PORT FREEPORT



2019 Economic Impact Analysis

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This report estimates the total economic impact that Port Freeport has on local, statewide, and national economies through the operation of and investment in leased and privately-owned terminals.

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EXECUTIVE SUMMARY

In 2016, Texas A&M Transportation Institute (TTI) researchers completed an economic impact summary for Port Freeport, which identified and estimated the total impact of economic activities at the port. In the study, researchers found that the port has a considerable impact on the local and state economies in terms of employment, economic output, labor income, tax revenues, and potential future growth. Since the conclusion of that study, the port has seen extensive new investments and growth in several economic sectors. Researchers were then tasked with determining current impacts using data collected from both primary and secondary sources located at the port. TTI researchers estimate that Port Freeport generates the following economic impacts at the local and state level:

- 15,794 direct jobs
- 150,651 jobs supported statewide
 - 45,492 jobs supported within Brazoria County
 - 105,159 jobs supported elsewhere within Texas
 - **\$98.8 billion** in total economic output statewide
 - \$61.8 billion in total output within Brazoria County
 - \$37 billion in total output elsewhere within Texas
- **\$2.5 billion** in tax impact to local and state government entities
 - \$913 million generated from impacts within Brazoria County
 - \$1.6 billion generated from impacts elsewhere in Texas
- **\$3.2 billion** in federal tax revenues
 - \circ \$1.2 billion generated from impacts within Brazoria County
 - \$2 billion generated from impacts elsewhere in Texas

Supplemental to the local and state impacts, researchers also estimated the aggregated national impact of Port Freeport operations:

- 279,783 estimated total jobs supported nationally
- \$149 billion contributed to national economic output
- **\$4.5 billion** in tax state and local revenues
- **\$5.4 billion** in federal tax revenues

For this analysis, TTI researchers used the Impact Analysis for Planning (IMPLAN) model. The IMPLAN model is a widely used economic analysis tool that government agencies, universities, and private corporations have used for decades. A series of economic inputs used by the tool were collected from primary and secondary sources located at the port to conduct the analysis. These data were collected primarily through an online survey and phone interviews.

Freeport has experienced many changes since TTI completed its original study in 2016. Most notably, investment in the production of petrochemicals along the coast has seen an uptick in recent years. In addition, new tenants and expanded waterway service infrastructure have led to higher employment and value added to the water transportation sector, and subsequently to the supporting agencies that facilitate the movement of goods.

Port Freeport has a considerable local, state, and national impact, and the area is likely to see continued economic growth. Unlike in the previous study, the number of estimated heavy construction workers at the port slightly decreased. While this leads to a decrease in the total number of direct jobs, heavy construction is not a static field. Employment in this field varies by location and purpose, often making this industry difficult to consistently anticipate or evaluate. While construction jobs decreased, researchers saw increases in all economic sectors that have fixed operations at the port. The value of production is higher in these fields than in construction, resulting in a larger overall economic impact despite lowered direct employment numbers.

Through this study, researchers have shown that Port Freeport has a considerable impact not only on the local economy of Brazoria County, but also on the state and national economies. These results, coupled with the billions of dollars of planned investments in facilities and infrastructure at the port, show that the area is likely to see continued economic growth.

INTRODUCTION

Background

Port operations are a vital component to international and domestic transportation. According to the United Nations Conference on Trade and Development, global seaborne trade reached 10.3 billion tonsⁱ of goods in 2016 (1). The United States accounted for nearly 1.3 billion tons in combined imports and exports in that same year. Moreover, Texas makes up a considerable percentage of this throughput, handling more than 525 million tons of those imports and exports in 2017.ⁱⁱ Ports and the water transportation they facilitate have a critical role in both the global and domestic economies.

The investment in and continued operation of the port infrastructure needed to efficiently move these goods create not only direct economic impacts to the communities in which they are located, but also indirect and induced impacts to the regional, state, and the national economies. These impacts come in several forms including jobs, output, labor income, and tax revenues. Economic impact analyses seek to estimate these impacts in terms of total jobs and dollars across a single or multiple study areas.

Purpose of the Study

The purpose of this study was to estimate the total annual economic impact of operations located at Port Freeport and/or operations dependent on Port Freeport facilities on the local (Brazoria County), state, and national economies. The impacts estimated in this report are provided as primary (direct) and secondary (indirect and induced) effects of the port's annual operations. These impacts are reported in terms of employment, production (output), income, and tax revenues at the local, regional, statewide, and national scale. The purpose of this study was to estimate the total annual economic impact of operations located at Port Freeport and/or operations dependent on Port Freeport facilities.

For the purposes of this study, researchers identified industries that were dependent on Port Freeport waterway facilities and/or

dependent on existing port activities. This includes industries located on property the port owns and leases to others (e.g., Freeport LNG and Enterprise Seaway) within the inner harbor, privately owned terminal facilities in the port district (e.g., Dow and BASF), industries directly related to the movement of goods in and out of the port (i.e., auxiliary services), port administration and support services (e.g., Port Freeport staff and U.S. Coast Guard), and those industries directly benefiting from waterborne trade that may be located away from the port.

ⁱ Loaded onto vessels.

ⁱⁱ As presented in 2020-2021 Port Capital Program of the Port Authority Advisory Committee (PAAC)

TEXAS PORTS SYSTEM

The Texas ports system consistently ranks as the second largest ports system in the United States (2). Texas ports handled over 524 million tons in 2017. This number was twice as much as the next closest state, California, which handled just over 244 million tons in the same year. The state with the highest amount of waterborne tonnage that year, Louisiana, handled just over 572 million tons. While Louisiana boasts a slightly higher total tonnage of waterborne trade, this is primarily domestic trade. Texas has the highest amount of international trade of any state in both shipping and receiving according to the 2017 data (2) (Table 1).

State	Totals	Shipping: Domestic	Shipping: Foreign	Receiving: Domestic	Receiving: Foreign	Intrastate
Total	2,385,121	584,349	746,105	584,349	765,957	288,711
Louisiana	572,065	90,667	188,526	148,176	86,867	57,828
Texas	524,583	55,867	210,030	28,057	157,861	72,768
California	244,063	4,444	64,323	16,897	147,598	10,801
New Jersey	144,184	30,203	19,781	10,700	74,772	8,728
Washington	119,422	11,325	61,606	14,626	22,457	9,408
Florida	103,590	5,933	17,177	45,412	34,668	400
Illinois	90,563	62,013	102	18,521	1,553	8,375
Kentucky	89,944	45,669	0	22,365	0	21,909
Ohio	82,982	14,501	6,697	49,507	3,850	8,427
Pennsylvania	72,569	11,870	3,935	24,214	25,398	7,153

Table 1. Calendar Year 2017 Waterborne Tonnage by State (Top 10) (in Units of 1,000 Tons)

Source: (2)

The Texas ports system is comprised of 11 deep-draft ports and numerous shallow-water ports trading a variety of goods and providing numerous services (Table 2). The Gulf Coast region of waterborne trade is one of the major trade hubs in North America. According to the U.S. Census Bureau, the Texas ports system had six of the top 25 ports in the United States by total tonnage in 2018 (3). This included the ports of Houston, Beaumont, Corpus Christi, Texas City, Port Arthur, and Freeport. Port Freeport ranked 5th in Texas and 19th in the nation with over 21.1 million in total tonnage.

