

# Draft

# Environmental Assessment

Vista Pacifico LNG, S.A.P.I. de C.V.

VPLNG Mid-Scale Project

Office of Resource Sustainability

Office of Fossil Energy and Carbon Management

September 2022

DOE/EA-2192

THIS PAGE INTENTIONALLY LEFT BLANK

## Table of Contents

|         |  |    |
|---------|--|----|
| 1       | Introduction .....   | 3  |
| 1.1     | Background .....   | 3  |
| 1.2     | Purpose and Need.....  | 4  |
| 1.2.1   | Applicant.....   | 4  |
| 1.2.2   | Department of Energy.....  | 4  |
| 1.3     | Alternatives .....   | 4  |
| 1.3.1   | Proposed Action.....   | 4  |
| 1.3.1.1 | Project Description .....  | 4  |
| 1.3.1.2 | DOE’s Proposed Action .....  | 5  |
| 1.3.2   | No Action Alternative.....   | 5  |
| 1.4     | Scope of the Environmental Assessment .....                              | 5  |
| 1.4.1   | Extraterritorial Impacts .....   | 5  |
| 1.4.2   | Summary of Mexico’s Environmental Review Process .....                   | 6  |
| 2       | Potential Environmental Impacts.....                                     | 7  |
| 2.1     | Affected Environment.....  | 7  |
| 2.1.1   | Incremental Natural Gas Production.....                                  | 7  |
| 2.1.2   | Incremental Cross-Border Pipeline Transportation of Natural Gas.....     | 8  |
| 2.1.3   | Marine Transportation of LNG.....  | 9  |
| 2.1.4   | GHG Emissions and Climate Change.....                                    | 9  |
| 2.2     | Potential Impacts .....  | 10 |
| 2.2.1   | Natural Gas Production.....  | 10 |
| 2.2.1.1 | Proposed Action .....  | 10 |
| 2.2.1.2 | No Action Alternative .....  | 10 |
| 2.2.2   | Natural Gas Pipelines.....   | 11 |
| 2.2.2.1 | Proposed Action .....  | 11 |
| 2.2.2.2 | No Action Alternative .....  | 14 |
| 2.2.3   | Marine Transport of LNG.....   | 14 |
| 2.2.3.1 | Proposed Action .....  | 14 |
| 2.2.3.2 | No Action Alternative .....  | 15 |
| 2.2.4   | GHG Emissions .....  | 15 |
| 2.2.4.1 | Proposed Action .....  | 15 |
| 2.2.4.2 | No Action Alternative .....  | 21 |
| 3       | List of States & Tribes Contacted.....                                   | 23 |
| 3.1     | Tribes Contacted .....   | 23 |
| 3.2     | States Contacted.....  | 23 |
| 4       | List of Preparers.....   | 24 |
| 4.1     | U.S. Department of Energy.....   | 24 |
|         | Appendix A: Agency and Tribal Correspondence.....                        | 25 |
|         | Appendix B: Application Summary of Existing Cross-Border Facilities..... | 28 |
|         | Appendix C: Natural Gas Pipeline Border Crossing Locations.....          | 28 |

## ACRONYMS & ABBREVIATIONS

|                    |  |
|--------------------|--|
| AEO                | Annual Energy Outlook  |
| ASEA               | Agencia Nacional de Seguridad Industrial y de Protección al Medio Ambiente del Sector Hidrocarburos/National Agency for Industrial Security and Environmental Protection for the Hydrocarbon Industry [Mexico] |
| Bcf                | Billion cubic feet   |
| Bcf/d              | Billion cubic feet per day   |
| Bcf/yr             | Billion cubic feet per year  |
| CCS                | Carbon Capture and Storage   |
| CO <sub>2</sub>    | Carbon dioxide   |
| CO <sub>2</sub> -e | Carbon dioxide-equivalent  |
| CRE                | Comisión Reguladora de Energía/Energy Regulatory Commission [Mexico]   |
| DOE                | U.S. Department of Energy  |
| EA                 | Environmental Assessment   |
| EIA                | U.S. Energy Information Administration   |
| EIS                | Environmental Impact Statement   |
| EPA                | Environmental Protection Agency  |
| ERA                | Environmental Risk Assessment [Mexico]   |
| EViS               | Evaluación de Impacto Social/Social Impact Assessment [Mexico]   |
| FECM               | Office of Fossil Energy and Carbon Management  |
| FERC               | Federal Energy Regulatory Commission   |
| FTA                | Free Trade Agreement   |
| GWP                | Global Warming Potential   |
| IEA                | International Energy Agency  |
| INAH               | Instituto Nacional de Antropología e Historia/National Institute of Anthropology and History [Mexico]  |
| LGEEPA             | Ley General del Equilibrio Ecológico y la Protección al Ambiente/General Law of Ecological Balance and Environmental Protection [Mexico]   |
| LNG                | Liquefied Natural Gas  |
| MIA                | Manifestación de Impacto Ambiental [Mexico review process - Environmental Impact Assessment]   |
| MWh                | Megawatt hour  |
| MMcf               | Million cubic feet   |
| NETL               | National Energy Technology Laboratory  |
| SEMARNET           | Secretaría de Medio Ambiente y Recursos Naturales/Ministry of Environmental and Natural Resources [Mexico]   |
| SENER              | Secretaría de Energía/Ministry of Energy [Mexico]  |
| NEPA               | National Environmental Policy Act  |
| NGA                | Natural Gas Act  |
| PHMSA              | Pipeline and Hazardous Materials Safety Administration   |
| ROI                | Region of Influence  |
| Tcf                | Trillion cubic feet  |
| Tj                 | Terajoule  |

# 1 Introduction

## 1.1 Background

The Department of Energy (DOE) Office of Fossil Energy and Carbon Management (FECM) received an application<sup>1</sup> from Vista Pacifico LNG, S.A.P.I. de C.V. (Vista Pacifico) on November 18, 2020, supplemented on November 23, 2020 (Application). In the Application, Vista Pacifico requests long-term, multi-contract authorization to export domestically-produced natural gas from the United States to Mexico through existing and future cross-border pipeline facilities and, after liquefaction in Mexico, to re-export<sup>2</sup> the U.S.-sourced natural gas in the form of liquefied natural gas (LNG) to other countries.

The Natural Gas Act (NGA) directs approval of certain types of applications to export natural gas from the United States, and the NGA requires a public interest review of other applications. Specifically, section 3(c) of the NGA requires that proposed imports and/or exports of natural gas, including LNG, in applications to FECM requesting authorization of imports and/or exports from and/or to nations with which there are in effect free trade agreements (FTA) requiring national treatment for trade in natural gas (FTA countries), be deemed consistent with the public interest and granted without modification or delay.

<sup>3</sup> In addition, all LNG imports are deemed to be consistent with the public interest by section 3(c).<sup>4</sup>

In the case of applications to export LNG to non-FTA countries<sup>5</sup>, NGA Section 3(a) requires DOE to conduct a public interest review and grant authority to export unless DOE finds that the proposed exports would not be consistent with the public interest. In addition, DOE's decision whether to authorize natural gas exports to non-FTA countries must comply with the National Environmental Policy Act (NEPA).<sup>6</sup> This environmental assessment (EA), prepared pursuant to NEPA, informs DOE's public interest analysis under the NGA. DOE's review of the Application falls under NGA section 3(a).

---

<sup>1</sup> Vista Pacifico LNG, S.A.P.I. de C.V., Application for Long-Term Multi-Contract Authorizations to Export Natural Gas to Mexico and to Export Liquefied Natural Gas from Mexico to Free Trade Agreement and Non-Free Trade Agreement Nations, VPLNG Mid-Scale Project, Docket No. 20-153-LNG. <https://www.energy.gov/sites/prod/files/2020/11/f80/20-153-LNG%20Mid-Scale%20Project.pdf>.

<sup>2</sup> For purposes of this Environmental Assessment, "re-export" means to ship or transmit U.S.-sourced natural gas in its various forms (gas, compressed, or liquefied) subject to DOE's jurisdiction under the Natural Gas Act, 15 U.S.C. § 717b, from one foreign country (*i.e.*, a country other than the United States) to another foreign country.

<sup>3</sup> DOE is required by section 3(c) of the Natural Gas Act to authorize liquefied natural gas (LNG) exports to FTA countries. Section 3(c) provides that all such exports are "deemed to be consistent with the public interest" and that their authorization "shall be granted without modification or delay." Therefore, because DOE lacks discretion with respect to such approvals, the approvals do not require environmental analysis under NEPA. The U.S. Trade Representative maintains a list of countries with which the United States has free trade agreements at <https://ustr.gov/trade-agreements/free-trade-agreements>.

<sup>4</sup> LNG imports to be authorized by DOE must also come from countries with which trade is not prohibited by U.S. law or policy.

<sup>5</sup> Non-FTA countries are those that do not have an FTA requiring national treatment for trade in natural gas, and with which trade is not prohibited by U.S. law or policy.

<sup>6</sup> 42 U.S.C. 4321 *et seq.*

## 1.2 Purpose and Need

### 1.2.1 Applicant

Vista Pacifico states that the proposed project is designed to meet LNG demand and emphasizes its focus on Asian markets. Vista Pacifico states that “[t]he VPLNG Mid-Scale Project is designed to meet the growing global demand for North American-sourced LNG over the next few decades,”<sup>7</sup> and that its “location along the coast of Sinaloa [on the west coast of Mexico] will permit the VPLNG Mid-Scale Project to transport US natural gas to growing Asian markets while avoiding transits through the Panama Canal...”, along with other markets.<sup>8</sup>

### 1.2.2 Department of Energy

DOE’s purpose is to review the Application under NGA section 3(a), and to authorize the natural gas exports requested unless it finds that the proposed exports would not be consistent with the public interest.

## 1.3 Alternatives

DOE evaluated the Proposed Action of granting the requested authorization to Vista Pacifico and a No Action Alternative in which the requested authorization would not be granted.

