

~~EXECUTIVE OFFICE OF THE PRESIDENT~~

**COUNCIL ON ENVIRONMENTAL QUALITY**

WASHINGTON, D.C. 20503 [RIN 0331-AA06](#)

August 1, 2016

~~MEMORANDUM FOR HEADS OF FEDERAL DEPARTMENTS AND AGENCIES~~

**FROM:**

**SUBJECT:**

~~C — INA GOLDFISHER~~  
~~C — CIL ON ENVIRONMENTAL QUALITY~~

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~~Final Guidance for Federal Departments and Agencies on Consideration~~  
~~[\[CEQ-2022-0005\]](#)~~

[National Environmental Policy Act Guidance on Consideration of Greenhouse Gas](#)

**Emissions and ~~the Effects of~~ Climate Change in**

**AGENCY:** Council on Environmental Quality.

**ACTION:** Notice of interim guidance; request for comments.

**SUMMARY:** The Council on Environmental Quality (CEQ) is issuing this interim guidance to assist agencies in analyzing greenhouse gas (GHG) and climate change effects of their proposed actions under the National Environmental Policy Act ~~Reviews~~(NEPA). CEQ is issuing this guidance as interim guidance so that agencies may make use of it immediately while CEQ seeks public comment on the guidance. CEQ intends to either revise the guidance in response to public comments or finalize the interim guidance.

**DATES:** This interim guidance is effective immediately. CEQ invites interested persons to submit comments on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

**ADDRESSES:** You may submit comments, identified by docket number CEQ–2022–0005, by any of the following methods:

- Federal eRulemaking Portal: <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202–456–6546.
- Mail: Council on Environmental Quality, 730 Jackson Place NW, Washington, DC 20503.

All submissions received must include the agency name, “Council on Environmental Quality,” and the docket number, CEQ–2022–0005. All comments received will be posted without change to <https://www.regulations.gov>, including any

personal information provided. Do not submit electronically any information you consider to be private, Confidential Business Information (CBI), or other information, the disclosure of which is restricted by statute.

**FOR FURTHER INFORMATION CONTACT:** Jomar Maldonado, Director for NEPA, 202–395–5750 or [Jomar.MaldonadoVazquez@ceq.eop.gov](mailto:Jomar.MaldonadoVazquez@ceq.eop.gov).

## **SUPPLEMENTARY INFORMATION:**

### **I. ~~INTRODUCTION~~ Introduction**

The Council on Environmental Quality (CEQ) issues this guidance to assist ~~Federal~~ Federal agencies in their consideration of the effects of greenhouse gas (GHG) emissions<sup>1</sup> and climate change when evaluating proposed major Federal actions in accordance with the National Environmental Policy Act (NEPA)<sup>2</sup> and the CEQ Regulations Implementing the Procedural Provisions of NEPA (CEQ Regulations).<sup>23</sup> This guidance will facilitate compliance with existing NEPA requirements, ~~thereby~~ improving the efficiency and consistency of reviews of proposed Federal actions for agencies, decision makers, project proponents, and the public.<sup>3-4</sup> ~~The~~ is guidance provides Federal agencies a common

~~<sup>1</sup> For purposes of this guidance, CEQ defines GHGs in accordance with Section 19(m) of Exec. Order No. 13693, Planning for Federal Sustainability in the Next Decade, 80 Fed. Reg. 15569, 15882 (Mar. 25, 2015) (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride). Also for purposes of this guidance, “emissions” includes release of stored GHGs as a result of land management activities affecting terrestrial GHG pools such as, but not limited to, carbon stocks in forests and soils, as well as actions that affect the future changes in carbon stocks. The common~~

<sup>1</sup> For purposes of this guidance, CEQ defines GHGs consistent with CEQ’s *Federal Greenhouse Gas Accounting and Reporting Guidance* (Jan. 17, 2016).

[https://www.sustainability.gov/pdfs/federal\\_ghg%20accounting\\_reporting-guidance.pdf](https://www.sustainability.gov/pdfs/federal_ghg%20accounting_reporting-guidance.pdf) (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride). Also, for purposes of this guidance, “emissions” includes release of stored GHGs as a result of land management activities affecting terrestrial GHG pools such as carbon stocks in forests and soils, as well as actions that affect the future changes in carbon stocks. To facilitate comparisons between emissions of the different GHGs, a common unit of measurement for GHGs is metric tons of CO<sub>2</sub> equivalent (mt CO<sub>2</sub>-e).

<sup>2</sup> 42 U.S.C. 4321 et seq.

<sup>3</sup> 40 CFR parts 1500–1508.

<sup>4</sup> This guidance is not a rule or regulation, and the recommendations it contains may not apply to a particular situation based upon the individual facts and circumstances. This guidance does not change or substitute for any law, regulation, or other legally binding requirement, and is not legally enforceable. The use of non-mandatory language such as “guidance,” “recommend,” “may,” “should,” and “can,” describes CEQ policies and recommendations. The use of mandatory terminology such as “must” and “required” describes controlling requirements under the terms of NEPA and the CEQ regulations, but this document does not affect legally binding requirements.

unit of measurement for GHGs is metric tons of CO<sub>2</sub> equivalent (MTCO<sub>2</sub>e).

See 42 U.S.C. 4321 « 3, « 0 cm r » i i so + 1508.

~~This guidance is not a rule or regulation, and the recommendations it contains may not apply to a particular situation based upon the individual facts and circumstances. This guidance does not change or substitute for any law, regulation, or other legally binding approach for assessing their proposed actions, while recognizing each agency's unique circumstances and authorities.~~<sup>4</sup>

The United States faces a profound climate crisis and there is little time left to avoid a dangerous—potentially catastrophic—climate trajectory. Climate change is a fundamental environmental issue, and its effects on the human environment fall squarely within NEPA's purview.<sup>5</sup> Major Federal actions may result in substantial GHG emissions or emissions reductions, so Federal leadership that is informed by sound analysis is crucial to addressing the climate crisis. Federal proposals may also be affected by climate change, so they should be designed in consideration of resilience and adaptation to a changing climate.<sup>6</sup> Climate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources, ~~causation, mechanisms of action, and impacts. Analyzing a proposed action's GHG emissions and the effects of climate change relevant to a proposed action—particularly how climate change may change an action's environmental effects—can provide useful~~ and effects. Further, climate change raises environmental justice concerns because it will disproportionately and adversely affect human health and the environment in some communities, including communities of color, low-income communities, and Tribal Nations and Indigenous communities. Given the urgency of the climate crisis and NEPA's important role in providing critical information to decision makers and the public:

<sup>4</sup>This guidance also addresses recommendations offered by a number of stakeholders. See President's State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience, *Recommendations to the President* (November 2014), p. 20 (recommendation 2.7), available at [www.whitehouse.gov/sites/default/files/docs/task\\_force\\_report\\_0.pdf](http://www.whitehouse.gov/sites/default/files/docs/task_force_report_0.pdf); U.S. Government Accountability Office, *Future Federal Adaptation Efforts Could Better Support Local Infrastructure Decision Makers*, (Apr. 2013), available at <http://www.gao.gov/assets/660/653741.pdf>. Public comments on drafts of this guidance document are available at <http://www.whitehouse.gov/administration/eop/eeq/initiatives/nepa/comments/>

<sup>5</sup>NEPA recognizes “the profound impact of man’s activity on the interrelations of all components of the natural environment.” (42 U.S.C. 4331(a)). ~~It~~ Among other things, it was enacted to, ~~inter alia,~~ “promote efforts ~~which that~~

will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of ~~man~~ humans.” (42 U.S.C. 4321). See also 42 U.S.C. 4332(2)(F) (requiring all Federal agencies to “recognize the worldwide and long-range character of environmental problems”).

<sup>6</sup>See 42 U.S.C. 4332(2)(A) (directing agencies to ensure the use of “the environmental design arts” in planning and decision making).

~~CEQ is issuing the guidance to provide for greater clarity and more consistency in how agencies address climate change in the environmental impact assessment process. This guidance uses longstanding NEPA principles because such an analysis should be similar to the analysis of other environmental impacts under NEPA. The guidance is intended to assist agencies in disclosing and considering the reasonably foreseeable effects of proposed actions that are relevant to their decision-making processes. It confirms that agencies should provide the public and decision makers with explanations of the basis for agency determinations.~~

requirement, and is not legally enforceable. The use of non-mandatory language such as “guidance,” “recommend,” “may,” “should,” and “can,” is intended to describe CEQ policies and recommendations. The use of mandatory terminology such as “must” and “required” is intended to describe controlling requirements under the terms of NEPA and the CEQ regulations, but this document does not affect legally-binding requirements.

~~Focused and effective consideration of climate change in NEPA reviews<sup>6</sup> will allow agencies to improve the quality of their decisions. Identifying important interactions between a changing climate and the environmental impacts from a proposed action can help Federal agencies and other decision makers identify practicable opportunities to reduce GHG emissions, improve environmental outcomes, and contribute to safeguarding communities and their infrastructure against the effects of extreme weather events and other climate-related impacts.~~

~~Agencies implement NEPA through one of three levels of NEPA analysis: a Categorical Exclusion (CE); an Environmental Assessment (EA); or an Environmental Impact Statement (EIS). This guidance is intended to help Federal agencies ensure their analysis of potential GHG emissions and effects of climate change in an EA or EIS is commensurate with the extent of the effects of the proposed action.<sup>7</sup> NEPA reviews should quantify proposed actions’ GHG emissions, place GHG emissions in appropriate~~

<sup>6</sup>The term “NEPA review” is used to include the analysis, process, and documentation required under NEPA. While this document focuses on NEPA reviews, agencies are encouraged to analyze GHG emissions and climate-resilient design issues early in the planning and development of proposed actions and projects under their substantive authorities.¶

context and disclose relevant GHG emissions and relevant climate impacts, and identify alternatives and mitigation measures to avoid or reduce GHG emissions. CEQ encourages agencies to mitigate GHG emissions associated with their proposed actions to the greatest extent possible, consistent with national, science-based GHG reduction policies established to avoid the worst impacts of climate change.<sup>7</sup> ~~Agencies have discretion in how they tailor their individual NEPA reviews to accommodate the approach outlined in this guidance, consistent with the CEQ Regulations and their respective implementing procedures and policies.<sup>8</sup> CEQ does not expect that implementation of this guidance will require agencies to develop new NEPA implementing procedures. However, CEQ recommends that agencies review their NEPA procedures and propose any updates they deem necessary or appropriate to facilitate their consideration of GHG emissions and climate change.<sup>9</sup> CEQ will review agency~~

~~proposals for revising their NEPA procedures, including any revision of CEs, in light of this guidance.~~

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As discussed in this guidance, when ~~addressing~~conducting climate change analyses in NEPA reviews, agencies should consider: (1) ~~T~~he potential effects of a proposed action on climate change ~~as indicated,~~ including by assessing both GHG emissions ~~(e.g., to include, where applicable, carbon sequestration);<sup>10</sup> and reductions from~~ the proposed action; and (2) the effects of climate change on a proposed action and its

<sup>7</sup>. See 40 CFR 1502.2(b) (Impacts shall be discussed in proportion to their significance); 40 CFR 1502.15 (Data and analyses in a statement shall be commensurate with the importance of the impact...); <sup>7</sup> See White House Fact Sheet, *President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target* (Apr. 22, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>; see also Executive Order (E.O.) 14008, *Tackling the Climate Crisis at Home and Abroad*, 86 FR 7619 (Jan. 25, 2021).

<sup>8</sup>. See 40 CFR 1502.24 (Methodology and scientific accuracy).<sup>11</sup>

<sup>9</sup>. See 40 CFR 1507.3. Agency NEPA implementing procedures can be, but are not required to be, in the form of regulation. Section 1507.3 encourages agencies to publish explanatory guidance, and agencies also should consider whether any updates to explanatory guidance are necessary. Agencies should review their policies and implementing procedures and revise them as necessary to ensure full compliance with NEPA.

environmental impacts. Analyzing reasonably foreseeable climate effects in NEPA reviews<sup>8</sup> helps ensure that decisions are based on the best available science and account for the urgency of the climate crisis. Climate change analysis also enables agencies to evaluate reasonable alternatives and mitigation measures that could avoid or reduce potential climate change-related effects and help address mounting climate resilience and adaptation challenges.

Accurate and clear climate change analysis:

- Helps decision makers, stakeholders, and the public to identify and assess reasonable courses of action that will reduce GHG emissions and climate change effects;
- Enables agencies to make informed decisions to help meet applicable Federal, State, Tribal, regional, and local climate action goals;<sup>9</sup>
- Promotes climate change resilience and adaptation and prioritizes the national need to ensure climate-resilient infrastructure and operations, including by considering the reasonably foreseeable effects of climate change on infrastructure

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<https://www.federalregister.gov/d/2021-02177>; E.O. 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, 86 FR 70935 (Dec. 13, 2021), <https://www.federalregister.gov/d/2021-27114>.

investments and the resources needed to protect such investments over their lifetime;<sup>10</sup> ~~and, (2) The effects of climate change on a proposed action and its environmental impacts.~~

<sup>8</sup> The term “NEPA review” as used in this guidance includes the analysis, process, and documentation required under NEPA. While this document focuses on reviews conducted pursuant to NEPA, agencies should analyze GHG emissions and climate-resilient design issues early in the planning and development of proposed actions and projects under their substantive authorities.

<sup>9</sup> For example, the United States has set an economy-wide target of reducing its net GHG emissions by 50 to 52 percent below 2005 levels in 2030. See United Nations Framework Convention on Climate Change (UNFCCC), U.S. Nationally Determined Contribution (Apr. 20, 2021), <https://unfccc.int/NDCREG>.

<sup>10</sup> Carbon sequestration is the long-term carbon storage in plants, soils, geologic formations, and oceans.<sup>10</sup> Resilience is a priority for Federal agency actions. See, e.g., E.O. 14057, *supra* note 7; see also E.O. 14008, *supra* note 7.

- Protects national security by helping to identify and reduce climate change-related threats including potential resource conflicts, stresses to military operations and installations, and the potential for abrupt stressors;<sup>11</sup>
- Enables agencies to better understand and address the effects of climate change on vulnerable communities, thereby responding to environmental justice concerns and promoting resilience and adaptation;
- Supports the international leadership of the United States on climate issues;<sup>12</sup> and
- Enables agencies to better assess courses of action that will provide pollution reduction co-benefits and long-term cost savings and reduce litigation risk to Federal actions—including projects carried out pursuant to the Bipartisan Infrastructure Law<sup>13</sup> and the Inflation Reduction Act.<sup>14</sup>

This interim<sup>15</sup> GHG guidance, effective upon publication, builds upon and updates CEQ’s 2016 *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (“2016 GHG Guidance”), highlighting best practices for analysis grounded in science and agency experience.<sup>16</sup> CEQ is issuing this guidance to provide for greater clarity and more consistency in how agencies address climate change in NEPA reviews. This guidance applies **longstanding NEPA principles** to the analysis of climate change effects, which are a well-recognized category of effects on

<sup>11</sup> See, e.g., Nat’l Intel. Council, *Implications for U.S. National Security of Anticipated Climate Change* (Sept. 21, 2016), NIC WP 2016-01,

[https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/Implications\\_for\\_US\\_National\\_Security\\_of\\_Anticipated\\_Climate\\_Change.pdf](https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/Implications_for_US_National_Security_of_Anticipated_Climate_Change.pdf); see also Dep’t of Def., Directive 4715.21, *Climate Change Adaptation and Resilience* (Jan. 14, 2016), <https://dod.defense.gov/Portals/1/Documents/pubs/471521p.pdf>.

<sup>12</sup> See 42 U.S.C. 4332(2)(F) (requiring all Federal agencies to “recognize the worldwide and long-range character of environmental problems”).

<sup>13</sup> Infrastructure Investment and Jobs Act, Pub. L. 117–58, 135 Stat. 429.

<sup>14</sup> Pub. L. 117–169, 136 Stat. 1818.

<sup>15</sup> CEQ is issuing this guidance as interim guidance so that agencies may make use of it immediately while CEQ seeks public comment on the guidance. CEQ may revise the guidance in response to public comments or finalize the interim guidance at a later date.

<sup>16</sup> CEQ, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, 81 FR 51866



the human environment requiring consideration under NEPA. In fact, Federal agencies have been analyzing climate change impacts and GHG emissions in NEPA documents for many years. CEQ intends the guidance to assist agencies in publicly disclosing and considering the reasonably foreseeable effects of their proposed actions. CEQ encourages agencies to integrate the climate and other environmental considerations described in this guidance early in their planning processes. CEQ will review any agency proposals for revised NEPA procedures, including any revision of existing categorical exclusions, in light of this guidance.<sup>17</sup>

## **II. Summary of Key Content**

This guidance explains ~~the application of~~ how agencies should apply NEPA principles and existing best practices to the analysis of their climate change analyses by:

- Recommending that agencies leverage early planning processes to integrate GHG emissions and climate change, and considerations into the identification of proposed actions, reasonable alternatives (as well as the no-action alternative), and potential mitigation and resilience measures;
- ~~Recommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions, taking into account~~ Recommending that agencies quantify a proposed action's projected GHG emissions or reductions for the expected lifetime of the action, considering

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(Aug. 8, 2016), [https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa\\_final\\_ghg\\_guidance.pdf](https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf). On April 5, 2017, CEQ withdrew the final 2016 guidance, as directed by E.O. 13783. 82 FR 16576 (Apr. 5, 2017). On June 26, 2019, CEQ issued draft GHG guidance. 84 FR 30097 (June 26, 2019). CEQ rescinded this draft guidance on February 19, 2021, pursuant to E.O. 13990. 86 FR 10252 (Feb. 19, 2021). In addition, on April 20, 2022, CEQ issued a Final Rule for its "Phase 1" NEPA rulemaking. 87 FR 23453. CEQ will be proceeding with updates to the NEPA regulations as set forth in the 2022 Regulatory Agenda. <sup>17</sup> See 40 CFR 1507.3. Agencies should review their policies and implementing procedures and revise them as necessary to ensure compliance with NEPA. Agency NEPA implementing procedures can be, but are not required to be, in the form of regulation. Section 1507.3 encourages agencies to publish explanatory guidance, and agencies also should consider whether any updates to explanatory guidance are necessary in light of this guidance.

available data and GHG quantification tools that are suitable for the proposed

~~agency~~ action;

- Recommends ing that agencies use projected GHG emissions ~~(to include, where applicable, carbon sequestration implications associated with the proposed agency action) as a proxy for assessing actions and their reasonable alternatives to help assess~~ potential climate change effects ~~when preparing a NEPA analysis for a proposed agency action~~;
- ~~Recommends that where agencies do not quantify a proposed agency action's projected GHG emissions because tools, methodologies, or data inputs are not reasonably available to support calculations for a quantitative analysis, agencies include a qualitative analysis in the NEPA document and explain the basis for determining that quantification is not reasonably available;~~ Recommending that agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives;
- Discuss ing methods to appropriately analyze reasonably foreseeable direct, indirect, and cumulative GHG emissions ~~and climate effects~~;
- ~~Guides the consideration of reasonable alternatives and recommends agencies consider the short- and long-term effects and benefits in the~~ Guiding agencies in considering reasonable alternatives and mitigation ~~analysis~~ measures, as well as addressing short- and long-term climate change effects;
- Advis ing agencies to use the best available information and science when assessing the potential future state of the affected environment in ~~a~~ NEPA ~~analysis, instead of undertaking new research, and provides~~ analyses and

providing up to date examples of existing sources of scientific information;

- ~~Counsels~~Recommending agencies ~~to~~ use the information developed during the NEPA review to consider reasonable alternatives that would make the actions and affected communities more resilient to the effects of a changing climate;
- Outlines ~~ing special~~ unique considerations for agencies analyzing biogenic carbon dioxide sources and carbon stocks<sup>18</sup> associated with land and resource management actions under NEPA;
- ~~Recommends that agencies select the appropriate level of NEPA review to assess the broad scale effects of GHG emissions and climate change, either to inform programmatic (e.g., landscape scale) decisions, or at both the programmatic and tiered project or site specific level, and to set forth a reasoned explanation for the agency's approach; and~~

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- ~~Counsels~~Advising agencies that the “rule of reason” inherent in NEPA and the CEQ Regulations ~~allows~~should guide agencies ~~to in~~ determineing, based on their expertise and experience, how to consider an environmental effect and prepare an analysis based on the available information. ~~;~~ and

## II. BACKGROUND

- Reminding agencies to incorporate environmental justice considerations into their analyses of climate-related effects, consistent with Executive Orders 12898 and 14008.

