

establishes the blueprint for DOE's energy storage roadmap (Section 5). The roadmap provides more tactical direction, informed by the mission, vision, and strategic approach.

Section 3 presents an overview of the types of DOE activities that support DOE's Energy Storage SRM. Activities include not only conventional research activities, but also those efforts that are foundational and crosscutting in support of the mission and vision of the SRM as well as stakeholder engagements. Representative activities are identified in the appendix.

Section 4 describes the portfolio of energy storage technologies and highlights opportunities for future DOE investment based on the current landscape of technologies and use cases.

Section 5 describes the path forward to achieve the strategic objectives and vision of this Energy Storage SRM. This section highlights DOE activities to facilitate technology innovation and deployment, to empower decision-makers, and to strengthen collaboration throughout the energy storage ecosystem.

Finally, Section 6 summarizes anticipated outcomes and next steps over the next decade as DOE works to implement this Energy Storage SRM.

The appendices provide additional context for the Energy Storage SRM: Appendix A identifies DOE offices with relevant energy storage R&D programs.

Appendix B provides a list of acronyms used in this document.

Appendix C provides a list of key terms and definitions used in this document.

Appendix D provides updates to the ESGC 2020 Roadmap action items and targets; it also describes major transitions from the ESGC 2020 Roadmap to the current SRM.

Appendix E identifies representative DOE activities contributing to DOE's energy storage portfolio.

Appendix F reviews the relevant 2015 Grid Modernization Initiative Multi-Year Program Plan (GMI MYPP) energy storage activities and provides updates on recommended tasks. Additionally, relevant elements of the GMI MYPP 2020 Update are also discussed.

Appendix G highlights relevant policy and regulatory drivers impacting the energy storage landscape.

Appendix H highlights representative examples of DOE's international energy storage activities and initiatives.

Appendix I summarizes the recommendations from the Electricity Advisory Committee's 2022 Biennial Energy Storage Review, which focused on the ESGC 2020 Roadmap.

DOE is seeking general feedback on the draft Energy Storage SRM as part of its process to update the ESGC 2020 Roadmap.

Signing Authority

This document of the Department of Energy was signed on December 4, 2024, by Gene Rodrigues, Assistant Secretary for the Office of Electricity, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the **Federal Register**.

Signed in Washington, DC, on December 17, 2024.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

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DEPARTMENT OF ENERGY

2024 LNG Export Study: Energy, Economic, and Environmental Assessment of U.S. LNG Exports

VENTURE GLOBAL CALCASIEU PASS, LLC [DOCKET NO. 13-69-LNG, 14-88-LNG, & 15-25-LNG]; VENTURE GLOBAL PLAQUEMINES LNG, LLC [DOCKET NO. 16-28-LNG]; COMMONWEALTH LNG, LLC [DOCKET NO. 19-134-LNG]; PORT ARTHUR LNG PHASE II, LLC [DOCKET NO. 20-23-LNG]; VENTURE GLOBAL CP2 LNG, LLC [DOCKET NO. 21-131-LNG]; NEW FORTRESS ENERGY LOUISIANA FLNG LLC [DOCKET NO. 22-39-LNG]; MEXICO PACIFIC LIMITED LLC [DOCKET NO. 22-167-LNG]; GULFSTREAM LNG DEVELOPMENT, LLC [DOCKET NO. 23-34-LNG]; CORPUS CHRISTI LIQUEFACTION, LLC; CCL MIDSCALE 8-9, LLC; AND CHENIERE MARKETING, LLC [DOCKET NO. 23-46-LNG]; LAKE CHARLES EXPORTS, LLC [DOCKET NO. 23-87-LNG]; SOUTHERN LNG COMPANY, L.L.C. [DOCKET NO. 23-109-LNG]; MAGNOLIA LNG, LLC [DOCKET NO. 23-137-LNG]; SABINE PASS LIQUEFACTION, LLC AND SABINE PASS LIQUEFACTION STAGE V, LLC [DOCKET NO. 24-27-LNG]; GATO NEGRO PERMITIUM DOS, S.A.P.I. DE C.V. [DOCKET NO. 24-87-LNG].

AGENCY: Office of Fossil Energy & Carbon Management, Department of Energy.

ACTION: Notice of availability of the 2024 LNG Export Study and request for comments.

