Philadelphia LNG Export Task Force Report

Representative Martina White, Chair

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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 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.

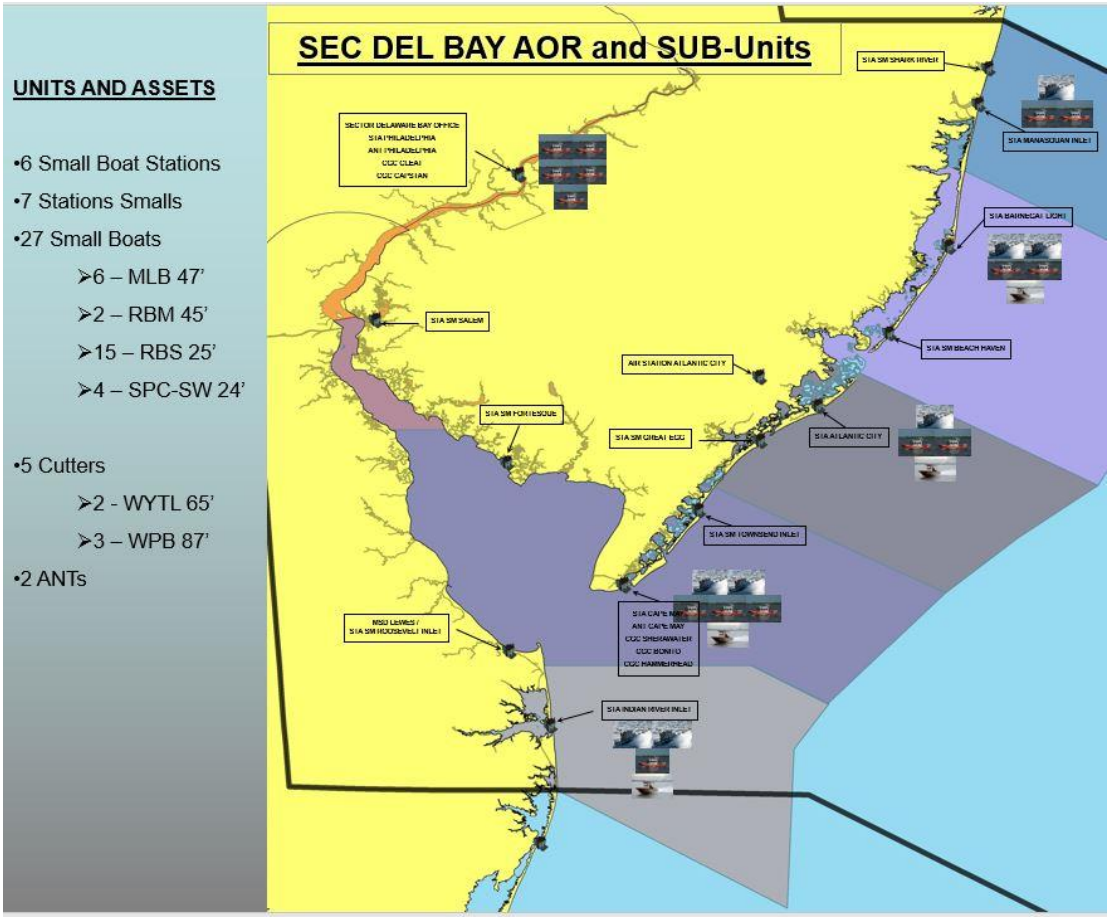
The Pilots Association for the Bay and River Delaware

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 month[14], 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 States[16]. 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 prefiling 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 faciality 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]

