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October 3, 2019

To: Federal Energy Regulatory Commission

Subject: Failure to Use the Social Cost of Greenhouse Gases in the Alaska LNG Project Draft Environmental Impact Statement—Docket No. CP17-178-000

Submitted by: Environmental Defense Fund, Institute for Policy Integrity at New York University School of Law, Montana Environmental Information Center, Natural Resources Defense Council, Sierra Club, The Wilderness Society, Union of Concerned Scientist[1]

CO28-1

These comments address the failure of the Federal Energy Regulatory Commission's environmental assessment of the Alaska Gasline Development Corporation's Alaska LNG project to provide a meaningful analysis of the pipeline project's climate effects, as required by the National Environmental Policy Act (NEPA) and Natural Gas Act (NGA).

The draft environmental impact statement (DEIS), prepared by the Federal Energy Regulatory Commission (FERC), on the Alaska LNG Project, reviews the proposal construct and operate a new gas treatment plant, two transmission lines, a compressor station, and an LNG liquefaction facility and marine terminal.[2] While the DEIS quantifies the tons of direct greenhouse gas emissions related to this project—up to 15 million metric tons of carbon dioxide-equivalent emissions per year from operations annually,[3] and an additional two million tons from construction[4]—FERC fails to use the social cost of greenhouse gas metric to fully account for the climate effects of these emissions. Had FERC applied the social cost of greenhouse gas metrics to monetize the climate damages of those emissions, decisionmakers and the public would have been informed that the project's direct carbon emissions will cause hundreds of millions of dollars per year in climate costs, from property damage, lost productivity, premature death, and other quantifiable effects from construction and operations emissions alone.[5] FERC also fails to consider the downstream greenhouse gas emissions of the project, despite the fact that there are readily available tools for FERC to easily make these estimates.

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[1] Our individual organizations may separately submit other comments regarding other aspects of the DEIS.

[2] FERC, Draft Environmental Impact Statement for the Alaska LNG Project at 1-1 (2019) [hereinafter "DEIS"].

[3] DEIS at 4-903, 4-913-915, 4-925 (annual gas treatment plant emissions of 6,607,655; annual compressor emissions of 233,785, 206,381, 166,013, and 191, 658; annual heater emissions of 125,201; annual liquefaction emissions of 7,863,113). *See also* DEIS at 4-104 (listing up to 60,792 metric tons of CO2e emissions from permafrost thaw during the life of the project). The use of FERC's emissions estimates here does not endorse those estimates as accurate or complete.

[4] DEIS at 4-897 to 4-901.

[5] The central estimate for the social cost of carbon for year 2020 emissions is $42 in 2007$. Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Update of the Social Cost of Carbon* 4 (2016). Using the CPI inflation calculator, $42 in 2007$ was worth about $52 in 2018$. 15 million metric tons * $52/ton = $780 million in climate damages for year 2020 emissions. A full analysis of climate damages would account for the facts that the social cost of carbon rises over time, but also that future costs and benefits should be discounted to present value.

CO28-1 See the response to comment CO24-3.

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FERC recapitulates flawed arguments used in other inadequate NEPA reviews to implicitly explain why the Commission refuses to use the social cost of greenhouse gases metric for the project. Specifically, FERC claims that there is "there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Project's incremental contribution to GHGs,"[6] and accordingly, that it is "not able to assess potential GHG-related impacts attributable to this Project" and ultimately is "unable to determine the significance of the Project's contribution to climate change."[7] CO28-1

FERC must assess the real-world climate impacts of its project's lifecycle emissions, including direct, upstream, and downstream emissions, and the social cost of greenhouse gas methodology is the best available tool for meaningfully weighing the significance of such impacts under both NEPA and the NGA. The draft DEIS arbitrarily rejects the social cost of greenhouse gas methodology, and so FERC has so far fallen short of its obligations under NEPA and the NGA.

I. FERC Should Monetize the Social Cost of Greenhouse Gases in its EIS

The National Environmental Policy Act (NEPA), the statute under which environmental impact statements are required, directs agencies to fully and accurately analyze the environmental, public health, and social welfare differences between proposed alternatives, and to contextualize that information for decision-makers and the public. NEPA requires a more searching analysis than merely disclosing the amount of pollution. Rather, FERC must examine the "ecological[,]… economic, [and] social" impacts of those emissions, including an assessment of their "significance."[8] By failing to use available tools, such as the social cost of carbon, to analyze the significance of emissions, FERC violated NEPA. CO28-2

Section 7 of the Natural Gas Act requires that the construction and operation of all interstate natural gas facilities first obtain a "certificate of public convenience and necessity issued by the Commission authorizing such acts or operations."[9] FERC is directed to approve only those certificates that are "or will be required by the present or future public convenience and necessity."[10] When enacting the Natural Gas Act, Congress determined that the "business of transporting and selling natural gas for ultimate distribution to the public is affected with the public interest."[11] As a result, the public convenience and necessity standard has been interpreted to encompasses "all factors bearing on the public interest."[12] Numerous courts have confirmed that environmental consequences must be considered when evaluating whether certificate application is in the public interest.[13] By not disclosing the significance of the project's climate impacts, FERC violated Section 7 of the NGA.

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[6] DEIS at 4-1162.
[7] DEIS at 4-1162.
[8] 40 C.F.R. §§ 1508.8(b), 1502.16(a)-(b).
[9] 15U.S.C.§717f(c)(1)(A)
[10] 15 U.S.C. § 717f(e).
[11] 15 U.S.C. § 717.
[12] Atl. Refining Co. v. Pub. Serv. Comm'n of N.Y., 360 U.S. 378, 391 (1959).
[13] Pub. Utilities Comm'n of State of Cal. v. FERC, 900 F.2d 269, 281 (D.C. Cir. 1990); Minisink Residents for Envtl. Pres. & Safety v. FERC, 762 F.3d 97, 101 (D.C. Cir. 2014) ("*Minisink*"); Myersville Citizens for a Rural Cmty. v. FERC, 783 F.3d 1301, 1307 (D.C. Cir. 2015) ("*Myersville*"); Sierra Club v. DOE, 867 F.3d 189, 202 (D.C. Cir. 2017).

CO28-2 See the response to comment CO24-3.

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Monetizing Climate Damages Fulfills the Obligations and Goals of NEPA and the NGA

CO28-3 When a project has climate consequences that must be assessed under NEPA, monetizing the climate damages fulfills an agency's legal obligations under NEPA in ways that simple quantification of tons of greenhouse gas emissions cannot. NEPA requires "hard look" consideration of beneficial and adverse effects of each alternative for major federal government actions. The U.S. Supreme Court has called the disclosure of impacts the "key requirement of NEPA," and held that agencies must "consider and disclose the *actual environmental effects*" of a proposed project in a way that "brings those effects to bear on [the agency's] decisions."[14] Courts have repeatedly concluded that an environmental impact statement must disclose relevant climate effects.[15] NEPA requires "a reasonably thorough discussion of the significant aspects of the probable environmental consequences," to "foster both informed decisionmaking and informed public participation."[16] In particular, "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impact analysis that NEPA requires," and it is arbitrary to fail to "provide the necessary contextual information about the cumulative and incremental environmental impacts."[17] Furthermore, the analyses included in environmental assessments and impact statements "cannot be misleading."[18] An agency must provide sufficient informational context to ensure that decisionmakers and the public will not misunderstand or overlook the magnitude of a proposed action's climate risks compared to the no action alternative. As this section explains, by only quantifying the volume of greenhouse gas emissions, agencies fail to assess and disclose the actual climate consequences of an action and misleadingly present information in ways that will cause decisionmakers and the public to overlook important climate consequences. Using the social cost of greenhouse gas metrics to monetize climate damages fulfills NEPA's legal obligations in ways that quantification alone cannot.

CO28-4 Similarly, monetizing climate damages advances the NGA's goals of reasoned decisionmaking. To assess whether a project is "required by present or future public convenience and necessity,"[19] FERC must "evaluate *all factors* bearing on the public interest."[20] Relevant factors include any "adverse effects" to "general societal interests," and specifically include "environmental impacts" beyond just those

[14] *Baltimore Gas & Elec. Co. v. Natural Res. Def. Council*, 462 U.S. 87, 96 (1983) (emphasis added); *see also* 40 C.F.R. § 1508.8(b) (requiring assessment of the "ecological," "economic," "social," and "health" "*effects*") (emphasis added).

[15] As the Ninth Circuit has held: "[T]he fact that climate change is largely a global phenomenon that includes actions that are outside of [the agency's] control . . . does not release the agency from the duty of assessing the effects of *its* actions on global warming within the context of other actions that also affect global warming." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008); *see also Border Power Plant Working Grp. v. U.S. Dep't of Energy*, 260 F. Supp. 2d 997, 1028-29 (S.D. Cal. 2003) (failure to disclose project's indirect carbon dioxide emissions violates NEPA).

[16] *Ctr. for Biological Diversity*, 538 F.3d at 1194 (citations omitted).

[17] *Id.* at 1217.

[18] *High Country Conservation Advocates v. U.S. Forest Service*, 52 F. Supp. 3d 1174, 1182 (D. Colo. 2014); *accord. Johnston v. Davis*, 698 F.2d 1088, 1094-95 (10th Cir. 1983) (disapproving of "misleading" statements resulting in "an unreasonable comparison of alternatives"); *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 446 (4th Cir. 1996) ("For an EIS to serve these functions" of taking a hard look and allowing the public to play a role in decisionmaking, "it is essential that the EIS not be based on misleading economic assumptions"); *see also Sierra Club v. Sigler*, 695 F.2d 957, 979 (5th Cir. 1983) (holding that an agency's "skewed cost-benefit analysis" was "deficient under NEPA"); *see generally Bus. Roundtable v. SEC*, 647 F.3d 1144, 1148-49 (D.C. Cir. 2011) (criticizing an agency for "inconsistently and opportunistically fram[ing] the costs and benefits of the rule" and for "fail[ing] adequately to quantify the certain costs or toe explain why those costs could not be quantified").

[19] 15 U.S.C. § 717f(e).

[20] *Missouri Public Serv. Comm'n v. FERC*, 234 F. 3d 36, 38 (D.C. Cir. 2000) (quoting *Atlantic Ref. Co. v. Public Serv. Comm'n*, 360 U.S. 378, 391 (1959)) (emphasis added).

CO28-3 See the response to comment CO24-3.

CO28-4 See the response to comment CO24-2.

experienced by landowners and the surrounding community, extending to cover the range of "other environmental issues considered under the National Environmental Policy Act."[21] When FERC "articulate[s] the critical facts upon which it relies" to review public convenience and necessity, "[a] passing reference to relevant factors . . . is not sufficient to satisfy the Commission's obligation to carry out 'reasoned' and 'principled' decisionmaking. [Courts] have repeatedly required the Commission to 'fully articulate the basis for its decision.'"[22] Consequently, when FERC weighs a project's climate consequences directly into its review of public convenience and necessity, monetization using the social cost of greenhouse gas metrics achieves the goal of fully articulating a relevant factor, while quantification alone would obscure important details. CO28-4

Under Section 3 of the NGA, regulatory oversight for the export of LNG and supporting facilities is divided between FERC and the Department of Energy (DOE). The NGA prohibits exportation of any natural gas from the U.S. to a foreign country without authorization.[23] The DOE delegated its authority to approve or deny applications for the siting, construction, expansion, or operation of LNG terminals to FERC, while retaining exclusive authority over the export of natural gas.[24]

Section 7 of the NGA provides FERC with the requisite authority to authorize the construction and operation of interstate natural gas pipelines, storage projects, and LNG facilities, which it approves through the issuance of a certificate of public convenience and necessity (hereinafter, "certificate").[25] There is a presumption favoring LNG authorization under Section 3 of the NGA, which provides that "an LNG proposal 'shall' be authorized unless the proposal 'will not be consistent with the public interest…'"[26] Conversely, FERC's review of new interstate natural gas pipelines under Section 7 of the NGA is not presumptive and requires a finding that a pipeline proposal "is or will be required by the present or future public convenience and necessity…"[27] Section 7(c) of the NGA has been characterized as "the heart of the statute."[28] This is because this statutory section provides FERC with wide latitude to establish natural gas policy.[29]

FERC fails to provide estimates of any of the project's downstream emissions. While some court cases indicate that the Department of Energy, and not FERC, is responsible for evaluating emissions from gas exported from LNG terminals,[30] the downstream emissions of pipelines must be analyzed and disclosed to the public under NEPA, and courts have recently instructed FERC to analyze downstream emissions from pipeline projects. In a recent case about another pipeline project,[31] the D.C. Circuit concluded that because greenhouse gas emissions are an indirect, reasonably foreseeable effect of authorizing the

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[21] 88 FERC ¶ 61,227, Statement of Policy at pp.23-24 (Sept. 15, 1999). *See, e.g., Minisink Residents for Envtl. Pres. v. FERC*, 762 F.3d 97, 101 (D.C. Cir. 2014) ("listing "conservation" and "environmental . . . issues" as the NGA's "subsidiary purposes").

