COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW

Filed Electronically
Secretary Kimberly D. Bose
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

November 13, 2019

RE: Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Delta LNG and Delta Express Pipeline Project (PF19–4–000)

Secretary Bose:

The Sabin Center for Climate Change Law ("Sabin Center")[1] submits these comments on the scope of the proposed environmental impact statement ("EIS") for the Delta LNG and Delta Express Pipeline Project, announced by the Federal Energy Regulatory Commission ("FERC" or the "Commission") in July and October 2019.

For the limited purposes of these comments, the Sabin Center takes no position on the export of liquefied natural gas ("LNG") or on whether FERC should approve the Delta LNG and Delta Express Pipeline Project (the "Project"). Rather, consistent with the scoping process's goal of identifying significant issues for FERC to consider, the Sabin Center's comments focus on the potential impacts of climate change on the Project and vice versa—impacts not identified in FERC's Notice of Intent.

A. NEPA and Climate Change

Pursuant to its obligations under the National Environmental Policy Act ("NEPA"), the Commission must consider the environmental impacts of sea level rise and associated storm surge, flooding, and erosion risks, as exacerbated by increased frequency and intensity of hurricanes and tropical storms. In addition, it would be consistent with the purposes of NEPA for the agency to also assess the indirect impacts of upstream and downstream Project-related activities, to disclose the greenhouse gas emissions associated with them, and to assess the impacts of those emissions. These phenomena may additionally affect other issues already identified by FERC as pertinent to environmental review, such as endangered and threatened species; water resources, fisheries, and wetlands; cultural resources; vegetation and wildlife; cumulative impacts; and public safety. The Sabin Center urges FERC to robustly consider the impacts of climate change on the Project and the impacts of the Project's greenhouse gas emissions as part of the agency's environmental review.

[1] The Sabin Center for Climate Change Law at Columbia Law School develops legal techniques to fight climate change, trains law students and lawyers in their use, and provides the public with up-to-date resources on key topics in climate law and regulation. The Sabin Center works closely with the scientists at Columbia University's Earth Institute and with governmental, nongovernmental, and academic organizations. *See* https://climate.law.columbia.edu/. Please contact the Sabin Center for assistance locating any sources.

NEPA's implementing regulations provide that agencies must consider significant and reasonably foreseeable indirect and cumulative environmental impacts.[2] Agencies must also define an appropriate baseline for considering projected environmental impacts, and that baseline should incorporate anticipated environmental conditions.[3] Accordingly, the Commission must consider sea level rise, the increasing frequency and severity of hurricanes, and their combined effects on storm surge as future baseline environmental conditions. Several federal courts have confirmed that NEPA regulations require federal agencies to evaluate the impacts of a changing climate on their actions.[4] Consideration of climate change impacts has accordingly become an essential part of the NEPA process.[5] Furthermore, the withdrawal of the CEQ guidelines does not affect the above judicially upheld obligations as was explicitly noted in the withdrawal notice.[6]

FERC itself has already recognized the relevance and importance of climate change impacts to similar and similarly situated facilities located in Louisiana and elsewhere. For instance, FERC required consideration of climate change impacts in connection with a proposed LNG export facility in flood-prone coastal Louisiana (the "Mississippi River LNG Project").[7] After the applicant for the Mississippi River LNG Project submitted draft resource reports to the Commission, FERC directed the applicant to supplement the reports with information regarding

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[2] *See* 40 C.F.R. §§ 1508.7 (defining "cumulative impact"), 1508.8 (defining "effects" as including direct and reasonably foreseeable indirect effects), 1508.25(c) (providing that EISs must consider direct, indirect, and cumulative impacts); *see also* CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997) [hereinafter "Considering Cumulative Effects Under NEPA"], *available at* http://1.usa.gov/JLkM2I.

[3] *See* Considering Cumulative Effects under NEPA, *supra* note 2, at 41; 40 C.F.R. 1502.15 (defining "affected environment").

[4] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1215-1217 (9th Cir. 2008) (finding that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct"); *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 548-50 (8th Cir. 2003) (finding that degradation in air quality was a reasonably foreseeable indirect effect of a project that would increase the supply of coal to power plants); *AquaAlliance, et al., v. U.S. Bureau of Reclamation*, 287 F. Supp. 3d 969, 1032 (E.D. Cal. 2018) (concluding that Bureau failed to adequately account for effects of climate change on water management project); *Idaho Rivers United v. United States Army Corps of Engineers*, No. C14-1800JLR, 2016 WL 498911, at *17 (W.D. Wash. Feb. 9, 2016) (finding that agency properly analyzed the effect of climate change on sediment disposition); *High Country Conservation Advocates v. United States Forest Serv.*, No. 13-CV-01723-RBJ, 2014 WL 2922751, at *8-11, 13-15 (D. Colo. June 27, 2014) (holding that it was arbitrary and capricious for federal agencies to omit analysis of GHG emissions and related costs in EISs for mining exploration projects); *see also* FERC, Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act, FN 15, 4-123—4-127 (Feb. 2017), https://perma.cc/7DAW-BX9P (instructing "[y]ou should provide the data needed to support our NEPA analysis (e.g., the project's contribution to GHG emissions; local or state GHG emissions; and any local, state, or regional goals for GHG emissions or climate change," and requiring reporting on greenhouse gas emissions from construction and operation of facilities).