### 1.3.1 Proposed Action

#### 1.3.1.1 *Project Description*

The application requests authorization to export approximately 240 billion cubic feet per year (Bcf/yr) through existing or future cross-border pipelines, of which about 40 Bcf/yr would be used as fuel for pipeline operation or liquefaction processes, and about 200 Bcf/yr would be used as feedstock (to be liquefied) for Vista Pacifico’s proposed VPLNG Mid-Scale LNG facility (Facility). The Facility will encompass liquefaction and export terminal facilities located in Topolobampo, Mexico, municipality of Ahome, on the coast of the Gulf of California in the northwestern part of the Mexican state of Sinaloa, approximately 350 miles directly south of the U.S.-Mexico border.

The proposed VPLNG Mid-Scale project (“Project”) would receive, process, and liquefy natural gas into LNG, which would be stored on location and loaded onto ocean-going vessels for export to various foreign countries. The Project requires various permits from regulatory entities in Mexico, as well as authorization from DOE for the export of U.S.-produced gas for the Project and for the re-export of LNG from the Project to FTA and Non-FTA nations. If DOE grants the requested authorization, Vista Pacifico has indicated its intent to reach a final investment decision and commence construction of the Project and place it in service within seven years of the date of the DOE order, pending approvals from regulatory entities in Mexico. In its Application, Vista Pacifico emphasizes its advantage in serving markets in Asia,

---

<sup>7</sup> Application at 13.

<sup>8</sup>*Id.* at 13-14.

due to its location on the west coast of Mexico, allowing LNG to be transported without needing to transit the Panama Canal.<sup>9</sup>

### **1.3.1.2 DOE's Proposed Action**

DOE's proposed action is to authorize the exports described in the Application if DOE determines that such exports are not inconsistent with the public interest.

### **1.3.2 No Action Alternative**

If the Application is not granted, DOE assumes, for the purposes of this EA, that the Facility would not be built and the potential environmental impacts from the Project would not occur. However, global demand for natural gas, including demand for LNG, is expected to experience growth, even accounting for transition away from fossil fuels.<sup>10</sup> DOE therefore believes it is likely that some or all of the demand for LNG that the Project is intended to serve would be met by other LNG facilities.

## **1.4 Scope of the Environmental Assessment**

### **1.4.1 Extraterritorial Impacts**

The environmental impacts subject to analysis in this EA are limited to those direct and indirect impacts that would occur in the United States and those that affect the global commons, such as global climate change that results from emissions of greenhouse gases (GHGs). This EA does not analyze potential environmental impacts associated with elements of the proposed Project that would occur within the sovereign territory of Mexico or any other country. These include the potential local and regional impacts of pipeline transportation of natural gas within Mexico to the Facility, the construction and operation of the Facility in Mexico (including LNG terminal operations), and terminal operations, transport, and use of LNG within the receiving country.

NEPA does not require an analysis of environmental impacts that occur within another sovereign nation that result from actions approved by that sovereign nation. Executive Order (E.O.) 12,114 (Jan. 4, 1979) requires federal agencies to prepare an analysis of significant impacts from a federal action in certain defined circumstances and exempts agencies from preparing analyses in others. The E.O. does not require federal agencies to evaluate impacts outside the U.S. when the foreign nation is participating with the U.S. or is otherwise involved in the action [Section 2- 3(b)]. The Project meets this criterion – it would have to

---

<sup>9</sup> Application at 13.

<sup>10</sup> EIA's International Energy Outlook 2021 projects global natural gas consumption to increase by more than 30% between 2019 and 2050, in its Reference Case, even as it projects renewable sources to pass natural gas by the end of the 2030s. *See* EIA, International Energy Outlook 2021, <https://www.eia.gov/outlooks/ieo/consumption/sub-topic-01.php>. McKinsey has also projected LNG demand growth averaging 3.4% per year to 2035, with continued growth of 0.5% per year through 2050. The firm's accelerated transition scenario still shows an increase in demand only slightly lower by mid-century. *See* McKinsey, Global Gas Outlook to 2050, Summary Report, at 2 (Feb. 2021), <https://www.mckinsey.com/~media/mckinsey/industries/oil%20and%20gas/our%20insights/global%20gas%20outlook%20to%202050/global-gas-outlook-2050-executive-summary.pdf>.

be constructed in accordance with all applicable Mexican laws, regulations, and standards. Additionally, aside from the life cycle emission of GHGs and the marine transport of LNG in international waters, the federal action would not affect the global commons.

### 1.4.2 Summary of Mexico’s Environmental Review Process

The Project and any pipeline facilities that may be constructed in Mexico are subject to review and approval by Mexican agencies under the state and federal laws of that nation. While outside of the scope of this EA, DOE is providing information about Mexico’s review process for the public’s information. The agencies in Mexico with potential jurisdiction over the activities proposed within Mexico, with respect to environmental and cultural impacts, are listed in Table 1.

| Agency  | Environmental, Cultural and Safety Assessments   |
|---|--|
| Environmental and Safety Agency for the Hydrocarbon Industry (ASEA) | Manifestacio de Impacto Ambiental/Environmental Impact Assessment (MIA); Environmental Risk Assessment (ERA); Registration of Industrial, Operational, and Environmental Safety Management Systems; Unique Regulated Registry Number; Technical Justification Study which demonstrating that the ecosystem’s biodiversity will not be jeopardized where natural vegetation will be removed |
| Energy Regulatory Commission (CRE)                                  | Transportation permit for natural gas through pipelines, with any new pipeline engineering to be verified by a third party with a report that supports the permitted design  |
| Secretary of Energy (SENER)   | Evaluacion de Impacto Social/Social Impact Assessment (EvIS), which identifies, characterizes, and assesses social impacts that could be caused by the project; Social Management Plan designed to implement specific measures required to address positive or negative social impacts   |
| National Institute of Anthropology and History (INAH)               | Archaeological Survey conducted before construction; archaeological clearance if INAH finds that archaeological vestiges exist.  |

**Table 1.** Mexican agencies responsible for environmental, cultural, and safety assessments for LNG and/or pipeline projects<sup>11</sup>

Mexico’s primary statute governing environmental reviews of projects is the Ley General del Equilibrio Ecológico y la Protección al Ambiente/General Law of Ecological Balance and Environmental Protection (LGEEPA), which is administered by the Secretaría de Medio Ambiente y Recursos Naturales/Ministry of Environmental and Natural Resources (SEMARNAT). Within the SEMARNAT, the Agencia Nacional

<sup>11</sup> See Application at Appendix B, pages 3-7.



de Seguridad Industrial y de Protección al Medio Ambiente del Sector Hidrocarburos/National Agency for Industrial Security and Environmental Protection for the Hydrocarbon Industry (ASEA), is responsible for regulating and supervising industrial, operational and environmental safety for projects related to the hydrocarbon sector, including the construction of natural gas pipelines and liquefaction facilities.

As part of ASEA’s review of projects under LGEEPA, an MIA must be prepared. Similar to an Environmental Impact Statement (EIS) under NEPA, a MIA presents the results of comprehensive analysis and studies of potential environmental impacts associated with a project, including site preparation, construction, operation, and decommissioning, as well as an assessment of measures to mitigate environmental impacts and an analysis demonstrating compliance with Mexican laws and regulations, as well as prudent industry practices and international standards.

ASEA also oversees a facility’s continued compliance with applicable laws, regulations, and conditions governing safety, risk mitigation, technical processes, and the environment. In addition to review of the MIA and ERA, ASEA reviews and issues authorizations for projects, such as pipelines and liquefaction facilities, that will impact existing land use.

Project proponents of pipeline and liquefaction facilities must perform an EvIS, which identifies, characterizes and assesses social impacts that could be caused by the project along with a social management plan to address those impacts. The EvIS is subject to review and approval of the Secretaría de Energía/Ministry of Energy. In addition, permits are required from the Comisión Reguladora de Energía/Energy Regulatory Commission to engage in activities that are subject to third-party access and those activities that are not subject to third-party access but require a permit, including the self-supply of electric energy, transportation, liquefaction, regasification, and storage of natural gas in Mexico.

## **2 Potential Environmental Impacts**

### **2.1 Affected Environment**

The affected environment is limited to the areas potentially affected by the Proposed Action that are within the scope of the EA, as detailed in section 1.4.

#### **2.1.1 Incremental Natural Gas Production**

Potential natural gas sources for the Project include producing basins in the lower-48 states. The U.S. Energy Information Administration (EIA) projects that, by 2030, over 90% of natural gas produced in the lower-48 states will be produced from unconventional resources, which include gas from tight geological formations, gas from shale formations or gas associated with oil in tight formations, and gas from coal beds (“coalbed methane”).<sup>12</sup> More than 80% is expected to be produced from shale formations alone. According to EIA’s 2022 Annual Energy Outlook (AEO), the share of gas produced from these sources is expected to remain above 90% in 2050. The most likely impacts associated with natural gas production

---

<sup>12</sup> See EIA, 2022 Annual Energy Outlook, <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=14-AEO2022&cases=ref2022&sourcekey=0>

would therefore relate to Project-induced incremental production of those resources. As discussed in DOE's environmental study, *Addendum to Environmental Review Documents Concerning Imports of Natural Gas from the United States* (Aug. 2014) (Addendum),<sup>13</sup> which is incorporated herein by reference, identifies areas potentially affected in unconventional natural gas production include water resources, air quality, induced seismicity, and land use.<sup>14</sup>

### 2.1.2 Incremental Cross-Border Pipeline Transportation of Natural Gas

Vista Pacifico proposes to utilize any cross-border pipeline or combination of pipelines that are currently operational or may become operational. In its Application, Vista Pacifico does not propose to construct and operate new pipeline facilities in the United States. Natural gas transported on behalf of the Project would increase utilization of pipelines, and therefore has the potential to cause incremental impacts in emissions related to pipeline operations. (These potential impacts are addressed in section 2.2.2.1, below.)