## III. Background

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<sup>18</sup> See infra section IV(I).

Consistent with NEPA, climate change analysis is a critical component of environmental reviews and integral to Federal agencies managing and addressing climate change.<sup>19</sup> Recognizing the increasing urgency of the climate crisis and advances in climate science and GHG analysis techniques, CEQ has clarified and updated its 2016 GHG guidance on particular components including basic updates to reflect developments in climate science, methods to provide context for the impacts associated with GHG emissions, analysis of indirect effects, programmatic approaches, and environmental justice considerations. This guidance is applicable to all Federal actions subject to NEPA, with a focus on those for which an environmental assessment or environmental impact statement is prepared.<sup>20</sup> This guidance does not—and cannot—expand the range of Federal agency actions that are subject to NEPA.<sup>21</sup>

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## A. NEPA

NEPA is designed to promote consideration of potential effects on the human environment<sup>1422</sup> that would result from proposed Federal agency actions, and to provide the public and decision makers with useful information regarding reasonable alternatives<sup>1223</sup> and mitigation measures to improve the environmental outcomes of

Federal agency actions. NEPA encourages early planning, ensures that the environmental

<sup>19</sup> This updated guidance is also consistent with E.O.s 13990, 14008, and 14057, which set forth commitments to address climate change; direct that Federal infrastructure investment reduce climate pollution; and that Federal permitting decisions consider the effects of GHG emissions and climate change. *See* E.O. 13990, 86 FR 7037 (Jan. 25, 2021); E.O. 14008, *supra* note 7; E.O. 14057, *supra* note 7.

<sup>20</sup> Notwithstanding this focus, where appropriate, agencies also should apply this guidance to consider climate impacts and GHG emissions in establishing new categorical exclusions (CEs) and extraordinary circumstances in their agency NEPA procedures. *See* 40 CFR 1507.3(e)(2)(ii); CEQ, *Final Guidance for Federal Departments and Agencies on Establishing, Applying, and Revising Categorical Exclusions Under the National Environmental Policy Act*, 75 FR 75628 (Dec. 6, 2010).

<sup>21</sup> *See* 40 CFR 1508.1(q).

<sup>14</sup> 40 CFR 1508.14 (“‘Human environment’ shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.”);<sup>22</sup> 42 U.S.C. 4331(a) (“[R]ecognizing the profound impact of [human] activity on the interrelations of all components of the natural environment”).

<sup>123</sup> 40 CFR ~~1508.25(b)~~ 1501.9(e)(2) (“Alternatives, which include: (1) No the no action alternative; (2) ~~Other~~; other reasonable courses of ~~actions~~; (3) Mitigation action; and mitigation measures (not in the proposed action).”).

effects of proposed actions are ~~taken into account~~considered before decisions are made, and informs the public of significant environmental effects of proposed Federal agency actions, promoting transparency and accountability ~~concerning Federal actions that may significantly affect the quality of the human environment.~~<sup>24</sup>

Agencies implement NEPA through one of three levels of analysis: a categorical exclusion (CE); an environmental assessment (EA); or an environmental impact statement (EIS). Agencies have discretion in how they tailor their individual NEPA reviews in consideration of this guidance, consistent with the CEQ Regulations and their respective implementing procedures and policies.<sup>25</sup> NEPA reviews should identify measures to avoid, minimize, or mitigate adverse effects of Federal agency actions.<sup>26</sup> Better analysis and informed decisions are the ultimate goal of the NEPA process.<sup>1327</sup> Inherent in NEPA and the CEQ Regulations is a “rule of reason” that allows agencies to determine, based on their expertise and experience, how to consider an environmental effect and prepare an analysis based on the available information. The usefulness of that information to the decision-making process and the public, and the extent of the

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anticipated environmental consequences, are important factors to consider when applying that “rule of reason.”

## **B. Climate Change**

Climate change ~~science continues to expand and refine our understanding of the impacts of anthropogenic GHG emissions~~is a defining national and global environmental challenge of this time, threatening broad and potentially catastrophic impacts to the

<sup>24</sup> See 42 U.S.C. 4332 and 40 CFR 1501.2.

<sup>25</sup> See 40 CFR 1502.23 (methodology and scientific accuracy).

<sup>26</sup> 40 CFR 1505.2(a)(3).

<sup>1327</sup> 40 CFR 1500.1(ea) (“Ultimately, of course, it is not better documents but better decisions that count. NEPA’s purpose is not to generate paperwork—even excellent paperwork—but to provide for informed decision making and foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.”).<sup>27</sup>

human environment. It is well established that rising global atmospheric GHG concentrations are substantially affecting the Earth's climate, and that the dramatic observed increases in GHG concentrations since 1750 are unequivocally caused by human activities including fossil fuel combustion.<sup>28</sup>

CEQ's first Annual Report in 1970 ~~referenced climate change, indicating that "[m]an may be changing his~~discussed the various ways that human-driven actions were understood to potentially alter global temperatures and weather.<sup>29</sup> At that time, the mean level of atmospheric carbon dioxide (CO<sub>2</sub>) had been measured as increasing to 325 parts per million (ppm) from ~~an~~a pre-Industrial average

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<sup>28</sup> See, e.g., Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis* ("The Physical Science Basis"), *Summary for Policymakers*, SPM-5 (Aug. 7, 2021), <https://www.ipcc.ch/report/ar6/wg1/chapter/summary-for-policymakers/> ("Observed increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by human activities"); see also *id.*, *Technical Summary*, TS-45, <https://www.ipcc.ch/report/ar6/wg1/chapter/technical-summary/>; United States Global Change Research Program ("USGCRP"), *Fourth National Climate Assessment* ("Fourth National Climate Assessment"), *Volume II: Impacts, Risks, and Adaptation in the United States*, 76 (2018), <https://nca2018.globalchange.gov/> ("Many lines of evidence demonstrate that human activities, especially emissions of greenhouse gases from fossil fuel combustion, deforestation, and land-use change, are primarily responsible for the climate changes observed in the industrial era, especially over the last six decades"); IPCC, *Climate Change 2014 Synthesis Report*, 46 (2014), [https://www.ipcc.ch/site/assets/uploads/2018/05/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf) ("Emissions of CO<sub>2</sub> from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emissions increase from 1970 to 2010, with a similar percentage contribution for the increase during the period 2000 to 2010 (high confidence)."). These conclusions are built upon a robust scientific record that has been created with substantial contributions from the USGCRP, which informs the United States' response to global climate change through coordinated Federal programs of research, education, communication, and decision support. See section 103, Pub. L. 101-606, 104 Stat. 3096. For additional information on the USGCRP, visit <http://www.globalchange.gov>. The USGCRP, formerly the Climate Change Science Program, coordinates and integrates the activities of 13 Federal agencies that conduct research on changes in the global environment and their implications for society. The USGCRP began as a Presidential initiative in 1989 and was codified in the Global Change Research Act of 1990 (Pub. L. 101-606). USGCRP-participating agencies are the Departments of Agriculture, Commerce, Defense, Energy, the Interior, Health and Human Services, State, and Transportation; the U.S. Agency for International Development, the Environmental Protection Agency, NASA, the National Science Foundation, and the Smithsonian Institution.

<sup>29</sup> See CEQ, *Environmental Quality: The First Annual Report*, p.93 (August Aug. 1970); ~~available at,~~ [https://ceq.doe.gov/ceq-reports/annual\\_environmental\\_quality\\_reports.html](https://ceq.doe.gov/ceq-reports/annual_environmental_quality_reports.html).

of 280 ppm ~~pre-Industrial levels.~~<sup>1530</sup> Since 1970, the global average concentration of atmospheric ~~carbon dioxide~~CO<sub>2</sub> has increased to ~~approximately 400~~414.21 ppm (~~2015-globally averaged value~~).<sup>16</sup> as of 2021, setting a new record high.<sup>31</sup> Methane is a potent GHG; over a 100-year period, the emissions of a ton of methane contribute 28 to 36 times as much to global warming as a ton of carbon dioxide. Over a 20-year timeframe, methane is about 84 times as potent as carbon dioxide.<sup>32</sup> Concentrations of methane (CH<sub>4</sub>), have more than doubled from pre-Industrial levels.<sup>33</sup> Methane concentrations continue to grow rapidly.<sup>34</sup> Concentrations of other GHGs have similarly continued to grow, including nitrous oxide (N<sub>2</sub>O) and hydrofluorocarbons (HFC).<sup>35</sup> Since the publication of CEQ's first Annual Report, ~~it has been determined that~~ human activities have caused the carbon dioxide content of the atmosphere of our planet to increase to its

<sup>1530</sup> See USGCRP, *Climate Change Impacts in the United States: The Third National Climate Assessment, Appendix 3: Climate Science Supplement*, 739 (Jerry J. M. Melillo, Terese (T.C.) Richmond, & Gary W. Yohe et al. eds., 2014) [hereinafter ("Third National Climate Assessment")], *Appendix 3 Climate Science Supplement*, p. 739; U.S. Env't Protection Agency (EPA), April 2015: EPA 430-R-15-004, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2013*, available at <https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory/sites/default/files/2015-12/documents/us-ghg-inventory-2015-main-text.pdf>; see also D.L. Hartmann, D.L., A.M.G. Klein Tank, M. Rusticucci, et al., 2013 *Observations: Atmosphere and Surface*, in *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (T.F. Stocker, T.F., D. Qin, G.-K., et al. (eds)), Cambridge University Univ. Press: Cambridge, United Kingdom and New York, NY, USA. Available at [http://www.archive.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5\\_Chapter02\\_FinalFINAL.pdf](http://www.archive.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter02_FinalFINAL.pdf).

<sup>31</sup> Nat'l Oceanic and Atmospheric Admin. (NOAA), *Climate Change: Atmospheric Carbon Dioxide* (June 23, 2022), <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>.

<sup>32</sup> Although there are different ways to weight methane compared to carbon dioxide, the U.S. nationally determined contribution (NDC) under the Paris Agreement uses the 100-year GWP from the IPCC's Fifth Assessment Report. See IPCC, *Climate Change 2014 Synthesis Report*, *supra* note 28, at 5. To avoid potential ambiguity, CEQ encourages agencies to use the 100-year GWP when disclosing the GHG emissions impact from an action in their NEPA documents.

<sup>33</sup> See EPA, Proposed Rule on Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 86 FR 63110, 63114 (Nov. 15, 2021), <https://www.federalregister.gov/d/2021-24202>; see also Climate and Clean Air Coalition and United Nations Environment Programme (UNEP), *Global Methane Assessment*, 18 (2021), <https://www.ccaoalition.org/en/resources/global-methane-assessment-full-report>; USGCRP, Fourth National Climate Assessment, *supra* note 28, Volume I, 82. Methane emissions are responsible for about 20 percent of climate forcing globally. See California Air Resources Board, *Short-Lived Climate Pollutant Reduction Strategy*, 7 (Mar. 2017), [https://ww2.arb.ca.gov/sites/default/files/2020-07/final\\_SLCP\\_strategy.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf).

<sup>34</sup> See, e.g., NOAA, *Increase in atmospheric methane set another record during 2021* (Apr. 7, 2022), <https://www.noaa.gov/news-release/increase-in-atmospheric-methane-set-another-record-during-2021>.

<sup>16</sup> See Ed Dlugokencky & Pieter Tans, National Oceanic and Atmospheric Administration/Earth System Research Laboratory, <http://www.esrl.noaa.gov/gmd/ccgg/trends/global.html>.<sup>35</sup> See USGCRP, Fourth National Climate Assessment, *supra* note 28, Volume I, 81 (Figure 2.5).

highest level in at least 800,000 years.<sup>1736</sup>

~~It is now well established that rising global atmospheric GHG emission concentrations are significantly affecting the Earth's climate. These conclusions are built upon a scientific record that has been created with substantial contributions from the United States Global Change Research Program (USGCRP), which informs the United States' response to global climate change through coordinated Federal programs of research, education, communication~~

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Rising GHG levels are causing corresponding increases in average global temperatures and in the frequency and severity of natural disasters including storms, flooding, and decision support wildfires.<sup>1837</sup> ~~Studies have projected the effects of increasing GHGs on many resources normally discussed in the NEPA process~~Even if the United States and the world meet ambitious de-carbonization targets, those trends will continue for many years, adversely affecting critical components of the human environment, including water availability, ocean acidity, sea-level rise, ecosystem functions, biodiversity, energy production, energy transmission and distribution.

<sup>1736</sup> See Nat'l Aeronautics and Space Admin. (NASA) Earth Observatory, *The Carbon Cycle* (June 16, 2011), <http://earthobservatory.nasa.gov/Features/CarbonCycle>; University Univ. of California Cal. Riverside, National Aeronautics and Space Administration (NASA), and Riverside Unified School District, *Down to Earth Climate Change*, <http://globalclimate.ucr.edu/resources.html>; USGCRP, *Third Fourth National Climate Assessment, Appendix 3 Climate Science Supplement*.

~~¶~~—736 (“Although climate changes in the past have been caused by natural factors supra note 28, Volume II, human activities are now the dominant agents of change. Human activities are affecting climate through increasing atmospheric levels of heat-trapping gases and other substances, including particles.”).<sup>1454</sup>

<sup>1837</sup> See Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990). For additional information on the United States Global Change Research Program [hereinafter “USGCRP”], visit <http://www.globalchange.gov>. The USGCRP, formerly the Climate Change Science Program, coordinates and integrates the activities of 13 Federal agencies that conduct research on changes in the global environment and their implications for society. The USGCRP began as a Presidential initiative in 1989 and was codified in the Global Change Research Act of 1990 (Public Law 101–606). USGCRP participating agencies are the Departments of Agriculture, Commerce, Defense, Energy, Interior, Health and Human Services, State, and Transportation; the U.S. Agency for International Development, the Environmental Protection Agency, NASA, the National Science Foundation, and the Smithsonian Institution.<sup>37</sup> See IPCC, *Climate Change 2022: Impacts, Adaptation, and Vulnerability* (“Climate Change 2022”), *Summary for Policymakers*, 8 (H.-O. Pörtner et al. eds., 2022), <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>; USGCRP, *Fourth National Climate Assessment, supra note 28, Climate Science Special Report, Chapter 7, 207*, [https://science2017.globalchange.gov/downloads/CSSR\\_Ch7\\_Precipitation.pdf](https://science2017.globalchange.gov/downloads/CSSR_Ch7_Precipitation.pdf); NOAA, *Climate Change Increased Chances of Record Rains in Louisiana by at Least 40 Percent* (Sept. 7, 2016), <https://www.noaa.gov/media-release/climate-change-increased-chances-of-record-rains-in-louisiana-by-at-least-40-percent>.



agriculture and food security, air quality, and human health.<sup>1938</sup>

Based primarily on the scientific assessments of the [U.S. Global Change Research Program \(USGCRP\)](#), the National Research Council, and the Intergovernmental Panel on Climate Change ([IPCC](#)), in 2009 the Environmental Protection Agency (EPA) issued a finding that [declared that](#) the changes in our climate caused by elevated concentrations of ~~greenhouse gases~~ [GHGs](#) in the atmosphere are reasonably anticipated to endanger the public health and ~~public~~-welfare of current and future generations.<sup>2039</sup> ~~In 2015~~ [Since then](#), EPA [has](#) acknowledged more recent scientific assessments that “highlight the urgency of addressing the rising

concentration of ~~CO<sub>2</sub>~~ [GHGs](#) in the atmosphere,” ~~finding~~<sup>40</sup> [and has found](#) that certain ~~groups~~ [communities, including communities of color, low-income communities, Tribal Nations and Indigenous communities](#), are especially vulnerable to climate-related

<sup>1938</sup> See USGCRP, [Third](#) ~~Fourth~~ National Climate Assessment, *available at* [http://nea2014.globalchange.gov/system/files\\_force/downloads/low/NCA3\\_Climate\\_Change\\_Impacts\\_in\\_the\\_United%20States\\_Low\\_Res.pdf?download=1](http://nea2014.globalchange.gov/system/files_force/downloads/low/NCA3_Climate_Change_Impacts_in_the_United%20States_Low_Res.pdf?download=1); IPCC, *Climate Change 2014 Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment* *supra* note 28; IPCC, *Special Report on the Ocean and Cryosphere in a Changing Climate*, (H.-O. Pörtner et al., eds., 2019), <https://www.ipcc.ch/srocc/>; IPCC, *Special Report of the Intergovernmental Panel on Climate Change and Land*, (P.R.K. Pachauri, & L.A. Meyer Shukla et al., eds., 2014) [2019](#), *available at* [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf) [srcl](#); see also [USGCRP](#), <http://www.globalchange.gov>; 40 CFR ~~1508.8~~ [1508.1\(g\)\(4\)](#) (“effects include ecological [\(such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems\)](#), aesthetic, historic, cultural, economic, social, ~~and~~ [or](#) health” effects); USGCRP, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016)*, *available at* <https://health2016.globalchange.gov/>.

<sup>2039</sup> See generally [EPA](#), Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, [Final Rule](#), 74 [Fed. Reg.](#) [FR](#) 66496 (Dec. 15, 2009); (For noting, for example, ~~at~~ [66497-98](#): “[t]he evidence concerning how human-induced climate change may alter extreme weather events also clearly supports a finding of endangerment, given the serious adverse impacts that can result from such events and the increase in risk, even if small, of the occurrence and intensity of events such as hurricanes and floods. Additionally, public health is expected to be adversely affected by an increase in the severity of coastal storm events due to rising sea levels,” *id.* [at](#) [66497-98](#)).

<sup>40</sup> See [EPA](#), [Final Rule for Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act](#), 86 [FR](#) 55124 (Oct. 5, 2021), <https://www.federalregister.gov/d/2021-21030>.

effects.<sup>2141</sup> ~~Broadly~~

~~stated, the~~ Climate change also is likely to increase a community's vulnerability to other environmental impacts, further exacerbating environmental justice concerns. The effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, longer fire seasons and more severe wildfires, degraded air quality, ~~more heavy downpours and flooding,~~ increased drought, greater sea-level rise, ~~more intense storms~~ an increase in the intensity and frequency of extreme weather events, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems.<sup>2242</sup>

### ~~III. CONSIDERING THE EFFECTS OF GHG EMISSIONS AND CLIMATE CHANGE~~

The IPCC Assessment Report reinforces these findings by providing scientific evidence of the impacts of climate change driven by human-induced GHG emissions, on our ecosystems, infrastructure, human health, and socioeconomic makeup.<sup>43</sup> Moreover, the effects of climate change are likely to fall disproportionately on

~~This guidance is applicable to all Federal actions subject to NEPA, including site-specific actions, certain funding of site-specific projects, rulemaking actions, permitting~~

<sup>21</sup> See EPA, *Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units*, 80 Fed. Reg. FR 64661, ~~64677~~ 64647 (Oct. 23, 2015) (“Certain groups, including children, the elderly, and the poor, are most vulnerable to climate-related effects.” Recent studies also find that certain communities, including low-income communities and some communities of color ... are disproportionately affected by certain climate change related impacts— including heat waves, degraded air quality, and extreme weather events—which are associated with increased deaths, illnesses, and economic challenges. Studies also find that climate change poses particular threats to the health, well-being, and ways of life of indigenous peoples in the U.S.); see also EPA, EPA 430-R-21-003, *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts* (“Six Impacts”) (Sept. 2021), [https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability\\_september-2021\\_508.pdf](https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf).