SUMMARY: The Office of Fossil Energy & Carbon Management (FECM) of the Department of Energy (DOE) gives notice of availability of a multi-volume study updating DOE's understanding of the potential effects of U.S. liquefied natural gas (LNG) exports on the domestic economy; U.S. households and consumers; communities that live near locations where natural gas is produced or exported; domestic and international energy security, including effects on U.S. trading partners; and the environment and climate (Study or 2024 LNG Export Study). The Study is composed of a summary report and four appendices containing three coordinated modeled analyses and a qualitative literature review. The Study materials are available on the DOE/FECM website at <https://www.energy.gov/fecm/regulation>. DOE intends to use the Study to inform its public interest review of, and ultimately decisions in, certain applications to export LNG to countries with which the United States does not have a free trade agreement (FTA) requiring national treatment for trade in natural gas and with which trade is not prohibited by U.S. law or policy (non-FTA applications), including decisions in the above-referenced proceedings and future proceedings, and for other purposes. DOE invites the submission of comments regarding the Study. DOE does not intend to revise the Study upon receipt of comments. Rather, comments received will inform DOE's public interest determination in each of the above-listed non-FTA application proceedings and future non-FTA export proceedings. Comments submitted in compliance with the instructions in this Notice will be placed in the administrative record for all of the above-listed proceedings and need only be submitted once.

DATES: Comments are to be filed pursuant to the procedures detailed in the Public Comment Procedures section no later than 4:30 p.m., Eastern time, February 18, 2025. DOE will not accept reply comments (*i.e.*, comments responding to other commenter's comments).

ADDRESSES:

Electronic Filing of Comments Using Online Form (Strongly encouraged):
<https://fossil.energy.gov/app/docketindex/docket/index/30>.

Postal Mail, Hand Delivery, or Private Delivery Services (e.g., FedEx, UPS, etc.): U.S. Department of Energy (FE-

34), Office of Regulation, Analysis, and Engagement, Office of Fossil Energy and Carbon Management, Forrestal Building, Room 3E-056, 1000 Independence Avenue SW, Washington, DC 20585.

Due to potential delays in DOE's receipt and processing of mail sent through the U.S. Postal Service, we encourage respondents to submit comments electronically to ensure timely receipt.

FOR FURTHER INFORMATION CONTACT: Ms. Beverly Howard, Docket Room Manager, U.S. Department of Energy (FE-34), Office of Regulation, Analysis, and Engagement, Office of Resource Sustainability, Office of Fossil Energy and Carbon Management, Forrestal Building, Room 3E-042, 1000 Independence Avenue SW, Washington, DC 20585, (202) 586-9478, FERGAS@hq.doe.gov.

SUPPLEMENTARY INFORMATION:

Background

DOE is responsible for authorizing exports of domestically produced natural gas, including LNG, to foreign countries under section 3 of the Natural Gas Act (NGA), 15 U.S.C. 717b.¹ Under the NGA, an application to export domestically produced natural gas as LNG to countries that have an FTA with the United States is deemed to be consistent with the public interest by statute and must be granted without modification or delay. As for an application to export domestically produced natural gas, including LNG, to countries that have no FTA with the United States, but with which trade is not prohibited by U.S. law or policy (non-FTA countries), DOE must grant the application, unless it finds that the proposed exportation will not be consistent with the public interest.

Since 2012, to inform its public interest determination, DOE has commissioned multiple studies to help assess the various facets of the public interest that are affected by U.S. LNG exports, including how different levels of LNG exports could impact the U.S. economy, environmental and climate considerations, and energy security and international considerations. DOE's most recent economic and environmental analyses of U.S. LNG exports were published in 2018 and 2019, respectively. At that time, U.S. LNG exports were just getting underway and U.S. export capacity was 4 billion cubic feet per day, less than one-third of

what it is today. Since then, both the world as well as the global natural gas sector have changed significantly. The purpose of the 2024 LNG Export Study is to provide an update to DOE's prior analyses and understanding of how varying levels of U.S. LNG exports impact and inform DOE's statutory public interest determination.

2024 LNG Export Study

The Study comprises a summary report and four appendices.

First, *Appendix A: Global Energy and Greenhouse Gas Implications of U.S. LNG Exports* presents an analysis of the global market demand for U.S. LNG exports across a range of scenarios and the global emissions impacts of increased U.S. LNG exports through 2050. The three defining variables in the scenario design are (1) global climate policies and policy ambition, (2) technology availability, and (3) U.S. LNG export levels. This analysis uses the Global Change Analysis Model (GCAM), which is an integrated multisector model of global energy, economy, agriculture, land use, water, and climate systems. DOE's Pacific Northwest National Laboratory conducted the principal modeling work in Appendix A.