There is a significant and growing natural gas pipeline supply infrastructure between producing basins in the Southwestern and Gulf Coast regions of the U.S. and northern Mexico (Figure 1). The cross-border pipeline connections that have already been approved by, or proposed to, the U.S. Federal Energy Regulatory Commission (FERC) are highlighted in Figure 1, which was constructed with data from EIA and other public sources.<sup>15</sup> Appendix C provides details about the pipelines in Figure 1, including the border crossing location and average export data for 2021. Appendix B provides the summary of existing cross-border facilities provided in the Application, including the FERC docket numbers for the related regulatory proceedings. This data shows that there is nearly 15 billion cubic feet per day (Bcf/d)<sup>16</sup> of existing physical cross-border pipeline capacity between the United States and Mexico, including nearly 7 Bcf/d of capacity in California, Arizona, and West Texas, and approximately 8 Bcf/d in South Texas.

---

<sup>13</sup> <https://www.energy.gov/sites/prod/files/2014/08/f18/Addendum.pdf>.

<sup>14</sup> The Addendum also addresses potential impacts on upstream greenhouse gas emissions (apart from their role in local or regional air quality), but those emissions are addressed holistically with emissions from other life cycle segments in section 2.1.4 ("GHG Emissions and Climate Change") below.

<sup>15</sup> <https://www.energy.gov/sites/prod/files/2015/08/f25/POEE%20List.pdf>; Natural Gas Intelligence, 2022 Map of Mexico's Natural Gas Pipelines, Market Hubs & LNG Facilities, <https://www.naturalgasintel.com/ngis-2022-map-of-mexicos-natural-gas-pipelines-market-hubs-lng-facilities/>; EIA, U.S. Natural Gas Exports and Re-Exports by Point of Exit, [https://www.eia.gov/dnav/ng/ng\\_move\\_poe2\\_a\\_EPG0\\_ENP\\_Mmcf\\_a.htm](https://www.eia.gov/dnav/ng/ng_move_poe2_a_EPG0_ENP_Mmcf_a.htm); <https://ienova.gcs-web.com/static-files/1ba71478-c5cf-424c-9c2a-38ff0de6f0da>;

<sup>16</sup> Pipeline capacities are often discussed in Bcf/d, to indicate a possible rate of flow. 1 Bcf/d is equivalent to 365 Bcf/yr.



**Figure 1:** U.S. Natural Gas Pipelines with Cross-Border Connections to Mexico (Source: KeyLogic, constructed using information from EIA and other public sources, including the Application.)

### 2.1.3 Marine Transportation of LNG

Exports from the Facility in Mexico would occur via ocean transport. The potentially affected environment in marine transportation of LNG includes resources that could be impacted by a release of the LNG cargo, in liquid or gaseous form, as well as routine shipping-related risks, such as fuel leaks and engine emissions. These resources include the ocean environment and the atmosphere in the area around an LNG vessel at sea.

### 2.1.4 GHG Emissions and Climate Change

Rising atmospheric GHG concentrations are significantly altering global climate systems with the potential for long-term impacts on human society and the environment. The region of influence (ROI) for GHGs differs from other resource areas considered in this EA since the concerns about GHG emissions are primarily related to climate change, which is global and cumulative in nature.

Increasing GHG concentrations in the atmosphere are linked to a range of ongoing and potential changes to global climate. Assessments of future climate change are strongly dependent on predicted trends in GHG emissions, which depend on future policy and other actions to reduce GHG emissions. Climate change is linked to rising surface temperatures, changing levels of precipitation, reduction in sea ice cover, increasing ocean temperature, and rising sea levels. Climate change can result in changes in ecosystems, an increase in the frequency and severity of extreme weather events, and can impact human health and society.

## 2.2 Potential Impacts

### 2.2.1 Natural Gas Production

The natural gas to be liquefied and exported by the Project would first have to be produced from natural gas wells in the lower-48 states. As noted in section 2.1.1, a significant majority of natural gas produced in the U.S. is from unconventional resources.

#### 2.2.1.1 Proposed Action

On August 15, 2014, DOE published the Addendum.<sup>17</sup> DOE prepared the Addendum to be responsive to the public and to provide the best information available on a subject that had been raised by commenters in LNG export application dockets. The Addendum addresses unconventional natural gas production in the lower-48 states. It does not attempt to identify or characterize the incremental environmental impacts that would result from LNG exports to non-FTA countries.<sup>18</sup>

The Addendum determined that the current rapid development of natural gas resources in the United States likely will continue, with or without the export of natural gas to non-FTA nations.<sup>19</sup> Nevertheless, a decision by DOE to authorize exports to non-FTA nations could accelerate that development by some increment. The Addendum reviewed the academic and technical literature covering the most significant issues associated with unconventional natural gas production, including impacts to water resources, air quality, GHG emissions, induced seismicity, and land use.

The Addendum shows that there are potential environmental issues associated with unconventional natural gas production that need to be carefully managed, especially with respect to emissions of volatile organic compounds and methane, and the potential for groundwater contamination. However, DOE does not have the ability to determine which specific natural gas resources would be produced to serve the Project.

#### 2.2.1.2 No Action Alternative

In the No Action Alternative, LNG would not be supplied from the Project. In this case, DOE assumes that other LNG facilities would serve incremental international demand for LNG, supplying some or all of the volume planned to be supplied by the Project. Therefore, natural gas could be produced for liquefaction, in the United States or in another country.

If produced in the lower-48 United States for a North American project, any potential impacts related to incremental natural gas production would similarly occur in the No Action Alternative, which would therefore not have a currently identifiable environmental advantage over the proposed action. If produced

---

<sup>17</sup> <https://www.energy.gov/sites/prod/files/2014/08/f18/Addendum.pdf>.

<sup>18</sup> See *Sierra Club v. U.S. Dep't of Energy*, 867 F.3d 189, 198–99 (D.C. Cir. 2017) (upholding DOE's conclusion that, without knowing where local production of the incremental natural gas would occur, the corresponding environmental impacts are not reasonably foreseeable under NEPA).

<sup>19</sup> Addendum at 2.

outside of the United States for a foreign LNG project, it would be outside the scope of this analysis to assess impacts from natural gas production.

## 2.2.2 Natural Gas Pipelines

### 2.2.2.1 Proposed Action

DOE considered potential environmental impacts from natural gas pipeline transportation in the lower-48 states that may be caused by the Project's natural gas demand, which would be equal to about 0.87% of U.S. pipeline system throughput in 2020.<sup>20</sup> All of the U.S. pipelines that could potentially transport natural gas to Mexico for the Project's use are under federal or state jurisdiction. They have been, or, in the case of pipelines under development, are being or will be evaluated by the FERC and/or the relevant state regulatory authorities, for environmental and other impacts.<sup>21</sup> Appendix B lists cross-border pipelines and includes FERC docket numbers for the regulatory review of those pipelines. The documents in those FERC dockets, including those related to environmental review, are incorporated herein by reference.

Incremental pipeline throughput would not increase the flow of natural gas to levels above those permitted by FERC and/or state regulatory authorities, for existing or future pipelines. Incremental natural gas flow caused by the Project's demand would therefore not be expected to cause environmental effects that exceed permitted levels.

DOE also considered pipeline safety. Potential impacts relevant to this EA are any impacts associated with the operation of these pipelines that might be incrementally greater with marginally higher throughput due to the Project's demand. The Pipeline and Hazardous Materials Safety Administration (PHMSA) develops and enforces regulations for the safe, reliable, and environmentally sound operation of the nation's pipeline transportation system.<sup>22</sup>

Reviewing PHMSA incident reports submitted by companies that operate U. S. pipelines that connect at border crossings between the U.S. and Mexico, DOE finds that between January 2010 and July 2022 these companies submitted a total of 81 incident reports for their entire operations (Table 2). These 81 incidents resulted in about 2 Bcf of gas emissions over this 12½ year time period. Five of these incidents accounted for nearly 40% of the emitted gas. The reasons for these incidents are highlighted in Table 2. "Equipment failure" is noted as the most common cause, accounting for 46% of the incidents.

---

<sup>20</sup> The Application requests authority to export up to 240 Bcf/yr. EIA reports that the U.S. natural gas transportation network "delivered about 27.7 [Tcf] of natural gas" in 2020. (240 Bcf ÷ 27.7 Tcf, or 27,700 Bcf = 0.87%.) EIA, Natural Gas Explained: Natural Gas Pipelines, <https://www.eia.gov/energyexplained/natural-gas/natural-gas-pipelines.php>.

<sup>21</sup> For information about FERC's regulatory role for natural gas pipelines, see the web page at <https://www.ferc.gov/industries-data/natural-gas/overview/natural-gas-pipelines#:~:text=FERC%20itself%20has%20no%20jurisdiction,needed%20pipelines%20and%20related%20facilities>. For information regarding environmental reviews of any of the pipelines listed in Appendix B, see FERC's eLibrary at <https://elibrary.ferc.gov/eLibrary/search>.

<sup>22</sup> For information on PHMSA's role in ensuring the safe operation of natural gas pipelines, see <https://www.phmsa.dot.gov/regulations>.

| Company                          | System    | Incident Reports | Total Vol. Gas Released (MMcf) | Causes  |
|----------------------------------|-----------|------------------|--------------------------------|---|
| West Texas Gas Inc.              | Transport | 4                | 7.5                            | Corrosion failure (1), equipment failure (1), excavation damage (2)   |
| Tennessee Gas Pipeline (El Paso) | Transport | 15               | 431.6                          | Corrosion failure (3), equipment failure (8), incorrect operation (1), failure of pipe material or weld (3)   |
| El Paso                          | Transport | 24               | 614.2                          | Corrosion failure (2), equipment failure (10), excavation damage (1), incorrect operation (3), failure of pipe material or weld (3), outside force damage (3), other incident (2) |
| ONEOK                            | Transport | 12               | 305.6                          | Corrosion failure (3), equipment failure (4), excavation damage (1), incorrect operation (2), failure of pipe material or weld (2)  |
| Kinder Morgan                    | Transport | 20               | 587.4                          | Corrosion failure (2), equipment failure (12), excavation damage (2), failure of pipe material or weld (2), outside force damage (1), natural forces damage (1)                   |
| TETCO (Enbridge)                 | Transport | 2                | 21.2                           | Failure of pipe material or weld (2)  |
| Enbridge                         | Transport | 3                | 97.3                           | Equipment failure (1), excavation damage (1), other incident (1)  |
| Valley Crossing                  | Transport | 1                | 3.5                            | Equipment failure (1)   |
| <b>Total</b>                     |           | <b>81</b>        | <b>2068.3</b>                  |   |

**Table 2.** Data from PHMSA incident reports<sup>23</sup> from January 2010 to July 2022

Of these 81 incident reports, nine were reported to be located in counties associated with border crossing locations; one in Arizona and eight in Texas. These nine incidents are listed in Table 3. The location of eight of the nine incidents appear to indicate that they could be (but are not necessarily) associated with equipment/operations supporting pipeline crossings. Five of these eight incidents were reported by Kinder Morgan, all due to malfunction of control/relief equipment, at company infrastructure relatively close to the pipeline border crossing it operates near Laredo, Texas. There have been no incidents reported to PHMSA at locations near that border crossing since April 2018.

