# Port of Portland Container Service Forecast and Economic Contribution Assessment
# FINAL REPORT

PREPARED FOR

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# Chapter 1. Executive Summary

## Purpose

BST Associates was retained to update the Port of Portland container forecast and to prepare an economic contribution assessment associated with this container traffic.

The following report was developed for the Port of Portland as input for grant applications. Key findings are summarized below.

## Container Forecast

Container operations at the Port of Portland restarted at the beginning of 2020, when SM Line commenced a new weekly service that connected Portland with ports in Asia. In the past few months, several other lines have chosen Portland for additional service:

- SM Line will now supplement the existing service with calls by extra-loader vessels every other week.
- SM line has also formed a partnership with Union Pacific Railroad to offer intermodal service from Portland to Chicago.
- MSC is adding a weekly call in Portland to its existing "Santana" service from China to the Pacific Northwest. Portland will serve as the first port of call on this route.
- Lotus Containers has chartered six vessel calls from Ocean 7 starting mid-August with calls at Portland every three weeks, with each vessel carrying around 600 containers.
- Portland has also begun receiving chartered vessels carrying 200 to 300 domestic 53-foot containers per ship, with these ad-hoc calls scheduled to run through 2022.
- Additional negotiations are underway that may add more long-term container service on a bi-weekly or weekly basis.

Some of these services have started in response to congestion at other ports caused by the impacts of Covid-19 on the supply chain, and these services are expected to continue until that congestion is resolved. However, the existing SM Line Rose service and the MSC Santana service are projected to continue after the congestion is resolved, under both the reference and high case forecast scenarios.

Under the low, reference and high cases forecast volumes are projected to grow to approximately 143,000 TEU (low), 177,000 TEU (reference), 214,000 TEU (high) by 2030. (See Table 1-1).

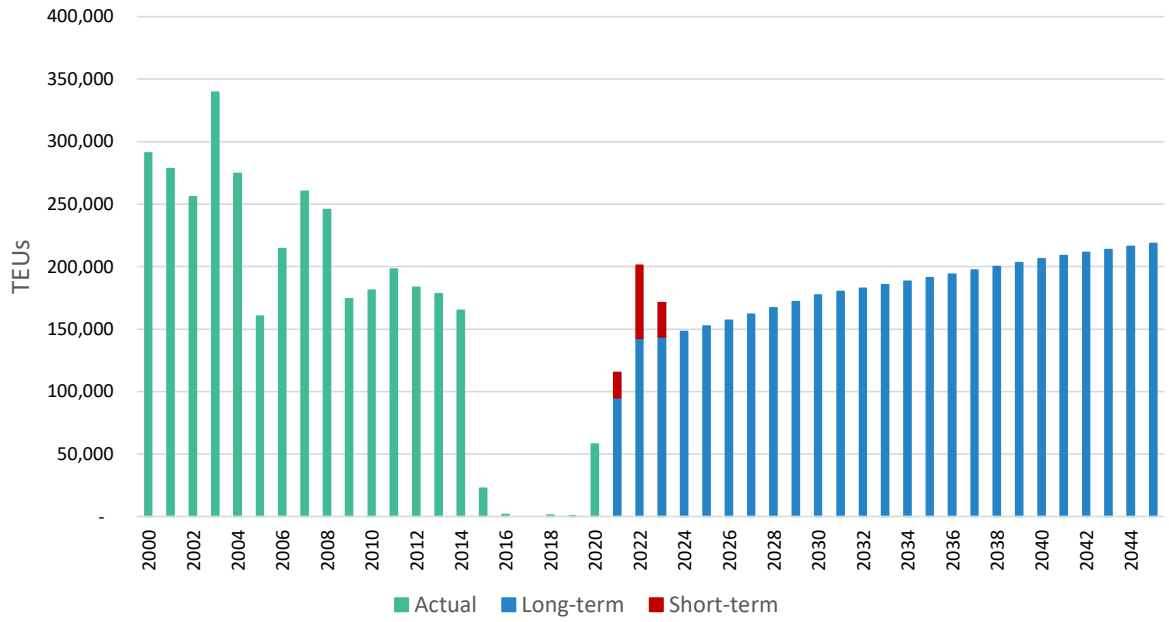
Figure 1-1 illustrates the container forecast from 2021 to 2045. This graph separates cargo volumes that are projected for the short term (through 2023) from those expected to last for the long-term. The short-term volumes are primarily related to Covid-19 supply chain problems, while the long-term volumes primarily serve the local/regional market.

**Table 1-1: Portland Container Trade by Vessel (1,000 TEU)**

| | | History | | | Forecast | | | Compound Annual Growth Rate | |
|---|---|---|---|---|---|---|---|---|---|
| Direction | Case | 2000 | 2010 | 2020 | 2021 | 2030 | 2045 | 2000-2021 | 2021-2045 |
| | Low | - | - | - | 111 | 143 | - | | 0.0% |
| Total | Reference | 290.9 | 181.1 | 58 | 115 | 177 | 219 | -4.3% | 2.7% |
| | High | - | - | - | 122 | 214 | 314 | | 4.0% |

Source: BST Associates

**Figure 1-1: Port of Portland Container Forecast – Reference Case**




## Economic Contribution – Supply Chain

Under the reference case forecast for 2030, the economic contributions resulting from the forecasted container terminal activity of 177,000 TEU at the Port of Portland include:

- Employment
  - 719 direct, full-time-equivalent jobs,
  - 1,619 total jobs (direct, indirect and induced).
  - Each direct job supports 1.25 additional jobs.
- Income [1]
  - Direct income is projected to be $57 million in 2030. These are family wage jobs, with an average payroll (wages plus benefits) of $79,000 per job, which is 36% percent higher than the statewide average wage.
  - Each $1 of direct income supports $2.8 of additional income.

