COMMENTS OF EARTHJUSTICE, NATURAL RESOURCES DEFENSE COUNCIL, SIERRA CLUB, AND WE ACT FOR ENVIRONMENTAL JUSTICE ON THE DEPARTMENT OF ENERGY'S DECEMBER 2024 ASSESSMENT OF U.S. LNG EXPORTS

I. Introduction

The Department of Energy's (DOE) study demonstrates that liquefied natural gas (LNG) exports are contrary to the public interest, and that applications to export additional LNG from the United States should be denied. DOE's study is a necessary step forward, building on prior analyses. While the study is incomplete in some regards, addressing that incompleteness will only further bolster the conclusion that DOE's study already makes clear—that additional exports are both harmful and unnecessary.

Many of the study's findings reaffirm DOE's prior conclusions. Every study or analysis DOE has ever published or commissioned has held that exports from the lower-48 states increase domestic gas prices. These include DOE's forecasts published in 2012, 2015, and 2018,[1] and retrospective analyses of the effects of exports that have since occurred.[2] Similarly, the DOE study affirms DOE's prior finding that LNG exports increase domestic energy prices and costs to the manufacturing sector.[3]

Other aspects of DOE's study address issues of inevitable but previously implicit consequences. For the first time, DOE estimates the *impact* of export-driven price increases on American households, rather than merely looking at aggregate indicators like gross domestic product (GDP). Here, DOE finds a triple increase: higher gas prices, higher electricity prices, and higher prices for manufactured goods.

In another first, although DOE has always acknowledged that LNG is not exclusively a substitute for other fossil fuels, DOE finally incorporates discussion of renewable energy into its climate analysis. DOE concludes that, in every scenario, increasing LNG exports increases global greenhouse gas (GHG) emissions. In the "Defined Policies" scenario where U.S. LNG exports exceed currently authorized levels, the annual emissions associated with exports in 2050 would

[1] DOE, LNG Export Studies (June 2018), https://www.energy.gov/fecm/articles/lng-export-studies

[2] U.S. EIA, U.S. natural gas supply and demand balance shifts amid outage at Freeport LNG (July 2022), https://www.eia.gov/todayinenergy/detail.php?id=53079.

[3] U.S. EIA, Effect of Increased Natural Gas Exports on Domestic Energy Markets, 5 (January 2012), https://www.energy.gov/sites/prod/files/2013/04/f0/fe_eia_lng.pdf (LNG exports increase electric prices); NERA Economic Consulting, Macroeconomic Impacts of LNG Exports from the United States, 62 (December 2012), https://www.energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf (LNG exports decrease aggregate wages in manufacturing industries).

be 1.5 gigatons of carbon dioxide equivalent (CO_2e), before accounting for market effects,[4] or about 25% of current U.S. annual greenhouse gas emissions.[5]

Further, DOE's study concludes that there is no need for additional exports. The U.S.'s allies—particularly in Europe—are reducing their gas demand, and the world is already adequately supplied by already DOE-approved projects. Because no one needs the gas, LNG exports do not provide benefits that outweigh the severe costs they impose upon the public; therefore, they should not be approved under the Natural Gas Act.[6]

DOE's study is therefore a needed update to underlying economic analysis and a long-overdue first look at how exports will impact households and renewable energy. However, even with these additions, DOE's study is not comprehensive—DOE still has acknowledged, but not fully addressed, a variety of impacts, including adverse impacts to price stability, public health, various environmental resources, and environmental justice communities. To address those issues, and to apply the study's findings to individual projects, DOE must ensure that the effects of exports are included in project-specific National Environmental Policy Act (NEPA)[7] reviews. In short, LNG exports make individual households and the country as a whole worse off. Therefore, LNG exports are not consistent with the public interest, and DOE must deny individual export applications.[8]

II. Additional approvals of U.S. LNG are not needed to meet global demand.

DOE's study includes a set of scenarios that cover a wide range of possible future global demand for LNG.[9] Scenario modeling is standard practice and a reasonable method for discerning potential future outlooks. As DOE lays out, the Global Change Analysis Model (GCAM) used for this study "has a long history of being used to conduct global, regional, national, and subnational assessments of energy and climate policies and their long-term (multi-decadal) economic and market implications to inform national and international decision-making."[10] GCAM is extensively published in scientific peer-reviewed literature, is used for U.S. government interagency projects and reports, and is an integral part of all reports of the Intergovernmental Panel on Climate Change (IPCC) to date.[11]

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[4] DOE, Energy, Economic, and Environmental Assessment of U.S. LNG Exports, S-16 (December 2024) ("DOE Summary").
[5] *See* EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022, ES-4 (April 2024), https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf.
[6] 15 U.S.C. § 717b(a).
[7] *See* 42 U.S.C. § 4321 *et seq.*
[8] 15 U.S.C. § 717b(a).
[9] DOE, Appendix A: Global Energy and Greenhouse Gas Implications of U.S. LNG Exports, A-1, Table ES-1 (December 2024) ("DOE App. A").
[10] *Id.* at A-7.
[11] *Id.*

The GCAM model determines equilibrium levels of global demand for specific energy sources considering constraints related to resource supply, technological advancement, and GHG emissions caps provided by climate policy goals. DOE explores 15 scenarios with varying levels of climate policy ambition, carbon capture and storage (CCS) availability, and U.S. LNG export levels; DOE focuses its analysis and results on five main scenarios.[12] DOE includes six additional sensitivities that investigate low and high levels of natural gas supply in the U.S. and Middle East.[13]

Under this range of possible future global demand for LNG, in four of five main scenarios modeled, the amount of LNG DOE has already approved exceeds demand.[14] The "Defined Policies" scenario is the only scenario that projects demand for exports above those already approved by DOE; even this case projects no additional export demand until after 2040.[15]

Experts agree that the current pace of LNG expansion will overwhelm projected demand. Under the International Energy Agency's (IEA) net zero scenario, LNG demand through 2050 can be met entirely by projects existing today. Even under the STEPS (existing policies) scenario, the IEA says there is a risk that LNG oversupply will lower prices and stimulate new demand, in turn, slowing down the energy transition and displacing solar, wind, and heat pumps. The other possibility is that the LNG supply glut is not absorbed and becomes stranded assets.[16] The Institute for Energy Economics and Financial Analysis (IEEFA) forecasts an oversupply in LNG markets by 2026.[17] Bloomberg New Energy Finance agrees: "Make no mistake — the LNG market will still be oversupplied later this decade."[18]

This evidence all supports the conclusion that the Defined Policies scenario (i.e., the only scenario where demand exceeds the amount of LNG DOE has already approved) is unlikely to occur. DOE has done its due diligence to model this scenario to allow for a comparison of potential futures. With the balance of the evidence suggesting that this level of LNG demand is unlikely to materialize, DOE cannot ignore that all other scenarios do not require further approvals.

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[12] DOE Summary at S-2, S-3.
[13] DOE, Appendix C: Consequential Greenhouse Gas Analysis of U.S. LNG Exports, C-8 (December 2024)) ("DOE App. C").
[14] DOE Summary at S-22.
[15] *Id.* at S-3.
[16] International Energy Agency (IEA), World Energy Outlook 2024, 180 (October 2024), https://www.iea.org/reports/world-energy-outlook-2024.
[17] Institute for Energy Economics and Financial Analysis, Global LNG Outlook 2024-202, 4 (April 2024), https://ieefa.org/sites/default/files/2024-04/Global%20LNG%20Outlook%202024-2028_April%202024%20%28Final%29.pdf.
[18] Stephen Stapczynski, "Global Gas Glut to Be Delayed by Another Year", Bloomberg (May 2024), https://www.bloomberg.com/news/newsletters/2024-05-06/global-lng-glut-not-likely-to-hit-until-at-least-2026?cmpid=BBBXT050624_ENERGY&utm_medium=email&utm_source=newsletter&utm_term=240506&utm_campaign=energy.

All of DOE's scenarios also allow for a "moderate" or "high" level of CCS.[19] CCS deployment in the model allows for more gas use, including LNG due to the abatement of associated emissions.[20] DOE finds that global gas demand may be even lower if there were alternative assumptions, such as lower or no CCS deployment.[21] DOE provides a helpful set of scenarios that demonstrate a range of potential future gas demand. However, because CCS is included in all scenarios, global gas demand may be even lower than the lowest case available in DOE's study. DOE should account for that in any future decisions on LNG export applications.

