

Philadelphia LNG Export Task Force Report

Representative Martina White, Chair

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Table of Contents

Task Force Members..... 3

Executive Summary 5

Feasibility and Security..... 7

Economic Impact 21

Examining Obstacles and Policy Recommendations..... 30

Acknowledgements..... 36

References..... 37

Endnotes..... 41

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Executive Summary

The natural gas industry has been an important piece of Pennsylvania's economy for over a century. From the discovery of natural gas in the 19th century to becoming the second-largest natural gas producer in the United States, Pennsylvania's economy enjoys a legacy of energy production as a key driver of economic growth.¹

Pennsylvania's introduction to natural gas began in 1878 when the Haymaker brothers unearthed a natural gas field near Pittsburgh, marking the beginning of a new era for the state's energy sector. Through technological innovation, the industry slowly but steadily advanced and increased natural gas production. But it wasn't until the discovery of the Marcellus and Utica shale formations, along with the adoption of hydraulic fracturing (fracking) combined with horizontal drilling technology, that Pennsylvania became a major player in the U.S. natural gas market.

The natural gas industry significantly contributes to the state's economy by supporting a variety of industries including manufacturing, transportation, and utilities. Natural gas production generates significant state tax revenue through the collection of the state impact fee—a fee that generated \$278.9 million in 2022 alone.²

While our Commonwealth's natural gas resources are plentiful enough to meet the energy demand both domestically and internationally, those resources are only as useful as our ability to utilize them. We must continue examining ways to safely and efficiently bring our natural gas to market and support the need for sustainable economic growth at home and sustainable energy abroad, that supports Pennsylvania workers and reduces carbon emissions. One approach is the examination of a potential liquified natural gas (LNG) export terminal in southeastern Pennsylvania.

Signed into law by Democrat Governor Tom Wolf, House Bill 2458 (Act 133 of 2022), sponsored by Representative Martina White, established the bipartisan, bicameral Philadelphia LNG Export Task Force (Task Force). Act 133 commissioned the Task Force to:

- Identify and examine the existing obstacles, economic feasibility, economic impact, and the security necessities that would be involved with making the Port of Philadelphia an LNG export terminal.
- Identify industry partners who can assist in making the Port of Philadelphia an LNG export terminal.
- Develop recommendations for making the Port of Philadelphia an LNG export terminal.
- Hold public meetings to effectuate the task force's duties.

- Issue a report on the Task Force’s activities, findings, and recommendations to the Governor, Senate, and House of Representatives.³

To carry out these duties, this Task Force held multiple public hearings, and attended tours of various facilities including the Port of Philadelphia, United States Coast Guard Sector Delaware Bay, and Eastern Controls Inc. to gather information and learn about the critical role each entity would play in establishing an LNG export terminal in the Greater Philadelphia area. Throughout this process, the Task Force engaged with a variety of experts, stakeholders and interested parties, many of whose testimony is referenced throughout this report.

Feasibility and Security

When considering a complex project like an LNG export terminal, it is imperative that the highest level of safety and security measures are adopted and implemented during both construction and operation of the facility, as well as for the accompanying maritime traffic. This section considers how a terminal would interact with the existing maritime landscape, its impact on both cargo and personnel on the Delaware River and the Port of Philadelphia, as well as to the environmental impact, including regulatory oversight by the Federal Energy Regulatory Commission and the role of natural gas in reducing carbon emissions. Additionally, we explore the broader national security and geopolitical implications of U.S. energy exports from the Greater Philadelphia area, and its potential impact on U.S. foreign policy and global energy markets.

Impact on the Delaware River and Port of Philadelphia

The Port of Philadelphia (Port) receives between 250 and 300 ships in an average month, traveling to and from the Port through the Delaware Bay and on the Delaware River. The Delaware River and Bay is home to a network of organizations who maintain a strong working relationship to ensure the safe and orderly movement of cargo and personnel.

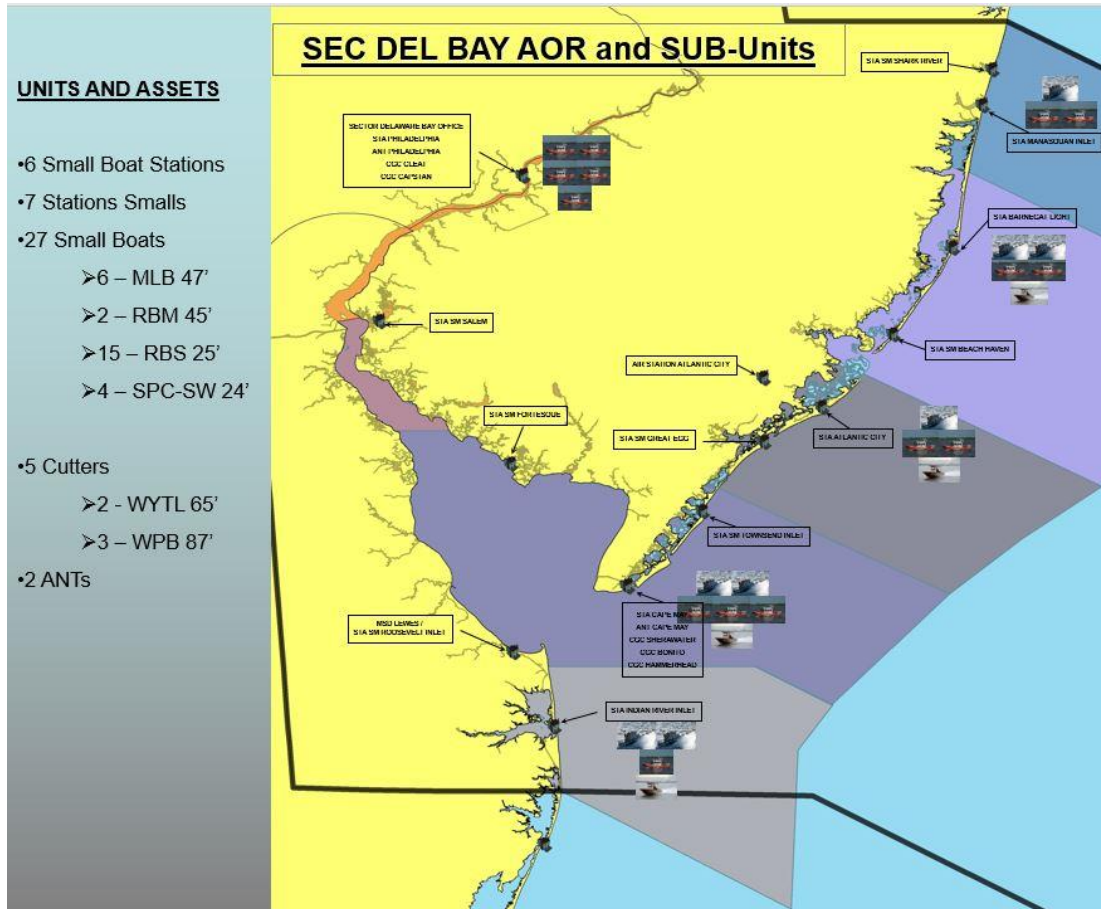
The Pilots Association for the Bay and River Delaware

The Pilots Association for the Bay and River Delaware (Pilots' Association) is one of the oldest state pilots' organizations in the country and is recognized as a leader in technology, training, and piloting accountability. Delaware River & Bay pilots are highly trained and experienced mariners responsible for the safe navigation of commercial vessels on the Delaware River & Bay and its tributaries, including the Schuylkill & Salem Rivers and the Chesapeake & Delaware Canal. Their jurisdiction extends from the Atlantic Ocean to Trenton, New Jersey.⁴ First class pilots in the Pilots' Association average over 20 years' experience in piloting ships on the Delaware Bay and River.⁵

United States Coast Guard Sector Delaware Bay

The Pilots' Association works closely with the United States Coast Guard (USCG) Sector Delaware Bay, who have established robust safety protocols and experienced response teams in the case of an event within their jurisdictional waterways. The Coast Guard's Captain of the Port has the legal authority to impose safety orders including tug requirements, traffic control rules and regulations and anchor restrictions based on conditions and in response to the needs of individual cases.⁶

The Sector Command Center operates 24 hours a day, 7 days a week and is responsible for monitoring and coordinating all Coast Guard operations within the Sector's Area of Responsibility. The USCG Sector Delaware Bay ensures maritime safety, security, and environmental protection with multiple units and highly trained personnel throughout the Delaware River and Bay region.



Source: (United States Coast Guard Atlantic Area n.d.)

USCG Sector Delaware Bay maintains the safe and efficient navigation of maritime vessels through their maintenance of waterway markings and navigation aids, such as color-coded buoys and light fixtures. These markings establish maritime lanes, similar to roadway markings on a highway, as well as communicate other pertinent information to ships to ensure their safe entry and exit from port.

The Coast Guard is also responsible for inspecting commercial vessels, overseeing marine events, and issuing licenses and credentials to maritime professionals like the pilots, while also safeguarding critical maritime infrastructure and ensuring the security of ports, waterways, and coastal areas. Many of these evaluations and inspections occur before the vessels even enter the

waterways of the Delaware River and Bay, and the Coast Guard continues monitoring and ensuring safety protocols are followed from when a vessel enters and exits the port and surrounding waterways under their jurisdiction. The Coast Guard's mission to maintain waterway safety includes environmental protection as well. USCG Sector Delaware Bay has protocols in place and is prepared to respond to all potential spills or leaks of hazardous materials of any kind, including investigating, monitoring the situation, and supervising cleanup operations.⁷

The Maritime Exchange for the Delaware River and Bay

The Maritime Exchange for the Delaware River and Bay (Maritime Exchange), chartered in 1882, is a nonprofit association of maritime interests in the region. Comprised of businesses, nonprofits, and government agencies, the Maritime Exchange serves as the information hub for the Port. The exchange broadcasts safety, security and weather alerts, distributes federal agency and commercial updates, and provides federal rulemaking summaries to all involved parties.⁸ Additionally, the Maritime Exchange is authorized by the Coast Guard as the entity responsible for providing updates to stakeholders during security incidents and assists in the return to normal operations following an event as a member of the Maritime Transportation System Recovery Unit.

Among its various services, The Maritime Exchange records ship movements and provides vessel intelligence 24/7/365, while utilizing their specialized Maritime On-line system.⁹ Maritime On-Line provides timely, accurate and reliable information on the real time locations of ships and vessels, as well as provides port schedules, including the anticipated arrival and departure times of vessels while allowing users to upload and manage cargo manifests.

Representatives from each of these organizations are also members of the Mariners' Advisory Committee for the Bay & River Delaware (MAC). Since 1964, the MAC meets regularly to discuss any relevant changes to local navigation conditions, solve safety-related issues and publish safety navigation notices to ships.¹⁰ The men and women responsible for servicing and securing the Delaware River and the surrounding waterways are highly qualified experts and professionals.

Any ship participating in international trade, both United States and foreign flagged ships, is required by law to accept the services, and be guided by, a pilot who is licensed and regulated by the Commonwealth of Pennsylvania or the State of Delaware.¹¹ These highly trained personnel have safely piloted thousands of large ships in and out of the Port of Philadelphia, including liquid petroleum gas carriers, petroleum tankers and chemical carriers.¹²

Energy Transfer’s Marcus Hook Terminal, which began operations in 2013, exports various liquid petroleum products, including propane, butane, and ethane.¹³ These products have been, and continue to be, safely shipped on the waterways of the Delaware River and Bay by trained and experienced maritime experts. The addition of tankers carrying liquified natural gas to and from an LNG export terminal would not adversely impact maritime safety in the Port or on the Delaware River and Bay. An LNG export terminal would service an estimated four to eight ships per month¹⁴, resulting in a less than two percent increase in overall maritime traffic—an increase the professionals serving and securing the port and the Delaware River and Bay are prepared to accommodate with their existing tools, resources, and protocols—as the ships carry similar products to those already traversing its waterways.¹⁵

Elsewhere in the United States, LNG tankers regularly move in and out of active ports in major U.S. cities. The Everett Marine Terminal, also referred to as the Everett LNG Terminal, is located on the Mystic River in Boston Harbor, Massachusetts. It has been in continuous operation since 1971, making it the longest operating import terminal in the United States¹⁶. For over half a century, LNG tankers have navigated Boston Harbor, situated adjacent to the City of Boston, as a routine aspect of port commerce.

Environmental Safety

Ensuring that any LNG export terminal project is constructed and operated in an environmentally safe manner is top priority for this Task Force and any industry partner seeking to take part in a proposed project. Responsible stewardship of our Commonwealth’s natural resources, and the protection of its citizens health and wellbeing, is the ethical and moral responsibility of all involved parties. As the independent regulatory agency over the siting, construction, and operation of LNG import and export facilities, the Federal Energy Regulatory Commission (FERC) assesses environmental impact by conducting a thorough analysis of a project through a rigorous review process and the assessment of an Environmental Impact Statement.

FERC Review and Approval

Any proposed LNG export terminal must obtain all applicable permits and approvals from FERC before construction and operation can begin. FERC is the lead agency responsible for ensuring an LNG export terminal project complies with all applicable provisions of the National Environmental Protection Act. Applicants seeking approval for an LNG export facility begin the process by entering a mandatory pre-filing process, which includes the drafting of an Environmental Impact Statement.

An Environmental Impact Statement (EIS) is a comprehensive document that assesses the potential environmental impact of a proposed project, in this case an LNG export terminal

project. Input data is gathered from a variety of sources as FERC staff draft an EIS during the mandatory pre-filing period. The EIS begins by stating the purpose and need for the proposed project and describes the rendering of the LNG export terminal, including the facility location, capacity, and details surrounding the facility's operation.¹⁷

Next, baseline environmental data is gathered from the area of the proposed facility, including geological data such as soil and ground conditions, air quality measurements, biological resources such as plant life and wildlife, and both surface and groundwater resources in the area. Additionally, applicants gather socioeconomic data from the local community and review historically and culturally significant sites.¹⁸

The EIS includes an examination of potential environmental impacts of the proposal, including estimates of greenhouse gas emissions and other pollutants from the proposed facility's operation, noise levels from construction and operation, and an assessment of the impact on local transportation, including the impact on maritime traffic for export terminals proposed near a port, as well as an evaluation of risks associated with any potential accident associated with LNG.¹⁹

Along with these datapoints, an EIS outlines environmental mitigation measures, which seek to reduce, avoid, or compensate for any negative environmental impacts. This includes FERC potentially recommending a change in the facility design, adjusting proposed operating procedures, or require applicants to provide compensatory measures like habitat restoration. With all the data taken together, the EIS analyzes the direct, indirect, and cumulative environmental impact of a project that results in “dozens of conditions and requirements that the project developer must satisfy to ultimately construct and operate the facility.”²⁰