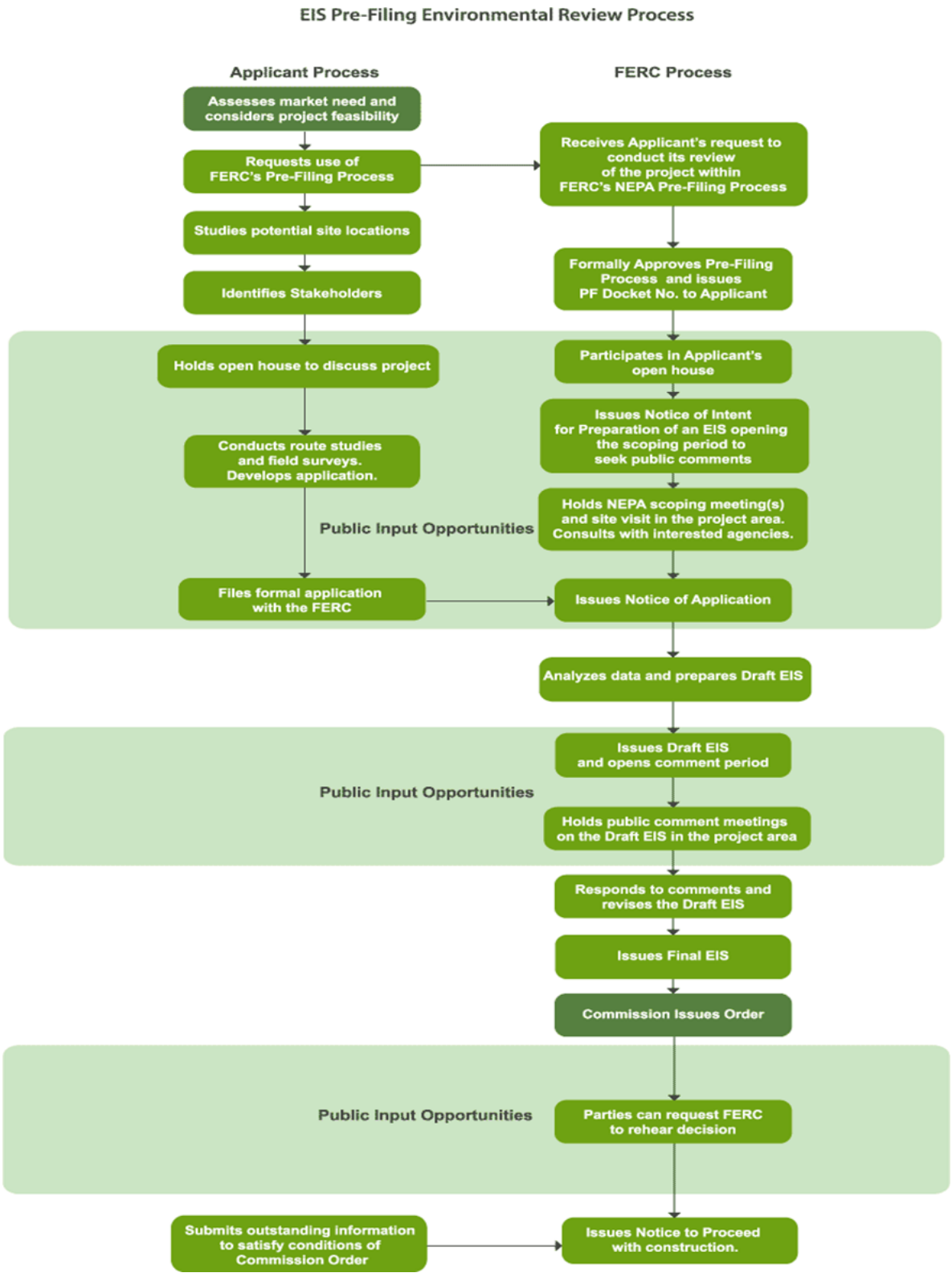
Along with these datapoints, an EIS outlines environmental mitigation measures, which seek to reduce, avoid, or compensate for any negative environmental impacts. This includes FERC potentially recommending a change in the facility design, adjusting proposed operating procedures, or require applicants 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:



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.