In DOE's study, the "Net Zero (Moderate CCS): Model Resolved" scenario projects U.S. LNG exports will peak in 2040 and then decline through 2050. Even at the peak, U.S. LNG exports do not exceed existing and final investment decision (FID) levels in this scenario.[22] The "Net Zero" scenario assumes that the U.S. and the rest of the world achieve net zero carbon emissions by 2050,[23] a goal that has been widely accepted as necessary to avoid catastrophic climate change.[24]

Further, the moderate CCS assumption in this scenario is also more reasonable to keep the model from overly relying on this technology. The moderate CCS assumption is more conservative than the high CCS assumption, which includes GCAM CCS deployment levels, which "are higher than comparable scenarios in the existing literature and current deployment levels."[25] In this scenario, the U.S. would not need any other new LNG export projects to move forward, even those that already have DOE approval. Unneeded projects include Venture Global's Calcasieu Pass 2, Glenfarne Group's Texas LNG, and many more.[26]

DOE aggregates LNG demand at the global level. DOE also explores the end-users of this global demand as it considers the impacts of LNG exports on "domestic and international energy security, including effects on U.S. trading partners."[27] Since the Russian invasion of Ukraine, LNG advocates have attempted to justify further LNG export approvals by arguing that Europe

[19] DOE Summary at S-17–18.
[20] *Id.* at S-3–17.
[21] *Id.* at S-3.
[22] *Id.*
[23] DOE App. A at A-1, Table ES-1.
[24] International Energy Agency (IEA), World Energy Outlook 2024, 239 (October 2024), https://www.iea.org/reports/world-energy-outlook-2024, (reiterating IEA's earlier finding that demand for fossil fuels globally is set to remain far too high to achieve the Paris Agreement goal of limiting the rise in average global temperatures to 1.5°C). In a scenario where we do achieve that goal (NZE), they find "that no new long lead-time conventional oil and gas projects are required, and no new coal mines or coal mine lifetime extensions are needed either").
[25] DOE App. A at A-14.
[26] DOE Summary at S-14, Table 2. DOE's assumptions include only projects listed in the December 2023 LNG Exports snapshot as construction status of "operating" (in which case DOE uses the "Operating" volume) or "under construction" (in which case DOE uses the "Under Construction Pursuant to FID" volume) moving forward. Anything with a pre-construction status, not yet on this list, or expansions at facilities on this list that are not yet under construction would not be needed.
[27] DOE Summary at S-v.

needs U.S. LNG , and that meeting these needs with additional exports supports national security;[28] these arguments hinge on the assertion that additional LNG is needed by and will be delivered to U.S. allies like Europe.[29] By contrast, DOE's analysis of actual end-users of U.S. LNG provides solid facts that should be the basis of decisions on the security benefits of U.S. LNG exports going forward. DOE clearly rebuts this false claim, demonstrating that Europe is unlikely to be the biggest importer of U.S. gas in the future: "While Europe has been the primary destination for U.S. LNG from 2016 to present, global demand and the destination of U.S. LNG in the future is less certain."[30] Europe is actively reducing its use of fossil fuels, including gas. Further, Europe's contracted LNG supplies will exceed demand by 2027 if the EU achieves the goals of the REPowerEU strategy.[31] European leaders themselves supported the Biden Administration's LNG export approval pause, confirmed they did not forecast a need for more U.S. LNG, and expressed their concern "that a false depiction of European energy needs is now being used as an excuse by the fossil fuel industry and their allies to dramatically expand US LNG exports to the global market."[32]

LNG demand for other key U.S. allies, such as Japan and South Korea, are also projected to remain flat or decline through 2050 across DOE's scenarios.[33] This is consistent with what IEEFA found in its study, concluding that demand for LNG in Japan and South Korea has dropped in recent years and is likely to continue to decline as both countries invest in carbon free power generation.[34]

On the other hand, China is now a very likely destination for U.S. LNG. "China has recently become the largest global importer of LNG and has signed several contracts with operating or proposed U.S. LNG projects. China is expected to have the highest LNG imports of any country across all scenarios in 2050."[35] The national security and trade benefits of exporting LNG to China compared to close U.S. allies like Europe, Japan, or South Korea are starkly different.

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[28] Jov Onsat, "Industry Claims Climate Blow, Activists Hail Win as US Restricts LNG Export", Rigzone (January 2024), https://www.rigzone.com/news/industry_claims_climate_blow_activists_hail_win_as_us_restricts_lng_export-29-jan-2024-175545-article/.

[29] World Oil, "Restricting LNG exports harms global energy production and national security, Energy Workforce warns" (January 2024), https://worldoil.com/news/2024/1/28/restricting-lng-exports-harms-global-energy-production-and-national-security-energy-workforce-warns/.

[30] DOE Summary at S-6.

[31] European Union Agency for the Cooperation of Energy Regulators, Analysis of the European LNG market developments 2024 Market Monitoring Report, 36 (April 2024), https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER_2024_MMR_European_LNG_market_developments.pdf#page=36.

[32] Justice Le Site Web De Marie Toussaint, La lettre de 60 parlementaires de toute l'Europe à Joe Biden (January 2025), https://www.marietoussaint.eu/actualites/lettre-joe-biden.

[33] DOE App. A at A-3–23.

[34] Institute for Energy Economics and Financial Analysis, Global LNG Outlook 2024-2028, 27-30 (April 2024), https://ieefa.org/sites/default/files/2024-04/Global%20LNG%20Outlook%202024-2028_April%202024%20%28Final%29.pdf.

[35] DOE Summary at S-6.

Therefore, DOE should differentiate the expected national security and trade benefits of U.S. LNG exports based on the likely destinations.

III. Increased LNG exports increase GHG emissions.

To evaluate GHG emissions, DOE conducts a consequential life cycle assessment (LCA) that assesses the impacts of potential U.S. LNG export expansion on global energy markets and emissions. Employing this consequential approach allows DOE to account for both the emissions impacts of increasing U.S. LNG exports, stemming from production, transport, and end-use of the gas, as well as the emissions impacts which result from induced changes in market behavior both domestically and abroad. Previous attempts by DOE to quantify the GHG emissions impact of LNG exports relied on comparisons of attributional LCAs for different fuel supply chains, an approach which fails to capture the system-wide impact of additional U.S. LNG volumes entering global markets.[36] In addition, DOE updates its estimates of upstream or "direct" project emissions, including liquefaction. Taken together, DOE's analysis provides a replicable methodology that can be used to estimate the GHG intensity and per-facility impact of existing and proposed U.S. LNG export projects.

DOE's general approach for analyzing the consequential life cycle impacts of additional U.S. LNG exports is largely consistent with the approaches taken in other studies that have looked to model effects of shifts in LNG exports volumes. Smillie et al.[37] and Stock et al.[38] both model economic and emissions impacts of increased LNG exports (including those induced by market effects) within a more limited scope than the analysis undertaken by DOE. Smillie's 2022 study looks at the effect U.S. LNG expansion has on patterns of global coal and gas consumption, while Stock's 2024 study looks at the effects this expansion has on the U.S. energy system as a whole (including shifts in deployment of renewable energy). Using different approaches, both of these studies find that increasing U.S. LNG exports induces increased domestic gas prices (consistent with DOE findings described herein) and highlight the effect this price increase has on consumption and emissions within the U.S. energy sector.

The consequential LCA is based on the outputs of the GCAM model, which provides the cumulative change in emissions in CO_2e based on CO_2, CH_4, and N_2O emissions. To estimate the GHG implications of increased LNG exports, DOE compares the level of global emissions between scenarios. DOE also analyzes the social cost of GHGs (SC-GHG) associated with each scenario. SC-GHG is an established method for quantifying the net economic damages resulting from emitting one additional ton of GHGs into the atmosphere, including temperature

[36] Roman-White et al., "Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States: 2019 Update" (September 2019), https://www.energy.gov/sites/prod/files/2019/09/f66/2019%20NETL%20LCA-GHG%20Report.pdf.
[37] Smillie et al., "Greenhouse Gas Estimates of LNG Exports Must Include Global Market Effects" (January 2022), https://pubs.acs.org/doi/10.1021/acs.est.1c04753.
[38] Stock and Zaragoza, "The Market and Climate Implications of U.S. LNG Exports" (March 2024), https://www.nber.org/system/files/working_papers/w32228/w32228.pdf.

mortality, changes in agricultural productivity, sea level rise, and increased energy costs for residential and commercial buildings.[39] The Environmental Protection Agency (EPA) has used SC-GHG to analyze actions that affect GHG emissions since 2008, and the models used to estimate SC-GHG have become more sophisticated during that time as more data has become available.[40] DOE uses a SC-GHG with near-term discount rates of 2.5%, 2.0%, and 1.5%, in accordance with EPA's most recent methodological update, which was conducted based on best available science and with an external peer review panel.[41]

Before discussing the results, it is important to understand what these scenarios represent. The scenario with the least ambitious climate policies ("Defined Policies") assumes countries meet the GHG limits they have set for themselves. In the U.S., for instance, the Defined Policies scenario assumes that the Bipartisan Infrastructure Law and Inflation Reduction Act are fully implemented as originally passed by Congress.[42] The medium scenario, "Commitments," assumes a minimum decarbonization rate of 8% per year, which is "a significant departure from historically observed decarbonization rates."[43] There is no scenario modeling emissions where countries fail to implement the policies they have already passed. By taking this approach, DOE is appropriately evaluating the volume of U.S. LNG exports that would be compatible with existing policy, including existing climate mitigation strategies. **DOE does not include a future scenario where existing mitigation strategies are rolled back; in such a case, emissions would likely be even higher than the estimates presented in the DOE study.**

At the same time, the "Defined Policies" scenario only has a 70% likelihood of limiting peak temperature increases below 3°C.[44] At global warming levels of 3°C, scientists estimate that the annual chance of major heat waves would increase from 5% to 80%,[45] and the IPCC predicts that nearly a third of species will face a very high risk of extinction.[46] The "Net Zero" scenario is the only one with a greater than 50% likelihood of limiting warming to 1.5°C, and "Net Zero" with moderate CCS is the only scenario that achieves this without relying on dramatic advancements in CCS technology. Under this scenario, U.S. LNG exports fall below the existing level.[47] For that reason, that scenario is not included in the consequential LCA analysis, and is therefore largely omitted from discussion. **However, it raises a crucial point: U.S. LNG exports must *decrease* to limit global warming to 1.5°C.**

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[39] Rennert et al., Comprehensive evidence implies a higher social cost of CO2, *Nature* (September 2022), https://www.nature.com/articles/s41586-022-05224-9.
[40] U.S. EPA, Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (November 2023), https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf.
[41] *Id.*
[42] DOE Summary at S-38.
[43] *Id.* at S-6.
[44] DOE App. A at A-14, Table 3.
[45] Arnell, N.W., Lowe, J.A., Challinor, A.J. et al., Global and regional impacts of climate change at different levels of global temperature increase (June 2019), https://link.springer.com/article/10.1007/s10584-019-02464-z.
[46] IPCC, 2022: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the IPCC. *Cambridge University Press.*, 3056, doi:10.1017/9781009325844.
[47] DOE App. C at C-8.