[5] *See e.g.*, *AquaAlliance*, 287 F. Supp. 3d at 1032 ("Nonetheless, the FEIS/R fails to address or otherwise explain how this information about the potential impacts of climate change can be reconciled with the ultimate conclusion that climate change impacts to the Project will be less than significant: . . [T]his amounts to a 'failure to consider an important aspect of the problem'. . .") (internal citation omitted).

[6] Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16576 (April 5, 2017), *available at* https://www.federalregister.gov/documents/2017/04/05/2017-06770/withdrawal-of-final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas ("The withdrawal of the guidance does not change any law, regulation, or other legally binding requirement.").

[7] Louisiana LNG Energy, LLC, Proposed Mississippi River LNG Project (PF14-17-000).

potential impacts of sea level rise and storm impacts for the design life of the facility.[8] Moreover, FERC's Environmental Assessments of the Dominion Cove Point LNG export facility on the Chesapeake Bay and the Cameron LNG facility in coastal Louisiana both consider several implications of climate change for those facilities.[9] Nothing about the Delta LNG and Delta Express Pipeline Project makes it less susceptible to climate change than these earlier examples of FERC-licensed LNG infrastructure projects. Accordingly, its EIS must take the effects of climate change into account.

Additionally, federal courts have repeatedly confirmed that NEPA regulations require federal agencies to evaluate the climate change-related impacts of their actions.[10] Accordingly, the Commission should consider the downstream greenhouse gas emissions caused by fossil fuel combustion,[11] as well as the other life cycle emissions from the facility's production and transportation of LNG.[12]

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[8] Letter to Louisiana LNG Energy, LLC providing comments on Draft Resource Reports 2 through 9 re the Mississippi River LNG Project under PF14-17 (Nov. 24, 2014) (enclosed).

[9] *See* FERC, Environmental Assessment for the Cove Point Liquefaction Project, Dominion Cove Point LNG, LP Docket No. CP13-113-000, at 40, 169–171 (May 2014), http://bit.ly/1k5fNM0 ("Climate change in the northeast region could have two effects that may cause increased storm surges: temperature increase of the Chesapeake Bay waters, which would increase storm intensity; and a rising sea level. The final grade elevation of the Liquefaction Facilities Project site would range between 70 and 130 feet above mean sea level. Therefore, even with increased sea levels due to climate change and increased storm surge, the Project facilities would not be vulnerable to even a 100-year climate change-enhanced storm surge because of its significant elevation above sea level."); FERC, Environmental Assessment for the Cameron LNG Expansion Project, Cameron LNG, LLC Docket No. CP15-560-000, at 115 (Feb. 2016), https://perma.cc/7MA8-DW2W ("Climate change in the region would have two effects that may cause increased storm surges, increased temperatures of Gulf waters, which would increase storm intensity, and a rising sea level. In Louisiana, relative sea level changes have been estimated by the NOAA to be about 14 inches by 2050. This is greater than the global average because of regional ground subsidence. The Cameron LNG Terminal is designed for a 500-year storm surge elevation level of 12.4 feet amsl. Given that the Expansion Project's process equipment minimum elevation point of support would be 12.5 feet amsl and the LNG storage tank (T-205) would be 14.0 amsl at top of the elevated pile cap, climate change-enhanced sea level rise and subsidence are considered adequately addressed in the Expansion Project design.").

[10] *Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1363 (D.C. Cir. 2017) ("FERC's environmental impact statement did not contain enough information on the greenhouse-gas emissions that will result from burning the gas that the pipelines will carry."); *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1215-1217 (9th Cir. 2008) (finding that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct"); *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 74 (D.D.C. 2019) (BLM must analyze downstream emissions in oil and gas lease environmental assessments); *San Juan Citizens All. v. United States Bureau of Land Mgmt.*, 326 F. Supp. 3d 1227 (D.N.M. 2018) (same); *High Country Conservation Advocates v. United States Forest Serv.*, No. 13-CV-01723-RBJ, 2014 WL 2922751, at *8-11, 13-15 (D. Colo. June 27, 2014) (holding that it was arbitrary and capricious for federal agencies to omit analysis of GHG emissions and related costs in EISs for mining exploration projects).

