

PORT OF WILMINGTON ECONOMIC IMPACT STUDY

Findings February 2018

Abstract

The Port of Wilmington makes important economic contributions to the local area, the State of Delaware and the regional and even national economies. Future growth and associated economic impact growth is constrained by the limited ability to fund capital expenditures for growth and maintenance

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Commissioned by Diamond State Port Corporation**

Executive Summary

This report provides estimates of the economic impacts of the Port of Wilmington (POW) on the region, including the U.S. Census-defined Philadelphia – Wilmington – Camden Metropolitan Statistical Area (MSA), and on the State of Delaware separate from the MSA. The following summary highlights the key findings.

In fiscal year 2017, a total of 5,802,000 short tons moved in and out of Port of Wilmington facilities, an average annual expansion of 5.4 percent from 2010. There were:

- 2.5 million short tons of containerized cargoes,
- 1.4 million tons of dry bulk cargoes,
- 1.4 million tons of liquid bulk cargoes, and
- 451,000 tons of non-containerized cargoes which include vehicles break-bulk and project cargoes.

MSA Region Key Impacts

In 2017, the annual economic impacts to the MSA region associated with operations at POW include:

- 5,717 total jobs; 2,951 direct jobs and 2,766 indirect and induced jobs,
- \$363.5 million or \$67.65 per ton of cargo in payments to labor.

POW-related jobs in the MSA region pay an average of \$30.57 per hour and an average annual salary exclusive of fringe benefits of \$63,592.

Region-wide, the port generated

- \$508.8 million or \$87.70 per cargo ton in value-added
- \$922.2 million or \$158.94 per cargo ton in total output/final demand
- \$35.6 million or \$6.13 per cargo ton in tax revenue

Delaware State Key Impacts

The 2017 key economic impacts of POW operations on the State of Delaware were found to be the following:

- 5,390 total jobs (2,951 direct jobs and 2,439 indirect and induced jobs) amounting to 0.93 jobs per thousand cargo tons,
- \$330.0 million in payments to labor or \$56.88 per ton of cargo.

POW-related jobs pay an average of \$29.44 per hour in the State of Delaware and an average annual salary exclusive of fringe benefits of \$61,230.

Across the direct jobs generated by POW:

- 56.9 percent were associated with the break-bulk trade (e.g., fruit, vehicles, project cargo);
- 24.0 percent were in the container trade;
- 6.8 percent in dry bulk;
- 5.4 percent were allocated to liquid bulk (petroleum and fruit juice) and,
- 6.9 percent were jobs categorized as “other”.

Truck drivers (45.3%) accounted for the majority of the 2,951 occupations directly associated with POW operations followed by:

- Auto processing workers (16.7%),
- In-port and out-port warehousing workers (9.3%),
- Longshoremen (7.9%),
- Port operations workers (6.1%),
- Rail crews (3.8%),
- Other stevedoring (0.8%), and
- “Not allocated” employment is 10.2 percent of the total.

For the State of Delaware, POW generated:

- \$462.9 million or \$79.78 per cargo ton in value-added,
- \$838.6 million or \$144.53 per cargo ton in total output/final demand,
- \$26.7 million or \$4.61 per cargo ton in tax revenue.

Future growth Forecasts

The POW cargo forecast and associated jobs and economic impact growth is severely constrained by capacity and the inability of the DSPC and State of Delaware to provide significant capital investment as outlined by the 2016 Master Plan.

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PORT OF WILMINGTON ECONOMIC IMPACT STUDY 2017

Background

The Port of Wilmington (POW) is a full-service deep-water port that is under the management of Diamond State Port Corporation (DSPC), a corporation owned by the State of Delaware. The port is located on the banks of the Delaware River 65 miles from the Atlantic Ocean. POW handles containerized, break bulk, dry and liquid bulk cargoes and is especially known for managing trade in perishable cargoes such as fruits and vegetables. It connects to its inland markets via truck and rail.

Table 1 displays POW statistics by fiscal year from 2010 to 2017. They indicate

- Strong average annual growth in containerized trade (+7.7%) and dry bulk trade (12.9%)
- Moderate average annual growth in vehicles trade (+3.1%)
- flat to negative growth in the break-bulk and liquid bulk trade (-0.8% and -0.7% respectively)

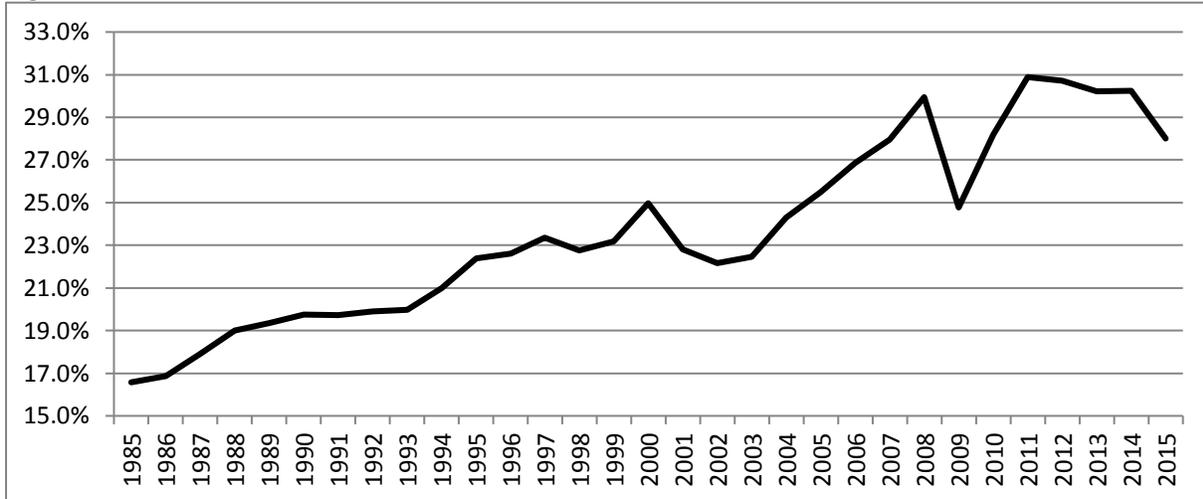
Table 1. Port of Wilmington Fiscal Year (July to June) Cargo (000 Short Tons) and Average Annual Growth Rate