<sup>22</sup> See <http://www.globalchange.gov/climate-change/impacts-society> and *Third National Climate Assessment, Chapters 3-15 (Sectors) and Chapters 16-25 (Regions)*, available at <http://nea2014.globalchange.gov/downloads>.<sup>42</sup> See 80 FR 64647, *supra* note 41; see also USGCRP, *Fourth National Climate Assessment, supra* note 28, Volume II, Chapters 2–12 (Sectors) and Chapters 18–27 (Regions); Thomas R. Knutson et al., *Global Projections of Intense Tropical Cyclone Activity for the Late Twenty-First Century from Dynamical Downscaling of CMIP5/RCP4.5 Scenarios*, 7221 (Sep. 15, 2015), <https://journals.ametsoc.org/view/journals/clim/28/18/jcli-d-15-0129.1.xml>; Ashley E. Payne et al., *Responses and Impacts of Atmospheric Rivers to Climate Change*, 143, 154 (Mar. 9, 2020), <https://www.nature.com/articles/s43017-020-0030-5>; IPCC, *Climate Change 2022, supra* note 37; IPCC, *Special Report on Climate Change and Land, supra* note 38, at 270–72; U.S. Nat'l Park Service (NPS), *Wildlife and Climate Change* (last updated Dec. 8, 2021), <https://www.nps.gov/articles/000/wildlife-climateimpact.htm>.

<sup>43</sup> See IPCC, *Climate Change 2022, supra* note 37, *Summary for Policymakers*.

~~decisions, and land and resource management decisions.~~<sup>23</sup>

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vulnerable communities, including communities of color, low-income communities and Tribal Nations and Indigenous communities with environmental justice concerns.<sup>44</sup>

~~This guidance does not—and cannot—expand the range of Federal agency actions that are subject to NEPA.~~

#### IV. Quantifying, Disclosing, and Contextualizing Climate Impacts, and Addressing the Potential Climate Change Effects of Proposed Federal Actions

Consistent with section 102(2)(C) of NEPA, Federal agencies ~~should~~must disclose and consider the reasonably foreseeable effects of their proposed actions including the extent to which a proposed action and its reasonable alternatives ~~would~~(including the no action alternative) would result in reasonably foreseeable GHG emissions that contribute to climate change, ~~through GHG emissions, and take into account.~~ Federal agencies also should consider the ways in which a changing climate may impact the proposed action and ~~any alternative actions~~its reasonable alternatives, and change the action's environmental effects over the lifetime of those effects, ~~and alter the overall environmental implications of such actions.~~

This guidance is intended to assist agencies in disclosing and considering the effects of GHG emissions and climate change ~~along with the other reasonably foreseeable environmental effects of their proposed actions.~~ This guidance does not establish any

~~extreme weather events—which are associated with increased deaths, illnesses, and economic challenges. Studies also~~

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<sup>23</sup> See 40 CFR 1508.18.<sup>44</sup> See, e.g., EPA, Six Impacts, supra note 41.

~~find that climate change poses particular threats to the health, well-being, and ways of life of indigenous peoples in the U.S.”):~~

particular quantity of GHG emissions as “significantly” affecting the quality of the human environment ~~or give greater consideration to the effects of GHG emissions and~~.  
However, quantifying a proposed action’s reasonably foreseeable GHG emissions whenever possible, and placing those emissions in appropriate context are important components of analyzing a proposed action’s reasonably foreseeable climate change effects.

This section of the guidance identifies and explains the following steps agencies should take when analyzing a proposed action’s climate change effects under NEPA:

1) Quantify the reasonably foreseeable GHG emissions (including direct and indirect emissions) of a proposed action, the no action alternative, and any reasonable alternatives as discussed in Section IV(A) below.

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2) Disclose and provide context for the GHG emissions and climate impacts associated with a proposed action and alternatives, including by, as relevant, monetizing climate damages using estimates of the SC-GHG, placing emissions in the context of relevant climate action goals and commitments, and providing common equivalents, as described below in Section IV(B).

3) Analyze reasonable alternatives, including those that would reduce GHG emissions relative to baseline conditions, and identify available mitigation measures to avoid, minimize, or compensate for climate ~~change over~~ other effects ~~on the human environment~~.

**A. ~~GHG Emissions as a Proxy for the Climate Change Impacts of~~Quantifying a Proposed Action**

~~In light of the global scope of the impacts of GHG emissions, and the incremental contribution of each single action to global concentrations, CEQ recommends agencies use the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions’ potential effects~~

~~on climate change in NEPA analysis.~~<sup>24</sup> ~~This approach, together with providing a qualitative summary discussion of the impacts of GHG emissions based on authoritative reports such as the USGCRP's National Climate Assessments and the Impacts of Climate Change on Human Health in the United States, a Scientific Assessment of the USGCRP, allows an agency to present the environmental and public health impacts of a proposed action in clear terms and with sufficient information to make a reasoned choice between no action and other alternatives and appropriate mitigation measures, and to ensure the professional and scientific integrity of the NEPA review.~~<sup>25</sup> 's GHG Emissions

To ensure that Federal agencies consider the incremental contribution of their actions to climate change, agencies should quantify the reasonably foreseeable direct and indirect GHG emissions of their proposed actions and reasonable alternatives (as well as the no-action alternative) and provide additional context to describe the effects associated with those projected emissions in NEPA analysis.<sup>45</sup>

Climate change results from an increase in atmospheric GHG concentrations from the incremental addition of GHG emissions from millions a vast multitude of individual sources;<sup>26</sup> ~~which collectively have a large impact on a global scale.~~

~~CEQ recognizes that the~~<sup>46</sup> The totality of climate change impacts is not attributable to any single action, but ~~are~~is exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, it is crucial for the Federal Government to analyze and consider the potential climate change effects of its

<sup>24</sup> See 40 CFR 1502.16, 1508.9.

<sup>25</sup> See 40 CFR 1500.1, 1502.24 (requiring agencies to use high quality information and ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).

<sup>45</sup> See 40 CFR 1502.16.

<sup>26</sup> Some sources emit GHGs in quantities that are orders of magnitude greater than others. See EPA, *Greenhouse Gas Reporting Program 2014 Reported Data*, Figure 2: Direct GHG Emissions Reported by Sector (2014), available at <https://www.epa.gov/ghgreporting/ghgrp-2014-reported-data> (amounts of GHG emissions by sector); *Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units*, 80 Fed. Reg. 64661, 64663, 64689 (Oct. 23, 2015) (regulation of GHG emissions from fossil fuel-fired electricity-generating power plants); *Oil and Natural Gas Sector Emission Standards for New, Reconstructed, and Modified Sources*, 81 Fed. Reg. 34824, 35830 (June 3, 2016) (regulation of GHG emissions from oil and gas sector).

<sup>46</sup> Some sources emit GHGs in quantities that are orders of magnitude greater than others. See EPA, *Greenhouse Gas Reporting Program, 2021 Reported Data*, Figure 1: Direct GHG Emissions Reported by Sector (2021), <https://www.epa.gov/ghgreporting/ghgrp-reported-data> (showing amounts of GHG emissions by sector).

proposed actions.<sup>47</sup>

NEPA requires more than a statement that emissions from a proposed Federal action or its alternatives represent only a small fraction of global or domestic emissions-  
~~is essentially.~~ Such a statement ~~about~~ merely notes the nature of the climate change challenge, and is not ~~an appropriate~~ a useful basis for deciding whether or to what extent to consider climate change ~~impacts~~ effects under NEPA. Moreover, ~~these~~ such comparisons ~~are~~ and fractions also are not an appropriate method for characterizing the ~~potential impacts associated with~~ extent of a proposed action's and its alternatives ~~and mitigations'~~ contributions to climate change because this approach does not reveal anything beyond the nature of the climate change challenge itself: ~~the~~ the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large ~~impact.~~ When effect.

Therefore, when considering GHG emissions and their significance, agencies should use appropriate tools and methodologies ~~for to~~ quantifying GHG emissions ~~and comparing.~~ compare GHG emission quantities across alternative scenarios. ~~Agencies should not limit themselves to calculating a proposed (including the no action's alternative), and place~~ emissions ~~as a percentage of sector, nationwide, or global emissions in deciding whether or to what extent to consider climate change impacts under NEPA.~~

#### 1. GHG Emissions Quantification and Relevant Tools

~~This guidance recommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions. Agencies should be guided by the principle that the extent of the analysis should be commensurate with the quantity of projected~~

<sup>47</sup> In addition to NEPA's requirement to describe the environmental impacts of the proposed action and any adverse environmental effects that cannot be avoided should the proposal be implemented, 42 U.S.C. § 4332(2)(C)), NEPA also articulates a policy to use all practicable means and measures "to foster and promote the general welfare, to create and maintain conditions under which [humans] and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." including by "attain[ing] the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences." 42 U.S.C. 4331(a)-(b).

~~GHG emissions and take into account available data and GHG quantification tools that are suitable for and commensurate with the proposed agency action.<sup>27</sup> The rule of reason and the concept of proportionality caution against providing an in-depth analysis of emissions regardless of the insignificance of the quantity of GHG emissions that would be caused by the proposed agency action~~ in relevant context, including how they relate to climate action commitments and goals. This approach allows an agency to present the environmental and public health effects of a proposed action in clear terms and with sufficient information to make a reasoned choice between no action and other alternatives and appropriate mitigation measures. This approach will also ensure the professional and scientific integrity of the NEPA review.<sup>48</sup>

As part of the NEPA documents they prepare, agencies should quantify the reasonably foreseeable gross GHG emissions increases and gross GHG emission reductions<sup>49</sup> for the proposed action, no action alternative, and any reasonable alternatives over their projected lifetime, using reasonably available information and

data.<sup>50</sup> Agencies generally should quantify gross emissions increases or reductions (including both direct and indirect emissions) individually by GHG, as well as aggregated in terms of total CO<sub>2</sub> equivalence<sup>51</sup> by factoring in each pollutant's global warming potential (GWP), using the best available science and data.<sup>52</sup> Agencies also should

<sup>27</sup> See 40 CFR 1500.1(b) (“Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.”); 40 CFR 1502.2(b) (Impacts shall be discussed in proportion to their significance); 40 CFR 1502.15 (Data and analyses in a statement shall be commensurate with the importance of the impact...).

<sup>48</sup> See 40 CFR 1502.23 (requiring agencies to ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).

<sup>49</sup> Note that agencies should be guided by a rule of reason and the concept of proportionality in undertaking this analysis, particularly for proposed actions with net beneficial climate effects, as described in Section IV(A).

<sup>50</sup> See, e.g., *Sierra Club v. Fed. Energy Regul. Comm'n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017); *San Juan Citizens Alliance v. Bureau of Land Mgmt.*, 326 F. Supp. 3d 1227, 1241–44 (D.N.M. 2018); see generally *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973) (“Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as ‘crystal ball inquiry.’”).

<sup>51</sup> This is typically expressed in metric tons of CO<sub>2</sub> equivalent, or mt CO<sub>2</sub>-e.

<sup>52</sup> As discussed above, methane is a potent GHG. See *supra* note 32.

quantify proposed actions' total net GHG emissions or reductions<sup>53</sup> (both by pollutant and by total CO<sub>2</sub>-equivalent emissions) relative to baseline conditions.<sup>54</sup> To facilitate readability, agencies should include an overview of this information in the summary sections of EISs and, when relevant, in the summary section of EAs. Agencies also may use visual tools, such as charts and figures, to help readers more easily comprehend emissions data and compare emissions across alternatives.

Where feasible, agencies should also present annual GHG emission increases or reductions. This is particularly important where a proposed action presents both reasonably foreseeable GHG emission increases and GHG emission reductions. The agency generally should present annual GHG emissions increases or reductions, as well as net GHG emissions over the projected lifetime of the action, consistent with existing best practices.<sup>55</sup> Agencies should be guided by a rule of reason and the concept of

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proportionality in undertaking this analysis, particularly for proposed actions with net beneficial climate effects, as described below.

Quantification and assessment tools are widely available, and are already in broad use in the Federal Government and private sectors, by state and local governments, and globally.<sup>28</sup> ~~Such quantification tools and methodologies have been developed~~ CEQ maintains a GHG Accounting Tools website listing many such tools.<sup>56</sup> These tools are designed to assist agencies, institutions, organizations, ~~agencies~~, and companies ~~with that~~

<sup>53</sup> Net emissions can be calculated by totaling gross emissions (all reasonably foreseeable direct and indirect GHG emissions from the proposed action) and subtracting any gross emissions reductions from the proposed action, such as renewable energy generation that will displace more carbon intensive energy sources or the addition of carbon sinks. The resulting net value may be either a net increase in total GHG emissions or a net decrease in emissions. In rare circumstances, agencies should consider whether a significant delay between increased emissions and decreased emissions could undermine the value of a net emissions calculation as a metric of climate impact.

<sup>54</sup> See *infra* section IV(D).

<sup>55</sup> For example, certain types of actions may involve construction emissions in their first year or two, followed by operational emissions increases in a few years prior to achieving net emissions reductions in later years.

<sup>28</sup> See [https://ceq.doe.gov/current\\_developments/GHG-accounting-tools.html](https://ceq.doe.gov/current_developments/GHG-accounting-tools.html).

<sup>56</sup> See CEQ, *GHG Tools and Resources*, <https://ceq.doe.gov/guidance/ghg-tools-and-resources.html>.



have different levels of technical sophistication, data availability, and GHG source profiles. ~~When data inputs are reasonably available to support calculations, agencies should conduct GHG analysis and disclose quantitative estimates of GHG emissions in their NEPA reviews.~~ Agencies should use tools that reflect the best available science and data. These tools can provide ~~estimates of~~ GHG emissions estimates, including emissions from fossil fuel combustion and ~~estimates of GHG emissions and~~ carbon sequestration<sup>57</sup> for many of the sources and sinks potentially affected by proposed resource management actions.<sup>29</sup><sup>58</sup> When considering which ~~tool(s)~~ tools to employ, it is important to consider the proposed action's temporal scale, and the availability of input data.<sup>30</sup><sup>59</sup> ~~Examples of the kinds of methodologies agencies might consider using are presented in CEQ's 2012 Guidance for Accounting and Reporting GHG Emissions for a wide variety of activities associated with Federal agency operations.~~<sup>31</sup> ~~When~~ Furthermore, agencies should seek to obtain the information needed to quantify GHG emissions, including by requesting or requiring information held by project applicants or by conducting modeling when relevant.

In the rare instance when an agency determines that ~~quantifying GHG emissions would not be~~

~~warranted because~~ tools, methodologies, or data inputs are not reasonably available to quantify GHG emissions associated with a specific action, the agency should explain why such an analysis cannot be done, and should seek to present a reasonable estimated range of quantitative emissions for the proposed action and alternatives. Where tools are available for some aspects of the analysis but not others, agencies should use all

<sup>57</sup> Carbon sequestration is the long-term carbon storage in plants, soils, geologic formations, and oceans.

<sup>29</sup><sup>58</sup> For example, ~~USDA's COMET-Farm~~ the U.S. Department of Agriculture's (USDA's) Forest Inventory and Analysis tool can be used to assess the carbon sequestration of existing ~~agricultural~~ forestry activities along with the reduction in carbon sequestration (emissions) of project-level activities, ~~<http://cometfarm.nrel.colostate.edu/>~~ Examples of other tools are available at, *See USDA, Forest Inventory Data & Tools (FIA)*, [https://eeq.doe.gov/www.fs.usda.gov/current\\_developments/GHG-accounting-tools.html](https://eeq.doe.gov/www.fs.usda.gov/current_developments/GHG-accounting-tools.html) ~~research/products/dataandtools/forestinventorydata.~~

<sup>30</sup><sup>59</sup> See 40 CFR ~~1502.22~~ [1502.21](#).

<sup>31</sup> See/

[https://www.whitehouse.gov/sites/default/files/microsites/eeq/revised\\_federal\\_greenhouse\\_gas\\_accounting\\_and\\_reporting\\_guidance\\_](https://www.whitehouse.gov/sites/default/files/microsites/eeq/revised_federal_greenhouse_gas_accounting_and_reporting_guidance_)

reasonably available tools and describe any relevant limitations.

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Agencies are encouraged to identify and communicate any data or tool gaps that they encounter to CEQ.

If an agency determines that it cannot provide even a reasonable range of potential GHG emissions, the agency should provide a qualitative analysis and its rationale for determining that ~~the~~ quantitative analysis is not ~~warranted~~possible. A qualitative analysis ~~can rely on~~may include sector-specific descriptions of the GHG emissions ~~off~~from the category of Federal agency action that is the subject of the NEPA analysis, but should seek to provide additional context for potential resulting emissions.

~~When updating their NEPA procedures<sup>32</sup> and guidance, agencies should coordinate with CEQ to identify 1) the actions that normally warrant quantification of their GHG emissions, and consideration of the relative GHG emissions associated with alternative actions and 2) agency actions that normally do not warrant such quantification because tools, methodologies, or data inputs are not reasonably available. The determination of the potential significance of a proposed action remains subject to agency practice for the consideration of context and intensity, as set forth in the CEQ Regulations.<sup>33</sup>~~

~~<sup>2</sup>The Scope of the~~Agencies should be guided by the rule of reason, as well as their expertise and experience, in conducting analysis commensurate with the quantity of projected GHG emissions and using GHG quantification tools suitable for the proposed

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<sup>33</sup> See 40 CFR 1507.3.

<sup>32</sup> 40 CFR 1508.27 (“‘Significantly’ as used in NEPA requires considerations of both context and intensity: (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. . . . (b) Intensity. This refers to the severity of impact.”).

action.<sup>60</sup> The rule of reason and the concept of proportionality caution against providing an in-depth analysis of emissions regardless of the insignificance of the quantity of GHG emissions that the proposed action would cause. For example, some proposed actions may involve net GHG emission reductions or no net GHG increase, such as certain infrastructure or renewable energy projects. For such actions, agencies should generally quantify projected GHG emission reductions, but may apply the rule of reason when determining the appropriate depth of analysis such that precision regarding emission reduction benefits does not come at the expense of efficient and accessible analysis. Absent exceptional circumstances, the relative minor and short-term GHG emissions associated with construction of certain renewable energy projects, such as utility-scale solar and offshore wind, should not warrant a detailed analysis of lifetime GHG emissions. As a second example, actions with only small GHG emissions may be able to rely on less detailed emissions estimates.

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**B. Disclosing and Providing Context for a Proposed Action's GHG Emissions and Climate Effects**

~~In order to assess effects, agencies should take account of the proposed action—including “connected” actions<sup>34</sup>—subject to reasonable limits based on feasibility and practicality. Activities that have a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for a proposed agency action or as a consequence of a proposed agency action, should be accounted for in the NEPA analysis.~~  
~~060412.pdf. Federal agencies’ Strategic Sustainability Performance Plans reflecting their annual GHG inventories and reports under Executive Order 13514 are available at <https://www.performance.gov/node/3406/view?view=public#supporting-info>.~~ In addition to quantifying emissions as described in Section IV(A), agencies should disclose and provide context for GHG emissions and climate effects to help decision makers and the public understand proposed actions’ potential GHG emissions and climate change effects. To disclose effects and provide additional context for proposed actions’ emissions once GHG emissions have been estimated, agencies should use the following best practices, as relevant:

(1) In most circumstances, once agencies have quantified GHG emissions, they

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<sup>60</sup> See 40 CFR 1502.2(b) (environmental impact statements shall discuss impacts in proportion to their significance); 40 CFR 1502.15 (data and analyses in a statement shall be commensurate with the importance of the impact).