[22] *Missouri Public Serv. Comm'n*, 234 F.3d at 40, 41 (citations omitted).

[23] 15 U.S.C. § 717b(a).

[24] *EarthReports, Inc., d/b/a/ Patuxent Riverkeeper, et al. v. FERC,* 2016 WL 3853830 at *2 (D.C. Cir. July 15, 2016) (citing Dep't of Energy Delegation Order No. 00-004.00A (effective May 16, 2006); 42 U.S.C. § 7172(e)).

[25] 15 U.S.C. § 717(f) (2014).

[26] 15 U.S.C. § 717b(a).

[27] 15 U.S.C. § 717f(e); *EarthReports, Inc.*, 2016 WL 3853830 at *2 (citing *W. Va. Pub. Servs. Comm'n v. Dep't of Energy*, 681 F.2d 847, 856 (D.C. Cir. 1982)).

[28] James H. McGrew, AMERICAN BAR ASSOCIATION BASIC PRACTICE SERIES: FED. ENERGY REGULATORY COMM'N 76 (2d ed. 2009).

[29] Joseph P. Tomain, ENERGY LAW IN A NUTSHELL 288 (2d ed. 2011).

[30] *Sierra Club v. FERC*, 827 F.3d 36, 48 (D.C. Cir. 2016).

[31] *Sierra Club v. FERC*, 867 F.3d 1357 (D.C. Cir. 2017) ("*Sabal Trail*").

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project that FERC has legal authority to mitigate the impacts of the Southeast Market Pipelines Project and should have provided a quantitative estimate of the downstream greenhouse emissions that would result from burning the natural gas transported by the pipelines, or at least explained more specifically why the agency could not do so.[32] The D.C. Circuit reached its conclusion as a growing number of other federal courts have held that NEPA requires analysis of reasonably foreseeable upstream and downstream emissions.[33] The DEIS does not specify that all natural gas transported by the pipeline will ultimately be exported through the LNG terminal.[34] And though in *Sabal Trail* the D.C. Circuit knew which power plants would burn the gas from the pipeline, knowing the exact, individual end-uses is not a necessary precondition to assessing reasonably foreseeable downstream emissions.[35] Accordingly, FERC should provide an estimate of the project's lifecycle emissions, including downstream emissions. CO28-4

Additionally, FERC failed to meaningfully analyze and disclose the fugitive emissions of GHGs associated with the project. In the DEIS, FERC merely states that the project would "result in fugitive emissions of GHGs (primarily [methane])" but that these fugitive emissions "do not require additional analysis."[36] Fugitive emissions for the project include 2,781 tons per year of CO2e associated with the proposed gas treatment plant,[37] and 2,424 tons per year of CO2e associated with the liquefaction facilities operation.[38] However, FERC failed to analyze the methane leakage potential for a project of this large scale, and failed to disclose the impacts of these fugitive emissions in a way the public and decisionmakers can understand. CO28-5

FERC Must Assess Actual Incremental Climate Impacts, Not Just the Volume of Emissions

The tons of greenhouse gases emitted by a project are not the "actual environmental effects" under NEPA, nor are they the relevant "factors bearing on the public interest" under the NGA. Rather, the actual effects and relevant factors are the incremental climate impacts caused by those emissions, and must be analyzed and disclosed to the public, including:[39] CO28-6

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[32] *Id.* at 1375.

[33] See, e.g., WildEarth Guardians, 870 F.3d at 1237-38; Mid States, 345 F.3d at 549-50; Montana Envtl. Info. Ctr., 274 F. Supp. 3d at 1090-91; San Juan Citizens Alliance, 326 F.Supp.3d at 1243-44; W. Org. of Res. Councils, No. CV-16-21-GF-BMM, at *13; WildEarth Guardians v. Zinke, 2019 WL at *14-18.

[34] For example, DEIS at 2-18 indicates that the mainline pipeline will include three gas interconnections "to allow for future in-state deliveries of natural gas."

[35] *See* Jayni Hein et al., Pipeline Approvals and Greenhouse Gas Emissions (Institute for Policy Integrity Report, 2019), https://policyintegrity.org/files/publications/Pipeline_Approvals_and_GHG_Emissions.pdf. at 16.

[36] DEIS at 4-915.

[37] *Id.* at 4-903

[38] *Id.* at 4-925.

[39] These impacts are all included to some degree in the three integrated assessment models (IAMs) used by the IWG (namely, the DICE, FUND, and PAGE models), though some impacts are modeled incompletely, and many other important damage categories are currently omitted from these IAMs. *Compare* Interagency Working Group on the Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis* at 6-8, 29-33 (2010), https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf [hereinafter 2010 TSD]; *with* Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (Cost of Carbon Project Report, 2014), http://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf. For other lists of actual climate effects, including air quality mortality, extreme temperature mortality, lost labor productivity, harmful algal blooms, spread of west nile virus, damage to roads and other infrastructure, effects on urban drainage, damage to coastal property, electricity demand and supply effects, water supply and quality effects, inland flooding, lost winter recreation, effects on agriculture and fish, lost ecosystem services from coral reefs, and wildfires, *see* EPA, *Multi-Model*

CO28-5 The estimated fugitive GHG emissions associated with Mainline Pipeline operation included in table 4.15.5-15 of the final EIS are relatively small compared to other GHG emissions sources and do not trigger other regulatory programs, such as air permitting.

CO28-6 See the responses to comments CO26-65 and CO26-69.

CO28 – Institute for Policy Integrity (cont'd)

CO28-6

- property lost or damaged by sea-level rise, coastal storms, flooding, and other extreme weather events, as well as the cost of protecting vulnerable property and the cost of resettlement following property losses;
- changes in energy demand, from temperature-related changes to the demand for cooling and heating;
- lost productivity and other impacts to agriculture, forestry, and fisheries, due to alterations in temperature, precipitation, CO_2 fertilization, and other climate effects;
- human health impacts, including cardiovascular and respiratory mortality from heat-related illnesses, changing disease vectors like malaria and dengue fever, increased diarrhea, and changes in associated pollution;
- changes in fresh water availability;
- ecosystem service impacts;
- impacts to outdoor recreation and other non-market amenities; and
- catastrophic impacts, including potentially rapid sea-level rise, damages at very high temperatures, or unknown events.

Even in combination with a general, qualitative discussion of climate change, by calculating only the tons of greenhouse gases emitted or a percentage comparison to sectoral, regional, or national emissions, an agency fails to meaningfully assess the actual incremental impacts to property, human health, productivity, and so forth.[40] An agency therefore falls short of its legal obligations and statutory objectives by disclosing only volume estimates. Similarly, courts have held that merely quantifying the acres of timber to be harvested or the miles of road to be constructed does not constitute a "description of *actual* environmental effects," even when paired with a qualitative "list of environmental concerns such as air quality, water quality, and endangered species," when the agency fails to assess "the degree that each factor will be impacted."[41]

CO28-7

By monetizing climate damages using the social cost of greenhouse gas metrics, FERC can satisfy NEPA's mandate to analyze and disclose to the public the actual effects of emissions and their significance. The social cost of greenhouse gas methodology calculates how the emission of an additional unit of greenhouse gases affects atmospheric greenhouse concentrations, how that change in atmospheric

Framework for Quantitative Sectoral Impacts Analysis: A Technical Report for the Fourth National Climate Assessment (2017); U.S. Global Change Research Program, *Climate Science Special Report: Fourth National Climate Assessment* (2017); EPA, *Climate Change in the United States: Benefits of Global Action* (2015); Union of Concerned Scientists, *Underwater: Rising Seas, Chronic Floods, and the Implications for U.S. Coastal Real Estate* (2018).

[40] *See High Country*, 52 F. Supp. 3d at 1190 ("Beyond quantifying the amount of emissions relative to state and national emissions and giving general discussion to the impacts of global climate change, [the agencies] did not discuss the impacts caused by these emissions."); *Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074, 1096–99 (D. Mont. 2017) (rejecting the argument that the agency "reasonably considered the impact of greenhouse gas emissions by quantifying the emissions which would be released if the [coal] mine expansion is approved, and comparing that amount to the net emissions of the United States").

[41] *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 995 (9th Cir. 2004) ("A calculation of the total number of acres to be harvested in the watershed is . . . not a sufficient description of the actual environmental effects that can be expected from logging those acres."); *see also Oregon Natural Res. Council v. Bureau of Land Mgmt.*, 470 F.3d 818 (9th Cir. 2006). *See also NRDC v. U.S. Nuclear Reg. Comm'n*, 685 F.2d 459, 487 (D.C. Cir. 1982) (ruling that merely listing "the quantity of . . . heat, chemicals, and radioactivity released" is insufficient under NEPA if the agency "does not reveal the meaning of those impacts in terms of human health or other environmental values"), *rev'd sub nom. on other grounds Baltimore Gas & Elec. Co.*, 462 U.S. at 106-07 ("agree[ing] with the Court of Appeals that NEPA requires an EIS to disclose the significant health, socioeconomic, and cumulative consequences of the environmental impact of a proposed action," but finding that the specific "consequences of effluent releases" could be assessed at a subsequent stage in the particular proceeding under review).

CO28-7 See the response to comment CO24-3.

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concentrations changes temperature, and how that change in temperature incrementally contributes to the above list of economic damages, including property damages, energy demand effects, lost agricultural productivity, human mortality and morbidity, lost ecosystem services and non-market amenities, and so forth.[42] CO28-7

FERC incorrectly claims that it cannot "attribute discrete, quantifiable, physical effects on the environment to the Project's incremental contribution to GHGs."[43] Monetizing the project's greenhouse gas emissions would allow FERC to determine exactly the project's discrete impacts on climate change.

Climate Damages Depend on Stock and Flow, But Volume Estimates Only Measure Flow

The climate damage generated by each additional ton of greenhouse gas emissions depends on the background concentration of greenhouse gases in the global atmosphere. Once emitted, greenhouse gases can linger in the atmosphere for centuries, building up the concentration of radiative-forcing pollution and affecting the climate in cumulative, non-linear ways.[44] As physical and economic systems become increasingly stressed by climate change, each marginal additional ton of emissions has a greater, non-linear impact. The climate damages generated by a given amount of greenhouse pollution is therefore a function not just of the pollution's total volume but also the year of emission, and with every passing year an additional ton of emissions inflicts greater damage.[45] CO28-8

As a result, focusing just on the volume or rate of emissions is insufficient to reveal the incremental effect on the climate. The change in the rate of emissions (flow) must be assessed given the background concentration of emissions (stock). A percent comparison to national emissions is perhaps even more misleading. For example, a project that adds 23 million additional tons per year of carbon dioxide would have contributed to 0.43% of total U.S. carbon dioxide emissions in the year 2012.[46] In the year 2014, that same project with the same carbon pollution would have contributed to just 0.41% of total U.S. carbon dioxide emissions—a seemingly smaller relative effect, since the total amount of U.S. emissions increased from 2012 to 2014.[47] However, because of rising background concentrations of global greenhouse gas stock, and because of growing stresses in physical and economic systems, the marginal climate damages per ton of carbon dioxide (as measured by the social cost of carbon) increased from $33 in 2012 to $35 in 2014 (in 2007$).[48] Consequently, those 23 million additional tons would have caused marginal climate damages costing $759 million in the year 2012, but by 2014 that same 23 million tons would have caused $805 million in climate damages. To summarize: the percent comparison to national emissions misleadingly implies that a project adding 23 million more tons of carbon dioxide would have a relatively less significant effect in 2014 than in 2012, whereas monetizing climate damages using the social cost of greenhouse gases would accurately reveal that the emissions in 2014 were much

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[42] 2010 TSD, *supra* note 39, at 5.

[43] DEIS at 4-1162

[44] Carbon dioxide also has cumulative effects on ocean acidification, in addition to cumulative radiative-forcing effects.

[45] *See* 2010 TSD, *supra* note 39, at 33 (explaining that the social cost of greenhouse gas estimates grow over time).

[46] Total U.S. carbon dioxide emissions in 2012 were 5,366.7 million metric tons (for all greenhouse gases, emissions were 6,529 MMT CO2 eq). *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016* at ES-6, tbl. ES-2 (2018).