<sup>23</sup> PHMSA, Distribution, Transmission & Gathering, LNG, and Liquid Accident and Incident Data, <https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data>.

| Company                      | Incident Report No. | Date of Incident Report | County           | Location                      | Nearby Border Interconnect (Pipeline Operator) | Total Vol. Gas Released (MMcf) | Cause                                      |
|------------------------------|---------------------|-------------------------|------------------|-------------------------------|--|--------------------------------|--|
| El Paso Natural Gas          | 20160090            | 11/12/2016              | Cochise Co., AZ  | Monument 90 Meter Station     | Nogales (El Paso)                              | 8.49                           | Malfunction of control/relief equipment    |
| El Paso Natural Gas          | 20170025            | 3/24/2017               | Hudspeth Co., TX | Cornudas Compressor Station   | None   | 3.13                           | Malfunction of control/relief equipment    |
| Kinder Morgan Tejas Pipeline | 20180081            | 8/8/2018                | Hidalgo Co., TX  | Rio Grande 8" pipeline        | Penitas (Kinder Morgan)                        | 7.40                           | Excavation damage by 3 <sup>rd</sup> party |
|                              | 20180046            | 4/28/2018               | Starr Co., TX    | Rio Grande Compressor Station | Laredo (Kinder Morgan)                         | 3.92                           | Malfunction of control/relief equipment    |
|                              | 20160053            | 6/29/2016               | Zapata Co., TX   | Operator property             | Laredo (Kinder Morgan)                         | 9.59                           | Malfunction of control/relief equipment    |
|                              | 20160057            | 7/6/2016                | Starr Co., TX    | Bob West Compressor Station   | Laredo (Kinder Morgan)                         | 6.11                           | Malfunction of control/relief equipment    |
|                              | 20150126            | 10/26/2015              | Starr Co., TX    | Bob West Compressor Station   | Laredo (Kinder Morgan)                         | 17.71                          | Malfunction of control/relief equipment    |
|                              | 20150058            | 4/29/2015               | Starr Co., TX    | Bob West Compressor Station   | Laredo (Kinder Morgan)                         | 10.60                          | Malfunction of control/relief equipment    |
| West Texas Gas               | 20180031            | 3/7/2018                | Maverick Co., TX | Pipeline in Eagle Pass, TX    | Eagle Pass (West Texas Gas)                    | 0.24                           | Excavation damage by 3 <sup>rd</sup> party |
| <b>Total</b>                 |                     |                         |                  |                               |  | <b>67.19</b>                   |  |

**Table 3.** Incidents reported by companies operating pipelines that connect to cross-border interconnections along the Mexico-U.S. border, from January 2010 to July 2022, that are located within the same county as a pipeline border crossing

Assuming the eight incidents close to the border crossings were directly related to operations at those crossings, approximately 64 million cubic feet (MMcf) of gas would have been emitted during the time period from January 2010 to July 2022, mostly due to equipment malfunctions. According to EIA data, from January 2010 through June 2022 (a similar period of time), approximately 15.5 Trillion cubic feet

(Tcf) of gas was exported via pipeline to Mexico.<sup>24</sup> That would equate to the accidental emission of less than one-one thousandth of one percent<sup>25</sup> of total exported gas during this period, well below current estimates of average methane emissions associated with upstream production and transport across the U.S. natural gas infrastructure.<sup>26</sup>

### **2.2.2.2 No Action Alternative**

If the Project were not constructed, any potential local or regional impacts associated with incremental pipeline transportation of natural gas for the Project would not occur. If incremental LNG production capacity were constructed in North America using natural gas from the lower-48 states, local or regional impacts would be similar to gas supplied to the Project (although perhaps at different locations in the United States), and the No Action Alternative would not have a currently identifiable environmental advantage over the Proposed Action. If incremental liquefaction capacity were developed outside of the United States, impacts associated with pipeline transportation would occur within a sovereign foreign country and therefore would be outside the scope of this analysis.

### **2.2.3 Marine Transport of LNG**

#### **2.2.3.1 Proposed Action**

DOE considered potential impacts associated with the marine transport of LNG from production facilities to destination markets. As part of a NEPA rulemaking finalized on December 4, 2020,<sup>27</sup> DOE conducted a detailed review of technical documents regarding potential effects associated with marine transport of LNG.<sup>28</sup> These documents were identified in an accompanying Marine Transport Technical Support Document (Technical Support Document), which is incorporated herein by reference.<sup>29</sup> On the basis of the data referenced in the Technical Support Document, DOE concluded that “the transport of natural gas

---

<sup>24</sup> EIA, U.S. Natural Gas Pipeline Exports to Mexico, <https://www.eia.gov/dnav/ng/hist/n9132mx2a.htm>

<sup>25</sup> The more exact figure is 0.000413%

<sup>26</sup> The EPA’s 2020 GHG Inventory states that methane emissions from U.S. oil and natural gas production, processing, transport and distribution activities in 2020 totaled about 211 MMTCO<sub>2</sub>-eq. <https://www.epa.gov/natural-gas-star-program/estimates-methane-emissions-segment-united-states>) This would be equivalent to about 8.45 MMT of methane, which in turn is equivalent to about 438 Bcf of methane. EPA Conversion tables, <https://www.epa.gov/cmop/coal-mine-methane-units-converter#metricTons>) The volume of U.S. gross natural gas production in 2020 was just under 40,614 Bcf, according to EIA data. [https://www.eia.gov/dnav/ng/ng\\_prod\\_sum\\_a\\_EPG0\\_FGW\\_mmcf\\_a.htm](https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmcf_a.htm). This translates to a loss of 0.0107 cubic feet of methane emitted to the atmosphere per cubic feet of natural gas produced, or about 1.07% since natural gas is mostly methane. Researchers have proposed that based on comparisons of “top down” atmospheric measurements with the EPA’s GHGI “bottom up” measurements, actual methane emissions may be 60 to 70% higher than the EPA estimates. (<https://www.iea.org/news/methane-emissions-from-the-energy-sector-are-70-higher-than-official-figures>; <https://www.edf.org/climate/methane-studies>) A loss of 0.000413 percent is well below either of these figures.

<sup>27</sup> See U.S. Dep’t of Energy, National Environmental Policy Act Implementing Procedures, Final Rule; 85 Fed. Reg. 78,197 (Dec. 4, 2020).

<sup>28</sup> *Id.* at 78,199.

<sup>29</sup> See *id.* at 78,198 n.16 (citing U.S. Dep’t of Energy, Technical Support Document, Notice of Final Rulemaking, National Environmental Policy Act Implementing Procedures (10 C.F.R. Part 1021) (Nov. 2020)).



by marine vessels adhering to applicable maritime safety regulations and established shipping methods and safety standards normally does not pose the potential for significant environmental impacts.”<sup>30</sup>

### **2.2.3.2 No Action Alternative**

If the Project were not constructed, some or all of the volume of LNG the Project would have exported could be supplied to markets from other sources. Although varying with transportation distance (which could be shorter or longer), DOE finds that these impacts would be similar to those identified in the Marine Transport Technical Support Document, and would also “not pose the potential for significant environmental impacts.”

## **2.2.4 GHG Emissions**

### **2.2.4.1 Proposed Action**

DOE’s National Energy Technology Laboratory (NETL) conducted a study in 2014, which was updated in 2019, both of which studies (collectively, GHG Studies) are incorporated herein by reference, of GHG emissions attributable to LNG exports from the lower-48 states, to inform decisions on applications to export lower-48 natural gas in the form of LNG to non-FTA countries. DOE has determined that the findings of this study are applicable to assessment of the GHG emissions from the Project. This EA does not include a Project-specific calculation of emission from construction and operation of the proposed Facility; however, DOE finds that its study of Life Cycle GHG emissions provide sufficient consideration of these emissions.

In 2014, NETL published *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States* (2014 LCA GHG Report).<sup>31</sup> The 2014 LCA GHG Report calculated the life cycle (LCA) GHG emissions for LNG made from natural gas sourced from the lower-48 states and exported to markets in Europe and Asia. DOE commissioned this life cycle analysis to inform its review of non-FTA applications, as part of its broader effort to evaluate different environmental aspects of the LNG production and export chain. The 2014 LCA GHG Report concluded that the use of U.S. LNG exports for power production in European and Asian markets will not increase global GHG emissions from a life cycle perspective, when compared to regional coal extraction in the global regions near the point of consumption, and consumption, for power production.

In 2019, NETL published an update to the 2014 LCA GHG Report, entitled *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas From the United States: 2019 Update* (2019 Update).<sup>32</sup> The conclusions of the 2019 Update were consistent with those of the 2014 LCA GHG Report—that,

---

<sup>30</sup> *Id.* at 78,200; *see also id.* at 78,202. We note that, in the 2014 LCA GHG Report and 2019 Update, DOE also considered how emissions associated with the ocean transport of U.S. LNG in tankers contribute to total life cycle GHG emissions.