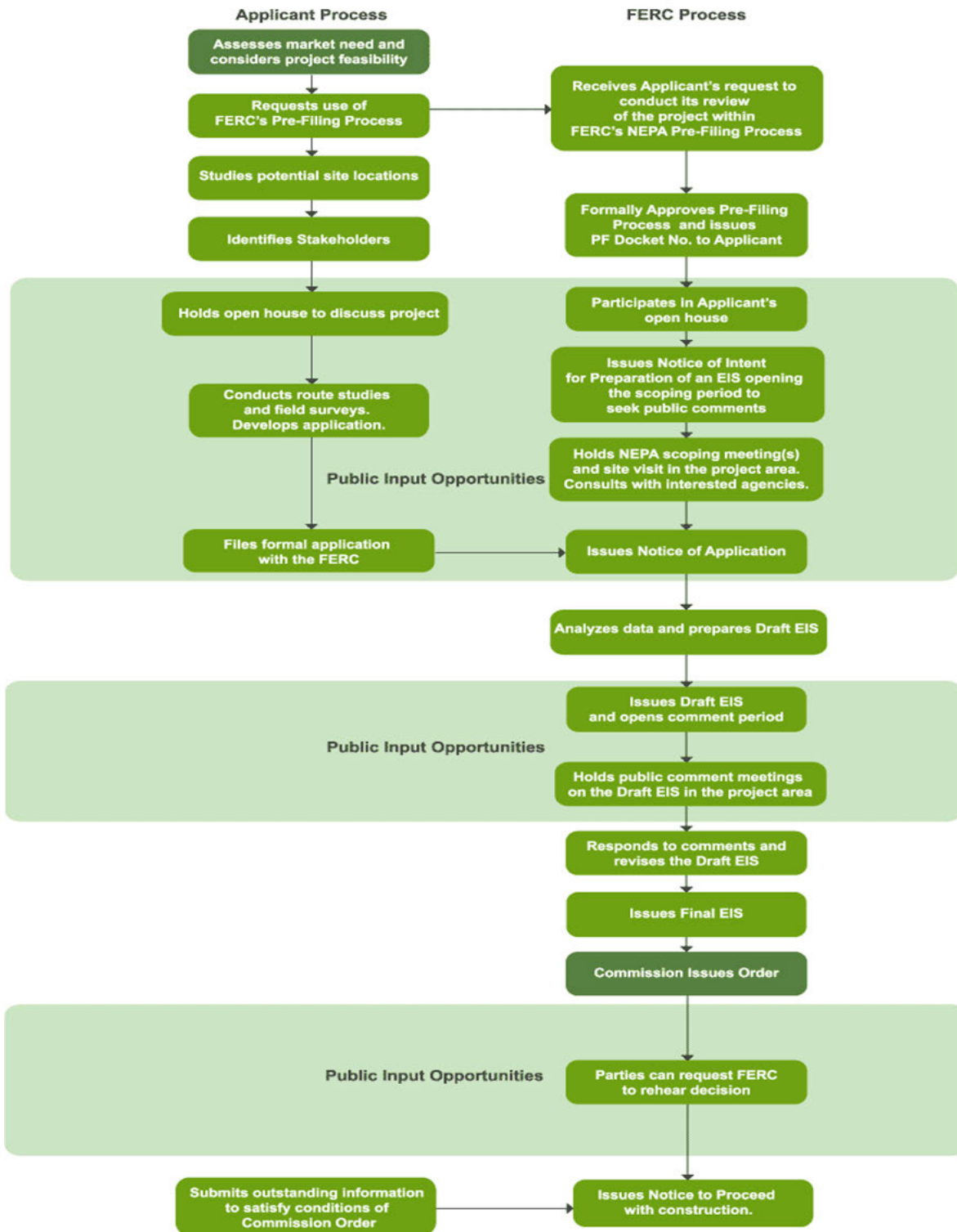
Throughout this rigorous process, applicants informally collaborate with FERC staff, third-party contractors (if required) and any cooperating agencies in the development and review of draft environmental reports and other relevant documents to ensure compliance. Various cooperating agencies include federal, state and local agencies. For example, a 2020 final EIS for a proposed LNG project in Alaska included coordination with The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers, U.S. Coast Guard, Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, National Park Service, U.S. Department of Energy, and the National Marine Fisheries Service.²¹

Additionally, other interested parties are consulted during the pre-filing process, such as environmental groups and other nongovernmental organizations requesting intervention status, with FERC typically granting the requests, as well as multiple opportunities for public input.²² In total, this process lasts several months, and often, takes a year to complete.²³

Upon completing the draft EIS, FERC holds public meetings near the proposed LNG export terminal site, as well as opens a public comment period. During this public comment period, the applicant has the opportunity to respond to public comments. Additionally, FERC staff may ask the applicant questions, which they are required to answer, “on the record”. In fact, all conversations between the applicant seeking approval for an LNG export terminal and FERC staff and commissioners, must be conducted “on the record”, either as written communications or discourse during public meetings.

At the conclusion of this in-depth process, FERC prepares the final Environmental Impact Statement and releases the statement to the public.²⁴ The extent of this comprehensive and exhaustive process is captured in the following flowchart:

EIS Pre-Filing Environmental Review Process



Source: (Federal Energy Regulatory Commission 2020)

Once the pre-filing and environmental review processes are complete, FERC staff prepare a draft order for the approval, construction, and operation of the proposed LNG export terminal. This draft order is submitted to the five FERC commissioners and must be approved by a majority of the commissioners. When determining if a project receives final approval, FERC commissioners are tasked with evaluating whether the project aligns with the public interest or if granting approval would be “inconsistent” with the public interest.²⁵ In a manner similar to U.S. Supreme Court decisions, Commissioners can concur in the majority opinion, write a separate concurrence, or issue a dissenting opinion of the commissioner’s collective decision.²⁶

Following the issuance of an order, organizations that had previously been granted intervening status during the pre-filing period have the ability to request a rehearing of the order, resulting in the FERC commissioners repeating the above process. In total, the process to obtain FERC approval—from the beginning of the mandatory pre-filing process to final approval—often takes three years or more and costs tens of millions of dollars.²⁷

However, this is not where the approval process typically ends. FERC decisions routinely face legal challenges, with the cases being heard in the D.C. Circuit Court of Appeals. Although projects are typically allowed to proceed during the appeals process unless otherwise instructed by the Court, obtaining an appellate court decision can take a few years. Depending on the case outcome, FERC may be required to take further action to address any issues highlighted by the court. An example of legal challenges resulting in further FERC action can be seen in a recent case involving an LNG export terminal in Brownsville, Texas, where the Court remanded the case back to FERC for further climate and environmental justice review. This further review by FERC took almost two years to complete.²⁸

U.S. Department of Energy

While FERC is responsible for authorizing the siting and construction of onshore and near-shore LNG export facilities, the Department of Energy (DOE) maintains jurisdiction over the natural gas commodity, pursuant to Section 3 of the Natural Gas Act.²⁹ The Department of Energy’s regulatory review process “historically has incorporated consideration of a range of factors, including resource adequacy, national security, the public interest and international trade issues.”³⁰ Projects do not proceed until they receive full authorization from the DOE, which typically follows the FERC order and any rehearing of the case at FERC.³¹

Section 3 requires that applications to export LNG to countries with which the U.S. has entered into a free trade agreement “be deemed to be consistent with the public interest” and granted “without modification or delay”.³² Applications for export to countries without a free trade agreement undergo a more rigorous review by DOE to determine if the project truly serves the

public interest. Department of Energy decisions may also be appealed both administratively and in court.

Pipeline Infrastructure

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the federal agency responsible for the regulation of pipeline transportation of natural gas, as well as the transportation and storage of Liquefied Natural Gas. PHMSA's LNG safety regulations are codified under 49 CFR Part 193, which prescribes safety standards for LNG facilities involved in the transportation of gas by pipeline subject to federal pipeline safety laws.³³ Both FERC and PHMSA inspect U.S. LNG import and export terminals to ensure safe operations.

The cooperation between PHMSA and FERC in regulating LNG export facilities has strengthened in recent years through the signing of a Memorandum of Understanding (MOU) by the two agencies.³⁴ This MOU is aimed at expediting the coordination during the permit application review process for proposed LNG facilities, where PHMSA reviews compliance with siting requirements contained in Part 193 of the Federal Pipeline Safety Regulations and summarizes its findings in a Letter of Determination. This Letter of Determination is accepted by FERC as the authoritative determination of a proposed facility's ability to comply with safety regulations and is a key input in the process by which FERC determines to issue, or not issue, approval for a proposed project.

The Greater Philadelphia area is uniquely situated to require very limited pipeline infrastructure to facilitate the creation of an LNG export terminal. In testimony before the Pennsylvania Senate Energy and Environmental Resources Committee, Franc James, CEO of Penn America Energy, discussed a previous rendering of a proposed LNG export facility along the Delaware River.

Analyzing the current pipeline infrastructure in place across Pennsylvania,³⁵ approximately 99% of needed pipeline infrastructure is already in place to support an LNG export terminal in the Greater Philadelphia area, as the “long -haul pipelines” are already in place—that is, there are major pipelines already in place that can transport natural gas from Northeast, Northwest and Southwest Pennsylvania to an export terminal in Southeastern Pennsylvania.³⁶ Constructing pipeline to go the “last mile” to an export facility can utilize already existing pipeline right of ways, by replacing current pipelines already in service, with newer pipelines that support a larger capacity in order to service an export terminal. In his assessment, this “last mile” construction would involve lifting and replacing only 22-23 miles of pipeline on only one or two lines currently in service.³⁷

While this Task Force has not, and is not, considering any specific export terminal proposal, an assessment and review of the current pipeline infrastructure is important to note. The ability to

utilize already existing pipelines to “lift and replace”, rather than site and construct new pipelines in the Greater Philadelphia area, is an encouraging development and this Task Force requests that any industry partner looking to site an LNG export terminal in the area prioritize the use of this method when feasible.

Natural Gas and Green Energy

While navigating the current energy transition towards clean energy, the United States must balance the immediate need for reliable energy and the long-term goal of reducing carbon emissions. Natural gas is already aiding in this transition, as it is the cleanest burning fossil fuel, emitting significantly lower quantities of carbon dioxide, sulfur dioxide, and nitrogen oxides compared to its fossil fuel counterparts.³⁸ As we continue working towards a sustainable energy landscape, natural gas exports are a pragmatic solution to meeting both current and future energy needs and carbon reduction goals.

Natural gas has the potential to mitigate the risks associated with climate change by significantly reducing global carbon emissions. By transitioning away from carbon-intensive fossil fuels, the United States can be a global leader in reducing greenhouse gas emissions. When undergoing combustion, natural gas emits about 117 pounds of CO₂ per million British thermal units (MMBtu), compared to over 200 pounds of CO₂ per MMBtu of coal, and more than 160 pounds per MMBtu of distillate fuel oil.³⁹

Increasing access to natural gas can result in a significant net global greenhouse gas emissions reduction of around 40-50%. In the United States, we have seen the transition towards natural gas account for as much as 61% of U.S. emissions reductions over the 15-year period from 2005-2020. The expansion of U.S. natural gas exports to other rapidly growing Asian countries, primarily reliant on coal, is perhaps the largest tool towards achieving the goal of global emissions reduction. U.S. LNG, and Pennsylvania’s natural gas power plants, features approximately 50% less lifecycle emissions compared to older coal-fired power plants in China, highlighting the United States’ commitment to cleaner energy production.⁴⁰

While natural gas primarily consists of methane, recent advances in technology and increased regulatory measures have helped reduce methane emissions associated with natural gas production. The United States features some of the strictest regulations to mitigate methane emissions in the world. With this regulatory framework, coupled with industry efforts to reduce methane emissions, we not only have the tools to continue driving methane emissions even lower than present levels, but cement our nation’s status as the cleanest natural gas producer in the world.⁴¹

For example, Eastern Controls Inc., located in southeastern Pennsylvania, is one of the primary suppliers of control valves and measurement and monitoring instrumentation for the LNG terminal located in Cove Point, Maryland.⁴² Eastern Controls supplies control valves that regulate the flow of LNG throughout the export facility, which are a critical component in the safe and efficient processing and exporting of LNG. These valves regulate the flow of gas by adjusting their position based on signals from a control system, which monitors conditions like pressure and flow rate.

Actuators within the control valves adjust their position to either restrict or allow flow, responding to control signals to accurately manage gas flow. They can operate in different configurations to adjust gas flow as required. The seals within control valves are made from materials that can endure the high pressures and low temperatures associated with LNG, ensuring a tight seal to prevent leaks. Eastern Controls supplies the most advanced valves on the market, which maximizes seal integrity to ensure near zero leaks and emissions within the facility.⁴³

LNG export facilities also feature the most advanced internal safety equipment to detect any gas leak or open flame. These devices continuously monitor for gas leaks and flames within the facility. Various types of detection instruments are deployed to tackle these challenges. Flame detectors in LNG facilities are designed to detect hydrocarbon flames by creating a cone of vision for effective flame detection. Continued advancements in this technology allow for the use of multi-spectrum infrared sensors and Neural Network Technology (NNT) to detect fire events at distances of up to 230 feet.⁴⁴ This cutting-edge safety equipment is available from manufacturers and suppliers right here in Pennsylvania.

When it comes to reducing methane emissions, the natural gas industry has taken a leading role. Not only is it an ethical imperative to prevent the escape of methane, but natural gas producers have a monetary interest in preventing methane emissions. Any product that escapes and evaporates at any point in the production process is a product that cannot be monetized. Any gas emissions escaping into the atmosphere are evaporating profit for natural gas producers, making the prevention of methane emissions a priority for producers, consumers, and our environment. Continued cooperation between natural gas producers, process equipment manufacturers and regulatory agencies is encouraged to further technological innovation while continuing to refine the regulatory framework to ensure regulations are effective, but not overly burdensome. Together, we can further expand Pennsylvania's role as leaders in clean energy production and be responsible stewards of our Commonwealth's environmental resources.

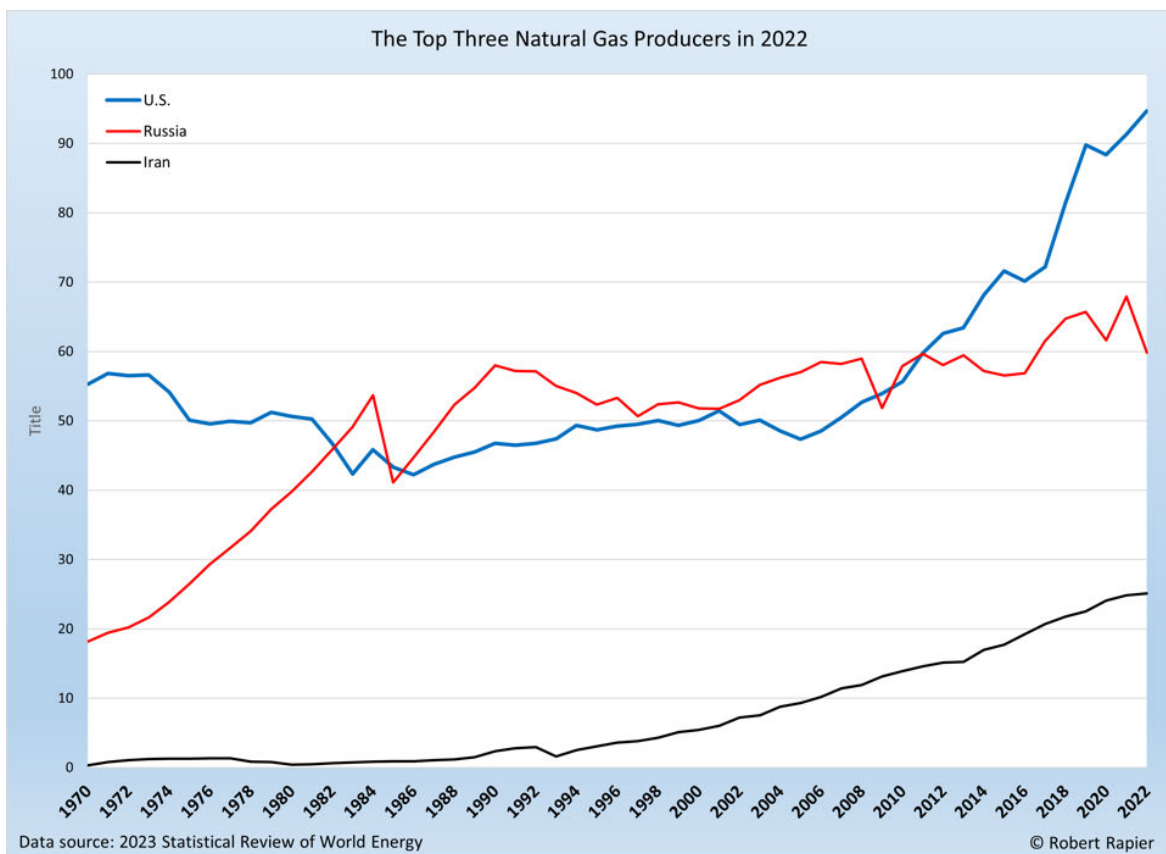
Internationally, our European allies also recognize the potential for reducing carbon emissions from the expanded adoption of natural gas. In early 2022, even before the Russian invasion of Ukraine, the European Commission moved forward with a draft plan to designate natural gas

fired power plants as “green investments that can help Europe cut planet-warming emissions”⁴⁵—a plan backed by the European Union Parliament.⁴⁶

Accordingly, in just the first half of 2022 alone, European countries imported a record quantity of liquefied natural gas from the United States.⁴⁷ Unfortunately, this was coupled with the recommissioning of old and less environmentally friendly power plants in response to the unfolding energy crisis due to Russian aggression. Pennsylvania is strategically located to be the foremost leader in providing natural gas to meet European energy demand.