[11] *Sierra Club*, 867 F.3d at 1373–74 (D.C. Cir. 2017) ("We conclude that the EIS . . . should have either given a quantitative estimate of the downstream greenhouse emissions that will result from burning the natural gas that the pipelines will transport or explained more specifically why it could not have done so. As we have noted, greenhouse-gas emissions are an indirect effect of authorizing this project, which FERC could reasonably foresee, and which the agency has legal authority to mitigate."); *see also Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549 (8th Cir. 2003) (finding in NEPA review for coal railway, STB must account for greenhouse gas emissions and air quality effects from foreseeable increase in coal consumption and combustion); FERC, Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act, FN 15, 4-123—4-127 (Feb. 2017), https://perma.cc/7DAW-BX9P (instructing "[y]ou should provide the data needed to support our NEPA analysis (e.g., the project's contribution to greenhouse gas emissions; local or state GHG

The D.C. Circuit has held that FERC need not assess the greenhouse gas emissions resulting from export-induced increases in domestic production associated with new export facilities, because LNG exports cannot take place without approval from the Department of Energy ("DOE").[13] However, "when determining the contents of an . . . EIS, an agency must consider all 'connected actions,'" and "[a]n agency impermissibly 'segments' NEPA review when it divides connected . . . federal actions into separate projects and thereby fails to address the true scope and impact of the activities that should be under consideration."[14] The D.C. Circuit has raised, without answering, the question of whether FERC's construction authorizations and DOE's export authorizations are "connected actions" for purposes of NEPA review in the LNG export context.[15]

"Connected actions" include those actions that "[a]re interdependent parts of a larger action and depend on the larger action for their justification."[16] FERC's action in approving construction of an LNG export terminal would not be justified without an expectation that the terminal will be used to export LNG. Nor could DOE justify approving LNG exports through a facility whose construction was not approved. The two agencies' approval actions are thus interdependent parts of the larger LNG export process. Similarly, the D.C. Circuit has indicated that a project without substantial independent utility is more likely to be considered "connected" to other related actions.[17] An LNG export facility has no independent utility absent export approvals. Because FERC's approval of the Project and DOE's approval of LNG exports are "connected actions," their greenhouse gas impacts must be assessed in a single EIS. In order to avoid impermissibly narrowing the scope of the EIS, FERC should therefore act jointly with DOE to assess upstream and downstream indirect emissions resulting from exports of LNG through the Project. The Commission has the authority to do so under the Natural Gas Act

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emissions; and any local, state, or regional goals for GHG emissions or climate change)," and requiring reporting on greenhouse gas emissions from construction and operation of facilities).

[12] *Sierra Club v. United States Dep't of Energy*, 867 F.3d 189, 201–02 (D.C. Cir. 2017) (noting that as part of its review "the Department evaluated the upstream and downstream greenhouse-gas emissions (CO2 and methane) from producing, transporting, and exporting LNG in its Life Cycle Report").

[13] *Sierra Club v. Fed. Energy Regulatory Comm'n*, 827 F.3d 36, 46-47 (D.C. Cir. 2016) ("Sierra Club Freeport") (holding that FERC did not need to consider upstream emissions that would only occur if the Department of Energy approved the facility for LNG export); *EarthReports, Inc. v. Fed. Energy Regulatory Comm'n*, 827 F.3d 949, 954 (D.C. Cir. 2016) (extending the holding of *Sierra Club Freeport* to downstream emissions).

[14] *Delaware Riverkeeper Network v. Fed. Regulatory Comm'n*, 753 F.3d 1304, 1313, 1314 (D.C. Cir. 2014).

[15] *Sierra Club Freeport* at 45-46 (citing 40 C.F.R. § 1508.25(a)(1)).

[16] 40 C.F.R. § 1508.25(a)(1)(iii).

[17] *Delaware Riverkeeper*, 753 F.3d at 1315-16. To the extent FERC may argue that the Project has substantial independent utility apart from DOE export authorizations because it will transport natural gas within Alaska, FERC cannot rely on *Sierra Club (Freeport)* to avoid assessing the upstream and downstream indirect greenhouse gas emissions related to domestic use.