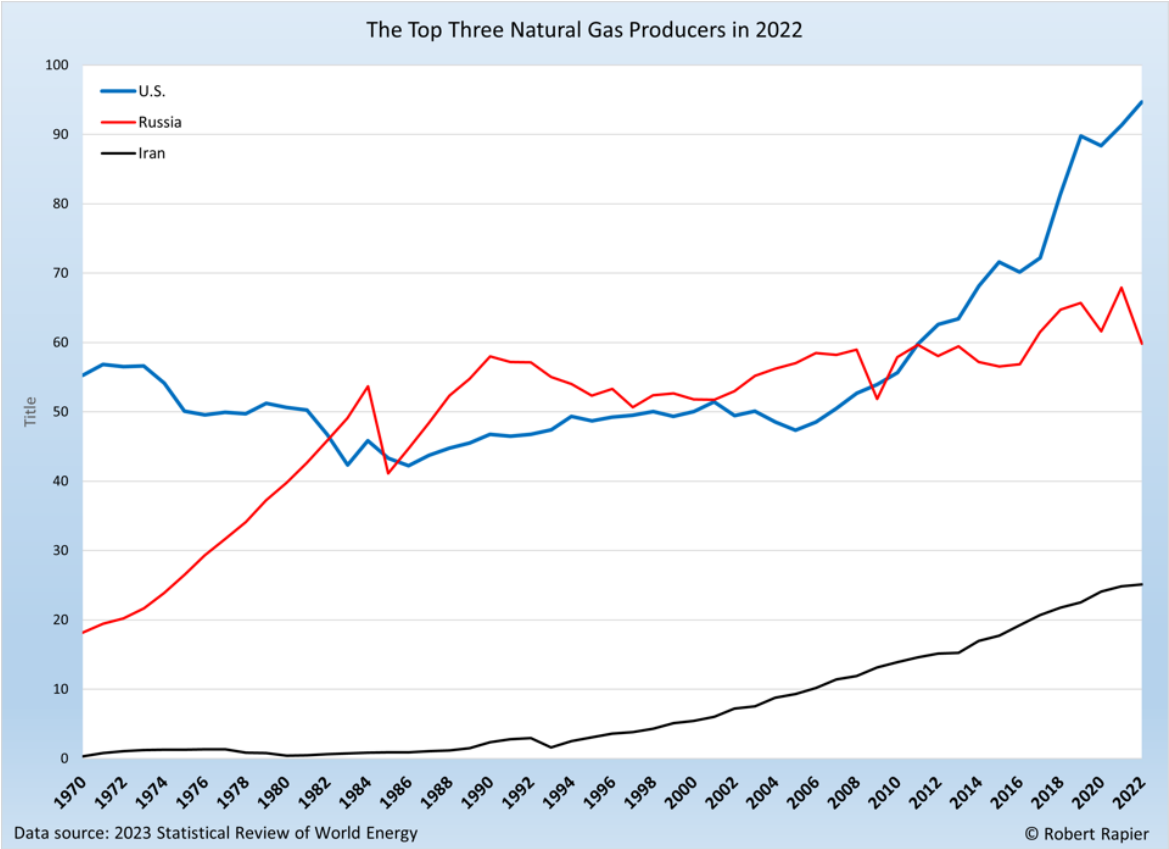
Internationally, our European allies also recognize the potential for reducing carbon emissions from the expanded adoption of natural gas. In early 2022, even before the Russian invasion of Ukraine, the European Commission moved forward with a draft plan to designate natural gas

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)