Cargo Type	2010	2011	2012	2013	2014	2015	2016	2017	Average p.a. Growth
Containers	1,597	1,685	1,750	1,879	2,102	2,244	2,337	2,493	7.7%
Break Bulk	336	399	423	515	420	395	343	321	-0.8%
Vehicles	108	87	108	116	97	101	141	130	3.1%
Dry Bulk	686	1,150	1,261	1,365	1,592	1,873	1,954	1,421	12.9%
Liquid Bulk	1,498	1,112	1,544	1,369	1,289	2,008	1,789	1,437	-0.7%
Total	4,225	4,433	5,086	5,244	5,500	6,621	6,564	5,802	5.4%

Source: DSPC Website

POW makes important economic contributions to the local area, the State of Delaware, the regional economy and even the national economy. As a share of US national income, international trade has progressed rapidly since 1985 reaching a peak of 31 percent in 2011 and stabilizing more recently between 28 and 30 percent. Local economies can participate in this growth if they maintain adequate facilities to play a key role in the international trade supply chain. This includes infrastructure such as seaports that can reduce cargo handling costs and efficiently connect to inland destinations.

Figure 1. US Trade as Share of GDP



Source: World Bank national accounts data, and OECD National Accounts data files 2017.

Table 2 shows international shipments by mode of transport and year. Waterborne international trade is a relatively small presence representing just 8.5 percent of the value of trade in 2012 and 7.2 percent in 2015.

Table 2. US International Trade Value by Transport Mode

Mode	Value of International Shipments (Billions of 2012 dollars)		Share by Mode	
	2012	2015	2012	2015
Truck	676	723	18.1%	17.3%
Rail	168	179	4.5%	4.3%
Water	317	299	8.5%	7.2%
Air, air & truck	898	1,033	24.0%	24.8%
Multiple modes & mail	1,516	1,720	40.6%	41.3%
Pipeline	122	132	3.3%	3.2%
Other & unknown	39	82	1.0%	2.0%
Total	3,735	4,168	100.0%	100.0%

Source: SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, Freight Analysis Framework, Version 4.3.1, 2017.

By weight, waterborne trade dominates competing modes with a 17.1 percent share in 2015, slightly below its share of nearly 1 in 5 tons shipped in 2012.

Table 3. US International Trade Tonnage by Transport Mode

Mode	Weight of International Shipments (Millions of Tons)		Share by Mode	
	2012	2015	2012	2015
Truck	193	208	9.7%	10.4%
Rail	135	143	6.8%	7.2%
Water	382	340	19.1%	17.1%
Air, air & truck	8	8	0.4%	0.4%
Multiple modes & mail	1,002	1,021	50.2%	51.2%
Pipeline	271	269	13.6%	13.5%
Other & unknown	4	5	0.2%	0.2%
Total	1,995	1,995	100.0%	100.0%

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, Freight Analysis Framework, Version 4.3.1, 2017.

Participation of seaports in this trade carries with it large economic benefits, but requires that seaports and their operations keep pace with technological developments in waterborne transport. Vessels serving US and global trade lanes are increasingly large and efficient to operate. To fully realize those efficiencies, ports must have sufficient physical and operational capacity to accommodate them.

Previous economic impact studies that sought to gauge the relationship between seaport operations and economic benefits show a clear correlation. The more cargo moving in or out of any US port, the larger the economic gains to the local area and the broader region in the form of employment, income, output, and tax revenues. In the context of the proposed expansion of POW via its purchase of the Edgemoor site, POW engaged Seabury Maritime PFRA, LLC (SMPFRA) to conduct an economic impact study to quantify POW’s impact on the State of Delaware and the broader, regional economy. The study seeks to more fully understand these economic impacts in order to enable a comparison of the benefits gained by keeping POW at its status quo (the baseline) against various proposals put forth by private entities to invest in POW. What follows is a presentation of the baseline results.

Methodology

The chosen methodology for this study is to first determine the number of direct jobs at POW, and then run that data through IMPLAN, a commercially available input-output model. In general, an input-output model translates inputs such as direct jobs, at the firm or a higher aggregate and generates direct, indirect and induced employment, income, economic output and tax revenue effects via a series of relevant quantifying factors or what are known as multipliers. Direct effects are income, output and tax revenues generated from payments to workers that are required for the facilities’ operation or, if it is capital expenditure that is under scrutiny, needed to build the project or facility. Indirect effects are those jobs, income, output and tax revenues generated by spending on materials and other inputs required to operate or complete the construction of the facility. Induced effects are jobs and income generated by the additional spending of those benefitting from direct and indirect impacts.