<sup>31</sup> U.S. Dep’t of Energy, *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas From the United States*, 79 Fed. Reg. 32,260 (June 4, 2014).

<sup>32</sup> Nat’l Energy Tech. Lab., *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States: 2019 Update* (DOE/NETL-2019/2041) (Sept. 12, 2019),

<https://www.energy.gov/sites/prod/files/2019/09/f66/2019%20NETL%20LCA-GHG%20Report.pdf>.

“[w]hile acknowledging uncertainty, to the extent U.S. LNG exports are preferred over coal in LNG-importing nations, U.S. LNG exports are likely to reduce global GHG emissions on per unit of energy consumed basis for power production.”<sup>33</sup> Additionally, “to the extent U.S. LNG exports are preferred over other forms of imported natural gas, they are likely to have only a small impact on global GHG emissions.”<sup>34</sup> Both the 2014 LCA GHG Report and the 2019 Update are incorporated herein by reference.

DOE finds that the Project is comparable to the representative LNG Project analyzed in the GHG Studies, and therefore finds it reasonable to apply the GHG Studies in reviewing the life cycle emissions from the Project. The source of natural gas for the Project (the lower-48 U.S.) is the same source analyzed in the GHG Studies. Pipeline transport within the U.S. would also be comparable. Emissions from pipeline transport within Mexico may differ from U.S. pipeline emissions estimates in the GHG Studies for two reasons: 1) the total transport distance may be longer due to the Project’s location compared to a U.S. Gulf Coast location, and 2) GHG emissions from pipelines in Mexico may be different from emissions from U.S. pipelines. The extent of these differences is unknown or uncertain, but a sensitivity analysis of pipeline emissions values in the GHG Studies based on these two considerations can reasonably estimate a range of possible divergence from the GHG Studies’ findings.

DOE also assumes that marine shipments of LNG from the Project would have similar attributes to shipment from a U.S. Gulf Coast location analyzed in the GHG Studies. As noted above, the Application emphasizes exports to Asian markets, and so transport to that region is the focus of DOE’s assessment here, although the Application allows for exports to other markets as well. The shorter distance to markets in Asia would lead to slightly lower marine transport emissions from LNG shipping from the Project, as compared to a Gulf Coast location. (If the Project were to export LNG to some other markets, such as Europe, shipping distances would be longer, and marine transport-related emissions commensurately greater, than LNG shipped from a Gulf Cost export terminal.) Emissions from end use would be the same regardless of destination.

---

<sup>33</sup> U.S. Dep’t of Energy, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas From the United States: 2019 Update – Response to Comments, 85 Fed. Reg. 72, 85 (Jan. 2, 2020).

<sup>34</sup> Id.

Results from the 2019 Update for each segment of the life cycle analysis, for that study’s representative Asian market (Shanghai, China), are shown in Table 4 below.<sup>35</sup> Because the GHG Studies examined use of fuels for power generation as a basis of comparison, emissions rates are expressed in terms of the amount of carbon dioxide-equivalent of GHGs emitted per unit of electricity generated -- carbon dioxide-equivalent emissions per Megawatt hour (CO<sub>2</sub>-e/MWh).

| Process Element        | 100-yr GWP |
|------------------------|------------|
| Natural Gas Extraction | 21         |
| Gathering and Boosting | 50         |
| Processing             | 18         |
| Pipeline Transport     | 60         |
| Liquefaction           | 41         |
| Tanker Transport       | 76         |
| LNG Regasification     | 4          |
| Power Plant Operations | 416        |
| Electricity T&D        | 2          |
| Total                  | 688        |
| Low                    | 663        |
| High                   | 763        |

**Table 4.** Life cycle GHG emissions (100-yr GWP) for U.S. LNG shipped from New Orleans to Shanghai, China for power generation (kg CO<sub>2</sub>-e/MWh)

GHGs in this analysis were reported on the common mass basis of kilograms (kg) of carbon dioxide equivalent (CO<sub>2</sub>-e) using the global warming potentials (GWPs) of each GHG from the 2013 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). The 100-yr GWP is the timeframe used for comparison in this EA.

Segments related to natural gas production and processing and to regasification and end use would be the same for the Project as in the GHG Studies. DOE evaluated the three segments that might have variation between the Project and the GHG Studies – these are listed in red in the table. Differences could result from 1) distance and conditions of pipeline transport from U.S. producing basins to the proposed Mexican LNG plant locations as compared to the U.S. Gulf Coast; 2) conditions of operation for an LNG plant in Mexico versus a U.S. Gulf Coast facility; and 3) distance and conditions of LNG tanker transport from Mexican LNG terminals to Shanghai as compared to tanker transport from New Orleans to Shanghai.

Therefore, differences in calculated emissions would primarily result from: 1) any difference in natural gas pipeline transport distance between U.S. producing basins and the liquefaction plants and differences in emissions between Mexican pipelines and U.S. pipelines; 2) differences in the emissions associated

---

<sup>35</sup> 2019 Update, Exhibit A-2, p. A-2.

with liquefaction in Mexico versus the U.S.; and 3) the difference in nautical distance traveled by an LNG tanker between liquefaction plants and Shanghai, China. We examine each of these three categories below.

**Pipeline Transport** – In the GHG Studies, extracted and processed natural gas is transported via pipeline, where GHG emissions are associated with: 1) the combustion of a portion of the natural gas in compressors; 2) intentional venting; and 3) fugitive losses of natural gas. Emissions from these sources are a function of the length of the transport distance, the number of compressor stations (a function of the length of transport), and the associated natural gas storage capacity (a function of the throughput), as well as maintenance and operational practices. DOE believes it reasonable to assume that throughput is comparable in both scenarios, in which case the potential differences are reduced to the possible difference in pipeline transport distance from gas sources to the Project, and to possible emissions differences between pipeline operations in Mexico and in the United States.

Analysis in the GHG Studies estimated that the average pipeline transport distance from natural gas extraction to an LNG terminal on the Gulf Coast was 971 km (~600 miles), that being the average pipeline transmission distance for LNG exports from the United States.<sup>36</sup> This distance is based on the characteristics of the entire transmission network and delivery rate for natural gas in the United States. The pipeline transport distance from U.S. production sources to the Project would not necessarily be longer, but DOE nevertheless explored this possibility by assuming an approximately 50% increase in average transportation distance, or a total of 900 miles.

The GHG studies estimated that total expected life cycle GHG emissions of U.S. LNG exports to Shanghai, China from the Gulf Coast would be 688 kg CO<sub>2</sub>-e/MWh (See Exhibit A-2 in the 2019 Update). The GHG studies estimated that 8.7%, or 60 kg CO<sub>2</sub>-e/MWh, of these emissions would be from pipeline transport.<sup>37</sup> DOE assumed a linear relationship between distance and emissions -- that extending the transportation distance from ~600 miles to 900 miles (an approximately 50% increase) would increase the pipeline transport contribution to GHG emissions from 60 kg CO<sub>2</sub>-e/MWh to 90 kg CO<sub>2</sub>-e/MWh (a 50% increase), with emissions rates from pipeline transportation held constant at levels estimated for U.S. pipelines in the GHG Studies.<sup>38</sup> This would increase total estimated life cycle emissions to 718 kg CO<sub>2</sub>-e/MWh, an increase of about 4.4%.<sup>39</sup> The higher pipeline transport-related emissions would be about 12.5% of the new total.

---

<sup>36</sup> Nat'l Energy Tech. Lab., *Life Cycle Analysis of Natural Gas Extraction and Power Generation* (DOE/NETL-2019/2039) (April 19, 2019), p. 4. <https://www.netl.doe.gov/energy-analysis/details?id=3198>.

<sup>37</sup> Using the 100-year GWP.

<sup>38</sup> In the GHG studies, emissions profiles of transmission pipelines in other countries are held constant at the U.S. rate, with the pipeline transport distance being the determinant of emissions differences (2019 Update Exhibit 5-5, p. 13)

<sup>39</sup> An increase of 30 kg CO<sub>2</sub>-e/MWh from a total of 688 CO<sub>2</sub>-e/MWh:  $30 / 688 = 0.0436$ , or about 4.4%.

*Possible Differences Between Pipeline Emissions in Mexico and the United States*

DOE has not identified a direct estimate for the emissions of pipelines in Mexico. For this EA, DOE has assumed that pipeline emissions in Mexico would be the same as from pipelines located in the United States. This is the same assumption DOE made in the GHG Studies for pipeline emissions in all countries.

However, DOE recognizes that higher and growing divergence in emissions rates between Mexican and United States pipeline transportation are possible given policy and regulatory differences with the U.S. regulatory system. These include Environmental Protection Agency (EPA) requirements to report greenhouse gas emissions for pipeline transportation<sup>40</sup> (and other components of the natural gas value chain) and FERC requirements for accounting for lost and unaccounted for gas.<sup>41</sup> And in the future, U.S. pipeline operators may be subject to regulatory emission limits,<sup>42</sup> with those pipelines that do not meet regulatory limits subject to a waste emissions charge established in the Inflation Reduction Act of 2022.<sup>43</sup>

On the other hand, DOE notes that the average pipeline age in Mexico<sup>44</sup> is less than most U.S. pipelines, and therefore in the near-term, Mexican pipelines may experience fewer age-related maintenance issues that could increase risk of methane emissions.<sup>45</sup>

DOE notes that the extent to which the Mexican pipeline emissions rate would influence total life cycle emissions is limited, given that the pipeline transportation emissions would be approximately 12.5% of the total life cycle emissions for a delivery to Asia, with the longer transport distance estimated above.

---

<sup>40</sup> EPA's Greenhouse Gas Reporting Program (GHGRP) covers emissions from different aspects of the oil and gas industry through several of its subparts. The reporting is required of domestic natural gas market participants in different phases of oil and natural gas value chains, including extraction, production, transport, and use. <https://www.epa.gov/ghgreporting>.