(NGA) as designated lead agency for NEPA compliance,[18] and the legal obligation under NEPA's requirement that "connected actions" be considered together.[19]

Moreover, FERC should disclose the consequences of the Project's greenhouse gas emissions, in addition to including indirect and cumulative effects in its accounting of those emissions, in order to inform decision-makers and the public about the scale of the emissions impact from the Project.[20] There are a number of ways to assess the effects of a project's greenhouse gas emissions. Among the most useful are the social cost of carbon, methane, and nitrous oxide.[21] Although they were developed for a rulemaking context, these metrics can readily be used in an environmental analysis to better understand the potential costs associated with greenhouse gas emissions. The cost estimates are a useful proxy for the actual impacts of climate change. Additional tools to understand the magnitude of greenhouse gas emissions' impact include the EPA's quantification threshold of 25,000 tons per year of carbon dioxide equivalent to identify major emitters for the purposes of greenhouse gas reporting (as noted by EPA, facilities that surpass this threshold are considered the "largest emitters" in the country).[22] FERC should also consider using the EPA's Greenhouse Gas Equivalencies Calculator, which can be used to compare emissions from the proposal with, for example, emissions from household electricity use or vehicle miles driven.[23] This tool provides a reference point that an agency can use to assess a proposed project's impact on the climate. Finally, FERC could evaluate the Project's greenhouse gas emissions in the context of global and national carbon budgets; estimates have been developed for both.[24]

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[18] 15 U.S.C. § 717n(b)(1)(designating the Commission to be "the lead agency for the purposes of coordinating all applicable Federal authorizations and for the purposes of complying with the National Environmental Policy Act"); *see also* 42 U.S.C. § 7172(a)(2)(B).

[19] For further information regarding federal agencies' obligation to assess greenhouse gas emissions resulting from fossil fuel transportation projects under NEPA, please refer to the attached article (Attachment A: Burger and Wentz, 2019).

[20] *See, e.g., San Juan Citizens All.*, 326 F. Supp. 3d at 1247 (agency must evaluate potential impacts of greenhouse gas emissions caused by project in light of revised total greenhouse gas projections).

[21] The Social Cost of Carbon, Methane, and Nitrous Oxide, though now rescinded, are scientifically credible estimates of the societal costs of greenhouse gas emissions, developed through a lengthy process of interagency consultation and peer review, and that cost is absolutely relevant to assessing the nature and significance of the proposed Project's environmental consequences. See *Zero Zone Inc. v. Dept. of Energy*, 832 F.3d 654 (7th Cir. 2016) (upholding use of methodology for calculating social cost of carbon used by the Interagency Working Group on the Social Cost of Carbon); Interagency Working 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 (May 2013, Revised August 2016); Interagency Working Group on the Social Cost of Greenhouse Gases, Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide (Aug. 2016). *See also Montana Environmental Information Center v. OSM*, 274 F.Supp.3d 1074 (D. Montana 2017) (requiring disclosure of greenhouse gas costs in NEPA review where benefits were also disclosed, and citing the federal Social Cost of Carbon as an available disclosure tool); *High Country Conservation Advocates v. USFS*, 52 F.Supp.3d 1174 (D. Colo. 2014) (same)

[22] EPA, GHG Reporting Program Facts and Figures, https://www.epa.gov/ghgreporting/key-facts-and-figures.

[23] EPA, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[24] *See, e.g.*, Corinne Le Quéré et al., Global Carbon Budget 2018, Earth Systems Science Data (2018); Daniel J. Hayes, The North American Carbon Budget, in Second State of the Carbon Cycle Report: A Sustained Assessment Report (Cavallaro et al. eds, USGCRP 2018).

Finally, in assessing the Project's potential climate impacts, FERC should use updated figures to properly assess the magnitude of greenhouse gas pollution that would result from the Project. FERC has recently used a global warming potential (GWP) of 25 for methane, based on a 100-year time horizon, in conducting NEPA analysis.[25] This GWP is flawed for two reasons. First, because methane remains in the atmosphere for under two decades,[26] a 20-year timeframe is more relevant than the 100-year span. At least one court has concluded that an "unexplained decision to use the 100-year time horizon," even a decision based on EPA's use of that timeframe, "when other more appropriate time horizons remained available, qualifies as arbitrary and capricious."[27] The most recent Intergovernmental Panel on Climate Change (IPCC) Assessment Report estimates that methane's GWP is 87 over a 20-year timeframe (when the effects of oxidation are taken into account).[28] FERC should use this figure. Second, the most recent IPCC Assessment Report estimates that methane's GWP over a 100-year time frame is 36 (when the effects of oxidation are included).[29] Even though this time horizon is inappropriate, the FERC should not use outdated science. Although the Greenhouse Gas Reporting Rule uses a GWP of 25 for methane,[30] courts have recognized the IPCC as authoritative,[31] and "[t]he EPA considers the GWP estimates presented in the most recent IPCC scientific assessment to reflect the state of science."[32] An EIS must provide a "full and fair discussion of environmental impacts," and the information made available to the public "must be of high quality."[33] In order to fulfill this mandate, FERC should use up-to-date science when assessing the potency of methane.