Table 2. Overview of Texas Ports (2016)

Port	Characteristics*	Major Assets/Attributes	Top Commodities/ Specialties**
Port of Orange	 Draft class: deep Channel depth: 31 ft Channel width: 200 ft 	 Home to barges that service deep-water oil rigs 4 berths and 8 warehouses Used to service, repair, and maintain military reserve fleet 	• Lay berthing, vessel construction, and repair
Port of Port Arthur	 Draft class: deep Channel depth: 40 ft Channel width: 450 ft 	 3 wharf rail tracks (150-car capacity) 2 shed tracks (80-car capacity) 6 storage yard tracks (140-car capacity) 3,102 ft of docks 116,000 sq-m of storage 	 Forest products (wood pellets) Iron Steel Dry bulk Bagged cargo Bailed cargo Military cargo Project cargo
Port of Beaumont	 Draft class: deep Channel depth: 40 ft Channel width: 400 ft 	 Served by 3 Class 1 rail lines Roll-on/roll-off ramp 9 berths 620,000 sq-ft of covered storage space Over 80 acres of open-air storage 650-ft heavy-duty cargo wharf 	 Military equipment Forest products Steel/iron Crude oil Industrial project cargo Aggregate/bulk cargo Bulk grain Wind energy components
Port of Houston	 Draft class: deep Channel depth: 46.5 ft Channel width: 530 ft 	 8 cargo terminals owned and operated or leased by the port Largest petrochemical complex in the United States Access to 3 Class 1 Railroads 	 Containerized cargo Food and drink Retail goods Plastic resins Chemicals/minerals Steel Forest products Grain Dry and liquid bulk Coal Petroleum coke Fertilizer
Port of Galveston	 Draft class: deep Channel depth: 46 ft Channel width: 1,200 ft 	 Roll-on/roll-off ramp Port-owned and -operated cruise terminals and facilities Served by 2 Class 1 rail lines Marine repair facility and shipyard Port-related short-line railroad 	 Bulk fertilizer Bulk liquids Fresh fruit (including bananas, melons, and pineapple) Roll-on/roll-off cargoes Construction equipment Project cargoes Wind power equipment Household goods and personal vehicles Concrete pipe Bulk grain

Port Freeport

Port	Characteristics*	Major Assets/Attributes	Top Commodities/ Specialties**
Port Freeport	 Draft class: deep Channel depth: 46 ft (to be dredged to 56 ft) Channel width: 400 ft 	 14 berths 55-ft-deep channel following Freeport Harbor Channel Improvement Project Two post-Panamax cranes Deepwater ship berths— 5 public berths and 7 private facility berths Access to Union Pacific rail line 	 Liquefied natural gas Crude oil Petrochemical feedstocks Containerized cargo Refrigerated fresh fruit Rice New and used automobiles High and heavy construction Equipment Limestone aggregate Project cargo Steel products
Port of Palacios	 Draft class: shallow Channel depth: 14 ft Channel width: 400 ft 	 4 turning basins with 13,000 ft of dock space 2 recreational marinas with 55 slips 800 acres of developable land 	 Shrimping, fishing, shipbuilding, and tourism top industries
Calhoun Port Authority	 Draft class: deep Channel depth: 38 ft Channel width: 200 ft 	 5 deep-water berths 6 brown-water barge berths Dry bulk dock that can handle carriers up to 740 ft long Served by Point Comfort and Northern Railway 	 Petrochemicals Crude oil Condensate Bauxite Alumina
Port of West Calhoun	Draft class: shallowChannel depth: 14 ft	• Berths for seafood production, and oil and gas exploration	• Waterway used for petroleum coke and chemicals
Port of Victoria	 Draft class: shallow Channel depth: 14 ft Channel width: 125 ft 	 2 cargo docks and 3 liquid loading docks Center that can be used by chemical, construction, and steel fabrication and agribusiness industries 	 Crude oil Condensate Frac sand Fertilizer Chemicals Aggregate
Port Corpus Christi	 Draft class: deep Channel depth: 47 ft (to be dredged to 54 ft) Channel width: 300 ft 	 13 public liquid docks 16 private liquid docks 3 general cargo docks 2 bulk docks Over 295,000 sq-ft of covered storage space Over 125 acres of open storage Access to 3 Class 1 rail lines and over 60 miles of rail, including the new Nueces River Rail Yard 	 Crude oil Fuel oil Gas oil Bauxite Feedstock Aggregate Naphtha Reformate Benzene Fertilizer Wind energy cargo Military cargo Grain

Port	Characteristics*	Major Assets/Attributes	Top Commodities/ Specialties**
Port of Harlingen	 Draft class: shallow Channel depth: 12 ft Channel width: 120 ft 	 650-ft dry/liquid cargo wharf 100-ft dry bulk wharf 150 acres of open storage 	 Liquid fertilizer Sand Aggregates Gasoline Diesel Ethanol Raw sugar Cotton Sorghum Corn
Port of Port Isabel	 Draft class: deep Channel depth: 36 ft Channel width: 200 ft 	 5 docks (2 cargo, 1 roll-on/roll-off, and 2 oil) 	 Pipe for offshore oil and gas Shrimp Okra Spinach
Port of Brownsville	 Draft class: deep Channel depth: 42 ft Channel width: 250 ft 	 12 cargo docks, 4 oil docks, 1 liquid cargo dock, and 1 bulk cargo dock 40,000 acres of land 65 acres of open storage and 13 acres covered storage Access to 3 rail lines 	 Steel products Lubricants Gasoline Diesel Jet fuel Grain Aluminum Windmill components (4)
Port of Texas City	 Draft class: deep Channel depth: 46 ft Channel width: 1,200 ft 	 Privately owned by stakeholders, including Union Pacific and BNSF Railways 	 Crude petroleum oil Refined petroleum products Petrochemicals

* Depth indicates to Mean Lower Low Water (MLLW)

**2015 Tonnage numbers can be found from the TxDOT Maritime Division (6) Sources: (5, 6)

Economic Activity

In a 2017 Texas A&M Transportation Institute (TTI) study, researchers estimated that approximately 2.2. million jobs were in some way related on the Texas ports system. This was estimated to have contributed to over \$111 billion in personal income and \$5.8 billion in annual state tax revenue (7). These economic impacts are created through the production and movement of goods that are reliant on waterway facilities. TTI researchers estimated these impacts by evaluating the types, amounts, and value of commodities being moved domestically and internationally in and out of public and private terminals at Texas ports.

Texas ports handle a large variety of commodities. However, the state's primary commodities remain goods related to energy and chemical production (Figure 1). In 2016, these two categories comprised over 75 percent of the total tonnage. The third and fourth largest commodities in terms of total tonnage were bulk cargo and agriculture, respectively. Miscellaneous goods and lumber products comprised the remaining approximately 3 percent of goods moved.



Source: (8) Figure 1. Percent of Total Tons Handled by All Texas Ports in 2016

Stakeholders

The Texas ports system is complex and is supported by state agencies and committees that work to ensure that it operates efficiently and safely, and advocate for the direction of funds to maritime investments. Some of the major stakeholders that support port activity include the Texas Department of Transportation, Port Authority Advisory Committee, Texas Ports Association, Department of Homeland Security, U.S. Coast Guard, and U.S. Army Corps of Engineers. These entities contribute vital resources and information to the effort to ensure that the Texas ports system, and consequently the Texas economy, remains economically competitive.

Texas Department of Transportation

The Texas Department of Transportation (TxDOT), through its Maritime Division, monitors the Texas ports system. The division "promotes the development and intermodal connectivity of Texas ports, waterways and marine infrastructure and operations" (9). This group also promotes use of the Gulf Intracoastal Waterway (GIWW) and supports waterborne transportation to increase the economic competitiveness of the state.

The Maritime Division and the Port Authority Advisory Committee (PAAC) develop the Port Mission Plan (PMP). This biennial plan that was submitted to the Governor, Lt. Governor and the Speaker of the House addresses key issues, challenges, and opportunities of Texas ports in a legislative report. In addition, the plan identifies strategies that the ports system must take in order to stay economically competitive. Within this comprehensive plan, TxDOT's Maritime Division produces the *Port Connectivity Report* and the *Ship Channel Improvement Report*.