<sup>34</sup> 40 CFR 1508.25(a) (Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously, or; (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.);

should apply the best available estimates of the SC-GHG<sup>61</sup> to the incremental metric tons of each individual type of GHG emissions<sup>62</sup> expected from a proposed action and its alternatives.<sup>63</sup> SC-GHG estimates allow monetization (presented in U.S. dollars) of the climate change effects from the marginal or incremental emission of GHG emissions, including carbon dioxide, methane, and nitrous oxide.<sup>64</sup> These 3 GHGs represent more than 97 percent of U.S. GHG emissions.<sup>65</sup> The SC-GHG provides an appropriate and valuable metric that gives decision makers and the public useful information and context about a proposed action's climate effects even if no other costs or benefits are monetized, because metric tons of GHGs can be difficult to understand and assess the significance of in the abstract.<sup>66</sup> The SC-GHG translates metric tons of emissions into the familiar unit of dollars, allows for comparisons to other monetized values, and estimates the damages associated with GHG emissions over time and associated with different GHG

<sup>61</sup> The SC-GHG estimates provide an aggregated monetary measure (in U.S. dollars) of the future stream of damages associated with an incremental metric ton of emissions and associated physical damages (e.g., temperature increase, sea-level rise, infrastructure damage, human health effects) in a particular year. The "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990" released by the Interagency Working Group on Social Cost of Greenhouse Gases (IWG SC-GHG) in February 2021 presents interim estimates of the social cost of carbon, methane, and nitrous oxide, which are the same as those developed by the IWG in 2013 and 2016 (updated to 2020 dollars). See IWG SC-GHG, U.S. Gov't, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (Feb. 2021), [https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument\\_SocialCostofCarbonMethaneNitrousOxide.pdf](https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf). The Technical Support Document notes that estimates of the SC-GHG have been used in NEPA analysis.

<sup>62</sup> Note that applying the specific social cost of each individual GHG to the quantifications of that GHG is more accurate than transforming the gases into CO<sub>2</sub>-equivalents and then multiplying the CO<sub>2</sub>-equivalents by the social cost of CO<sub>2</sub>. See IWG SC-GHG, U.S. Gov't, *Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide*, 2 (Aug. 2016), [https://www.epa.gov/sites/default/files/2016-12/documents/addendum\\_to\\_sc-ghg\\_tsd\\_august\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-12/documents/addendum_to_sc-ghg_tsd_august_2016.pdf).

<sup>63</sup> See IWG SC-GHG, *Technical Support Document*, *supra* note 61. Agencies should typically apply the best available estimates of the SC-GHG to the incremental metric tons of GHG emissions expected from a proposed action and its alternatives. In uncommon circumstances, an agency may choose not to do so if doing so would be confusing, there are no available estimates for the GHG at issue, or, consistent with the concept of proportionality, an agency does not produce a quantitative estimate of GHG emissions because the emissions at issue are *de minimis*.

<sup>64</sup> Estimates of SC-HFCs have been developed and are available for use in NEPA analysis. See, e.g., EPA, *Regulatory Impact Analysis for Phasing Down Production and Consumption of Hydrofluorocarbons*

<sup>65</sup> EPA, EPA 430-R-22-003, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2020* (Apr. 2022), <https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf>.

<sup>66</sup> As described in section VI(F), NEPA does not require a cost-benefit analysis in which all monetized benefits and costs are directly compared.

pollutants.<sup>67</sup> The SC-GHG also can assist agencies and the public in assessing the significance of climate impacts. This is a simple and straightforward calculation that should not require additional time or resources.

Certain circumstances may make monetization using the SC-GHG particularly useful, such as if a NEPA review monetizes other costs and benefits for the proposed action (see Section VI(F)); if the alternatives differ in GHG emissions over time or in the type of GHGs emitted; or if the significance of climate change effects is difficult to assess or not apparent to the public without monetization. SC-GHG estimates can help describe the net social costs of increasing GHG emissions as well as the net social benefits of reducing such emissions. Given NEPA’s mandates to consider worldwide and long-range environmental problems,<sup>68</sup> it is most appropriate for agencies to focus on SC-GHG estimates that capture global climate damages and, consistent with the best

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(HFCs) (June 2022), <https://www.epa.gov/system/files/documents/2022-07/RIA%20for%20Phasing%20Down%20Production%20and%20Consumption%20of%20Hydrofluorocarbons%20%28HFCs%29.pdf>.

~~For example, NEPA reviews for proposed resource extraction and development projects typically include the reasonably foreseeable effects of various phases in the process, such as clearing land for the project, building access roads, extraction, transport, refining, processing, using the resource, disassembly, disposal, and reclamation. Depending on the relationship between any of the phases, as well as the authority under which they may be carried out, agencies should use the analytical scope that best informs their decision making.~~

~~The agency should focus on significant potential effects and conduct an analysis that is proportionate to the environmental consequences of the proposed action.<sup>35</sup>~~

<sup>67</sup> For example, if alternatives or mitigation strategies would result in varying emissions or reductions of carbon dioxide, methane, and nitrous oxide over time, presenting emissions estimates in metric tons of each gas, or in metric tons of CO<sub>2</sub>e, alone cannot fully illustrate the differences in the temporal pathways of these pollutants’ impacts on society. The SC-GHG estimates can capture these differences when estimating the damages from the emission of each specific pollutant in a common unit of measurement, i.e., the U.S. Dollar.

<sup>68</sup> See, e.g., NEPA’s direction that agencies shall consider the “worldwide and long-range character of environmental problems.” 42 U.S.C. 4332(2)(F).

available science, reflect a timespan covering the vast majority of effects and discount future effects at rates that consider future generations. It is often also worth affirming that SC-GHG estimates, including those available at the publication of this guidance, may be conservative underestimates because various damage categories (like ocean acidification) are not currently included.

(2) Where helpful to provide context, such as for proposed actions with relatively large GHG emissions or reductions or that will expand or perpetuate reliance on GHG-emitting energy sources, agencies should explain how the proposed action and alternatives would help meet or detract from achieving relevant climate action goals and commitments, including Federal goals, international agreements, state or regional goals, Tribal goals, agency-specific goals, or others as appropriate.<sup>69</sup> ~~Agencies can rely on basic NEPA principles to determine and explain the reasonable parameters of their analyses in order to disclose the reasonably foreseeable effects that may result from their proposed actions.~~<sup>36</sup> However, as explained above, NEPA requires more than a statement that emissions from a proposed Federal action or its alternatives represent only a small fraction of global or domestic emissions. Such comparisons and fractions are not an appropriate method for characterizing the extent of a proposed action's and its alternatives' contributions to climate change. Agencies also should discuss whether and to what extent the proposal's reasonably foreseeable GHG emissions are consistent with GHG reduction goals, such as those reflected in the U.S. nationally determined

<sup>35</sup>. ~~See 40 CFR 1501.7(a)(3), 1502.2(b), and 1502.15.~~<sup>69</sup> For example, the U.S. Department of the Interior's Bureau of Land Management (BLM) has discussed how agency actions in California, especially joint projects with the State, may or may not facilitate California reaching its GHG emission reduction goals, including goals under the State's Assembly Bill 32 (Global Warming Solutions Act) and related legislation. *See, e.g.,* BLM, Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and Final Environmental Impact Statement, Vol. I, section I.3.3.2, 12 (Oct. 2015), [https://eplanning.blm.gov/public\\_projects/lup/66459/20012403/250016887/I.3\\_Planning\\_Process.pdf](https://eplanning.blm.gov/public_projects/lup/66459/20012403/250016887/I.3_Planning_Process.pdf); *see also* 40 CFR 1506.2(d) (directing agencies to discuss any inconsistency of a proposed action with an approved State, Tribal, or local plan or law); BLM, Environmental Assessment for Oberon Renewable Energy Project, 33–34 (Aug. 2021), [https://eplanning.blm.gov/public\\_projects/2001226/200478716/20043975/250050165/Environmental%20Assessment%201-Main%20Text.pdf](https://eplanning.blm.gov/public_projects/2001226/200478716/20043975/250050165/Environmental%20Assessment%201-Main%20Text.pdf).

<sup>36</sup>. ~~See 40 CFR 1502.16.~~

contribution under the Paris Agreement. Federal planning documents that illustrate multi-decade pathways to achieve policy may also provide useful information, such as the *Long-Term Strategy of the United States*:

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*Pathways to Net-Zero Greenhouse Gas Emissions by 2050*.<sup>70</sup> Similarly, agencies' own climate goals may provide relevant context. Evaluating a proposed action's and its alternatives' consistency with such goals and commitments can help illuminate the policy context, the importance of considering alternatives and mitigation, and tradeoffs of the decision and help agencies evaluate the significance of a proposed action's GHG emissions and climate change effects. This type of comparison provides a different kind of disclosure and context than that provided by application of SC-GHG estimates as described above, demonstrating the potential utility of multiple contextualization methods.

(3) Where relevant, agencies should summarize and cite to available scientific literature to help explain the real-world effects—including those that will be experienced locally in relation to the proposed action—associated with an increase in GHG emissions that contribute to climate change, such as sea-level rise, temperature changes, ocean acidity, and more frequent and severe wildfires and drought, and human health effects (including to underserved populations).<sup>71</sup> Agencies should use the best available information, including scenarios and climate modeling information that are most relevant to a proposed action.<sup>72</sup>

(4) Agencies also can provide accessible comparisons or equivalents to help the

<sup>70</sup> U.S. Dep't of State (DOS) & U.S. Exec. Off. of the President (EOP), *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050* (Nov. 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>.

<sup>71</sup> For example, see the scientific studies referenced in section III(B).

<sup>72</sup> In addition, newer tools or modelling may enable agencies in some cases to provide information on localized or "downscaled" climate effects in addition to global effects. See, e.g., Romany M. Webb et al., *Evaluating Climate Risk in NEPA Reviews: Current Practices and Recommendations for Reform*, 29, <https://blogs.edf.org/climate411/files/2022/02/Evaluating-Climate-Risk-in-NEPA-Reviews-Full-Report.pdf>.

public and decision makers understand GHG emissions in more familiar terms.

Techniques may include placing a proposed action's GHG emissions in more familiar metrics such as household emissions per year, annual average emissions from a certain

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number of cars on the road, or gallons of gasoline burned. <sup>73</sup> Such comparisons may be a useful supplement and can, for example, be presented along with monetized damage estimates using SC-GHG values. Agencies should use disclosure and contextualization methods that best fit their proposed actions and alternatives.

### C. 3-Reasonable Alternatives

Considering reasonable alternatives, including alternatives that avoid or mitigate GHG emissions, is fundamental to the NEPA process and accords with ~~NEPA~~ Sections 102(2)(C) and 102(2)(E).<sup>37</sup> ~~The CEQ regulations emphasize that the alternatives analysis is the heart of the EIS under NEPA Section 102(2)(C).~~<sup>38</sup> ~~NEPA Section 102(2)(E) provides an independent requirement for,~~ which independently require the consideration of alternatives in environmental documents.<sup>39</sup> <sup>74</sup> NEPA calls upon agencies to use the NEPA process to “identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects ~~of these actions upon the quality of~~ of the human environment.”<sup>40</sup> ~~The requirement to~~<sup>75</sup>

~~consider alternatives ensures that agencies account for approaches with no, or less, adverse environmental effects for a particular resource.~~

Consideration of alternatives ~~also~~ provides ~~each~~ an agency decision maker the information needed to examine other possible approaches to a particular proposed action (including the no action alternative) that could alter ~~the~~ environmental ~~impact~~ effects or

<sup>73</sup> See EPA's equivalency calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

<sup>37</sup> 42 U.S.C. 4332(2)(C), 4332(2)(E); 40 CFR 1502.14, 1508.9(b).

<sup>38</sup> 40 CFR 1502.14.

<sup>39</sup> See 40 CFR 1500.2, 1508.9(b).<sup>74</sup> See 42 U.S.C. 4332(2)(C) and (2)(E).

<sup>40</sup> 40 CFR 1500.2(e).

<sup>75</sup> See 42 U.S.C. 4332(2)(C)(iii); 40 CFR 1502.1, 1502.14.



the balance of factors considered in making the decision. ~~Agency~~Agencies make better informed decisions ~~are aided when there are reasonable alternatives that allow for~~by comparing relevant GHG emissions, GHG emission reductions, and carbon sequestration potential, ~~across reasonable alternatives, assessing~~ trade-offs with other environmental values, and evaluating the risks from ~~—and/or~~ resilience to— climate change inherent in a proposed action and its design.

Agencies must consider a range of reasonable alternatives ~~consistent with the level of NEPA review (e.g., EA or EIS) and the purpose and need for the proposed action~~, as well as reasonable mitigation measures if not already included in the proposed action or alternatives.<sup>44</sup> ~~Accordingly, a comparison of these alternatives based on GHG emissions and any potential mitigation measures can be useful to advance a reasoned choice among alternatives and mitigation actions. When conducting the analysis, an agency,~~ consistent with the level of NEPA review (e.g., EA or EIS) and the purpose and need for the proposed action,<sup>76</sup> Agencies should leverage the early phases of their existing

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planning processes to help identify potential alternatives to address an action's anticipated environmental effects. When analyzing alternatives, agencies should compare the anticipated levels of GHG emissions from each alternative—including the no-action alternative—and mitigation ~~actions~~ to provide information to the public and enable the decision maker to make an informed choice.

~~Agencies~~ To help provide clarity, agencies should consider ~~reasonable alternatives and mitigation measures to reduce action-related GHG emissions or increase carbon sequestration in the same fashion as they consider~~ presenting charts, tables, or figures, as

<sup>44</sup> See 42 U.S.C. 4332(2)(C), 4332(2)(E), and 40 CFR 1502.14(f), 1508.9(b). The purpose and need for action usually reflects both the extent of the agency's statutory authority and its policies.

<sup>76</sup> See 42 U.S.C. 4332(2)(C), 4332(2)(E), and 40 CFR 1502.14(e), 1501.5(c)(2). The purpose and need for action usually reflects both the extent of the agency's statutory authority and its policies.

appropriate, to compare GHG emissions and climate effects across alternatives ~~and mitigation measures for any other environmental effects.~~

Neither NEPA, the CEQ Regulations, and/or this guidance ~~do not~~ require the decision ~~maker to select the alternative with the lowest net level of emissions. Rather, they allow for the careful consideration of emissions and mitigation measures along with all the other factors considered in making a final decision.~~

#### 4. Direct and Indirect Effects

~~If the direct and indirect GHG emissions can be quantified based on available information, including reasonable projections and assumptions,~~ maker to select the alternative with the lowest net GHG emissions or climate costs or the greatest net climate benefits. However, and in line with the urgency of the climate crisis, agencies should use the information provided through the NEPA process to help inform decisions that align with climate change commitments and goals. For instance, agencies should evaluate reasonable alternatives that may have lower GHG emissions, which could include technically and economically feasible clean energy alternatives to proposed fossil fuel-related projects, and consider mitigation measures to reduce GHG emissions to the greatest extent possible.

Where relevant—such as for proposed actions that will generate substantial GHG emissions—agencies should identify the alternative with the lowest net GHG emissions or the greatest net climate benefits among the alternatives they assess. And, as described throughout this guidance, they should use the NEPA process to make informed decisions grounded in science that are transparent with respect to how Federal actions will help meet climate change goals and commitments, or alternately, detract from them.

#### D. Baseline for Considering Environmental Effects

A NEPA review must identify the area affected by a proposed action (i.e., the

affected environment).<sup>77</sup> Identification of the affected environment includes identifying and describing reasonably foreseeable environmental trends, including climate change effects. The NEPA review also must identify the current and projected future state of the affected environment without the proposed action (i.e., the no action alternative), which serves as the baseline for considering the effects of the proposed action and its reasonable alternatives.<sup>78</sup> For an estimate of GHG emissions from the proposed action to have meaningful context, an accurate estimate of GHG emissions without the proposed action should be included in a NEPA review. The temporal bounds for the analysis are determined by the projected initiation of the action and the expected life of the proposed action and its effects.<sup>79</sup> It is noteworthy that the impacts of GHGs can be very long-lasting.<sup>80</sup>

#### **E. Direct and Indirect Effects**

NEPA requires agencies ~~should to~~ consider ~~and disclose~~ the reasonably foreseeable direct and indirect ~~emissions when analyzing the direct and~~ effects of their proposed actions and reasonable alternatives (as well as the no-action alternative).<sup>81</sup> The term “direct effects” refers to reasonably foreseeable effects that are caused by the action and occur at the same time and place.<sup>82</sup> The term “indirect effects”

refers to effects that are caused by the action and are later in time or farther removed in

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<sup>77</sup> See 40 CFR 1502.15 (providing that environmental impact statements shall succinctly describe the environmental impacts on the area(s) to be affected or created by the alternatives under consideration).

<sup>78</sup> See, e.g., CEO, Memorandum to Agencies: Forty Most Asked Questions Concerning CEO’s NEPA Regulations, Question 3, “No-Action Alternative” (1986) (“This analysis provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives”).

<sup>79</sup> CEO, *Considering Cumulative Effects Under the National Environmental Policy Act* (1997), [https://ceq.doe.gov/publications/cumulative\\_effects.html](https://ceq.doe.gov/publications/cumulative_effects.html). Agencies also should consider proposed actions pursuant to E.O. 13653, *Preparing the United States for the Impacts of Climate Change*, 78 FR 66817 (Nov. 6, 2013), which considers how capital investments will be affected by a changing climate over time.

<sup>80</sup> Elevated concentrations of carbon dioxide will persist in the atmosphere for hundreds or thousands of years, so the earth will continue to warm in the coming decades. The warmer it gets, the greater the risk for more severe changes to the climate and the earth’s system. EPA, *Impacts of Climate Change*, <https://www.epa.gov/climatechange-science/impacts-climate-change> (last updated Aug. 19, 2022); EPA, *Understanding Global Warming Potentials*, <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials> (last updated May 5, 2022).

<sup>81</sup> 42 U.S.C. 4332(2)(C)(i); 40 CFR 1508.1(g).

<sup>82</sup> 40 CFR 1508.1(g)(1).

distance, but are still reasonably foreseeable.<sup>83</sup> Indirect effects generally include reasonably foreseeable emissions related to a proposed action that are upstream or downstream of the activity resulting from the proposed action.<sup>4284</sup> For example, where the proposed action involves fossil fuel extraction, direct emissions typically include GHGs emitted during the process of exploring for and extracting the fossil fuel. The reasonably foreseeable indirect effects of such an action likely would include effects associated with the processing, refining, transporting, and end-use of the fossil fuel being extracted, including combustion of the resource to produce energy. Indirect emissions<sup>85</sup> are often reasonably foreseeable since quantifiable connections frequently exist between a proposed activity that involves use or conveyance of a commodity or resource, and changes relating to the production or consumption of that resource.<sup>86</sup>

As discussed in Section IV(A), agencies generally should quantify all reasonably foreseeable emissions associated with a proposed action and reasonable alternatives (as well as the no-action alternative). Quantification should include the reasonably foreseeable direct and indirect GHG emissions of their proposed actions. Agencies also should disclose the information and any assumptions used in the analysis and explain any uncertainties.