U.S. LNG Exports: National Security Implications

U.S. LNG exports are a strategic tool in addressing geopolitical instability in Europe and across the globe. By enhancing energy security and diversifying supply, LNG exports help counter the influence of dominant gas supplying countries who are hostile to the United States and its allies. While the shale revolution propelled the United States as the leading natural gas producing nation, the second and third largest natural gas producing nations are Russia and Iran respectively.⁴⁸



Source: (Rapier 2023)

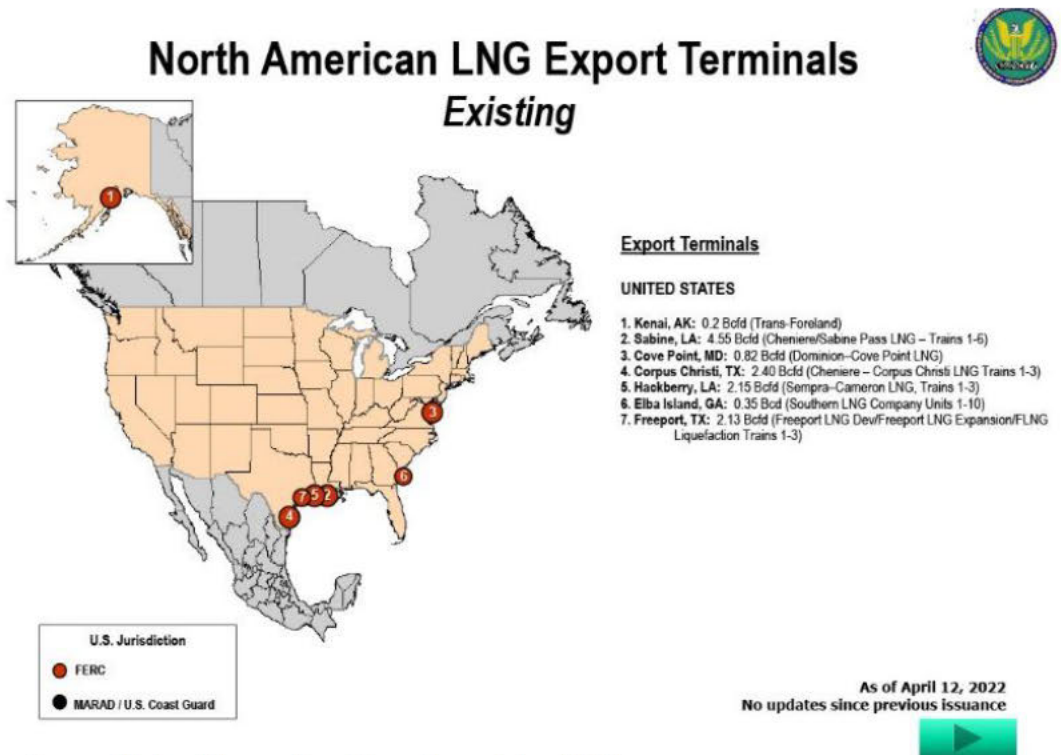
Russia has proven its willingness to use its considerable energy resources as a geopolitical weapon. The European Union spent much of the 21st century dependent upon natural gas supplied from Russia to support their energy demand.⁴⁹ Reliance on a nefarious actor like Russia for natural gas became a serious issue for the E.U. when Russia invaded Ukraine in February 2022, and subsequently cut off gas supplies to EU countries in response to their support for Ukraine.⁵⁰

This disruption in the European energy markets led to skyrocketing, unaffordable energy prices for consumers, energy shortages and disrupted industrial operations across the European continent.⁵¹ As tragic as the loss of life and human suffering created by Russia's unprovoked invasion of Ukraine, this event highlighted the need for diversified energy sources and brought a renewed sense of urgency to the reevaluation of Europe's energy strategy, highlighting energy security as not only an economic benefit, but an important tool in maintaining geopolitical stability.

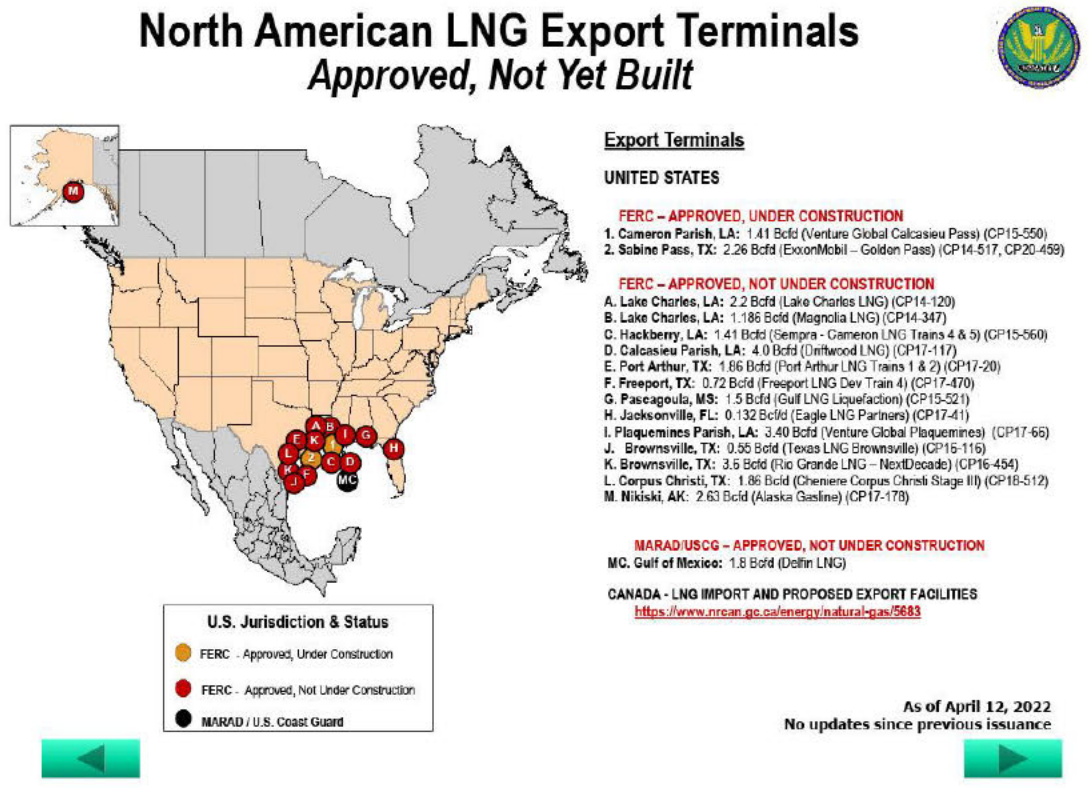
Accordingly, due to its geographic significance, an LNG export terminal along the Delaware River presents a unique opportunity to not just provide U.S. LNG, but Pennsylvania LNG, to our European allies. The Cove Point, Maryland LNG export terminal is the only operational facility on the east coast north of Georgia.⁵² Given Philadelphia's closer geographic proximity to European ports, utilizing an export terminal in the Greater Philadelphia area for shipping LNG would result in significant time, cost, and energy savings when compared to export terminals along the Gulf of Mexico.⁵³

Moreover, none of the export terminals that are awaiting FERC approval or have received FERC approval and are awaiting construction are planned for the east coast, with the overwhelming majority of sites planned in states along the Gulf of Mexico.⁵⁴

Figure 1: North American LNG Export Terminals: Existing, Approved Not Yet Built, Proposed

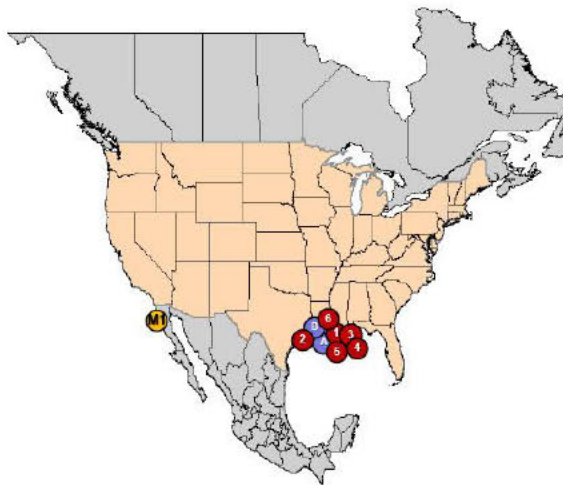


Source: (Federal Energy Regulatory Commission 2022)



Source: (Federal Energy Regulatory Commission 2022)

North American LNG Export Terminals Proposed



UNITED STATES

PROPOSED TO FERC

Pending Applications:

1. Cameron Parish, LA: 1.18 Bcf/d (Commonwealth, LNG) (CP19-502)
2. Port Arthur, TX: 1.86 Bcf/d (Sempra - Port Arthur LNG Trains 3 & 4) (CP20-55)
3. Cameron Parish, LA: 1.45 Bcf/d (Venture Global CP2 Blocks 1-3) (CP22-21)
4. Cameron Parish, LA: .057 Bcf/d (Venture Global Galoisieu Pass) (CP22-25)
5. Hackberry, LA: -0.45 Bcf/d (Sempra - Cameron LNG Vacate T5 & modify T4) (CP22-41)
6. Plaquemines Parish, LA: 0.45 Bcf/d (Venture Global Plaquemines) (CP22-92)

Projects in Pre-filing:

- A. LaFourche Parish, LA: 0.65 Bcf/d (Port Fourchon LNG) (PF17-9)
- B. Plaquemines Parish, LA: 2.76 Bcf/d (Delta LNG - Venture Global) (PF19-4)

CANADA

For Canadian LNG Import and Proposed Export Facilities:

<https://www.nrcan.gc.ca/energy/natural-gas/5683>

MEXICO (Projects in advanced planning/development stages)

- M1. Baja California, MX: 0.4 Bcf/d (Sempra - Energía Costa Azul Phase 1)



As of April 12, 2022
Updated to reflect changes since previous issuance

Source: (Federal Energy Regulatory Commission 2022)

While an LNG export facility along the Delaware River will take years to plan, construct and begin service, it is tragic that geopolitical turmoil and uncertainty will likely continue. Whether it is unprovoked Russian aggression in Ukraine in 2022⁵⁵, terrorist attacks and the outbreak of war in Israel threatening the stability of the Middle East and driving energy prices higher,⁵⁶ or escalating tension in southeast Asia and the South China Sea, the United States has the resources to be well positioned to address global energy demand, regardless of geopolitical circumstances.

Although the United States is the current leader in natural gas production, both Russia and Iran's overall shale deposits are larger than those in the United States.⁵⁷ The growing global demand for sustainable energy is constant, while the only thing that may change is the supplying nation.

Economic Impact

An LNG export terminal in the Greater Philadelphia area provides a unique opportunity for regional and statewide economic growth. Coupled with the recent announcement of Southeastern Pennsylvania obtaining \$750 million in federal funding for the construction of a regional hydrogen hub through the U.S. Department of Energy's (DOE) Regional Clean Hydrogen Hubs program, the Philadelphia area can lead our Commonwealth on the path to being one of the most

critical energy producing regions in not just the United States, but across the world.⁵⁸ This potential brings with it the opportunity for the creation of thousands of sustainable jobs, billions of dollars in additional economic output, and tens of millions of dollars in additional state and local tax revenue to support local programs.

To capture and quantify these economic benefits, Carl Marrara, the Executive Director of the Pennsylvania Manufacturers' Association, conducted an economic analysis of how an LNG Export Facility would benefit the local, regional, and state-wide economies, utilizing the IMPLAN economic modeling program. The IMPLAN program "is a regional software analysis tool that is designed to estimate the impact or ripple effect...of a given economic activity within a specific geographic area through the implementation of its Input-Output model".⁵⁹

The analysis sought to replicate the closest facility, geographically, to southeastern Pennsylvania—the Cove Point, Maryland LNG facility. Simply put, the analysis seeks to answer the following: if the Cove Point LNG facility was built in the Greater Philadelphia area, what would be the corresponding economic impact?

"The inputs for the economic analysis are based on existing information from the Cove Point LNG facility in Lusby, Maryland. Completed in 2018, this LNG export facility is the closest in proximity to Delaware County, PA, and is supplied by Marcellus and Utica Shale gas. Cove Point was a former LNG intake facility that was converted to handle both intake-outtake. The Cove Point LNG Terminal has a storage capacity of 14.6 billion cubic feet (BCF) and a daily send-out capacity of 1.8 BCF.

A study completed by Sage Policy Group found that during the four years of the construction project to build the Cove Point LNG Terminal, there was an average of 4,323 construction jobs supported per year. These construction jobs consist of the following categories:

- *1,017 Environmental and Technical Services*
- *3,213 Construction of Manufacturing Facility*
- *93 Industrial Equipment Servicing and Repair*

The study conducted by the Pennsylvania Manufacturers' Association will use these same inputs for a four-year construction phase of a project in Delaware County, PA.

The full-time, ongoing operations at the facility consist of 204 "Industrial Gases Manufacturing" jobs. Because this category does not assume LNG production, a commodity event was added to the model to show potential natural gas intake. Based on industry knowledge of the Cove Point LNG terminal, this facility utilizes a conservative average of 1BCF of natural gas feedstock per day. Assuming plant operations will be

maintained 365 days per year, the minimum feedstock required would be 365BCF of natural gas per year. Transportation costs are estimated at a conservative total of \$.50/MCF. The EIA predicts \$2.91/MCF as an average for 2023 +\$.50/MCF = \$3.41/MCF. Using 2023 dollars and values, the needed natural gas input to the model equals \$1,244,650,000 per year. This value of natural gas will be added to the model as a commodity event.”⁶⁰

The study measures three components of economic impact: direct effects, indirect effects, and induced effects:

- **Direct effects:** measure jobs and production created by the LNG export facility.
- **Indirect effects:** measure the jobs and economic activity created by business-to-business purchases in the supply chain to support facility construction and operations.
- **Induced effects:** economic impact of labor income spent on goods and services in other sectors of the economy.⁶¹

Assuming a four-year construction phase, a similarly sized LNG export facility would produce over 7000 jobs per year, with approximately \$575.35 million in labor income alone added to the state and local economy. In total, construction of the facility would add approximately \$1.195 billion in total yearly economic output.⁶²

Construction - Estimates Per Year (2023 \$value)				
Impact Results Overview				
Impact	Employment	Labor Income	Value Added	Output
Direct	4,323	\$ 378,622,178.24	\$ 389,102,116.87	\$ 645,195,101.26
Indirect	1,062	\$ 8,954,964.49	\$ 138,832,802.55	\$ 252,796,377.24
Induced	1,677	\$ 106,834,895.04	\$ 179,948,209.75	\$ 297,614,517.10
TOTAL	7,062	\$ 575,352,037.00	\$ 707,833,128.97	\$ 1,195,605,955.60

Source: (Marrara 2023)

The industries most positively impacted from the increase in economic activity are those in the skilled trades, led by jobs created for the construction of the facility structures, as well as commercial and industrial machinery repair, concrete manufacturing and fabricated pipe and fitting manufacturing.⁶³

Top 10 Industries Impacted by Growth Percentage				
	Industry	Impact Output	Growth %	
1	Construction of new manufacturing structures	\$ 493,605,845	15.18	
2	Environmental and other technical consulting	\$ 2,216,200,957	6.37	
3	Commercial and industrial machinery repair	\$ 2,813,110,797	0.5	
4	Ready-mix concrete manufacturing	\$ 1,267,267,996	0.42	
5	Fabricated pipe and fitting manufacturing	\$ 402,891,106	0.33	
6	Mineral wool manufacturing	\$ 408,162,590	0.32	
7	Stone mining and quarrying	\$ 1,607,309,329	0.24	
8	Other concrete product manufacturing	\$ 970,301,240	0.23	
9	Other fabricated metal manufacturing	\$ 1,038,172,042	0.21	
10	Wholesale - machinery supplies	\$ 7,173,800,081	0.2	

Source: (Marrara 2023)

Over the full four-year construction period, the analysis estimates a total of 28,249 jobs created—17,292 direct, 4,248 indirect and 6,709 induced jobs—resulting in approximately \$2.301 billion in labor income and over \$4.782 billion in total economic output.⁶⁴

Construction - Estimates Per Year (2023 \$value) Impact Results Overview				
Total over 4-Year Project				
Impact	Employment	Labor Income	Value Added	Output
Direct	17,292	\$ 1,514,648,712.94	\$ 1,556,408,446.68	\$ 2,580,780,405.03
Indirect	4,248	\$ 359,417,857.96	\$ 555,331,210.21	\$ 1,011,185,508.95
Induced	6,709	\$ 427,339,580.15	\$ 719,792,839.01	\$ 1,190,458,068.41
TOTAL	28,249	\$ 2,301,408,151.04	\$ 2,831,532,515.90	\$ 4,782,423,982.39

Source: (Marrara 2023)

Over 2600 indirect and induced jobs from the project would be located in the Southeast alone (Delaware, Philadelphia, Chester, Montgomery, and Bucks Counties), producing over \$524.7 million in regional economic output. This growth would be led by employment services, hospitals, family services, restaurants, real estate, and truck transportation.⁶⁵

Construction - Indirect/Induced Jobs Supported Per Year (2023 \$value)				
Delaware/Philadelphia/Chester/Montgomery/Bucks Counties				
Impact	Employment	Labor Income	Value Added	Output
Indirect	1,003	\$ 85,263,926.59	\$ 131,381,913.21	\$ 235,824,548.25
Induced	1,625	\$ 103,883,219.29	\$ 174,950,960.94	\$ 288,894,875.15
TOTAL	2,628	\$ 189,114,145.88	\$ 206,332,874.15	\$ 524,719,423.40

Source: (Marrara 2023)

Top 7 Employment Growth - Indirect		
	Industry	Employment
1	Hospitals	80
2	Individual and family services	80
3	Offices of physicians	67
4	Full service restaurants	64
5	Limited service restaurants	59
6	Higher education/school services	53
7	Retail - food and beverage stores	50

Top 7 Employment Growth - Indirect		
	Industry	Employment
1	Employment Services	103
2	Other real estate	63
3	Truck transportation	56
4	Architectural, engineering services	43
5	Wholesale durable goods	43
6	Wholesale machinery supply	40
7	Accounting, bookkeeping, payroll services	38

Source: (Marrara 2023)

While the local and regional benefits are substantial, they are not limited to southeastern Pennsylvania. Based on estimates for other supported industries across the commonwealth, the analysis found that over 111 indirect and induced jobs would be supported, adding over \$7.5 million in labor income and over \$25.6 million in total economic output during the construction phase.⁶⁶

Construction - Jobs Supported Over 4-year Project 62 Remaining PA Counties				
Impact	Employment	Labor Income	Value Added	Output
Indirect	59	\$ 4,591,037.89	\$ 7,450,889.35	\$ 16,971,828.99
Induced	52	\$ 2,951,675.74	\$ 4,997,248.81	\$ 8,719,641.96
TOTAL	111	\$ 7,542,713.64	\$ 12,448,138.16	\$ 25,691,470.94

Source: (Marrara 2023)

The state and local tax implications of a project of this nature cannot be understated. In the construction phase alone, an LNG export project would have the potential to generate tens of millions of dollars in local tax revenue on the county and subcounty levels. The IMPLAN analysis estimates the initial local tax impact to total nearly \$57 million over the four-year period, with nearly \$79 million in state revenue and over \$391 million in federal tax revenues—totaling over \$527 million.