[47] Total U.S. carbon dioxide emissions in 2014 were 5,568.8 million metric tons (and for all greenhouse gases, 6,763 MMT CO2 eq.) *Id.*

[48] Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis* at 25 tbl. A1 (2016) (calculating the central estimate at a 3% discount rate), https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc_tsd_final_clean_8_26_16.pdf [hereinafter 2016 TSD].

CO28-8 See the response to comment CO24-3.

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more damaging than the emissions in 2012—almost $50 million more. This example illustrates why only providing a percentage comparison against national or global greenhouse gas inventories (as FERC has done in other environmental reviews) is misleading. CO28-8

CO28-9 Capturing how marginal climate damages change as the background concentration changes is especially important because NEPA requires assessing both present and future impacts.[49] Different project alternatives can have different greenhouse gas consequences over time. Most simply, different alternatives could have different start dates or other consequential changes in timing. For example, FERC acknowledges that the applicant has not yet provided a revised construction schedule, but says such timing changes would not affect its determination of the project's impacts' significance.[50] Nor does FERC seriously consider an option to delay the pipeline project. Such an alternative could significantly change the climate consequences of natural gas projects, especially because a project's relative greenhouse gas effect compared to other alternatives or to the no-action *status quo* can change over time as the fuel mix in the overall market changes.[51] If FERC had used the social cost of greenhouse gases to assess the significance of the project's climate effects, it would know that a different timeline for construction and operation of the project can result in different total climate consequences. For the reasons explained above, calculating volumes or percentages is insufficient to accurately compare the climate damages of project alternatives with varying greenhouse gas emissions over time.

CO28-10 By factoring in projections of the increasing global stock of greenhouse gases as well as increasing stresses to physical and economic systems, the social cost of greenhouse gas metrics enable accurate and transparent comparisons of projects with varying greenhouse gas emissions over time.

Furthermore, FERC should use the social cost of greenhouse gas metrics to determine if the "updated construction emission calculations" it requests from AGDC[52] will result in a significant difference in the timing of emissions as presented in this DEIS. If the change in the timing of construction emissions, or total construction emissions, results in a significant change in monetized climate damages, that change should be disclosed for the public, with an additional opportunity to comment on any significant changes before the EIS is finalized.

Monetization Provides the Required Informational Context that Volume Estimates Lack

CO28-11 NEPA requires sufficient informational context; the NGA requires a reasoned explanation of factors and more than "passing references."[53] Yet without proper context, numbers like 125 thousand tons of carbon dioxide-equivalent in annual emissions from compressor station operations[54] will be misinterpreted by people as meaningless. Indeed, in a country of over 300 million people and over 6.5 billion tons of annual greenhouse gas emissions, it is far too easy to make highly significant effects appear relatively trivial. For example, presenting all weather-related deaths as less than 0.1% of total

[49] NEPA requires agencies to weigh the "relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity," as well as "any irreversible and irretrievable commitments of resources." 42 U.S.C. § 4332(2)(C).

[50] DEIS at 4-898.

[51] *See* U.S. Energy Info. Admin., *Annual Energy Outlook 2018 with Projections to 2050* at 84 (2018) (projecting coal's share of electricity generation to decline over time, while renewables' share increases).

[52] DEIS at 4-898.

[53] *See Missouri Public Serv. Comm'n*, 234 F.3d at 41.

[54] DEIS at 4-913

CO28-9 See the response to comment CO24-3.

CO28-10 See the response to comment CO24-3 and the updates to section 4.15.4 of the final EIS.

CO28-11 See the response to comment CO24-3.

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CO28-11

U.S. deaths makes the risk of death by weather event sound trivial, but in fact that figure represents over 2,000 premature deaths per year[55]—hardly an insignificant figure.[56] As the U.S. Court of Appeals for the Fifth Circuit recently observed, even a seemingly "very small portion" of a "gargantuan source of [harmful] pollution" may nevertheless "constitute[ ] a gargantuan source of [harmful] pollution on its own terms."[57] In other words, percentages can be misleading and can be manipulated by the choice of the denominator; what matters is the numerator's actual contribution to total harm.

Economic theory explains why monetization is a much better tool than volume estimates or percent comparisons to provide the necessary contextual information on climate damages. For example, many decisionmakers and interested citizens would wrongly take FERC's word that because there are no greenhouse gas emissions targets, it is impossible "to determine the significance of the Project's contribution to climate change"[58] and therefore the project's emissions should be treated as zero. As Professor Cass Sunstein has explained—drawing from the work of recent Nobel laureate economist Richard Thaler—a well-documented mental heuristic called "probability neglect" causes people to irrationally reduce small probability risks entirely down to zero.[59] People have significant "difficulty understanding a host of numerical concepts, especially risks and probabilities."[60] FERC's characterization of the project's greenhouse gas emissions misleadingly makes the climate impacts appear vanishingly small. By comparison, by applying the social cost of carbon dioxide (about $52 per ton for year 2020 emissions in 2018$[61]), decisionmakers and the public can readily comprehend that up to 15 million tons of carbon dioxide-equivalent emissions from the project's operational activities in just in the year 2020 would generate over $780 million in climate damages.[62]

Similarly, many people will be unable to distinguish the significance of project alternatives or scenario analyses with different emissions: for example, whether there is a significant difference between 6.6 million metric tons of emissions from gas treatment plant operations with "maximum flare" versus 4.2 million metric tons without maximum flare.[63] As the U.S. Environmental Protection Agency's website explains, "abstract measurements" of so many tons of greenhouse gases can be rather inscrutable for the public, unless "translat[ed] . . . into concrete terms you can understand."[64] Abstract volume estimates fail to give people the required informational context due to another well-documented

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[55] *Compare* Nat'l Ctr. for Health Stat., Ctrs. for Disease Control & Prevention, *Death Attributed to Heat, Cold, and Other Weather Events in the United States, 2006-2010* at 1 (2014) (reporting about 2000 weather-related deaths per year) *with* Nat'l Ctr. for Health Stat., *Deaths and Mortality*, https://www.cdc.gov/nchs/fastats/deaths.htm (reporting about 2.7 million U.S. deaths per year total).

[56] The public willingness to pay to avoid mortality is typically estimated at around $9.6 million (in 2016$). E.g., 83 Fed. Reg. 12,086, 12,098 (Mar. 19, 2018) (U.S. Coast Guard rule using the Department of Transportation's value of statistical life in a recent analysis of safety regulations). Losing 2,000 lives prematurely to weather-related events is equivalent to a loss of public welfare worth over $19 billion per year.

[57] *Southwestern Elec. Power Co. v. EPA*, No. 15-60821, 2019 WL 1577740 at *22 (5th Cir., Apr. 12, 2019).

[58] DESI at 4-1162.

[59] Cass R. Sunstein, *Probability Neglect: Emotions, Worst Cases, and Law*, 112 Yale L. J. 61, 63, 72 (2002).

[60] Valerie Reyna & Charles Brainerd, *Numeracy, Ratio Bias, and Denominator Neglect in Judgments of Risk and Probability*, 18 Learning & Individual Differences 89 (2007).

[61] *See supra* note 5.

[62] See calculation *supra* note 5.

[63] DEIS at 4-903.

[64] EPA, *Greenhouse Gas Equivalencies Calculator*. *Available at* https://web.archive.org/web/20180212182940/ https:/www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last updated Sept. 2017) ("Did you ever wonder what reducing carbon dioxide (CO_2) emissions by 1 million metric tons means in everyday terms? The greenhouse gas equivalencies calculator can help you understand just that, translating abstract measurements into concrete terms you can understand.").

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mental heuristic called "scope neglect." Scope neglect, as explained by Nobel laureate Daniel Kahneman, among others, causes people to ignore the size of a problem when estimating the value of addressing the problem. For example, in one often-cited study, subjects were unable to meaningfully distinguish between the value of saving 2,000 migratory birds from drowning in uncovered oil ponds, as compared to saving 20,000 birds.[65]

Scope neglect means many decisionmakers and members of the public would be unable to meaningfully distinguish the climate risks of 6.6 million versus 4.2 million metric tons of emissions. Certainly people can discern that one number is higher, but without any context it may be difficult to weigh the relative magnitude of the climate risks from these volumes of emissions. In contrast, the climate risks would have been readily discernible through application of the social cost of greenhouse gas metrics. In this example, the additional 2.4 million metric tons from maximum flare events contributes over $124 million in additional climate damages.[66]

In general, non-monetized effects are often irrationally treated as worthless.[67] On several occasions, courts have struck down administrative decisions for failing to give weight to non-monetized effects.[68] Most relevantly, in *Center for Biological Diversity v. NHTSA*, the U.S. Court of Appeals for the Ninth Circuit found it arbitrary and capricious to give zero value "to the most significant benefit of more stringent [fuel economy] standards: reduction in carbon emissions."[69] Monetizing climate damages provides the informational context required by NEPA and the NGA, whereas a simple tally of emissions volume and rote, qualitative, generic description of climate change are misleading and fail to give the public and decisionmakers the required information about the magnitude of discrete climate effects.[70]

Climate Effects Must Be Monetized If Other Costs and Benefits Are Monetized

CO28-12

Though NEPA does not require a full and formal cost-benefit analysis in all cases,[71] agencies' approaches to assessing costs and benefits must be balanced and reasonable. Courts have warned agencies, for example, that "[e]ven though NEPA does not require a cost-benefit analysis," an agency cannot

[65] Daniel Kahneman et al., *Economic Preferences or Attitude Expressions? An Analysis of Dollar Responses to Public Issues*, 19 J. Risk & Uncertainty 203, 212-213 (1999).

[66] *See* figures and calculation at *supra* note 5.

[67] Richard Revesz, *Quantifying Regulatory Benefits*, 102 Cal. L. Rev. 1424, 1434-35, 1442 (2014).

[68] *See id.* at 1428, 1434.

[69] 538 F.3d at 1199.

[70] *See* 42 U.S.C. § 4332(2)(B) (requiring agencies to "identify and develop methods and procedures . . . which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations").

[71] 40 C.F.R. § 1502.23 ("[T]he weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis."); *but see e.g.*, *Sierra Club v. Sigler*, 695 F.2d 957, 978-79 (5th Cir. 1983) (holding that NEPA "mandates at least a broad, informal cost-benefit analysis," and so agencies must "fully and accurately" and "objectively" assess environmental, economic, and technical costs); *Chelsea Neighborhood Ass'ns v. U.S. Postal Serv.*, 516 F.2d 378, 387 (2d Cir. 1975) ("NEPA, in effect, requires a broadly defined cost-benefit analysis of major federal activities."); *Calvert Cliffs' Coordinating Comm. v. U.S. Atomic Energy Comm'n*, 449 F.2d 1109, 1113 (D.C. Cir. 1971) ("NEPA mandates a rather finely tuned and 'systematic' balancing analysis" of "environmental costs" against "economic and technical benefits"); *Nat'l Wildlife Fed. v. Marsh*, 568 F. Supp. 985, 1000 (D.D.C. 1983) ("The cost-benefit analysis of NEPA is concerned primarily with environmental costs. . . . A court may examine the cost-benefit analysis only as it bears upon the function of insuring that the agency has examined the environmental consequences of a proposed project."); *High Country*, 52 F.Supp.3d at 1191 (holding that NEPA does not require cost-benefit analysis, although monetizing benefits but not costs is arbitrary and capricious).

CO28-12 See the response to comment CO24-3.