Second, *Appendix B: Domestic Energy, Economic, and Greenhouse Gas Assessment of U.S. LNG Exports* presents an analysis of the implications of the various U.S. LNG export levels on the U.S. economy and greenhouse gas (GHG) emissions. The analysis in Appendix B was conducted using an updated and adapted version of the U.S. Energy Information Administration's National Energy Modeling System (NEMS) and Industrial Economics' Household Energy Impact Distribution Model. OnLocation, Inc. and Industrial Economics, Incorporated performed the principal modeling work in Appendix B.

Third, *Appendix C: Consequential Greenhouse Gas Analysis of U.S. LNG Exports* is an analysis of global GHG emissions in response to increased U.S. LNG Exports. DOE's National Energy Technology Laboratory (NETL) performed the principal modeling work in Appendix C.

Finally, *Appendix D: Addendum on Environmental and Community Effects of U.S. LNG Exports* is a literature review of the effects of upstream, midstream, and downstream natural gas production and exports on the environment and on local communities. This appendix summarizes key findings from peer-reviewed scientific literature, as well as publications from industry and non-governmental organizations.

Staff in DOE headquarters, with support from NETL, prepared the summary information in Appendix D.

Appendices A, B, and C present scenarios that evaluate the impact of different levels of U.S. LNG exports on global and domestic energy systems. This Study does not attach probabilities to any of these scenarios and is not intended to serve as a forecast of U.S. LNG exports and associated impacts. Rather, the 2024 LNG Export Study explores a range of conditions that rely on the described assumptions. The primary reference for comparison in this Study is the level of U.S. LNG exports as it moves from levels associated with facilities that are operating or under construction pursuant to a final investment decision (FID) as of December 2023 (referred to as *Existing/FID Exports* levels) to levels determined by the global energy model (GCAM) in response to policy and technology assumptions (referred to as *Model Resolved* levels).

Key U.S. natural gas supply and economic impact findings include:

- The price of natural gas at the Henry Hub in Louisiana, a main trading hub for natural gas in the U.S., increases in scenarios where the export level is *Model Resolved* (i.e., based on modeled global demand and unconstrained U.S. LNG exports) when compared with *Existing/FID Exports*.

—Across the *Defined Policies* with reference U.S. supply assumptions, the 2050 Henry Hub natural gas price increases 31% in 2022 dollars (from \$3.53/MMBtu to \$4.62/MMBtu), as U.S. LNG exports increase in response to the modeled global demand level. The modeled price increase is equivalent to about \$0.03/MMBtu for every billion cubic feet/day (Bcf/d) of increased LNG export above existing and FID levels.²

—This study does not include forward-looking modeling on the impacts of increasing LNG exports on natural gas price volatility. Given the unique role of the U.S. as the largest global producer, consumer, and, more recently, exporter of natural gas, there is uncertainty in how rising export levels will affect the domestic market. While there has not been a consistent relationship between domestic prices and export levels to date, that could change as a larger percentage of U.S. natural gas is exported. Current authorized export levels (over 48 Bcf/d) are equivalent to approximately

¹ The authority to regulate the imports and exports of natural gas, including LNG, under section 3 of the NGA has been delegated to the Assistant Secretary for FECM in Redlegation Order No. S4-DEL-FE1-2023, issued on April 10, 2023.

² For comparison, Henry Hub prices in 2022 and 2023 were \$6.45/MMBtu and \$2.53/MMBtu, respectively.

45% of current U.S. natural gas production.

- The impacts of increasing U.S. LNG exports on domestic natural gas prices vary by region. Within the model, LNG export facilities are assumed to be centered in the Gulf Coast region. While gas is sourced from regions around the country, the Gulf Coast and Southwest regions experience the greatest price impacts from increased LNG exports in model projections.

- Higher U.S. LNG export levels in 2050 are associated with higher U.S. residential natural gas prices.

—In the *Defined Policies* scenarios, U.S. residential natural gas prices are 4% higher in 2050 in 2022 dollars when the scenario assumes *Model Resolved* levels of exports compared to *Existing/FID Exports* levels.

—When sensitivity scenarios assume low U.S. natural gas supply, the higher level of U.S. LNG exports under *Model Resolved* assumptions compared to *Existing/FID Exports* assumptions results in 7% higher residential gas prices in 2050. When the sensitivity scenarios assume high U.S. natural gas supply, the higher level of U.S. LNG exports results in 3% higher prices in 2050.

- Under the *Defined Policies* scenario with the reference U.S. supply assumption, the estimated annual energy expenditure impacts of the increased 2050 natural gas prices across all socioeconomic levels and census divisions are:

—Up to a \$122.54 per year average increase for natural gas plus electricity expenditures across all households, with average household expenditure impacts up to 0.50% of average annual income and 3.4% of natural gas and electricity bills,³ including:

- Up to a \$46.52 per year average increase for natural gas expenditures at natural gas households (households identified in the National Energy Modeling System, or NEMS model, as using natural gas for space heating), with an average natural gas household expenditure impact of up to 0.24% of average annual income and 6.7% of average natural gas bills; and

- Up to a \$118.37 per year average increase for electricity expenditures across all households, with an average household expenditure impact of up to 0.5% of average annual income and 3.5% of average electricity bills.