Tax Impacts - 4 Year Construction Phase					
Sub County General	Sub County Special	County	State	Federal	Total
\$15,869,180.93	\$ 35,016,801.31	\$ 6,084,427.04	\$ 78,897,316.51	\$ 391,373,829.35	\$527,241,555.15

Source: (Marrara 2023)

Following the completion of the facility construction, the LNG export terminal would shift into full time operations. The analysis assumes 204 full time industrial gases manufacturing jobs alone, as well as the approximate amount of natural gas product input at the Cove Point facility, estimating \$1,244,650,000 per year.⁶⁷ In total, the facility could directly support an estimated 514 jobs in the facility, producing over \$201 million in yearly labor income alone, and over \$1.75 billion in direct yearly economic output.

Moreover, the facility would support an additional 2,485 indirect and induced jobs each year, accounting for over \$231 million in additional labor income. Overall, a facility the size of Cove Point would support nearly 3,000 jobs, over \$432.41 million in labor income, and over \$2.44 billion in economic output each year.⁶⁸ Each subsequent year of full-time operations will likely see an increase in the dollar output due to year over year inflation.

Full-Time Operations Impact Results Overview				
Impact	Employment	Labor Income	Value Added	Output
Direct	514	\$ 201,004,368.76	\$ 1,105,773,453.80	\$ 1,752,329,368.10
Indirect	1,280	\$ 153,908,047.99	\$ 281,582,555.62	\$ 475,226,417.63
Induced	1,205	\$ 77,498,998.68	\$ 130,597,762.89	\$ 216,928,828.47
TOTAL	2,999	\$ 432,411,415.43	\$ 1,517,953,772.31	\$ 2,444,484,614.19

Source: (Marrara 2023)

The breakdown of the direct, indirect, and induced employment growth by industry is found in Figure 2:

Figure 2: Full-Time Operations Employment Growth by Industry



Top 3 Employment Growth - Direct		
	Industry	Employment
1	Oil and gas extraction	216
2	Industrial gas manufacturing	204
3	Waste management/remediation services	50

Top 10 Employment Growth - TOTAL		
	Industry	Employment
1	Oil and gas extraction	258
2	Industrial gas manufacturing	209
3	Custom computer programming services	204
4	Management of companies	109
5	Truck transportation	104
6	Waste management/remediation services	82
7	Employment services	81
8	Other real estate	65
9	Full-service restaurants	62
10	Hospitals	57

Top 7 Employment Growth - Indirect		
	Industry	Employment
1	Custom computer programming services	202
2	Management of companies	98
3	Truck transportation	94
4	Employment services	61
5	Maintenance and repair of non-residential	43
6	Oil and gas extraction	43
7	Services to buildings	41

Top 7 Employment Growth - Indirect		
	Industry	Employment
1	Hospitals	57
2	Individual and family services	57
3	Offices of physicians	48
4	Full service restaurants	48
5	Limited service restaurants	46
6	Higher education/school services	43
7	Retail - food and beverage stores	38

Source: (Marrara 2023)

As with the facility construction, full time operations can generate significant year over year tax revenue. The analysis estimates the tax implications of a facility the size of Cove Point would generate over \$47 million in county and subcounty tax revenue, while adding an additional \$52.18 million in state and over \$84 million in federal tax revenue. In total, the study found the modeled LNG export facility could generate nearly \$184 million in yearly, recurring tax revenue, to invest communities and support state and local programs.

Tax Impacts - Yearly Operations					
Sub County General	Sub County Special	County	State	Federal	Total
\$10,362,112.22	\$ 30,903,874.76	\$5,808,518.88	\$ 52,181,040.71	\$ 84,486,955.90	\$ 183,742,512.46

Source: (Marrara 2023)

For the purpose of creating the IMPLAN model, the LNG export terminal project is assumed to begin construction in 2023, with full-time operations beginning in 2027. As outlined previously, FERC review and the final permitting decision is a multi-year process. And again, it is important to note this analysis represents the potential economic impact of an LNG export terminal. This taskforce has not contemplated any specific proposal for an LNG export terminal, nor is the above data a reflection of any specific plan or rendering of a facility for Southeastern Pennsylvania. By utilizing available data from an already operational facility (Cove Point, Maryland), the IMPLAN study conducted by the Pennsylvania Manufacturers’ Association is an estimate the economic impact an LNG export terminal can have locally, regionally, and statewide, if such a facility were to be replicated in the greater Philadelphia area (see Figure 3).

Figure 3: Project Impact Roadmap



IN FIVE YEARS (FOUR YEARS OF CONSTRUCTION, ONE YEAR OF OPERATIONS) THIS PROJECT COULD SUPPORT:

31,248	\$2.7B	\$4.3B	\$7.1B	\$714M
TOTAL JOBS	IN LABOR INCOME EARNED	IN GROSS STATE PRODUCT	IN TOTAL OUTPUT	IN TOTAL TAXES PAID

Source: (Marrara 2023)

Examining Obstacles and Policy Recommendations

A potential LNG export terminal in the Greater Philadelphia area offers a chance to boost Pennsylvania's presence in the global energy sector and support economic growth in not just Southeastern Pennsylvania, but across the entire Commonwealth. The recommendations provided in this section are derived from the expert testimony received during public hearings, stakeholder feedback, and data-driven analyses.

These recommendations offer a practical pathway to advance an LNG export terminal project by:

- Facilitating pathways to support our current skilled labor workforce, and workforce of the future, by promoting educational opportunities and partnerships with industry and institutions of higher education, and K-12 schools—especially those located in the Greater Philadelphia area and surrounding communities.
- Streamlining and improving the permitting process in Pennsylvania to balance regulatory considerations with the need for an effective and efficient permitting process to attract investment in Pennsylvania.
- Calling upon Congress to modernize the Jones Act to facilitate the transport of LNG between U.S. ports.

By pursuing and applying these recommendations, Pennsylvania can attract and effectively leverage the opportunities presented by an LNG export terminal.

Developing Pennsylvania's Skilled Labor Workforce

An LNG export terminal in the Greater Philadelphia area presents a tremendous opportunity to foster a relationship between the natural gas industry and local schools and communities. This collaboration can bridge the existing education-industry gap by integrating real-world vocational training into the K-12 education framework. Throughout the various tours attended by this taskforce, a common theme was the existence and the pressing need to address this gap. It is not simply a skills gap, but first and foremost an awareness gap that presents an obstacle to the development of our skilled labor workforce. Before students can begin coursework and vocational training for a career, they need to be aware of the available jobs and opportunities in these various fields.

Instilling an awareness from an early age of skilled trades as a possible career is crucial in broadening students' perspectives on viable career paths. By partnering with local school districts, natural gas industry partners can play a role in helping to curate educational programs experiences that provide a glimpse into the jobs available within the sector. This early exposure can challenge the current cultural narrative that associates educational and career achievement

solely with traditional academic education and foster a more inclusive understanding of post-secondary education that includes vocational training and skilled trades apprenticeships. Our Commonwealth already boasts some of the best applied technology education institutions in the region who can assist in this endeavor. Located in Williamsport, PA, Pennsylvania College of Technology offers approximately 100 academic majors, with graduates reporting a 96% overall placement rate. Many of the STEM focused majors are aligned with the needs of the natural gas industry. These programs include Welding and Metal Fabrication; Electronics & Computer Engineering Technology; Electrical; and Diesel Truck and Heavy Equipment & Power Generation.

In the U.S. News & World Report's 2024 Best Colleges rankings, Penn College emerged as a leader, securing the No. 1 spot in both the Most Innovative Schools and Undergraduate Teaching categories within the Regional Colleges North division. Moreover, the College was recognized as the No. 4 Top Public School and attained a commendable No. 6 overall ranking in the Regional Colleges North division. Additionally, Penn College was honored as the No. 2 Best College for Veterans within the same regional division.

In addition to two-year undergraduate programs, Penn College's Workforce Development division provides training for 5,000 or more incumbent workers annually across an array of sectors, including oil & gas. The College currently has six registered apprenticeship programs, all of which align with or support that industry:

- Mechatronics Technician
- CNC Precision Machinist
- Industrial Manufacturing Technician
- Plastics Process Technician – Injection Molding
- Plastics Process Technician – Extrusion
- Industrial Maintenance Mechanic (Intro-MECH)

Policymakers must facilitate and support outreach programs to connect K-12 students to institutions like Penn College, Thaddeus Stevens School of Technology in Lancaster, PA, and other career and technical institutions. Through hands-on training, guided mentorship, and real-world problem-solving scenarios, students can acquire the foundational skills and knowledge for future careers in the industry. These programs, tailored to meet educational standards and complement the existing curriculum, can enhance the learning experience while preparing students for a transition into the workforce.

There are industry members currently supporting work development initiatives in southeastern PA as well. In addition to providing control valves and instrumentation for measurement and

other heavy processing equipment for LNG facilities like Cove Point, Eastern Controls Inc. also sponsors a robust workforce training program.⁶⁹ The Eastern Controls Workforce Development Program is designed to equip technical staff with a blend of theoretical knowledge and practical skills through a curriculum of core courses. These courses utilize real-world equipment and procedures to provide a hands-on learning experience at their facility in Edgemont, PA. The training covers key areas required in process-focused industries and is delivered through both classroom and lab settings in their state-of-the-art Process Training Unit (PTU), a full-scale, fully functional process plant.

The PTU is an advanced automation facility aimed at providing hands-on training to engineers and technicians. The PTU showcases numerous instruments for monitoring and optimizing process variables like flow, pressure, and temperature. Located in Edgemont, Pennsylvania, the 5,000 square foot training area houses a diverse range of equipment from various manufacturers, providing an extensive curriculum taught by industry experts. This initiative offers a multitude of training opportunities, keeping the facility updated with innovative process measurement and control devices.⁷⁰

The collaboration between the natural gas industry, local school districts, and applied technology education institutions is a step towards creating a sustainable and mutually beneficial relationship. By investing in the educational development of K-12 students, industry partners are not simply laying the groundwork for a skilled workforce, but positively impact the broader community by giving industry partners the ability to demonstrate a commitment to the communities of the Greater Philadelphia area.

Additionally, partnerships with local trade unions and their apprenticeship programs are a crucial aspect of this initiative. Trade unions have a long-standing tradition of providing rigorous training programs that prepare individuals for careers in skilled trades. Collaborating with unions can ensure that workforce training meets high standards and aligns with industry needs. Union partnerships can facilitate a smoother transition for students into post-secondary apprenticeship programs, fostering a pathway from school to a meaningful career working on various projects like an LNG export terminal.

Natural gas industry partners seeking to locate an LNG export terminal in the greater Philadelphia area should be willing to partner with the School District of Philadelphia and neighboring school districts, to develop and provide apprenticeship and mentorship opportunities for K-12 students, and assist policymakers in connecting K-12 schools, applied technology education institutions, and local union apprenticeship programs to develop and support a local, skilled workforce.

Comprehensive Permitting Reform

As previously outlined, FERC works closely with PHMSA when issuing all applicable federal permits for the pipeline infrastructure associated with an LNG export terminal. However, FERC is responsible for reviewing and approving new pipeline infrastructure that stems directly from LNG export terminal projects, as detailed in the submitted applications, including those for interstate pipelines. But an LNG export terminal is only valuable so long as it has natural gas to export. This means Pennsylvania needs to have the takeaway capacity to support the responsible increase in production of natural gas: from the drilling of new natural gas wells, to extracting the natural gas, and transporting the natural gas to market, where it is purchased and used by businesses and consumers.

To build out required infrastructure, natural gas producers require a multitude of permit approvals through the Pennsylvania Department of Environmental Protection, including but not limited to:⁷¹

- Erosion & Sediment Control Permit for all activities which require earthmoving for both well sites and pipeline construction.⁷²
- Well drilling permits for the physical construction of a natural gas well.⁷³
- Air Quality Permit (GP-5 and GP-5A), which regulate well pad and compressor station emissions.⁷⁴
- Waterway Crossing Permits (Chapter 105) for constructing pipelines underneath waterways and wetlands.⁷⁵
- Title 5 or Air Quality Plan Approval for large scale processing facilities.⁷⁶

With increased competition for business investment in both the domestic and global marketplace, Pennsylvania needs to maintain a streamlined and efficient regulatory processes to compete. Maintaining a timely and predictable permitting process is not just a bureaucratic or technical matter, but a critical component to attract and retain business investments in Pennsylvania. Companies make long-term investment decisions based on a multitude of factors, one being the predictability and reliability of obtaining necessary permits. Delays and uncertainties in the permitting process can have significant financial implications—increasing project costs, adversely impacting project financing options, and even jeopardizing the overall viability of the project.

The taskforce heard from industry representatives on issues with the current permitting process during the May 19 hearing:

“Far too often, permit decisions are not made within the timeframes in which they are promised, or in some cases, statutorily mandated. By law, air quality general permit decisions are to be made within 30 calendar days, but it is not unusual for the PA Department of Environmental Protection (PA DEP) to take months – and in some outlier cases, over a year – to issue a permit. Currently, there is no penalty for PA DEP failing to meet its statutory mandate, nor is there any recourse for the permit applicant to seek. You can appeal a permit denial to the courts; but there is nowhere – beyond common sense and basic customer service – to appeal the lack of a permit decision.”⁷⁷

Reforming the environmental permitting process to ensure timely decisions does not mean compromising on standards or safety. Rather, it means creating a well-defined, transparent framework that allows for quick and thorough evaluations. Efficiency can be achieved through continued digitization, improving coordination among various state agencies, and setting reasonable and effective timelines for each phase of the permitting process.

The Governor’s administration recognizes the importance of this issue, by creating the Office of Transformation and Opportunity within the first few weeks of the new term, with the goal of increasing coordination between Commonwealth agencies, expedite permit reviews and ensure timely review and approval of key incentive programs to “help develop and lead an overall growth strategy and implement economic development projects.”⁷⁸ The Office of Transformation and Opportunity intends to “serve as a one-stop-shop to cut through red tape, bring state agencies together, support Pennsylvania businesses who want to grow, and encourage other businesses to move here.”⁷⁹

This Task Force is committed to achieving this objective and strongly urges members of the General Assembly, as well as officials within the Governor's Administration, to overcome obstacles in the permitting process by guaranteeing that state agencies have sufficient, well-trained staff to manage their caseloads effectively. Additionally, it is crucial to institute protocols that ensure permit decisions are rendered within the timeframes mandated by law. To further enhance accountability and fairness, the General Assembly should collaborate with state agencies to establish a well-defined appeals process for permit applicants who have not received decisions within the legally prescribed periods. Furthermore, DEP should prioritize the seamless integration and improvement of its Permit Application Consultation Tool (PACT)⁸⁰ into the existing application process and collaborate with industry members to help facilitate the continued improvement of permitting procedures. This would not only expedite the preparation process for applicants, but also streamline the time needed for the comprehensive review and processing of applications.

Modernizing the Jones Act

The Jones Act, also known as the Merchant Marine Act of 1920, was enacted by Congress following the First World War in an effort to support and revitalize the United States maritime industry following World War I. Among other requirements, the Jones Act mandates vessels transporting goods between U.S. ports must be built in the United States, owned by U.S. citizens, and crewed by U.S. citizens.⁸¹ Historically, laws akin to the Jones Act trace back to the early U.S. legislative efforts to regulate domestic maritime trade and ensure it was conducted primarily by American ships.