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selectively monetize benefits in support of its decision while refusing to monetize the costs of its action.[72]

In *High Country Conservation Advocates v. Forest Service*, the U.S. District Court of Colorado found that it was "arbitrary and capricious to quantify the *benefits* of the lease modifications and then explain that a similar analysis of the *costs* was impossible when such an analysis was in fact possible."[73] The court explained that, to support a decision on coal mining activity, the agencies had "weighed several specific economic benefits—coal recovered, payroll, associated purchases of supplies and services, and royalties," but arbitrarily failed to monetized climate costs using the readily available social cost of carbon protocol.[74] Similarly, in *Montana Environmental Information Center v. Office of Surface Mining* (*MEIC v. OSM*), the U.S. District Court of Montana followed the lead set by *High Country* and likewise held an environmental assessment to be arbitrary and capricious because it quantified the benefits of action (such as employment payroll, tax revenue, and royalties) while failing to use the social cost of carbon to quantify the costs.[75]

High Country and *MEIC v. OSM* are the latest applications of a broader line of case law in which courts find it arbitrary and capricious to apply inconsistent protocols for analyzing some effects compared to others, especially when the inconsistency obscures some of the most significant effects.[76] For example, in *Center for Biological Diversity v. NHTSA*, the U.S. Court of Appeals for the Ninth Circuit ruled that, because the agency had monetized other uncertain costs and benefits of its vehicle fuel efficiency standard—like traffic congestion and noise costs—its "decision not to monetize the benefit of carbon emissions reduction was arbitrary and capricious."[77] Specifically, it was arbitrary to "assign[ ] no value to *the most significant benefit* of more stringent [vehicle fuel efficiency] standards: reduction in carbon emissions."[78] When an agency bases a decision on cost-benefit analysis, it is arbitrary to "put a thumb on the scale by undervaluing the benefits and overvaluing the costs."[79] Similarly, the U.S. Court of Appeals for the District of Columbia Circuit has chastised agencies for "inconsistently and opportunistically fram[ing] the costs and benefits of the rule [and] fail[ing] adequately to quantify certain costs or to explain why those costs could not be quantified"[80]; and the U.S. Court of Appeals for the Tenth Circuit has remanded an environmental impact statement because "unrealistic" assumptions "misleading[ly]" skewed comparison of the project's positive and negative effects.[81]

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[72] *High Country Conservation Advocates*, 52 F. Supp. 3d at 1191; *accord. MEIC v. Office of Surface Mining*, 274 F. Supp. 3d at 1094-99 (holding it was arbitrary for the agency to quantify benefits in an EIS while failing to use the social cost of carbon to quantify costs, as well as arbitrary to imply there would be no effects from greenhouse gas emissions).

[73] 52 F. Supp. 3d at 1191.

[74] *Id.*

[75] 274 F. Supp. 3d at 1094-99 (also holding that it was arbitrary to imply that there would be zero effects from greenhouse gas emissions).

[76] Other cases from different courts that have declined to rule against failures to use the social cost of carbon in NEPA analyses are all distinguishable by the scale of the action or by whether other effects were quantified and monetized in the analysis. *See League of Wilderness Defenders v. Connaughton*, No. 3:12-cv-02271-HZ (D. Ore., Dec. 9, 2014); *EarthReports v. FERC*, 15-1127, (D.C. Cir. July 15, 2016); *WildEarth Guardians v. Zinke*, 1:16-CV-00605-RJ, at 23-24, (D. N.M. Feb. 16, 2017).

[77] 538 F.3d 1172, 1203 (9th Cir. 2008).

[78] *Id.* at 1199.

[79] *Id.* at 1198.

[80] *Bus. Roundtable v. SCC*, 647 F.3d 1144, 1148-49 (D.C. Cir. 2011)

[81] *Johnston v. Davis*, 698 F.2d 1088, 1094–95 (10th Cir. 1983)

Here, the DEIS reports $395 million in labor income for a single year of operations,[82] as well as construction payroll[83] and total purchases[84]—categories of economic benefits similar to the income and output benefits highlighted in *High Country* and *MEIC*.[85] The DEIS repeatedly refers to the project's "economic benefits,"[86] and relies on monetized figures of payroll and purchases to conclude that "[i]ndirect economic benefits via tax revenue, employment, and spending would be expected to be permanent and significant."[87] FERC violates NEPA by reporting impacts like earnings in monetized figures while failing to use another readily available protocol to monetize important environmental costs. CO28-12

II. The Social Cost of Greenhouse Gas Metric Is the Appropriate Tool to Assess the Significance of a Project's Emissions

The draft EIS claims that the agency is "not aware of a tool to meaningfully attribute specific increases in global CO2 concentrations, heat forcing, or similar global impacts to Project-specific GHG emissions,"[88] and that "[w][ithout either the ability to determine discrete resource impacts or an established target to compare GHG emissions against," FERC is "unable to determine the significance of the Project's contribution to climate change."[89] However, FERC's claim is misleading: applying the social cost of greenhouse gas protocol to monetize the incremental climate impacts of specific projects is appropriate, straightforward, and meaningfully facilitates review of the significance of a project's environmental impacts. Indeed, FERC has elsewhere admitted that "we accept that the Social Cost of Carbon methodology does constitute a tool that can be used to estimate incremental physical climate change impacts."[90] CO28-13

CO28-13 See the response to comment CO24-3.

Monetization Is Appropriate and Useful in Any Decision with Significant Climate Impacts, and Its Use Should Not Be Limited to Regulatory Analyses

Though the federal Interagency Working Group on the Social Cost of Greenhouse Gases originally developed its estimates of the social cost of greenhouse gases to harmonize the metrics used by agencies in their various regulatory impact analyses, there is nothing in the numbers' development that would limit applications to other decisionmaking contexts. The social cost of greenhouse gases measures the marginal cost of any additional unit of greenhouse gases emitted into the atmosphere. The government action that precipitated a particular unit of emissions—whether a regulation, the granting of a permit, or a project approval—is irrelevant to the marginal climate damages caused by the emissions. Whether emitted by a leaking pipeline or the fossil fuel extraction process, whether emitted because of a regulation or a resource management decision, whether emitted in Colorado or Maine or anywhere else, the marginal climate damages per unit of emissions remain the same. Indeed, the social CO28-14

CO28-14 See the response to comment CO24-3.

[82] DEIS at 4-605.
[83] DEIS at table 4.11.2-6.
[84] DEIS at 4-602.
[85] The DEIS also suggests significant governmental revenue benefits, *see* DEIS at table 4.11.4-3.
[86] DEIS at ES-4, 4-602, 4-1147, 5-33.
[87] DEIS at 4-1147.
[88] DEIS at 4-1162.
[89] *Id.*
[90] *Sabal Trail Remand Order*, 162 FERC 61,233, at P 48.

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cost of greenhouse gases has been used by many federal and state agencies in environmental impact analyses[91] and in resource management decisions.[92]

The Social Cost of Greenhouse Gas Metric Provides a Tool to Assess the Significance of Individual Physical Impacts

CO28-15

The social cost of greenhouse gas methodology is well suited to measure the marginal climate damages of individual projects. These protocols were developed to assess the cost of actions with "marginal" impacts on cumulative global emissions, and the metrics estimate the dollar figure of damages for one extra unit of greenhouse gas emissions. This marginal cost is calculated using integrated assessment models. These models translate emissions into changes in atmospheric greenhouse concentrations, atmospheric concentrations into changes in temperature, and changes in temperature into economic damages. A range of plausible socio-economic and emissions trajectories are used to account for the scope of potential scenarios and circumstances that may actually result in the coming years and decades. The marginal cost is attained by first running the models using a baseline emissions trajectory, and then running the same models again with one additional unit of emissions. The difference in damages between the two runs is the marginal cost of one additional unit. The approach assumes that the marginal damages from increased emissions will remain constant for small emissions increases relative to gross global emissions. In other words, the monetization tools are in fact perfectly suited to measuring the marginal effects of individual projects or other discrete agency actions.

Some of the incremental impacts on the environment that the social cost of greenhouse gas protocol captures—and which the DEIS fails to meaningfully analyze—include property lost or damaged; impacts to agriculture, forestry, and fisheries; impacts to human health; changes in fresh water availability; ecosystem service impacts; impacts to outdoor recreation and other non-market amenities; and some catastrophic impacts, including potentially rapid sea-level rise, damages at very high temperatures, or unknown events.[93] A key advantage of using the social cost of greenhouse gas tool is that each physical

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[91] For example, in August 2017, the Bureau of Ocean Energy Management called the social cost of carbon "a useful measure to assess the benefits of CO2 reductions and inform agency decisions," and applied the metric in an environmental impact statement to monetize the emissions difference of about 5 million metric tons per year between the proposed oil and gas development project and the no-action baseline, *Draft Environmental Impact Statement—Liberty Development Project in the Beaufort Sea, Alaska* at 3-129, 4-50 (2017). More generally, agencies have used IWG's social cost of greenhouse gas estimates not only in scores of rulemakings but also in NEPA analyses for resource management decisions. *See* Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 Columbia J. Envtl. L. 203, 270-84 (2017) (listing all uses by federal agencies through July 2016).

[92] States have used the social cost of greenhouse gases in decisions about electricity planning. *See* Iliana Paul et al., *The Social Cost of Greenhouse Gases and State Policy: A Frequently Asked Questions Guide* (Policy Integrity Report, 2017), http://policyintegrity.org/files/publications/SCC_State_Guidance.pdf.

[93] These impacts are all included to some degree in the three integrated assessment models (IAMs) used by the IWG (namely, the DICE, FUND, and PAGE models), though some impacts are modeled incompletely, and many other important damage categories are currently omitted from these IAMs. *Compare* Interagency Working Group on the Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis* at 6-8, 29-33 (2010), https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf [hereinafter 2010 TSD]; *with* Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (Cost of Carbon Project Report, 2014), http://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf. For other lists of actual climate effects, including air quality mortality, extreme temperature mortality, lost labor productivity, harmful algal blooms, spread of West Nile virus, damage to roads and other infrastructure, effects on urban drainage, damage to coastal property, electricity demand and supply effects, water supply and quality effects, inland flooding, lost winter recreation, effects on agriculture and fish, lost ecosystem services from coral reefs, and wildfires, *see* EPA, *Multi-Model Framework for Quantitative Sectoral Impacts Analysis: A Technical Report for the Fourth National Climate Assessment* (2017);

CO28-15 See the response to comment CO24-3.

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impact—such as sea-level rise and increasing temperatures—need not be assessed in isolation. Instead, the social cost of greenhouse gas tool conveniently groups together the multitude of climate impacts and, consistent with NEPA regulations,[94] enables agencies to assess whether all those impacts are cumulatively significant and to then compare those impacts with other impacts or alternatives using a common metric. CO28-15

By applying the social cost of greenhouse gases, the common metric of money provides the very framework for assessing significance that FERC is looking for. While the relative significance of, for example, 20,000 additional tons of carbon dioxide per year versus 2 million additional tons of carbon dioxide per year may be somewhat challenging to discern, the relative significance of \$1 million per year in climate damages versus \$100 million per year in climate damages is much easier to discern. In this case, applying the social cost of greenhouse gases reveals that the project's direct operational emissions alone will cause at least \$780 million per year in property damage, lost productivity, premature death, and other quantifiable effects.[95] Determining the significance of \$780 million in annual climate damages still requires FERC to exercise its professional judgment, but that is no different than how FERC routinely applies its judgment to determine the significance of impacts to landowners, the local community, or the tax base. Tellingly, in this DEIS, FERC first monetizes the project's employment payroll figures and total purchasing before concluding that "[i]ndirect economic benefits via tax revenue, employment, and spending would be expected to be permanent *and significant*."[96] In short, FERC used monetized figures of alleged economic benefits to assess significance. Similarly, as opposed to the raw volume estimates, monetized figures of climate damage could be reasonably weighed by FERC against reasonable judgments about a project's other qualitative, quantitative, or monetized costs and benefits. In short, applying the social cost of greenhouse gases is both straightforward and meaningfully informs FERC's decisions under NEPA and the NGA in ways that volume estimates alone cannot.

The Tons of Greenhouse Gas Emissions at Stake Here Are Clearly Significant

While there may not be a bright-line test for determining significance, the potential emissions from this project are clearly significant and warrant monetization. In *High Country*, the District Court for the District of Colorado found that it was arbitrary for the Forest Service not to monetize the "1.23 million tons of carbon dioxide equivalent emissions [from methane] the West Elk mine emits annually."[97] That suggests a threshold for monetization far below the tons of greenhouse gases at stake here. In *MEIC v. OSM*, the District Court for the District of Montana found it was arbitrary for the Office of Surface Mining not to monetize the 23.16 million metric tons of carbon dioxide-equivalent.[98] In *Center for Biological Diversity*, the Ninth Circuit found that it was arbitrary for the Department of Transportation CO28-16

U.S. Global Change Research Program, *Climate Science Special Report: Fourth National Climate Assessment* (2017); EPA, *Climate Change in the United States: Benefits of Global Action* (2015); Union of Concerned Scientists, *Underwater: Rising Seas, Chronic Floods, and the Implications for U.S. Coastal Real Estate* (2018).

[94] 40 C.F.R. § 1508.27(b)(7) (explaining that actions can be significant if related to individually insignificant but cumulatively significant impacts).

[95] The central estimate for the social cost of carbon for year 2020 emissions is \$42 in 2007\$. Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Update of the Social Cost of Carbon* 4 (2016). Using the CPI inflation calculator, \$42 in 2007\$ was worth about \$52 in 2018\$. 1.97 million tons CO_2e + .393 million tons CO_2e * \$52/ton = ~\$104 million in climate damages for year 2020 emissions. A full analysis of climate damages would account for the facts that the social cost of carbon rises over time, but also that future costs and benefits should be discounted to present value.