The use of IMPLAN to estimate regional economic impacts in the form of industry output, jobs, income and local tax revenues is well-established. First developed by the US Forest Service, IMPLAN has since

been expanded to apply across a wide range of industries and economic sectors including the analysis of regional benefits of transportation facilities and capital expenditure projects. There are many such impact studies for the port sector. For instance, Towson University's Regional Economic Studies Institute used IMPLAN to determine the regional economic impact of the Panama Canal expansion on the areas surrounding the Port of Baltimore.¹ It was found that the additional capital expenditures at the Port made to accommodate the new generation of larger vessels, (the construction phase) plus the additional cargo landed and exported (the operations phase) would generate significant benefits for the regional economy in the form of increased jobs and income. Specifically, the model generated estimates of job and income creation from direct spending on capital improvements plus, the model generated estimates of indirect jobs such as in trucking, rail, warehousing and other freight-related services. The model was also used to determine the impact on the region's economy should no action be taken to expand the Port of Baltimore such that vessels divert to more competitive ports.

It should be noted that IMPLAN, like all input-output models is limited in one critical way, specifically, it is not a dynamic simulation model and therefore is not recommended for rigorous forecasting functions. The main reason for this limitation is that IMPLAN ignores technical change that affects its multipliers. For instance, if a dollar of spending in sector X generated Y jobs in 2002, then in 2020, a dollar of spending would generate the same number of jobs. This might be unrealistic given that there are significant trends in technical progress that would change the multiplier over time, especially in some sectors. Thus for long-term investment in infrastructure, researchers will need to make adjustments to the IMPLAN multipliers to account for technological change. Nevertheless, IMPLAN is a widely accepted tool for regional economic modeling and is therefore a defensible means of analyzing the regional impacts of operations and investment.

Study Areas

As defined by the US Census, POW lies within the Philadelphia-Wilmington-Camden Metropolitan Statistical Area (MSA). This area includes 11 counties in the States of Pennsylvania, New Jersey, Delaware and Maryland. The 11-county area will be deemed the regional economy or study area. Individual counties are listed below.

- Burlington County, NJ
- Camden County, NJ
- Salem County, NJ
- Gloucester County, NJ
- Bucks County, PA
- Chester County, PA
- Delaware County, PA
- Montgomery County, PA
- Philadelphia County, PA

¹ See Economic and Fiscal Impacts of the Panama Canal Expansion on the Port of Baltimore, downloaded from <https://www.towson.edu/campus/business/research/resi/documents/resi-eagb.pdf>

- New Castle County, DE
- Cecil County, MD

However, the model was also used to estimate impacts exclusive to the State of Delaware. Delaware counties are listed here.

- New Castle County, DE
- Kent County, DE
- Sussex County, DE

The Philadelphia-Wilmington-Camden MSA

According to the US Bureau of Economic Analysis, as of 2015, the population of the Philadelphia-Camden-Wilmington MSA was estimated to be 6,069,875 persons, the 7th largest in the US. Per capita income was \$57,173, or 119 percent of the national average of \$48,112.² The 2005-2015 compound annual growth rate of per capita income was 3.1 percent, just above the national growth rate of 3.0 percent. In the aggregate, the MSA had a personal income of \$347 billion in 2015.

State of Delaware

The total population of Delaware was 944,076³ in 2015 and per capita income was \$47,727. Total personal income amounted to \$45.6 billion and total output was \$70.2 billion. Delaware GDP is relatively slow-growing at an average annual rate of 2.3 percent from 2006 – 2016.⁴ The State of Delaware participates in international trade at slightly above what its population would suggest. The value of overseas shipments originating in Delaware range between 0.3 percent and 0.4 percent of all US export shipment value while Delaware’s population is just under 0.3 percent of the total US population.⁵

MSA Level Economic Impacts

MSA Direct Jobs Estimates

IMPLAN will accept as inputs, estimates of direct jobs at the port then use these to impute total wages and income. Direct wages and income are subsequently used to generate estimates of indirect and induced jobs, income, value-added, total output and tax revenues across the specified market or region. Estimates of direct jobs at POW were originally to be derived using an online survey via the Survey Monkey platform. We developed the survey instrument in early September and distributed it to all firms known to operate at POW. The survey included questions about total employment, total wages, the geographic distribution of employment, operating costs and type of business. Unfortunately, the response rate for this exercise was low with just 8 firms or 20 percent of the sample responding and not

² Source BEA at <https://www.bea.gov/regional/bearfacts/pdf.cfm?fips=37980&areatype=MSA&geotype=4>

³ Source: <https://fred.stlouisfed.org/series/DEPOP>

⁴ Source: <https://www.bea.gov/regional/bearfacts/pdf.cfm?fips=10000&areatype=STATE&geotype=3>

⁵ See US Census Total U.S. Exports (Origin of Movement) from Delaware available at <https://www.census.gov/foreign-trade/statistics/state/data/de.html>

all of the responses were complete. Therefore, SMPFRA and industry experts applied their knowledge of POW and port operations in general, engaged in discussions with port users, consulted private data providers and applied whatever survey results were usable to arrive at direct jobs estimates by company and occupational categories. These estimates (provided in Tables 4a and 4b) formed the foundation of the economic impact to follow. Impacts include jobs, wages, value-added, income/output and tax revenues.

MSA Employment

Direct jobs are generated by POW or by the cargo moving through POW and would not exist but for POW. SMPFRA developed a survey of POW tenants for which they were asked to provide the number of full- and part-time workers employed at the Port, the residential geography of those employees and the firm’s expenditures on wages and inputs. The survey was distributed via email with several follow-up attempts by additional emails and by phone. As discussed above, the response was poor and not sufficient to draw robust statistical inferences from. Therefore, SMPFRA filled in the gaps left by the survey instrument with its own research. After considerable effort, SMPFRA estimates that there are currently 2,951 jobs directly tied to POW activities. Their categorization is provided in Table 4a below.