While one of the most efficient methods for delivering Pennsylvania natural gas to neighboring New England states is by pipeline, the continued rejection of natural gas pipeline permits by New York has created a barrier for not just New Yorkers, but all of New England.⁸²

With pipeline transportation off the table, the maritime shipping of natural gas via LNG tankers is the next best option. However, Jones Act requirements are a significant barrier to the domestic transportation of LNG, particularly to regions like New England. Currently, there are zero LNG tankers that meet the requirements of the Jones Act to service LNG from one U.S. port to another. Without access to U.S. LNG, New England States were left with few options—either utilize less environmentally friendly fossil fuels or purchase natural gas from foreign sources. Last year, NE States burned substantial amounts of fuel oil to meet nearly 40% of its electricity demand, which lead to skyrocketing power bills for consumers and a substantial increase in carbon emissions.⁸³ In previous years, the Boston Harbor received Russian LNG tankers, which delivered Russian natural gas to U.S. consumers, while Pennsylvania natural gas remained stuck in the ground.⁸⁴

Residents in the northeast anticipate these conditions continuing in the upcoming winter due in large part to limited natural gas pipelines, resulting in “few prospects for relief.” Recent reports from the Energy Information Administration suggest that “households’ average spending on the diesel-like fuel this winter is slated to rise about 8% annually, to roughly \$1,850 apiece...the expected bill is 75% more than the EIA’s estimates for those who heat their homes with electricity and 200% more than natural gas.”⁸⁵

LNG tankers built outside of the United States can dock in U.S. ports and deliver natural gas from foreign countries, but those same ships cannot deliver U.S. natural gas to the same ports under current law. This presents a considerable obstacle for the transportation of LNG from Pennsylvania to other U.S. ports. Congress should amend the Jones Act to reduce these stringent requirements and allow for the efficient transportation of U.S. LNG from one U.S. port to another.

Moreover, it is imperative for state and local policymakers to consider leveraging Philadelphia's historic shipyards for the construction of LNG tankers. These shipyards, steeped in a rich maritime heritage, have the potential to become a national leader for LNG tanker production. By further pursuing this opportunity, we can stimulate further economic growth while utilizing and developing the skilled local workforce. Building LNG tankers in Philadelphia would not only alleviate Jones Act compliance concerns, but further enhance Pennsylvania's standing as a national and global energy leader. At minimum, the Biden Administration should grant a temporary waiver allowing ships that transport LNG between U.S. ports to bypass the stringent requirements of the Jones Act, while simultaneously advancing initiatives to construct LNG tankers domestically. Aspects of the Jones Act have previously been waived, specifically to allow ships to deliver much needed supplies to Puerto Rico for hurricane relief in the aftermath of Hurricane Maria in 2017.⁸⁶ It is imperative to update the Jones Act to align with the always evolving complexities of today's energy landscape.

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Appendix I: Rebuttal Statement of Representative Joe Hohenstein

Introduction

The Philadelphia LNG Task Force is a creation of the Pennsylvania General Assembly and was established under Act 133 of 2022, formerly HB 2458. The Task Force is charged with examining and making recommendations regarding obstacles, economic feasibility, economic impact, and security that would be “involved with making the Port of Philadelphia an LNG export terminal.” Under section 7 of the statute, a report on these issues is required within one year of the passage of the act. Section 7(b) permits a rebuttal statement to be made by any member or members who disagree with the majority report. This Minority Report is being submitted pursuant to that section.

As set forth below, there are myriad concerns with siting an LNG facility within the geographical area covered by the Philadelphia Port. In fact, the impracticality of any site directly within the area of the Port of Philadelphia (PhilaPort) was recognized at an early stage, and the Task Force was primarily focused on a site in Chester, Pennsylvania. That site also has a direct limitation, making an LNG facility impractical, to say the least, and most likely impossible. The property at 800 W. Front Street, Chester, PA 19013 has a restrictive covenant placed on it by the Delaware County Commissioners, who conveyed the land with the proviso and requirement that it NOT be used for an LNG facility. This lack of a suitable site anywhere in the Southeastern Pennsylvania region, let alone within the purview of the Port of Philadelphia, should be sufficient to lay to rest any consideration of an LNG facility pursuant to this legislation. However, if the lack of a suitable location is not enough, we have also set forth reasons why an LNG facility is unwise based on economic feasibility, economic impact, safety and security, and environmental justice.

Task Force Process

Before addressing the substance of the work of the Task Force, it is important to note concerns with the process of how that work was conducted. HB 2458 was passed by the House of Representatives on April 13, 2022, by a vote of 124-74. It passed the Senate on October 25, 2022, by a vote of 37-12 and was signed into law by the Governor on November 3, 2022. Under

the statute, an initial organizing meeting was held on January 13, 2022. It is noted that at the time, no appointment to the Task Force had been made from several stakeholders. In particular, the Democratic Speaker of the House had not appointed a member from the House of Representatives yet. The statute requires that the initial meeting be called by the member who was appointed by the Speaker. The January 13, 2022 meeting was called by the member of the House of Representatives who had been appointed by the previous Speaker. At that meeting, the quorum present voted that person, Representative Martina White, the prime sponsor of HB2458, to be the Chair of the Task Force. The initial failure to follow the process dictated by the statute and the holding of the first meeting called by a member who was arguably not authorized to do so was never addressed in the subsequent proceedings and meetings of the Task Force.

It is also notable that at several points during the public meetings there were concerns expressed at the ability for people in the affected community to participate – notably in Chester, Pennsylvania. Those concerns were addressed, at least in part, by holding a final public hearing on August 22, 2023, in the City of Chester where some concerned residents gave their testimony. On this point, this Minority Report includes a section addressing environmental justice because Chester has been identified by both the federal Environmental Protection Agency and the Pennsylvania Department of Environmental Protection as an environmental justice area. Given the fact that the only potentially realistic physical location for an LNG was in the City of Chester, we have decided that it is appropriate to add a layer of review to account for its status as an environmental justice community.

Testimony

ORAL TESTIMONY

April 20, 2023

The first public hearing of the Philadelphia LNG Task Force was held on April 20, 2023, focusing on the security of LNG export facilities. A summary of the oral testimony is as follows:

David Cuff, President of the Pilots' Association for the Bay and River Delaware, was the first to testify, regarding the training of ship pilots and the safety of vessels being navigated on the Delaware River. He stated:

“Ships the size of the anticipated LNG carriers would be piloted from the mouth of the Delaware Bay to the intended berth only by the most qualified and experienced first-class pilots. These full-time professional mariners have all successfully gone through a multi-year training and apprentice program and passed intensive examinations...Over the course [of their training], they have each safely piloted thousands of large ships including LPG carriers, petroleum tankers, chemical tankers, container vessels, car carriers, and many more.”

Lisa Humber, President of the Maritime Exchange for the Delaware River and Bay, was the next to testify, providing an overview of the Exchange and discussing the impacts associated with establishing an LNG terminal in the Philadelphia area. She noted that the Exchange has three primary roles - 1. Recording ship movements and providing vessel intelligence, 2. Advocating for the business community, and 3. Acting as an information hub for the port. She also stated that the foremost benefit of a new LNG facility from the Exchange's perspective must be the economic impact for the region:

“With global demand for LNG increasing every year, a new LNG terminal here can only strengthen the port's competitive position...With its strong history as an energy port, Philadelphia is ideally situated to capture a share of this growing market.”

Representative Hohenstein then directed a question to Cuff:

“...I know in other places there are things like bridge lockdowns, limitations on the activity in the port and the ability of traffic to go up and down the river while that ship is going up and down itself...I'd like to hear your perspective on that.”

Cuff replied:

“We currently export LPG out of Marcus Hook...When these vessels load they take a tug escort vessel so from whatever berth they sail from down to a couple miles below the Delaware Memorial Bridge...The Coast Guard does escort some of them but not all of them.”

Cuff went on to say:

“Okay in regards to other traffic on the river, obviously we have not had LNG here yet. I can only speak of speaking to the pilots and the Coast Guard in Maryland...that it does not disrupt any traffic down there. I believe they do have certain Coast Guard escorts, but again this is stuff that we're all learning...”

Adam Nagel, Campaign Manager for Penn Future in the city of Philadelphia, was the next to testify, stating concerns regarding the inherent danger of the proposed facility.

“A routine part of LNG storage is venting, which occurs as heat naturally enters the tanks and transforms some of the LNG into natural gas...This means that natural gas, mainly the greenhouse gas methane, is released directly into the atmosphere...What's more is that LNG is highly flammable, burning at extreme temperatures so hot that a fire fueled by LNG cannot be extinguished. It must simply be allowed to burn out...Some experts liken a large-scale explosion of this material to the impact of a nuclear bomb...LNG is a highly explosive substance and is considered by experts to be too dangerous for large-scale rail transport...”

Given the Port of Philadelphia's proximity to residential neighborhoods, any incident would cause significant damage and result in injuries or even death. These are neighborhoods that have contended with health and environmental effects of historic industrial activity focused on the Delaware River. In the case of a serious incident, the surrounding area would require significant assistance from the city to ensure that residents are safe and healthy.”

Former Congressman Tim Ryan, co-chair of Natural Allies For a Clean Energy Future was the next to testify, on the benefits of natural gas and defeating global coal use. He stated:

“Pennsylvania has a great opportunity here to continue as a leader in the energy sector...Pennsylvania can be a leader in the global emissions reduction strategy. And this is especially true looking at places like China who have abundant sources of coal and no abundant supply of natural gas...And John Kerry, a US climate envoy in the Biden administration, has said that there's nothing anyone else in the world can do to keep global temperature rise under one and a half degrees Celsius unless China pulls back its planned coal construction.”

Next to testify was **Dustin Meyer, VP for Natural Gas Markets, American Petroleum Institute**. He stated:

“What we do here in the United States can serve as a model for other countries in how to reduce emissions while bolstering energy security and maintaining reliable and affordable energy access. U.S. natural gas is at the core of this effort, and Pennsylvania, as the second largest gas producing state is uniquely well positioned to play an outsized role.”

May 19, 2023

The second public hearing of the Philadelphia LNG Task Force was held on May 19, 2023. A summary of the testimony follows:

Mark Freeman, President of Labor’s Local 413, located in Chester, PA, was the first to testify. He stated:

“This plant brings opportunities for our members to make affordable living wages and to continue to send their children to college and just have the liberties of being able to take care of their families...The construction industry has kind of slowed down over the last few years and the LNG project would give a much-infused help to our members.”

Rep. Hohenstein asked Mr. Freeman:

“Has anybody taken a look at how many jobs would specifically get added in or is there a study out there that would tell you how many new jobs for your local might get created by something like this?”

Freeman replied:

“I believe there was some talk of about 1,200 construction jobs. I'm not all clear on how many permanent jobs that there will be on the maintenance side either.”

Hohenstein then asked:

“How do you feel about the potential environmental impact [of the proposed LNG facility]?”

Freeman replied,

“It's mixed. We definitely want to do things in a safe and healthy way.”

State Representative Carol Kazeem was the next to testify.

“My community where I still reside along with my children and family has been promised economic salvation each time an industrial plant is proposed. It happened with the paper mill and it happened with the trash incinerator. It has happened a dozen subsequent times. And what did we get? A 27% childhood asthma rate, an increase in health risks and illness amongst our seniors, a decrease in jobs in companies...and also a 19.3% infant mortality rate. What we didn't get was the promise of permanent jobs and also financial emancipation.”

Kazeem further stated:

“For those that are not aware, in 2020, there was a plant like this, it was the Freeport LNG in Texas. And it didn't go well. It ended up in a big explosion and they are still trying to repair that. And with Chester City being a five-mile radius, I'm very concerned about what that would look like for the lives of the people in Chester...Not only is this project not a long-term financial solution for the city of Chester, but it will also serve as a further detriment to the lives and welfare of my friends, cousins, and neighbors.”

The next testifier was **David Callahan, President of the Marcellus Shale Coalition**.

“I'll focus my comments on challenges which have impacted production levels to date and impeded the ability to site and build critical infrastructure. First and foremost, we need pipelines. The development of shale gas resources in the Northeastern United States has been a game changer. But these not-so-new areas of production here in Pennsylvania need additional pipelines to reach markets, both within our Commonwealth and regionally.”

Callahan further stated:

“Permitting improvements at the state level are critically necessary as well. Natural gas projects are among the most regulated among any in this state. A myriad of permits are required for shale gas development...Far too often, permit decisions are not made within the time frames which they are promised, or in some cases, statutorily mandated.”

David Wachtner, partner and co-head of the Global LNG Practice at K&L Gates Law

Firm was next to testify. He stated, in summary:

“The comprehensive federal regulatory structure over LNG exports plays a critical role in ensuring safety, environmental sustainability, and market stability. The U.S. has emerged as a global leader in LNG exports, and the development of LNG facilities has significant positive domestic, economic, geopolitical, and environmental implications, allowing key strategic allies to reduce carbon emissions and eliminate reliance on Russian natural gas supplies.”

Stephanie Wissman, Executive Director of the American Petroleum Institute, asked Wachtner about his opinion of a recent policy statement released by the Department of Energy regarding the DOE’s approach to granting extensions for LNG export.

Wachtner replied, in part:

“There have been a number of LNG export projects that have applied for DOE authorization, got authorization to export, and did not build...In other words, they've authorized so much more LNG to be exported than what we're actually exporting...And the Department of Energy says we don't think we should be exporting more volumes because we've said yes to this much already. They're trying to clean that up.”

August 22, 2023

The Final LNG Task Force Hearing was held on August 22, 2023. A summary of the testimony follows:

Carl Marrara, Executive Director of the Pennsylvania Manufacturers Association, was the first to testify. Referring to an economic analysis based on the Cove Point, MD LNG facility, he stated:

“...the construction of the facility would support a total of 28,249 direct, indirect, and induced jobs. This totals more than \$2.3 billion in labor income, \$2.8 billion in gross state product or value added, and \$4.8 billion in total output. Over the four years of construction, the tax obligation would be around \$527 million in total, with 80 of that

going to the state, 392 federal, and the remaining to local governments. The full-time ongoing operations of the facility consist of 204 industrial gas manufacturing jobs.”

Marrara’s analysis was based on numbers relating to the Cove Point, Maryland LNG facility, which has a production capacity of 5.75Mtpa (million tons per annum).¹ The goal for a potential Pennsylvania site would be an output of 7Mtpa.²

Marrara outlined five areas of concern. 1. Permitting reform for pipelines and other infrastructure. 2. Permitting reform for the construction of new manufacturing or commercial facilities. 3. A focus on workforce training programs. 4. The complete lack of U.S.-flagged LNG carriers, currently barring American LNG from being transported between U.S. ports. 5. A need to enhance Pennsylvania’s business competitiveness.

Zulene Mayfield, Chair of Chester Residents Concerned for Quality Living was the next to testify. Mayfield read a statement from **Fermin Morales, member of the IBEW (Local 98)** which stated, in part:

“Instead of calling for another scheme that may put money in the pockets of certain people, they should look at the overall picture of the damage that LNG will bring to the community of Chester...They should look into the real dangers of LNG as a fossil fuel...Setting up an LNG facility in our neighborhoods would bring spills, explosions and contamination on top of the damage already being done to our air quality and atmosphere...The idea that we were not allowed to speak at this task force previously in April on issues of safety and security, that matter is a testament that you have no interest in what the communities most impacted have to say...We have a right to dissent on issues that matter to us...Renewables are now cheaper than coal, and LNG renewables have been a creator of jobs tenfold compared to fossil fuels, including LNG.”

¹ LNG terminal profile: Cove Point Export LNG Liquefaction Terminal, US, Offshore Technology (Updated July 30, 2023). <https://www.offshore-technology.com/data-insights/cove-point-export-lng-liquefaction-terminal-the-us/?cf-view>

² Kenny Cooper, Susan Phillips, *Could Delco get a major LNG export terminal? How Biden’s plans to increase LNG exports could clash with its environmental justice goals in Chester*, WHYY (Updated June 16, 2022). <https://whyy.org/articles/delco-major-lng-export-terminal-environmental-justice-chester/>

Mayfield then gave her own testimony. She addressed concerns regarding the health and safety of Chester residents, stating:

“The American Lung Association consistently rates the air quality [in Chester] either a “D” or “F...The taskforce has not allowed public testimony from community scientific experts and others that would enhance the education of the legislators...”