[96] DEIS at 4-1147 (emphasis added).

[97] 52 F. Supp. 3d at 1191 (quoting an e-mail comment on the draft statement for the quantification of tons).

[98] *MEIC v. Office of Surface Mining* at 36-37.

CO28-16 See the responses to comments CM6-4, CO24-2, CO24-3, and CO27-2.

not to monetize the 35 million metric ton difference in lifetime emissions from increasing the fuel efficiency of motor vehicles:[99] given the estimated lifetime of vehicles sold in the years 2008-2011 (sometimes estimated at about 15 years on average), this could represent as little two million metric tons per year. In a recent environmental impact statement from the Bureau of Ocean Energy Management published in August 2017, the agency explained that the social cost of carbon was "a useful measure" to apply to a NEPA analysis of an action anticipated to have a difference in greenhouse gas emissions compared to the no-action baseline of about 25 million metric tons over a 5-year period,[100] or about 5 million metric tons per year. CO28-16

Under any reasonable application of the social cost of greenhouse gas metrics, the high-end emissions estimates from the operations of the project will cause more than $780 million of dollars in climate damages each year. Tellingly, FERC deemed it appropriate to monetize smaller effects of the project. For example, it had no problem reporting the potential for the project to generate $395 million in per year in operational labor income.[101] A potential climate cost of hundreds of millions of dollars is also significant, particularly in the context of a document the very purpose of which is to evaluate a project's *environmental* impacts.

Monetizing Climate Damages Is Appropriate and Useful Regardless of Whether Every Effect Can Be Monetized in a Full Cost-Benefit Analysis

Even without a full cost-benefit analysis of the project, monetizing one key impact still provides useful information for decisonmakers and the public even when monetizing other impacts is not feasible. The social cost of greenhouse gases enables a more accurate and transparent comparison of alternatives along the dimension of climate impacts even if other costs and benefits cannot be quantified, and "breakeven analysis" could provide a framework for making decisions when some effects but not others are monetized. Climate damages can and should be monetized even if other costs and benefits are harder to quantify or monetize and so must be discussed qualitatively. Many effects can readily be quantified and monetized, and agencies should generally do so when feasible; other effects, like water quality, are notoriously difficult to quantify and monetize, due to the geographically idiosyncratic nature of individual water bodies. Greenhouse gases, by comparison, have the same impact on climate change no matter where they are emitted, and those impacts are readily monetized using the social cost of greenhouse gases methodology. Regardless of whether all other effects can be monetized, using the social cost of greenhouse gases provides useful and necessary information to the public and decisionmakers. In particular, whether or not other effects are monetized, using the social cost of greenhouse gases will facilitate comparison between alternative options along the dimension of climate change. As discussed above, different alternatives could have varying greenhouse gas consequences over time, and monetization provides the best means of comparing project alternatives along the dimension of climate change. CO28-17 CO28-18

Moreover, analytical frameworks exist to weigh qualitative effects alongside monetized effects. NEPA regulations, for example, first state that if there are "important qualitative considerations," then the ultimate "weighing of the merits and drawbacks of the various alternatives" should not be displayed exclusively as a "monetary cost-benefit analysis." Nevertheless, NEPA regulations further acknowledge CO28-19

[99] 538 F.3d at 1187.

[100] BOEM, *Liberty Development and Production Plan Draft EIS* at 3-129, 4,50 (2017) (89,940,000 minus 64,570,000 is about 25 million).

[101] DEIS at 4-605.

CO28-17 See the response to comment CO24-3.

CO28-18 See the response to comment CO24-3.

CO28-19 See the response to comment CO24-3.

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that when monetization of costs and benefits is "relevant to the choice among environmentally different alternatives," "that analysis" can be presented alongside "any analyses of unquantified environmental impacts, values, and amenities."[102] In other words, agencies should provide quantified and/or monetized impacts to the extent practicable, alongside any qualitative assessment. CO28-19

The Office of Management and Budget's *Circular A-4*[103] guidance to agencies on conducting economic analysis also provides a framework for weighing monetized and qualitative costs and benefits, called break-even analysis:

> It will not always be possible to express in monetary units all of the important benefits and costs. When it is not, the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate. In such cases, you should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis. If the non-quantified benefits and costs are likely to be important, you should carry out a "threshold" analysis to evaluate their significance. Threshold or "break-even" analysis answers the question, "How small could the value of the non-quantified benefits be (or how large would the value of the non-quantified costs need to be) before the rule would yield zero net benefits?" In addition to threshold analysis you should indicate, where possible, which non-quantified effects are most important and why.[104]

Even without using something as formal as a break-even analysis, it is clear that monetizing climate damages provides useful information whether or not every effect can be monetized in a full cost-benefit analysis.

III. FERC Should Use the Interagency Working Group's 2016 Estimates of the Social Cost of Carbon, Methane, and Nitrous Oxide

In 2016, the IWG published updated central estimates for the social cost of greenhouse gases: $50 per ton of carbon dioxide, $1440 per ton of methane, and $18,000 per ton of nitrous oxide (in 2017 dollars for year 2020 emissions).[105] Agencies must continue to use estimates of a similar or higher[106] value in their analyses and decisionmaking. A recent Executive Order disbanding the IWG does not change the fact that the IWG estimates still reflect the best available data and methodologies. CO28-20

FERC's insistence on continuing to wait for a "universally accepted" tool that can "meaningfully attribute specific increases in global CO_2 concentrations, heat forcing, or similar global impacts to Project-specific GHG emissions,"[107] sets the wrong standard for analysis. Though perhaps not "universally accepted"—as

[102] 40 C.F.R. § 1502.23.

[103] Though *Circular A-4* focus on agencies' regulatory analyses under Executive Order 12,866, the document nevertheless more generally has distilled best practices on economic analysis and is a useful guide to all agencies undertaking an assessment of costs and benefits.

[104] OMB, Circular A-4 at 2 (2003).

[105] U.S. Interagency Working Group on the Social Cost of Greenhouse Gases, "Technical support document: Technical update of the social cost of carbon for regulatory impact analysis under executive order 12866 & Addendum: Application of the methodology to estimate the social cost of methane and the social cost of nitrous oxide" (2016), available at https://obamawhitehouse.archives.gov/omb/oira/social-cost-of-carbon.

[106] See, e.g., Richard L. Revesz et al., Global Warming: Improve Economic Models of Climate Change, 508 NATURE 173 (2014) (explaining that current estimates omit key damage categories and, therefore, are very likely underestimates).

[107] DEIS at 4-1162.

CO28-20 See the response to comment CO24-3.

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evident by FERC's continued opposition to the metrics—the IWG's social cost of greenhouse gas estimates have been used in over 100 federal actions and numerous state actions.[108] The social cost of greenhouse gas tool has been widely used precisely because it allows agencies to consider the actual effects of emissions and their significance in ways that merely providing a quantitative estimate of the volume of emissions cannot. CO28-20

IWG's Methodology Is Rigorous, Transparent, and Based on Best Available Data

Beginning in 2009, the IWG assembled experts from a dozen federal agencies and White House offices to "estimate the monetized damages associated with an incremental increase in carbon emissions in a given year" based on "a defensible set of input assumptions that are grounded in the existing scientific and economic literature."[109] IWG's methods combined three frequently used models built to predict the economic costs of the physical impacts of each additional ton of carbon.[110] The models together incorporate such damage categories as: agricultural and forestry impacts, coastal impacts due to sea level rise, impacts from extreme weather events, impacts to vulnerable market sectors, human health impacts including malaria and pollution, outdoor recreation impacts and other non-market amenities, impacts to human settlements and ecosystems, and some catastrophic impacts.[111] IWG ran these models using a baseline scenario including inputs and assumptions drawn from the peer-reviewed literature, and then ran the models again with an additional unit of carbon emissions to determine the increased economic damages.[112] IWG's social cost of carbon estimates were first issued in 2010 and have been updated several times to reflect the latest and best scientific and economic data.[113] CO28-21

Following the development of estimates for carbon dioxide, the same basic methodology was used in 2016 to develop the social cost of methane and social cost of nitrous oxide—estimates that capture the distinct heating potential of methane and nitrous oxide emissions.[114] These additional metrics used the same economic models, the same treatment of uncertainty, and the same methodological assumptions that IWG applied to the social cost of carbon, and these new estimates underwent rigorous peer-review.[115]

IWG's methodology has been repeatedly endorsed by reviewers. In 2014, the U.S. Government Accountability Office concluded that IWG had followed a "consensus-based" approach, relied on peer-reviewed academic literature, disclosed relevant limitations, and adequately planned to incorporate new information through public comments and updated research.[116] In 2016 and 2017, the National Academies of Sciences, Engineering, and Medicine issued two reports that, while recommending future

[108] Institute for Policy Integrity, Social Cost of Greenhouse Gases, Issue Brief (Feb 2017).

[109] IWG, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (2010) ("2010 TSD"). *Available at* https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf.

[110] *Id.* at 5. These models are DICE (the Dynamic Integrated Model of Climate and the Economy), FUND (the Climate Framework for Uncertainty, Negotiation, and Distribution), and PAGE (Policy Analysis of the Greenhouse Effect).

[111] *Id.* at 6-8.

[112] *Id.* at 24-25.

[113] IWG, *Technical Update of the Social Cost of Carbon* at 5–29 (2016). *Available at* https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/ scc_tsd_final_clean_8_26_16.pdf.

[114] *See* 2016 IWG Addendum at 2.

[115] *Id.* at 3.

[116] Gov't Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates* 12-19 (2014). Available at http://www.gao.gov/assets/670/665016.pdf.

CO28-21 See the response to comment CO24-3.

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CO28-21

improvements to the methodology, supported the continued use of the existing IWG estimates.[117] And in 2016, the U.S. Court of Appeals for the Seventh Circuit held that the Department of Energy's reliance on IWG's social cost of carbon was reasonable.[118] It is, therefore, unsurprising that leading economists and climate policy experts have endorsed the IWG's values as the best available estimates.[119]

A Recent Executive Order Does Not Change the Requirements to Monetize Climate Damages

In March 2017, President Trump disbanded the IWG and withdrew their technical support documents.[120] Nevertheless, Executive Order 13,783 assumes that federal agencies will continue to "monetiz[e] the value of changes in greenhouse gas emissions" and instructs agencies to ensure such estimates are "consistent with the guidance contained in OMB Circular A-4."[121] Consequently, while federal agencies no longer benefit from ongoing technical support from the IWG on use of the social cost of greenhouse gases, by no means does the new Executive Order imply that agencies should not monetize important effects in their environmental impact statements. The Executive Order does not prohibit agencies from relying on the same choice of models as the IWG, the same inputs and assumptions as the IWG, the same statistical methodologies as the IWG, or the same ultimate values as derived by the IWG. To the contrary, because the Executive Order requires consistency with Circular A-4, as agencies follow the Circular's standards for using the best available data and methodologies, they will necessarily choose similar data, methodologies, and estimates as the IWG, since the IWG's work continues to represent the best available estimates.[122] The Executive Order does not preclude agencies from using the same range of estimates as developed by the IWG, so long as the agency explains that the data and methodology that produced those estimates are consistent with Circular A-4 and, more broadly, with standards for rational decisionmaking.

Similarly, the Executive Order's withdrawal of the Council on Environmental Quality's guidance on greenhouse gases,[123] does not—and legally cannot—remove agencies' statutory requirement to fully analyze and disclose the environmental impacts of greenhouse gas emissions. As the Council on Environmental Quality explained in its withdrawal, the "guidance was not a regulation," and "[t]he withdrawal of the guidance does not change any law, regulation, or other legally binding requirement."[124] In other words, when the guidance originally recommended the appropriate use of the social cost of greenhouse gases in environmental impact statements,[125] it was simply explaining that use

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[117] Nat'l Acad. Sci., Engineering & Med., *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* 3 (2017), https://www.nap.edu/read/24651/chapter/1; Nat'l Acad. Sci., Engineering & Med., *Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update* 1–2 (2016); https://www.nap.edu/read/21898/chapter/1.

[118] *Zero Zone,* 832 F.3d at 679.

[119] See, e.g., Richard Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 Science 655 (2017); Michael Greenstone et al., *Developing a Social Cost of Carbon for U.S. Regulatory Analysis: A Methodology and Interpretation*, 7 Rev. Envtl. Econ. & Pol'y 23, 42 (2013); Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 Nature 173 (2014) (co-authored with Nobel Laureate Kenneth Arrow, among others).