B. Complementary Legal Authorities and Policies Supporting Consideration of Climate Impacts

Complementing NEPA requirements, state law also supports consideration of climate change adaptation in the proposed EIS. In response to hurricanes Katrina and Rita, the Louisiana Legislature passed Act 8 of the First Extraordinary Session of 2005 (Act 8), which established the Coastal Protection and Restoration Authority (CPRA). The CPRA is legally required to develop and implement a comprehensive coastal protection plan, consisting of a master plan that is revised every six years as well as annual plans.[34] Additionally, Louisiana Executive Order JBE2016-09 instructs all state agencies, departments, and offices to carry out their regulatory

[25] *See, e.g.,* FERC, Alaska LNG Project, Draft Environmental Impact Statement (June 2019) at 4-878; FERC, Jordan Cove Energy Project, Draft Environmental Impact Statement (March 2019) at 4-666.
[26] IPCC, Climate Change 2013, The Physical Science Basis, Chapter 8, 714 (Sept. 2013).
[27] *W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt.*, CV-16-21-GF-BMM, 2018 WL 1475470, at *15 (D. Mont. Mar. 26, 2018).
[28] IPCC, *supra* note 26.
[29] *Id.*
[30] 40 C.F.R. Pt. 98, Subpt. A, Tbl. A–1.
[31] *See, e.g.*, *Mass. v. Env. Protection Agency*, 549 U.S. 497, 508 (2007); *Ctr. For Biological Diversity v. National Highway Traffic Safety Admin.*, 538 F.3d 1172, 1190 (9th Cir. 2008).
[32] EPA, Understanding Global Warming Potentials, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.
[33] 40 C.F.R. §§ 1502.1, 1500.1(b).
[34] LA. STAT. ANN. §§ 49:214.5.2, 49:214.5.3.

programs, practices, grants, and contracts "in a manner consistent with the Coastal Master Plan and the public interest to the maximum extent possible."[35]

Federal guidance further directs assessment of climate change impacts. The Securities and Exchange Commission ("SEC") has issued guidance regarding publicly traded companies' obligation to disclose the impacts that climate change may have on their operations.[36] FERC can facilitate such disclosure by conducting an analysis of climate change impacts on the proposed facility.

C. Primary Climate Impacts Pertinent to Environmental Review of the Project

1. Sea Level Rise

As anthropogenic greenhouse gas emissions warm the planet, causing glaciers and ice sheets to melt and oceans to absorb increasing volumes of heat, global sea levels will continue to rise, and will do so at increasing rates.[37] In the next several decades, storm surges and high tides will combine with sea level rise to increase flooding, threatening coastal communities and industries.[38] Though the proposed location for the Project is not directly on the coast, its placement at the Port of Plaquemines still leaves it vulnerable to storm surge—especially in light of the rapid subsidence and loss of wetlands along the Louisiana coast.[39]

Sea level rise is occurring rapidly along the western gulf coast[40] contributing to a particularly high vulnerability for Louisiana's shoreline.[41] The CPRA has data specifically

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[35] State of Louisiana, Exec. Order No. JBE 2016-09, Consistency with Louisiana's Comprehensive Master Coastal Plan to Ensure a Sustainable Integrated Coastal Ecosystem (April 4, 2016), *available at* http://gov.louisiana.gov/assets/ExecutiveOrders/JBE16-09.pdf.

[36] Sec. Exch. Comm'n, *Commission Guidance Regarding Disclosure Related to Climate Change* (2010) ("Significant physical effects of climate change… have the potential to affect a registrant's operations and results. For example, severe weather can cause catastrophic harm to physical plants and facilities and can disrupt manufacturing and distribution processes…. Registrants whose businesses may be vulnerable to severe weather or climate related events should consider disclosing material risks of, or consequences from, such events in their publically filed disclosure documents."), *available at* http://www.sec.gov/rules/interp/2010/33-9106.pdf.

[37] Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive Summary of the Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 26 pp .12-34.

[38] Fleming, E., J. Payne, W. Sweet, M. Craghan, J. Haines, J.F. Hart, H. Stiller, and A. Sutton-Grier, 2018: Coastal Effects. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 322-352; Kate Gordon et al., The Risky Business Project, *Risky Business: The Economic Risks of Climate Change in the United States* at 20 (2014) [hereinafter "Risky Business"], *available at* http://riskybusiness.org/report/national/.

[39] Nienhuis, J. H. et al., *A New Subsidence Map for Coastal Louisiana*, 27 GSA Today 58-59 (June 2017), *available at* http://www.geosociety.org/gsatoday/groundwork/G337GW/article.htm; Blum, M.D., and Roberts, H.H., *Drowning of the Mississippi Delta Due to Insufficient Sediment Supply and Global Sea-Level Rise*, 2 Nature Geoscience 488–491 (2009), *available at* https://www.nature.com/articles/ngeo553.