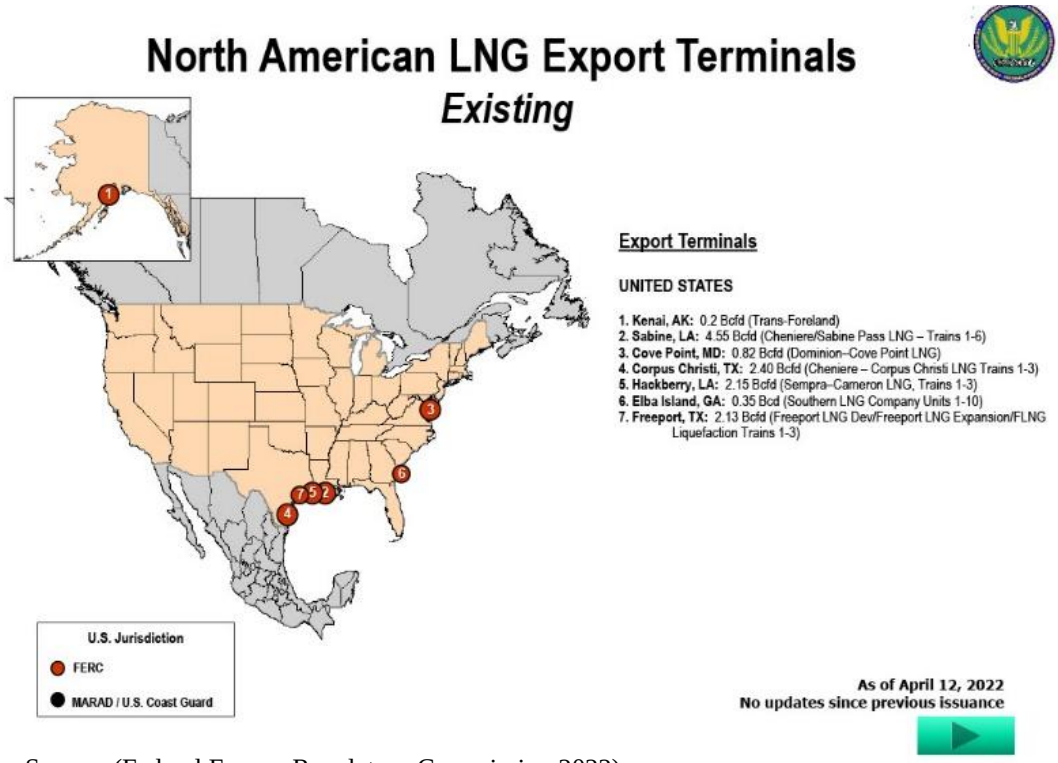
Russia has proven its willingness to use its considerable energy resources as a geopolitical weapon. The European Union spent much of the 21st century dependent upon natural gas supplied from Russia to support their energy demand.[49] Reliance on a nefarious actor like Russia for natural gas became a 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 lead 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.

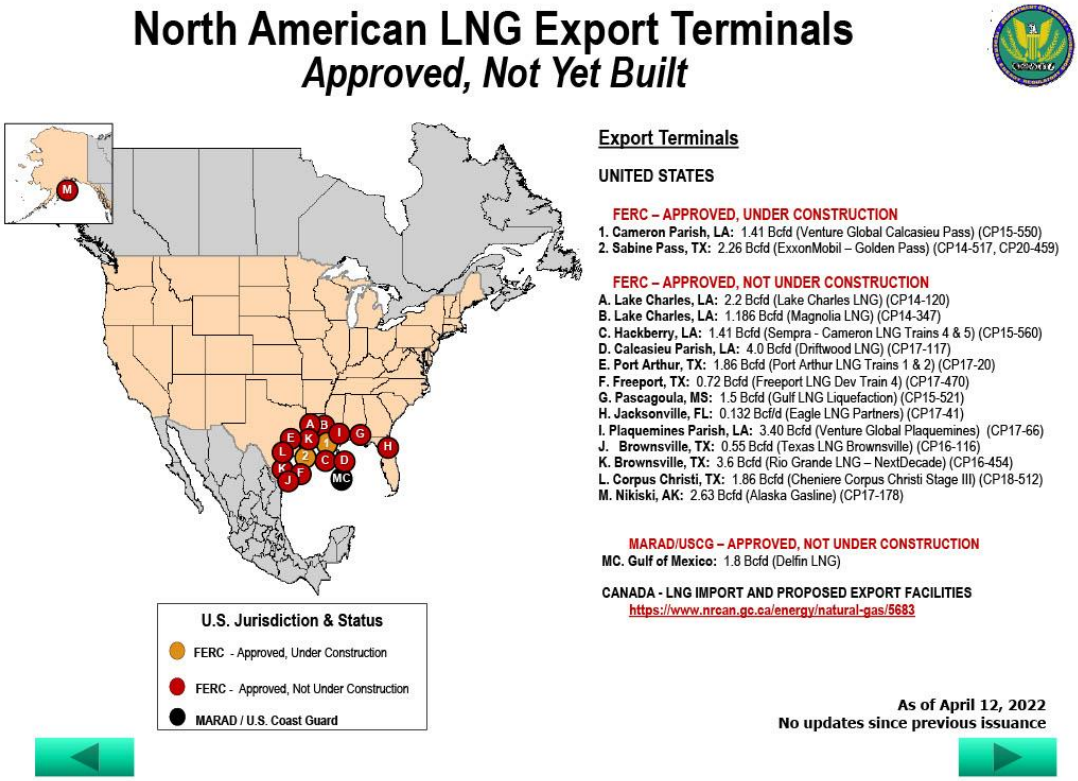
Accordingly, due to its geographic significance, an LNG export terminal along the Delaware River presents a unique opportunity to not just provide U.S. LNG, but Pennsylvania LNG, to our European allies. The Cove Point, Maryland LNG export terminal is the only operational facility on the east coast north 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]

