provided quantitative estimates for every category of GHG emissions identified in this report.²⁰⁴ Notably, in one of the EISs, USACE concluded that operational GHG emissions (509,666 metric tons CO₂e/year) from a proposed mixed-used residential project would have a “significant” effect on global climate change.²⁰⁵ In an EIS for a similar but smaller mixed-use development proposal, USACE noted that 109,627 metric tons CO₂e/year was a “cumulatively considerable contribution to a significant cumulative impact” on

²⁰⁴ The Vail Mountain Recreation Enhancement Project EIS, was the only EIS to not quantify any emissions, or to mention climate change at all. U.S. FOREST SERV., U.S. DEP’T OF AGRICULTURE, VAIL MOUNTAIN RECREATION ENHANCEMENT PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT (Aug. 2014).

²⁰⁵ U.S. ARMY CORPS OF ENG’RS, PLACER VINEYARDS FEIS, *supra* note 31, at 3.5-16.

global climate change.²⁰⁶ Most of the EISs (70%) also discussed how climate change could affect the proposed development. Finally, almost all of the EISs discussed energy and/or water efficiency, which made sense given the nature of the projects.

Direct Operational Impacts – All but one of the EISs (92%) quantified direct operational emissions. The main sources of operational emissions included the use of natural gas or fuel oil for heating and the operation of other onsite utilities (power generation and water treatment).

Construction Impacts – Eight EISs (62%) discussed construction emissions, and seven (54%) quantified those emissions. The exception, the Halletts Point Rezoning EIS, used a rough estimate that construction emissions are “equivalent to the total emissions from the operation of the projects over approximately 5 to 10 years” because of the difficulty of predicting exactly what development would occur as a result of the rezoning.²⁰⁷

Induced Trips – Eleven EISs (85%) discussed and quantified emissions from induced trips (85%). This generally consisted of vehicles traveling to and from finished buildings, although construction vehicles were sometimes included in this as well. A higher proportion of buildings EISs discussed this category than EISs from any other sector.

Purchased Electricity – Eleven EISs (85%)—the same set of EISs that quantified induced trips—discussed emissions from purchased electricity. Of these, ten (77%) calculated and disclosed the specific quantity of GHGs emitted as a result of purchased power. The one exception was the Halletts Points Rezoning EIS, which did estimate the amount of power that would be purchased in its discussion of operational emissions, but did not disclose the proportion of the operational emissions that corresponded with electricity purchases.²⁰⁸ Fuel and electricity consumption for the project would represent the majority of direct emissions, and as such an individual value for purchased power alone was not calculated.

Other Emissions – Only three EISs (23%) discussed other sources of GHG emissions. In each case, the emissions were for downstream infrastructure systems, such as the emissions from water treatment of the buildings’ water and those resulting from solid waste disposal.²⁰⁹

²⁰⁶ CITY OF RANCHO CORDOVA & U.S. ARMY CORPS OF ENG’RS, *supra* note 31, at 3.4-18.

²⁰⁷ CITY PLANNING COMM’N, CITY OF N.Y., *supra* note 15, at 17-7.

²⁰⁸ *Id.*

²⁰⁹ U.S. ARMY CORPS OF ENG’RS, USACE Action ID: SPK-2006-01050, SIERRA VISTA SPECIFIC PLAN: FINAL ENVIRONMENTAL IMPACT STATEMENT at 3.5-15 – 3.5-18 (May 2013) [hereinafter SIERRA VISTA FEIS]; BUREAU OF INDIAN AFFAIRS, U.S. DEP’T OF

Emissions from Alternatives – Eleven EISs (85%) discussed GHG emissions from alternatives. Of these, ten (77%) provided a quantitative value of tons of emissions from at least one other alternative. Most projects had multiple build alternatives that were substantially different, which made this quantification highly relevant.

Impacts of Climate Change – Nine EISs (69%) discussed the impacts of climate change, and all nine of these EISs also considered how climate change would affect water resources in the project area. The precision of the discussion varied: some of the EISs focused on a regional or statewide assessment of climate change impacts, whereas others contained a more site-specific analysis of how climate change could affect the proposed building or environmental resources in the area. The most detailed project was the Suncreek Specific Plan EIS, which used General Circulation Models (GCMs), hydrological models, and IPCC data to predict future local temperature, precipitation, snowpack, sea level, water quality, and water supply, and then extrapolated those figures to consider future water availability and energy needs for the project.²¹⁰

Energy and Water Efficiency – Twelve EISs (92%) discussed energy efficiency and eight (62%) discussed water efficiency. Energy efficiency was usually discussed as a mitigation measure for GHG emissions. Usually, energy efficient design and building were discussed (common measures included efficient lighting and HVAC systems). Energy efficient transportation (for construction vehicles and induced trips) was also sometimes mentioned, with EISs noting that fuel efficient vehicles and a reduction in idling time, among other practices, would mitigate GHG emissions. Water efficiency generally received less attention than energy efficiency, but over half of the EISs did mention measures to reduce water use in building design and operation (e.g., the use of water-conserving appliances).²¹¹

THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT: SOBOBA BAND OF LUISEÑO INDIANS HORSESHOE GRANDE FEE-TO-TRUST PROJECT at 4-45 – 4-46 (Sep. 2013); BUREAU OF INDIAN AFFAIRS, U.S. DEP'T OF THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT: LOS COYOTES BAND OF THE CAHUILLA AND CUPENO INDIANS FEE-TO-TRUST AND CASINO-HOTEL PROJECT at 4.13-27 (Apr. 11, 2014) [hereinafter LOS COYOTES FEIS].

²¹⁰ CITY OF RANCHO CORDOVA & U.S. ARMY CORPS OF ENG'RS, *supra* note 31, at 3.4-32 – 3.4-45.

²¹¹ Examples include: U.S. ARMY CORPS OF ENG'RS, SIERRA VISTA FEIS, *supra* note 209, at 3.5-20; U.S. ARMY CORPS OF ENG'RS USACE Action ID: SPK-2005-00938, WESTBROOK PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT at 3.5-24 (Apr. 2014); CITY OF RANCHO CORDOVA & U.S. ARMY CORPS OF ENG'RS, *supra* note 31, at 3.4-23 – 3.4-24; BUREAU OF INDIAN AFFAIRS, (LOS COYOTES FEIS, *supra* note 209, at 5-5; BUREAU OF INDIAN AFFAIRS, DEP'T OF THE INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT PROPOSED STOCKBRIDGE-MUNSEE CASINO 222 (Jan. 2014).

3.12 Military, Space and Government Research

The seventeen EISs in this category included thirteen proposals for new or modified military installations and operating practices, and four proposals involving space exploration and government research facilities. The lead agencies for the military EISs were the US Navy, the US Air Force, and the US Army. The non-military EISs included one proposal from the Federal Aviation Administration (FAA) to approve a license for the SpaceX Texas Launch Site, and three proposals from the National Aeronautics and Space Administration (NASA) for: (i) the Mars 2020 Mission, (ii) the continuation of a sounding rockets launch program, and (iii) the demolition and environmental cleanup of a field laboratory.

Table 3.12 – Climate-Related Considerations in Military EISs

| Issue Analyzed | # EISs |
|---|-----------|
| GHG Emissions | |
| (1) Direct operational impacts | 17 (17) |
| (2) Construction impacts | 10 (10) |
| (3) Induced trips | 9 (9) |
| (4) Purchased electricity | 5 (3) |
| (5) Other emissions | 0 (0) |
| (6) Emissions from alternatives | 14 (14) |
| Impacts of Climate Change | |
| (7) Impact of climate change on action, generally | 8 |
| (8) Impact of climate change on water resources | 7 |
| Energy and Water Efficiency | |
| (9) Energy efficiency | 12 |
| (10) Water efficiency | 4 |
| Total EISs | 17 |

The EISs in this category contained a relatively thorough analysis of GHG emissions, including emissions from construction, ongoing operations, induced trips, and purchased electricity (where applicable), and comparisons of projected GHG emissions from the preferred action, reasonable alternatives, and a no action baseline. This information was presented in a relatively straightforward way (e.g., in a table summarizing the results), and was easy to locate in

the EISs. Many of the EISs also discussed measures to improve energy efficiency or mitigate emissions. However, like the other EIS categories analyzed in this report, the agencies almost always concluded that GHG emissions would not be significant. In reaching this conclusion, the agencies often noted that: (i) the emissions were very small in proportion to US and/or global totals, and (ii) there are no formally adopted significance threshold for GHGs.²¹²

Direct Operational Impacts – Every EIS in this category provided quantitative estimates of operational GHG emissions associated with the proposed action—e.g., emissions from on-site generators and other equipment, the operation of aircraft and other vehicles during training exercises, and emissions from spacecraft and rocket launches.²¹³ For the military projects, these emissions were typically compared with an operating baseline (the “no action” alternative) to clarify how the project would increase or decrease emissions.

Construction Impacts – Ten of the seventeen (59%) EISs acknowledged that the project would generate GHG emissions during construction and provided quantitative estimates of these emissions. The EISs that did not discuss construction-related emissions did not generally entail significant construction activities (they dealt with management and operational changes at military bases, rather than the construction of new infrastructure). The one exception was the Mars 2020 Mission EIS—although this proposal did not entail the construction of new facilities at the launch site, it did note that a new spacecraft would be built for the mission (but did not discuss any environmental impacts associated with the construction of the spacecraft).²¹⁴

Induced Trips – Nine of the EISs (53%) discussed emissions from induced trips and provided quantitative estimates of these emissions. These included emissions from vehicle commutes and the transportation of materials or equipment to/from the project site (emissions from aircraft and vehicles operated as part of training exercises or base operations were included in the operational emissions category).