Port Connectivity Report

As part of the PMP, the Maritime Division develops the *Port Connectivity Report*. This report is intended to assess the connectivity between Gulf Coast ports. Specifically, this plan examines roadway connections from port gates to major freight corridors and identifies concerns or problem areas (10). The report also provides recommendations for projects to address these challenges.

Ship Channel Improvement Report

The *Ship Channel Improvement Report* is the part of the PMP that identifies authorized ship channel improvement projects and their feasibility (11). The report highlights the cost and time-sensitive nature of ship channel improvement projects, as well as the consequences for missed deadlines in terms of global trade potential. This report is designed to illustrate to policy makers the importance of these projects in sustaining a safe and efficient system.

Port Authority Advisory Committee

Established under the Texas Transportation Code, Section 55.006, PAAC provides a direct line of communication between representatives of the port industry and the Texas Transportation Commission. PAAC communication provides the commission with feedback and recommendations on port and transportation-related matters (12).

The committee is comprised of nine members from various regions of the state. Seven members are appointed by the Texas Transportation Commission to serve a staggered three-year term. One of those seven members is appointed from the Port Authority of Harris County. Three are from ports on the Texas upper coast, and three are from ports on the Texas lower coast. The lieutenant governor and the speaker of the house each appoint a single member to fill the committee.

The committee is responsible for reviewing prospective projects that are eligible to be funded via the Port Access Account Fund (see the "Funding" section of this report for a description) and is required to submit a report every two years that details the projects that are recommended and funding levels (13). The committee is also responsible for developing the Texas Ports Capital Program that outlines "…the goals and objectives of the committee concerning the development of maritime port facilities and an intermodal transportation system" (13).

Port Capital Program

The Port Capital Program (PCP) examines the needs of the Texas ports system and considers the port facilities, waterways, and inland connectors. The goal of this plan, as it relates to the broader PMP, is to inform the Texas Transportation Commission and recommend strategic capital projects and studies. For the 2020–2021 PCP, PAAC voted to recommend a request of \$125 million to assist in the development of priority projects (14).

Investment Strategy

The *Investment Strategy* report is the piece of the PMP that identifies investment strategies for critical port projects across the state. Specifically, the report focuses on investments such as "improved ship channels, multimodal connections, and replacement of outdated and failing port facilities" (15). This report refers to other pieces of the PMP, specifically the PCP and the *Ship Channel Improvement Report*, and identifies strategies, existing and new funding opportunities, and additional funding needs to illustrate these needed investments to state policy makers.

Texas Ports Association

In addition to TxDOT, numerous other stakeholders are involved in the activities and development of Texas ports. The Texas Ports Association aims "to advance the development of Texas ports, enabling them to compete with ports outside of Texas and thereby strengthen the economy of Texas" (16).

U.S. Army Corps of Engineers

The United States Army Corps of Engineers (USACE) is a U.S. federal agency under the Department of Defense and is one of the world's largest public engineering, design, and construction management agencies. Although generally associated with dams, canals and flood protection in the United States, USACE is involved in a wide range of public works throughout the world. The corps' mission is to "Deliver vital public and military engineering services; partnering in peace and war to strengthen our Nation's security, energize the economy and reduce risks from disasters. (17)"

Some key activities of the Corps include (18):

- Operating and maintaining 12,000 miles of commercial inland navigation channels
- Annually dredging more than over 200 million cubic yards of construction and maintenance dredge
- Owning and operating more than 600 dams
- Researching and developing technologies to protect the nation's environment and enhance quality of life.

The Galveston District of the U.S. Army Corps of Engineers has responsibility for aspects related to the Texas ports system, namely maintaining all federal ship channels and the GIWW.

Funding

Typical funding for port investments includes port-generated funds (e.g., operations, local taxing authority, and bonds), federal funding, and other grants. There is currently no dedicated funding source for Texas ports in the state's budget. Texas has largely kept a hands-off approach to port infrastructure investments (5). The primary sources of funding for long-term capital investment projects, such as channel deepening and widening projects and channel maintenance dredging, come from a variety of programs through multiple federal departments.

According to the U.S. Committee on the Marine Transportation System's *Federal Funding Handbook for Marine Transportation System Infrastructure*, 80 federal assistance programs are available for port activities.ⁱⁱⁱ These include assistance in four major categories (5):

- 1. Energy, economy, and resilience
- 2. Safety and security
- 3. Environment
- 4. Infrastructure

ⁱⁱⁱ A list of programs can be found in the U.S. Committee on the Marine Transportation System's *Federal Funding Handbook for Marine Transportation System Infrastructure*. The handbook was last revised August 28, 2017, at the time of this study.

However, the PAAC has noted that these federal funding sources have been inconsistent and inhibit the growth of both deep- and shallow-draft ports in the state (19). The problem is exacerbated at smaller ports with limited tax bases and/or lower revenues from port operations. The report notes that the need for a dedicated, flexible funding source for Texas ports "will help alleviate this financing gap and assist ports with overcoming their financial challenges" (19).

In 2001, the 77th Texas Legislature created the Port Access Account Fund.^{iv} This fund was designed as a funding mechanism to allow the state to provide financial The primary sources of funding for long-term capital investment projects are multiple federal departments. In 2001, the Port Access Account Fund was created, but no funds have ever been appropriated to the account.

assistance for security improvements, the upgrade and expansion of port facilities, and related studies (20, 21). Chapter 55 of the Texas Transportation Code authorizes spending of money from this account on (13):

- 1. Construction or improvement of transportation facilities within the jurisdiction of a maritime port
- 2. The dredging or deepening of channels, turning basins, or harbors
- 3. The construction or improvement of wharves, docks, structures, jetties, piers, storage facilities, cruise terminals, or any other facilities necessary or useful in connection with maritime port transportation or economic development
- 4. The construction or improvement of facilities necessary or useful in providing maritime port security
- 5. The acquisition of container cranes or other mechanized equipment used in the movement of cargo or passengers in international commerce
- 6. The acquisition of land to be used for maritime port purposes
- 7. The acquisition, improvement, enlargement, or extension of existing maritime port facilities
- 8. Environmental protection projects that:
 - a. Are required as a condition of a state, federal, or local environmental permit or other form of approval
 - b. Are necessary for the acquisition of spoil disposal sites and improvements to existing and future spoil sites
 - c. Result from the undertaking of eligible projects

However, no funds have ever been appropriated to the account, even though it remains in the statute. It is uncertain whether future legislative sessions will appropriate funds to this account. However, PAAC has identified the securement of recurring state general revenue funds as a key strategy in the PMP. Goals in the PMP specifically related to funding include (15):

- Identifying high-priority and strategic port projects and making recommendations to TxDOT for investment
- Incorporating maritime interests in TxDOT planning activities and documents
- Promoting Texas ports for economic development opportunities
- Identifying federal, state, or other funding opportunities for maritime investment

^{iv} 77th Session of the Texas Legislature, SB 1282, Texas Transportation Code, Section 55.005.

PORT FREEPORT

Port Freeport is a comprehensive^v deep-water port located in Freeport, Texas. Its jurisdiction covers about 85 percent of Brazoria County. The port is approximately 60 miles south of the Port of Houston. As a political subdivision within Texas, Port Freeport is governed by a port commission consisting of six members: five represent a geographic location, and the sixth represents an at-large position. Each commissioner is elected to serve a six-year term.