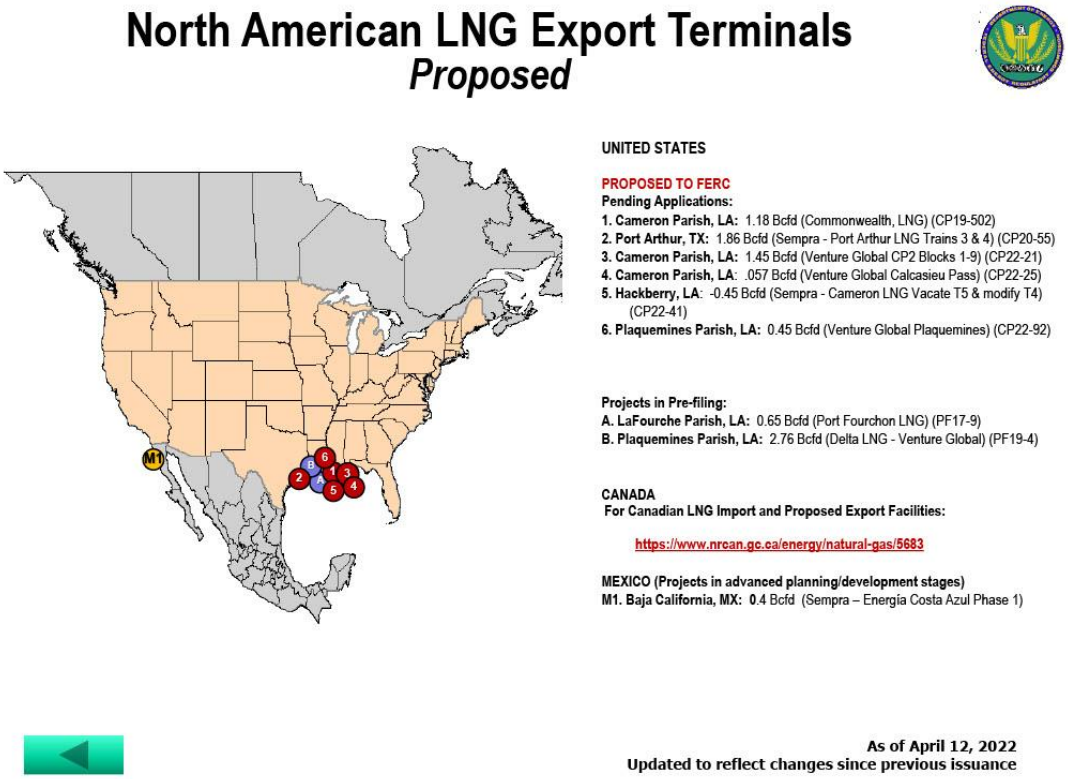
Figure 1: North American LNG Export Terminals: Existing, Approved Not Yet Built, Proposed



Source: (Federal Energy Regulatory Commission 2022)



Source: (Federal Energy Regulatory Commission 2022)



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 2022[55], 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 constriction 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	$ 389,102,116.67	$ 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, concreate 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)