DOE's results demonstrate that U.S. LNG exports are responsible for immense amounts of GHG emissions. In the "Defined Policies" scenario, where U.S. LNG exports exceed currently authorized levels, the annual emissions associated with exports in 2050 would be 1.5 gigatons of CO_2e, before accounting for market effects,[48] or about 25% of current U.S. annual GHG emissions.[49]

When considering the market effects of exported gas, DOE also finds that LNG exports increase GHG emissions. DOE's results demonstrate that increased LNG exports have a significant impact on GHG emissions and associated SC-GHG **across all scenarios**. In the "Defined Policies" scenario, increasing exports from existing and FID levels to "Model Resolved" increases GHG emissions by 711 teragrams (Tg) CO_2e by 2050, with an associated SC-GHG of $130 billion.[50] These impacts could be even higher if the U.S. LNG exports increase. The "Defined Policies" scenario with higher exports yields an emissions increase of 1,452 Tg CO_2e by 2050, with an associated SC-GHG of $250 billion compared to existing export levels.[51] On a facility level, the estimated cumulative SC-GHG for a single added facility exporting one billion cubic feet per day (bcf/d) is $13 billion on average, or $25 billion for a project with a high-GHG liquefaction process (i.e., a terminal that emits more GHGs per unit of production during liquefaction than average).[52]

The increased GHG emissions are largely attributable to the fact that as countries around the world implement climate mitigation measures, LNG does not merely displace coal and other high-polluting energy sources–it displaces low-carbon renewables. In the "Defined Policies" scenario, 25% of the energy from increased LNG exports is displacing renewables, while only 13% displaces coal.[53] This refutes the widespread fossil fuel industry talking point that LNG exports only displace dirtier energy fuels and therefore support decarbonization efforts.[54]

In addition to analyzing the global market effects of increased LNG exports, the study provides more robust estimates of the life cycle emissions associated with domestic upstream U.S. LNG production compared to previous studies. The emissions from upstream gas and liquefaction processes are referred to as project direct emissions. On average, the report estimates project direct emissions intensity for 2020 to be 14.5 G CO_2e/MJ under a 100-year global warming

[48] DOE Summary at S-16.
[49] EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2022, ES-4 (April 2024), https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf.
[50] DOE App. C at C-30, Table 23 (value provided reflects a 2% discount rate).
[51] *Id.*
[52] *Id.* at C-27, Table 20 (assuming a 2% discount rate).
[53] DOE App. A. at A-2, Figure 5.
[54] *E.g.*, American Petroleum Institute, API on LNG Permit Pause: A 'Win for Russia' and 'Broken Promise to U.S. Allies' (January 26, 2024), https://www.api.org/news-policy-and-issues/news/2024/01/24/api-statement-on-reported-plans-to-restrict-us-lng ("There is no review needed to understand the clear benefits of U.S. LNG for …reducing emissions around the world by transitioning countries toward cleaner fuels.").

potential (GWP), and 21.3 g CO_2e/MJ under a 20-year GWP.[55] This value is substantially lower than a recent peer-reviewed study published in *Energy Science & Engineering,* which estimated combined emissions from upstream, midstream, and liquefaction to be 90 g CO_2e per MJ.[56] The author attributes these higher estimates to the fact that government agencies rely on industry self-reported data, which is likely to underestimate emissions.[57]

Nonetheless, DOE's analysis of upstream emissions improves upon previous DOE estimates by incorporating additional emissions data from the liquefaction stage of LNG production, particularly acid gas removal, based on the National Energy Technology Laboratory (NETL) 2024 natural gas baseline study estimate. Incorporating more accurate process data yielded an average liquefaction stage emissions intensity of 0.258 kg CO_2e /kg LNG. This is consistent with other estimates.[58] DOE should continue to improve upon estimates of liquefaction and other process emissions with more complete data from the EPA's GHG Reporting Program, which DOE acknowledges to be incomplete.[59]

DOE's analysis also explores the sensitivity of modeled consequential LCA results to varying levels of methane emissions intensity from upstream oil and gas operations. DOE establishes a baseline methane leakage rate for their various scenarios (0.56% of total production) and varies this value from 0.2% to 2.8% in increments of 0.2%.[60] DOE runs these varied methane intensity values through this study's established LNG expansion scenarios, and the resulting consequential emissions for the "Defined Policies–existing/FID" scenario is subtracted from the "Defined Policies– model resolved" scenario. This emissions difference in the varied methane intensity cases is compared to the corresponding difference in the baseline methane emissions intensity case. The tabulated results show limited impact of varying methane emissions intensity across the various scenarios, suggesting that DOE's results are not sensitive to assumptions around methane emissions intensity.[61] These findings are somewhat intuitive given that, in configuring this sensitivity analysis, DOE scales methane emissions intensity for geographies outside the U.S. by the same treatment factor applied to U.S. emissions, and compares baseline methane emissions intensity to varied emissions intensities on a net scenario basis.

While these assumptions have their logical merits, they also have the effect of minimizing the potential increases in global emissions stemming from U.S. LNG export expansion in the event that U.S. progress on methane emissions reduction is slower than in other supply geographies.

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[55] DOE App. C at C-3.
[56] Howarth, The greenhouse gas footprint of liquefied natural gas (LNG) exported from the United States, 12 *Energy Science &* Engineering, 4843-4859 (2024)*,* https://scijournals.onlinelibrary.wiley.com/doi/epdf/10.1002/ese3.1934*.* Data is taken from Table 4 by adding the values for combined emissions from "upstream and midstream emissions" and "liquefaction."
[57] *Id.*
[58] DOE App. C at C-18, Table 13.
[59] *Id.* at C-12.
[60] *Id.* at C-36.
[61] *Id.* at Table 29.

Moreover, DOE's approach of comparing the consequential GHG intensity in varied methane intensity scenarios to the corresponding base case value nets out gross impacts of poor methane mitigation progress; it does this by subtracting gross emissions results in varied methane emissions intensity scenarios from one another before comparing them to the base case. From a policy perspective it would be useful for DOE to show the difference in gross consequential global emissions between their various high methane emissions intensity scenarios and scenarios with baseline methane emissions intensity. That would allow for a comparison of the potential changes in actual methane emissions themselves under higher or lower leakage rates. It would also be useful for DOE to show the difference in gross consequential global emissions between scenarios where methane leakage rates in the U.S. changed, while methane leakage rates abroad remained the same.

Furthermore, the methane leakage rates used are all lower than recent estimates of the weighted average across U.S. producing regions (2.95%), according to a peer-reviewed article from researchers at Stanford University.[62] In fact, the highest observed value from that study was nearly 10%, based on aerial site measurements.[63] **Thus, DOE likely underestimates the upstream domestic GHG emissions in all scenarios.**

As part of this analysis, DOE also estimates breakeven GHG performance percentages for project direct emissions,[64] which provide guidance on how much a project would need to reduce its upstream emissions in order to offset the increase in non-direct emissions that would result on a global level. Depending on the scenario, these values range from 8%-87%, which should be considered a best-case scenario considering that DOE's upstream emissions factors are lower than recent peer-reviewed studies, as noted above.[65] **This indicates that to avoid increasing global GHG emissions, projects would need to achieve near-zero leakage rates at production, processing, and in transport, as well as significant decarbonization of process energy, including the electricity grid supplying those facilities.**

In conclusion, DOE's consequential GHG analysis uses established methodologies that are consistent with best available science, and assumptions that are sound and well-reasoned, if optimistic. **The model demonstrates that increasing U.S. LNG exports above existing approved levels will lead to higher global GHG emissions in all possible scenarios, even under best-case scenario assumptions around CCS technology and upstream emissions.** Furthermore, under moderate CCS deployment, U.S. LNG exports must decrease in order to limit global warming to the 1.5° C threshold, which scientists agree is necessary to avoid catastrophic and escalating

[62] Sherwin, E.D., Rutherford, J.S., Zhang, Z. et al. US oil and gas system emissions from nearly one million aerial site measurements. *Nature* 627, 328–334 (2024), https://doi.org/10.1038/s41586-024-07117-5.
[63] *Id.*
[64] DOE App. C at C-34, Table 27.
[65] *Id.*

damages to environmental and socioeconomic systems.[66] Approving additional exports is unjustifiable from a climate perspective.