Port Freeport operates with a 46-ft deep-water channel, which is the shortest deep-water channel on the Texas coast. The 2014, Water Resources and Reform Development act authorized by U.S. congress approved the deepening of n the channel. The \$295 million Freeport Harbor Channel Improvement Project will deepen the existing channel to a mean lower low-water level of 51-56 ft, making Port Freeport the deepest port in Texas. On May 5, 2018, voters approved a \$130 million bond package, which includes the Freeport Harbor Channel Project (22). The remaining funds required to complete the project are being provided through federal funding programs.

The \$295 million Freeport Harbor Channel Project will deepen the existing channel to a mean lower low-water level of 51-56 ft, which would make Port Freeport the deepest port in Texas.

History

Since its establishment as the Brazos River Harbor Navigation District in 1925, the port and its operations have expanded significantly. The port's first two docks were built in the 1950s through the issuance of a series of ad valorem tax and port revenue bonds (23). Construction on various buildings and facilities continued over the next two decades, and in 1980, most of the land that the port owns was acquired through the issuance of additional ad valorem tax bonds (23). In 1988, the port established Foreign-Trade Zone (FTZ) No. 149, which enables businesses operating within the port's jurisdiction to postpone or eliminate customs duties on goods being imported. The FTZ includes Brazoria and Fort Bend Counties. In 2007, via the passage of House Bill 542, the Brazos River Harbor Navigation District was officially renamed Port Freeport.

Expansion of the port's facilities continued in the 2000s. In 2013, construction of a new 800-foot berth (Berth 7) was completed, which signified the start of development of the container terminal. In 2014, Port Freeport acquired two post-panamax gantry cranes which were commissioned at the container terminal. In 2015, an automobile storage and processing facility was constructed at the port. In 2017, Port Freeport broke ground on Phase 1 of new rail construction for the master planned multimodal industrial park to include warehousing, packaging and distribution facilities and more storage area for automobiles and equipment.

Economic Profile

The port has a variety of public and private terminals and handles millions of tons of cargo of various types with billions of dollars invested in operations and infrastructure. This activity has led Port Freeport to be named one of the top 10 fastest growing seaports for exports by Forbes Magazine (24). In 2017, Port Freeport exports exceeded

^v TxDOT classifies a port as *comprehensive* if it can handle a wide variety of cargo generally at a high volume.

\$1.48 billion, up by nearly 58 percent from the previous year. This is credited to the investments made by both public and private sectors in the area, the container terminal expansion and the recently completed liquified petroleum gas export facility along the Freeport Harbor Channel.

Port Freeport is supported by several modes of land transportation nearby that facilitate the movement of goods to and from the port, including State Highway 36, State Highway 288, and a rail line operated by the Union Pacific Railroad. In addition, the port has direct access to the GIWW, which facilitates intrastate and interstate barge traffic.

In the 2016 report, TTI researchers examined the economic impact the port had on the region and state. Researchers identified over 16,000 jobs directly related to port activity through the tenants, private terminal owners, and operations deemed to be dependent on port operations and the construction taking place at the port. For this report, researchers looked at the economic profile, or summation of all the pieces of Freeport's activities, to see how things have changed in the past few years. Researchers found that nearly all companies examined in the 2016 report continue

Nearly all companies examined in the 2016 report continue to remain at Port Freeport and have been expanding operations.

to remain at Port Freeport and have been expanding operations.

This section gives a brief overview of the current industries, economic activity, and planned development occurring at the port.

Tenants and Private Terminals

The industries currently located at Port Freeport are primarily those dealing in chemical manufacturing, oil shipments and refinement, produce, and automobiles.

Port tenants are companies that lease land or facilities owned by Port Freeport. These companies are directly related to the maritime freight shipping through the Port Freeport ship channel. Tenants present at the port include:

- Riviana Foods, Inc.
- Hoëgh Autoliners
- MSC/Chiquita Brands, Inc.
- Dole Fresh Fruit Company
- Freeport LNG
- G&H Towing Company
- Horizon Terminal Services
- Mammoet
- Ports America, Inc.

- Tenaris
- Enterprise Seaway
- CMA/ CGM
- Vulcan Materials
- Gulf Stream Marine
- Kirby Inland Marine
- Zachry
- Invenergy Development
- Sallaum Lines

In addition to tenants located on port property, several private terminal owners are present at the port. These companies use the ship channel and GIWW for shipments but do not lease land from Port Freeport. These

companies are included in the analysis because not only do they provide economies of density^{vi} in the region, they would also be directly impacted by positive or negative changes in ship channel availability. The following are the companies with a private terminal at the port:

- BASF Corporation
- Phillips 66
- Dow Chemical Company
- Freeport LNG (Public-Private Partnership)

Commodities

Port Freeport handles a large variety of commodities, primarily liquid bulk for the energy industry. Other important commodities handled by the port are clothing, fresh fruits and vegetables, rice, paper goods, project cargo, plastic resins, aggregate, autos, and steel. In fiscal 2018, Freeport moved approximately 21.1 million total shorts tons, ranking 5th in the State of Texas and 19th of all ports in the United States (3).

In 2018, the port handled over 2.3 million short tons through the port tenants or public facilities, which excludes private terminals, which primarily deal in petrochemical manufacturing and oil refining (25). Figure 2 shows the breakdown of these short tons. Bulk aggregate, and containerized cargo comprised nearly 70 percent of all annual short tons.



Figure 2. Percent of Total Short Tons Handled by Port Freeport in Fiscal Year 2017

vi Economies of density refers to the benefit resulting from spatial proximity of suppliers or providers.

Development

Freeport and the surrounding region have experienced billions of dollars in public and private investment in the last five years, which has expanded the production capabilities and workforce of industries in the region and helped sustain the economic growth and competitiveness of the port. These expansions represent additional economic benefits, in terms of direct, indirect, and induced impacts. Freeport has experienced billions of dollars in public and private investment in the last five years, which has expanded the production capabilities and workforce of industries in the region and helped sustain the economic growth and competitiveness of the port.

This section highlights recently completed

and ongoing^{vii} development projects. These projects do not represent all investments at or near Port Freeport but include substantial investments made with a clear link to port activity.

Recently Completed Projects

In recent years, the port has experienced billions of dollars of infrastructure and operational investments. These investments have come from both the port and businesses operating at the port. The following highlights some major investments made in recent years.

Dow Chemical Company Freeport—Polyolefins and Elastomers Plant

In 2017, Dow Chemical completed construction of a new polyolefins and elastomers plant in Freeport. The plant is a central component of Dow's \$6 billion investment initiative on the U.S. Gulf Coast (26). The estimated capital invested in Freeport from the plant was \$846 million (27). In addition to financial indicators, job creation was a success with peak numbers of construction workers estimated at 1,200. The total direct and indirect new jobs created as a result of the plant's operation are estimated at 235.

Phillips 66 - Liquified Petroleum Gas Export Facility - Freeport, Texas

In 2017, Phillips 66 completed a \$2.06 billion expansion at their terminal on the Freeport Harbor Channel to allow the export of Liquified Petroleum Gas with a current LPG export capacity of 200,000 barrels per day. The Phillips 66 terminal is connected by pipeline to the Phillips 66 Sweeny facility in Sweeny, Texas. Phillips 66 has had a presence on the Freeport Harbor Channel since the 1940's. An estimated total of 126 full-time jobs created due to this expansion (28).

<u> Tenaris – Pipe Mill – Bay City, TX</u>

In 2018, Tenaris, a multinational manufacturer of steel products, completed construction of a \$1.8 billion state-of-the-art pipe mill in neighboring Matagorda County. The 1.2 million square foot mill incorporates a high level of automation and cutting-edge technologies into its production of seamless pipe. Tenaris also has a storage yard at Port Freeport to store and supply the pipe mill with raw steel billets. The pipe mill generated 1,500 jobs during construction and an estimated 700 full-time employees (29).

vii At the time of this report.