³Due to regional differences, the per year average increase for natural gas plus electricity is less than the sum of the per year average increase for natural gas and electricity expenditures.

—This analysis did not explore the impact of increased natural gas and electricity prices on broader consumer and industrial goods, which could have an additional impact on consumer expenditures.

- NEMS includes granular detail about the energy system, such as prices, and a separate macroeconomic module that provides feedback on changes in the broader economy. One result of the model's configuration is that increases in energy production in response to LNG exports generally yield increases in gross domestic product (GDP) in the modeling framework, but secondary effects (e.g., effects resulting from changes in the price of consumer goods) may moderate this relationship.⁴ As an example of this effect, 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 (\$80 billion, 2022 dollars), and cumulatively from 2020 to 2050, GDP increases \$410 billion (2022 dollars discounted at 3%). GDP is one of several measures of economic activity, and an increase in GDP does not necessarily correlate with a positive effect on broader public and consumer welfare.

- Across all scenarios, modeled U.S. domestic natural gas supply is sufficient to meet modeled global demand for U.S. LNG while continuing to meet domestic demand. This result holds across sensitivity scenarios on U.S. oil and gas supply.

Key energy security findings include:

- The global market for LNG has been increasing for several years, and LNG re-gasification and associated import infrastructure is being built out globally, but future demand for natural gas and LNG is uncertain and the demand centers are expected to shift.

- DOE natural gas export authorizations do not include destination restrictions beyond a prohibition to exporting to sanctioned countries. Accordingly, U.S. LNG generally follows global market demand.

—During the five years before Russia's invasion of Ukraine, from 2016 through 2021, South Korea, Japan, and China were the top three importers of U.S. LNG, collectively importing 34% of U.S. exports, while Europe imported 28%.

—From 2022 through 2023, that mix changed, with the share delivered to Europe growing to more than 63% of total U.S. LNG exports, while exports

⁴ See Appendix B for further discussion of how NEMS models GDP.

to Asia were reduced to over 24% of the total.

- 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 are less certain.

—European policies aim to reduce the use of fossil fuels, including natural gas. Demand for natural gas and LNG in Asia is expected to increase in most scenarios.

—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.

—Countries' decarbonization policies and the availability of more cost-competitive energy sources, such as coal and renewables, will determine the outlook for U.S. LNG's role in the global energy market and the energy transition.

Key GHG emission findings include:

- The ultimate global GHG consequences of U.S. LNG exports depend on market effects such as changes in energy demand and the sources used to meet that demand for electricity and other uses of natural gas. A consequential lifecycle analysis enables an examination of how the availability of U.S. LNG may affect global energy consumption, what types of energy U.S. LNG would displace, and the resulting global greenhouse gas implications.⁵ When comparing *Model Resolved* to *Existing/FID* scenarios, increased availability of U.S. LNG from 23.7 Bcf/d to 56.3 Bcf/d in 2050 results in an additional 0.08% in cumulative (2020–2050) global services and an increase of 711 million metric tons (MMT) carbon dioxide equivalent (CO₂e) or 0.05% in cumulative global GHG emissions.⁶

- Attributional studies estimate direct emissions associated with use of natural

⁵ Past DOE and NETL life cycle studies of natural gas, including LNG, have been attributional studies that estimate emissions associated with units of natural gas, LNG, or other fuels used to generate a megawatt-hour (MWh) of baseload electricity. A consequential LCA accounts for the direct emissions from production, delivery, and use of the U.S. exported natural gas and the indirect emissions from changes in market behavior, such as substitution of natural gas for other sources of energy or additional energy use. The consequential GHG intensity calculated in this study is therefore the total effect (direct and indirect market effects) of U.S. LNG on global GHG emissions per unit of U.S. LNG exported.

⁶ Global services are defined as those products of the global economy that provide services to consumers, such as energy, commodities, fertilizers, etc.

gas, LNG, or other fuels used to generate electricity. These studies do not directly consider market effects of the exported gas but are used to compare the potential environmental profiles of alternatives. Comparing *Model Resolved* to *Existing/FID Exports* levels in the *Defined Policies* scenario, the direct life cycle GHG emissions from production,

export, and end use (assuming 100% combustion without carbon capture and storage, or CCS) of increased U.S. LNG exports, before accounting for market effects, would cumulatively (2020–2050) contribute 8,588 MMT CO₂e based on an attributional life cycle GHG profile of 76 g CO₂e/megajoule (MJ). In 2050, direct life cycle GHG emissions

from all U.S. LNG would be approximately 1,500 MMT CO₂e before accounting for market effects.