Table 4a. POW Direct Jobs by Occupation and Cargo Sector*

Occupation	Other	Containers	Dry Bulk	Break-bulk	Liquid Bulk	Total	Share of Total Direct Jobs
Port Operations	135	25	15	6	0	181	6.1%
Longshoreman	10	124	20	74	5	233	7.9%
Other stevedore	7	3	3	11	0	24	0.8%
Warehousing In Port**	0	16	0	98	0	114	3.9%
Warehousing Out Port***	7	26	13	113	0	159	5.4%
Auto Processing	0	0	0	492	0	492	16.7%
Truck Drivers	0	469	137	730	0	1,336	45.3%
Rail Crews	0	0	0	111	0	111	3.8%
Other	44	32	12	58	155	301	10.2%
Total	203	695	200	1,693	160	2,951	100.0%

* The numbers in Table 4a represent jobs without controlling for hours worked. ** Warehousing jobs within the confines of POW. *** Warehousing jobs outside POW.

As shown above,

- The majority of workers (45.3%) at POW are truckers while the share of auto processors (16.7%) are a distant second;
- Longshoremen make up 7.9 percent of the work force at POW and operations personnel add another 6.1 percent.

Across cargo types, Table 4b provides jobs per thousand tons of cargo.

Table 4b. Jobs Per Thousand tons by Cargo Sector*

Cargo Sector	Jobs Per Thousand Cargo Tons
Containers	0.28
Break Bulk	3.76
Dry Bulk	0.14
Liquid Bulk	0.11
Total Cargo-Related Jobs	0.51

* Break bulk includes autos and project cargo. Source: SMPFRA using DSPC FY 2017 cargo statistics.

Using the 2,951 jobs by occupation as inputs, the IMPLAN model estimates an additional 2,766 indirect and induced jobs for a total of 5,717 either directly or indirectly associated with POW operations in the year 2017. Table 4c contains the IMPLAN job estimates plus estimated jobs per thousand tons of cargo.

Table 4c. MSA Employment Estimates

Job Classification	2017 Job Estimates	Jobs Per Thousand Cargo Tons
Direct	2,951	0.51
Indirect	1,188	0.20
Induced	1,578	0.27
Total	5,717	0.99

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

The historical progression of employment impacts at POW is given in Table 5.

Table 5. Current and Historical POW Employment Estimates

MSA Level	Previous Estimates*			SMPFRA Estimates	Average Annual Growth Rates	
	2006	2011	2016		2006 - 2017	2011 - 2017
Impact				2017		
Direct Jobs	2,295	2,201	3,031	2,951	2.3%	5.0%
Indirect + Induced Jobs	2,305	2,117	2,915	2,766	1.7%	4.6%
Total Jobs	4,600	4,318	5,946	5,717	2.0%	4.8%

* Martin Associates for 2006 and 2011 estimates, and DSPC for 2016 estimates.

The statistics in Table 5 suggest steady employment growth derived from POW operations from 2006 through 2017. However, it is also clear that growth accelerated significantly during the 2011 -2017 period in spite of sluggish growth in the value of total US merchandise trade during roughly the same period.⁶

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⁶ The US Census reports 0.4 percent average annual decline in the value of merchandise trade from 2011 – 2016. See <https://www.census.gov/foreign-trade/statistics/historical/goods.pdf>.

Estimated wages earned in 2017 by POW-associated employment are displayed in Table 6 along with the average 2017 MSA wage for January through September.

Table 6. MSA Wage Income, Average Annual Earnings and Hourly Wage*

Job Classification	2017 Total Wage Earnings (000's)	Wage Earnings Per Cargo Ton**	Average Annual Salary	Average Hourly Wage	Average Hourly MSA Wage (All Jobs)***
Direct	191,186	32.95	64,787	31.15	28.49
Indirect	83,505	14.39	70,301	33.80	28.49
Induced	88,833	15.31	56,306	27.07	28.49
Total	363,524	62.65	63,592	30.57	28.49

*Note wages are estimated exclusive of fringe benefits. Hourly wage is calculated assuming 2,080 hours per year.

Calculated from IMPLAN output and DSPC Cargo Statistics. * Source: US Bureau of Labor Statistics - includes all non-farm workers.

The majority of POW associated jobs in the region are relatively high-paying positions with an average wage that is 7.3 percent higher than the average wage for all jobs in the MSA. Direct jobs at POW pay 9.3 percent more than the average MSA wage and indirect jobs pay 18.6 percent higher wages than the regional average. Induced jobs associated with POW operations pay on average 5.0 percent less than the average MSA wage.

Value-Added

Technically, value-added is the value of production net of the value of intermediate goods needed for the production process. Specifically it measures the increase in local employee wages plus local business profits. It will always be less than total output which measures business revenues without consideration of input costs. Estimates of value-added by job classification for POW are provided in Table 7.

Table 7. MSA Region Value-Added

Effect Classification	2017 Value-Added (000's)	Value-Added Per Cargo Ton
Direct	219,662	37.86
Indirect	135,600	23.37
Induced	153,573	26.47
Total	508,835	87.70

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

POW contributes an estimated \$508.8 million in value-added to the region's economy. This amounts to \$87.70 per ton of cargo moving in and out of the port.

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Output

The MSA region's total output is the sum of all revenues earned by firms less leakages to outside the region, including spending on imports. Estimates of the MSA region's output derived from POW operations are given in Table 8.

Table 8. MSA Region Output

Effect Classification	2017 Output (000's)	Output Per Cargo Ton
Direct	444,169	76.55
Indirect	230,642	39.75
Induced	247,343	42.63
Total	922,155	158.94

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

The impact of the port on the MSA region's output is \$922.2 million or \$158.9 per ton of cargo.

State and Local Tax Revenue – MSA Region

Across the MSA, state and local taxes are collected on economic activity. IMPLAN provides estimates of these revenues using a state and local tax revenue matrix.