Repeatedly, committee members, including the chair, stated that Chester specifically has been targeted for an LNG [facility]. Proposed, it would be the largest LNG terminal on the East Coast. Chester is five miles...with roughly 33 to 36,000 people. A very densely populated area. The Elba Island [Georgia] LNG sits on 840 acres of land. Coal Point [Maryland] sits on 1,000 acres of land. Yet, Penn America has proposed to you all that they intend to produce just as much as two of these other LNG facilities. And they're going to do it on 100 acres of land?” [If Penn America’s proposal] creates a buffer for this community...the buffer would be displacing all of us, businesses, and churches. 805 homes to be exact, four churches, a daycare, and numerous businesses, and in fact, possibly the local 413 building.”

Next to testify was **Stefan Roots, City Councilman for Chester**. He stated:

“There are 35,000 reasons I don’t want a liquefied natural gas export facility in the region of Chester...I take public health and public safety very seriously for the 35,000 residents I represent here...New polluting industries are not welcome in Chester...LNG will discourage new investment in homes and businesses. An LNG terminal will result in population depletion...A real partnership is forming between city, county, state, and federal elected officials to create a new Chester. Chester wants to stop predators from devaluing our assets. Just because we have a river doesn't mean you can use it to put our public safety and public health at risk.”

Neil Chatterjee, former commissioner and chair of the United States Federal Energy Regulatory Commission (FERC), gave the final testimony of the day, summarizing the authorization process for LNG export. He stated, in part:

“FERC's authority in evaluating applications for the financial gas export facilities comes from the Natural Gas Act...The Natural Gas Act requires companies wanting to export

US natural gas to obtain an authorization. The firm has authority over construction and operation of the export facility...Other parties, for instance, environmental NGOs, safety groups, health groups, can request intervention status in a FERC energy export application, and FERC has historically always granted these interventions in order to prepare the draft environmental impact statement. Once the draft environmental impact statement is done, there are public meetings near the project site, and a formal comment period...After this very rigorous process is completed, the agency can prepare a final environmental impact statement and then make it public...I want stakeholders who have their concerns to understand the agency listens and pays attention and really, really does heavily scrutinize these projects.”

SUPPLEMENTAL TESTIMONY

In addition to the oral testimony provided at the three hearings, some supplemental written testimony was submitted. Summaries of the written testimonies are as follows:

April

Fred Millar, environmental safety advocate, national policy analyst and consultant, who was denied the opportunity to testify in person, provided written testimony. He wrote:

“Federal agency experts have recently raised alarms that the US LNG industry has been ‘building larger facilities, on smaller sites, and closer to populations’ and ignoring the special huge risks posed by LNG export facilities also storing large quantities of flammable “heavy hydrocarbon” refrigerants such as propane and butane...We thus have a born-yesterday, learning on the job, disaster risk-imposing US industry and weak government at the federal level [states and localities have no safety say] which minimize the appearance of risk, and which are heedless of the decades-old Congressional directive [not regulation] for the proponents of new LNG facilities to ‘seek remote siting.’”

Thomas D. Schuster, Director of the Sierra Club Pennsylvania Chapter, also provided written testimony. In addition to highlighting the risks of pipeline explosions, vapor cloud

explosions, and other catastrophic risks of LNG transport (likening a potential explosion to the equivalent of an atomic bomb), he also highlighted concerns over climate disruption. He wrote:

“Expanding the number of LNG export facilities will put this climate mitigation goal out of reach. The Sierra Club estimates that lifecycle emissions from full operation of just the existing LNG export facilities are approximately 516 million metric tons of carbon dioxide equivalent (MMT CO₂e) annually, equal to over 111 million cars or 138 coal plants.”

He also addressed the need for additional U.S. exports of LNG to Europe, writing:

“Although the European Commission has asked for additional gas deliveries immediately, Europe does not need additional gas in the medium or long term. The International Energy Agency has concluded that heat pumps, building efficiency, and similar measures can significantly reduce the European Union’s gas use, and thus reliance on Russian energy, this year, with greater reductions each following year...The IEA has explained that further expansion of global LNG exports cannot be part of the path to net-zero emissions.”

August

Dr. Marilyn Howarth, Director of Community Engagement at the Center of Excellence in Environmental Toxicology at the Perelman School of Medicine at the University of Pennsylvania, wrote:

“Siting an LNG export facility in or near Chester would increase risks to an already environmentally overburdened community... for the immediate residents of Chester, they would expect increases in asthma, heart attacks, strokes, and cancer due to the air pollution added by the LNG plant.”

“Safety issues should also be considered. Pipeline rupture although rare raises additional concerns for people living and working in and beyond Chester. Freeport LNG explosion of June 2022 resulted in a 450 ft high fireball. Its location on Quintana Island far from residences allowed its impact to be contained on site. This is not the situation found in Chester where residences are nearby. Explosions and fires would impact residents directly and immediately...”

“Our Center researchers used multiple publicly available data sources which ranked Chester among the highest zip codes for lung cancer risk due to air toxics alone...Adding to the air toxics in Chester by emissions from LNG would increase lung cancer risk.”

Dustin Meyer, Senior Vice President of American Petroleum Institute, provided a follow-up letter to address questions presented during his oral testimony. He wrote:

“During questioning, Senator Williams requested information about how the industry is working to mitigate methane emissions across the natural gas value chain. The American Petroleum Institute (API) supports efforts to mitigate methane emissions, and thanks to innovation and concerted industry action, average methane emissions intensity declined by nearly 66 percent across all seven major producing regions from 2011 to 2021.”

He also provided supplemental documentation outlining strategies to reduce emissions at LNG facilities, as well as during loading, transport and delivery. These strategies include high efficiency gas turbines, electrification, waste heat recovery, seal gas recovery, leak detection and recovery, and other efficiency initiatives.

Christine Reuther from **Delaware County Council** provided a recorded Declaration of Deed Restrictions, effective as of May 6th, 2022, regarding the property where the LNG facility is being proposed (known as 800 W. Front Street, Chester, PA 19013). It states, in part:

“For a period of twenty (20) years from the date of this Declaration of Deed Restrictions as set forth at the top of this page, there shall be no use of the Property as a liquified natural gas plant...”

Task Force Objectives

EXISTING OBSTACLES

Restrictive Covenant on Proposed Chester Site

The Delaware County Recorder of Deeds has recorded a Declaration of Deed Restrictions dated and effective as of May 6th, 2022, in reference to the location of the proposed LNG facility in Chester. (800 W. Front Street, Chester, PA 19013). The Declaration states, in part: “For a period of twenty (20) years from the date of this Declaration of Deed Restrictions as set forth at the top of this page, there shall be no use of the Property as a liquified natural gas plant...”³

Tanker Size

A large LNG facility such as the proposed Penn America LNG facility in Chester, or any other large facility being considered by the Philadelphia LNG Export Task Force will require large scale operations. Limits on the size of shipping vessels could markedly reduce the facility’s operational capacity.

Modern LNG vessels are significantly larger than the average tankers that traverse the Delaware River to ports in the Philadelphia region. The average LNG vessel is approximately 300 meters (~984 feet) long and 43 meters (~141 feet) wide.⁴ The largest tankers currently navigating the Delaware River this far up the river are “Dragon Class” ships which are approximately 180 meters (~590 feet) long and 26 meters (~85 feet) wide.⁵ For perspective, this is a 60% difference in ship size.

A fully laden LNG vessel can reach 12.5m "maximum draft," which is 41 feet. This means that the LNG tankers that use the river’s navigation channel would be just 4 feet from the bottom of the artificially deepened 45-foot navigation channel in the Delaware River, increasing chances of accidental grounding, clashes with debris, or the dangers of shifting depths caused by

³ Delaware County Recorder of Deeds, Instrument No. 2022028312, Recorded May 13, 2022.

⁴ Yong Bai, Wei-Liang Jin, Marine Structural Design (Second Edition), 2016, p49-71.

<https://www.sciencedirect.com/topics/engineering/natural-gas-carrier#:~:text=A%20typical%20modern%20LNG%20carrier,125%2C000%20and%20150%2C000%20m3.>

⁵ *Dragon Class Liquid Transport Vessels*, Ship Technology (Dec. 29, 2016). <https://www.ship-technology.com/projects/dragon-class-liquid-gas-transport-vessels/?cf-view&cf-closed>

storm events. It may also increase environmental impacts such as ship strikes with marine species, including those protected by the federal government as federally endangered species (such as the Delaware River's unique ecotype of Atlantic sturgeon).

Distance from the Ocean

Another consideration regarding river logistics and obstacles is the distance of an LNG terminal located in southeastern PA from the ocean. LNG facilities are typically located on a coast, with direct access to the ocean, both for safety reasons and for the economic advantage of getting quickly into the ocean voyage.

A terminal in the Delaware River ports would be about 84 river miles or 70 nautical miles upriver from the Atlantic Ocean. For a good portion of the river travel, about 30 miles of the 84 river miles, ships would have to traverse the relatively narrow and shallow river, utilizing the navigation channel until the river gradually widens into the Bay. This increases the risk of shipping accidents and exposes densely populated communities on adjacent land to the loaded ships. It may also increase costs for the shipper (and reduce profits) due to the extra time required for the journey and the possible limits on the size of the LNG carrier that can be practically used.

Parcel Size

The issue of space for such a large facility is illustrated by examining the available parcels along the southeastern Pennsylvania riverfront. There is no unused parcel that is large enough or remote enough in Chester, or the surrounding area, to accommodate the facility and the infrastructure required for an LNG processing plant and export terminal.

Penn America LNG is proposing a new LNG facility in the Chester, PA area, however, there is no appropriate site for such a facility. The currently proposed site is only 100 acres, in a densely populated area. LNG facilities that would produce the amount of LNG Penn America says they are planning (7 million metric tons per year) require much more land. For instance, the Elba Island, GA LNG processor and export terminal has an export capacity of about 1/3 of that amount (2.5 mmt/year) and uses 140 acres.⁶ Cove Point, MD's LNG liquefaction plant is smaller

⁶ *Elba Island LNG Terminal*, Global Energy Monitor Wiki (last edited Oct. 13, 2023).
https://www.gem.wiki/Elba_Island_LNG_Terminal

(export capacity of 5.25 mmt/year), about 75% of the size of the proposed Chester facility and sits on 1000 acres in a much more remote area.⁷ Cove Point's active facility doesn't use the entire 1000 acres, but the acreage provides a safety buffer from populated areas. 1000 acres is 1/3 of the entire City of Chester, a city with a population of over 32,600 residents as of the 2020 Census.

Infrastructure

New or expanded pipeline delivery systems would be required to bring natural gas to Southeastern PA. LNG processing requires enormous volumes of natural gas because the gas is reduced by 620 times when it is frozen into liquid form.

The Penn America plan for a Chester LNG facility would likely require an expansion of one of the existing market pipelines that currently bring gas to the Marcus Hook region.⁸ Additionally, there would need to be a new connector pipeline built from the current line to Chester.⁹ Originally named the Greater Philadelphia Lateral Expansion Pipeline, this Enbridge (formerly Spectra) pipeline project seems to be dormant. The webpage has been taken down from the ENBRIDGE website; it was outdated by 2023 with an "in-service" date of 2019. They would need to get easements for about 5 miles for a new "greenfield" connector pipeline from the existing market pipeline in Chester County. This entails the company acquiring easements and other rights of way and multiple regulatory approvals. The Eagle Compressor, shown below on the map from the pipeline site, exists at 310 Fellowship Rd., Chester Springs, PA 19425.

⁷ *Cove Point LNG Terminal*, Global Energy Monitor Wiki (last edited Oct. 12, 2023).

https://www.gem.wiki/Cove_Point_LNG_Terminal

⁸ *Economic Impact Analysis (EIA): City of Chester LNG Project, Executive Summary*, Penn America Energy (August, 2016).

⁹ *Id.*



Map [source: https://www.enbridge.com/investment-center/faqs](https://www.enbridge.com/investment-center/faqs)

Other means of transporting natural gas to an LNG processing facility on the river could include trucks or rail. Trucks would be cumbersome and slow, and the quantities needed to transport the amount projected to be produced by Penn America at Chester would not be possible or feasible. Transporting LNG by rail is not allowed under federal regulations at this time, but a rule that could allow this under certain conditions is planned to be released for public comment by the US DOT's Pipeline and Hazardous Materials Safety Administration in early 2024. The public safety rule that lifted the longstanding ban on LNG by rail was adopted under the Trump Administration but was suspended by the Biden Administration this year. It is not clear if rail could potentially be used to transport already-liquefied methane, or LNG, in the future.

Whatever the means of transport, the natural gas would have to be transported from other parts of Pennsylvania since there is no natural gas or fracking in the Delaware River Basin, New Jersey, or Delaware. The closest gas wells are located in the Susquehanna River Basin which are several hundred miles distant. This adds expense, and time, and is logistically complex. It also expands the footprint of the project with infrastructure and/or transportation resulting in adverse environmental and community impacts throughout the infrastructure's pathway.

In addition to the processing plant, storage tanks, chemical storage, on-site pipelines and other operating necessities for an LNG facility, a deepwater wharf would need to be built in the river for marine tankers to access for filling and export shipping. The river is not dredged to the required 45-foot depth except for the navigation channel, which would require the company to dredge the Delaware from the navigation channel to the export dock. This is a major undertaking

in terms of permitting and capital investment and carries a host of adverse environmental impacts.

ECONOMIC FEASIBILITY/VIABILITY

There is no guaranteed long-term viability for a LNG facility in Pennsylvania.

Numerous LNG Projects Already in the Works

There is no need for additional LNG facility proposals. The Oil and Gas Journal predicts increased exports from the Gulf Coast as new projects, already in development for many years, come on line.

“The agency forecasts US LNG exports to average 12 billion cubic feet per day (bcfd) in 2023 and 13.3 bcf in 2024, as two new LNG liquefaction projects are expected to come online: QatarEnergy and ExxonMobil Corp.’s 18 million tons per year (tpy) Golden Pass, and Venture Global LNG Inc.’s 20 million tpy Plaquemines plants. Global economic conditions and demand for natural gas in Europe and Asia may affect this forecast.”¹⁰

U.S. exports will be buoyed by Gulf Coast exports over the next year and the international LNG industry is making a place for its business wherever there is demand. The U.S. may find itself with plenty of LNG terminals with not enough places to send it, an economic boondoggle.

The June 15, 2023 IEEFA article explains, referring to Rio Grande LNG, a proposed LNG facility in Brownsville Texas on the Gulf Coast:

“If NextDecade is able to secure financing for Rio Grande LNG, it will be the seventh LNG project under construction that relies on U.S. natural gas. Two facilities are currently being built in Mexico, both sourced with U.S. gas. Three brand new U.S. terminals are under construction: Golden Pass LNG, spearheaded by ExxonMobil and Qatar Petroleum; Sempra Energy’s terminal in Port Arthur, Texas; and Venture Global’s

¹⁰ *Natural gas deliveries to US LNG plants increased in first-half 2023*, Oil & Gas Journal (July 14, 2023). <https://www.ogj.com/pipelines-transportation/lng/article/14296427/natural-gas-deliveries-to-us-lng-plants-increased-in-first-half-2023> and *The EU’s Imports of Russian LNG Surged by 40% in the First Half of 2023*, Oilprice.com (August 30, 2023). <https://oilprice.com/Latest-Energy-News/World-News/The-EUs-Imports-Of-Russian-LNG-Surged-By-40-In-The-First-Half-Of-2023.html>

Plaquemines LNG project in Louisiana. There's an expansion underway at Cheniere's Corpus Christie LNG plant, as well.