Port Freeport

<u>Chevron Phillips Chemical Company – Ethylene Fractionator and Polyethylene Plant – Old Ocean,</u> <u>Texas</u>

In 2017, CP Chem completed construction of two world-scale polyethylene units in Old Ocean, Texas. The new units are each capable of producing 500,000 metric tons or 2.2 billion pounds of plastic resin annually. A rail facility with 5 miles of track and a capacity to store of over 1,500 railcars was also constructed supporting the new polyethylene units with full and empty railcar storage and staging, railcar maintenance, and other transportation functions. The investment level was \$1.8 billion and construction jobs were estimated at 4,000 at peak with a total estimated 140 full-time jobs created (30).

Velasco Terminal Expansion

The first phase of the Velasco Terminal expansion began in 2012 and was completed in 2014 after the completion of the post-Panamax cranes commissioning process (31). The two 100-ft-gauge cranes are located at Berth 7 and have an outreach of 18 container bays across with a lifting capacity of up to 75 tons each. The upcoming phases for Velasco Terminal call for two additional 800-ft berths (Berths 8 and 9), a 200-ft roll-on/roll-off ramp, additional post-Panamax cranes, as well as increased container storage capacity. This terminal will directly benefit from completion of the Freeport Harbor Channel Improvement Project.



Source: (32) Figure 3. Velasco Terminal at Port Freeport

BASF/Yara—Ammonia Production Facility and Storage Tank

A joint venture between BASF and Yara International resulted in a new ammonia production facility completed in Freeport in April 2018. A press release notes that because this facility uses hydrogen in ammonia production, Yara Freeport can use the hydrogen from the production of other petrochemical plants located nearby, and that this new plant has the capacity to process 750,000 metric tons of ammonia each year (33). The plant, along with the accompanying storage tank, provides an estimated capital investment of \$1.09 billion, an estimated 10 direct new jobs for BASF and Yara, and 62 total new jobs (27).

Praxair—Hydrogen Plant

In April 2018, Praxair began operations of a new hydrogen plant to supply hydrogen and nitrogen to the recently completed BASF/Yara ammonia plant. As part of the agreement among the three companies, Praxair will supply 170 million standard cu ft of hydrogen per day and 2,000 tons of nitrogen per day to the BASF/Yara plant (34). The Praxair plant adds an additional \$277 million in capital investments to the Freeport area and created 9 new direct jobs and 42 total new jobs (27).

Olin Corporation Freeport—Bleach Plant

Olin Corporation completed a new bleach plant in Freeport in 2017. The plant will increase Olin's U.S. bleach production by 10 percent, and distribution from the plant will require more than 100 trucks and railcars combined on a weekly basis (35). The overall capital investment to the Freeport area is estimated at \$25 million and created 42 new direct and indirect jobs (27).

CMA CGM Group Port Freeport—Brazex Service

The CMA CGM Group began its Brazil Express (Brazex) service for Port Freeport. Vessels will make port calls on a weekly basis to Port Freeport and stop at 16 ports along the route. This new service will allow for more access to markets in places like Kingston, Jamaica, and Cartagena, Colombia, for the many companies that Port Freeport serves (36).

Additional Projects

Other smaller expansion projects in recent years have helped promote and sustain economic growth at Port Freeport. These projects include the construction of new Port Freeport administrative offices and a new U.S. Customs and Border Protection agency facility. These facilities help support and enhance ongoing operations.

Ongoing Projects

In addition to the completion of billions of dollars of investments in production, terminal, and transportation facilities, Port Freeport has several projects under way that contribute to not only the current economic impact of port operations, but also to facilitate growth, additional personal income, and economic activity for years to come. The following are projects directly related to port operations.

Multimodal Industrial Park Project

Construction of the first phase of the Parcel 14 rail development project began in 2017 with the awarding of a \$21 million contract to James Construction. The 250-acre sure is currently being developed as a multimodal industrial park designed for warehousing of plastic resins, cross-docking activities, and distribution (37).

The site is designed to help support existing businesses, accommodate future growth at the terminals, and support the existing petrochemical industry operations. Port Freeport Director Phyllis Saathoff said, "the new rail facility will enhance our partnerships with area industry and will be the first step in future connections to the Texas International Trade Corridor" (37).

Freeport LNG Quintana/Oyster Creek—Natural Gas Liquefaction: Trains 1-3

Freeport LNG is working toward the finalization of three new LNG trains to serve the existing regasification facility and terminal on Quintana Island (Figure 4). Freeport LNG Quintana Train 1 is slated to open in the second half of 2019, with the second and third trains following in early 2020 (38). The 4th train is planned, and a FERC approval is expected this year. When fully operational, these trains will have a capacity to liquefy over 2 billion cu ft each day of natural gas (38). The combined capital investment from the three LNG trains is estimated at \$15

billion.^{viii} At the peak of construction, approximately 4,000 workers will be employed across the various trains. (39). Moreover, Trains 1 through 3 will create an estimated 88, 52, and 23 new direct company jobs, respectively, when completed (39). The LNG trains are estimated to create direct and indirect new jobs totaling 414, 244, and 108, respectively (39).



Source: (40)

Figure 4. Freeport LNG Regasification Facility and Terminal

MEGlobal Oyster Creek—Ethylene Glycol Plant

MEGlobal is in the process of building a monoethylene glycol (MEG) manufacturing plant in Oyster Creek. This project is slated to come online in mid-2019 and will provide MEG to Dow Chemical based on a supply agreement, with the majority of product slated for export (41). Once completed, the new facility will bring an \$1 billion in capital investment to the Oyster Creek area (39). At the peak of construction, it is estimated that 1,400 construction workers will be employed. Once operational, the plant is estimated to employ 35 direct company jobs and more than 172 direct and indirect new jobs (39).

Praxair Freeport—Air Separation Unit Producing Argon, Nitrogen, Oxygen, and Carbon Dioxide

Praxair is in the process of constructing a \$232 million air separation unit in Freeport, which will supply oxygen and nitrogen to MEGlobal's forthcoming ethylene glycol plant. The air separation unit will be operational in 2019

viii Provided by Freeport LNG through TTI's administered survey.

and is part of a long-term agreement between the two companies (42). The air separation unit will contribute \$104 million in capital investment to the Freeport area (39). The project is estimated to employ 70 construction workers at the peak of construction and will contribute to about 15 new company hires plus 70 direct or indirect jobs (39).

Shintech/K-Bin Freeport—PVC Compounding

Shintech and K-Bin are working on a project to increase their polyvinyl chloride (PVC) compounding capabilities in Freeport, slated to finish sometime in 2019. The project is estimated to add an additional \$17 million in capital investment to the Freeport area (39). At peak construction, the project is estimated to employ 25 construction workers (39). After completion, the Shintech/K-Bin project will create an estimated 10 new company jobs and 17 direct and indirect new jobs (39).

Property

All of the projects above are within the Port Freeport Navigation District. Port Freeport has 811 acres of developed land with 18 operating berths (including private docks) and a 70-ft-deep berthing area. These characteristics are complemented by two post-Panamax cranes and 7,000 acres of developable land (43). The port has been described as "one of the most accessible ports on the Gulf Coast" due to its location to the existing petrochemical industry and proximity to open water (44).

METHODOLOGY

The methodology used in this analysis uses primary and secondary sourced data as input into the Impact Analysis for Planning (IMPLAN) economic impact modeling tool to generate a snapshot of economic activity and impacts. Data were collected using a variety of methods, including an electronically distributed survey; phone/email interviews; published federal, state, and local data sources; and figures from local agencies.