[40] NOAA, *U.S. Sea Level Trend Map* (2016) [hereinafter "NOAA Sea Level Trend Map"], *available at* https://tidesandcurrents.noaa.gov/sltrends/slrmap.html.

[41] Hammar-Klose, E., and E. Thieler, *2001: National Assessment of Coastal Vulnerability to Future Sea-Level Rise: Preliminary Results for the US Atlantic, Pacific and Gulf of Mexico Coasts*. US Reports 99–593, 00-178, and 00-179. U.S. Geological Survey, *available at* http://woodshole.er.usgs.gov/project-pages/cvi/; *Coastal Protection and*

examining the flood risk, economic risk, severe coastal erosion effects, and adaptation efforts for Plaquemines Parish. The CPRA projects that ten years from now much of the area surrounding the proposed Project site will experience 16 or more feet of flooding during 50-year storm events.[42] Regionally, coastal counties, and parishes in Alabama, Mississippi, Louisiana, and Texas already face significant losses from hurricane winds, land subsidence, and sea level rise that annually average $14 billion.[43] The same study estimates that future losses for the 2030 timeframe could reach between $18 billion to $23 billion with approximately 50% of the increase in the estimated losses related to climate change.[44]

Many sources provide current and credible data regarding sea level rise and its potential consequences generally and in Louisiana in particular. As relevant examples, the Sabin Center directs the Commission's attention to:

- Intergovernmental Panel on Climate Change ("IPCC"), Chapter 2.2.3 Ocean, Cryosphere and Sea Level, in Climate Change 2014 Synthesis Report, Fifth Assessment Report, at 62, *available at* https://perma.cc/9K4F-LDFC[45]
- Intergovernmental Panel on Climate Change ("IPCC"), Chapter 13 Sea Level Change, in Climate Change 2013: The Physical Science Basis, *available at* https://perma.cc/EK2J-WSLX[46]
- The Fourth National Climate Assessment, Chapter 8 at 329, 335, 338, *available at* https://nca2018.globalchange.gov/downloads/NCA4_Ch08_Coastal-Effects_Full.pdf[47]
- The Fourth National Climate Assessment, Chapter 19 at 746, 749, 757-58, 761, *available at* https://nca2018.globalchange.gov/downloads/NCA4_Ch08_Coastal-Effects_Full.pdf[48]
- Climate Central, Surging Seas: Sea Level Rise Analysis, *available at* https://perma.cc/D7GV-BUTQ

Restoration Authority of Louisiana, Louisiana's Comprehensive Master Plan for a Sustainable Coast (2017), [Hereafter "Louisiana's Coastal Plan"], *available at* http://coastal.la.gov/wp-content/uploads/2017/04/2017-Coastal-Master-Plan_Web-Single-Page_CFinal-with-Effective-Date-06092017.pdf.

[42] *See* Coastal Protection & Restoration Authority's Master Plan Data Viewer Flood Risk Map, showing map of future flooding risk in Plaquemines Parish (accessed Nov. 13, 2019), *available at* http://cims.coastal.louisiana.gov/masterplan/.

[43] America's Wetland Foundation, America's Energy Coast, and Entergy, *Building a Resilient Energy Gulf Coast: Executive Report* (2010), *available at* www.entergy.com/ content/our_community/environment/GulfCoastAdaptation/ Building_a_Resilient_Gulf_Coast.pdf.

[44] *Id*.

[45] Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (R.K. Pachauri and L.A. Meyer, eds., 2014).

[46] J.A. Church et al., *Sea Level Change*, in Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (T.F. Stocker et al., eds., 2013).

[47] Fleming, *supra* note 38.

[48] L., A. Terando, K. Dow, K. Hiers, K.E. Kunkel, A. Lascurain, D. Marcy, M. Osland, and P. Schramm, 2018: Southeast. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 743–808.

- Risky Business: The Economic Risks of Climate Change in the United States, *available at* https://perma.cc/U62D-KRVG
- America's Wetland Foundation, America's Energy Coast, and Entergy, Building a Resilient Energy Gulf Coast: Executive Report, *available at* https://perma.cc/NZ33-9ZUC
- Coastal Protection and Restoration Authority of Louisiana, Louisiana's Comprehensive Master Plan for a Sustainable Coast, *available at* https://perma.cc/LC5J-Z7UN

2. Increasing Frequency and Severity of Hurricanes and Tropical Storms

Since the early 1980's, Atlantic hurricane activity has substantially increased by measures including intensity, frequency, and duration as well as the number of strongest (Category 4 and 5) storms.[49] Warming sea surface temperatures in the Atlantic are linked to this increase in hurricane activity.[50] Human-induced emissions of heat-trapping gases and particulate pollution influence these local sea temperatures.[51] The coastline along the northern Gulf of Mexico is especially vulnerable to disastrous flooding and erosion during hurricanes.[52] The combination of sea level rise with more severe and frequent hurricanes will affect storm surge and coastal damages. The previously listed resources describe these impacts and costs.