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Table 9. MSA Region Tax Collections

Description	State and Local Tax Revenue	State and Local Taxes \$/Cargo Ton
Dividends	91,068	0.02
Social Ins Tax- Employee Contribution	129,701	0.02
Social Ins Tax- Employer Contribution	262,057	0.05
Tax on Production and Imports: Sales Tax	9,391,392	1.62
Tax on Production and Imports: Property Tax	10,286,401	1.77
Tax on Production and Imports: Motor Vehicle License fees	183,650	0.03
Tax on Production and Imports: Severance Tax	-	-
Tax on Production and Imports: Other Taxes	2,721,941	0.47
Tax on Production and Imports: S/L Non-Taxes	51,600	0.01
Corporate Profits Tax	2,029,955	0.35
Personal Tax: Income Tax	8,680,208	1.50
Personal Tax: Non-Taxes (Fines- Fees)	1,103,383	0.19
Personal Tax: Motor Vehicle License	294,378	0.05
Personal Tax: Property Taxes	159,396	0.03
Personal Tax: Other Tax (Fish/Hunt)	205,316	0.04
Total State and Local Tax Revenue	35,590,445	6.13

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

State of Delaware Impacts

We adjusted the IMPLAN dataset to include just the three counties in Delaware and reran the analysis using as input, direct jobs by occupational category just as in the MSA-level analysis.

Table 10. State of Delaware Employment Estimates

Job Classification	2017 Job Estimates	Jobs Per Thousand Cargo Tons
Direct	2,951	0.51
Indirect	1,099	0.19
Induced	1,340	0.23
Total	5,390	0.93

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

There are a total of 5,390 jobs in the State of Delaware resulting from operations at POW; 2,951 direct and 2,439 indirect and induced jobs. For every thousand tons of cargo moving through POW, there are 0.93 jobs created.

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Table 11. State of Delaware Wage Income, Average Annual Earnings and Hourly Wage*

Job Classification	2017 Total Wage Earnings (000's)	Wage Earnings Per Cargo Ton**	Average Annual Salary	Average Hourly Wage	Average Hourly State Wage (All Jobs)***
Direct	198,205,679	34.16	67,166	32.29	26.40
Indirect	67,953,561	11.71	61,825	29.72	26.40
Induced	63,860,275	11.01	47,668	22.92	26.40
Total	330,019,515	56.88	61,230	29.44	26.40

*Note wages are estimated exclusive of fringe benefits. Hourly wage is calculated assuming 2,080 hours per year.

Calculated from IMPLAN output and DSPC Cargo Statistics. * Source: US Bureau of Labor Statistics - includes all non-farm workers.

As in the case of the MSA, jobs within the State of Delaware that are associated with POW operations are relatively well-compensated. Direct jobs pay on average 22.3 percent more than the statewide average; indirect jobs pay 12.6 percent higher wages. Pay for POW induced jobs in the State of Delaware is, however, relatively weak with an hourly wage that is on average 13.2 percent lower than the statewide average.

Delaware Value-Added Impacts

Estimates of value-added impacts for the State of Delaware by impact classification are contained in Table 12.

Table 12. State of Delaware Value-Added

Effect Classification	2017 Value-Added (000's)	Value-Added Per Cargo Ton
Direct	221,519	38.18
Indirect	119,197	20.54
Induced	122,167	21.06
Total	462,883	79.78

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

POW contributes an estimated \$462.9 million in value-added to Delaware's economy which amounts to \$79.78 per ton of cargo moving in and out of the port.

Output – Delaware State

The State's total POW-related output is given in Table 13.

Table 13. State of Delaware Output

Effect Classification	2017 Output (000's)	Output Per Cargo Ton
Direct	445,995	76.87
Indirect	198,646	34.24
Induced	193,915	33.42
Total	838,556	144.53

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

The POW's impact on total State of Delaware output is \$838.6 million or \$145 per ton of cargo.

Delaware State and Local Tax Revenue

Estimates of local tax revenues are provided in Table 14.

Table 14. State and Local Tax Collections - Delaware

State and Local Tax Revenue	State and Local Tax Revenue \$	State and Local Revenue \$/Cargo Ton
Dividends	60,580	0.01
Social Ins Tax- Employee Contribution	59,459	0.01
Social Ins Tax- Employer Contribution	120,135	0.02
Tax on Production and Imports: Sales Tax	2,872,074	0.50
Tax on Production and Imports: Property Tax	4,108,105	0.71
Tax on Production and Imports: Motor Vehicle Licenses	121,963	0.02
Tax on Production and Imports: Severance Tax	-	-
Tax on Production and Imports: Other Taxes	9,271,268	1.60
Tax on Production and Imports: S/L Non-Taxes	121,421	0.02
Corporate Profits Tax	1,709,286	0.29
Personal Tax: Income Tax	6,940,038	1.20
Personal Tax: NonTaxes (Fines- Fees	940,920	0.16
Personal Tax: Motor Vehicle License	220,322	0.04
Personal Tax: Property Taxes	72,337	0.01
Personal Tax: Other Tax (Fish/Hunt)	118,489	0.02
Total Tax Revenue	26,736,395	4.61

Source: IMPLAN output and SMPFRA using DSPC cargo statistics.

POW-related tax revenues across the State of Delaware amount to \$26.7 million

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Port of Wilmington Long-term Forecasts

The port is nearing capacity without the significant investment requirements identified in the recently completed 2016 Master Plan. The port of Wilmington, DSPC, and the State of Delaware are constrained by the inability to fund capital improvements. As POW considers its future options, there is a need to forecast cargo, jobs, and the associated economic impact for a base case. This base case will also be utilized during the US Army Corps of Engineers (USACE) dredge permitting process that is required for some potential investment options by the private sector under consideration.