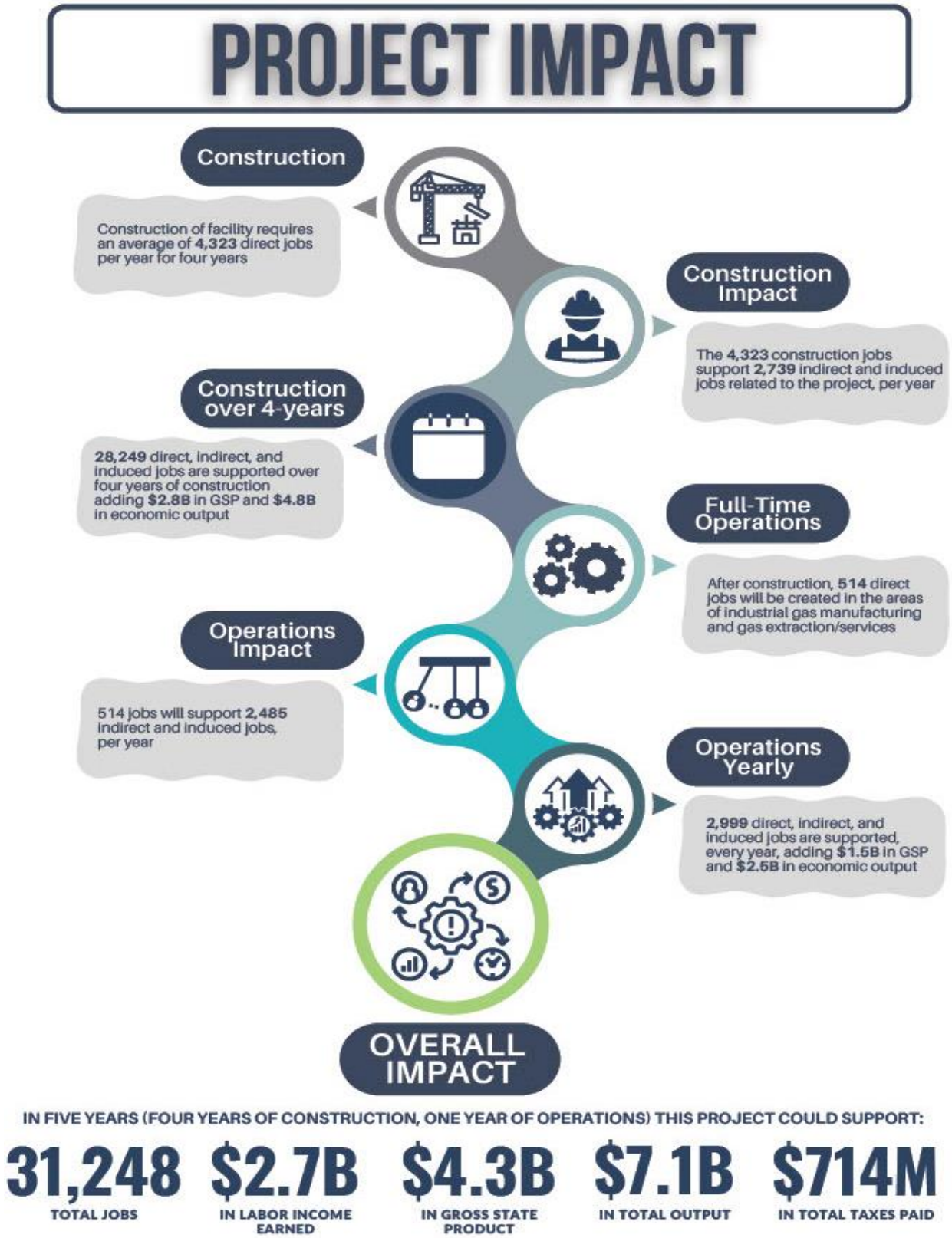
As with the facility construction, full time operations can generate significant year over year tax revenue. The analysis estimates the tax implications of a facility the size of Cove Point would generate over $47 million in county and subcounty tax revenue, while adding an additional $52.18 million 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



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.
- Call 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 facilitates 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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We also wish to express our appreciation to the diverse groups and organizations that welcomed us for tours and site visits. These tours afforded us an insightful glimpse into the challenges and opportunities of a potential LNG export facility. Their willingness to share the impactful work they engage in daily has been instrumental in our effort to compile this report. The collective effort and collaboration demonstrated by all participating stakeholders underscores our shared dedication to advancing the prosperity of the Commonwealth of Pennsylvania.

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