~~To compare a project's estimated direct and indirect emissions with GHG emissions from the no-action alternative, agencies should draw on existing, timely, objective, and authoritative analyses, such as those by the Energy Information Administration, the Federal Energy Management Program, or Office of Fossil Energy of~~

<sup>83</sup> 40 CFR 1508.1(g)(2); see also *Birckhead v. Fed. Energy Regul. Comm'n*, 925 F.3d 510, 516 (D.C. Cir. 2019).

<sup>42</sup> For example, where the proposed action involves fossil fuel extraction, direct emissions typically include GHGs emitted during the process of exploring for or extracting the fossil fuel. The indirect effects of such an action that are reasonably foreseeable at the time would vary with the circumstances of the proposed action. For actions such as a Federal lease sale of coal for energy production, the impacts associated with the end-use of the fossil fuel being extracted would be the reasonably foreseeable combustion of that coal.

<sup>84</sup> These indirect emissions are sometimes referred to as “upstream” or “downstream emissions,” described in relation to where in the causal chain they fall relative to the proposed action.

<sup>85</sup> As used in this guidance, “indirect emissions” refers to emissions that are indirect effects of the proposed action.

<sup>86</sup> For example, natural gas pipeline infrastructure creates the economic conditions for additional natural gas production and consumption, including both domestically and internationally, which produce indirect (both upstream and downstream) GHG emissions that contribute to climate change.

the Department of Energy.<sup>43</sup> ~~In the absence of such analyses, agencies should use other available information. When such analyses or information for quantification is unavailable, or the complexity of comparing emissions from various sources would make quantification overly speculative, then the agency should quantify emissions to the extent that this information is available and explain the extent to which quantified emissions information is unavailable while providing a qualitative analysis of those emissions. As with any NEPA analysis, the level of effort should be proportionate to the scale of the emissions relevant to the NEPA review.~~ uncertainty.<sup>87</sup> In assessing a proposed action's, and reasonable alternatives', reasonably foreseeable direct and indirect GHG emissions, the agency should use the best available information.<sup>88</sup> As with any NEPA review, the rule of reason should guide the agency's

analysis and the level of effort can be proportionate to the scale of the net GHG effects and whether net effects are positive or negative, with actions resulting in very few or an overall reduction in GHG emissions generally requiring less detailed analysis than actions with large emissions.<sup>89</sup>

Agencies should seek to obtain the information needed to quantify emissions, including by requesting or requiring information held by other entities (such as project applicants), because such information is generally essential to reasoned decision making.<sup>90</sup> Where information regarding direct or indirect emissions is not available,

<sup>43</sup> For a current example, see Office of Fossil Energy, Nat'l Energy Tech. Lab., U.S. Dep't of Energy, *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States*, Pub. No. DOE/NETL-2014/1649 (2014), available at <http://energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf>.

<sup>87</sup> See 40 CFR 1502.21.

<sup>88</sup> For example, agencies may consider consulting information available from the U.S. Energy Information Administration, the International Energy Agency, the Federal Energy Management Program, or the

<sup>89</sup> For example, as noted in section (IV)(A)(1), for proposed actions that involve net GHG emission reductions (such as renewable energy projects), agencies should attempt to quantify net GHG emission reductions, but may apply the rule of reason when determining the appropriate depth of analysis such that precision regarding emission reduction benefits does not come at the expense of efficient and accessible analysis.

<sup>90</sup> See 40 CFR 1502.21(b); see also *Birckhead*, 925 F.3d at 520; *Barnes v. U.S. Dep't of Transp.*, 655 F.3d 1124 (9th Cir. 2011). Agencies also may consider amendments to their regulations, where appropriate, to ensure they are able to gather from applicants the information needed to analyze the climate change effects of proposed actions.

agencies should make best efforts to develop a range of potential emissions.<sup>91</sup> Agencies can provide an upper bound for effects analysis by treating the resource provided or enabled by the actions they take as new or additional. In the example of fossil fuel extraction or transportation, this is sometimes referred to as a “full burn” assumption, as the agency can provide an upper bound estimate of GHG emissions by assuming that all of the available resources will be produced and combusted to create energy.<sup>92</sup>

Some proposed actions, such as those increasing the supply of certain energy resources like oil, natural gas, or renewable energy generation, may result in changes to the resulting energy mix as energy resources substitute for one another on the domestic or

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Department of Energy. See, e.g., U.S. Energy Info. Admin., Annual Energy Outlook 2022 (Mar. 3, 2022), <https://www.eia.gov/outlooks/aeo/>; International Energy Agency (IEA), *Net Zero by 2050*, (May 2021), <https://www.iea.org/reports/net-zero-by-2050>,

global energy market.<sup>93</sup> Different energy resources emit different amounts of GHGs and other air pollutants.<sup>94</sup> For proposed actions involving such resource substitution considerations, where relevant, CEO encourages agencies to conduct substitution analysis to provide more information on how a proposed action and its alternatives are projected to affect the resulting resource or energy mix, including resulting GHG emissions.<sup>95</sup>

Substitution analysis generally is relevant to actions related to the extraction,

<sup>91</sup> See, e.g., Jayni Hein, Jason Schwartz, and Avi Zevin, *Pipeline Approvals and Greenhouse Gas Emissions*, 29–30 (Apr. 2019), discussing availability of tools for quantifying substitution effects and noting the need for further modeling tool development.

<sup>92</sup> A full burn assumption is consistent with analyses prepared by some agencies. See BLM, Environmental Assessment, DOI–BLM–CO–S010–2011–0074–EA, 81 (2017), [https://eplanning.blm.gov/public\\_projects/nepa/70895/127910/155610/King\\_II\\_Lease\\_Mod\\_Final\\_EA\\_2017-1012.pdf](https://eplanning.blm.gov/public_projects/nepa/70895/127910/155610/King_II_Lease_Mod_Final_EA_2017-1012.pdf) (stating that the agency “assume[d] that the remaining portion of the maximum year coal to be shipped . . . is eventually combusted.”).

<sup>93</sup> See, e.g., *WildEarth Guardians v. BLM.*, 870 F.3d 1222, 1235 (10th Cir. 2017) (“[W]hen coal carries a higher price, for whatever reason that may be, the nation burns less coal in favor of other sources. A force that drives up the cost of coal could thus drive down coal consumption.”); see also Jayni Hein and Natalie Jacewicz, *Implementing NEPA in the Age of Climate Change*, 10 Mich. J. Env’tl L. 1, 40–43 (2020) (describing energy substitution analysis and how agencies can conduct it for NEPA analysis).

<sup>94</sup> See Hein & Jacewicz, *supra* note 93, at 42 (citing B.D. Hong & E.R. Slatick, U.S. Energy Info. Admin., *Carbon Dioxide Emission Factors for Coal*, [https://www.eia.gov/coal/product\\_ion/quarterly/co2\\_article/co2.html](https://www.eia.gov/coal/product_ion/quarterly/co2_article/co2.html)).

<sup>95</sup> See, e.g., Peter Howard, Inst. for Pol’y Integrity, N.Y.U. Sch. of L., *The Bureau of Land Management’s Modeling Choice for the Federal Coal Programmatic Review* (June 2016), [https://policyintegrity.org/files/publications/BLM\\_Model\\_Choice.pdf](https://policyintegrity.org/files/publications/BLM_Model_Choice.pdf) (describing multiple power sector models available to Federal agencies for use in NEPA analysis); see also *WildEarth Guardians*, 870 F.3d at 1235 (holding that an agency’s “blanket assertion that coal would be substituted from other sources, unsupported by hard data, does not provide ‘information sufficient to permit a reasoned choice’ between the preferred alternative and no action alternative.”).

transportation, refining, combustion, or distribution of fossil fuels, for example. Agencies should not simply assume that if the federal action does not take place, another action will perfectly substitute for it and generate identical emissions, such that the action's net emissions relative to the baseline are zero.<sup>96</sup> Such an assumption of perfect substitution typically contradicts basic economic principles of supply and demand.<sup>97</sup> Instead, where relevant, agencies can use available models to help conduct substitution analysis.<sup>98</sup> Agencies should disclose any assumptions and inputs used in substitution analysis and use models that accurately account for reasonable and available energy substitute resources, including renewable energy. Further, the analysis generally should be complemented with evaluation that compares the proposed action's and reasonable

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alternatives' energy use against scenarios or energy use trends that are consistent with achieving science-based GHG reduction goals, such as those pursued in the *Long-Term Strategy of the United States*.<sup>99</sup>

In addition to addressing an action's direct and indirect effects, NEPA requires agencies to address the effects of "connected" actions.<sup>100</sup> When evaluating a proposed Federal action, agencies should account for other closely related actions that should be discussed in the same EIS or EA. Actions are connected if they: (i) automatically trigger other actions that may require environmental impact statements; (ii) cannot or will not proceed unless other actions are taken previously or simultaneously; or (iii) are

<sup>96</sup> Hein & Jacewicz, *supra* note 93, at 43–44 (describing the fallacy of perfect substitution); *id.* at 51–52 (describing litigation concerning the Wright Area coal leases).

<sup>97</sup> See, e.g., *WildEarth Guardians*, 870 F.3d at 1235–37.

<sup>98</sup> Available models include the Bureau of Ocean Energy Management's Revised Market Simulation Model, the U.S. Energy Information Administration's National Energy Modeling System, and ICF International's Integrated Planning Model.

<sup>99</sup> DOS & EOP, *supra* note 70; see also Hein & Jacewicz, *supra* note 93, at 48 (stating, "[a] far more rational approach would be to model at least two policy scenarios: one taking the "constant demand" approach, and the other based on fossil fuel consumption consistent with meeting the 1.5 or 2 degrees Celsius warming targets laid out in the Paris Accord.").

<sup>100</sup> Note that the concepts of "connected actions" and "indirect effects" bear some similarities but are analytically distinct. "Connected actions" are actions related to a proposed action that an agency must consider in the same environmental impact statement. See 40 CFR 1501.9(e)(1). "Indirect effects" are not actions in themselves, but rather reasonably foreseeable effects that are caused by the proposed action.

interdependent parts of a larger action and depend on the larger action for their justification.<sup>101</sup> For example, NEPA reviews for proposed resource extraction and development projects typically should address the reasonably foreseeable effects of other closely related agency actions that authorize separate phases or aspects of development. Depending on the relationship between any of the phases, as well as the authority under which they may be carried out, agencies should use the analytical scope that best informs their decision making.

#### **E. ~~5.~~Cumulative Effects**

“Cumulative impact” is defined in the CEQ Regulations as the “impact. In addition to analyzing a proposed action’s direct and indirect effects, NEPA and CEQ’s regulations require an agency to also consider the proposed action’s cumulative effects.<sup>102</sup>

Cumulative effects are effects on the environment that result from the incremental ~~impact~~effects of the action when added to the effects of other past, present, and

reasonably foreseeable ~~future~~ actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.<sup>2244</sup> ~~All GHG emissions contribute to cumulative climate change impacts. However, for most Federal agency actions CEQ does not expect that an EIS would be required based solely on the global significance of cumulative impacts of GHG emissions, as it would not be consistent with the rule of reason to require the preparation of an EIS for every Federal action that may cause GHG emissions regardless of the magnitude of those emissions.~~

Based on the agency identification and analysis of the ~~direct and indirect effects~~ of its proposed action, NEPA requires an agency to consider the cumulative impacts of its proposed action and reasonable alternatives.<sup>45</sup> As noted above, for the purposes of

<sup>101</sup> 40 CFR 1501.9(c)(1).

<sup>102</sup> See 40 CFR 1502.16, 1508.1(g)(3).

<sup>44</sup> 40 CFR 1508.7.

<sup>45</sup> See 40 CFR 1502.16, 1508.7, 1508.8. See also CEQ Memorandum to Heads of Federal Agencies, *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*, June 24, 2005, available at [https://eeq.doe.gov/nepa/regs/Guidance\\_on\\_CE.pdf](https://eeq.doe.gov/nepa/regs/Guidance_on_CE.pdf).



~~NEPA, the analysis of the effects of GHG emissions is essentially a cumulative effects analysis that is subsumed within the general analysis and discussion of climate change impacts. Therefore, direct and indirect effects analysis for GHG emissions will adequately address the cumulative impacts for climate change from the proposed action and its alternatives and a separate cumulative effects analysis for GHG emissions is not needed.~~<sup>103</sup> In evaluating a proposed action's cumulative climate change effects, an agency should consider the proposed action in the context of the emissions from past, present, and reasonably foreseeable actions. When assessing cumulative effects, agencies should also consider whether certain communities experience disproportionate cumulative effects, thereby raising environmental justice concerns.<sup>104</sup>

All types of GHG emissions contribute to real-world physical changes. Given that climate change is the result of the increased global accumulation of GHGs climate effects analysis is inherently cumulative in nature. Thus, the analysis and public disclosure of cumulative effects can be accomplished by quantifying GHG emissions and providing context for understanding their effects as discussed above, including by monetizing climate damages using estimates of the SC-GHG, placing those damages in the context of relevant climate action goals and commitments, and summarizing and citing to available scientific literature to help explain real world effects.

#### **G. 6.Short- and Long-Term Effects**

When considering effects, agencies should take into account both the short- and long-term adverse and beneficial effects using a temporal scope that is grounded in the concept of reasonable foreseeability. Some proposed actions ~~will have to consider~~and reasonable alternatives will require consideration of effects ~~at~~from different stages of the action to ensure the direct effects and reasonably foreseeable indirect effects are appropriately assessed; for example, the effects of construction are different from the

<sup>103</sup> 40 CFR 1508.1(g)(3).

<sup>104</sup> See *infra* section VI(E).

effects of the operations and maintenance of a facility.

~~Biogenic GHG emissions and carbon stocks from some land or resource management activities, such as a prescribed burn of a forest or grassland conducted to limit loss of ecosystem function through wildfires or insect infestations,~~

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The effects analysis should cover the action's reasonably foreseeable lifetime, including anticipated GHG emissions associated with construction, operations, and decommissioning. Agencies should identify an appropriate lifetime for the proposed action using available indicators and guided by the concept of reasonable foreseeability.

Identifying an appropriate lifetime for the action also will inform assessment of long-term emissions benefits of proposed actions and reasonable alternatives. For example, development of a new wind energy project may result in short-term construction GHG emissions and loss of stored carbon, while in the longer term a restored, healthy ecosystem may provide long-term carbon sequestration. Therefore, the but overall long-term GHG benefits. Agencies should describe both short- and long-term effects should be described in comparison to the no action alternative in the NEPA review reviews and clearly explain the net effect of their actions even if precision regarding the timing of short- and long-term effects is not possible.

## **H. ~~7.~~ Mitigation**

~~Mitigation is an important component of the NEPA process that Federal agencies can use to avoid, minimize, and compensate for the adverse environmental effects associated with their actions. Mitigation, by definition, includes avoiding impacts, minimizing impacts by limiting them, rectifying the impact, reducing or eliminating the impacts over time, or compensating for them.~~<sup>46</sup> Identifying and analyzing potential

mitigation measures is an important component of the NEPA process.<sup>105</sup> Evaluating potential mitigation measures generally involves first determining whether impacts from a proposed action or alternatives can be avoided, then considering whether adverse impacts can be minimized, then, when impacts are unavoidable, rectifying them and, if appropriate, requiring compensation for residual impacts.<sup>106</sup> Consequently, agencies should consider reasonable mitigation measures and alternatives as provided for under existing CEQ Regulations and take into account relevant agency statutory authorities and policies. The NEPA process is also intended to provide useful advice and information to State, local and tribal governments and private parties so that the agencies can better coordinate with other agencies and organizations regarding the means to mitigate effects of their actions.<sup>47</sup> The NEPA process considers the effects of mitigation commitments made by project proponents or others and mitigation required under other relevant permitting and environmental review regimes.<sup>48</sup>

~~As Federal agencies evaluate potential mitigation of GHG emissions and the interaction of a proposed action with climate change, the agencies should also carefully evaluate the quality of that mitigation to ensure it is additional, verifiable, durable, enforceable, and will be implemented.<sup>49</sup> Agencies should consider the potential for mitigation measures to reduce or mitigate~~Mitigation plays a particularly important role in how agencies should assess the potential climate change effects of proposed actions and

<sup>105</sup> See 42 U.S.C. 4332(2)(C) (requiring consideration of mitigation measures in impact statements by requiring the consideration of “any adverse environmental effects which cannot be avoided”).

<sup>106</sup> See 40 CFR 1508.20, 1508.25 (Alternatives 1508.1(s), 1501.9(e)(2) (alternatives include mitigation measures not included in the proposed action); see generally 10 CFR 900.3 (2019) (identifying “mitigation hierarchy” as “first seeking to avoid, then minimize impacts, then, when necessary, compensate for residual impacts”); U.S. Fish and Wildlife Service (FWS) Mitigation Policy (Nov. 21, 2016), <https://www.federalregister.gov/d/2016-27751>.

<sup>47</sup> NEPA directs Federal agencies to make “advice and information useful in restoring, maintaining, and enhancing the quality of the environment” available to States, Tribes, counties, cities, institutions and individuals. NEPA Sec. 102(2)(G).

<sup>48</sup> See CEQ Memorandum to Heads of Federal Agencies, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*, 76 FR 3843 (Jan. 21, 2011) available at [https://ceq.doe.gov/current\\_developments/docs/Mitigation\\_and\\_Monitoring\\_Guidance\\_14Jan2011.pdf](https://ceq.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf).

<sup>49</sup> See Presidential Memorandum: *Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment* (<https://www.whitehouse.gov/the-press-office/2015/11/03/mitigating-impacts-natural-resources-development-and-encouraging-related>) defining “durability” and addressing additionality.

reasonable alternatives. Agencies should consider mitigation measures that will avoid or reduce GHG emissions. Given the urgency of the climate crisis, CEQ encourages agencies to mitigate GHG emissions to the greatest extent possible.

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Agencies should consider mitigation, particularly avoidance and minimization, as early as possible in the development of their actions, including during scoping, public engagement, and alternatives analysis. As part of early and meaningful public engagement, agencies should solicit public input on potential mitigation measures, including from communities that the proposed action and reasonable alternatives may affect. In their NEPA documents, agencies should discuss any mitigation measures considered and whether they included those measures in the preferred alternative. Where potential mitigation measures are not adopted, agencies should explain why as early as practicable in the NEPA process.

Agencies should consider available mitigation measures that avoid, minimize, or compensate for GHG emissions and climate change effects when those measures are reasonable and consistent with achieving the purpose and need for the proposed action. Such mitigation measures could include enhanced energy efficiency, renewable energy generation and energy storage, lower GHG-emitting technology, reduced embodied carbon in construction materials, carbon capture, carbon and sequestration ~~(e.g., forest, agricultural soils, and coastal habitat restoration)~~, sustainable land management practices, and capturing ~~or beneficially using~~ GHG emissions such as methane.