As discussed, the Project's proposed site makes it vulnerable to storm surge. Plaquemines Parish, where the Project would be located, experienced flooding during Hurricane Barry in July 2019 after levees were overtopped.[53] The 2018 hurricane season produced 15 named storms, including eight hurricanes of which two were "major" (Category 3, 4 or 5);[54] the 2018 hurricanes Florence and Michael caused $24 billion and $25 billion worth of damage, respectively.[55] The 2017 hurricane season was particularly catastrophic with 17 named storms, 10 of which became hurricanes, including three category 4 storms that made landfall in the

[49] U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, Jerry M. et al., eds., 2014), 41-42; Christensen, J.H., et al., *Climate Phenomena and their Relevance for Future Regional Climate Change*, in Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Stocker, T.F., et al. eds.)(See especially 14.3.4-5, 14.6, 14.8.3); *see also* Kossin, J.P.et al., *Extreme storms*, in 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I 257-276 (Wuebbles, D.J., et al. eds., U.S. Global Change Research Program, 2017)[hereinafter "NCA 4 Extreme Storms"].
[50] *Id*.
[51] *Id*.
[52] *See* Thatcher, C.A.; Brock, J.C., and Pendleton, E.A., 2013. Economic vulnerability to sea-level rise along the northern U.S. Coast. *In*: Brock, J.C.; Barras, J.A., and Williams, S.J. (eds.), *Understanding and Predicting Change in the Coastal Ecosystems of the Northern Gulf of Mexico*, Journal of Coastal Research, Special Issue No. 63, p. 234 Coconut Creek (Florida).
[53] "Parts of Plaquemine Parish flooding after levees are overtopped," WGNO (July 13, 2019), *available at* https://wgno.com/2019/07/13/parts-of-plaquemines-parish-flooding-after-levees-are-overtopped/; Veronica Rocha, et al., "Barry makes landfall in Louisiana," CNN (July 15, 2019), *available at* https://www.cnn.com/us/live-news/tropical-storm-barry-saturday-2019-intl/h_ebd51fffbd65b191cb568df419b1d939.
[54] Nat. Oceanic and Atmospheric Admin., "Destructive 2018 Atlantic hurricane season draws to an end," (Nov. 28, 2018), *available at* https://www.noaa.gov/media-release/destructive-2018-atlantic-hurricane-season-draws-to-end.
[55] Nat. Oceanic and Atmospheric Admin., "Assessing the U.S. Climate in 2018," (Feb. 6, 2019), *available at* https://www.ncei.noaa.gov/news/national-climate-201812.

U.S.[56] Hurricane Harvey inflicted an estimated $125 billion worth of damage altogether, including in Louisiana, making it the second costliest tropical cyclone ever to strike the United States mainland.[57] Global models project further increases in intensity, precipitation rate, and wind speed for tropical cyclones over the 21st Century.[58]

3. Upstream and Downstream Impacts

Delta LNG proposes to construct an LNG export terminal in Plaquemines Parish, Louisiana, and two parallel pipelines. Domestically sourced natural gas would be transported by the Delta Express Pipeline to the Delta LNG terminal, which would produce, store, and deliver up to 24 million tons per annum of LNG to LNG carriers for export overseas.[59] Extracting natural gas from wells, processing it for transport, cooling it for loading into tankers, transporting it in those tankers, and, of course, combustion by end-users, are all activities that will occur as a result of the proposed Project. Each of these component activities has predictable environmental impacts.[60] Further, these activities will contribute to the Project's upstream and downstream greenhouse gas emissions. DOE has analyzed the life cycle impacts of greenhouse gas emissions from U.S. LNG export facilities.[61] In a 2014 addendum analyzing the upstream greenhouse gas emissions of LNG export facilities, DOE estimated that that each incremental increase in natural gas production of 1 trillion standard cubic feet per year will generate an additional 6.8 million metric tons of CO_2 equivalent per year.[62] While the exact downstream emissions of combusting natural gas may depend on several uncertain variables, FERC should engage in "reasonable forecasting" and provide a quantitative estimate of the greenhouse emissions, or else a complete explanation for why it cannot provide the estimate.[63] Additionally, as discussed, FERC should work jointly with DOE to assess the impacts of the life cycle greenhouse gas emissions associated with the Project.