IV. There are clear economic downsides of LNG exports, with additional analysis possible.

In contrast to its previous analysis, DOE recognizes that the economic effects of U.S. LNG exports are not adequately measured by GDP alone. DOE assesses the impact of increased LNG exports on GDP, recognizing that GDP is not necessarily a meaningful approximation of public welfare. DOE also assesses the impacts of increased U.S. LNG exports on domestic gas prices, finding increases in LNG exports will increase prices for U.S. consumers in at least three ways. These are improvements over DOE's past analysis and demonstrate a baseline of the economic downsides of increased U.S. LNG exports.

DOE could expand this analysis to more completely demonstrate the economic impacts of LNG by assessing further economic costs that are not included in the study. As it stands, DOE's study paints a far more accurate picture of the costs of U.S. LNG exports than before, demonstrating that there may be some positive effects to GDP, but those are overplayed and outweighed by key price increases and other factors DOE did not consider.

A. Macroeconomic benefits of LNG, reflected in GDP growth, do not reflect a meaningful approximation of public welfare.

DOE's study finds that higher U.S. LNG exports increase U.S. GDP. However DOE notes that the GDP increases are an outcome of the model's configuration, and "an increase in GDP does not necessarily correlate with a positive effect on broader public and consumer welfare."[67]

1. GDP increases are an outcome of the model's configuration and inefficient.

DOE uses the National Energy Modeling System (NEMS) to model the impact of changes in LNG exports on GDP. NEMS is configured such that increases in energy production generally yield increases in GDP.[68] While this is how the model is configured, some research has found the opposite; a study in Energies found that permitting higher levels of LNG exports slightly reduced GDP while also increasing U.S. GHG emissions and electricity prices.[69]

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[66] IPCC, 2018: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Cambridge University Press, doi:10.1017/9781009157940.001.

[67] DOE Summary at S-5.

[68] *Id.*

[69] Sarica, Kemal & Tyner, Wallace, Economic Impacts of Increased U.S. Exports of Natural Gas: An Energy System Perspective. Energies. 9. 401. 10.3390/en9060401 (2016), https://www.researchgate.net/publication/303531193_Economic_Impacts_of_Increased_US_Exports_of_Natural_Gas_An_Energy_System_Perspective.

Even if increased LNG exports do raise GDP in this model's configuration, increasing fossil fuel energy output to increase GDP is an inefficient growth model for raising U.S. GDP. Globally, two thirds of energy going into energy systems is lost; the majority of that, worth over $4.5 trillion, or almost 5% of global GDP, is due to the inherent inefficiencies of producing and delivering fossil fuels, as energy is lost in each step of those processes before it is ever consumed as an end product.[70]

The LNG value chain is incredibly inefficient; it uses a vast amount of energy to produce and deliver gas to an LNG terminal, convert the gas to liquid, transport it across oceans, re-gasify it, and transport it to an end use. There are much more efficient ways to increase the U.S.'s GDP than investment in another inefficient and unnecessary fossil fuel facility. For example, clean energy contributes much more to GDP growth. DOE estimates that in the "Defined Policies" scenario with reference U.S. supply assumptions, increasing exports from existing and FID levels to "Model Resolved" levels results in a 0.2% increase in GDP in 2050.[71] This is the largest difference across all supply assumptions. For comparison, in 2023 alone clean energy growth accounted for a 0.15% increase in U.S. GDP.[72]

The expansion of gas in the U.S. can offer immediate economic benefits to a select group. Increases in GDP largely reflect increased production, processing, transportation, and export of gas. These changes are reflected in industrial sector output.[73] In fact, the oil and gas extraction sub-sector accounts for 75% of the potential increase in industrial output from 2020 to 2050, underscoring why the oil and gas sector is so in favor of increasing U.S. LNG exports.[74] Other industries face declines in output due to higher gas prices that accompany higher LNG exports.[75] The Industrial Energy Consumers of America voiced concerns over the impact of LNG exports on their gas supply and prices and urged the DOE to put consumer safeguards in place to avoid harming U.S. consumers.[76]

[70] RMI, "The Incredible Inefficiency of the Fossil Energy System" (June 2024), https://rmi.org/the-incredible-inefficiency-of-the-fossil-energy-system/.
[71] DOE Summary at S-29.
[72] IEA, Clean energy is boosting economic growth (April 2024), https://www.iea.org/commentaries/clean-energy-is-boosting-economic-growth. The GDP in the U.S. grew by 2.5% in 2023; 6% of that growth was due to clean energy growth. 2.5% * 6.0% = .15%.
[73] DOE, Appendix B: Domestic Energy, Economic, and Greenhouse Gas Assessment of U.S. LNG Exports at B-33 to B-36 (December 2024) ("DOE App. B").
[74] DOE Summary at S-5.
[75] DOE App. B at B-33–B-36.
[76] Industrial Energy Consumers of America, LNG Letter to Secretary Granholm (January 2024), https://www.ieca-us.com/wp-content/uploads/01.25.24_LNG-Letter-to-Granholm.pdf.

2. Increased LNG exports create a number of adverse effects on the economy that are not captured in GDP alone.

DOE rightly acknowledges that the picture of GDP presented in NEMS does not capture "secondary effects (e.g., effects resulting from changes in the price of consumer goods) [that] may moderate this relationship."[77] While GDP is a widely used indicator of economic health, it is not considered a perfect measure of overall economic well-being because it only captures the total value of goods and services produced within a country, neglecting important factors like income inequality, environmental impact, and social welfare; therefore, it should be used alongside other metrics to get a more complete picture of a population's well-being.[78, 79] DOE has not quantified the non-GDP costs of LNG exports in this study. Adverse economic effects include:

- Price Instability: The surge in natural gas production may result in fluctuating prices.[80] Price spikes can leave businesses and energy insecure households that use gas with skyrocketing bills.
- Environmental Impacts: The environmental repercussions associated with natural gas extraction—such as contamination of water sources, air pollution, and disruption of ecosystems—can impose significant costs on communities and the broader economy.[81] Cleanup efforts, health-related issues, and loss of biodiversity may create financial burdens for local and state authorities.
- Hindrance to Renewable Energy Transition: Prioritizing natural gas may impede the shift toward renewable energy sources. Increased investments in fossil fuels can delay the advancement of cleaner energy technologies, which could offer significant long-term economic benefits, such as job growth and enhanced energy independence.[82]

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[77] DOE Summary at S-5.

[78] Fan VY, Bloom DE, Ogbuoji O, Prettner K, Yamey G. Valuing health as development: going beyond gross domestic product. BMJ. 2018 Oct 23;363:k4371. doi: 10.1136/bmj.k4371. PMID: 30352788; PMCID: PMC6198784, https://pmc.ncbi.nlm.nih.gov/articles/PMC6198784/.

[79] Amit Kapoor and Bibek Debroy, "GDP is Not a Measure of Human Well-Being", Harvard Business Review (October 2019), https://hbr.org/2019/10/gdp-is-not-a-measure-of-human-well-being.

[80] Clark Williams-Derry, "IEEFA U.S.: Booming U.S. natural gas exports fuel high prices" (November 2021), https://ieefa.org/resources/ieefa-us-booming-us-natural-gas-exports-fuel-high-prices.

[81] Klasic et al., A review of community impacts of boom-bust cycles in unconventional oil and gas development, Energy Research & Social Science, Volume 93, 2022, 102843, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2022.102843, https://www.sciencedirect.com/science/article/pii/S2214629622003462.

[82] C. Gürsan, V. de Gooyert, The systemic impact of a transition fuel: Does natural gas help or hinder the energy transition?, Renewable and Sustainable Energy Reviews, Volume 138, 2021, 110552, ISSN 1364-0321, https://doi.org/10.1016/j.rser.2020.110552. (https://www.sciencedirect.com/science/article/pii/S1364032120308364); Lotus Kaufman, "Unmasking Dark Money: How Fossil Fuel Interests Can Undermine Clean Energy Progress", Kleinman Center for Energy Policy (June 2023), https://kleinmanenergy.upenn.edu/commentary/blog/unmasking-dark-money-how-fossil-fuel-interests-can-undermine-clean-energy-progress/; DOE, 2024 United States Energy & Employment Report 2024 (October 2024), https://www.energy.gov/policy/us-energy-employment-jobs-report-useer.

- Public Health Consequences: Health issues linked to gas extraction and transport, including respiratory ailments and other conditions related to air and water pollution, can lead to rising healthcare expenses.[83] These costs may burden public health systems and diminish overall economic productivity.
- Community Disruption: The proliferation of gas production can result in social upheaval, including heightened traffic, industrialization of rural regions, and shifts in local economies.[84] Communities may struggle to cope with these changes, leading to social tensions and a decline in quality of life.
- Economic Disparities: The advantages of gas expansion may not be evenly shared across regions. While some areas may prosper, others could suffer economic decline or environmental degradation, exacerbating economic inequalities both within and between communities.[85]
- Extreme Weather Costs: As fossil fuel driven climate change continues, extreme weather like hurricanes, wildfires, and extreme heat become more intense.[86] These disasters are extremely costly.

Frameworks exist to quantify these non-GDP factors, which would allow for a more complete picture of the economic impact of LNG exports. For example, environmental impacts can be quantified using ecosystem services frameworks.[87] Public health consequences can be quantified using air modeling and health impact functions. EPA provides a free, government tool to use for these types of analyses - the CO–Benefits Risk Assessment (COBRA) tool.[88] Sierra Club and Greenpeace USA used the tool to complete such an analysis finding that LNG export terminals are already permitted to emit levels of air pollution that cause serious health harms

[83] Physicians for Social Responsibility, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking and Associated Gas and Oil Infrastructure (October 2023), https://psr.org/resources/fracking-compendium-9/.