If all seven projects are put into service, U.S. LNG export capacity—already high enough to create pain for U.S. consumers—will grow by 80 percent. The U.S. could be exporting as much as 22 billion cubic feet of gas per day, or more than one-fifth of all gas currently produced in the U.S. Additional LNG projects also are waiting in the wings, crossing their fingers that they'll get a financial green light.”¹¹

This projected increase in LNG exports doesn't include all the additional LNG export projects already in the bureaucratic queue, waiting for required approvals from the many agencies that have jurisdiction over LNG export projects and terminals. “Federal regulators have already approved 12 new plants that would redouble America's already vast LNG export capacity.”¹²

Additional LNG export facilities will put all climate-mitigation efforts out of reach. According to testimony provided to the Philadelphia LNG Task Force by Thomas Schuster, Director of the Sierra Club PA Chapter, lifecycle emissions from currently existing LNG export facilities are approximately 516 million metric tons of carbon dioxide equivalent annually, equal to over 111 million cars or 138 coal plants. There are currently 22 proposed LNG export projects – emissions for the 22 proposed projects would be equivalent to that of 440 coal plants or over 354 million cars. That means that the full proposed LNG buildout could contribute to the climate crisis as much as 578 coal plants or 465 million cars.¹³

Poor Long-Term Market

Officials within the oil and gas industries claim there is an increasing market for U.S. LNG exports, particularly in Europe and Asia, but research suggests otherwise. No new LNG facilities are needed to meet the demand that officials say Europe requires during the current military crisis. Existing terminals in the United States are already pumping out LNG at an

¹¹ Clark Williams-Derry, *Rio Grande LNG project could raise U.S. gas prices—and add to a looming global glut*, Institute for Energy Economics and Financial Analysis (June 15, 2023). <https://ieefa.org/resources/rio-grande-lng-project-could-raise-us-gas-prices-and-add-looming-global-glut>

¹² Clark Williams-Derry, *LNG exports may spell trouble on horizon for U.S. consumers*, Institute for Energy Economics and Financial Analysis (April 24, 2023). <https://ieefa.org/resources/lng-exports-may-spell-trouble-horizon-us-consumers>

¹³ Thomas Schuster written testimony, provided to Philadelphia LNG Task Force on April 20, 2023.

increased rate; the U.S. exceeded the extra 15 billion cubic meters (BCM) in 2022 that was promised to the European Union by President Biden without new facilities.¹⁴ Data from the U.S. Department of Energy and S&P Global showed that the 15 BCM goal had been met and surpassed by mid-August 2022—less than five months after the pledge.¹⁵

Economists predict that the increased exports don't have a positive sustainable financial position considering the market outlook for LNG in the coming years. The June 15, 2023 IEEFA article continues to address the lack of a long term market for more LNG from any U.S. location:

“One of the many ironies of the ongoing LNG buildout is that the global market may not actually need Rio Grande’s capacity at all. The U.S. is not the only country that is building LNG export plants. Qatar, which produces the world’s cheapest LNG, is in the middle of a massive expansion. Meanwhile, Canada, Russia, and Australia all have LNG projects under construction, as do Mozambique, Indonesia, Senegal, Nigeria, and Gabon.”¹⁶

There is more likely an LNG glut globally than a need for more. The United States, and Pennsylvania’s Marcellus shale, move in a global market that is not under our control. Long term contracts from other nations’ supply will continue to feed LNG to those who want it. Spot pricing of LNG will continue to be unstable and not a reliable predictor for financial planning and long-term contracts are already committed in a world economy that doesn’t include Marcellus.

Global Movement Away from LNG

On the world stage, LNG’s reputation has suffered, no matter the source. As stated in this December 20, 2022 IEEFA article:

¹⁴ Jarret Renshaw, Scot Disavino, *Analysis: U.S. LNG exports to Europe on track to surpass Biden promise*, Reuters (July 26, 2022). <https://www.reuters.com/business/energy/us-lng-exports-europe-track-surpass-biden-promise-2022-07-26/>

¹⁵ Clark Williams-Derry, *The liquefied natural gas (LNG) boom in Europe isn’t all good news for U.S. exporters*, Institute for Energy Economics and Financial Analysis (Dec. 20, 2022). <https://ieefa.org/resources/liquefied-natural-gas-lng-boom-europe-isnt-all-good-news-us-exporters>

¹⁶ Clark Williams-Derry, *Rio Grande LNG project could raise U.S. gas prices—and add to a looming global glut*, Institute for Energy Economics and Financial Analysis (June 15, 2023). <https://ieefa.org/resources/rio-grande-lng-project-could-raise-us-gas-prices-and-add-looming-global-glut>

“At this point, sky-high prices and supply glitches have saddled LNG with a reputation as an unreliable and volatile energy source, curbing LNG-to-power plans in Asia and forcing energy forecasters—including Bloomberg, ICIS, and IEA, among others—to slash their projections for Asian LNG demand growth.”¹⁷

The article continues:

“[T]he [European] continent is responding mostly by cutting demand for gas, by using the fuel more efficiently while ramping up substitutes such as wind and solar. Those shifts are likely to last for the long haul, and are being supercharged both by high prices and by the continent’s ambitious climate goals, which call for major cuts in gas consumption. The European economic think tank, Bruegel, projects that cuts in European gas demand by 2030 could be so steep that most of the continent’s LNG import infrastructure will be unneeded.”¹⁸

The future for LNG from any source is dim. The need for LNG will lessen until it is far too expensive and polluting to be marketable. As IEEFA says, by 2030 the rejection of LNG by current buyers could leave unneeded infrastructure standing and unused. It is not a viable pathway to a thriving port here on the Delaware River and it is not a sound economic investment for Pennsylvania.

ECONOMIC IMPACT

Increase in Local LNG Prices

Expansion of LNG exports will cause financial concerns for U.S. consumers. The April 24, 2023 IEEFA report states:

“Although it’s unlikely that all of those projects will move forward, the projects that are already under construction could create massive headaches for U.S. consumers. Exports are locked into contracts for 20 years. Even if the U.S. gas industry can boost production

¹⁷ *Id.*

¹⁸ *Id.*

for a while, it seems exports eventually will lift demand, put pressure on supply, and create price chaos in domestic gas markets.”¹⁹

The cost of residential home heating with natural gas markedly increased in 2022 since the Ukraine war began. Economists point out that the price spike is linked clearly to U. S. exports of LNG to Europe, where producers have gotten about seven times more profit for the gas.²⁰ President Biden’s agreement with the European Commission to increase LNG exports from the U.S. to Europe was an effort to help replace Russian gas,²¹ but a secondary effect is a significant increase in domestic natural gas home heating costs because companies are finding higher profits overseas. Exporting LNG from the Delaware River ports would contribute to the increase in our home heating bills and other domestic energy needs.

Domestic gas prices for consumers can be expected to rise as exports rise, as stated in the IEEFA article of June 15, 2023:

“With every new LNG export project that’s completed, U.S. gas markets move one step closer to shortages, volatility, and higher prices. America’s gas export surge forced U.S. consumers to compete with overseas buyers, pushing U.S. natural gas prices to their highest levels in well over a decade.”²²

Consumers at home are not capable of winning in a bidding war with overseas buyers. The reason LNG companies are exporting overseas is not to be patriotic or generous, it is to fetch the highest profits possible.

¹⁹ Clark Williams-Derry, *LNG exports may spell trouble on horizon for U.S. consumers*, Institute for Energy Economics and Financial Analysis (April 24, 2023). <https://ieefa.org/resources/lng-exports-may-spell-trouble-horizon-us-consumers>

²⁰ Matt Egan, *Us natural gas prices spike to 14-year high. Here’s why*, CNN Business (Aug. 17, 2022). <https://www.cnn.com/2022/08/17/energy/natural-gas-inflation-heat-wave/index.html>

²¹ *Joint Statement between the United States and the European Commission on European Energy Security*, Whitehouse.gov (March 25, 2022). <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/25/joint-statement-between-the-united-states-and-the-european-commission-on-european-energy-security/>

²² Clark Williams-Derry, *Rio Grande LNG project could raise U.S. gas prices—and add to a looming global glut*, Institute for Energy Economics and Financial Analysis (June 15, 2023). <https://ieefa.org/resources/rio-grande-lng-project-could-raise-us-gas-prices-and-add-looming-global-glut>

SECURITY/SAFETY

Unique Dangers of LNG

LNG is a liquefied cryogenic flammable gas when cooled to at least -260 degrees F. It is classified as extremely flammable (Category 1, the most dangerous class) under the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).²³ LNG is also classified as Hazardous under OSHA regulations and in accordance with United States Department of Transportation regulations.²⁴ As reported by the federal Pipeline and Hazardous Materials Safety Administration (PHMSA), which has jurisdiction over LNG handling (PHMSA), “LNG poses potential hazards as a cryogenic liquefied flammable gas, including cryogenic temperature exposure, fire, and asphyxiation hazards.”²⁵

If LNG is released into the atmosphere, it has extremely dangerous hazardous effects and the potential for catastrophic impacts. The released LNG creates an extremely cold vapor cloud that robs oxygen from the air. If in an enclosed space, it asphyxiates, causing death.²⁶ Metal can become embrittled by exposure to the cold vapor, compromising structures such as bridges or railways.²⁷

“[M]ethane is odorless, and LNG contains no odorant, making instant detection of a release resulting from an incident difficult without a detection device,” explains PHMSA.²⁸ Released LNG *may* appear to be visible as the methane mixes with atmospheric moisture, or it can be completely invisible. This makes it difficult to predict or locate the cloud during the critical period following release.

²³ *Safety Data Sheet: Liquefied Natural Gas (LNG)*, PGW (Issued June 6, 2015). Retrieved from: <https://www.pgworks.com/uploads/pdfs/LNGSafetyData.pdf>

²⁴ *Id.*

²⁵ PHMSA, *Hazardous Materials: Suspension of HMR Amendments Authorizing Transportation of Liquefied Natural Gas by Rail*, p. 46 (Sept 1, 2023). Retrieved from: <https://www.federalregister.gov/documents/2023/09/01/2023-18569/hazardous-materials-suspension-of-hmr-amendments-authorizing-transportation-of-liquefied-natural-gas>

²⁶ SP 20534 Special Permit to transport LNG by rail in DOT-113C120W rail tank cars. Final Environmental Assessment. Docket No. PHMSA-2019-0100. December 5, 2019. p. 11.

²⁷ SP 20534 Special Permit to transport LNG by rail in DOT-113C120W rail tank cars. Final Environmental Assessment. Docket No. PHMSA-2019-0100. December 5, 2019. p. 9.

²⁸ PHMSA, *Hazardous Materials: Suspension of HMR Amendments Authorizing Transportation of Liquefied Natural Gas by Rail*, p. 46 (Sept. 1, 2023). Retrieved from: <https://www.federalregister.gov/documents/2023/09/01/2023-18569/hazardous-materials-suspension-of-hmr-amendments-authorizing-transportation-of-liquefied-natural-gas>

This danger is amplified because if the extremely flammable cloud is ignited, it will burn back to the original source of release, exposing the entire area to a fire that cannot be extinguished. The rapid expansion to ~620 times its original volume moves the cloud far beyond the point of release, increasing the likelihood of it reaching an ignition source.²⁹ An LNG vapor cloud can erupt with only a small ignition source, such as a spark or static electricity.³⁰

Need for Remote Siting

The Congressional Research Service has issued several publications detailing the unique dangers posed by the transport and storage of LNG. The CRS has found that:

“[A] major spill would likely result in a...serious fire.”³¹ CRS also notes that counterterrorism advisors have “asserted that terrorists have both the desire and capability to attack LNG shipping with the intention of harming the general population.”³²

The US Emergency Response Guidebook advises in the case of an LNG fire to initially evacuate a 1-mile radius.³³ In the recent Plymouth, WA LNG fire, they evacuated a 2-mile radius.³⁴ The extremely hot fire caused by a LNG leak or spill can cause fatal injuries to people as far as 2 miles away under certain conditions.³⁵

²⁹ James D. Narva, Executive Director, National Association of State Fire Marshals to PHMSA re. Docket Number PHMSA-2018-0025 (HM-264) – LNG by Rail. P.6

³⁰ *Safety Data Sheet: Liquefied Natural Gas (LNG)*, PGW (Issued June 6, 2015). Retrieved from: <https://www.pgworks.com/uploads/pdfs/LNGSafetyData.pdf>

³¹ CONGRESSIONAL RESEARCH SERVICE, *Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety, and Regulation* Dec. 14, 2009. p. 6.

https://www.everycrsreport.com/files/20091214_RL32205_e95cb50c88dbd56a2c8f706b2d521ef7ae81ee00.pdf

³² CONGRESSIONAL RESEARCH SERVICE, *Liquefied Natural Gas (LNG) Import Terminals: Siting, Safety, and Regulation*, p. 23 (Dec. 14, 2009).

https://www.everycrsreport.com/files/20091214_RL32205_e95cb50c88dbd56a2c8f706b2d521ef7ae81ee00.pdf

³³ USDOT, PHMSA, *Emergency Response Guidebook*, 2020.

³⁴ Tarika Powell. *Williams Companies Failed to Protect Employees in Plymouth LNG Explosion*, Sightline (June 3, 2016). <https://www.sightline.org/2016/06/03/williams-companies-failed-to-protect-employees-in-plymouth-lng-explosion/>

³⁵ “DELAWARE COASTAL MANAGEMENT PROGRAM AND FINAL ENVIRONMENTAL IMPACT STATEMENT”. [From the U.S. Government Printing Office, www.gpo.gov]. U.S. DEPARTMENT OF COMMERCE, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management, *41T4 O74f. UNITED STATES DEPARTMENT OF COMMERCE, the Assistant Secretary for Science and Technology, Washington, D.C. 20230 (July 2 1979). P. 225 of PDF.

A release of LNG from a storage container, tank, or processing facility in a densely populated area would not allow for an evacuation in time to avoid human health impacts, including injuries and potential deaths at a catastrophic level. The placement of any LNG facility within the southeastern region of Pennsylvania or within any of the Delaware River ports would not be feasible due to the inability to evacuate or avoid significant harm to inhabitants, infrastructure, and the environment within the impact area.

ENVIRONMENTAL/COMMUNITY IMPACT

Environmental Justice Zone – Health Risks

The proposed LNG facility falls within a documented Environmental Justice Zone in the City of Chester. It will have a significant impact on the approximately 70,000 people living within a 3-mile radius, some of them living outside the city limits of Chester (the population of Chester is 32,605 as per the 2020 Census). 41% of those residents are low-income, and 58% are people of color.³⁶

The Chester community already experiences high levels of air pollution, and the introduction of an LNG facility will further increase residents' exposure to pollutants. In addition to the safety risks involved in operating a LNG facility in a populated area, the pollution from the facility will further put residents' and workers' health at risk. Air pollution is a known cause of adverse human health conditions. According to the U.S. EPA:

“Decades of research have shown that air pollutants such as ozone and particulate matter (PM) increase the amount and seriousness of lung and heart disease and other health problems.”³⁷ Dangerous pollutants would be emitted into the air by an LNG processing facility, putting nearby residents at risk.”

EPA continues:

“Research has shown that some people are more susceptible than others to air pollutants. These groups include children, pregnant women, older adults, and individuals with pre-existing heart and lung disease. People in low socioeconomic neighborhoods

³⁶ *Penn LNG Liquefaction and Export Terminal*, Oil & Gas Watch (last accessed Oct. 18, 2023). <https://oilandgaswatch.org/facility/5224>

³⁷ *Research on Health Effects from Air Pollution*, EPA (last updated Jan. 26, 2023). <https://www.epa.gov/air-research/research-health-effects-air-pollution>

and communities may be more vulnerable to air pollution because of many factors. Proximity to industrial sources of air pollution, underlying health problems, poor nutrition, stress, and other factors can contribute to increased health impacts in these communities.”³⁸

EPA explains about the principal criteria air pollutants:

“EPA sets National Ambient Air Quality Standards (NAAQS) for six principal criteria air pollutants—nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide, ozone and lead—all of which have been shown to be harmful to public health and the environment.”³⁹

These principal criteria air pollutants are the very pollutants, some of them the precursors to ozone, which would be emitted by the processing of LNG. All but lead would be emitted into the air by an LNG processing facility and would increase air pollution in Delaware County and Chester.

The Chester community is already overburdened with air pollutants and other environmental burdens because of current air emissions from the Covanta Delaware Valley LP Incinerator and other industrial facilities. For instance, at the Covanta incinerator nitrogen oxides (NOx) are emitted from the facility’s six (6) waste combustors and NOx would also be emitted from an LNG processing facility. Nitrogen Oxides or NOx are a group of poisonous, highly reactive gases.⁴⁰ These gases form when fuel is burned at high temperatures.⁴¹ NOx and volatile organic compounds (VOC) react in the atmosphere with sunlight to produce ground-level ozone (smog), fouling the air. Of the six pollutants that are measured by national air quality standards, particle pollution and ground-level ozone have the most widespread health threats.⁴² NOx can

³⁸ *Research on Health Effects from Air Pollution*, EPA (last updated Jan. 26, 2023). <https://www.epa.gov/air-research/research-health-effects-air-pollution>

³⁹ *Id.*

⁴⁰ *Nitrogen Oxides (Nox) Control Regulations*, EPA (last updated July 13, 2023). <https://www3.epa.gov/region1/airquality/nox.html>

⁴¹ *Id.*

⁴² *US EPA Nonattainment Areas and Designations*. Data.gov (last updated Aug. 30, 2023). <https://catalog.data.gov/dataset/us-epa-nonattainment-areas-and-designations>

cause respiratory distress and irritation and burns to the eyes and skin at higher levels. After prolonged exposure, NO_x can cause fluid buildup in the lungs, and even death.⁴³

The Delaware Valley region, including Delaware County and Chester, is a non-attainment area for ozone and particle pollution⁴⁴, meaning it does not meet federal air standards that are set to protect human health and the environment.