[120] Exec. Order No. 13,783 § 5(b), 82 Fed. Reg. 16,093 (Mar. 28, 2017).

[121] *Id.* § 5(c).

[122] *See* Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 Science 6352 (2017) (explaining that, even after Trump's Executive Order, the social cost of greenhouse gas estimate of around $50 per ton of carbon dioxide is still the best estimate).

[123] Exec. Order 13,783 § 3(c)

[124] 82 Fed. Reg. 16,576, 16,576 (Apr. 5, 2017).

[125] *See* CEQ, *Revised Draft Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* at 16 (Dec. 2014), *available at* https://obamawhitehouse.archives.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf ("[A]lthough developed specifically for regulatory impact

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of the social cost of greenhouse gases is consistent with longstanding NEPA regulations and case law, all of which are still in effect today. CO28-21

Notably, some agencies under the Trump administration have continued to use the IWG estimates even following the Executive Order. For example, in August 2017, the Bureau of Ocean Energy Management called the social cost of carbon "a useful measure" and applied it to analyze the consequences of offshore oil and gas drilling.[126] And in July 2017, the Department of Energy used the IWG's estimates for carbon and methane emissions to analyze energy efficiency regulation, describing the social cost of methane as having "undergone multiple stages of peer review."[127]

Two agencies have developed new "interim" values of the social cost of greenhouse gases following the Executive Order. Relying on faulty economic theory, these "interim" estimates drop the social cost of carbon from $50 per ton in year 2020 down to as little as $1 per ton, and drop the social cost of methane from $1420 per ton in year 2020 down to $58. These "interim" estimates are inconsistent with accepted science and economics; the IWG's 2016 estimates remain the best available estimates. The IWG's methodology and estimates have been repeatedly endorsed by reviewers as transparent, consensus-based, and firmly grounded in the academic literature. By contrast, the "interim" estimates ignore the interconnected, global nature of our climate-vulnerable economy, and obscure the devastating effects that climate change will have on younger and future generations. FERC should not use the "interim" social cost of greenhouse gas estimates because of their methodological flaws, as described more fully in the attached comments which we have previously submitted to FERC on its misleading use of the unsupported "interim" values.

Uncertainty Supports Higher Social Cost of Greenhouse Gas Estimates, and Is Never a Reason to Abandon the Metric

Generally, uncertainty is *not* a reason to abandon the social cost of greenhouse gas methodologies;[128] quite the contrary, uncertainty supports higher estimates of the social cost of greenhouse gases, because most uncertainties regarding climate change entail tipping points, catastrophic risks, and unknown unknowns about the damages of climate change. Because the key uncertainties of climate change include the risk of irreversible catastrophes, applying an options value framework to the regulatory context strengthens the case for ambitious regulatory action to reduce greenhouse gas emissions. CO28-22

There are numerous well-established, rigorous analytical tools available to help agencies characterize and quantitatively assess uncertainty, such as Monte Carlo simulations, and the IWG's social cost of greenhouse gas protocol incorporates those tools. To further deal with uncertainty, the IWG recommended to agencies a range of four estimates: three central or mean-average estimates at a 2.5%, 3%, and 5% discount rate respectively, and a 95th percentile value at the 3% discount rate. While the IWG's technical support documents disclosed fuller probabilities distributions, these four estimates

analyses, the Federal social cost of carbon, which multiple Federal agencies have developed and used to assess the costs and benefits of alternatives in rulemakings, offers a harmonized, interagency metric that can provide decisionmakers and the public with some context for meaningful NEPA review.").

[126] *Draft Environmental Impact Statement—Liberty Development Project in the Beaufort Sea, Alaska* at 3-129.

[127] Energy Conservation Program: Energy Conservation Standards for Walk-In Cooler and Freezer Refrigeration Systems, 82 Fed. Reg. 31,808, 31,811, 31,857 (July 10, 2017).

[128] *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1200 (9th Cir. 2008) ("[W]hile the record shows that there is a range of values, the value of carbon emissions reductions is certainly not zero.").

CO28-22 See the response to comment CO24-3.

were chosen by agencies to be the focus for decisionmaking. In particular, application of the 95th percentile value was not part of an effort to show the probability distribution around the 3% discount rate; rather, the 95th percentile value serves as a methodological shortcut to approximate the uncertainties around low-probability but high-damage, catastrophic, or irreversible outcomes that are currently omitted or undercounted in the economic models. CO28-22

The shape of the distribution of climate risks and damages includes a long tail of lower-probability, high-damage, irreversible outcomes due to "tipping points" in planetary systems, inter-sectoral interactions, and other deep uncertainties. Climate damages are not normally distributed around a central estimate, but rather feature a significant right skew toward catastrophic outcomes. In fact, a 2015 survey of economic experts concludes that catastrophic outcomes are increasingly likely to occur.[129] Because the three integrated assessment models that the IWG's methodology relied on are unable to systematically account for these potential catastrophic outcomes, a 95th percentile value was selected instead to account for such uncertainty. There are no similarly systematic biases pointing in the other direction which might warrant giving weight to a low-percentile estimate.

Additionally, the 95th percentile value addresses the strong possibility of widespread risk aversion with respect to climate change. The integrated assessment models do not reflect that individuals likely have a higher willingness to pay to reduce low-probability, high-impact damages than they do to reduce the likelihood of higher-probability but lower impact damages with the same expected cost. Beyond individual members of society, governments also have reasons to exercise some degree of risk aversion to irreversible outcomes like climate change.

The National Academies of Sciences, Engineering, and Medicine did recommend that the IWG document its full treatment of uncertainty in an appendix and disclose low-probability as well as high-probability estimates of the social cost of greenhouse gases.[130] However, that does not mean it would be appropriate for individual agencies to rely on low-percentile estimates to justify decisions. While disclosing low-percentile estimates in a sensitivity analysis may promote transparency, relying on such an estimate for decisionmaking—in the face of contrary guidance from the best available science and economics on uncertainty and risk—would not be a "credible, objective, realistic, and scientifically balanced" approach to uncertainty, as required by Circular A-4.[131]

In short, the 95th percentile estimate attempts to capture risk aversion and uncertainties around lower-probability, high-damage, irreversible outcomes that are currently omitted or undercounted by the models. There is no need to balance out this estimate with a low-percentile value, because the reverse assumptions are not reasonable:

- There is no reason to believe the public or the government will be systematically risk seeking with respect to climate change.[132]

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[129] Howard and Sylvan 2015, *supra* note **Error! Bookmark not defined.**, at 2. ("Experts believe that there is greater than a 20% likelihood that this same climate scenario would lead to a 'catastrophic' economic impact (defined as a global GDP loss of 25% or more)."). *See also* Pindyck 2016.

[130] Nat'l Acad. Of Sci., *Assessment of Approaches to Updating the Social Cost of Carbon* 49 (2016) ("[T]he IWG could identify a high percentile (e.g., 90th, 95th) and corresponding low percentile (e.g., 10th, 5th) of the SCC frequency distributions on each graph.").

[131] CIRCULAR A-4 at 39.

[132] As a 2009 survey revealed, the vast majority of economic experts support the idea that "uncertainty associated with the environmental and economic effects of greenhouse gas emissions increases the value of emission controls, assuming some level of risk-aversion." *See Expert Consensus, supra* note 129, at 3 (citing 2009 survey).

CO28-22

- The consequences of overestimating the risk of climate damages (i.e., spending more than we need to on mitigation and adaptation) are not nearly as irreversible as the consequences of underestimating the risk of climate damage (i.e., failing to prevent catastrophic outcomes).
- Though some uncertainties might point in the direction of lower social cost of greenhouse gas values, such as those related to the development of breakthrough adaptation technologies, the models already account for such uncertainties around adaptation; on balance, most uncertainties strongly point toward higher, not lower, social cost of greenhouse gas estimates.[133]
- There is no empirical basis for any "long tail" of potential benefits that would counteract the potential for extreme harm associated with climate change.

Moreover, even the best existing estimates of the social cost of greenhouse gases are likely underestimated because the models currently omit many significant categories of damages—such as depressed economic growth, pests, pathogens, erosion, air pollution, fire, dwindling energy supply, health costs, political conflict, and ocean acidification, as well as tipping points, catastrophic risks, and unknown unknowns—and because of other methodological choices.[134]

Consequently, uncertainty suggests an even higher social cost of greenhouse gases and so is not a reason to abandon the metric, which would misleadingly suggest that climate damages are worthless.

Sincerely,

Susanne Brooks, Director of U.S. Climate Policy and Analysis, Environmental Defense Fund
Tomás Carbonell, Senior Attorney and Director of Regulatory Policy, Environmental Defense Fund
Rachel Cleetus, Ph.D., Policy Director, Climate and Energy Program, Union of Concerned Scientists
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[133] *See* Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014). R. Tol, *The Social Cost of Carbon*, 3 Annual Rev. Res. Econ. 419 (2011) ("[U]ndesirable surprises seem more likely than desirable surprises. Although it is relatively easy to imagine a disaster scenario for climate change—for example, involving massive sea level rise or monsoon failure that could even lead to mass migration and violent conflict—it is not at all easy to imagine that climate change will be a huge boost to human welfare.").

[134] *See* Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, *supra* note 133; Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (Cost of Carbon Project Report, 2014); Frances C. Moore & Delavane B. Diaz, *Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy*, 5 NATURE CLIMATE CHANGE 127 (2015) (demonstrating SCC may be biased downward by more than a factor of six by failing to include the climate's effect on economic growth).

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*No part of this document purports to present New York University School of Law's views, if any.

Attached:

Joint Comments to FERC on Using the Social Cost of Greenhouse Gases to Weigh Climate Impacts of New Natural Gas Transportation Facilities in Environmental Analyses and in Reviews of Public Convenience and Necessity (Docket No. PL18-1-000) (submitted July 25, 2018)

Jayni Hein et al., Pipeline Approvals and Greenhouse Gas Emissions, Institute for Policy Integrity Report (2019)

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Document Content(s)

CO29 – Trustees for Alaska

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TRUSTEES FOR ALASKA
PROTECT | DEFEND | REPRESENT

Via Efile

December 19, 2019

The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, D.C. 20426

Re: Supplemental Comments on the Draft Environmental Impact Statement for the Alaska LNG Project DEIS, Docket No. CP17-178-000

Dear Secretary Bose:

Trustees for Alaska submits the attached supplemental comments on behalf of National Parks Conservation Association. The comments address the Federal Energy Regulatory Commission (FERC) Draft Environmental Impact Statement (DEIS) on the Alaska LNG Project Draft Environmental Impact Statement and extensive additional technical information that was released in the last days of the public comment period.

NPCA had several times requested an extension of the public comment period, but received no response to those requests. The attached supplemental comments demonstrate newly identified and continuing deficiencies with the air quality analysis, considering the new information that was not provided in time for analysis during the comment period. Thank you for your consideration of these supplemental comments. CO29-1

Sincerely,

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Enc. Supplemental Technical Comments by Dr. Howard Gebhart on behalf of National Parks Conservation Association

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CO29-1 See the responses to comments CM3-1, CM3-7, and CM4-6.

Supplemental Technical Comments on Alaska LNG Project
DRAFT Environmental Impact Statement (EIS) – Air Quality Sections

By:
D. Howard Gebhart
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Submitted on behalf of National Parks Conservation Association

OVERVIEW

CO29-2

This report provides supplemental technical comments related to the proposed Alaska LNG Project Draft EIS air quality analysis. These supplemental comments are tied to information with respect to cumulative air quality impacts that were added to the record during September 2019 (See: Long-Range Air Quality and Air Quality related Values Impact Analysis for Nationally Designated Protected Class I and Class II Areas, September 25, 2019). Given the original comment period deadline of October 3, 2019, it was not possible to fully review any air quality dispersion modeling studies that were not part of the Draft EIS record at the start of the formal comment period.

The revised cumulative modeling analysis dated September 25, 2019 remains inadequate. Specific concerns with the cumulative air quality modeling analysis are summarized below.

CO29-3

- The revised cumulative air quality modeling analysis does not fulfill the requirements for a cumulative analysis under the National Environmental Policy Act (NEPA). Specifically, the revised cumulative modeling addresses only those emissions associated with the Alaska LNG Project and did not include emissions from non-project emission sources. The non-project cumulative emissions had been addressed in previous air quality modeling studies conducted for the Draft EIS, but these emissions were not included in the September 25, 2019 update. There is still no air quality modeling analysis where the Alaska LNG Project emissions have been analyzed in their entirety along with cumulative emissions from non-project sources.