The IMPLAN Model

To estimate the total economic impact of operations at Port Freeport, TTI research staff used the IMPLAN model, an economic impact assessment model that uses the standard input-out (IO) modeling technique with 528 different industry-sector multipliers. This model uses a diverse database of economic factors, established sector multipliers, and area demographics. These data, in combination with user inputs, are used to measure the initial change (**direct impact**) in a local economy.

The IMPLAN model measured direct impacts, indirect impacts, and induced impacts.

From these direct impacts, the model also generates estimated indirect and induced impacts. **Indirect impacts** are the effects of purchasing goods

and materials used in the production of the direct impacts. These represent money exchanging hands between producers both in the local economy and outside the region. These typically represent the raw materials and goods needed in a specific sector's production. Companies producing a good make purchases during the project, thereby indirectly supporting another business. **Induced impacts** are the impacts in a local economy from employees spending their wages. This supports local services and stores. For example, an employee at the local shipping company purchasing a television for his personal use from the local electronics store. This supports employment at local stores, which creates additional induced impacts. These impacts reoccur until all of the money is leaked^{ix} from the local economy. See Figure 5 for an overview of the modeling process. An IO model tracks economic impacts in two directions: backward linkages and forward linkages. Backward linkages represent the upstream impacts in the supply chain from purchases of goods and materials required for a change in production. This is the impact to the supplying industries. Forward linkages represent the impacts downstream of the supply chain. These are the predicted impacts to the demanding industries as a result of a change in production.

^{ix} Leaked refers to the money being spent on goods produced outside the study region.



Figure is illustrative and does not fully detail the complexities of the IO modeling process. Source: Adapted from (45, 46)

Figure 5. Input-Output Modeling Process

Inputs

The IMPLAN model requires a set of inputs to determine the direct, indirect, and induced impacts of a set of economic activities. The most common inputs into the model include employment, revenue, and payroll. These inputs were collected through various forms of communications with port tenants and private terminal owners located at or near Port Freeport. Employment at facilities directly related to port activity, such as chemical production plants and oil refineries, was also included in this study because of the facilities' relationship to the operations located at the port. While the terminal operations themselves are ongoing at the port, the manufacturing and sale of goods at those plants are directly dependent on the import and export process. While not all these private companies rely directly on Port Freeport facilities, the Brazos River, or the harbor, these companies are tied to the economic activity present in the region.

Any businesses outside the inner harbor area, excluding the petroleum and chemical manufacturing plants previously mentioned, were not included in this study unless a clear linkage between freight movements along the

waterway was present. Companies benefiting from proximity to operations using the waterway (e.g., chemical manufacturing using a product or by-product of a company receiving shipments via the waterway) are indirect impacts because they are purchasing a product to be used in their own production. These economic sectors are included in the results but not as direct impacts. Additional details on these economic sectors are in the "Results" section of this report.

Data Collection Methods

Researchers primarily used two data collection methods for the analysis: a survey administered at the beginning of the project and phone interviews with company representatives. Both the survey and interviews focused primarily on determining the economic sector of the company and collecting employment estimates.

<u>Survey</u>

The primary data collection method for this analysis was a survey sent to Freeport tenants, private terminal owners, and other major industries located at the port. This brief survey was intended to obtain the following:

- Primary economic sector of the business
- Economic characteristics (one or more of the following)
 - Total employment
 - Annual payroll
 - Annual revenue
- Transportation totals (e.g., annual vessel calls, trucks, and railcars)

Additional space in the survey allowed respondents to provide additional details about their operation at or related to Port Freeport. This was intended to give TTI researchers more insight into the type and scale of each business's operation. In addition, details on the current economic activity helped researchers determine how businesses relate to each either as primary or supporting operations.

Interviews

TTI researchers called or emailed any company that did not complete the survey before the latter months of the analysis. These interviews were informal and generally lasted less than five minutes. The goal of the calls and emails was to ascertain baseline data needed for the analysis. As opposed to the online survey, which contained ample opportunity for respondents to provide detailed descriptions of a company's operations at the port, calls and emails were designed to be as brief as possible. Researchers found that informal conversations allowed for the collection of the baseline information needed for the analysis without imposing a burden on the respondent.

Secondary Sources

TTI researchers used a variety of secondary sources to collect data on employment, businesses operations, and construction projects occurring at the port. This included the Economic Development Alliance of Brazoria County resources, press releases, news stories, and contacts with Port Freeport administration. These sources helped fill in gaps in the analysis. But more importantly, these sources helped researchers gain a clearer picture of the complexity and innerworkings of the day-to-day activities in and around Port Freeport.

Multipliers

Multipliers in the IMPLAN model are used to determine the output of the analysis. Multipliers in economic IO models are factors applied to an initial value. These multipliers are used to derive a total output, employment,

labor income, and value added. For each category, the multiplier seeks to identify the multiplied effect based on one unit of the corresponding direct impact. For example, if the employment multiplier in an economic sector within a region is 2.6, then for every 1 direct job in that sector, an additional 1.6 jobs are added within the region.

Multipliers at the single-county level are typically smaller than those at the multi-county or state levels, due to leakage. As previously mentioned, leakage in an economy is when money is spent outside of the study region. An example is a company in the study area of Brazoria County buying a product from a supplier in Harris County. That money is now with a Harris County company, and the money paid is used for the Harris County company's operations and employees. If the study region were increased to the entire state, multipliers would increase in value because now there is less leakage from the model. Only money leaving the state, as opposed to Brazoria County, would be accounted for.

For this analysis, researchers used Type Regional Social Accounting Matrices (SAM) multipliers through the IMPLAN model. SAM "provides information on non-market financial flows. IMPLAN interindustry models provide information on market transactions between firms and consumers, and they capture payments of taxes by individuals and businesses, transfers of government funds to people and businesses, and transfer of funds from people to people" (47). In short, type SAM multipliers add the effects of household income (induced impacts) into the multiplier calculations. This helps track monetary flows in, out of, and within a region. This provides a more accurate calculation of the indirect and induced impacts stemming from a change in the local economy (direct impacts).

SAM multipliers add the effects of household income (induced impacts) into the multiplier calculations.

For tax impacts, the IMPLAN model provides an extensive breakdown of each type of tax paid within the analyzed region type. The values estimated are created using the SAM framework. Tax amounts are calculated using publicly available data from government data sources, including the Bureau of Economic Analysis and Census of Government Finances.

Further details on the IMPLAN model, its capabilities, multiplier data, and assumptions can be found through the extensive online knowledge base at <u>https://implanhelp.zendesk.com/hc/en-us/categories/360000041033-Knowledge-Base</u>.

Multi-regional Input-Output Analysis

The IMPLAN model can conduct analyses which examine impacts and linkages between multiple regions Multi-Regional Input-Output (MRIO). MRIO allows the user to determine how production within the study region affects production and household spending in any other region within the United States without loss of individual region details. In the case of Port Freeport, researchers used local multipliers (Brazoria County) to examine the direct impacts of production in Brazoria, and to determine the indirect impacts and induced impacts in both the local region and the rest of Texas.

A limitation of the MRIO functionality is the type of geographies that can be joined. Therefore, national impacts are shown using only national multipliers. This methodology disregards local industry details in favor of averaged

multipliers. This provides some loss of accuracy in the results but provides an estimate of the overall national impact.

Output Definitions

Using the inputs and the various multipliers, IMPLAN produces a series of results that comprise the total economic impact of a market change. These include both summary impacts and tax impacts.