²¹² See, e.g., U.S. MARINE CORPS, U.S. DEP’T OF THE NAVY, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MODIFICATION AND EXPANSION OF TOWNSEND BOMBING RANGE at 4-24 (Mar. 2014) [hereinafter TOWNSEND BOMBING RANGE FEIS] (“[c]urrently, there are no formally adopted or published NEPA thresholds for assessing the potential significance of GHG emissions. Therefore, in the absence of a formally adopted threshold of significance for GHGs, this FEIS examines the relative increase in GHG emissions that would result from implementation of the action alternatives using the U.S. GHG inventory of 2009 [USEPA 2011b] as the baseline for current GHG emissions.”).

²¹³ For the purposes of this survey, we include emissions from demolition and clean-up activities as “operational emissions” for an EIS for the proposed.

²¹⁴ SCIENCE MISSION DIRECTORATE, NAT’L AERONAUTICS AND SPACE ADMIN., FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE MARS 2020 MISSION at 2-24 (Nov. 2014).

Several EISs did not discuss emissions from induced trips because the project involved operational changes that would not increase the number of people commuting to the base or the amount of materials that needed to be transported to or from the base.²¹⁵ But there we also some EISs that clearly involved an expansion of existing infrastructure or operations but failed to discuss the implications for emissions from commuter trips and the transport of construction materials to and from the site.²¹⁶

Purchased Electricity – Five of the EISs (29%) discussed emissions from purchased electricity, and three EISs (18%) quantified those emissions. Most of the remaining EISs did not discuss emissions from purchased electricity because all electricity was generated on site, and these emissions were included in the operational emissions. In the two EISs that discussed but did not quantify emissions from purchased electricity, there was no clear justification for why quantitative projections were not included.²¹⁷

Other Emissions – None of the EISs discussed other emissions, such as emissions associated with the production of materials or fuels used on site.

Emissions from Alternatives – Fourteen of the EISs (82%) compared quantitative projections of GHG emissions from the preferred alternative, other alternatives, and a no action alternative. The information was presented in a relatively straightforward fashion to help decision-makers decide between alternatives—for example, two EISs included tables summarizing the total amount and percent increase of GHG emissions for two alternatives as compared with the no action baseline.²¹⁸

²¹⁵ See, e.g., U.S. DEP'T OF THE NAVY, FINAL ENVIRONMENTAL IMPACT STATEMENT/OVERSEAS ENVIRONMENTAL IMPACT STATEMENT FOR ATLANTIC FLEET TRAINING AND TESTING (Aug. 2013) [hereinafter ATLANTIC FLEET FEIS]; U.S. DEP'T OF THE NAVY, HAWAII-SOUTHERN CALIFORNIA TRAINING AND TESTING EIS/OEIS (Aug. 2013) [hereinafter HAWAII-SOUTHERN CALIFORNIA EIS].

²¹⁶ See, e.g., U.S. MARINE CORPS, TOWNSEND BOMBING RANGE FEIS, *supra* note 212; U.S. DEP'T OF THE NAVY, FINAL ENVIRONMENTAL IMPACT STATEMENT: OUTDOOR RESEARCH, DEVELOPMENT, TEST & EVALUATION ACTIVITIES (June 2013); SCIENCE MISSION DIRECTORATE, *supra* note 214.

²¹⁷ NAT'L AERONAUTICS AND SPACE ADMIN., FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED DEMOLITION AND ENVIRONMENTAL CLEANUP ACTIVITIES AT SANTA SUSANA FIELD LABORATORY at 4-90 (Mar. 2014) (noting that emissions from consumed electricity are “indirect impacts” and discussed qualitatively, without explaining why no quantitative analysis was performed); SCIENCE MISSION DIRECTORATE, *supra* note 214, at 4-75 (noting that energy use in support of launches would be the primary source of GHG emissions without quantifying those emissions).

²¹⁸ U.S. DEP'T OF THE NAVY, HAWAII-SOUTHERN CALIFORNIA EIS *supra* note 215, at 4-22 tbl. 4.4-1; U.S. DEP'T OF THE NAVY, ATLANTIC FLEET FEIS, *supra* note 215, at 4-43 tbl. 4.5-1.