A base case forecast has been developed that assumes:

- Masterplan cargo growth forecasts
 - Updated for actuals through 2017
 - Updated by eliminating a 2017 container service that did not materialize
 - Constrained to existing capacity due to the lack of significant Capital Expenditure (CAPEX) funds for minimum growth requirements in the Master Plan
 - Are not constrained by the potential loss of capacity in this analysis due to a possible lack of “maintenance” CAPEX that is identified in the Master Plan
- Jobs and economic impacts forecasted are based on the cargo forecasted

Using observed and IMPLAN generated results, SMPFRA generated long-term forecasts of jobs and regional economic impacts across POW cargo sectors. For jobs, the process involves first using observed 2017 jobs and cargo tonnage by sector, calculating jobs per ton per sector and growing those jobs forward to the year 2067 proportional to sectoral cargo growth.⁷

Table 15. Cargo base by Sector in 2017

	By Cargo Sector						
	Containers	Breakbulk	Liquid Bulk	Dry Bulk	Autos	Other	Total
2017 Cargo (000) Short Tons	2,493	1,421	1,437	321	130	0	5,802
Direct Jobs	695	694	160	200	999	203	2,951
Direct Jobs / 1,000 tons	0.279	0.141	0.111	2.162	7.685	NA	NA
Share Direct Jobs	23.6%	23.5%	5.4%	6.8%	33.9%	6.9%	100.0%

Indirect and induced jobs for 2017 by sector were generated by applying the aggregate IMPLAN ratios of indirect jobs to observed direct jobs and induced jobs to observed direct jobs. Forecasts of indirect and induced jobs were subsequently generated by growing them at the same rate as direct job growth (which grows proportional to cargo growth) under the assumption that the ratios of indirect and induced jobs to direct jobs do not change.

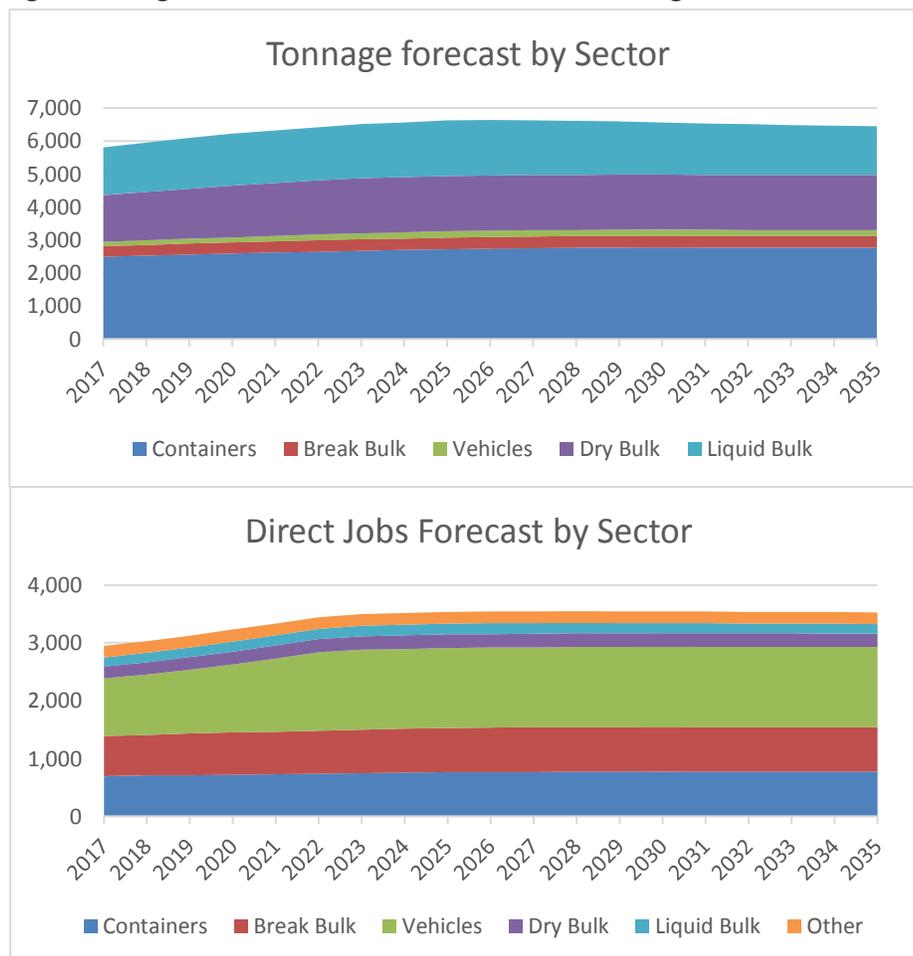
⁷ Note that cargo tonnage projections for all sectors but autos are capped beginning in the year 2035. For autos, tonnage is capped at 180,000 beginning in year 2023.

All other direct, indirect and induced economic impacts, including wages, output and value-added were generated by applying the 2017 share of direct jobs to aggregate IMPLAN outputs for the year 2017 then growing those impacts forward at the same rate as the growth in cargo.

Table 16. Cargo Forecast through 2035

Tons (000)	Cargo Forecast ->				
	2017	2022	2027	2032	2035
Containers	2,493	2,646	2,755	2,769	2,767
Break Bulk	321	341	355	357	356
Vehicles	130	176	180	180	180
Dry Bulk	1,421	1,640	1,675	1,665	1,659
Liquid Bulk	1,437	1,609	1,664	1,536	1,481
Total	5,802	6,413	6,629	6,507	6,443

Figure 2 and Figure 3. Cargo Forecast and Direct Jobs Forecast through 2035



Note the sector differences in cargo volumes versus jobs generated. The constraint of cargo growth is clearly evident after 2022.