Summary Impacts

Summary impacts are the typical impacts associated with production in an economic impact analysis. These represent the jobs and dollars that are produced and/or supported in some way by production. The results include direct, indirect, and induced impacts and are reported in terms of the following impact types:

- **Employment** numbers represent total annual average jobs, which is not the same as a full-time equivalent job. Instead, IMPLAN reports jobs as job-years, which includes self-employed and wage and salary employees. Full-time, part-time, and seasonal job estimates are based on a count of full-time/part-time averages over 12 months (48).
- Labor income is the amount paid to workers, or take-home pay. This includes both employee and proprietor income. Labor income provides the basis for induced impact calculations, which are the impacts of workers spending their wages inside and outside the local economy.
- Value added is the summation of labor income, property income, and indirect business taxes. Value added demonstrates the difference in the value of produced goods over the costs to produce that good. These costs include purchasing services and input materials used during production.
- **Output** represents the total value added, plus the value of the intermediate expenditures, such as purchases that go into production. Because there is value generated on business to business transactions, the IMPLAN model accounts for these in addition to the value of production for a specific industry.

Tax Impacts

In addition to the summary impacts, researchers also used IMPLAN to derive tax impacts based on the data inputs. These taxes are separated into two categories: state and local tax revenues, and federal tax revenues. Listed values are the estimated taxes paid to all local, state, and federal units of government within the analyzed region.

RESULTS

Results from this analysis are presented at three geographic scales: local (Brazoria County), statewide, and nationally. The results are reported in terms of employment, labor income, value added, and total output. In addition, local, state, and federal tax impacts at the local, statewide, and national levels are provided.

Brazoria County

The ongoing operations involving water transportation, petrochemical manufacturing, petroleum refining, administration, and additional economic sectors have a total economic output of approximately \$62 billion within Brazoria County. Nearly \$50 billion in economic output comes directly from impacts directly related to port activities. This equates to approximately 15,794 jobs directly related to port activities, with an additional 30,126 jobs supported in some way by these activities. Table 3 shows the full results.

Impact Type	Employment	Labor Income (in \$Billions)	Total Value Added (in \$Billions)	Output (in \$Billions)
Direct effect	15,794	\$2.0	\$10.6	\$49.9
Indirect effect	18,206	\$1.2	\$3.1	\$10.3
Induced effect	11,920	\$0.4	\$0.9	\$1.5
Total effect	45,920	\$3.7	\$14.5	\$61.8

Table 3. Brazoria County Estimated Impact Summary (in 2019 Dollars)

Regarding state and local taxes, the operations at the port are estimated to have generated approximately \$4.9 million in taxes on employee compensation, \$873.6 million in taxes on production and imports, \$24.8 million in taxes on households, and \$9.7 million in corporate taxes for operations within Brazoria County. Table 4 shows the full results.

Table 4. Brazoria County Estimated Tax Impact (State and Local) (in 2019 Dollars)

Description	Employee Compensation (in \$Millions)	Tax on Production and Imports (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Dividends		—		\$9.7
Social insurance tax	\$4.8	—	—	—
Tax on production and imports	—	\$873.6	—	—
Personal tax	—	—	\$24.8	—
Total state and local tax	\$4.8	\$873.6	\$24.8	\$9.7

Regarding federal tax receipts, the operations at the port are estimated to have generated approximately \$360.3 million in taxes on employee compensation, \$12.8 million in taxes on proprietor income, \$111.3 million in taxes on production and imports, \$279.7 million in taxes on households, and \$446.2 million in corporate taxes for operations within Brazoria County. Table 5 shows the full results.

Description	Employee Compensation (in \$Millions)	Proprietor Income (in \$Millions)	Tax on Production and Imports (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Social insurance tax— employee contribution	\$184.9	\$12.8			—
Social insurance tax— employer contribution	\$175.4				—
Tax on production and imports	—		\$111.3		
Corporate profits tax		—	_		\$446.2
Personal tax— income tax			—	\$279.7	
Total federal tax	\$360.3	\$12.8	\$111.3	\$279.7	\$446.2

 Table 5. Brazoria County Estimated Tax Impact (Federal) (in 2019 Dollars)

Statewide

The impacts of operation at Port Freeport extend outside Brazoria County and have a considerable impact at the state level. Using the MRIO analysis tools within the IMPLAN software, researchers determined the indirect and induced impacts of Port Freeport throughout Texas.

The analysis showed an additional estimated output of \$36.8 billion. This equates to an estimated additional 105,159 jobs generating approximately \$9 billion in labor income statewide that are in some way indirectly supported or induced by the operations at Port Freeport. Table 6 shows the full results.

Table 6. Statewide Estimated Impact Summary (in 2019 Dollars)

Impact Type	Employment	Labor Income (in \$Billions)	Total Value Added (in \$Billions)	Output (in \$Billions)
Direct effect	—	—		—
Indirect effect	61,386	\$6.8	\$13.5	\$30.1
Induced effect	43,773	\$2.2	\$3.9	\$6.7
Total effect	105,159	\$9.0	\$17.4	\$36.8

In addition to the summary impacts at the state level, the indirect and induced impacts within Texas but outside of Brazoria County also contribute to tax revenue for state and local governments. This equaled approximately \$9.1 million in taxes on employee compensation, \$1.5 billion in taxes on households, and \$64.2 million in corporate taxes. Table 7 shows the full results.

Table 7. Statewide Estimated Tax Impact ((State and Local) (in 2019 Dollars)

Description	Employee Compensation (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Social insurance	\$9.1	—	—
Total state and local tax	_	\$1,506.2	—
Personal tax	—		\$64.1
Total state and local tax	\$9.1	\$1,506.2	\$64.1

Lastly, the indirect and induced impacts within Texas but outside of Brazoria County generate federal tax revenues. This included an estimated \$697.1 million in taxes on employee compensation, \$107 million in taxes on proprietor income, \$171.6 million in taxes on production and imports, \$694.4 million in taxes on households, and \$305.9 million in corporate taxes from operations indirectly supported or induced by the operations of Port Freeport within Texas but outside Brazoria County. Table 8 shows the full results.

Description	Employee Compensation (in \$Millions)	Proprietor Income (in \$Millions)	Tax on Production and Imports (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Social insurance tax— employee contribution	\$357.8	\$107	—	—	
Social insurance tax— employer contribution	\$339.4		_	—	
Tax on production and imports	—		\$171.6		
Corporate profits tax	_		—	—	\$305.9
Personal tax: income tax	_		_	\$694.4	
Total federal tax	\$697.1	\$107	\$171.6	\$694.4	\$305.9

Table 8. Statewide Estimated Tax Impact (Federal) (in 2019 Dollars)

National

Regarding the national impacts of Port Freeport, TTI researchers estimate that the port supports over \$148 billion in economic output nationwide. This is the combined direct, indirect, and induced estimate calculated through the IMPLAN model. This output represents over 279,000 jobs supported in some way. These impacts result in billions of dollars in tax impacts for local, state, and federal government entities. Table 9, Table 10, and Table 11 show the detailed total impacts.

Table 9. National Estimated Impact Summary

Impact	Employment	Labor Income (in \$Billions)	Total Value Added (in \$Billions)	Output (in \$Billions)
Total impact	279,783	\$21.3	\$49.1	\$148.8

Table 10. National Estimated Tax Impacts (State and Local)

Impact	Employee Compensation (in \$Millions)	Tax on Production and Imports (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Total state and local tax	\$34.2	\$3,725.9	\$541.4	\$220.6

Table 11. National Estimated Tax Impact (Federal)

Impact	Employee Compensation (in \$Millions)	Proprietor Income (in \$Millions)	Tax on Production and Imports (in \$Millions)	Households (in \$Millions)	Corporations (in \$Millions)
Total federal tax	\$2,018.8	\$162.7	\$421.4	\$1,742.9	\$1,066.7

Consideration of Results

During the analysis previously conducted by TTI researchers, approximately 16,400 direct jobs were estimated at the port. This report estimated approximately 600 fewer direct jobs. While a direct comparison between TTI's in-house model and the IMPLAN model is ill advised, it is important to offer clarification of some of the differences between the results to avoid misrepresentation of growth or other trends.