CO29-4

- The revised cumulative air quality modeling analysis fails to correct a prior technical deficiency, which is not including ammonia emissions from non-project sources. An implicit assumption of the September 2019 cumulative modeling analysis is that the Alaska LNG Project emissions exist within an ammonia-limited environment, which is not correct. For example, the proposed liquefaction facility site would be located in an already industrialized area with several large non-project emission sources in the vicinity. One of these sources is a large fertilizer production facility with significant ammonia emissions (approximately 700 tons per year). The revised cumulative modeling analysis does not account for the large ammonia emissions from non-project sources in the vicinity of the liquefaction plant site, and as a result, the cumulative impacts listed in the Draft EIS have been underestimated.

CO29-2 Comment noted.

CO29-3 As discussed in sections 4.15.5.1, 4.15.5.2, and 4.15.5.3 of the EIS, the air quality modeling analyses completed for the aboveground facilities associated with the Project considered the air emissions from the facility being analyzed, regional emission sources in the vicinity of the facility, and ambient background concentrations. Therefore, these modeling analyses provided a cumulative assessment of emissions in the vicinity of the proposed Project facilities. Based on requests by our cooperating agencies, we requested that AGDC complete an additional modeling analysis to show the cumulative effect of all aboveground facilities associated with the Project on Class I and Class II nationally designated protected areas. This analysis is included in section 4.19.4.15. We believe that these analyses adequately assess the cumulative air quality impacts associated with the Project.

CO29-4 The Project is not a significant source of ammonia emissions; therefore, a separate analysis for ammonia was not necessary to analyze air quality impacts associated with the Project. However, ammonia was considered as part of the regional haze and visibility modeling analysis, which included an estimate of existing background ammonia concentrations.

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- The September 2019 cumulative modeling analysis, despite the technical deficiencies noted above, continues to demonstrate that the Alaska LNG Project will have adverse air quality impacts. These air quality impacts must be mitigated. Based on the revised September 2019 cumulative modeling assessment, no mitigation strategies to reduce and/or eliminate adverse air quality impacts has been proposed or evaluated. CO29-5

SUMMARY OF UPDATED CUMULATIVE MODELING RESULTS

The results from the revised September 2019 cumulative air quality impacts analysis demonstrate that the new cumulative project-related impacts generally exceed the impacts previously reported in the Draft EIS for project-related impacts. CO29-6

Also, the potential for adverse air quality impacts to visibility (Table 3 in the September 2019 cumulative modeling report) demonstrate adverse impacts are expected at almost all Class I and sensitive Class II locations modeled. Based on the Draft EIS, adverse visibility impacts occur when the 8th highest change in light extinction is 5% or more in any modeled year. Based on the updated cumulative impact modeling results, adverse visibility impacts are predicted at the following locations: Tuxedni National Wildlife Refuge, Denali National Park and Preserve, Kenai National Wildlife Refuge, Kenai Fjords National Park, Arctic National Wildlife Refuge, Gates of the Arctic National Park, Kanuti National Wildlife Refuge, Lake Clark Wilderness and National Preserve, and Yukon Flats National Wildlife Refuge. CO29-7

The updated cumulative visibility modeling also depicts adverse impacts at areas previously screened from review in the Draft EIS (Table 4 in the September 2019 cumulative modeling report), including: Katmai National Park, Noatak National Preserve, and Redoubt Bay Critical Habitat Area. The updated cumulative modeling analysis results cast doubt on the appropriateness of the initial screening procedures conducted for the original Draft EIS to exclude a more detailed assessment of air quality impacts at these locations. CO29-8

Similarly, the updated cumulative acid deposition modeling (Table 5 in the September 2019 cumulative modeling report) show adverse nitrogen deposition impacts at the following locations: Tuxedni National Wildlife Refuge, Denali National Park and Preserve, Kenai National Wildlife Refuge, Arctic National Wildlife Refuge, Gates of the Arctic National Park, Kanuti National Wildlife Refuge, Lake Clark Wilderness and National Park, and Yukon Flats National Wildlife Refuge. Based on the Draft EIS, adverse impacts for acid deposition occur when the modeled nitrogen deposition rate is predicted to exceed 0.005 kg/ha-yr or 5.0×10^{-3} kg/ha-yr for direct comparison to the format of the modeling results reported by Table 5 in the September 2019 cumulative modeling report. CO29-9

The predicted adverse impacts described above need to be mitigated. The updated cumulative air quality modeling analyses fail to provide any recommendations for mitigating the predicted adverse impacts nor does the updated modeling identify how planned mitigation measures might alter the expected air quality impacts. CO29-10

CO29-5 See the responses to comments FA1-62, FA3-78, and SA2-7. We have requested, but not been provided, feedback from FLMs regarding potential impacts to Class I and Class II nationally designated protected areas. Therefore, the final EIS summarizes the modeling data provided by AGDC and the associated AQRV thresholds.

CO29-6 Results of the cumulative modeling analysis identified some additional exceedances of screening values for regional haze and acid deposition based on combined Project impacts. See the responses to comments FA1-62 and FA3-78.

CO29-7 See the response to comment CO22-7.

CO29-8 See the response to comment CO22-7.

CO29-9 See the response to comment CO22-7.

CO29-10 See the responses to comments FA1-62, SA2-7, and CO29-5.

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TECHNICAL DEFICIENCY #1 – The revised cumulative modeling did not address the emissions from non-project sources and as such does not meet the cumulative impact assessment requirements under NEPA.

CO29-11

The revised Draft EIS modeling dated September 25, 2019 purports to address the cumulative air quality impacts by modeling emissions from all Alaska LNG Project components in a single analysis. In the original Draft EIS, the air quality analysis individually addressed air quality impacts of the various Alaska LNG Project components; i.e., Gas Treatment Plant, Mainline Compressor Stations, and Liquefaction Plant, but not all project components in combination. The approach presented in the Draft EIS was inadequate as it failed to provide a true cumulative air quality analysis that simultaneously addressed all project components in a proper cumulative analysis.

The updated cumulative modeling dated September 25, 2019 simultaneously addresses air quality impacts for all project components, e.g., Gas Treatment Plant, Mainline Compressor Stations, and Liquefaction Plant using the CALPUFF model. However, as noted below, non-project emissions previously included in the Draft EIS cumulative modeling have not been included in the September 2019 cumulative modeling update. CALPUFF has been used to estimate concentrations of emitted species (e.g., NOx, SO_2, PM-10, and PM-2.5) and also calculate concentrations of visibility/acid deposition precursor emissions such as ammonium sulfate and ammonium nitrate. The visibility and acid deposition impacts are then calculated using the CALPOST post-processing program following standard methods for visibility and acid deposition impact assessments. Lastly, the September 2019 cumulative modeling update is limited to impacts at Class I and sensitive Class II areas.

However, the revised cumulative modeling analysis is technically deficient because it is not a true cumulative modeling analysis as required under the National Environmental Policy Act (NEPA). The revised cumulative modeling analysis only addresses the impact of the Alaska LNG Project emissions and does not address the cumulative impacts of project emissions in combination with other regional emission sources. Within each of the individual analyses conducted for the Draft EIS (Gas Treatment Plant, Mainline Compressor Stations, and Liquefaction Plant), the air quality analyses addressed other nearby emission sources where appropriate. However, the updated cumulative modeling analysis completed during September 2019 fails to include any non-project emissions from other nearby emission sources along with potential reasonably foreseeable development (RFD), even though these emissions were previously addressed in other air quality modeling conducted for the Draft EIS. Until this omission is corrected and all relevant air quality emissions are considered in a complete and comprehensive cumulative air quality modeling assessment (including non-project emissions), the Alaska LNG Project Draft EIS remains technically deficient under NEPA.

The importance of properly addressing the potential cumulative air quality impacts from non-project emissions can be illustrated by considering the proposed liquefaction facility. The proposed Alaska LNG Project liquefaction plant site is along Cook Inlet to the north of the communities of Kenai, AK and Soldotna, AK. The proposed liquefaction plant site is already heavily industrialized, with several large emission sources located in the immediate proximity, including: a petroleum refinery (Tesoro) and an associated marine loading terminal (Tesoro KPL),

CO29-11 The far-field cumulative impact analysis was completed based on comments received from our cooperating agencies to assess impacts from all Project facilities on Class I and Class II nationally designated protected areas. Background ambient ozone and ammonia concentration data was included in the analysis.

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a second LNG facility (Conoco-Phillips Kenai LNG), two electric generating stations, (Bernice Lake and Nikiski), and a nitrogen fertilizer plant and associated loading terminal (Agrium). None of these emissions were included in the September 2019 update for the cumulative air quality modeling analysis, even though these emission sources were considered in previous Draft EIS modeling studies of air impacts near the liquefaction plant. CO29-11

TECHNICAL DEFICIENCY #2 – The revised cumulative modeling analysis incorrectly assumes that the Alaska LNG Project exists within an ammonia-limited environment and does not address the large and significant ammonia emissions released at neighboring sources located adjacent to the proposed liquefaction plant site. CO29-12

As mentioned above, the proposed Alaska LNG Project liquefaction plant would be located in an area which is already industrialized, and several large emission sources exist or are proposed in the vicinity of the liquefaction plant. In particular, the neighboring Agrium plant causes cumulative air quality impacts not addressed by the updated cumulative modeling analysis. The Draft EIS, including the supplemental cumulative modeling analysis prepared in September 2019, fails to provide a complete and comprehensive cumulative air quality impact analysis that appropriately consider the large and significant quantity of ammonia emissions at Agrium.

The Agrium fertilizer facility is located along Cook Inlet immediately to the north of the proposed Alaska LNG Liquefaction Plant site (See: Alaska LNG Project Air Quality Modeling Report – Liquefaction Facility, Figure 1-1). Based on information in the record (Resource Report No 9, Appendix D), Agrium was closed in 2011, but the owners have now applied for new air quality permits to reopen the facility. In short, the Agrium emissions are "reasonably foreseeable" and as such, should be included in the Alaska LNG Project cumulative air quality impact assessment.

Based on data in the record (Resource Report No. 9, Appendix D), the Agrium fertilizer plant has estimated ammonia emissions of approximately 700 tons per year (tpy). Ammonia emissions are important as ammonia would be expected to react with project-related emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) to form ammonium nitrate and ammonium sulfate. In turn, sulfates and nitrates constitute secondary particulate matter that increases local and regional concentrations of PM-10 and PM-2.5 as well as creating adverse impacts to visibility and acid deposition. These adverse impacts would occur both in the immediate vicinity of the Alaska LNG project site as well as at the more distant Class I and sensitive Class II areas that are addressed by the updated cumulative air quality impact analysis.

Based on a review of the emissions information presented in the Alaska LNG Project Air Quality Modeling Report (Resource Report No. 9, Appendix D) and also the September 2019 cumulative modeling update, the large ammonia emissions present at Agrium were not considered in the Draft EIS. Instead, the modeling analysis incorrectly assumes that the Alaska LNG Project would exist in an ammonia-limited environment. This is incorrect given the large ammonia emissions occurring at a nearby source.

In the original Draft EIS, the Agrium emissions were modeled, but the inventory only includes emissions for NOx and SO_2 from fuel combustion equipment, plus emissions for

CO29-12 See the response to comment CO29-4.

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particulate matter (PM-2.5) and carbon monoxide (CO). The emissions from fuel combustion are also speciated into elemental carbon and secondary organic aerosol (SOA) as inputs to the visibility assessment modeling. However, there is no documentation in the record that the large emissions sources for ammonia at Agrium have been properly addressed in the updated cumulative impact modeling. For the September 2019 cumulative impact modeling analysis, the information presented indicates that emissions from any and all non-project sources, including Agrium, are not addressed at all in the updated cumulative modeling analysis. CO29-12

In the case of the Alaska LNG Project, the cumulative impacts of interest are those tied to the conversion of project-related NOx emissions to ammonium nitrate. The Alaska LNG Project Liquefaction Plant has estimated NOx emissions of approximately 1,600 tons per year, whereas the project-related SO_2 emissions would be less than 100 tons per year.