[84] Klasic et al., A review of community impacts of boom-bust cycles in unconventional oil and gas development, Energy Research & Social Science, Volume 93, 2022, 102843, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2022.102843, https://www.sciencedirect.com/science/article/pii/S2214629622003462.

[85] Gavin Bridge, Begüm Özkaynak, Ethemcan Turhan, Energy infrastructure and the fate of the nation: Introduction to special issue, Energy Research & Social Science, Volume 41, 2018, 1-11, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2018.04.029. (https://www.sciencedirect.com/science/article/pii/S2214629618302251).

[86] World Weather Attribution and Climate Central, "When Risks Become Reality: Extreme Weather in 2024", 13 (December 2024), https://spiral.imperial.ac.uk/bitstream/10044/1/116443/13/World_Weather_Attribution_Annual_Report_LR.pdf ("The burning of oil, gas and coal are the cause of warming and the primary reason extreme weather is becoming more severe.").

[87] *See, e.g.*, EPA, National Ecosystem Services Classification System (NESCS) Plus, https://www.epa.gov/eco-research/national-ecosystem-services-classification-system-nescs-plus (accessed January 2025); Office of Information and Regulatory Affairs Office of Management and Budget, Guidance for assessing changes in environmental and ecosystem services in benefit-cost analysis (February 2024), https://www.whitehouse.gov/wp-content/uploads/2024/02/ESGuidance.pdf.

[88] EPA, CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA), https://www.epa.gov/cobra (accessed January 2025).

for people living in the region where the terminals are built. They also found that "[a]ir pollution from currently operating LNG export terminals is estimated to cause 60 premature deaths and $957 million in total health costs per year. If all the planned LNG terminals and expansion projects are built, those numbers would increase to 149 premature deaths and $2.33 billion in health costs per year."[89]

It is also possible to estimate the cost of extreme weather events. AccuWeather found that the record-breaking 2024 hurricane season inflicted about $500 billion in total damage and economic loss, a sum equivalent to nearly 2% of U.S. GDP.[90] That staggering sum includes five hurricanes and one subtropical storm that made landfall in the U.S. alone. Other disasters like wildfires bear their own immense cost. These are quantifiable impacts that DOE can include in its review of LNG export applications beyond what is outlined in the December 2024 study.

B. Increased LNG exports increase domestic prices.

DOE reaffirms[91] in its study that increased U.S. LNG exports will increase domestic gas prices. **As noted by Secretary Granholm, DOE's analysis "exposes a triple-cost increase to U.S. consumers from increasing LNG exports."**[92] **In all scenarios evaluated, more U.S. LNG exports will increase: (1) core natural gas prices; (2) electricity prices due to gas's role in creating U.S. electricity; and (3) prices of American-made consumer goods, due to pass-through costs from U.S. manufacturers.**[93] DOE's analysis is sound, reflects inequalities in energy access and affordability, and should be incorporated into future Natural Gas Act public interest analyses.[94] Still, as described below, more can be done to further strengthen DOE's pricing analysis.

The models used by DOE to evaluate pricing impacts are highly respected economic tools. As noted above, NEMS is an integrated model of the U.S. energy system, which has been used by both Republican and Democratic administrations to perform U.S. Energy Information Administration's (EIA) Annual Energy Outlook.[95] The model is recognized for its particularly

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[89] Johanna Heaureaux-Torres, Andres Chang, and Tim Donaghy, Permit to Kill: Potential Health and Economic Impacts from U.S. LNG Export Terminal Permitted Emissions, Sierra Club and Greenpeace USA, 4 (August 2024) ("Permit to Kill"), https://www.greenpeace.org/static/planet4-usa-stateless/2024/11/47b90812-permit-to-kill.pdf.
[90] AccuWeather, "AccuWeather Report: $500 billion in damage and economic loss estimated after destructive and unprecedented hurricane season" (November 2024), https://www.accuweather.com/en/press/accuweather-report-500-billion-in-damage-and-economic-loss-estimated-after-destructive-and-unprecedented-hurricane-season/1717667.
[91] This is not the first time that DOE has outlined the relationship; for example, it notes the correlation in its 2012, 2015, 2018 DOE forecasts. *See, e.g.*, https://www.energy.gov/fecm/articles/lng-export-studies.
[92] U.S. Secretary of Energy Jennifer M. Granholm on Updated Final Analyses, U.S. DOE (Dec. 17, 2024), https://www.energy.gov/articles/statement-us-secretary-energy-jennifer-m-granholm-updated-final-analyses.
[93] *Id.*
[94] 15 U.S.C. § 717b(a).
[95] *See, e.g.*, *Annual Energy Outlook: 2023*, U.S. EIA (Mar. 16, 2023), https://www.eia.gov/outlooks/aeo/info_nems_archive.php; *The National Energy Modeling System: An Overview 2018*, U.S. EIA (Apr. 2019), https://www.eia.gov/outlooks/aeo/nems/overview/pdf/0581(2018).pdf.

strong applicability to modeling for oil and gas, transportation, and the power sector overall.[96] However, NEMS does not analyze the distributional impacts of pricing across income level[97]; thus, DOE reasonably complemented its use of NEMS with the Household Energy Impact Distribution Model (HEIDM), which integrates NEMS outputs with census data to better model energy burden effects.[98] DOE then applied NEMS and HEIDM data to model scenarios designed by the GCAM, a model that has been developed at the Pacific Northwest National Laboratory for 30 years.[99]

DOE finds in the "Defined Policies" scenario that more U.S. LNG exports would result in 2050 Henry Hub prices increasing by 31% ($1.09/MMBtu) as compared to existing and FID export levels.[100] The increase in Henry Hub prices is projected to cause a 6.7% increase in average household gas bills and a 3.5% increase in average electricity bills.[101] DOE further projects that U.S. LNG exports would cumulatively increase energy costs in the industrial sector from 2020 to 2050 by $125 billion ($2022, discounted at 3%).[102]

These findings are consistent with modeling exercises undertaken by several academic institutions to analyze the impacts of expanding U.S. LNG exports. For example, as outlined in section III herein, Smillie and Stock's analyses of induced market effects from increased LNG exports both find that export expansion leads to increases in the cost of domestic gas (and coal in the case of Stock[103]). Princeton's Jesse Jenkins similarly finds that higher levels of U.S. LNG exports drive domestic gas price increases in his 2024 modeling work.[104] Initial findings from researchers at Harvard University show similar domestic gas price increases resulting from increased U.S. LNG exports.[105]

DOE's findings also make logical sense given the role that gas plays in U.S. electricity and industrial production. As noted by U.S. EIA, gas accounts for over 43% of U.S. electricity generation.[106] Further, 40% of U.S. gas is used for electricity production, with 32% going to the

[96] *What Can the NEMS Model Do and What Can't It Do?*, On Location (Mar. 1, 2021), https://onlocationinc.com/news/2015/08/what-can-the-nems-model-do-and-what-cant-it-do/.
[97] DOE App. B at B-8.
[98] *Id.*
[99] *GCAM: Global Change Analysis Model*, PNNL, https://gcims.pnnl.gov/modeling/gcam-global-change-analysis-model.
[100] DOE Summary at S-4.
[101] *Id.* at S-4–S-5.
[102] *Id.* at S-6.
[103] Stock and Zaragoza, *supra* note 38.
[104] Jesse Jenkins, "Analysis of energy market and greenhouse gas emissions impacts of pending U.S. liquefied natural gas export terminals", Princeton University ZERO Lab (2024), https://zenodo.org/records/13738309.
[105] Constanza Aubin, "Power Decarbonization in a Global Energy Market: The Climate Effect of U.S. LNG Exports" (Nov. 14, 2024), https://constanzaabuin.github.io/assets/pdf/Abuin-GlobalPowerDecarbonization.pdf
[106] *What is U.S. electricity generation by energy source*, U.S. EIA (Feb. 29, 2024), https://www.eia.gov/tools/faqs/faq.php?id=427.

industrial sector.[107] If increased LNG exports increase the core market price of gas, and that gas is being used to power 43% of American electricity, and much of the industrial sector, those costs are going to be passed onto consumers, both through electricity and gas bills and in pass-through costs.

But these numbers alone do not properly showcase the impact on American households. Accordingly, DOE properly contextualizes its numerical findings to understand the energy burden on American households. Evaluating energy burden, or how energy costs are "distributed across neighborhoods, racial and ethnic groups, and household types,"[108] helps to better evaluate the efficacy of considered policies and their impact across incomes. Research already shows that energy burdens are spread unevenly across racial and ethnic groups: for example, Black and Hispanic households are far more likely to face energy burden challenges.[109]

In the study, DOE estimates that continuing to export more LNG would increase natural gas and electricity costs for the average American household by well over $100 per year by 2050.[110] Critically, this estimate reflects expenditures averaged across **all households**, including those that do not directly use gas.[111] While this number may seem insignificant to some, a $100 annual increase is life-altering for many Americans, given that 40% of Americans are only one missed paycheck away from poverty.[112] Low income households will face disproportionate impacts of this increase. DOE finds that "Gas expenditure impacts per household as a percentage of household income are 8 to 10 times higher for the lowest income group (income of less than $30,000) than for the highest income group in *Model Resolved* scenarios relative to *Existing/FID Exports*, under both the *Defined Policies* (with reference U.S. supply assumption) and *Defined Policies Low US Supply*. For electricity, this range increases to 9 to 12 times higher."[113] Further, while DOE finds that increased LNG would increase consumer costs nationwide, exacerbating the already high energy burden faced by low-income households,[114] DOE also notes that these cost increases are most severe in the U.S. Gulf coast–the very region that the U.S. LNG industry argues it is helping economically.[115] To the contrary, DOE's study supports that increased LNG, and the resulting triple-compounding effect on prices, is a net-loser for the Gulf and for all U.S. consumers.