A recent study was released that confirms what other studies have found – that “Higher prenatal ambient air pollution exposure has been associated with impaired neurodevelopment in preschoolers and school-aged children.”⁴⁵ The study further explored “the relationships between prenatal ambient air pollution exposure and neurodevelopment during infancy.”⁴⁶

Another study has linked exposure to air pollution to an increased risk of dementia, as published in the *Journal of Alzheimer's Disease*. Specifically, high levels of PM_{2.5} and NO₂/NO_x in the air can lead to inflammation in the brain, related to dementia or cognitive decline in adults.⁴⁷

Released in September 2023, [a new study](#) examined the increase worldwide of antimicrobial resistance (AMR) to bacteria and found a surprising link to air pollution: "Airborne fine particulate matter, we usually call it PM2.5, contains a cocktail of microorganisms," says Hong Chen, professor of environmental engineering at Zhejiang University and corresponding author of the study.⁴⁸

Adding any pollution to the Delaware County and Chester region is unacceptable and will worsen air quality conditions for residents and workers. This will lead to more harm to

⁴³ *ToxFAQs*, Agency for Toxic Substances and Disease Registry (April 2002). <https://www.atsdr.cdc.gov/toxfaqs/tfacts175.pdf>

⁴⁴ *Air Quality Programs*, Delaware Valley Regional Planning Commission. <https://www.dvrpc.org/airquality/> and *Current Nonattainment Counties for All Criteria Pollutants*, EPA (current as of Sept. 30, 2023). <https://www3.epa.gov/airquality/greenbook/ancl.html>

⁴⁵ Z.E.M. Morgan, M.J. Bailey, D.I. Trifonova, D.I. et al. *Prenatal exposure to ambient air pollution is associated with neurodevelopmental outcomes at 2 years of age*. *Environ Health* **22**, 11 (2023). Published January 24, 2023. <https://doi.org/10.1186/s12940-022-00951-y>

⁴⁶ *Id.*

⁴⁷ Ruth Peters et al. *Air Pollution and Dementia: A Systematic Review*, *Journal of Alzheimer's Disease* (Published online Aug. 13, 2019). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6700631/>

⁴⁸ Gabriel Spitzer, *Superbugs catch a ride on air pollution particles. Is that bad news for people?* NPR (Sept. 7, 2023). https://www.npr.org/sections/goatsandsoda/2023/09/07/1198007048/superbugs-catch-a-ride-on-air-pollution-particles-is-that-bad-news-for-people?utm_campaign=Hot%20News&utm_medium=email&_hsmt=273478921&_hsenc=p2ANqtz-_lMuCzBzdq5b27q1PBERqkOOpKR7GBVYxsY9dryalqmosel_ceBsJhmwcO138EfSzyWVSh6qWoJN8Bobi3mbsS0YDGF_hmef0kK7IKBQWsSnZnDlc&utm_content=273478921&utm_source=hs_email

peoples' health from exposure to these damaging air pollutants. The line must be drawn somewhere and should be drawn whenever any air pollutant will add to this overburdened region.

Community Impact

According to the news outlet DeSmog, architectural renderings of the proposed facility include an approximately 25-acre parkland buffer to be added in front of the terminal. The addition of that buffer zone would displace at least three churches, a daycare center, numerous businesses, and multiple dozens of families in homes within the proposed zone.⁴⁹ Zulene Mayfield, Chairperson of Chester Residents Concerned for Quality Living, provided oral testimony before the Philadelphia LNG Task Force in August, 2023, stating that the actual number of homes that would be destroyed in order to build the proposed facility and buffer zone would be over 800.⁵⁰ If this proposal is approved, it would effectively displace a large portion of the surrounding population, and it would subject the remainder to dangerous pollutants.

Climate Concerns

Methane, released by LNG throughout its life cycle, is a huge contributor to the greenhouse gases that are warming the atmosphere, exacerbating negative effects of climate change. LNG proponents use faulty figures to support their claim that LNG is “clean” and emits less carbon or greenhouse gases than other fossil fuels. The math is incorrect that these supporters have been using, as data and new reports show.⁵¹

The NRDC published a report explaining that expansion of the LNG export industry is an ineffective strategy to reduce greenhouse gas emissions:

“Overseas export of U.S.-produced liquefied natural gas (LNG), gas kept in a liquid form for ease of transport, is rapidly expanding. Historically, gas has been considered a “bridge

⁴⁹ Edward Donnelly, *As EU Weans Itself From Russian Energy, U.S. Shale Gas Industry Pushes New LNG Export Plant in Pennsylvania*, DeSmog (Aug. 17, 2023). <https://www.desmog.com/2023/08/17/u-s-shale-gas-industry-pushes-lng-export-plant-in-pennsylvania-to-europe/>

⁵⁰ Zulene Mayfield Oral Testimony, provided to the Philadelphia LNG Task Force on Aug. 22, 2023.

⁵¹ Aaron Clark, *Methane From Oil and Gas Are Worse Than Reported to UN, Satellites Show*, Bloomberg (Sept. 14, 2023). <https://www.bloomberg.com/news/articles/2023-09-14/satellites-expose-holes-in-global-rules-for-methane-reporting#xj4y7vzkg> “Observed methane releases from global oil and gas operations are 30% higher than what countries estimate in reports to the UN, according to a new study that analyzed satellite observations of the potent greenhouse gas.”

fuel”—cleaner and with lower carbon dioxide emissions than coal or oil—and a potential tool to help address climate change. However, LNG is neither clean nor particularly low in emissions. In addition, the massive investments in new infrastructure to support this industry, including pipelines, liquefaction facilities, export terminals, and tankers, lock in fossil fuel dependence, making the transition to actual low-carbon and no-carbon energy even more difficult.

Our analysis shows that using LNG to replace other, dirtier fossil fuels, is not an effective strategy to reduce climate-warming emissions. In fact, if the LNG export industry expands as projected, it is likely to make it nearly impossible to keep global temperatures from increasing above the 1.5 degrees Celsius threshold for catastrophic climate impacts.”⁵²

The development of natural gas will further exacerbate the climate crisis. The composition of natural gas is about 95% methane. Methane leaks or is vented or flared at all stages of the natural gas process (extraction/production, gathering, processing, transmission, storage, local distribution and consumption). Methane is 86 times more powerful than carbon at heating the atmosphere on a 20-year time scale, 104 times more powerful than carbon over a 10-year period.⁵³

Scientific reports, including the IPCC 2021 Working Group Report, warns that we must reduce greenhouse gas emissions to keep the atmosphere from warming past critical meltdown.⁵⁴

“The report shows that emissions of greenhouse gases from human activities are responsible for approximately 1.1°C of warming since 1850-1900, and finds that averaged over the next 20 years, global temperature is expected to reach or exceed 1.5°C of warming. This assessment is based on improved observational datasets to assess

⁵² Amy Mall, *Sailing to Nowhere: Liquefied Natural Gas is Not an Effective Climate Strategy*, NRDC (Dec. 8, 2020). <https://www.nrdc.org/resources/sailing-nowhere-liquefied-natural-gas-not-effective-climate-strategy>

⁵³ Myhre, G. et al. 2013. *Anthropogenic and Natural Radiative Forcing*. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Stocker, T.F., D. Qin, G.K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P.M. Midglet (eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. and https://en.wikipedia.org/wiki/Global_warming_potential

⁵⁴ *Climate change widespread, rapid, and intensifying*, IPCC (Aug. 9, 2021). <https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

historical warming, as well progress in scientific understanding of the response of the climate system to human-caused greenhouse gas emissions.”⁵⁵

Greenhouse gas emissions must address methane, which means curtailing natural gas development. According to recent reports tracking greenhouse gases,

“...energy-related carbon dioxide emissions were at a record high last year and new renewable power capacity has stalled after years of strong growth. At the same time, methane, a more potent greenhouse gas than carbon dioxide, has risen in recent years due to oil and gas production, including fracking.”⁵⁶

Atmospheric methane levels rose steadily during the last few decades of the 20th century before leveling off for the first decade of the 21st century.⁵⁷ Since 2008, however, methane concentrations have again been rising rapidly. This increase, if it continues in coming decades, will significantly increase global warming and undercut efforts to reach the COP21 target of < 2 degrees C above the pre-industrial baseline.⁵⁸ Limiting warming to 1.5C will be even more difficult, if not impossible.

Natural gas systems emit more anthropogenic methane than any other source in the United States and are the third highest source for carbon dioxide emissions nationally.⁵⁹ Natural gas, considered “clean” or a “bridge fuel” is, in fact, a bigger problem than other fossil fuels due to uncontrolled and uncontrollable leaks, intentional flaring and venting. “Methane is far more potent than carbon dioxide in contributing to climate change. That makes it particularly harmful to the environment when it is discharged into the atmosphere. In the U.S. alone, the methane that leaks or is released from oil and gas operations annually is equivalent to the greenhouse gas emissions from more than 69 million cars, according to a Wall Street Journal analysis using

⁵⁵ *Id.*

⁵⁶ *Greenhouse Gas Emissions Must Be Halved by 2030 to Avoid 3C Warming: Scientists*, Insurance Journal (June 19, 2019). <https://www.insurancejournal.com/news/international/2019/06/19/529839.htm>

⁵⁷ Robert W. Howarth, *Ideas and perspectives: is shale gas a major driver of recent increase in global atmospheric methane?* *Biogeosciences* (16), 3033-3046 (published Aug. 14, 2019). <https://www.biogeosciences.net/16/3033/2019/bg-16-3033-2019.pdf>

⁵⁸ *Ibid.*

⁵⁹ *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014*, EPA (last updated May 3, 2023). <https://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014>

conversion formulas from the Environmental Protection Agency and emissions estimates for 2015.”⁶⁰

Methane’s impact on atmospheric warming is much shorter and simpler than carbon, as explained in a VOX.com article:

“Reduced emissions [of methane] have an almost immediate climate impact. It’s a short-term climate lever, and if the countries of the world are going to hold rising temperatures to the United Nations’ target of “well below” 2 degrees Celsius above the preindustrial baseline, they’re going to need all the short-term climate levers they can get.”⁶¹

According to Dr. Howarth of Cornell University, the planet is going to continue to warm to 1.5 degrees C in 12 years and to 2 degrees C in 35 years or less unless we substantially cut methane emissions.⁶² He points out that the planet responds much faster to methane than carbon dioxide. There is already so much carbon in the atmosphere that the only hope of meeting global climate targets is to address methane because that can quickly reduce greenhouse gases and slow the warming of the atmosphere.⁶³

On a local level, the Delaware River Watershed is already experiencing the effects of climate change. Reports about the Delaware River Basin show “the potential for changes in the seasonality and volume of stream flows, as well as the potential for sea level rise to impact the location of the salt front and the availability of storage to manage salinity in the Delaware River Estuary.”⁶⁴ 1.7 million people in the City of Philadelphia and the Greater Philadelphia Region draw their drinking water from the Delaware River, and keeping the salt levels in drinking water below EPA and health guidelines is essential. Multiple millions of dollars, upstream impoundments and decades of management by the Delaware River Basin Commission (comprised of the Governors of the four states and the Army Corps of Engineers for the federal

⁶⁰ Rebecca Elliott, *The Leaks That Threaten the Clean Image of Natural Gas*, The Wall Street Journal (Aug. 8, 2019). <https://www.wsj.com/articles/the-leaks-that-threaten-the-clean-image-of-natural-gas-11565280375>

⁶¹David Roberts, *Fracking may be a bigger climate problem than we thought*, Vox (Updated Aug. 29, 2019). <https://www.vox.com/energy-and-environment/2019/8/15/20805136/climate-change-fracking-methane-emissions>

⁶² Dr. Robert Howarth, Cornell University, *COP21 Reflections on the Historic Paris Climate Agreement*. http://events.cornell.edu/event/cop21_reflections_on_the_historic_climate_agreement

⁶³ Ibid.

⁶⁴ *Climate Change*, DRBC (last modified July 14, 2023). <https://www.nj.gov/drbc/programs/flow/climate-change.html#2>

government)⁶⁵ have kept the salt line from encroaching northward into the water intakes.⁶⁶ All efforts need to be made to prevent local impacts of climate change so that this irreplaceable water supply is not jeopardized. These reports on climate impacts on the Delaware River communities have been produced by the Delaware River Basin Commission,⁶⁷ the United States Army Corps of Engineers,⁶⁸ the United States Geological Survey⁶⁹ and others.

Sea Level rise translates into river level rise in the Delaware estuary and bay due to tidal influences. In the absence of adaptation, more intense and frequent extreme sea level events, together with trends in coastal development, will increase expected annual flood damages by 2-3 orders of magnitude by 2100.⁷⁰ The Delaware Valley Regional Planning Commission (DVRPC) reports that "...water levels of the tidal section of the Delaware River will rise as sea level rises along the Atlantic Coast. Rising water levels will be a permanent change and will introduce new flooding vulnerabilities along the Delaware that communities will need to address."⁷¹

In an earlier DVRPC report, the study on the effects of sea level rise concluded: "The study concludes that a three- to four-foot rise in sea level during the next 100 years will have a wide range of impacts. Rising seas will inundate almost all of Pennsylvania's 1,500 acres of tidal wetlands. The salt line in the Delaware River will migrate further upstream, threatening Philadelphia's drinking water supply. The pollutants found in contaminated sites may be released into estuary waters. Efforts to increase public access to the waterfront may be jeopardized by rising waters."⁷²

⁶⁵ *About DRBC*, DRBC (last modified July 3, 2023). <https://www.nj.gov/drbc/about/>

⁶⁶ *Salt Front*, DRBC (last modified Oct. 16, 2023). <https://www.nj.gov/drbc/programs/flow/salt-front.html>

⁶⁷ Amy Shallcross, *Analyzing Climate Change Impacts to Water Resources in the Delaware River Basin - Big Picture Risks*, DRBC (Nov. 1, 2018). https://www.nj.gov/drbc/library/documents/Shallcross_climate-change-wrm_WRADRBnov2018.pdf

⁶⁸ Billy Johnson, *Report prepared for: U.S. Army Engineer District, Philadelphia: Application of The Delaware Bay and River 3d Hydrodynamic Model to Assess the Impact of Sea Level Rise on Salinity* (2010). Available from U.S. Army Engineer District, Philadelphia or Delaware River Basin Commission.

⁶⁹ Tanja N. Williamson et al., *Summary of hydrologic modeling for the Delaware River Basin using the Water Availability Tool for Environmental Resources (WATER)*, U.S. Geological Survey Scientific Investigations Report 2015–5143, p. 68, (2015). <https://pubs.usgs.gov/sir/2015/5143/sir20155143.pdf>

⁷⁰ *The Ocean and Cryosphere in a Changing Climate*. Intergovernmental Panel on Climate Change (2019), Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/06_SROCC_Ch04_FINAL.pdf at 4-4.

⁷¹ *Coastal Effects of Climate Change in Southeastern PA, Introduction and Project Background*, DVRPC (Nov. 5, 2019). <https://www.arcgis.com/apps/MapSeries/index.html?appid=8080c91a101d460a9a0246b90d4b4610>

⁷² *Sea Level Rise Impacts in the Delaware Estuary of Pennsylvania*, DVRPC, Product No.: 04037 (June 2004). <https://www.dvrpc.org/Products/04037/>

A report on the Delaware Bay and estuary communities in New Jersey showed that more intense and frequent extreme weather events, together with trends in coastal development, will increase expected annual flood damages.⁷³ The damage to buildings in all the counties along Delaware River tidal waters has increased due to climate impacts since 1980 according to the study. These climate change-driven events will cause more hurricane-force wind damage and flooding and increases in building damage from rising tidal waters. These impacts will likewise be experienced on the Pennsylvania side of the estuary and bay.

Conclusion

The bottom line is, there is simply no suitable location for an LNG facility in Philadelphia or Southeastern Pennsylvania. Even before considering the impacts to neighboring communities and the environment, the obstacles are daunting. There is no space at the proposed site, in addition to a restrictive covenant that provides a significant legal obstacle. The economics of this project are also in question over the long-term, taking into account the number of LNG export terminals in the queue globally and anticipated future declines in natural gas demand. The proposed site would require substantial infrastructure investments in pipelines and dredging.

In addition to these issues, the impacts to the surrounding community would exacerbate decades of environmental injustice in this area. There are 70,000 people living within a 3-mile radius of the proposed site in Chester. Even if we were to ignore the public health impacts of adding yet another major source of pollution to this community, locating an LNG export terminal in an urban area next to a very busy waterway is a recipe for disaster. LNG is a volatile substance, and for good reason these facilities are generally built in remote locations.

For all of the reasons stated above, we make the recommendation to the General Assembly against any further resources being committed to investigating an LNG facility in Philadelphia or elsewhere in Southeastern Pennsylvania. The sooner we recognize reality, the sooner we can take the steps we need to continue to secure Pennsylvania's energy independence in ways that benefit all Pennsylvanians.

⁷³ *New Jersey's Rising Coastal Risk*, Rhodium Group (Oct. 2019). Pages 2, 3, and 4. https://rhg.com/wp-content/uploads/2019/10/Rhodium_NJCoastalRisk_Oct2019final.pdf