<sup>41</sup> Pipelines subject to FERC's jurisdiction are required to disclose volumes of natural gas lost and unaccounted for during pipeline operations in FERC Form 2. <https://www.ferc.gov/sites/default/files/2020-04/form-2.pdf>.

<sup>42</sup> See Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 86 Fed. Reg. 63,110 (Nov. 15, 2021).

<sup>43</sup> Inflation Reduction Act, Pub. L. 117-169, § 60113 (2022).

<sup>44</sup> "Since 2016, Mexico has been expanding its natural gas pipeline system, which has supported continual growth in U.S. natural gas exports." See U.S. natural gas exports to Mexico set to rise with completion of the Wahalajara system at <https://www.eia.gov/todayinenergy/detail.php?id=44278> July 6, 2020. For the U.S., see Gas Transmission Miles By Decade Installed at <https://portal.phmsa.dot.gov/analytics/saw.dll?Dashboard> Retrieved September 23, 2022. The data in the table indicates that 9% of the natural gas transmission miles of pipeline in the U.S. were installed since 2010.

<sup>45</sup> See Pipeline Replacement Background "...following major natural gas pipeline incidents, U.S. Department of Transportation and the Pipeline Hazardous Materials Safety Administration issued a Call to Action to accelerate the repair, rehabilitation, and replacement of the highest-risk pipeline infrastructure. Among other factors, pipeline age and material are significant risk indicators." <https://www.phmsa.dot.gov/data-and-statistics/pipeline-replacement/pipeline-replacement-background> April 26, 2021.

**LNG Liquefaction** – In the GHG Studies, LNG plant operations and associated emissions were based on the following assumptions:

- The LNG plant includes pre-treatment of the input pipeline-quality gas, liquefaction of the pre-treated gas, and on-site temporary storage of LNG before it is loaded onto an ocean tanker.
- The pre-treatment processes include: Acid gas removal (removal of CO<sub>2</sub> and H<sub>2</sub>S from the pipeline feed gas, to avoid freezing and plugging in downstream units), Molecular sieve dehydration (removal of water to avoid freeze-up and unplanned shut downs) and heavy hydrocarbon removal to protect the main heat exchanger from freezing and plugging, via adsorption or cryogenic distillation.
- The liquefaction plant employs a Propane Pre-Cooled Mixed Refrigerant (C3MR) process in combination with the pre-treatment technologies, represented through four different scenarios.
- Based on the publicly available data on U.S. plant export capacities and ship capacity assumptions, the residence time of LNG on site is estimated to be between 1.33 days to 1.60 days. During storage, boil-off gas (~0.02% to 0.1%) is assumed to be re-liquefied, which then enters back into the supply-chain.
- Pre-treatment and liquefaction energy requirements are assumed to be met through combusting a stream of natural gas as it leaves the pre-treatment facility and before it enters the liquefaction facility.

The *Vista Pacifico* application states that “... facilities will include: (a) a single natural gas liquefaction train module capable of producing up to four million tonnes per year of LNG, including the associated feed-gas pre-treatment adequate to receive pipeline quality feed gas; a single 180,000 cubic meter LNG storage tank ... ground flare equipment; piping and interconnection facilities; and associated utilities.”<sup>46</sup> No further details are provided in the Application regarding the specific natural of the liquefaction process to be used.

DOE believes it reasonable that, on a per-unit-volume-of-LNG-produced basis, GHG emissions from the proposed Mexican plants and the Gulf Coast plant modeled in the GHG Studies would be similar. DOE notes, however, that modeling of liquefaction facility operation in the GHG Studies did not include carbon capture and storage (CCS) capability. Liquefaction facilities in the U.S. are eligible for tax credits to add CCS to operations and some U.S. liquefaction facilities have stated their intention to pursue CCS capability that would reduce emissions from liquefaction operations.<sup>47</sup>

---

<sup>46</sup> Application at 6.

<sup>47</sup> See announcement from Sempra Infrastructure regarding the Cameron LNG project in Louisiana (May 22, 2022, <https://www.sempra.com/sempra-infrastructure-signs-participation-agreement-totalenergies-mitsui-mitsubishi-carbon>); See also announcement from NextDecade regarding the Rio Grande LNG project in Texas (March 18, 2021), <https://investors.next-decade.com/news-releases/news-release-details/nextdecade-launches-next-carbon-solutions>

**LNG Tanker Transport** – As discussed above, the Application emphasizes exports to markets in Asia, although does not limit its request to those markets. Because of the Application’s emphasis, DOE has focused its evaluation on transport routes to Asia, although exports to other markets, such as Europe, could occur. The 2019 Update based LNG tanker transport emissions on fuel combustion emissions (both compressed boil off gas and supplementary diesel fuel), average speed assumptions, and the distance between New Orleans and Shanghai via various sea routes. The calculation assumed that the shortest distance would be 18,544 kilometers (via the Panama Canal), while the distance via other alternate routes would vary from 25,436 to 31,722 kilometers (Table 5). In comparison, the distance from Topolobampo, Mexico (VPLNG Mid-Scale LNG Facility) to Shanghai is 12,318 km.<sup>48</sup> The shortening in routes that would occur if LNG were to be shipped from the Project, as opposed to New Orleans, are shown in Table 5.

| Departure Port                           | Route                      | Distance (km) | Shortening of Route with the Project |
|--|----------------------------|---------------|--------------------------------------|
| New Orleans                              | Via Panama Canal           | 18,544        | 34%                                  |
|  | Via Suez Canal             | 25,436        | 52%                                  |
|  | Via Cape of Good Hope      | 27,731        | 56%                                  |
|  | Via Strait of Magellan     | 31,606        | 61%                                  |
|  | Via Cape Horn              | 31,722        | 61%                                  |
| Topolobampo<br>( <i>Vista Pacifico</i> ) | Direct cross-Pacific route | 12,318        |                                      |

**Table 5.** Distance by sea for LNG tanker travel from U.S. Gulf Coast and from the Project to Shanghai, China, and calculated shortening of LNG tanker travel route for this representative Asian market

DOE believes it reasonable to assess marine transport-related GHG emissions as directly (i.e. linearly) related to transport distance. Based on these calculations, the reduction in GHG emissions associated with LNG tanker transport would be between 34% and 61%, depending on the port of departure and the New Orleans to Shanghai route chosen for comparison. As the share of the scenario’s emissions contributed by LNG tanker transport is approximately 11% ( $76 \div 688$  from Table 4), this would translate to a reduction in overall emissions of between 3% and 7% due to the shorter tanker travel route. DOE notes, however, the LNG exports to other markets, such as Europe, would entail greater shipping distances than the ones analyzed in the GHG Studies, and commensurately greater GHG emissions from marine transport of LNG.

**2.2.4.2 No Action Alternative**

If the Project were not constructed, other LNG production capacity could be constructed in the United States or another country to serve some or all of the LNG demand the Project is intended to serve. Since it is uncertain where this production would take place, it is not possible for DOE to make a quantitative

<sup>48</sup> Calculated using online platform [Maritime Optima](https://app.maritimeoptima.com/). See <https://app.maritimeoptima.com/>.

comparison of estimated life cycle GHG emissions. DOE acknowledges that the differences described could result in additional GHG emissions associated with Mexican LNG exports, as compared to alternative LNG sources and/or changes in natural gas production and consumption. However, DOE finds it not unreasonable to assume that GHG emissions would be broadly similar, and, given the global nature of climate change, would have similar incremental impacts.



### 3 List of States & Tribes Contacted

#### 3.1 Tribes Contacted

|   |
|---|
| <b>California</b>                       |
| Barona Reservation                      |
| Campo Reservation                       |
| Captain Grande (no longer in existence) |
| Cuyapaipe Reservation                   |
| Inaja and Cosmit Reservation            |
| Jamul Indian Village                    |
| La Jolla Reservation                    |
| La Posta Reservation                    |
| Los Coyotes                             |
| Manzanita Reservation                   |
| Mesa Grande Reservation                 |
| Pala Reservation                        |
| Pauma and Yuima Reservation             |
| Pechanga Tribe                          |
| Rincon Tribe                            |
| San Pasqual Reservation                 |
| Santa Ysabel Reservation                |
| Sycuan Reservation                      |
| Torres-Martinez Tribal Lands            |
| Viejas Reservation                      |
| <b>New Mexico</b>                       |
| N/A                                     |
| <b>Arizona</b>                          |
| Cocopah Reservation                     |
| Fort Yuma                               |
| Pascau Yaqui Reservation                |
| Tohono Reservation                      |
| <b>Texas</b>                            |
| Kickapoo                                |
| Ysleta Del Sur                          |

#### 3.2 States Contacted

|                          |
|--------------------------|
| <b>State Governments</b> |
| California               |
| Arizona                  |
| Texas                    |

## **4 List of Preparers**

### **4.1 U.S. Department of Energy**

Brian Lavoie, Sr. Natural Gas Analyst

Amy Sweeney, Director, Office of Regulation, Analysis, and Engagement

Jennifer Wade, Director, Division of Natural Gas Regulation

## Appendix A: Agency and Tribal Correspondence

SUBJECT LINE: Notice of Environmental Assessment to [state/Indian Tribe on the list]

--

To Whom it May Concern:

The U.S. Department of Energy recently announced that two environmental assessments (EAs) under the National Environmental Policy Act (NEPA) are being prepared pursuant to the review of applications to export U.S. natural gas from planned natural gas liquefaction projects in Mexico. Both applications include transfer by pipeline of natural gas from the U.S. to Mexico.

NEPA requires federal agencies to assess the potential environmental impacts of major federal actions significantly affecting the environment. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. An EA is a concise public document that provides sufficient evidence and analysis to determine to prepare an environmental impact statement or a finding of no significant impact.