- The additional GHG emissions per unit of additional U.S. LNG exported, or the consequential GHG emissions intensity, varies by scenario as shown in the table below.

CUMULATIVE (2020–2050) CONSEQUENTIAL GHG INTENSITIES OF U.S. LNG EXPORTS

| Comparison of scenarios | Scenario | 2050 U.S. LNG exports (Exajoule or EJ) [Bcf/d] ^a | Cumulative (2020–2050) change in . . . | | | Cumulative consequential GHG emissions intensity (g CO ₂ e/MJ) |
|--|---|---|--|---|---------------------|---|
| | | | U.S. LNG exports (EJ) [% increase from existing/FID] | GHG emissions (MMT CO ₂ e) [% increase from existing/FID] ^b | Global services (%) | |
| <i>Existing/FID Exports</i> to <i>Model Resolved</i> . | <i>Defined Policies</i> | 20.3 [56.3] | 113 [50%] | 711 [0.05%] | 0.08 | 6.3 |
| | <i>Commitments (High CCS)</i> | 11.9 [33.1] | 31 [14%] | 97 [0.01%] | 0.02 | 3.1 |
| | <i>Commitments (Mod CCS)</i> | 9.7 [26.8] | 11 [5%] | 67 [0.01%] | 0.01 | 5.9 |
| | <i>Net Zero (High CCS)</i> | 10.3 [28.5] | 17 [8%] | 21 [0.002%] | 0.01 | 1.2 |
| | <i>Net Zero (Mod CCS)^c</i> | 6.2 [17.2] | 0 | NA | NA | NA |

^a 2050 U.S. LNG export levels for *Model Resolved* scenarios.
^b Cumulative change in GHG emissions (2020–2050) are 1.2% higher than the GCAM results to align the upstream emission estimates with NETL estimates that are used to explore upstream and liquefaction facility contributions to the consequential results (see Appendix C for additional details).
^c *Net Zero (Mod CCS)* U.S. LNG export levels do not change between the *Existing/FID Exports* to *Model Resolved* scenarios resulting in no change in global emissions or services, the results are listed as “NA” or Not Applicable.

• Across scenarios in which U.S. LNG exports are assumed to exceed model-resolved levels (up to +20 Bcf/d by 2050, corresponding to the *High Exports* assumption for U.S. LNG exports), global cumulative GHG emissions (2020–2050) are 324 MMT CO₂e to 1,452 MMT CO₂e higher than their counterparts with model-resolved levels of U.S. LNG exports. With respect to cumulative consequential GHG emissions intensity, that is equivalent to a range of 3.5 g CO₂e/MJ to 12.6 CO₂e/MJ for additional U.S. LNG exports.

• The increase in global GHG emissions between the *Defined Policies: Model Resolved* and *Defined Policies: Existing/FID* scenarios is estimated to result in a cumulative social cost of GHG (SC–GHG) impact of \$84 billion using a discount rate of 2.5%, \$140 billion using a discount rate of 2.0%, and \$250 billion using a discount rate of 1.5% (all in 2022\$). The cumulative SC–GHG of the increase in global emissions across the study scenarios ranges from \$3 billion to \$170 billion (2.5%) to \$13 billion to \$500 billion (1.5%) in 2022 dollars.

Key environmental and community effects findings include:

- The production and transportation of natural gas in the U.S., including natural gas for export, has energy, labor/workforce, economic, environmental, and social justice implications, among others.
- Production and upstream impacts—Increased U.S. natural gas production increases upstream environmental

impacts, including on water, air, and land.

- Natural gas production and processing emits pollutants that are harmful to human health.
- Researchers have found spatial and temporal (*i.e.*, location and timing) correlations between seismic events and the disposal of produced water from oil and gas production through underground injection into saltwater disposal wells in several states including Texas, Oklahoma, Kansas, Colorado, Arkansas, and Ohio. Various means are underway to reduce the impact, such as recycling produced water, rather than disposing of it.

• Community Effects

- Natural gas production and processing impacts upstream, midstream, and downstream communities in harmful and beneficial ways. Additional research is needed on the impact of LNG exportation on local communities. In particular, in areas with existing heavy industry, the cumulative impact of LNG exports has yet to be determined.
- From an economic perspective, natural gas production and the development of natural gas export infrastructure tends to increase employment and wages in regions and communities where it occurs, but some evidence indicates that higher-wage jobs often go to people who either move to the area or commute, rather than to long-term residents.