The atmospheric reactions that generate formation of ammonium nitrate are complex. However, in simple terms, equilibrium is established between ammonium nitrate (NH_4NO_3), nitric acid (HNO_3), and ammonia (NH_3), as shown below:

$$NH_4NO_3 \Leftrightarrow HNO_3 + NH_3$$

In many cases, ammonia concentrations may be limited, which in turn can limit the formation of ammonium nitrate. However, where a large ammonia source like Agrium can intermingle with the project-related emissions, the excess ammonia would help drive the equilibrium reactions toward greater formation of ammonium nitrate. The equilibrium between ammonia nitrate and nitric acid/ammonia is also affected by atmospheric factors such as temperature and relative humidity (RH). Both colder temperatures and higher RH drive the equilibrium reactions toward increased formation of ammonium nitrate. At the Alaska LNG Project, the site experiences both cold temperatures due to the Alaska location and higher RH values due to the coastal location. Unless these factors are explicitly accounted for in the cumulative modeling, the result is an underestimate of nitrate formation, with resulting underestimates for both secondary concentrations of PM-10/PM-2.5 and the resulting cumulative impacts on visibility and acid deposition.

In the original Alaska LNG Draft EIS, there was an attempt to estimate the potential formation of secondary PM-2.5 (See: Air Quality Modeling Report – Liquefaction Facility, Section 8.4, Pg 111-116). This issue does not appear to have been addressed in the updated September 2019 cumulative modeling beyond the conversion of project-related emissions to sulfate and nitrate within the CALPUFF dispersion model. Also, the September 2019 cumulative modeling only addressed impacts at nearby Class I and sensitive Class II areas and does not address near-field impacts.

Nevertheless, the Draft EIS assessment of secondary PM-2.5 formation also relied on photochemical grid modeling (PGM) of hypothetical emission sources which do not accurately represent the site-specific situation. For example, the PGM modeling cited by the Draft EIS does not include scenarios that explicitly address nearby emission sources of ammonia. In fact, the PGM modeling cited by the Draft EIS assumed an ammonia-limiting environment that does not accurately describe the site-specific situation, where project NOx emissions would likely mix

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with existing and reasonably foreseeable ammonia emissions. In fact, the Air Quality Modeling Report – Liquefaction Facility (Pg 116) specifically states that the formation of ammonium sulfate and ammonia nitrate postulated in the Draft EIS would be significantly limited due to the lack of background ammonia. Such a statement is clearly incorrect and documents that the nearby and reasonably foreseeable Agrium ammonia emissions were never properly considered in either the original or updated September 2019 cumulative impact modeling. Had the Agrium ammonia emissions been properly considered in the modeling assessment, the result would have been an increased formation of ammonia nitrate and higher cumulative air quality impacts. CO29-12

Also, the PGM modeling cited by the Alaska LNG Project Draft EIS was conducted for hypothetical facilities in the continental United States (See: Air Quality Modeling Report – Liquefaction Facility, Pg 111-112). As such, the hypothetical PGM modeling was not conducted using representative colder temperatures typically found in Alaska. As stated above, colder temperatures drive the atmospheric reactions toward increased formation of ammonium nitrate and higher cumulative air quality impacts.

In CALPUFF (including the updated September 2019 cumulative modeling), background ammonia concentrations were assigned a value of either 0.1 ppb or 1 ppb, depending on the time of year. The higher value (1 ppb) was applied during the May-October time period and the smaller value (0.1 ppb) was assigned during the November to April time period. The approach of accounting for ammonia through an assumed background concentration likely underestimates ambient ammonia near and downwind of the proposed liquefaction plant. In this case, the project-related NOx emissions have the potential to interact with the nearby and reasonably foreseeable Agrium ammonia emissions. As explained previously, the ability for Alaska LNG project emissions to intermingle with the Agrium ammonia emissions means that the Alaska LNG Project NOx emissions would not be within an ammonia-limited environment, as depicted in the original Draft EIS CALPUFF visibility modeling and also in the updated CALPUFF modeling completed in September 2019.

Fortunately, a simple and easy-to-implement fix exists within CALPUFF or an alternative model to address this shortcoming, which would be to explicitly model the ammonia emissions from Agrium (and other nearby sources including the Alaska LNG liquefaction facility). The model itself would then create the background ammonia concentrations used by the model for the atmospheric chemistry and visibility calculations.

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SUMMARY AND CONCLUSIONS

The major findings and comments based on my review of the Alaska LNG Project Draft EIS supplemental cumulative air quality modeling analysis dated September 2019 are listed below:

1. The updated Draft EIS cumulative modeling assessment for the Alaska LNG Project is technically deficient as it addresses the impacts for only the project-related emissions (e.g., emissions from the gas treatment plant, mainline compressor stations, and liquefaction plant), but does not include any emissions from other nearby sources, including any reasonably foreseeable emissions. These non-project emissions were included in prior Draft EIS cumulative impact modeling, but not in the September 2019 update. As such, the cumulative impact modeling completed in September 2019 is not a true cumulative impact analysis as required under NEPA. CO29-13

2. The situation surrounding the proposed Alaska LNG Project liquefaction plant site includes a large and reasonably foreseeable source of ammonia emissions (approximately 700 tons per year), specifically the Agrium nitrogen fertilizer plant which has undergone permitting to allow restart of plant operations. The Agrium ammonia emissions would be expected to intermingle with the NOx emissions released at the proposed Alaska LNG Project liquefaction plant, which is planned for a site immediately adjacent to Agrium's plant site. These emissions were not considered in the September 2019 cumulative impact analysis. CO29-14

3. The combination of the Alaska LNG Project NOx emissions and the reasonably foreseeable ammonia emissions from the adjacent Agrium fertilizer plant creates an increased potential for formation of secondary ammonium nitrate through standard atmospheric chemistry reactions. These reactions can also be exacerbated by the colder ambient temperatures that typically exist within Alaska. Ammonium nitrate has potentially adverse environmental consequences as it adds to the secondary PM-10 and PM-2.5 formation downwind of the Alaska LNG project sites. It also creates an increased potential for adverse cumulative visibility and acid deposition impacts. CO29-15

4. The reasonably-foreseeable ammonia emissions from the adjacent Agrium fertilizer facility were not included in the revised cumulative impact modeling, nor were any other non-project emissions considered in the updated cumulative impact modeling completed for the Alaska LNG Project Draft EIS in September 2019. CO29-16

5. Despite the technical shortcomings of the September 2019 cumulative modeling analysis, adverse impacts to visibility and acid deposition were predicted at most nearby Class I and sensitive Class II areas. However, contrary to the requirements of NEPA, no mitigation strategy has been proposed or evaluated which would address the anticipated adverse air quality impacts. CO29-17

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CO29-13 See the response to comment CO29-3.

CO29-14 See the response to comment CO29-4.

CO29-15 See the response to CO29-11.

CO29-16 See the responses to comments CO29-3, CO29-4, and CO29-11.

CO29-17 See the responses to comment FA1-62, SA2-7, CO22-7, and CO29-5.

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6. There is still no air quality modeling analysis where the Alaska LNG Project emissions have been analyzed in their entirety along with cumulative emissions from non-project sources. It is recommended that FERC correct this deficiency and complete a new cumulative air quality modeling assessment that accounts for all non-project emissions explicitly considered in the previous Draft EIS air quality modeling. Given that the September 2019 cumulative modeling only considers emissions from sources associated with the Alaska LNG Project, the updated modeling does not constitute a true and complete cumulative analysis as required under NEPA. Also, the presence of a large and reasonable foreseeable ammonia emissions source at a site immediately adjacent to the proposed Alaska LNG Project liquefaction plant needs to be explicitly considered in a proper cumulative modeling assessment. CO29-18

CO29-18 See the responses to comments CO29-3, CO29-4, and CO29-11.

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Document Content(s)

CO30 – Center for Biological Diversity

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CENTER for BIOLOGICAL DIVERSITY   *Because life is good.*

Via FERC Online

January 31, 2020

Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Application of the Alaska Gasline Development Corporation Docket No: CP17-178-000; FERC/EIS-0296D

The Center for Biological Diversity (the "Center") submits these supplemental comments to the Federal Energy Regulatory Commission ("FERC") on the draft environmental impact statement ("Draft EIS") for the Alaska LNG project, 84 Fed. Reg. 32,451 (July 8, 2019).

Since the Center submitted its original comments on the Draft EIS in October 2019, several important studies have been released that are highly relevant to FERC's consideration of the Alaska Gasline Development Corporation's application to construct and operate the Alaska LNG project and to FERC's environmental analysis of the project.

CO30-1

First, the United Nations' November 2019 "Emissions Gap" report reiterated the need for urgent action to cut fossil fuel emissions. According to the report, if the world is to limit global warming to 1.5°C, countries must cut emissions by at least 7.6% per year over the next decade, for a total emissions reduction of 55% between 2020 and 2030.[1] The United Nations' November 2019 "Production Gap" report shows that countries like the United States are on course to extract vastly more fossil fuels than what is allowed to meet a 1.5°C or even 2°C target. Countries' current fossil fuel production plans would lead to 120% more fossil fuel emissions by 2030 than would be consistent with a 1.5°C pathway, and 210% more by 2040.[2] The United States is a primary contributor to this dangerous over-production of fossil fuels as the world's largest oil and gas producer and second largest coal producer, with current policies projected to lead to a 30% increase in oil and gas production by 2030.[3] Together these reports make clear that, to limit the worst damages of climate change, the United States must begin rapidly phasing out its fossil fuel production. The Alaska LNG project would do just the opposite.

Second, the Energy Information Administration released its Annual Energy Outlook for 2020 that contains energy-related projections through 2050. The report indicates that without

[1] United Nations Environment Programme, Emissions Gap Report 2019, UNEP, Nairobi (2019), at 25, 26, https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf?sequence=1&isAllowed=y.
[2] United Nations Environment Programme, et al., The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C (2019), at 4, 14, http://productiongap.org/.
[3] *Id.* at 31.

CO30-1 Comment noted. With respect to natural gas pipelines and LNG facilities, the NGA requires FERC to consider proposals submitted by applicants. The NGA does not authorize or direct FERC to engage in regional or national energy planning. Further, the Department of Energy maintains the authority to grant authorization to export LNG as a commodity, which would ultimately be consumed as a fossil fuel in another country. However, NEPA requires FERC to assess the potential environmental impacts associated with natural gas infrastructure projects, such as the Alaska LNG Project. Section 4.19.4.18 of the final EIS discusses potential climate change impacts associated with the Project. Upon the completion of NEPA, the Commission will determine whether the project is in the public interest.

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significant policy changes and a rapid transition away from fuels, annual U.S. greenhouse gas emissions are projected to begin rising again by the 2030s.[4] This means that the United States will not be anywhere close to where scientists say it needs to be to reduce its contributions to the climate crisis and avert the most catastrophic impacts of climate change. CO30-1

Third, the National Oceanic and Atmospheric Administration released its 2019 Arctic Report Card. The report highlights the "unprecedented changes as a result of warming air temperatures, declining sea ice, and warming waters" that are threatening species and ecosystems in Arctic regions.[5] The Alaska LNG project would exacerbate these harms.

Finally, the National Marine Fisheries Service ("NMFS") released a new abundance estimate for critically endangered Cook Inlet beluga whales that reveals the population is "estimated to be smaller and declining more quickly than previously thought."[6] Specifically, NMFS now estimates that the population size is between 250 and 317, with a median estimate of 279, and an estimated trend in abundance of approximately -2.3% per year, which is a faster rate of decline than the previous estimate of -0.5% per year. Cook Inlet belugas are highly vulnerable to noise and chemical pollution. Construction and operation of the Alaska LNG project would increase these threats, further jeopardizing the species' chance of survival and recovery. CO30-2

Each of these new studies, attached hereto, provides yet more evidence of why the Alaska LNG project is not in the public interest and why FERC should reject the project. *See* 15 U.S.C. § 717b(a). CO30-3 At the very least, the studies constitute significant new information that triggers FERC's duty to supplement its Draft EIS and reissue the document for public notice and comment. *See* 40 C.F.R. § 1502.9(c)(1). CO30-4

FERC's supplemental Draft EIS must meaningfully address the role of the Alaska LNG project in fueling the climate crisis and the harm that construction and operation of the project would cause to highly imperiled Cook Inlet beluga whales in light of this new information and the other information raised in the Center's October 2019 comments to FERC. FERC's failure to do so would be unlawful.

Sincerely,

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[4] U.S. Energy Information Administration, Annual Energy Outlook 2020 with projections to 2050, Jan. 2020, https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Full%20Report.pdf.
[5] Richter-Menge, J. et al., Arctic Repot Card 2019 (2019), https://arctic.noaa.gov/Report-Card.
[6] Shelden, K. E. W. and P. R. Wade (editors). 2019. Aerial surveys, distribution, abundance, and trend of belugas (Delphinapterus leucas) in Cook Inlet, Alaska, June 2018. AFSC Processed Rep. 2019-09, 93 p.

CO30-2	Comment noted.
CO30-3	Comment noted.
CO30-4	Comment noted. See also the response to comment CM6-4.