The EAs being prepared are related to the two LNG export proceedings shown below:

| Applicant                              | DOE Docket                 | Notice of Environmental Assessment   |
|--|----------------------------|--|
| Energía Costa Azul, S. de R.L. de C.V. | <a href="#">18-145-LNG</a> | <a href="#">Energia Costa Azul 18-145-LNG - Notice of EA - 07-12-2022.pdf (energy.gov)</a> |
| Vista Pacifico LNG S.A.P.I de C.V.     | <a href="#">20-153-LNG</a> | <a href="#">Vista Pacifico 20-153-LNG - Notice of EA - 7-12-22.pdf (energy.gov)</a>        |

You are being contacted as a state or tribe located near where the cross-border natural gas pipelines that may service the planned liquefaction projects are located. At this time, the planned liquefaction projects anticipate that they may source U.S. natural gas from one or more of the below existing pipelines, or from one or more additional cross-border pipelines that may be constructed in the future.

Vista Pacifico LNG, S.A.P.I. de C.V. Draft Environmental Assessment (DOE/EA-2192)

|   | Pipeline / Operator                                    | FERC Order Granting Presidential Permit or Establishing Capacity | FERC Docket Nos.                       | Point of Entry / Exit   | Approved / Proposed Capacity (mmcf/d) |
|---|--|--|--|---|---------------------------------------|
| 1   | San Diego Gas & Electric Co.                           | <u>116 FERC ¶ 61,246</u> (2006)                                  | CP93-117                               | Otay, CA / Tijuana, BC  | 800                                   |
| 2   | Southern California Gas Co.                            | 68 FERC ¶ 61,277 (1994)  | CP94-207                               | Calexico, CA/ Mexicali, BC                                      | 40                                    |
| 3   | North Baja Pipeline Co.                                | <u>98 FERC ¶ 61,020</u> (2002)                                   | CP01-23, CP06-61                       | Ogilby, CA/ Los Algodones, BC                                   | 500                                   |
| 4   | Sierrita Gas Pipeline                                  | <u>147 FERC ¶ 61,192</u> (2014)                                  | CP13-74, CP18-38                       | Sasabe, AZ/ Sasabe, Son   | 627                                   |
| 5   | El Paso Natural Gas Co (Ductos de Nogales)             | <u>94 FERC ¶ 61,393</u> (2001)                                   | CP01-41                                | Santa Cruz, AZ/ Nogales, Son                                    | 9                                     |
| 6   | El Paso Natural Gas Co (Douglas Meter)                 | <u>141 FERC ¶ 61,026</u> (2012)                                  | CP98-357, CP12-7                       | Cochise, AZ/ Agua Prieta, Son                                   | 117                                   |
| 7   | El Paso Natural Gas Co (El Fresnal/Willmex Meter)      | <u>141 FERC ¶ 61,026</u> (2012)                                  | CP99-323, CP12-7                       | Cochise, AZ/ Agua Prieta, Son                                   | 329                                   |
| 8   | El Paso Natural Gas Co (Naco/Monument 90 Facilities)   | <u>154 FERC ¶ 61,257</u> (2016)                                  | G-104, CP15-493                        | Cochise, AZ/ Naco, Son  | 57                                    |
| 9   | El Paso Natural Gas Co (Samalayuca Crossing)           | <u>140 FERC ¶ 61,072</u> (2012)                                  | CP93-253, CP12-74                      | El Paso, TX/ Cd. Juarez, Chih                                   | 545                                   |
| 10  | El Paso Natural Gas Co (El Norte Crossing)             | <u>140 FERC ¶ 61,174</u> (2012)                                  | CP12-96                                | Clint, TX/ Cd. Juarez, Chih                                     | 366                                   |
| 11  | ONEOK Partners (Roadrunner – Tarahumara PL)            | <u>153 FERC ¶ 61,041</u> (2015)                                  | CP15-161                               | San Elizario, TX/ San Isidro, Chih                              | 875                                   |
| 12  | Comanche Trail Pipeline LLC (ETP Waha-San Elizario)    | <u>155 FERC ¶ 61,182</u> (2016)                                  | CP15-503                               | San Elizario, TX/ San Isidro, Chih                              | 1,100                                 |
| 13  | Trans-Pecos Pipeline LLC (ETP Waha-Presidio)           | <u>155 FERC ¶ 61,140</u> (2016)                                  | CP15-500                               | Presidio, TX/ Ojinaga, Chih                                     | 1,300                                 |
| 14  | OkTex Pipeline Co., (Del Norte Facilities)             | 105 FERC ¶ 61,047 (2003)   | CP03-99, CP00-384 CP91-2128            | El Paso, TX / Juarez, Chih.                                     | 112                                   |
| 15  | West Texas Gas Co (Acuña Export Crossing)              | <u>101 FERC ¶ 61,058</u> (2002)                                  | CP02-97                                | Val Verde, TX/ Cd. Acuña, Coah                                  | 25                                    |
| 16  | West Texas Gas Co (Conagas)                            | <u>76 FERC ¶ 61,264</u> (1996)                                   | CP84-361, CP84-366, CP96-497, CP02-382 | Eagle Pass, TX/ Piedras Negras, Coah                            | 38                                    |
| 17  | West Texas Gas Co. (Reef Int'l Facilities)             | 99 FERC ¶ 61,221 (2002).   | CP02-74, CP08-410                      | Eagle Pass, TX / Piedras Negras, Chih.                          | 15                                    |
| 18  | Kinder-Morgan Texas Pipeline Co.                       | <u>77 FERC ¶ 61,205</u> (1996)                                   | CP96-583, CP12-440, CP13-94            | Roma, TX/ Cd. Miguel Aleman, Tam                                | 700                                   |
| 19  | NET Mexico Pipeline                                    | <u>145 FERC ¶ 61,112</u> (2013)                                  | CP13-482                               | Starr, TX/ Cd. Camargo, Tam                                     | 2,100                                 |
| 20  | Tennessee Gas Pipeline Co (PEMEX Exp)                  | <u>86 FERC ¶ 61,244</u> (1999)                                   | CP99-28                                | Hidalgo, TX/ Reynosa, Tam                                       | 185                                   |
| 2   | Tennessee Gas Pipeline Co (South Texas Exp)            | <u>101 FERC ¶ 61,360</u> (2002)                                  | CP02-117                               | Hidalgo, TX/ Reynosa, Tam                                       | 320                                   |
| 2   | Coral Energy Corp. / Kinder Morgan Border Pipeline LLC | <u>89 FERC ¶ 61,171</u> (1999)                                   | CP99-564, CP17-474                     | Hidalgo, TX/ Reynosa, Tam                                       | 450                                   |
| 23  | Houston Pipeline (Energy Transfer)                     | <u>146 FERC ¶ 61,195</u> (2014)                                  | CP14-13                                | Hidalgo, TX/ Reynosa, Tam                                       | 140                                   |
| 24  | Texas Eastern Transmission (South Texas Exp)           | 16 FPC 27 (1956)<br>9 FERC ¶ 61,362 (1979)                       | G-9785, CP80-93                        | Hidalgo, TX/ Reynosa, Tam                                       | 300                                   |
| 25  | Colombia Pipeline, LLC (Howard Energy - Impulsora)     | <u>151 FERC ¶ 61,117</u> (2015)                                  | CP14-513, CP16-70                      | Webb, TX/ Colombia, NL  | 1,120                                 |
| 26  | Encinal Gathering Ltd                                  | <u>121 FERC ¶ 61,248</u> (2007)                                  | CP07-418                               | Webb, TX/ Coahuila  | 60                                    |
| 27  | Valley Crossing Pipeline Co (Spectra Energy)           | <u>161 FERC ¶ 61,084</u> (2017)                                  | CP17-19                                | Brownsville, TX/ Offshore with Sur de Texas-Tuxpan Interconnect | 2,600                                 |
| <b>Total Existing Cross-Border Capacity</b> |  |  |  |   | <b><u>14,830</u></b>                  |

DOE anticipates providing a draft of the EAs later this summer, and a 15-day comment period open to your state or Indian Tribe will then commence.

If you have any questions related to this notice or have updated contact information, please reply to this email.

Thank you,

Office of Resource Sustainability

Division of Natural Gas Regulation

Office of Fossil Energy and Carbon Management

U.S. Department of Energy

Email: [fergas@hq.doe.gov](mailto:fergas@hq.doe.gov)

Website: <https://www.energy.gov/fe/division-natural-gas-regulation>



Engage and subscribe.