While DOE correctly highlights the significant pricing effects across the energy, electricity production, and manufacturing sectors, more can be done to evaluate the variety of economic

[107] *Natural gas explained*, U.S. EIA (Oct. 31, 2024), https://www.eia.gov/energyexplained/natural-gas/use-of-natural-gas.php.
[108] *See, e.g.*, *Energy Burden Tracking*, City of St. Paul, MN, https://climateaction.stpaul.gov/actions/32.
[109] *Energy Burden Research*, ACEEE, https://www.aceee.org/energy-burden.
[110] DOE Summary at S-4–S-5.
[111] DOE App. B at B-43.
[112] Aimee Picchi, *40% of Americans only one missed paycheck away from poverty*, CBS News (Jan. 29, 2019), https://www.cbsnews.com/news/40-of-americans-one-step-from-poverty-if-they-miss-a-paycheck/.
[113] DOE App. B-48.
[114] *Id.* at B-53.
[115] DOE Summary at S-5.

pricing impacts increased U.S. LNG exports may have. For example, DOE did not include any forward-looking modeling on the impacts of LNG exports on consumer price volatility. Just as it is important to consider the net increases in price, understanding changes in the consistency of U.S. domestic prices also would help DOE to better determine how U.S. LNG exports affect the public interest.

C. Conclusion on DOE's review of economic impacts of LNG exports.

Increased LNG exports create negative consequences that may affect long-term economic stability, environmental health, and social welfare. Striking a balance between these factors is essential for promoting sustainable economic development. DOE has appropriately acknowledged that GDP is not a complete measure of societal wellbeing. DOE's assessment of the impacts of increased LNG exports on domestic prices adds to the economic picture to provide insight into the impacts of expanding LNG exports further. Since DOE has not estimated the impact of other relevant economic factors, the findings here demonstrate a minimum level of projected economic harm.

V. DOE's study highlights some of the LNG exports industry's impacts on environmental justice communities, but is not a comprehensive environmental justice analysis.

Underpinning the decision to revisit DOE's analysis of LNG exports was the recognition that DOE had failed to date to evaluate the harms LNG exports inflict on environmental justice communities.[116] The study DOE produced begins to address that gap by recognizing some parts of the problem, including starting to identify some of the communities affected by the LNG export industry boom and some of the impacts the industry inflicts on those and other populations in the United States. However, DOE's study does not go far enough and is not the kind of environmental justice analysis that is required to capture the full extent of the harms being inflicted by LNG exports on environmental justice communities.

As DOE knows, there is a well-recognized generalized approach to conducting a robust environmental justice analysis.[117] Although DOE attempted to take some of the steps typically seen in an environmental justice analysis, it omitted key parts of the process entirely. In addition, despite the availability of tools to engage in an independent inquiry, DOE relied almost exclusively on existing published materials for the steps it did attempt. The result is far closer to an incomplete summary of available research literature than a genuine and comprehensive environmental analysis. While DOE's partial literature review makes clear that the environmental justice impacts of the LNG export industry are very real and need to be

[116] *See, e.g.*, The White House, Fact Sheet: Administration Announces Temporary Pause on Pending Approvals of Liquefied Natural Gas Export (January 2024), https://www.whitehouse.gov/briefing-room/statements-releases/2024/01/26/fact-sheet-biden-harris-administration-announces-temporary-pause-on-pending-approvals-of-liquefied-natural-gas-exports/.

[117] *See, e.g.*, Letter from New York University School of Law, Institute for Policy Integrity to DOE re. Programmatic Review of Liquefied Natural Gas Export Program 12–14 (March 2024), https://policyintegrity.org/documents/Comments_of_the_Institute_for_Policy_Integrity_4.pdf.

accounted for in any decision going forward to approve additional volumes of export, it does not come close to accounting for or analyzing the harms that authorizing more LNG exports would cause to environmental justice communities.

A. Introduction: conducting an environmental justice analysis.

EPA, among others, has developed technical guidance that lays out clear steps for analyzing environmental justice in federal actions.[118] Other federal agencies have regularly attempted to implement these steps to try to *analyze* the extent of harms of regulatory actions. Those steps include:

- Defining and identifying environmental justice communities
- Analyzing the impacts to environmental justice communities, including:
    - Meaningfully involving environmental justice communities to identify environmental justice concerns
    - Performing a baseline analysis
    - Performing a proximity-based analysis
- Determining disproportionality of impacts to environmental justice communities by performing comparison population group analysis
- Evaluating cumulative impacts to environmental justice communities, including
    - Considering multiple stressors and cumulative effects
    - Assessing vulnerability to climate change
- Assessing the economic distribution of costs and benefits
- Identifying and addressing key data, analytical and methodological gaps[119]

As commenters stated to DOE, this approach can "apply to a wholesale analysis of the LNG export program. Because DOE's programmatic analyses inform all adjudicatory actions going forward, they merit careful examination on part with those underpinning regulatory action."[120]

B. DOE's study acknowledges harms to environmental justice communities from LNG exports but falls short of a robust analysis of the adverse impacts of LNG exports on environmental justice communities.

DOE's Appendix D in places tracks the above steps recommended by EPA and others, but largely confines itself to summarizing the results of available peer-reviewed literature. Based on that

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[118] EPA, *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*, EPA-HQOW-2023-0222-213 (2016), https://www.epa.gov/sites/default/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf; EPA, Draft Revision of Technical Guidance for Assessing Environmental Justice in Regulatory Analysis, EPA-HQ-OA-2013-0320 (November 2023) ("EPA Technical EJ Guidance"); *see also* WE ACT for Environmental Justice, Community Engagement Brief, Community-Engagement-Brief-092322-FINAL.pdf.

[119] EPA Technical EJ Guidance, *supra* note 118.

[120] *See, e.g.*, Letter from New York University School of Law, Institute for Policy Integrity to DOE re. Programmatic Review of Liquefied Natural Gas Export Program, 13 (March 2024), https://policyintegrity.org/documents/Comments_of_the_Institute_for_Policy_Integrity_4.pdf.

review, the Department makes some important observations about the impacts of the LNG export industry on impacted communities. Those insights very clearly demonstrate that LNG exports harm environmental justice communities and inflict additional pollution and other burdens on populations that already experience a disproportionate amount of health and environmental burdens.

However, unlike in its analysis of the broader climate and economic harms of LNG exports, the fact that DOE did not look beyond the work of others and did no analysis of its own means that the full scope of the environmental justice burden remains unanalyzed.

1. DOE acknowledges that LNG exports affect environmental justice communities but does not identify those communities with any specificity.

Importantly, DOE recognizes that the impacts of the LNG export industry fall disproportionately on low income and/or communities of color. Specifically, following DOE staff's survey of the available research, Appendix D confirms that almost 18 million people in the United States live within about 1 mile… of a producing well."[121] Among those 18 million people, DOE found that the research shows that:

- Populations living near gas producing wells are "disproportionately low income and/or communities of color, meaning that these populations may be disproportionately exposed to any positive or negative effects associated with upstream oil and gas development."[122]
- "Low-income residents and people of color in California, Oklahoma, Texas, and Colorado are more likely to live near producing wells."[123]
- "In Colorado, there is a larger proportion of low value homes near producing oil and gas wells."[124]
- "In New Mexico, Native American populations are more likely to live in proximity to producing wells."[125]
- "[i]n the Eagle Ford Shale region in Texas, Hispanic residents have been found to be more exposed to natural gas flaring than non-Hispanic white residents, and more likely to live in proximity to a wastewater disposal well"[126]

While it could not find similar population estimates for populations living in close proximity to gas pipelines, it determined that "the number is likely to be higher" than for wells and that

[121] DOE, Appendix D: Addendum on Environmental and Community Effects of U.S. LNG Exports, D-45 (December 2024) ("DOE App. D").
[122] *Id.*
[123] *Id.*
[124] *Id.*
[125] *Id.*
[126] *Id.*

there is evidence that "counties with residents who have higher levels of social vulnerability have more natural gas gathering and transmission pipelines."[127]

Regarding LNG export terminals, DOE similarly found that LNG export facilities also tend to be disproportionately sited in areas that are "home to historically communities of color and low-income communities."[128]

Although these general findings are a step in the right direction, they do not go far enough to identify the specific communities being impacted by the effects of LNG exports. DOE's study cites to what it has called the "iconic EJSCREEN tool,"[129] but does not make use of the tool. DOE also did not mine existing LNG export permitting dockets—either its own or FERC's—for more detailed community-level data. The study, therefore, does not identify any specific environmental justice communities affected by the LNG export buildout, including specific communities impacted by the LNG export terminal buildout that is concentrated in a particular area of the Gulf Coast of western Louisiana and eastern Texas,[130] or the communities in the Permian Basin (which DOE acknowledges elsewhere will be a major source of gas for LNG exports). DOE does not explain why it did not do any of its own data collection or analysis, even though doing so is a standard part of conducting an environmental justice analysis.