- Growth in oil and gas production brings new revenues to local governments, but it can also bring additional burdens such as increased emergency services and police, expansion of water and wastewater infrastructure, and potential damage due to increased heavy road usage.
- Mineral rights owners receive royalties from oil and gas production, though such recipients are not always local residents.
- Quality of life impacts from natural gas development include noise, light pollution, dust, increased traffic, crime, and social disruptions due to the cyclical nature of an industry oriented toward commodity production.

The purpose of this Notice is to notify the public of the availability of the 2024 LNG Export Study and to enter the Study into the administrative record of the above listed non-FTA export application proceedings.⁷ DOE invites comments on the Study and how it may inform DOE’s public interest analysis. DOE does not intend to revise the 2024 Study upon receipt of comments. Instead, both the 2024 LNG Export Study, and the comments that DOE/FECM receives in response to this Notice, will inform DOE’s determination

⁷ For the purpose of this Notice, DOE is including non-FTA export application proceedings that are currently pending, where either (i) the environmental review under the National Environmental Protection Act (NEPA) led by other Federal agencies is underway or complete, or (ii) the application involves an extra-territorial proceeding where the NEPA review is led by DOE.

of the public interest in each of the above listed non-FTA export application proceedings and future non-FTA export application proceedings.

Request for Comment

DOE welcomes comments related to how the Study should be applied to DOE's public interest determinations going forward, as well as comments on any aspects of the analyses and findings in 2024 Study.

In particular, DOE solicits comment on the methods and findings in Appendix C. Appendix C provides a method of estimating the emissions intensity and SC-GHG for individual U.S. LNG projects, and of estimating a breakeven rate, which is the percent change difference between an individual project's emissions intensity and the default assumptions that would result in consequential GHG intensity of zero for the project. DOE seeks comment on this method of estimating project-specific emissions intensity and the breakeven rate. DOE seeks comment on what existing or developing technologies would allow U.S. LNG developers to achieve a breakeven rate, and how developers have used these technologies to reduce emissions.

DOE also seeks comment on whether and how the 2024 Export Study might support imposing LNG cargo or facility-level reporting requirements or other conditions related to emissions on authorization holders. To what extent do recent changes to the Environmental Protection Agency's GHG reporting rules ease the incremental burden that would be associated with facility-level or cargo-level emissions intensity reporting? Relatedly, could such reporting requirements support the determination of equivalence of methane monitoring, reporting and verification measures for purposes of European Union Regulation 2024/1787?⁸

Additionally, DOE seeks comment on whether Appendix D adequately and comprehensively considered the impacts of LNG exports on the local communities and regions where LNG exports occur (*i.e.*, communities where LNG exports and LNG export-related activities occur).⁹ Among other topics related to Appendix D, DOE seeks

⁸ Regulation (EU) 2024/1787 of the European Parliament and of the Council of 13 June 2024 on the reduction of methane emissions in the energy sector and amending Regulation (EU) 2019/942 (July 15, 2024).

⁹ For the purposes of these requests for comment, communities of interest include the towns, counties, parishes, boroughs, and other municipalities or political subdivisions in or around the geographic area where LNG exports occur, particularly the Gulf Coast region.

comment on whether Appendix D adequately addressed:

- The economic profiles of the region, or local communities within the region, including changes over time.
- Employment related to LNG exports in the region and in the U.S. more generally, including employment opportunities for local residents and/or members of underserved or disadvantaged communities in the region related to LNG exports. What barriers, if any, exist that limit or prevent local residents in the region from taking advantage of these employment opportunities? What are some of the ways LNG companies and the businesses that support them have enabled, or could enable, local residents in the region to be a part of their workforce, either directly or indirectly?
- The effects of LNG exports on other local industries in the region, including, but not limited to, fishing and tourism.
- The effects of LNG exports on property values and/or housing costs and availability in the region, and on public finances in the region, including tax revenue and/or additional spending on public services.
- The effects that air emissions from LNG exports (*e.g.*, nitrogen dioxide, particulate matter, volatile organic compounds, and other hazardous air pollutants) and other aspects of LNG exports may have on public health in the region, including physical and mental health, and the cumulative effects on regional public health of LNG exports occurring alongside multiple other industrial activities, including refining and petrochemicals. How do the effects of LNG exports compare with effects from other industries as they relate to regional public health?
- The effects of LNG exports on regional quality of life, including effects on traffic, noise levels, odors, visual effects, community safety, and/or neighborhood character.
- Whether local community members in the region have opportunities to engage with LNG exporters or agencies with LNG regulatory responsibilities on issues of concern.