~~Finally, the CEQ Regulations and guidance recognize the value of monitoring to ensure that mitigation is carried out as provided in a record of decision or~~ Federal agencies also should evaluate the quality of that mitigation by ensuring it meets

appropriate performance standards.<sup>107</sup> Appropriate performance standards help ensure that GHG mitigation is additional, verifiable, durable, enforceable, and will be implemented.<sup>108</sup> NEPA does not limit consideration of mitigation to actions involving significant effects. However, mitigation can be particularly effective in helping agencies reduce or avoid significant effects.<sup>109</sup> Agencies can discuss the scope of their mitigation authority to support any mitigation commitments relied upon in NEPA analysis, including mitigation supporting a finding of no significant impact.<sup>50110</sup> ~~The~~ In addition, consistent with existing agency best practice, an agency's final decision on the proposed action should identify those mitigation measures that the agency commits to take, recommends, or requires others to take. ~~Monitoring is particularly appropriate to confirm the effectiveness of mitigation when that mitigation is adopted to reduce the impacts of a proposed action on affected resources already increasingly vulnerable due to climate change.~~<sup>111</sup>

The CEQ Regulations and guidance also recognize the value of monitoring to ensure that mitigation is carried out as provided in a record of decision or finding of no significant impact.<sup>112</sup> Monitoring intensity and duration should be aligned with the

<sup>107</sup> See CEQ, Memorandum to Heads of Federal Agencies, Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact (“Appropriate Use of Mitigation and FONSI Memo”), 8–9, 76 FR 3843 (Jan. 21, 2011), [https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Mitigation\\_and\\_Monitoring\\_Guidance\\_14Jan2011.pdf](https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf).

<sup>108</sup> See *id.*; see also U.S. Army Corps of Engineers and EPA, Final Rule, Compensatory Mitigation for Losses of Aquatic Resources, 73 FR 19593 (Apr. 10, 2008) (discussing verifiable and enforceable performance standards for mitigation).

<sup>109</sup> See 40 CFR 1501.6(c).

<sup>50</sup> See 40 CFR 1505.2(e), 1505.3. See also CEQ Memorandum to Heads of Federal Agencies, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*, 76 FR 3843 (Jan. 21, 2011) available at [https://ceq.doe.gov/current\\_developments/docs/Mitigation\\_and\\_Monitoring\\_Guidance\\_14Jan2011.pdf](https://ceq.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf).<sup>110</sup> See *id.* (The finding of no

significant impact shall state the authority for any mitigation that the agency has adopted and any applicable monitoring or enforcement provisions. If the agency finds no significant impacts based on mitigation, the mitigated finding of no significant impact shall state any enforceable mitigation requirements or commitments that will be undertaken to avoid significant impacts.); see also CEQ, Appropriate Use of Mitigation and FONSI Memo, *supra* note 107, at 7 (“Mitigation commitments needed to lower the level of impacts so that they are not significant should be clearly described in the mitigated FONSI document and in any other relevant decision documents related to the proposed action.”).

<sup>111</sup> See CEQ, Appropriate Use of Mitigation and FONSI Memo, *supra* note 107, at 13–14.

<sup>112</sup> See 40 CFR 1505.2(a)(3), 1505.3; see also CEQ, Appropriate Use of Mitigation and FONSI Memo, *supra* note 107.

mitigation action taken.

Finally, while this subsection primarily addresses mitigating a proposed action's GHG emissions, agencies also should consider environmental design features, alternatives, and mitigation measures to address the effects of climate change on the proposed action, including to enhance resilience and adaptation. See Section IV(D).

### **I. Special Considerations for Biological GHG Sources and Sinks**

Many GHG emissions come from combusting fossil fuels and releasing substances into the atmosphere.<sup>113</sup> In addition to these sources, some GHG emissions are related to the natural carbon cycle,<sup>114</sup> or result from the combustion, harvest,

decomposition, or other processing of biologically based materials.<sup>115</sup> These types of emissions are referred to as “biogenic.”<sup>116</sup> Biogenic GHG emissions from land management actions—such as prescribed burning, timber stand improvements, fuel load reductions, and scheduled harvesting—involve GHG emissions and carbon sequestration that operate within the global carbon and nitrogen cycle, which may be affected by those actions. Similarly, some water management practices have GHG emission consequences

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<sup>113</sup> Burning fossil fuels (such as oil, coal, and natural gas), wood, and other forms of carbon releases stored carbon into the atmosphere, where it becomes a GHG. GHGs are gases in the atmosphere that absorb and release heat. Dep't of Energy, Off. of Science, *DOE Explains...the Carbon Cycle*, <https://www.energy.gov/science/doe-explains-the-carbon-cycle>.

<sup>114</sup> The carbon cycle is the process that moves carbon between plants, animals, and microbes; minerals in the earth; and the atmosphere. Most carbon on Earth is stored in rocks and sediments. The rest is in the ocean, atmosphere, and in living organisms. Scientists use the term “carbon sinks” to refer to places where carbon is stored away from the atmosphere. *Id.*

<sup>115</sup> Fossil fuels are not considered biologically based materials. *See, e.g., EPA, Framework for Assessing Biogenic CO<sub>2</sub> Emissions from Stationary Sources*, 5 (Nov. 2014), <https://www.epa.gov/sites/default/files/2016-08/documents/framework-for-assessing-biogenic-co2-emissions.pdf> (“In contrast to the relatively short timescale of the biological carbon cycle, carbon in fossil fuel reservoirs, such as coal seams and oil and gas deposits, was removed from the atmosphere by plants over millions of years but was not returned to the atmosphere through the natural processes described above. Instead, because of geologic processes, the carbon that accumulated in these deposits has been isolated from the active biological cycling of carbon to and from the atmosphere. Without human intervention, carbon in fossil fuel reservoirs could remain isolated from the biogeochemical cycling of carbon long into the future.”)

<sup>116</sup> EPA, *Carbon Dioxide Emissions Associated with Bioenergy and Other Biogenic Sources*, [https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-emissions-associated-bioenergy-and-other-biogenic-sources\\_.html](https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-emissions-associated-bioenergy-and-other-biogenic-sources_.html); *see also* Merriam-Webster Dictionary, *Biogenic* (Online Ed., last updated Oct. 21, 2022), <https://www.merriam-webster.com/dictionary/biogenic> (defining “biogenic” as “produced by living organisms”).

that may require unique consideration (e.g., reservoir management practices can reduce methane releases, wetlands management practices can enhance carbon sequestration, and water conservation can improve energy efficiency).

In the land and resource management context, how a proposed action and reasonable alternatives (as well as the no-action alternative) affects a net carbon sink or source will depend on multiple factors such as the local or regional climate and environment, the distribution of carbon across carbon pools in the action area, ongoing activities and trends, and the role of natural disturbances in the relevant area.

In NEPA reviews, for actions involving potential changes to biological GHG sources and sinks, agencies should include a comparison of net GHG emissions and carbon stock<sup>117</sup> changes that are anticipated to occur, with and without implementation of the proposed action and reasonable alternatives. The analysis should consider the

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estimated GHG emissions (from biogenic and fossil-fuel sources), carbon sequestration potential, and the net change in relevant carbon stocks in light of the proposed actions and timeframes under consideration, and explain the basis for the analysis.

Some actions that involve ecosystem restoration<sup>118</sup> can generate short-term biogenic emissions while resulting in overall long-term net reductions of atmospheric GHG concentrations through increases in carbon stocks or reduced risks of future emissions. One example is certain vegetation management practices that affect the risk of wildfire, insect and disease outbreak, or other disturbance. Some resource management activities, such as a prescribed burn or certain non-commercial thinning of forests or grasslands conducted to reduce wildfire risk or insect infestations, might result in short-term GHG emissions or loss of stored carbon but greater long-term ecosystem health,

<sup>117</sup> See, e.g., 10 CFR 300.2 (“Carbon stocks mean the quantity of carbon stored in biological and physical systems including: trees, products of harvested trees, agricultural crops, plants, wood and paper products and other terrestrial biosphere sinks, soils, oceans, and sedimentary and geological sinks.”).

<sup>118</sup> For example, Federal agencies sometimes consider actions that would benefit ecosystems by restoring degraded lands or restoring shoreline.

including an overall net increase in carbon sequestration and storage. However, other types of land-use changes, such as permanent deforestation, can adversely alter ecosystem long-term carbon dynamics, resulting in net emissions. Agencies can use relevant tools to analyze the anticipated long-term GHG emissions implications from proposed ecosystem restoration actions.

Federal land and resource management agencies should consider developing and maintaining agency-specific principles and guidance for considering biological carbon in management and planning decisions.<sup>119</sup> Such guidance can help address the importance of considering biogenic carbon fluxes and storage within the context of other management objectives and ecosystem service goals, and integrating carbon

considerations as part of a balanced and comprehensive program of sustainable management, climate change mitigation, and climate change adaptation.

**V. Considering the Effects of Climate Change on a Proposed Action**  
**~~B. CONSIDERING THE EFFECTS OF CLIMATE CHANGE ON A PROPOSED ACTION AND ITS ENVIRONMENTAL IMPACTS~~**

According to the USGCRP and others, GHGs already in the atmosphere will continue altering the climate system into the future, even with current or future emissions control efforts.<sup>51120</sup> Therefore To illustrate how climate change may impact proposed actions and alternatives and to consider climate resilience, a NEPA review should consider an action in the context ongoing impacts of climate change and the future foreseeable state of the environment, especially when evaluating project design.

<sup>119</sup> See, e.g., USDA Forest Service, *Considering Forest and Grassland Carbon in Land Management* (2017), <https://www.fs.usda.gov/research/treesearch/54316>; see also U.S. Dep't of the Interior, Order No. 3399, *Department-Wide Approach to the Climate Crisis and Restoring Transparency and Integrity to the Decision-Making Process* (Apr. 16, 2021), [https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3399-508\\_0.pdf](https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3399-508_0.pdf).

<sup>51120</sup> See Third USGCRP, Fourth National Climate Assessment, Appendix 3 *supra* note 28, Chapter 2, *Our Changing Climate Science Supplement 753-754*, available at [http://s3.amazonaws.com/nea2014/low/NCA3\\_Full\\_Report\\_Appendix\\_3\\_Climate\\_Science\\_Supplement\\_LowRes.pdf?download=1](http://s3.amazonaws.com/nea2014/low/NCA3_Full_Report_Appendix_3_Climate_Science_Supplement_LowRes.pdf?download=1), <https://nca2018.globalchange.gov/chapter/2/>.



siting, and reasonable alternatives. In addition, climate change resilience<sup>121</sup> and adaptation-  
~~and resilience—defined as adjustments to natural or human systems in response to~~  
~~actual or expected climate changes—~~<sup>122</sup> are important considerations for agencies  
contemplating and planning actions ~~with effects that will occur both at the time of~~  
~~implementation and into the future.~~<sup>52</sup> <sup>123</sup>

#### A. <sup>1</sup>Affected Environment

~~An agency~~Agencies should identify the affected environment to provide a basis  
for comparing the current and ~~the~~ future state of the environment as affected by the  
proposed action or its reasonable alternatives.<sup>53</sup><sup>124</sup> ~~The~~As discussed in Section IV(D),  
the current and projected future state of the environment without the proposed action  
(i.e., the no action alternative) represents the reasonably foreseeable affected  
environment,~~and this should be described.~~ In considering the effects of climate change  
on a proposed action, the agency should describe the affected environment for the  
proposed action based on  
~~authoritative~~ the best available climate change

reports,<sup>54</sup><sup>125</sup> which often project at least two possible future emissions scenarios.<sup>55</sup><sup>126</sup> The

<sup>121</sup> Resilience refers to the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruption. U.S. Dep't of Commerce Nat'l Inst. of Standards and Tech. (NIST), SP 800-160 Vol. 2, Rev. 1, 76. [https://csrc.nist.gov/glossary/term/resilience#:~:text=with%20mission%20needs.-,Source\(s\)%3A,naturally%20occurring%20threats%20or%20incidents.](https://csrc.nist.gov/glossary/term/resilience#:~:text=with%20mission%20needs.-,Source(s)%3A,naturally%20occurring%20threats%20or%20incidents.)

<sup>122</sup> Adaptation refers to actions taken at the individual, local, regional, and national levels to reduce risks from even today's changed climate conditions and to prepare for impacts from additional changes projected for the future. USGCRP, Fourth National Climate Assessment, *supra* note 28, Chapter 28, *Reducing Risks Through Adaptation Actions*, <https://nca2018.globalchange.gov/chapter/28/>.

<sup>52</sup> See Third National Climate Assessment, Chapter 28, "Adaptation" and Chapter 26, "Decision Support: Connecting Science, Risk Perception, and Decisions," available at <http://www.globalchange.gov/nea3-downloads-materials>; see also, Exec. Order No. 13653, 78 Fed. Reg. 66817 (Nov. 6, 2013) and Exec. Order No. 13693, *Planning for Federal Sustainability in the Next Decade*, 80 Fed. Reg. 15869 (Mach 25, 2015) (defining "climate-resilient design").<sup>123</sup> See E.O. 14008, *supra* note 7 and E.O. 14057, *supra* note 7.

<sup>53</sup><sup>124</sup> See 40 CFR 1502.15 (providing that environmental impact statements shall succinctly describe the environmental impacts on the area(s) to be affected or created by the alternatives under consideration). Note, however, that GHG emissions have effects that are global in scale.

<sup>54</sup><sup>125</sup> See, e.g., Third USGCRP, Fourth National Climate Assessment (Regional, *supra* note 28 (regional impacts chapters) available at <http://www.globalchange.gov/nea3-downloads-materials>.

<sup>55</sup><sup>126</sup> See, e.g., Third National Climate Assessment (Regional impacts chapters, *id.* (considering a low future global emissions scenario, and a high emissions scenario) available at <http://www.globalchange.gov/nea3-downloads-materials>.

temporal bounds for the state description of the affected environment are determined by the projected initiation of implementation and the expected life of the proposed action and its effects. <sup>56</sup>~~127 Agencies should remain aware of the evolving body of scientific information as more refined estimates of the impacts of climate change, both globally and at a localized level, become available.~~<sup>57</sup>

## <sup>2</sup>Impacts B. Effects

The analysis of climate change ~~impacts~~effects should focus on those aspects of the human environment that are impacted by ~~both the agency's potential action (i.e., the proposed action or its alternatives)~~ and climate change. ~~Climate~~The analysis also should consider how climate change can make a resource, ecosystem, human community, or structure more ~~susceptible~~vulnerable to many types of ~~impacts~~effects and lessen its resilience to other environmental ~~impacts apart from climate change~~effects. This increase in vulnerability can exacerbate the environmental effects of ~~the proposed action~~potential actions, including environmental justice impacts. For example, a proposed action or its alternatives may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is already warming due to increasing atmospheric temperatures. Such considerations are squarely within the scope of NEPA and can inform decisions on siting, whether to proceed with~~;~~ and how to design~~;~~the proposed action potential actions and reasonable alternatives, and to eliminate or mitigate ~~impacts~~effects exacerbated by climate change. They ~~can~~also can inform possible adaptation measures to address the ~~impacts~~effects of climate change, ultimately enabling the selection of smarter, more resilient actions.

<sup>56</sup><sup>127</sup> CEQ, *Considering Cumulative Effects Under the National Environmental Policy Act* (1997), [https://eeq.doe.gov/publications/cumulative\\_effects.html](https://eeq.doe.gov/publications/cumulative_effects.html) supra note 79. Agencies also should also consider their work under Exec. Order No. 13653, *Preparing the United States for the Impacts of Climate Change* relevant executive orders. See E.O. 13990, supra note 16; E.O. 14008, 78 Fed. Reg. 66817 (Nov. 6, 2013), that considers how capital investments will be affected by a changing climate over time supra note 7; E.O. 14057, supra note 7. Note that the effects of GHG emissions by their nature can be very long-lasting.

<sup>57</sup> See, e.g., <http://nea2014.globalchange.gov/report/regions/coasts>.

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### 3. Using Available Assessments and Scenarios to Assess Present and Future Impacts

In accordance with NEPA's rule of reason and standards for obtaining information regarding reasonably foreseeable effects on the human environment, agencies ~~need not undertake new research or analysis of potential climate change impacts in the proposed action area, but~~ may ~~instead~~ summarize and incorporate by reference ~~the~~ relevant scientific literature.<sup>58</sup> concerning the physical effects of climate change.<sup>128</sup> For example, agencies may summarize and incorporate by reference the relevant chapters of the most recent national climate assessments or reports from the USGCRP,<sup>59</sup> and the IPCC.<sup>129</sup> Particularly relevant to some proposed actions and reasonable alternatives are the most current reports on climate change ~~impacts~~effects on water resources, ecosystems, vulnerable communities, agriculture and forestry, health, coastlines, and ocean and arctic regions in the United States.<sup>60</sup><sup>130</sup> ~~Agencies may recognize that scenarios or climate modeling information (including seasonal, inter-annual, long-term, and regional-scale projections) are widely used, but when~~

Agencies should remain aware of the evolving body of scientific information as more refined estimates of the effects of climate change, both globally and at a localized level, become available.<sup>131</sup> Agencies should use the most up-to-date scientific projections available, identify any methodologies and sources used, and where relevant, disclose any

<sup>58</sup><sup>128</sup> See 40 CFR ~~1502.21~~ 1501.12 (material may be incorporated by reference if it is reasonably available for inspection by potentially interested persons during public review and comment).

<sup>59</sup> See <http://www.globalchange.gov/browse/reports>; <sup>129</sup> See USGCRP, Fourth National Climate Assessment, *supra* note 28; IPCC, *The Physical Science Basis*, *supra* note 28.

<sup>60</sup><sup>130</sup> See ~~Third~~ USGCRP, Fourth National Climate Assessment, *Our Changing Climate*, available at <http://nea2014.globalchange.gov/report>; *supra* note 28. Agencies should consider the latest final assessments and reports ~~when~~as they are updated.

<sup>131</sup> See, e.g., *id.*

relevant limitations of studies, climate models, or projections they rely on.<sup>132</sup>

In addition to considering climate change effects at the relevant global and national levels, agencies should identify and use information on future projected GHG emissions scenarios to evaluate potential future impacts (such as flooding, high winds, extreme heat, and other climate change-related impacts) and what those impacts will

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mean for the physical and other relevant conditions in the affected area. Such information should help inform development of the proposed action and alternatives, including by ensuring that proposed actions and alternatives consider appropriate resilience measures, environmental justice issues, and existing State, Tribal, or local adaptation plans. When relying on a single study or projection, agencies should consider ~~their~~ any relevant limitations and discuss them.<sup>64</sup><sup>133</sup>

### C. ~~4~~ Opportunities for Resilience and Adaptation

As ~~called for under NEPA, the CEQ Regulations, and CEQ guidance,~~ discussed in Section III(B), climate change presents risks to a wide array of potential actions across a range of sectors. Agencies should consider climate change effects on the environment and on proposed actions in assessing vulnerabilities and resilience ~~to the effects of climate change such as increasing sea level, drought, high intensity precipitation events, increased fire risk, or ecological change.~~ Consistent with NEPA, environmental reviews should provide relevant information that agencies can use to consider siting issues, ~~the initial project design~~ and consistency with existing State, Tribal, and local adaptation plans, as well as reasonable ~~alternatives with preferable overall environmental outcomes and improved resilience to climate effects.~~<sup>134</sup> Climate resilience and adaptation may be particularly relevant to the description of a proposed action, the alternatives analysis, and

<sup>132</sup> See 40 CFR 1502.23. Agencies can consult [www.data.gov/climate/portals](http://www.data.gov/climate/portals) for model data archives, visualization tools, and downscaling results.

<sup>64</sup> See 40 CFR 1502.22. Agencies can consult [www.data.gov/climate/portals](http://www.data.gov/climate/portals) for model data archives, visualization tools, and downscaling results.