Impacts of Climate Change – Eight of the EISs (47%) discussed how climate change could affect the proposed project, and seven EISs (41%) discussed how climate change may affect water resources in the project area. Unlike in other categories, where EISs typically focused on the impacts of climate change on the surrounding environment, the EISs in this category focused on how climate change would affect the proposed infrastructure or operations themselves. Impacts that were discussed included increased potential of wildfires, increased probability and intensity of storms for Navy bases, water shortages caused both by drought and by increased water usage by a growing population, and more frequent extreme events such as heat waves, droughts, scarcities of water supplies, and heavy rainfall. In this discussion, several EISs cited the Quadrennial Defense Review (2012)—a strategic guidance document on climate change adaptation and energy needs for the US Department of Defense. Two EISs also noted that NEPA required consideration of climate change impacts and adaptation measures.²¹⁹

Most of the EISs that discussed climate change impacts did not discuss how the agency intended to respond to those impacts, apart from noting that further monitoring and action may be required.²²⁰ For example, two EISs contained following language, without specifying *what* measures would be needed to mitigate climate change impacts:

“While operations at [the base] have already adapted to droughts, high temperatures, and scarce water supplies, exacerbation of these conditions in the future may increase the cost of proposed operations and could impede operations during extreme events. Additional measures could be needed to mitigate such impacts.”²²¹

There was one exemplary EIS that did consider adaptation measures for potential impacts on water as part of an Installation Energy and Sustainable Strategy (IESS).²²² Another EIS noted that

²¹⁹ “In addition to assessing the GHG emissions that would come from the action alternatives and the potential impact on global climate change, the analysis must assess how climate change might impact implementation of the action alternatives and what adaptation strategies could be developed in response.” U.S. MARINE CORPS, TOWNSEND BOMBING RANGE FEIS, *supra* note 212, at 4-26; *see also* U.S. AIR FORCE, FINAL UNITED STATES AIR FORCE F-35A OPERATIONAL BASING ENVIRONMENTAL IMPACT STATEMENT at BR4-47 (Sep. 2013).

²²⁰ *See, e.g.*, U.S. AIR FORCE, FINAL KC-46A FORMAL TRAINING UNIT (FTU) AND FIRST MAIN OPERATING BASE (MOB 1) BEDDOWN EIS (Mar. 2014) [hereinafter KC-46A FTU EIS] (“While operations at Altus AFB have already adapted to droughts, high temperatures, and scarce water supplies, exacerbation of these conditions in the future may increase the cost of proposed operations and could impede operations during extreme events. Additional measures could be needed to mitigate such impacts.”); U.S. AIR FORCE, POWDER RIVER TRAINING COMPLEX ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA ENVIRONMENTAL IMPACT STATEMENT (Nov. 2014) [hereinafter POWDER RIVER TRAINING COMPLEX EIS].

²²¹ U.S. AIR FORCE, POWDER RIVER TRAINING COMPLEX EIS, *supra* note 221; U.S. AIR FORCE, KC-46A FTU EIS, *supra* note 221.

²²² U.S. MARINE CORPS, U.S. DEP’T OF THE NAVY, FINAL ENVIRONMENTAL IMPACT STATEMENT LAND ACQUISITION AND AIRSPACE ESTABLISHMENT TO SUPPORT LARGE-SCALE MARINE AIR GROUND TASK FORCE LIVE FIRE AND MANEUVER TRAINING) at 5-39 – 5-40 (July 2012).

the agency intended to implement energy and water conservation measures that would make a military base more resilient to climate change, without discussing how climate change would actually affect the facility.²²³

Energy and Water Efficiency – Energy efficiency considerations were much more prominent in these EISs than other categories; 12 of the 17 EISs discussed energy efficiency. Energy efficiency measures were discussed as a strategy to mitigate environmental impacts, save costs, and increase resilience against external shocks.²²⁴ Only 4 of the 17 EISs discussed water efficiency measures, even though most of the projects did involve water withdrawals. Water efficiency measures were also discussed as strategies to mitigate environmental impacts and costs and improve project resilience.

4. CONCLUSION

This survey of federal EISs prepared between 2012 and 2014 indicates that climate change has become an increasingly prominent issue in federal environmental reviews, but there is still significant variation in terms of how and whether considerations related to GHG emissions, climate change impacts, and efficiency are addressed by federal agencies. The finalization of CEQ's 2014 draft guidance on climate change and NEPA reviews could help to promote a more standard approach to the evaluation of climate change considerations in these documents. While it appears that most agencies are already applying CEQ's recommended threshold for quantifying GHG emissions (25,000 tpy), they do not consistently apply other aspects of CEQ's guidance—such as the recommendations on the scope of indirect emissions that should be included in the NEPA analysis, and the recommendations on how to account for the impacts of climate change and select appropriate adaptation measures.

²²³ U.S. ARMY GARRISON, FORT BLISS, FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE IMPLEMENTATION OF ENERGY, WATER, AND SOLID WASTE SUSTAINABILITY INITIATIVES AT FORT BLISS, TEXAS & NEW MEXICO at iv (Dec. 2013).

²²⁴ U.S. AIR FORCE, KC-46A FTU EIS, *supra* note 221; U.S. ARMY GARRISON, FORT BLISS, *supra* note 224.