The primary reason for a reduction in direct employment was the estimate of construction workers present at the port. Because this is a dynamic figure, variation in this sector was expected. Also, divisions within companies directly related to the port relocated employees to operations not directly related to the port. Therefore, these jobs that were previously included in the analysis are no longer in the scope of this report. Outside these two cases, the data indicate growth in all other economic This report estimated approximately 600 fewer direct jobs than the previous report, mainly due to the dynamic nature of construction work, but the data indicate growth in all other economic sectors. The analysis also shows a shift to higher-valued production.

sectors directly related to the port. Water transportation, petrochemical manufacturing, refining, and transportation all saw increases in direct employment. This is a clear cause and effect of ongoing construction at both terminal and off-site facilities (e.g., the Velasco Terminal, Freeport LNG expansion, and additional terminal services).

The data collected show a shift in the economic sectors to higher levels of petrochemical production. This includes several new petrochemical construction projects and operations at the port. The growth in this area, specifically, has resulted in higher-value production, which explains the higher total output generated by each job in the study regions. While these two different models cannot be directly compared, the significant increase in output can be explained by the shift to higher-valued production occurring in the region.

Lastly, direct comparisons between the results of the IMPLAN model with any other modeling tool should not be made. Due to the differences in multipliers, process, and data collection process, economic impact models should be seen only as a snapshot look at current economic activity and subsequent impact. Differences should not be considered when examining trends unless the model and methodology between studies remain constant.

STRATEGIC OPPORTUNITIES

As the results show, Port Freeport has extensive economic impacts to the local, state, and national economies. These impacts come from the continued operation of goods movement and production at the port. Researchers, over the course of this study, found several upcoming investments and opportunities in the area. They include expansion of existing industry operations, port infrastructure projects to facilitate growth, and local and regional initiatives to attract industries and growth to the region. The following were noted as key strategic opportunities.

Port Freeport has extensive economic impacts to the local, state, and national economies, which come from the continued operation of goods movement and production at the port.

Developable Land

The port still maintains several thousand acres of open land. Over 500 acres have been mitigated and are ready for development. This includes the 262-acre Parcel 14, which is the site of the Parcel 14 Rail Development Project currently under construction. Parcel 19 is also 262 acres but has not yet been designated for any development.

In addition to available port property, the City of Freeport maintains long-term planning documents that are designed to revitalize the existing housing stock and redevelopment of underdeveloped and vacant lots within the city (49). These land use goals coincide with the increased economic development and workforce needs of the growing operations at Port Freeport. While this land use does not directly impact port operations, it does help support the indirect and induced impacts produced from the port.

Future Development

The Economic Development Alliance of Brazoria County (EDA) regularly updates a list of investments in the county. In addition to the information on the ongoing and recently completed projects, the group also examines announced projects and serious prospects.

One such project is the announced \$1.5 billion expansion of Phillips 66's operation in Sweeny, Texas, which is directly impacted by terminal operations located at Port Freeport. The company plans to begin construction on two new units that separate components of mixed natural gas (50). This will serve as a feedstock for neighboring petrochemical operations. EDA anticipates that construction of this project will employ over 2,500 construction workers at its peak (39). Moreover, the project is anticipated to create 97 new direct jobs and 358 total jobs.

Additionally, Phillips 66 began construction on two (2) 150,000 barrels per day Natural Gas Liquid Fractionators at their Sweeney refinery in Sweeny, Texas. Construction began in 2019 and is expected to complete in 2020. The work is expected to create 2,000 construction jobs at peak and 25 full-time jobs in Brazoria County (51).

Another key project entering development is Praxair's \$232 million construction of a new steam methane reformer and hydrogen compression station. The operation will supply hydrogen and steam to consumers within the Gulf Coast region via pipeline, including adjacent refinery and chemical complexes. This project is anticipated

to employ 300 construction jobs at peak and create 10 direct jobs once fully operation (52). Construction is slated to start in Q3 2019 and be completed Q1 2021.

Projects directly impacting port operations are the deepening and widening of the ship channel and the expansion of the Velasco Terminal. Both projects are set to increase the amount of cargo that can be moved in and out of the port via larger ships and provide an additional 1,600 linear ft of berthing space.

Transportation

In the previous version of this report, researchers discussed the Highway 36A Coalition, which is a transportation advocacy group in Brazoria, Fort Bend, and Waller Counties. The goal of the organization is to "promote[s] public and private investment in a regional free-flowing transportation corridor originating in and around the Freeport area of the Gulf Coast, through southern Brazoria, western Fort Bend, and Waller Counties connecting to SH 6 north of Hempstead to provide opportunities for economic growth, hurricane evacuation, and quality of life through these facilities" (53). The main project is the widening of SH 36 from Freeport to Brazoria. The project is intended to widen the existing two-lane undivided highway to a four-lane divided roadway in rural areas and to add a center left-turn lane in urban sections. The project is estimated to cost approximately \$60 million with no set anticipated start date. However, the right-of-way acquisition process for the widening phase is under way (54).

Regarding rail transportation, the ongoing construction of the Parcel 14 rail project includes 21,000 ft of track to aid in warehousing and distribution of synthetic resins, vehicles, and other cargo handled by the port. The initial phase includes 6,000 ft of lead track connecting the port to a Union Pacific line as well as three 5,000-ft ladder tracks in the yard. The second phase would add an additional four 5,500-ft sets of tracks in the next few years. The addition of rail lines will improve landside accessibility to the port.

SUMMARY

This report provides a brief overview of the Texas ports system and how Port Freeport helps sustain the state with the second largest waterborne trade activity in the country. Types and volumes of commodities being moved through the numerous Texas ports were also identified, as were port stakeholders and how these groups affect funding and prioritization of port capital improvement and connectivity projects. Following this overview, researchers investigated the current economic conditions at Port Freeport, identifying existing operations, trade totals, recent and ongoing developments, and other key characteristics of the port. During this process, researchers compiled a list of operations that needed to be contacted for data collection.

Researchers developed an online survey to send to a representative of each company. Researchers contacted companies that did not respond to the survey directly. The survey and interview responses served as the primary inputs to the IMPLAN model, which was used to estimate the local, statewide, and national impacts of Port Freeport operations in terms of employment, income, value added, total economic outputs, and various tax impacts.

The results showed that the port supports an estimated 15,794 jobs directly and over 150,000 jobs statewide, contributing nearly \$13 billion in labor income. Port Freeport also generates nearly \$100 billion in economic output statewide, \$2.5 billion in local and state tax revenue, and \$3.2 billion in federal tax revenue. Nationally, researchers estimate that the port has far-reaching effects, supports over 279,000 jobs, and contributes to over \$21 billion in labor income. Operations contribute to \$149 billion in total economic output, \$4.5 billion in tax state and local revenues, and \$5.4 billion in federal tax revenues.

The investment in new petrochemical operations and expanded terminal services, which has increased direct employment, has led to a greater economic impact, despite a slightly lowered number of total direct jobs.

These impacts represent additional growth at the port since TTI researchers completed similar research for the port in 2016. Researchers conclude that the investment in new petrochemical operations and expanded terminal services, which has increased direct employment, has led to a greater economic impact, despite a slightly lowered number of total direct jobs. Moreover, these impacts are expected to continue growing as new investments are being developed and the port continues to expand its operation.

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