<sup>134</sup> See 40 CFR 1502.16(a)(5), 1506.2(d).

the description of environmental consequences. For instance, agencies should consider increased risks associated with development in floodplains, avoiding such development wherever there is a practicable alternative, as required by Executive Orders 11988 and 13690.<sup>135</sup> Agencies also should consider the likelihood of increased temperatures and more frequent or severe storm events over the

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<sup>133</sup> *Id.*

lifetime of the proposed action, and reasonable alternatives (as well as the no-action alternative).<sup>136</sup> For example, an agency considering a proposed development of transportation infrastructure on a coastal barrier island should consider climate change effects on the environment and, as applicable, consequences of rebuilding where sea level rise and more intense storms will shorten the projected life of the project and change its effects on the environment.<sup>137</sup>

Agencies should integrate the NEPA review process ~~should be integrated~~ with the agency's planning, siting, and design efforts at the earliest possible time that would allow

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<sup>135</sup> See E.O. 11988, *Floodplain Management*, 42 FR 26951 (May 24, 1977).<sup>1</sup>

<http://www.archives.gov/federal-register/codification/executive-order/11988.html>; E.O. 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, 80 FR 6425 (Jan. 30, 2015), <https://www.federalregister.gov/d/2015-02379> (reinstated by E.O. 14030, *Climate-Related Financial Risk*, 86 FR 27967 (May 20, 2021), <https://www.federalregister.gov/d/2021-11168>).

<sup>136</sup> See, e.g., E.O. 14030, *supra* note 135.

<sup>137</sup> See U.S. Dep't of Transp., FHWA-HEP-15-007, *Assessing Transportation Vulnerability to Climate Change Synthesis of Lessons Learned and Methods Applied, Gulf Coast Study, Phase 2* (Oct. 2014), [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study/phase2\\_task6/fhw\\_ahp15007.pdf](http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/phase2_task6/fhw_ahp15007.pdf) (focusing on the Mobile, Alabama region); U.S. Climate Change Science Program, *Impacts of Climate Change and Variability on Transportation Systems and Infrastructure, Gulf Coast Study, Phase I* (Mar. 2008), <https://downloads.globalchange.gov/sap/sap4-7/sap4-7-final-all.pdf> (focusing on a regional scale in the central Gulf Coast). Information about the Gulf Coast Study is available at [https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study/index.cfm](https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/gulf_coast_study/index.cfm); see also Third National Climate Assessment, *supra* note 30, Chapter 28, *Adaptation*, 675, <http://nca2014.globalchange.gov/report/response-strategies/adaptation#intro-section-2> (noting that Federal agencies in particular can facilitate climate adaptation by “ensuring the establishment of [F]ederal policies that allow for ‘flexible’ adaptation efforts and take steps to avoid unintended consequences”).

for a meaningful analysis.<sup>62</sup><sup>138</sup> ~~Information Agencies may incorporate information developed during early planning processes that precede a NEPA review may be incorporated into the NEPA review. Decades of NEPA practice have shown that integrating environmental considerations with the planning processes provides useful information that program and project planners can consider in the design of designing the proposed action, alternatives, and potential mitigation measures. For instance, agencies should take into account increased risks associated with development in floodplains, avoiding such development wherever there is a practicable alternative, as required by Executive Order 11988 and Executive Order 13690.<sup>63</sup> In addition, agencies should take into account their ongoing efforts to incorporate environmental justice principles into their programs, policies, and activities, including the environmental justice strategies required by Executive Order 12898, as amended, and consider whether the effects of climate change in association with the effects of the proposed action may result in a disproportionate effect on minority and low income communities.<sup>64</sup>~~

Agencies also may consider co-benefits of the proposed action, alternatives, and potential mitigation measures for human health, economic and social stability, ecosystem services, or other benefits that increases climate change preparedness or resilience.

Individual agency adaptation plans and interagency adaptation strategies, such as agency Climate Adaptation Plans, the National Fish, Wildlife and Plants Climate Adaptation

<sup>62</sup><sup>138</sup> See 42 U.S.C. 4332 (“agencies of the Federal Government shall ~~...~~ utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making”); 40 CFR 1501.2 (“Agencies should integrate the NEPA process with other planning and authorization processes at the earliest possible reasonable time~~...~~”); *See also* // CEQ, Memorandum for Heads of Federal Departments and Agencies, Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act (“Efficient Environmental Reviews”), 77 FR 14473 (Mar. 12, 2012), [https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Improving\\_NEPA\\_Efficiencies\\_06Mar2012.pdf](https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Improving_NEPA_Efficiencies_06Mar2012.pdf).

<sup>63</sup> See Exec. Order No. 11988, “Floodplain Management,” 42 Fed. Reg. 26951 (May 24, 1977), available at <http://www.archives.gov/federal-register/codification/executive-order/11988.html>; Exec. Order No. 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, 80 Fed. Reg. 6425 (Jan. 30, 2015), available at <https://www.gpo.gov/fdsys/pkg/FR-2015-02-04/pdf/2015-02379.pdf>.

<sup>64</sup> See Exec. Order No. 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, 59 Fed. Reg. 7629 (Feb. 16, 1994), available at <https://ceq.doe.gov/nepa/regs/eos/ii-5.pdf>; CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act* (Dec. 1997), available at <http://ceq.doe.gov/nepa/regs/ej/justice.pdf>.

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for Heads of Federal Departments and Agencies, *Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act*, 77 Fed. Reg. 14473 (Mar. 12, 2012), available at

[https://eeq.doe.gov/current\\_developments/does/Improving\\_NEPA\\_Efficiencies\\_06Mar2012.pdf](https://eeq.doe.gov/current_developments/does/Improving_NEPA_Efficiencies_06Mar2012.pdf). Resources in a

Changing Climate, provide other good examples of the type of relevant and useful information that agencies can ~~be considered.~~<sup>65</sup> consider.<sup>139</sup>

~~Climate change effects on the environment and on the proposed project should be considered in the analysis of a project considered vulnerable to the effects of climate change such as increasing sea level, drought, high intensity precipitation events, increased fire risk, or ecological change. In such cases, a NEPA review will provide relevant information that agencies can use to consider in the initial project design, as well as alternatives with preferable overall environmental outcomes and improved resilience to climate impacts. For example, an agency considering a proposed long-term development of transportation infrastructure on a coastal barrier island should take into account climate change effects on the environment and, as applicable, consequences of rebuilding where sea level rise and more intense storms will shorten the projected life of the project and~~

<sup>65</sup><sup>139</sup> See <https://www.sustainability.performance.gov/progress.html> for agency sustainability plans, ~~which contain and~~ agency adaptation plans. See also <http://www.wildlifeadaptationstrategy.gov>; <http://www.usclimate.gov> U.S. Climate Resilience Tool Kit, <https://toolkit.climate.gov/tool/national-fish-wildlife-and-plants-climate-adaptation-strategy>; Interagency Climate Adaptation Task Force, *National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate* (Oct. 2011), [https://www.whitehouse.gov/sites/default/files/microsites/eeq/2016-12/documents/2011\\_national\\_action\\_plan\\_1.pdf](https://www.whitehouse.gov/sites/default/files/microsites/eeq/2016-12/documents/2011_national_action_plan_1.pdf); and [CEQ, Off. of the Federal Chief Sustainability Officer, \*Climate Resilient Infrastructure and Operations\*, \[https://www.epa.gov/greeningepa/adaptation/\]\(https://www.epa.gov/greeningepa/adaptation/climate-change-adaptation-plans\)](https://www.epa.gov/greeningepa/adaptation/climate-change-adaptation-plans)

~~change its effects on the environment.~~<sup>66</sup> ~~Given the length of time involved in present sea level projections, such considerations typically will not be relevant to short-term actions with short-term effects.~~ Considering the effects of climate change on a proposed action, and reasonable alternatives (as well as the no-action alternative), also helps to develop potential mitigation measures to reduce climate risks and promote resilience and adaptation. Where the analysis identifies climate-related risks to a proposed action or to the area affected by the proposed action, the agency should consider possible resilience and adaptation measures—including measures consistent with State, Tribal, or local adaptation plans—that could be employed to manage those effects. For example, where one or more climate effects could impair the operation of the proposed action, the agency should identify possible adaptation measures to enhance the action’s climate resilience. The agency should indicate whether the proposed action includes measures to adapt to climate change and, if so, describe those measures and the climate projections that informed them. The agency also should consider whether any potential measures undertaken to address a proposed action’s climate risk could result in any undesirable or unintended consequences.<sup>140</sup>

~~In addition, the particular impacts of climate change on vulnerable communities may be considered in the design of the action or the selection among alternatives to~~

<sup>66</sup> See U.S. Department of Transportation, Gulf Coast Study, Phase 2, *Assessing Transportation Vulnerability to Climate Change Synthesis of Lessons Learned and Methods Applied*, FHWA-HEP-15-007 (Oct. 2014) (focusing on the Mobile, Alabama region), available at [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study/phase2\\_task6/fhwahep15007.pdf](http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/phase2_task6/fhwahep15007.pdf); U.S. Climate Change Science Program, Synthesis and Assessment Product 4.7, *Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I* (Mar. 2008) (focusing on a regional scale in the central Gulf Coast), available at <https://downloads.globalchange.gov/sap/sap4-7/sap4-7-final-all.pdf>. Information about the Gulf Coast Study is available at [http://www.fhwa.dot.gov/environment/climate\\_change/adaptation/ongoing\\_and\\_current\\_research/gulf\\_coast\\_study](http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study). See also Third National Climate Assessment, Chapter 28, “Adaptation,” at 675 (noting that Federal agencies in particular can facilitate climate adaptation by “ensuring the establishment of federal policies that allow for “flexible” adaptation efforts and take steps to avoid unintended consequences”), available at <http://nca2014.globalchange.gov/report/response-strategies/adaptation#intro-section-2>.

<sup>140</sup> See, e.g., Jane Ebinger & Walter Vergara, World Bank, *Climate Impacts on Energy Systems: Key Issues for Energy Sector Adaptation*, 89–90 (2011), <https://openknowledge.worldbank.org/bitstream/handle/10986/2271/600510PUB0ID181mpacts09780821386972.pdf?sequence=1&isAllowed=y> (describing the potential for adaptation-related decision errors including “maladaptation,” in which actions are taken that constrain the ability of other decision makers to manage the impacts of climate change).



~~assess the impact, and potential for~~ In addition, agencies should consider their ongoing efforts to incorporate environmental justice principles into their programs, policies, actions, and activities, including the environmental justice strategies required by Executive Orders 12898 and 14008, and consider whether the effects of climate change in association with the effects of the proposed action may result in disproportionately high and adverse effects on communities with environmental justice concerns, which often include communities of color, low-income communities, and Tribal Nations and Indigenous communities, in the area affected by the proposed action.<sup>141</sup> Federal agencies should identify any communities with environmental justice concerns, including communities of color, low-income communities, and Tribal Nations and Indigenous communities, impacted by the proposed action, and consider how impacts from the proposed action could potentially amplify climate change-related hazards such as storm surge, heat waves, drought, flooding, and sea level change.<sup>142</sup> Moreover, Executive Order 13985 calls for an all-of-government approach to advancing equity for underserved populations, including rural communities and persons with disabilities. Agencies should meaningfully engage with affected communities regarding their proposed actions and consider the effects of climate change on vulnerable communities in designing the action or selection of alternatives, including alternatives that can reduce disproportionate impacts, effects on these such communities.<sup>67</sup> For example, chemical facilities located near the coastline could have increased risk of spills or leakage due to sea level rise or increased storm surges, putting local communities and

<sup>141</sup> See *infra* Section VI(E); E.O. 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, 59 FR 7629 (Feb. 16, 1994), <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>, as amended by E.O. 14008, *supra* note 7, section 219 (“Agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.”); CEO, *Environmental Justice Guidance Under the National Environmental Policy Act* (Dec. 1997), <https://ceq.doe.gov/docs/ceq-regulations-and-guidance/regs/ej/justice.pdf>.

<sup>142</sup> See, e.g., Federal Interagency Working Group on Environmental Justice & NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (Mar. 2016), [https://www.epa.gov/sites/default/files/2016-08/documents/nepa\\_promising\\_practices\\_document\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf).

<sup>67</sup> For an example, see [https://www.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A\\_FINAL\\_ROD\\_2-21-13.pdf](https://www.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A_FINAL_ROD_2-21-13.pdf).

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environmental resources at greater risk. Increased resilience could minimize such potential future effects. Finally, considering climate change preparedness and resilience can help ensure that agencies evaluate the potential for generating additional GHGs if a project has to be replaced, repaired, or modified, and minimize the risk of expending additional time and funds in the future.

### C. Special Considerations for Biogenic Sources of Carbon

~~With regard to biogenic GHG emissions from land management actions—such as prescribed burning, timber stand improvements, fuel load reductions, scheduled harvesting, and livestock grazing—it is important to recognize that these land management actions involve GHG emissions and carbon sequestration that operate within the global carbon and nitrogen cycle, which may be affected by those actions. Similarly, some water management practices have GHG emission consequences (e.g., reservoir management practices can reduce methane releases, wetlands management practices can enhance carbon sequestration, and water conservation can improve energy efficiency).~~

~~Notably, it is possible that the net effect of ecosystem restoration actions resulting in short-term biogenic emissions may lead to long-term reductions of atmospheric GHG concentrations through increases in carbon stocks or reduced risks of future emissions. In the land and resource management context, how a proposed action affects a net carbon sink or source will depend on multiple factors such as the climatic region, the distribution~~

~~of carbon across carbon pools in the project area, and the ongoing activities and trends. In addressing biogenic GHG emissions, resource management agencies should include a comparison of estimated net GHG emissions and carbon stock changes that are projected~~

~~to occur with and without implementation of proposed land or resource management actions.<sup>68</sup> This analysis should take into account the GHG emissions, carbon sequestration potential, and the changes in carbon stocks that are relevant to decision-making in light of the proposed actions and timeframes under consideration.~~

~~One example of agencies dealing with biogenic emissions and carbon sequestration arises when agencies consider proposed **vegetation management practices that affect the risk of wildfire, insect and disease outbreak, or other disturbance.** The public and the decision maker may benefit from consideration of the influence of a vegetation management action that affects the risk of wildfire on net GHG emissions and carbon stock changes. NEPA reviews should consider whether to include a comparison of net GHG emissions and carbon stock changes that are anticipated to occur, with and without implementation of the proposed vegetation management practice, to provide information that is useful to the decision maker and the public to distinguish between alternatives. The analysis would take into account the estimated GHG emissions (biogenic and fossil), carbon sequestration potential, and the net change in carbon stocks relevant in light of the proposed actions and timeframes under consideration. In such cases the agency should describe the basis for estimates used to project the probability or likelihood of occurrence or changes in the effects or severity of wildfire. Where such~~

## **VI. Traditional NEPA Tools and Practices**

~~tools, methodologies, or data are not yet available, the agency should provide a qualitative analysis and its rationale for determining that the quantitative analysis is not warranted. As with any other analysis, the rule of reason and proportionality should be applied to determine the extent of the analysis.~~

~~CEQ acknowledges that Federal land and resource management agencies are~~

<sup>68</sup> One example of a tool for such calculations is the Carbon On Line Estimator (COLE), which uses data based on USDA Forest Service Forest Inventory & Analysis and Resource Planning Assessment data and other ecological data. COLE began as a collaboration between the National Council for Air and Stream Improvement, Inc. (NCASI) and USDA Forest Service, Northern Research Station. It currently is maintained by NCASI. It is available at <http://www.fs.usda.gov/eere/tools/cole>.

~~developing agency-specific principles and guidance for considering biological carbon in management and planning decisions.<sup>69</sup> Such guidance is expected to address the importance of considering biogenic carbon fluxes and storage within the context of other management objectives and ecosystem service goals, and integrating carbon considerations as part of a balanced and comprehensive program of sustainable management, climate change mitigation, and climate change adaptation.~~

#### ~~IV. TRADITIONAL NEPA TOOLS AND PRACTICES~~

##### ~~A. Scoping and Framing the NEPA Review~~

~~To effectuate integrated~~ Scoping helps agencies integrate decision making, avoid duplication, and focus the NEPA review, the CEQ Regulations provide for ~~scoping.~~<sup>70</sup> ~~reviews.~~<sup>143</sup> In scoping, the agency determines the issues that the NEPA review will address and identifies the ~~impacts~~ ~~effects~~ related to the proposed action that the analysis will consider.<sup>71</sup><sup>144</sup> An agency can use the scoping process to help it determine whether analysis is relevant and, if so, the extent of analysis appropriate for a proposed action.<sup>72</sup><sup>145</sup> When scoping for the climate change issues associated with the proposed ~~agency action, and reasonable alternatives (as well as the no-action alternative)~~, the nature, location, timeframe, and type of the proposed action and the extent of its effects

<sup>69</sup> See Council on Climate Change Preparedness and Resilience, *Priority Agenda Enhancing the Climate Resilience of America's Natural Resources*, at 52 (Oct. 2014), available at [http://www.whitehouse.gov/sites/default/files/docs/enhancing\\_climate\\_resilience\\_of\\_americas\\_natural\\_resources.pdf](http://www.whitehouse.gov/sites/default/files/docs/enhancing_climate_resilience_of_americas_natural_resources.pdf).

<sup>70</sup><sup>143</sup> See 40 CFR ~~1501.7~~ 1501.9 (“There ~~Agencies~~ shall ~~be use~~ an early and open process ~~for to~~ determining the scope of issues ~~to be addressed and for~~ analysis in an environmental impact statement, including identifying the significant issues ~~related to a proposed action. This process shall be termed scoping and eliminating from further study non-significant issues.~~”); see also CEQ Memorandum for Heads of Federal Departments and Agencies, *Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act*, March 6, 2012, available at [https://ceq.doe.gov/current\\_developments/docs/Improving\\_NEPA\\_Efficiencies\\_06Mar2012.pdf](https://ceq.doe.gov/current_developments/docs/Improving_NEPA_Efficiencies_06Mar2012.pdf), supra note 139 (the CEQ Regulations explicitly require scoping for preparing an EIS; however, agencies ~~can~~ also can take advantage of scoping whenever preparing an EA).

<sup>71</sup><sup>144</sup> See 40 CFR 1500.4(~~bd~~), 1500.4(~~gi~~), ~~1501.7~~ 1501.9(a) and (c).

<sup>72</sup><sup>145</sup> See 40 CFR ~~1501.7~~ 1501.9 (The agency preparing the NEPA analysis must use the scoping process to, among other things, determine the scope and identify the significant issues to be analyzed in depth) ~~and~~; CEQ, *Memorandum for General Counsels, NEPA Liaisons, and Participants in Scoping*, April (Apr. 30, 1981), available at [https://eeq.doe.gov/sites/default/files/nepapub/nepa/regs/scope/scoping.htm\\_documents/RedDont/G-CEQ\\_-\\_scopingguidance.pdf](https://eeq.doe.gov/sites/default/files/nepapub/nepa/regs/scope/scoping.htm_documents/RedDont/G-CEQ_-_scopingguidance.pdf).

will help determine the degree to which to consider climate projections, including whether climate change considerations warrant emphasis, detailed analysis, and disclosure.<sup>146</sup>

Consistent with this guidance, agencies may develop their own agency-specific practices and guidance for framing the NEPA reviews. Grounded on the principles of

proportionality and the rule of reason, such ~~aids~~ practices and guidance can help an agency determine the extent to which ~~an analysis of GHG emissions and it should explore~~ climate change ~~impacts should be explored~~ effects in ~~the~~ its decision-making processes and will assist in the analysis of the no action and proposed alternatives and mitigation.<sup>73147</sup> The agency should explain such a framing process and its application to the proposed action to the decision makers and the public during the NEPA review and in the EA or EIS document.

### B. Frame of Reference

~~When discussing GHG emissions, as for all environmental impacts, it can be helpful to provide the decision maker and the public with a recognizable frame of reference for comparing alternatives and mitigation measures. Agencies should discuss relevant approved federal, regional, state, tribal, or local plans, policies, or laws for GHG emission reductions or climate adaptation to make clear whether a proposed project's~~

<sup>146</sup> As noted *infra* in section VI(E), to address environmental justice concerns, agencies should use the scoping process to identify potentially affected communities and provide early notice of opportunities for public engagement.