Table 16. Total Trade (and Non-Allocated) Impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	2,951	3,449	3,549	3,540	3,531
	Indirect	1,099	1,285	1,322	1,318	1,315
	Induced	1,339	1,566	1,611	1,607	1,603
	Total	5,389	6,299	6,482	6,465	6,450
Wage	Direct	198,205,679	231,667,498	238,388,549	237,772,871	237,214,398
	Indirect	67,953,561	79,425,733	81,730,003	81,518,922	81,327,453
	Induced	63,860,275	74,641,405	76,806,873	76,608,507	76,428,571
	Total	330,019,515	385,734,636	396,925,425	395,900,299	394,970,421
Value Added	Direct	221,519,082	258,916,757	266,428,353	265,740,258	265,116,096
	Indirect	119,197,169	139,320,478	143,362,392	142,992,135	142,656,280
	Induced	122,166,511	142,791,116	146,933,718	146,554,238	146,210,016
	Total	462,882,763	541,028,351	556,724,464	555,286,631	553,982,392
Output	Direct	445,994,728	521,289,216	536,412,664	535,027,289	533,770,635
	Indirect	198,646,276	232,182,478	238,918,469	238,301,423	237,741,708
	Induced	193,914,949	226,652,391	233,227,946	232,625,596	232,079,213
	Total	838,555,953	980,124,085	1,008,559,079	1,005,954,308	1,003,591,556

Tables 17--22 contain the Jobs and Economic impacts 2017 – 2035 by sector, and are included in the “Appendix: Additional Forecast Tables by Cargo Sector”

Conclusion

The Port of Wilmington is an important contributor to the economy of the State of Delaware and to the broader region as defined by the Philadelphia – Wilmington – Camden Metropolitan Statistical Area (MSA). Operations at POW support an estimated 2,951 direct jobs and another 2,766 indirect jobs in the MSA. For the State of Delaware, the 2,951 POW jobs support an additional 2,439 jobs across the State. As a share of the Philadelphia- Wilmington- Camden MSA’s total output, POW contributes 0.2 percent however, the share of the State of Delaware’s total output that can be traced to POW amounts to 0.7 percent. With respect to the ratio of impacts to cargo tonnage, our findings indicate that for the MSA, every 1,000 tons of cargo moving in and out of the port is associated with 0.99 direct, indirect and induced jobs. For the State of Delaware, there are 0.93 total jobs created for every 1,000 tons of cargo. These ratios will vary according to cargo type.

In terms of direct jobs at the POW, the break bulk trade, mostly because of the large number of auto processor and trucking jobs leads the other sectors with 3.75 total direct jobs created for every thousand tons of cargo. Containerized trade adds 0.28 direct jobs at the POW per thousand tons of cargo and there are 0.11 direct jobs created at POW for every thousand tons of dry bulk trade.

Wages earned from direct and indirect jobs created by POW operations are higher than the State and MSA averages while induced jobs pay somewhat less. Overall, however, wages paid to POW-related workers are higher than average and as such will generate more additional personal income and therefore tax revenues than the average job in the MSA and in the State of Delaware.

The base case forecast for POW is severely constrained by capacity, and the inability of the DSPC and State of Delaware to provide significant capital investment as outlined by the 2016 Master Plan. The forecast herein may be optimistic considering the CAPEX outlined in the Master Plan contained significant funds to maintain capacity.

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Appendix: Additional Forecast Tables by Cargo Sector

Table 17. Container trade impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	695	738	768	772	772
	Indirect	259	275	286	288	287
	Induced	316	335	349	350	350
	Total	1,269	1,347	1,403	1,410	1,409
Wage	Direct	46,686,419	49,559,421	51,601,673	51,859,818	51,825,818
	Indirect	16,006,143	16,991,133	17,691,306	17,779,810	17,768,153
	Induced	15,041,989	15,967,647	16,625,644	16,708,816	16,697,862
	Total	77,734,550	82,518,201	85,918,623	86,348,444	86,291,832
Value Added	Direct	52,177,782	55,388,713	57,671,179	57,959,688	57,921,688
	Indirect	28,076,335	29,804,104	31,032,276	31,187,520	31,167,072
	Induced	28,775,749	30,546,560	31,805,327	31,964,438	31,943,481
	Total	109,029,865	115,739,377	120,508,781	121,111,645	121,032,242
Output	Direct	105,051,968	111,516,687	116,112,082	116,692,950	116,616,444
	Indirect	46,790,199	49,669,588	51,716,379	51,975,099	51,941,023
	Induced	45,675,757	48,486,565	50,484,607	50,737,164	50,703,899
	Total	197,517,924	209,672,840	218,313,068	219,405,213	219,261,366

Table 18. Break bulk trade impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	694	745	774	776	776
	Indirect	258	278	288	289	289
	Induced	315	338	351	352	352
	Total	1,268	1,361	1,413	1,418	1,417
Wage	Direct	46,619,244	50,052,542	51,975,540	52,155,511	52,101,654
	Indirect	15,983,112	17,160,197	17,819,484	17,881,187	17,862,722
	Induced	15,020,345	16,126,527	16,746,101	16,804,086	16,786,734
	Total	77,622,702	83,339,266	86,541,125	86,840,784	86,751,110
Value Added	Direct	52,102,706	55,939,836	58,089,021	58,290,162	58,229,969
	Indirect	8,035,937	30,100,658	31,257,113	31,365,344	31,332,955
	Induced	28,734,345	30,850,501	32,035,764	32,146,692	32,113,496
	Total	108,872,988	16,890,996	121,381,898	121,802,198	121,676,421
Output	Direct	104,900,814	112,626,289	116,953,343	117,358,308	117,237,121
	Indirect	46,722,875	50,163,806	52,091,078	52,271,449	52,217,472
	Induced	45,610,037	48,969,012	50,850,380	51,026,456	50,973,765
	Total	197,233,726	211,759,106	219,894,801	220,656,214	220,428,358