DOE is aware of and has consulted with a wide body of published scientific literature regarding the effects of upstream natural gas production and midstream transportation of natural gas on local communities in Appendix D; however, given that LNG exports from the United States are a recent phenomenon, only a small amount of published scientific literature exists regarding the effects of LNG exports on local communities. Accordingly, in response to Appendix D, DOE seeks comment in particular from members of

those communities where LNG exports occur.

Public Comment Procedures

In response to this Notice, any person may file comments addressing the 2024 LNG Export Study. Comments may include, among other things, data, reports, studies, or personal testimony. Comments submitted in compliance with the procedures in this Notice will be placed in the administrative record for all of the above-referenced proceedings and need only be submitted once.

DOE is not establishing a new proceeding or docket in this Notice. Additionally, the submission of comments in response to this Notice will not make commenters parties to any of the affected dockets. Persons with an interest in the outcome of one or more of the affected dockets have been given an opportunity to intervene in or protest those matters by complying with the procedures established in the notice of application issued in each respective docket and published in the **Federal Register**.¹⁰

Comments may be submitted using one of the following methods:

(1) Submitting the comments using the online form at <https://fossil.energy.gov/app/docketindex/docket/index/30>;

(2) Mailing the filing to the Office of Regulation, Analysis, and Engagement at the address listed in **ADDRESSES** section; or

(3) Hand delivering the filing to the Office of Regulation, Analysis, and Engagement at the address listed in **ADDRESSES** section.

¹⁰ Notices of application in the affected dockets were published in the **Federal Register** as follows: *Venture Global Calcasieu Pass, LLC*, Docket Nos. 13–69–LNG, 14–88–LNG, and 15–25–LNG (Consolidated), 87 FR 1131 (Jan. 10, 2022); *Venture Global Plaquemines LNG, LLC*, Docket No. 16–28–LNG, 87 FR 29149 (May 12, 2022); *Commonwealth LNG, LLC*, Docket No. 19–134–LNG, 84 FR 65144 (Nov. 26, 2019); *Port Arthur LNG Phase II, LLC*, Docket No. 20–23–LNG, 85 FR 17568 (Mar. 30, 2020); *Venture Global CP2 LNG, LLC*, Docket No. 21–131–LNG, 87 FR 1133 (Jan. 10, 2022); *New Fortress Energy Louisiana FLNG LLC*, Docket No. 22–39–LNG, 87 FR 29151 (May 12, 2022); *Mexico Pacific Limited LLC*, FECM Docket No. 22–167–LNG, 88 FR 6716 (Feb. 1, 2023); *Gulfstream LNG Development, LLC*, Docket No. 23–34–LNG, 72 FR 23023 (Apr. 14, 2023); *Corpus Christi Liquefaction, LLC*, *CCL Midscale 8–9, LLC*, *Cheniere Marketing, LLC*, Docket No. 23–46–LNG, 88 FR 29662 (May 8, 2023); *Lake Charles Exports, LLC*, Docket No. 23–87–LNG, 88 FR 60670 (Sept. 5, 2023); *Southern LNG Company, L.L.C.*, Docket No. 23–109–LNG, 88 FR 73008 (Oct. 24, 2023); *Magnolia LNG, LLC*, Docket No. 23–137–LNG, 88 FR 88600 (Dec. 22, 2023); *Sabine Pass Liquefaction, LLC* and *Sabine Pass Stage V Liquefaction, LLC*, Docket No. 24–27–LNG, 89 FR 28762 (Apr. 19, 2024); *Gato Negro Permitium Dos, S.A.P.I. de C.V.*, Docket No. 24–87–LNG, 89 FR 78294 (Sept. 25, 2024).

For administrative efficiency, DOE/FECM prefers comments to be filed electronically using the online form (method 1). All comments must include a reference to the “2024 LNG Export Study” in the title line. Comments must be limited to the issues and potential impacts addressed in the 2024 LNG Export Study. DOE will review the comments received on a consolidated basis and may disregard comments that are not germane. Reply comments will not be accepted.

The record in the above-referenced proceedings will include all comments received in response to this Notice.

Additionally, all comments filed in response to this Notice will be available on the following DOE/FECM website: <https://fossil.energy.gov/app/docketindex/docket/index/30>.

The 2024 LNG Export Study is available electronically at <https://fossil.energy.gov/app/docketindex/docket/index/30> and for inspection and copying in the Division of Natural Gas Regulation docket room, Room 3E-042, 1000 Independence Avenue SW, Washington, DC 20585. The docket room is open between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Signing Authority

This document of the Department of Energy was signed on December 16, 2024, by Bradford Crabtree, Assistant Secretary, Office of Fossil Energy & Carbon Management, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the **Federal Register**.