2. DOE acknowledges but fails to analyze the adverse impacts of LNG exports on environmental justice communities.

Appendix D contains a long summary of the environmental and community harms associated with the production and transmission of gas based on DOE's review of available peer-reviewed literature. Again, however, DOE did little to mine additional sources of information, including documentation of the harms of particular LNG export infrastructure projects, including FERC and DOE project dockets. DOE also limited itself to describing the possible impacts of LNG exports at a high general level, with no indication of the scope or severity of the impacts on environmental justice communities. DOE does not explain why it could not have done more to quantify or at least provide greater details as to the severity of the impacts that more LNG exports would have such as degraded air quality, adverse health outcomes, and safety risks. For example, DOE's examination of the harms caused by the LNG export industry confirms that air pollutants are released all along the LNG export chain. DOE confirms that the natural gas production and transmission system that feeds LNG export terminals is responsible for significant portions of anthropogenic emissions of methane in the U.S.[131] and for missions of hazardous and carcinogenic air pollutants, including hazardous air pollutants like benzene.[132]

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[127] *Id.*

[128] *Id.*

[129] DOE, Energy Justice Dashboard (BETA), https://www.energy.gov/justice/energy-justice-dashboard-beta (last visited Jan. 10, 2025).

[130] DOE App. D at D-53 (acknowledging that "most existing and proposed LNG export facilities in the U.S. are sited on the Gulf Coast in Texas and Louisiana, some in very close proximity to one another.").

[131] *Id.* at D-10.

[132] *Id.* at D-12.

Nevertheless, DOE fails to do much more than enumerate air quality health hazards posed by LNG facilities, and falls short of assessing the health impacts that these facilities have on neighboring communities. While DOE points to a lack of peer-reviewed materials on the subject, as is discussed above and below, that should not end DOE's inquiry when it can do so much more to make use of data submitted in permitting processes and well-known air modeling tools, among other options, to fill in gaps and conduct a genuine and robust analysis. Indeed, several recent studies have sought to quantify the health impacts of LNG export activities, predominantly focusing on the effect that routine emissions from LNG export terminals have on local and regional air quality. As is discussed above in Section IV.A.2, Sierra Club and Greenpeace USA developed an analysis in 2024 looking at health impacts resulting from various levels of US LNG export infrastructure buildout. The study finds that air pollution from currently operating LNG export terminals causes an estimated 60 premature deaths and $957 million in total health costs per year.[133] A "full buildout" of all planned LNG terminals and expansion projects would increase those numbers to 149 premature deaths and $2.33 billion in health costs per year.[134]

And even these figures may underestimate the true health risk, as they are based on modeling that does not consider that LNG facilities are often located near more populated areas, where near-source pollution would impact population centers. To better capture near-source air quality and health impacts, NRDC is working with the University of Wisconsin--Madison's Nelson Institute Center for Sustainability and the Global Environment (SAGE) to model the impact of emissions from several operational LNG export terminals. This approach calculates local concentrations of NO_2, SO_2, CO and $PM_{2.5}$ using the AMS/EPA Regulatory Model (AERMOD) tool, an EPA resource used for regulatory permitting. Facility-level emissions from four major terminals are represented in AERMOD based on their values in the 2020 National Emissions Inventory. The local concentration profiles output by AERMOD are subsequently used to perform both health impact and equity analyses for communities neighboring these facilities. While preliminary, health impact findings suggest that operation of these four facilities may lead to an order of magnitude more fatalities than calculated with the COBRA model in prior work. These higher risks occur because plumes of high air pollution impact nearby downwind communities, an effect that is not captured with county-level estimates. Findings of the equity analyses also suggest that some facilities show increasing exposure to pollutants in areas with higher percentages of people of color and low-income households.

A similar set of deficiencies exist with respect to DOE's discussion of safety. Appendix D lists some of the serious safety threats posed by LNG infrastructure but does not provide any kind of analysis or risk assessment.[135] DOE referenced the Freeport LNG explosion, fire, and shutdown incident from 2022, but did not attempt to disclose the cost that this incident had to local

[133] Permit to Kill at 4.
[134] *Id.*
[135] DOE App. D at D-56.

communities—whether in terms of emergency response resources that needed to be deployed, cost of public response efforts, the cost of education efforts, or costs to the facility itself to repair, remediate or address the issues leading to the incident.[136]

In addition to not providing sufficient analysis of the impacts it identified, the list of impacts DOE provided may be incomplete, because it critically failed to follow a bedrock principle of environmental justice to meaningfully consult with affected communities **before** conducting its study. The peer-reviewed research DOE relies upon may have incorporated some element of this, and DOE did review and cite to materials submitted to it by grassroots groups during the study process, neither is a substitute for the robust community engagement EPA and others state is necessary up-front. As the letters DOE received throughout the study process highlighted,[137] failing to take basic steps like having an open comment period and docket and meeting with affected community members deprives DOE of the scope of community input and firsthand experiences that is needed to identify a comprehensive list of potential impacts to environmental justice communities.[138] While DOE acknowledges the importance of procedural justice and meaningful participation by environmental justice communities,[139] it did little to address those concerns in how it undertook the instant study. The study's list of potential impacts, therefore, is only the beginning of the analysis that is needed.

3. DOE acknowledges but fails to analyze the disproportionality of adverse impact from LNG exports.

DOE's study importantly concludes that "multiple studies have found evidence that populations living in proximity to upstream and midstream oil and gas activity tend to be members of groups that have been underserved and overburdened."[140] It further finds that, for several LNG export facilities on the Gulf Coast, the percentages of Black Americans, Hispanic Americans, and lower-income populations living within 3 miles of facilities were much higher than their population shares in their respective states or the nation as a whole, and that most of the communities near some 'LNG export facilities have greater existing environmental pollution burdens than other places in their states.'"[141]

However, DOE's study does nothing to independently assess the extent of the adverse impacts from LNG exports on environmental justice communities. Instead, in a single paragraph addressing the distribution of impacts, DOE attempts to couch this step as a concern of "some

[136] *See id.*
[137] *See, e.g.*, Letter from 198 methods et al. to President Biden and Secretary Granholm, In the matter of: DOE Updates to LNG Studies, 2–3 (April 2024).
[138] *See, e.g.,* Yoshira Ornelas Van Horne et al., "An applied environmental justice framework for exposure science", 33 Journal of Exposure Science & Environmental Epidemiology, 1–11 (January 2023), https://www.nature.com/articles/s41370-022-00422-z ("The traditional 'investigator-initiated' academic approach rarely serves communities most affected nor leads to structural changes to improve public health.")
[139] *See* DOE App. D at D-59–63.
[140] *Id.* at D-59.
[141] *Id.*

NGOs and some local community members often raise,"[142] rather than what EPA has long-considered to be a "vital" part of conducting any assessment of environmental justice concerns.[143] DOE's failure to analyze the disproportionality of the burdens imposed on environmental justice communities by the LNG export industry again misses a key part of the problem.

4. DOE did not conduct a cumulative impacts analysis.

EPA's Technical Guidance on conducting environmental justice assessment states that "[p]eople of color and low-income populations are often impacted by exposure to environmental hazards from multiple industrial sources, such as contaminants from manufacturing facilities, landfills, and leaking underground tanks; transportation-related air pollution; and consumer products."[144] It further concludes that "[t]he uneven distribution of the effects of climate change, such as increased risk of wildfires, droughts, flooding, and other extreme weather events, can further compound these differences in exposure."[145] As a result of these other factors, EPA determined that "[a]n analysis that considers risks from only one source can inaccurately characterize the potential health risks faced by a population group if they are also exposed to stressors from other sources."[146]

DOE, however, made no attempt to conduct a cumulative impacts analysis of the effects of upstream, midstream, or terminal operations for LNG export infrastructure. DOE only summarized that certain publications found that populations exposed to LNG export operations can experience cumulative impacts from other sources of pollution and other vulnerabilities, such as the risks of climate-related impacts like hurricanes and climate-intensified extreme weather events[147]. This approach is insufficient to give DOE a comprehensive understanding of how LNG exports exacerbate the adverse outcomes already experienced by environmental justice communities.

DOE has numerous examples to look to for guidance on how to conduct a cumulative impacts analysis. The Bullard Center conducted a cumulative impact assessment of the impact of the LNG buildout in Texas and Louisiana.[148] The assessment focused on six LNG export terminals

[142] *Id.*

[143] *See, e.g.*, EPA, Guidance on Considering Environmental Justice During the Development of Regulatory Actions (May 2015), https://www.epa.gov/sites/default/files/2015-06/documents/considering-ej-in-rulemaking-guide-final.pdf.

[144] EPA, *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*, EPA-HQOW-2023-0222-213 (2016); EPA Draft Revision of Technical Guidance for Assessing Environmental Justice in Regulatory Analysis, EPA-HQ-OA-2013-0320, 23 (November 2023).