<sup>73147</sup> See, e.g., Matthew P. Thompson, Bruce G. Marcot, Frank R. Thompson, III, Steven McNulty, Larry A. Fisher, Michael C. Runge, David Cleaves, and Monica Tomosy U.S. Forest Service, *The Science of Decisionmaking: Applications for Sustainable Forest and Grassland Management in the National Forest System* (2013), available at [https://www.fs.fed.us/rm/pubs\\_other/rmrs\\_2013\\_thompson\\_m004.pdf](https://www.fs.fed.us/rm/pubs_other/rmrs_2013_thompson_m004.pdf); [usda.gov/research/treearch/44326](https://www.usda.gov/research/treearch/44326); U.S. Forest Service, *The Comparative Risk Assessment Framework and Tools* (2010), available at [https://www.fs.fed.us/psw/topics/fire\\_science/eraft/eraftusda.gov/treearch/pubs/34561](https://www.fs.fed.us/psw/topics/fire_science/eraft/eraftusda.gov/treearch/pubs/34561); and Julien Martin, Michael C. Runge, James D. Nichols, Bruce C. Lubow, and William L. Kendall *et al.*, *Structured decision making as a conceptual framework to identify thresholds for conservation and management* (2009), 19 Ecological Applications 19:1079–1090, available at [1079–90 \(2009\)](https://doi.org/10.1890/08-0255.1), <https://www.esajournals.org/doi/abs/10.1890/08-0255.1>; <https://pubs.er.usgs.gov/publication/70036878>.

~~GHG emissions are consistent with such plans or laws.<sup>74</sup> For example, the Bureau of Land Management has discussed how agency actions in California, especially joint projects with the State, may or may not facilitate California reaching its emission reduction goals under the State's Assembly Bill 32 (Global Warming Solutions Act).<sup>75</sup> This approach helps frame the policy context for the agency decision based on its NEPA review.~~

## **B. ~~C~~ Incorporation by Reference**

~~Incorporation~~ Agencies should consider using incorporation by reference ~~is of great value~~ in considering GHG emissions or where an agency is considering the implications of climate change for the proposed action and its environmental effects. The NEPA review for a specific action can incorporate by reference earlier programmatic studies or information such as management plans, inventories, assessments, and research, as well as any relevant programmatic or other NEPA reviews.<sup>148</sup> Agencies should identify situations where prior studies or NEPA analyses are likely to cover emissions or adaptation issues, in whole or in part, and incorporate them by reference in NEPA documents (including tiered NEPA documents) where appropriate. Agencies should confirm that prior studies or programmatic documents were conducted within a reasonable timeframe of the proposed action under consideration such that underlying assumptions are still applicable. ~~When Incorporation by reference may be helpful when~~ larger scale analyses have considered climate change ~~impacts~~ effects and GHG emissions, and calculating GHG emissions ~~and carbon stocks~~ for a specific action ~~may~~ would provide only limited information beyond

<sup>74</sup> See 40 CFR 1502.16(e), 1506.2(d) (where an inconsistency exists, agencies should describe the extent to which the agency will reconcile its proposed action with the plan or law). See also Exec. Order No. 13693, 80 Fed. Reg. 15869 (Mar. 25, 2015) (establishing GHG emission and related goals for agency facilities and operations. Scope 1, 2, and 3 emissions are typically separate and distinct from analyses and information used in an EA or EIS.).

<sup>75</sup> See, e.g., U.S. Bureau of Land Management, Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and Final Environmental Impact Statement, Vol. I, § 1.3.3.2, at 12, available at <http://drecp.org/finaldrecp/>.

<sup>148</sup> See 40 CFR 1502.4(b), 1501.12.

the information already collected and considered in the larger scale analyses. ~~The NEPA reviews for a specific action can incorporate by reference earlier programmatic studies or information such as management plans, inventories, assessments, and research that consider potential changes in carbon stocks, as well as any relevant programmatic NEPA reviews.~~<sup>76</sup>

~~Accordingly, agencies~~

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Agencies should use the scoping process to consider whether they should incorporate by reference GHG analyses from other programmatic studies, action specific NEPA reviews, or programmatic NEPA reviews to avoid duplication of effort.

Furthermore, agencies should engage other agencies and stakeholders with ~~expertise or an interest in~~knowledge of related actions to participate in the scoping process to identify relevant GHG and adaptation analyses from other actions or programmatic NEPA documents.

#### ~~D. Using Available Information~~

~~Agencies should make decisions using current scientific information and methodologies.~~

~~CEQ does not expect agencies to fund and conduct original climate change research to support their NEPA analyses or for agencies to require project proponents to do so.~~

~~Agencies should exercise their discretion to select and use the tools, methodologies, and~~

~~scientific and research information that are of high quality and available to assess In~~

~~addition, agencies are encouraged to use searchable databases, websites, GIS tools, and~~

~~other technology to share NEPA reviews with relevant agencies, stakeholders, and the~~

~~impactspublic.<sup>77</sup>~~

~~Agencies should be aware of the ongoing efforts to address the impacts of climate-~~

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<sup>76</sup>. See 40 CFR 1502.5, 1502.21.

<sup>77</sup>. See 40 CFR 1502.24 (requiring agencies to ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).

~~change on human health and vulnerable communities.<sup>78</sup> Certain groups, including children, the elderly, and the poor, are more vulnerable to climate-related health effects, and may face barriers to engaging on issues that disproportionately affect them. CEQ recommends that agencies periodically engage their environmental justice experts, and the Federal Interagency Working Group on Environmental Justice,<sup>79</sup> to identify approaches to avoid or minimize impacts that may have disproportionately high and~~

~~adverse human health or environmental effects on minority and low-income populations.<sup>80</sup>~~

### C. ~~E.~~ Programmatic or Broad-Based Studies and NEPA Reviews

~~Agency decisions can address different geographic scales that can range from the programmatic or landscape level to the site or project-specific level. Agencies sometimes conduct analyses or studies that are not NEPA reviews at the national level or other broad scale level (e.g., landscape, regional, or watershed) to assess the status of one or more resources or to determine trends in changing environmental conditions.<sup>81</sup> In the context of long-range energy, transportation, and resource management strategies an agency may decide that it would be useful and efficient to provide an aggregate analysis~~

<sup>78</sup> USGCRP, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (Apr. 2016), available at <https://health2016.globalechange.gov/downloads>.

<sup>79</sup> For more information on the Federal Interagency Working Group on Environmental Justice co-chaired by EPA and CEQ, see <http://www.epa.gov/environmentaljustice/interagency/index.html>.

<sup>80</sup> *President's Memorandum for the Heads of All Departments and Agencies, Executive Order on Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Feb. 11, 1994), available at <https://eeq.doe.gov/nepa/regs/eos/ii-5.pdf>; CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act*, available at <https://eeq.doe.gov/nepa/regs/ej/justice.pdf>.

<sup>81</sup> Such a programmatic study is distinct from a programmatic NEPA review which is appropriate when the action under consideration is itself subject to NEPA requirements. See CEQ, *Memorandum for Heads of Federal Departments and Agencies, Effective Use of Programmatic NEPA Reviews*, Dec. 18, 2014, § I(A), p. 9, available at [https://www.whitehouse.gov/sites/default/files/docs/effective\\_use\\_of\\_programmatic\\_nepa\\_reviews\\_final\\_dec2014\\_searchable.pdf](https://www.whitehouse.gov/sites/default/files/docs/effective_use_of_programmatic_nepa_reviews_final_dec2014_searchable.pdf) (discussing non-NEPA types of programmatic analyses such as data collection, assessments, and research, which previous NEPA guidance described as joint inventories or planning studies).



~~of GHG emissions or climate change effects in a programmatic analysis and then incorporate by reference that analysis into future NEPA reviews.~~ In the context of long-range energy, transportation, resource management, or similar programs or strategies, an agency may decide that it would be useful and efficient to provide an aggregate analysis of GHG emissions or climate change effects in a programmatic analysis and then incorporate it by reference into future NEPA reviews.

These broad analyses may occur through programmatic NEPA documents, or they may occur through other processes by which agencies conduct analyses or studies at the national or other broad scale level (e.g., landscape, regional, or watershed) to assess the status of one or more resources or to determine trends in changing environmental conditions.<sup>149</sup> In appropriate circumstances, agencies may rely on programmatic analyses to make project-level NEPA reviews more efficient by evaluating and analyzing effects at an earlier stage and at a broader level than project-specific actions. Agencies also can use programmatic analysis to analyze emissions from related activities in a given region or

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sector, or to serve as benchmark against which agencies can measure site-specific actions.<sup>150</sup>

A tiered, analytical decision-making approach using a programmatic NEPA review is used for many types of Federal actions<sup>82</sup> and can be particularly relevant to addressing proposed land, aquatic, and other resource management plans. Under such an

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<sup>149</sup> Programmatic studies may be distinct from programmatic NEPA reviews in which the programmatic action itself is subject to NEPA requirements. See CEO, Memorandum for Heads of Federal Departments and Agencies, Effective Use of Programmatic NEPA Reviews, section I(A), 9 (Dec. 18, 2014), [https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Effective\\_Use\\_of\\_Programmatic\\_NEPA\\_Reviews\\_Final\\_Dec2014\\_searchable.pdf](https://ceq.doe.gov/docs/ceq-regulations-and-guidance/Effective_Use_of_Programmatic_NEPA_Reviews_Final_Dec2014_searchable.pdf) (discussing non-NEPA types of programmatic analyses such as data collection, assessments, and research, which previous NEPA guidance described as joint inventories or planning studies).

<sup>150</sup> For instance, where a planning level programmatic review of GHG emissions indicates that a collection of individual actions will collectively reduce GHG emissions, the NEPA analyses for the individual actions can demonstrate that the action is consistent with the emission reductions examined in the programmatic review.

<sup>82</sup> See 40 CFR 1502.20, 1508.28. A programmatic NEPA review may be appropriate when a decision is being made that is subject to NEPA, such as establishing formal plans, programs, and policies, and when considering a suite of similar projects.

approach, an agency conducts a broad-scale programmatic NEPA analysis for decisions such as establishing or revising [the](#) USDA Forest Service land management plans, Bureau of Land Management resource management plans, or Natural Resources Conservation Service conservation programs. Subsequent NEPA analyses for proposed site-specific decisions—[such as proposed actions that ~~implement~~are consistent with](#) land, aquatic, and other resource management plans—[may be tiered from the broader programmatic analysis, drawing upon its basic framework analysis to avoid repeating analytical efforts for each tiered decision. Examples of project- or site-specific actions that may benefit from being able to tier to a programmatic NEPA review include: \[siting and constructing transmission lines\]\(#\); \[siting and constructing wind, solar or geothermal projects\]\(#\); conducting \[wildfire risk reduction activities such as\]\(#\) prescribed burns \[or hazardous fuels reduction\]\(#\); approving grazing leases; granting rights-of-way; ~~issuing leases for oil and gas drilling; authorizing construction of~~ \[wind, solar or geothermal projects\]\(#\); ~~and approving hard rock mineral extraction~~ \[and approving site-specific resilience or climate adaptation actions\]\(#\).](#)

A programmatic NEPA review ~~may~~ also [may](#) serve as an efficient mechanism in which to assess Federal agency efforts to adopt broad-scale sustainable practices for energy efficiency, GHG emissions avoidance and emissions reduction measures, petroleum product use reduction, and renewable energy use, as well as other sustainability practices.<sup>83</sup> [151](#) While broad department- or agency-wide goals may be of a far larger scale than a particular program, policy, or proposed action, an analysis that informs how a particular action affects that broader goal can be of value.

#### **D. Using Available Information**

[Agencies should make decisions using current scientific information and](#)

<sup>83</sup>. See Exec. Order No. 13693, 80 Fed. Reg. 15869 (Mar. 25, 2015); [151 See E.O. 14057, supra note 7 \(establishing government-wide and agency GHG reduction goals and targets\).](#)

methodologies. CEQ does not necessarily expect agencies to fund and conduct original climate change research to support their NEPA analyses or for agencies to require project proponents to do so. Agencies should exercise their discretion to select and use the tools, methodologies, and scientific and research information that are of high quality and available to assess relevant effects, alternatives, and mitigation.<sup>152</sup>

#### **E. Environmental Justice Considerations**

Numerous studies have found that environmental hazards (including those driven by climate change) are more prevalent in and pose particular risks to areas where people of color and low-income populations represent a higher fraction of the population compared with the general population.<sup>153</sup> The NEPA process calls for identifying potential environmental justice-related issues and meaningfully engaging with communities that proposed actions and reasonable alternatives (as well as the no-action alternative) may affect.

Agencies should be aware of the ongoing efforts to address the effects of climate change on human health and vulnerable communities.<sup>154</sup> Certain groups, including children, the elderly, communities with environmental justice concerns, which often include communities of color, low-income communities, Tribal Nations and Indigenous

communities, and underserved communities are more vulnerable to climate-related health effects and may face barriers to engaging on issues that disproportionately affect them.

CEQ recommends that agencies regularly engage environmental justice experts and

<sup>152</sup> See 40 CFR 1502.23 (requiring agencies to ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).

<sup>153</sup> See, e.g., USGCRP, Fourth National Climate Assessment, *supra* note 28, Volume II, 342 and 1077–78; USGCRP, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (Apr. 2016), <https://health2016.globalchange.gov/downloads>; EPA, *Six Impacts*, *supra* note 41, at 8 (Figure ES.2), [https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability\\_september-2021\\_508.pdf](https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf).

<sup>154</sup> USGCRP, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, *supra* note 153.

leverage the expertise of the White House Environmental Justice Interagency Council<sup>155</sup> to identify approaches to avoid or minimize adverse effects on communities of color and low-income communities.<sup>156</sup>

When assessing environmental justice considerations in NEPA analyses, agencies should use the scoping process to identify potentially affected communities and provide early notice of opportunities for public engagement. This is important for all members of the public and stakeholders, but especially for communities of color and low-income communities, including those who have suffered disproportionate public health or environmental harms and those who are at increased risk for climate change-related harms. Agencies should engage such communities early in the scoping and project planning process to understand any unique climate-related risks and concerns. Agencies also should use the NEPA process to identify and analyze reasonably foreseeable effects, reasonable alternatives, and measures to avoid or minimize any such effects.

#### **F. Monetizing Costs and Benefits**

NEPA does not require ~~monetizing costs and benefits. Furthermore~~a cost-benefit analysis where all monetized benefits and costs are directly compared. In a NEPA review, the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations.<sup>84157</sup> When Using the SC-GHG to provide an estimate of the cost to society from GHG emissions—or

otherwise monetizing discrete costs or benefits of a proposed Federal action— does not necessitate conducting a benefit-cost analysis in NEPA documents. As described in

<sup>155</sup> For more information on the White House Environmental Justice Interagency Council, *see* <https://www.energy.gov/lm/white-house-environmental-justice-interagency-council-resources>.

<sup>156</sup> President's Memorandum for the Heads of All Departments and Agencies, Executive Order on Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (Feb. 11, 1994), [https://www.epa.gov/sites/production/files/2015-02/documents/clinton\\_memo\\_12898.pdf](https://www.epa.gov/sites/production/files/2015-02/documents/clinton_memo_12898.pdf); CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act* (Dec. 10, 1997), <https://ceq.doe.gov/docs/ceq-regulations-and-guidance/regs/ej/justice.pdf>.

<sup>84157</sup> See 40 CFR ~~1502.23~~ [1502.22](#).

Section IV(B), the SC-GHG estimates are useful information disclosure metrics that can help decision makers and the public understand and contextualize GHG emissions and climate damages. Agencies can use the SC-GHG to provide information on climate impacts even if other costs and benefits cannot be quantified or monetized.

If an agency determines that a ~~monetized assessment of the impacts of greenhouse gas emissions or a~~ monetary cost-benefit analysis is appropriate and relevant to the choice among different alternatives ~~being considered, such~~ the agency is considering, the agency may include the analysis ~~may be incorporated by reference~~<sup>85</sup> in or ~~appended~~ append it to the NEPA document, or incorporate it by reference<sup>158</sup> as an aid in evaluating the environmental consequences.<sup>86</sup> For example, a rulemaking could have useful information for the NEPA review in an associated regulatory impact analysis, which the agency could ~~be incorporated~~ incorporate by reference.<sup>87</sup> in a NEPA document.<sup>159</sup>

When using a monetary cost-benefit analysis, just as with tools to quantify emissions, ~~the~~ an agency should disclose the assumptions, alternative inputs, and levels of uncertainty associated with such analysis. Finally, if an agency chooses to monetize some but not all ~~impacts~~ effects of an action, the agency providing this additional information

<sup>85</sup> See 40 CFR 1502.21 (material may be cited if it is reasonably available for inspection by potentially interested persons within the time allowed for public review and comment).

<sup>158</sup> See 40 CFR 1501.12 (material may be cited if it is reasonably available for inspection by potentially interested persons within the time allowed for public review and comment).

<sup>86</sup> When conducting a cost-benefit analysis, determining an appropriate method for preparing a cost-benefit analysis is a decision left to the agency's discretion, taking into account established practices for cost-benefit analysis with strong theoretical underpinnings (for example, see OMB Circular A-4 and references therein). For example, the Federal social cost of carbon (SCC) estimates the marginal damages associated with an increase in carbon dioxide emissions in a given year. Developed through an interagency process committed to ensuring that the SCC estimates reflect the best available science and methodologies and used to assess the social benefits of reducing carbon dioxide emissions across alternatives in rulemakings, it provides a harmonized, interagency metric that can give decision makers and the public useful information for their NEPA review. For current Federal estimates, see Interagency Working Group on Social Cost of Carbon, United States Government, *Technical Support Document Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (revised July 2015), available at <https://www.whitehouse.gov/omb/oira/social-cost-of-carbon>.

<sup>159</sup> For example, the regulatory impact analysis was used as a source of information and aligned with the NEPA review for Corporate Average Fuel Economy (CAFE) standards, see National Highway Traffic Safety Administration Admin., *Corporate Average Fuel Economy Standards, Passenger Cars and Light Trucks, Model Years 2017-2025 2017-2025, Final Environmental Impact Statement*, Docket No. NHTSA-2011-0056-2011-0056, section 5.3.2 (July 2012), § 5.3.2, available at <https://www.nhtsa.gov/Laws+&+Regulations/CAFE+-+Fuel+Economy/Environmental+Impact+Statement+for+CAFE+Standards,+corporate-average-fuel-economy/environmental-impact-statement-cafe-standards-2017-2025>.

should explain its rationale for doing so.<sup>88160</sup>

## ~~V. CONCLUSION AND EFFECTIVE DATE~~

### VII. Conclusions and Effective Date

Agencies should ~~apply~~use this guidance to inform the NEPA review for all new proposed ~~agency actions when a NEPA review is initiated~~. Agencies should exercise judgment when considering whether to apply this guidance to the extent practicable to an on-going NEPA process. CEQ does not expect agencies to apply this guidance to concluded NEPA reviews and actions for which a final EIS or EA has been issued.

Agencies should consider applying this guidance to projectsactions in the EIS or EA preparation stage if this would inform the consideration of ~~differences between~~ alternatives or help address comments raised through the public comment process ~~with sufficient scientific basis that suggest the environmental analysis would be incomplete without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included.~~

Dated: January 4, 2023.

Brenda Mallory.

Chair.

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<sup>88160</sup> For example, the information may be responsive to public comments or useful to the decision maker in further distinguishing between alternatives and mitigation measures. In all cases, the agency should ensure that its consideration of the information and other factors relevant to its decision is consistent with applicable statutory or other authorities, including requirements for the use of cost-benefit analysis.

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