Signed in Washington, DC, on December 16, 2024.

Treana V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

[FR Doc. 2024-30370 Filed 12-19-24; 8:45 am]

BILLING CODE 6450-01-P

DEPARTMENT OF ENERGY

Privacy Act of 1974; System of Records

AGENCY: U.S. Department of Energy.

ACTION: Notice of a modified system of records.

SUMMARY: As required by the Privacy Act of 1974 and the Office of Management and Budget (OMB) Circulars A-108 and A-130, the Department of Energy (DOE or the Department) is publishing notice of a modification to an existing Privacy Act System of Records. DOE proposes to amend System of Records DOE-31 Firearms Qualifications Records. This System of Records Notice (SORN) is being modified to align with new formatting requirements, published by OMB, and to ensure appropriate Privacy Act coverage of business processes and Privacy Act information.

DATES: This modified SORN will become applicable following the end of the public comment period on January 21, 2025 unless comments are received that result in a contrary determination.

ADDRESSES: Written comments should be sent to Ken Hunt, Chief Privacy Officer, U.S. Department of Energy, 1000 Independence Avenue SW, Rm. 8H-085, Washington, DC 20585, by facsimile at (202) 586-8151, or by email at privacy@hq.doe.gov.

FOR FURTHER INFORMATION CONTACT: Ken Hunt, Chief Privacy Officer, U.S. Department of Energy, 1000 Independence Avenue SW, Rm. 8H-085, Washington, DC 20585, by facsimile at (202) 586-8151, by email at privacy@hq.doe.gov, or by telephone at (240) 686-9485.

SUPPLEMENTARY INFORMATION: On January 9, 2009, DOE published a Compilation of its Privacy Act Systems of Records, which included System of Records DOE-31 Firearms Qualifications Records. This notice proposes the following amendments: National Nuclear Security Administration (NNSA) Headquarters has been added as a system location. The following addresses have been removed as system locations: NNSA Naval Reactors Field Office in Schenectady, New York; NNSA Nevada Site Office in Las Vegas, Nevada; Nonproliferation and National Security Institute in Albuquerque, New Mexico; Argonne National Laboratory-West in Idaho Falls, Idaho; Brookhaven National Laboratory in Upton, New York; and Amarillo Site Office in Amarillo, Texas. The following addresses have been updated: NNSA John A. Gordon Albuquerque Complex, NNSA Los Alamos Site Office, Office of River Protection, Richland Operations Office, and both Office of Science locations. In the “Routine Uses” section, this modified notice deletes a previous

routine use concerning efforts responding to a suspected or confirmed loss of confidentiality of information as it appears in DOE’s compilation of its Privacy Act Systems of Records (January 9, 2009) and replaces it with one to assist DOE with responding to a suspected or confirmed breach of its records of Personally Identifiable Information (PII), modeled with language from OMB’s Memorandum M-17-12, “Preparing for and Responding to a Breach of Personally Identifiable Information” (January 3, 2017). Further, this notice adds one new routine use to ensure that DOE may assist another agency or entity in responding to the other agency’s or entity’s confirmed or suspected breach of PII, as appropriate, as aligned with OMB’s Memorandum M-17-12. This notice deletes a duplicative routine use about sharing the records to a Federal, state, or local agency in order to obtain information relevant to a Departmental decision concerning the hiring or retention of an employee, the issuance of a security clearance, the letting of a contract, or the issuance of a license, grant or other benefit. This routine use continues to be recognized, singularly, as routine use number two. An administrative change required by the FOIA Improvement Act of 2016 extends the length of time a requestor is permitted to file an appeal under the Privacy Act from 30 to 90 days. Both the “System Locations” and “Administrative, Technical and Physical Safeguards” sections have been modified to reflect the Department’s usage of cloud-based services for records storage. Language throughout the SORN has been updated to align with applicable Federal privacy laws, policies, procedures, and best practices.

SYSTEM NAME AND NUMBER:

DOE-31 Firearms Qualification Records.

SECURITY CLASSIFICATION:

Unclassified.

SYSTEM LOCATIONS:

Systems leveraging this SORN may exist in multiple locations. All systems storing records in a cloud-based server are required to use government-approved cloud services and follow National Institute of Standards and Technology (NIST) security and privacy standards for access and data retention. Records maintained in a government-approved cloud server are accessed through secure data centers in the continental United States.

U.S. Department of Energy, Headquarters, 1000 Independence Avenue SW, Washington, DC 20585.