## Appendix B: Application Summary of Existing Cross-Border Facilities

|   | Pipeline / Operator                                    | FERC Order Granting Presidential Permit or Establishing Capacity | FERC Docket Nos.                       | Point of Entry / Exit   | Approved / Proposed Capacity (mmcf/d) |
|---|--|--|--|---|---------------------------------------|
| 1   | San Diego Gas & Electric Co.                           | <u>116 FERC ¶ 61,246</u> (2006)                                  | CP93-117                               | Otay,CA / Tijuana, BC   | 800                                   |
| 2   | Southern California Gas Co.                            | 68 FERC ¶ 61,277 (1994)  | CP94-207                               | Calexico, CA/ Mexicali, BC                                      | 40                                    |
| 3   | North Baja Pipeline Co.                                | <u>98 FERC ¶ 61,020</u> (2002)                                   | CP01-23, CP06-61                       | Ogilby, CA/ Los Algodones, BC                                   | 500                                   |
| 4   | Sierrita Gas Pipeline                                  | <u>147 FERC ¶ 61,192</u> (2014)                                  | CP13-74, CP18-38                       | Sasabe, AZ/ Sasabe, Son   | 627                                   |
| 5   | El Paso Natural Gas Co (Ductos de Nogales)             | <u>94 FERC ¶ 61,393</u> (2001)                                   | CP01-41                                | Santa Cruz, AZ/ Nogales, Son                                    | 9                                     |
| 6   | El Paso Natural Gas Co (Douglas Meter)                 | <u>141 FERC ¶ 61,026</u> (2012)                                  | CP98-357, CP12-7                       | Cochise, AZ/ Agua Prieta, Son                                   | 117                                   |
| 7   | El Paso Natural Gas Co (El Fresnal/Willmex Meter)      | <u>141 FERC ¶ 61,026</u> (2012)                                  | CP99-323, CP12-7                       | Cochise, AZ/ Agua Prieta, Son                                   | 329                                   |
| 8   | El Paso Natural Gas Co (Naco/Monument 90 Facilities)   | <u>154 FERC ¶ 61,257</u> (2016)                                  | G-104, CP15-493                        | Cochise, AZ/ Naco, Son  | 57                                    |
| 9   | El Paso Natural Gas Co (Samalayuca Crossing)           | <u>140 FERC ¶ 61,072</u> (2012)                                  | CP93-253, CP12-74                      | El Paso, TX/ Cd. Juarez, Chih                                   | 545                                   |
| 10  | El Paso Natural Gas Co (El Norte Crossing)             | <u>140 FERC ¶ 61,174</u> (2012)                                  | CP12-96                                | Clint, TX/ Cd. Juarez, Chih                                     | 366                                   |
| 11  | ONEOK Partners (Roadrunner – Tarahumara PL)            | <u>153 FERC ¶ 61,041</u> (2015)                                  | CP15-161                               | San Elizario, TX/ San Isidro, Chih                              | 875                                   |
| 12  | Comanche Trail Pipeline LLC (ETP Waha-San Elizario)    | <u>155 FERC ¶ 61,182</u> (2016)                                  | CP15-503                               | San Elizario, TX/ San Isidro, Chih                              | 1,100                                 |
| 13  | Trans-Pecos Pipeline LLC (ETP Waha-Presidio)           | <u>155 FERC ¶ 61,140</u> (2016)                                  | CP15-500                               | Presidio, TX/ Ojinaga, Chih                                     | 1,300                                 |
| 14  | OkTex Pipeline Co., (Del Norte Facilities)             | 105 FERC ¶ 61,047 (2003)   | CP03-99, CP00-384 CP91-2128            | El Paso, TX / Juarez, Chih.                                     | 112                                   |
| 15  | West Texas Gas Co (Acuña Export Crossing)              | <u>101 FERC ¶ 61,058</u> (2002)                                  | CP02-97                                | Val Verde, TX/ Cd. Acuña, Coah                                  | 25                                    |
| 16  | West Texas Gas Co (Conagas)                            | <u>76 FERC ¶ 61,264</u> (1996)                                   | CP84-361, CP84-366, CP96-497, CP02-382 | Eagle Pass, TX/ Piedras Negras, Coah                            | 38                                    |
| 17  | West Texas Gas Co. (Reef Int'l Facilities)             | 99 FERC ¶ 61,221 (2002).   | CP02-74, CP08-410                      | Eagle Pass, TX / Piedras Negras, Chih.                          | 15                                    |
| 18  | Kinder-Morgan Texas Pipeline Co.                       | <u>77 FERC ¶ 61,205</u> (1996)                                   | CP96-583, CP12-440, CP13-94            | Roma, TX/ Cd. Miguel Aleman, Tam                                | 700                                   |
| 19  | NET Mexico Pipeline                                    | <u>145 FERC ¶ 61,112</u> (2013)                                  | CP13-482                               | Starr, TX/ Cd. Camargo, Tam                                     | 2,100                                 |
| 20  | Tennessee Gas Pipeline Co (PEMEX Exp)                  | <u>86 FERC ¶ 61,244</u> (1999)                                   | CP99-28                                | Hidalgo, TX/ Reynosa, Tam                                       | 185                                   |
| 2   | Tennessee Gas Pipeline Co (South Texas Exp)            | <u>101 FERC ¶ 61,360</u> (2002)                                  | CP02-117                               | Hidalgo, TX/ Reynosa, Tam                                       | 320                                   |
| 2   | Coral Energy Corp. / Kinder Morgan Border Pipeline LLC | <u>89 FERC ¶ 61,171</u> (1999)                                   | CP99-564, CP17-474                     | Hidalgo, TX/ Reynosa, Tam                                       | 450                                   |
| 23  | Houston Pipeline (Energy Transfer)                     | <u>146 FERC ¶ 61,195</u> (2014)                                  | CP14-13                                | Hidalgo, TX/ Reynosa, Tam                                       | 140                                   |
| 24  | Texas Eastern Transmission (South Texas Exp)           | 16 FPC 27 (1956)<br>9 FERC ¶ 61,362 (1979)                       | G-9785, CP80-93                        | Hidalgo, TX/ Reynosa, Tam                                       | 300                                   |
| 25  | Colombia Pipeline , LLC (Howard Energy - Impulsora)    | <u>151 FERC ¶ 61,117</u> (2015)                                  | CP14-513, CP16-70                      | Webb, TX/ Colombia, NL  | 1,120                                 |
| 26  | Encinal Gathering Ltd                                  | <u>121 FERC ¶ 61,248</u> (2007)                                  | CP07-418                               | Webb, TX/ Coahuila  | 60                                    |
| 27  | Valley Crossing Pipeline Co (Spectra Energy)           | <u>161 FERC ¶ 61,084</u> (2017)                                  | CP17-19                                | Brownsville, TX/ Offshore with Sur de Texas-Tuxpan Interconnect | 2,600                                 |
| <b>Total Existing Cross-Border Capacity</b> |  |  |  |   | <b><u>14,830</u></b>                  |

Source: Vista Pacifico’s Application

## Appendix C: Natural Gas Pipeline Border Crossing Locations

| Map number | Border Crossing Location             | State | US pipeline  | Mexican pipeline   | EIA 2021 Avg. Exports (MMcfd) |
|------------|--------------------------------------|-------|--|--|-------------------------------|
| 1          | Otay Mesa/Tijuana                    | CA    | SDG&E, SoCalGas  | Transportadora de Gas Natural de Baja California (Sempra)          | 1                             |
| 2          | Calexico/Mexicali                    | CA    | SoCal Gas  | Rosarito (Sempra)  | 66                            |
| 3          | Ogilby/Los Algodones                 | CA    | North Baja, El Paso  | Rosarito (Sempra)  | 349                           |
| 4          | Sasabe/Sasabe                        | AZ    | Sierrita (Kinder Morgan)   | Gasoducto Aguaprieta/Sonora Pipeline (Sasabe-Guaymas) (Sempra)     | 84                            |
| 5          | Nogales/Nogales                      | AZ    | El Paso  | Samayaluca-Sasabe (Carso Energy)                                   | 1                             |
| 6          | Douglas/Naco                         | AZ    | El Paso  | Naco-Hermosillo (CENAGAS)  | 149                           |
| 7          | Douglas/Agua Prieta                  | AZ    | El Paso  | Gasoducto la Caridad (Mexicana de Cobre)                           |                               |
| 8          | Columbus/Port of Palomas (Proposed)  | NM    | Proposed Paso Norte pipeline (Paso Norte Pipeline Group) to connect El Paso pipeline to border | Proposed Paso Norte pipeline to natural gas hub El Encino          | 0                             |
| 9          | San Jeronimo/San Jeronimo (Proposed) | NM    | El Paso  | Libramiento Juarez (Proposed)                                      | 0                             |
| 10         | El Paso/Juarez                       | TX    | Norteno Pipeline (ONEOK)   | Sistema Nacional de Gasoductos-SNG (PEMEX-CENAGAS)                 | 268                           |
| 11         | San Elizario/San Isidro              | TX    | El Paso, Comanche Trail  | San Isidro-Samalayuca, Samalayuca, Tarahumara (Chihuahua Corridor) | 276                           |
| 12         | Clint/El Hueco                       | TX    | Roadrunner (ONEOK)   | SNG  | 88                            |
| 13         | Presidio/Ojinaga                     | TX    | Trans-Pecos  | Ojinaga-El Encino  | 602                           |
| 14         | Del Rio/Acuna                        | TX    | West Texas Gas, Inc.   | SNG  | 1                             |
| 15         | Eagle Pass/Piedras Negras            | TX    | West Texas Gas, Inc.   | SNG  | 27                            |
| 16         | Laredo/Colombia                      | TX    | Kinder Morgan  | Nueva Era  | 280                           |
| 17         | Roma/Mier                            | TX    | Kinder Morgan  | Kinder Morgan  | 453                           |
| 18         | Rio Grande/Camargo                   | TX    | NET Mexico   | Los Ramones I (Sempra)   | 1,484                         |
| 19         | Penitas/Arguelles                    | TX    | Kinder Morgan  | SNG  | 0                             |
| 20         | McAllen/Arguelles                    | TX    | HPL  | SNG  | 187                           |
| 21         | Alamo/Reynosa                        | TX    | Tennessee Gas Pipeline   | SNG  | 175                           |
| 22         | Hidalgo/Reynosa                      | TX    | Kinder Morgan  | SNG  | 346                           |
| 23         | Rio Bravo/Rio Bravo                  | TX    | TETCO (Enbridge)   | SNG-Gasoducto Del Rio  | 173                           |
| 24         | Progreso/Rio Bravo                   | TX    | TETCO (Enbridge)   | SNG-Gasoducto Del Rio  |                               |
| 25         | Brownsville/Matamoros                | TX    | Valley Crossing  | SNG  | 893                           |

Data sources include: Table 1, Points of Entry/Exit, <https://www.energy.gov/sites/prod/files/2015/08/f25/POEE%20List.pdf>; Natural Gas Intelligence, 2022 Map of Mexico’s Natural Gas Pipelines, Market Hubs & LNG Facilities, <https://www.naturalgasintel.com/ngis-2022-map-of-mexicos-natural-gas-pipelines-market-hubs-lng-facilities/>; EIA, U.S. Natural Gas Exports and Re-Exports by Point of Exit, [https://www.eia.gov/dnav/ng/ng\\_move\\_poe2\\_a\\_EPG0\\_ENP\\_Mmcf\\_a.htm](https://www.eia.gov/dnav/ng/ng_move_poe2_a_EPG0_ENP_Mmcf_a.htm); Infraestructura Energética Nova, S.A.B. de C.V. 2018 Annual Report, <https://ienova.gcs-web.com/static-files/1ba71478-c5cf-424c-9c2a-38ff0de6f0da>; and Vista Pacifico’s Application.