Table 19. Auto trade impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	999	1,353	1,383	1,383	1,383
	Indirect	372	504	515	515	515
	Induced	454	614	628	628	628
	Total	1,825	2,472	2,526	2,526	2,526
Wage	Direct	67,107,528	90,903,885	92,918,116	92,918,116	92,918,116
	Indirect	23,007,391	31,165,821	31,856,387	31,856,387	31,856,387
	Induced	21,621,506	29,288,501	29,937,470	29,937,470	29,937,470
	Total	111,736,425	151,358,206	154,711,973	154,711,973	154,711,973
Value Added	Direct	75,000,869	101,596,207	103,847,357	103,847,357	103,847,357
	Indirect	40,357,206	54,667,888	55,879,208	55,879,208	55,879,208
	Induced	41,362,552	56,029,729	57,271,225	57,271,225	57,271,225
	Total	156,720,626	212,293,824	216,997,790	216,997,790	216,997,790
Output	Direct	151,002,757	204,548,395	209,080,740	209,080,740	209,080,740
	Indirect	67,256,704	91,105,958	93,124,666	93,124,666	93,124,666
	Induced	65,654,794	88,936,010	90,906,637	90,906,637	90,906,637
	Total	283,914,254	384,590,363	393,112,044	393,112,044	393,112,044

Table 20. Dry bulk trade impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	200	231	236	234	234
	Indirect	74	86	88	87	87
	Induced	91	105	107	106	106
	Total	365	422	431	428	426
Wage	Direct	13,434,941	15,504,890	15,836,397	15,739,320	15,685,692
	Indirect	4,606,084	5,315,753	5,429,408	5,396,126	5,377,740
	Induced	4,328,630	4,995,551	5,102,360	5,071,082	5,053,804
	Total	22,369,655	25,816,194	26,368,165	26,206,528	26,117,236
Value Added	Direct	15,015,189	17,328,611	17,699,110	17,590,615	17,530,679
	Indirect	8,079,521	9,324,349	9,523,711	9,465,331	9,433,080
	Induced	8,280,791	9,556,630	9,760,958	9,701,124	9,668,070
	Total	31,375,501	36,209,590	36,983,780	36,757,069	36,631,829
Output	Direct	30,230,782	34,888,502	35,634,446	35,416,007	35,295,336
	Indirect	13,464,806	15,539,356	15,871,600	15,774,307	15,720,560
	Induced	13,144,103	15,169,242	15,493,573	15,398,597	15,346,131
	Total	56,839,690	65,597,101	66,999,619	66,588,912	66,362,027

Table 21. Liquid Bulk trade impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	160	179	185	171	165
	Indirect	60	67	69	64	61
	Induced	73	81	84	78	75
	Total	292	327	338	312	301
Wage	Direct	10,747,952	12,037,165	12,447,229	11,490,511	11,073,523
	Indirect	3,684,867	4,126,866	4,267,453	3,939,449	3,796,487
	Induced	3,462,904	3,878,278	4,010,397	3,702,150	3,567,800
	Total	17,895,724	20,042,308	20,725,079	19,132,110	18,437,810
Value Added	Direct	12,012,151	13,453,003	13,911,300	12,842,051	12,376,016
	Indirect	6,463,617	7,238,925	7,485,529	6,910,177	6,659,408
	Induced	6,624,633	7,419,255	7,672,003	7,082,318	6,825,302
	Total	25,100,401	28,111,183	29,068,832	26,834,546	25,860,727
Output	Direct	24,184,626	27,085,561	28,008,271	25,855,501	24,917,211
	Indirect	10,771,844	12,063,922	12,474,898	11,516,053	11,098,138
	Induced	10,515,282	11,776,586	12,177,773	11,241,766	10,833,805
	Total	45,471,752	50,926,069	52,660,941	48,613,320	46,849,155

Table 22. Other (Non-Allocated) Impacts

Impact	Impact Type	2017	2022	2027	2032	2035
Jobs	Direct	203	203	203	203	203
	Indirect	75	75	75	75	75
	Induced	92	92	92	92	92
	Total	370	370	370	370	370
Wage	Direct	13,609,595	13,609,595	13,609,595	13,609,595	13,609,595
	Indirect	4,665,963	4,665,963	4,665,963	4,665,963	4,665,963
	Induced	4,384,902	4,384,902	4,384,902	4,384,902	4,384,902
	Total	22,660,460	22,660,460	22,660,460	22,660,460	22,660,460
Value Added	Direct	15,210,386	15,210,386	15,210,386	15,210,386	15,210,386
	Indirect	8,184,554	8,184,554	8,184,554	8,184,554	8,184,554
	Induced	8,388,441	8,388,441	8,388,441	8,388,441	8,388,441
	Total	31,783,382	31,783,382	31,783,382	31,783,382	31,783,382
Output	Direct	30,623,782	30,623,782	30,623,782	30,623,782	30,623,782
	Indirect	13,639,848	13,639,848	13,639,848	13,639,848	13,639,848
	Induced	13,314,976	13,314,976	13,314,976	13,314,976	13,314,976
	Total	57,578,606	57,578,606	57,578,606	57,578,606	57,578,606