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[56] Brian Sullivan, "The Most Expensive U.S. Hurricane Season Ever: By the Numbers," BLOOMBERG (Nov. 26, 2017), *available at* https://perma.cc/R3JM-PXAY.
[57] Nat. Hurricane Ctr., "Costliest U.S. tropical cyclones tables updated" (Jan. 26, 2018), *available at* https://www.nhc.noaa.gov/news/UpdatedCostliest.pdf.
[58] Melillo, *supra* note 50.
[59] *See* Notice of Intent.
[60] *See, e.g.*, Timothy Vinciquerra et al., *Regional air quality impacts of hydraulic fracturing and shale natural gas activity: Evidence from ambient VOC observations*, 110 Atmospheric Env't 144 (2015) (identifying natural gas hydrofracture drilling operations as sole plausible cause for increase in ambient emissions of ethane and VOCs—and, by inference, methane—in region downwind of drilling operations in Pennsylvania and West Virginia); Victor M. Heilweil et al., *Stream Measurements Locate Thermogenic Methane Fluxes in Groundwater Discharge in an Area of Shale-Gas Development*, 49 Envtl. Sci. & Tech. 4057 (2015) (measuring migration of fingerprinted methane, i.e., gas not attributable to sources other than drilling, into waters near shale-gas development operations); Christopher W. Moore et al., *Air Impacts of Increased Natural Gas Acquisition, Processing, and Use: A Critical Review*, 48 Envtl. Sci. & Tech. 8349 (2014) (discussing several case study-based natural gas lifecycle emissions assessments).
[61] U.S. Dept. of Energy, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, 79 Fed. Reg. 32,260 (June 4, 2014), *available at* https://perma.cc/V353-JDYZ.
[62] U.S. Dept. of Energy, Addendum to Environmental Review Documents Concerning Exports of Natural Gas from the United States, 79 Fed. Reg. 48,132 (Aug. 15, 2014),*available at* https://perma.cc/7Y6A-PM5Z.
[63] *Sierra Club*, 867 F.3d at 1373–74 (D.C. Cir. 2017); *see also Delaware Riverkeeper Network*, 753 F.3d at 1310.

To adequately protect the Delta LNG and Delta Express Pipeline Project and its surrounding environment from future climate change impacts, the Commission should consider the risks arising from increasing frequency and severity of hurricanes combined with sea level rise and associated storm surge, flooding, and erosion risks. Consideration of such risks by a federal agency would not be a novel undertaking,[64] and is especially exigent here given that the Project will support the compression and transport of combustible and potentially explosive gas.

Specifically, the Commission should assess the projected range of sea level rise and related potential for storm surge and erosion throughout the planned life of the Project, and should identify ways to effectively manage the associated risks. Similarly, the Commission should assess projected changes to frequency and severity of hurricanes in the vicinity of the Project and identify engineering solutions capable of managing the host of risks that extreme weather poses to sensitive infrastructure.

In its projections of the future state of coastlines, the Commission should take note of the western gulf coast's high rate of sea level rise relative to other regions of the U.S. and the world [65] coupled with its vulnerability to hurricanes and tropical storms. Louisiana lost approximately 4,833 square kilometers of land along its coast between 1932 and 2016, equal to a loss of 25% of the 1932 land area. [66] High wetland loss rates occurred during the 2005 and 2008 hurricane seasons, which were particularly hard on the Louisiana Coast.[67] The baseline of the Project's future environmental circumstances should reflect that the area surrounding the project appears to be highly sensitive to storm surge, climate change, subsidence, and the worsening synergistic impacts of these forces.

Additionally, the Commission should take into account the indirect and cumulative impacts that the Project would have on climate change. In doing so, the Commission should use up-to-date GWP estimates and evaluate the effects of the Project's greenhouse gas emissions.

Thank you for the opportunity to submit comments on the Delta LNG and Delta Express Pipeline Project. Please feel free to contact the Sabin Center with any questions.

Sincerely,

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[64] *See, e.g.*, Department of Interior, Seward Peninsula - Nulato Hills - Kotzebue Lowlands Rapid Ecological Assessment, Final Report II-3-c (Oct. 2012), *available at* http://bit.ly/207u2Rk.
[65] NOAA Sea Level Trend Map.
[66] Couvillion, B.R., et al., *Land Area Change in Coastal Louisiana from 1932 to 2016*, U.S. Geological Survey Scientific Investigations Map 3381, 16 p. pamphlet, *available at* https://pubs.er.usgs.gov/publication/sim3381.
[67] *Id*.

enclosures:

- FERC's Letter to Louisiana LNG Energy, LLC providing comments on Draft Resource Reports 2 through 9 re the Mississippi River LNG Project under PF14-17 (Nov. 24, 2014)