[145] *Id.*

[146] *Id.*

[147] *See, e.g.,* EPA, Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts, EPA 430-R-21-003 (September 2021), https://www.epa.gov/cira/population-specific-summaries.

[148] Bullard et al., "Liquefying the Gulf Coast: A Cumulative Impact Assessment of LNG Buildout in Louisiana and Texas" (May 2024), https://cdn.prod.website-

that are operational or proposed in Louisiana and Texas.[149] The study's authors detail how they used multiple sources of information, including Census and Centers for Disease Control data and a variety of primary and secondary sources to evaluate the cumulative burden imposed by the six chosen facilities.[150] DOE has not explained why it could not have replicated this or a similar approach or done more to assess cumulative impacts.[151]

5. DOE acknowledges some of the economic impacts of LNG exports to environmental justice communities but did not analyze the full extent of the economic distribution of costs and benefits of LNG exports.

DOE's study summarizes certain elements that pertain to the economic effects of LNG exports on environmental justice communities, but its incomplete and somewhat lop-sided cataloging does not do enough to assess the distributional effects of the costs and benefits of LNG exports. For example, in purporting to assess the local employment effects of LNG export terminals, the study readily cites reports issued by various LNG export companies that DOE claims show that LNG terminals have made efforts to hire locals.[152] There is nothing in the study to indicate that DOE made any effort to verify the claims made in these reports, determine whether the efforts being described benefit local environmental justice communities, or ascertain how those alleged benefits stack up against the economic costs the LNG industry imposes on environmental justice communities. In the same discussion, however, DOE distances itself from community members' accounts that only outsiders benefit from high-paying jobs at LNG export terminals by stating that "DOE was not able to identify published data regarding these assertions."[153]

DOE takes a similarly limited view of the effects the industry has on public finances. It quotes a letter from several organizations about the tax abatements the LNG export industry regularly gets from the state.[154] These figures are easily verifiable through public sources, as is data demonstrating the other extensive state and local incentives the LNG export industry enjoys.[155] They confirm that the economic benefits the LNG industry purportedly provides may be

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files.com/614d88a190900e498857f581/664604a23f64fa6444dd2a2b_Bullard%20Center%20Liquefying%20the%20Gulf%20Coast%20Report.pdf.

[149] *Id.* at 59.

[150] *Id.* at 60–62.

[151] *See, e.g.*, EPA, Interim Framework for Advancing Consideration of Cumulative Impacts (November 2024), https://www.epa.gov/system/files/documents/2024-11/epa-interim-cumulative-impacts-framework-november-2024.pdf.

[152] DOE App. D at D-57 (citing to reports not subject to peer-review issued by Cheniere, Golden Pass LNG, Rio Grande LNG, and Port Arthur LNG).

[153] *Id.*

[154] *Id.* at D-58.

[155] *See e.g.*, Louisiana Quality Jobs Program, 2020 Qualjobs Report, Exhibit 8, 15 (March 2020), https://app.lla.state.la.us/publicreports.nsf/0/8eb357bb7a433121862585290075e1ce/$file/quality%20jobs.pdf. (noting that the economic effect of the LNG export industry is a "large overall net loss").

significantly undermined by the extent to which the industry is bankrolled by public funds, and yet DOE makes no attempt to assess that reality.

DOE also did not make any effort to assess the extent of the economic harms the LNG export industry inflicts on other local businesses. For example, DOE notes the struggles that local fishing and shrimping industries have experienced in recent years. DOE specifically cites conclusions from the Louisiana Shrimp Task Force "—an advisory group that makes recommendations to the Louisiana Wildlife and Fisheries Commission and includes representatives from the shrimp industry and related state agencies—" "that the fishing and shrimping industry in Cameron Parish is threatened by construction, ship traffic, reduced access to boat launches, and the filling in of local wetlands" and that "the permitting of additional LNG exports in southwestern Louisiana" must stop.[156] But the study does nothing with that conclusion, indeed, it effectively attempts to minimize these concerns by asserting that the crab and shrimp harvest in Cameron and Calcasieu Parishes are relatively small shares of the Louisiana total.[157] DOE's treatment of these impacts completely miss the point of an environmental justice analysis to determine the extent and disproportionality of the impacts on environmental justice communities.

6. DOE acknowledges some of the data gaps it encountered but does not provide sufficient explanation or detail.

EPA instructs that an important part of any environmental justice analysis is identifying any data or methodological challenges encountered so that future efforts may be made to fill in gaps and improve on methodologies. DOE, however, failed to do that, generally stating that it lacked sufficient peer-reviewed research. But as discussed above, peer-reviewed research should not be the source of much of the information DOE can and should rely upon to (1) identify affected communities, (2) ensure a full accounting of impacts, and (3) conduct an actual analysis of the effects of DOE's potential approval of future export volumes. Other than to issue a call for more input, DOE has not provided any clarity on what data it needs, whether it encountered any methodological problems, whether it simply lacks the in-house expertise to be able to conduct an environmental justice analysis, or some combination of all of the above.

C. Conclusion on DOE's review of impacts of LNG exports on environmental justice communities.

DOE's study confirms that the LNG export industry is imposing burdens on environmental justice communities. DOE has thus taken an important and long-overdue step to acknowledge the existence of those burdens, but much work remains to be done to complete a robust and comprehensive environmental justice analysis. DOE cannot approve additional LNG exports without doing more to understand the scope and severity of the impacts inflicted on environmental justice communities.

[156] DOE App. D at D-58.
[157] *See id.*

VI. The study does not satisfy DOE's NEPA obligations.

NEPA requires that DOE prepare an environmental impact statement for all major DOE actions significantly affecting the quality of the human environment.[158] The study confirms that the decision to authorize large-scale gas exports to non-free trade agreement countries is such an action, but the study is not a substitute for NEPA review. FERC, while purportedly acting as lead agency for NEPA purposes, explicitly excludes the effects of DOE's export approval from the scope of FERC's NEPA analysis.[159]

DOE has prepared project-specific NEPA analyses for projects exporting LNG from Alaska[160] or (after initial export via cross-border pipeline) from Mexico.[161] DOE has never prepared a project-specific NEPA analysis for exports from a terminal in the lower-48 states. Although the public has raised concerns over DOE's failure to follow NEPA procedures in the past, no court has reached this issue. The issue was not presented in cases addressing DOE export approvals, but the courts have not offered any reason to doubt that DOE, like all other agencies, must comply with NEPA procedures.

DOE cannot meet its NEPA obligations regarding export approvals by relying on the categorical exclusion finalized in December 2020, codified at 10 C.F.R. Part 1021 Part D Appendix B5.7. Adoption of this categorical exclusion was arbitrary and unlawful. Moreover, even under the terms of DOE's categorical exclusion program, current facts, including the DOE study and new information about the Rice's whale, demonstrate that LNG export approvals lack the "integral elements" of an exempt project.

DOE's study reaffirms that LNG exports have foreseeable indirect effects upstream and downstream of the point of exports. These upstream effects–on gas production and energy markets–are a central concern of DOE's Natural Gas Act authority. In adopting the categorical exclusion, DOE did not and could not provide any demonstration that these effects are categorically unforeseeable and/or insignificant. Similarly, downstream effects of ship traffic cannot be dismissed as *de minimis*. In adopting the categorical exclusion, DOE arbitrarily argued that since LNG export vessels would constitute a small fraction of *total U.S.* shipping traffic, that these vessels would have a minimal impact *in the Gulf of Mexico*. But this is an apples-to-oranges comparison that fails to address the percentage increase of traffic in the actually affected areas. In addition, noting that LNG traffic is a small share of the total does not

[158] 42 U.S.C. § 4332(2)(C).
[159] *See, e.g.*, *Commonwealth LNG, LLC*, 181 FERC ¶ 61,143 P13 (November 2022).
[160] DOE, *National Environmental Policy Act Implementing Procedures*, 85 Fed. Reg. 78,197, 78,202 (Dec. 4, 2020), https://www.energy.gov/nepa/doeeis-0512-s1-supplemental-environmental-impact-statement-alaska-lng-project
[161] E.g., DOE, Mexico Pacific Limited LLC Environmental Assessment (November 2024), https://www.energy.gov/sites/default/files/2023-11/MPL_Draft%20Environmental%20Assessment_Final_11.21.23.pdf

demonstrate that the impact of LNG traffic in particular is insignificant: a small portion of a large problem can itself constitute a significant impact.

Even if the categorical exclusion was not inherently arbitrary, DOE's own regulations only permit invocation of a categorical exclusion where an action satisfies specific "integral elements."[162] LNG exports do not satisfy the first element, because they threaten violations of requirements for environmental protection, including executive orders protecting the climate. And Gulf Coast exports, at a minimum, also lack the fourth element, because they have the potential to impact the Rice's whale and other protected species.

VII. Conclusion

DOE's study is a critical update to the economic and environmental analyses underlying DOE's LNG export reviews. **The takeaway is clear: increased U.S. LNG hurts American pocketbooks, impedes climate targets, and harms communities.** These conclusions are based on conservative and incomplete assessments on how U.S. LNG exports displace renewable sources and disproportionately harm low-income households and environmental justice communities. Accordingly, more U.S. LNG exports are incompatible with the Natural Gas Act's public interest requirement and DOE should deny pending and future applications.

Sincerely,

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[162] 10 C.F.R. Part 1021 Subpart D Appendix B.

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