[1] Dollar estimates are reported in 2021 dollars.

  - Total income is projected to be $215 million (direct, indirect and induced effects).
- Revenues
  - $143 million (from key sectors in the supply chain serving the Port) in 2030.
- State and Local taxes
  - Approximately $21 million.

## Related Jobs

The total value of containerized trade that moves through the Port of Portland in 2030, to or from Oregon importers and exporters, is projected to be $1.98 billion. This includes $408.4 million in exports and $1.57 billion in imports. This level of activity supports:

- A total of 11,388 direct jobs, including 4,722 jobs related to exporters and 6,666 related to importers.
- Total direct income of $447.4 million, including $148.3 million related to exports and $299.2 related to imports.

## Transportation Cost Savings

The resumption of container service at Portland has reduced transportation costs for many Oregon businesses. Prior to re-introduction of container service, shippers and receivers trucked containers directly to terminals in Seattle or Tacoma (i.e., the Northwest Seaport Alliance, or NWSA), or trucked containers to/from Portland and then used rail shuttle service to/from the NWSA facilities.

Trucking containers to the Port of Portland and using ocean services at Portland generates significant savings for shippers. The transportation cost savings that result from container service at Portland are projected to be $31.5 million in 2030.[2]

**Table 1-2: Transportation Cost Savings in 2030 (Using 2021 Dollars)**

| | | Transportation Costs ($ million)[3] | | |
|---|---|---|---|---|
| **Region** | **Containers** | **With service** | **Without service** | **Savings** |
| Portland-North Willamette | 26,297 | $4.9 | $18.0 | $13.1 |
| Middle Willamette | 23,882 | $11.1 | $25.4 | $14.3 |
| Southern Oregon | 879 | $1.0 | $1.6 | $0.5 |
| Central Oregon | 5,230 | $4.6 | $7.7 | $3.1 |
| Eastern Oregon | 743 | $1.1 | $1.6 | $0.4 |
| **Oregon Total** | **57,031** | **$22.7** | **$54.2** | **$31.5** |

Source: BST Associates, Port of Portland, Tioga Group

[2] Transportation cost savings determined by estimating differential in trucking costs by region to Portland versus trucking/intermodal service to ports in the Seattle/Tacoma area.

[3] Includes imports and exports.

# Chapter 2. Container Forecasts

In the US Pacific Northwest, container trade is centered at the NWSA. Portland lost container service in 2015, after handling more than an average of 200,000 TEU per year since 2000. Recently, the Port of Portland has attracted new services, providing a boost to both current and projected future volumes. The new shipping services were attracted to Portland for several reasons, including the cost advantages for regional cargoes, the availability of port terminal capacity, high productivity from the Portland labor force, and relatively uncongested inland rail access.

The services that have commenced operations at the Port of Portland include:[4]

- SM Line started a weekly trans-Pacific liner service in Portland in early 2020. SM Line will now supplement the service with calls by extra-loader vessels every other week. SM Line has also formed a partnership with Union Pacific Railroad to offer intermodal through service from Portland to Chicago.
- MSC added a weekly call in Portland to its existing "Santana" service from China to the Pacific Northwest. The new rotation is: Yantian, Shanghai, Portland, Tacoma, Yantian. Portland will serve as the first port of call on this route.
- Since mid-August (2021), Lotus Containers, has started bringing in chartered vessels on the Ocean 7 service with calls every three weeks at the port. Each vessel call carries approximately 600 containers.
- Portland has also begun receiving chartered vessels carrying 200 to 300 domestic 53-foot containers per ship, with the ad-hoc calls presently anticipated to run through at least 2022.

Given the new commitments of vessel services using Portland, volume comparisons against recent historical volumes are difficult to ascertain. The long-term prospect for container shipping at the Port of Portland depends on several factors. Shipping analysts indicate that "carriers must generate enough local import and export cargo to warrant the one-day journey up the Columbia River, as well as the federal harbor maintenance fee and port charges, in order to make a Portland stop worthwhile".[5]

Productivity of labor was a major issue for Portland in the past, but increased productivity is a key driver behind the new container services. A key reason for the previous loss of container service was a dispute between the terminal operator at the time and labor, which led to delays in moving cargo and increased costs to shippers. However, this issue has been resolved. According to a recent article:

> "The flurry of activity represents a stark change for Portland, which had no weekly liner services for four years until early 2020 when SM Line added the port to its Pacific Northwest rotation. Portland, which handled more than 300,000 TEU a year from 2010 to 2015, lost its liner services due to a jurisdictional dispute involving the International Longshore & Warehouse Union (ILWU) and International Container Services Inc (ICTSI). ICTSI operated Portland's only container facility, Terminal 6, from 2010 to 2017. Mike

[4] Portland popularity growing among trans-Pacific carriers, Journal of Commerce, September 8, 2021.

[5] SM Line gives Portland a container comeback opening, Journal of Commerce, January 9, 2020.

Stanton, president of ILWU Local 8 in Portland, said Tuesday the local "fully supports the port's mission" to partner with industry to create jobs in Oregon and the Columbia River region."[6]

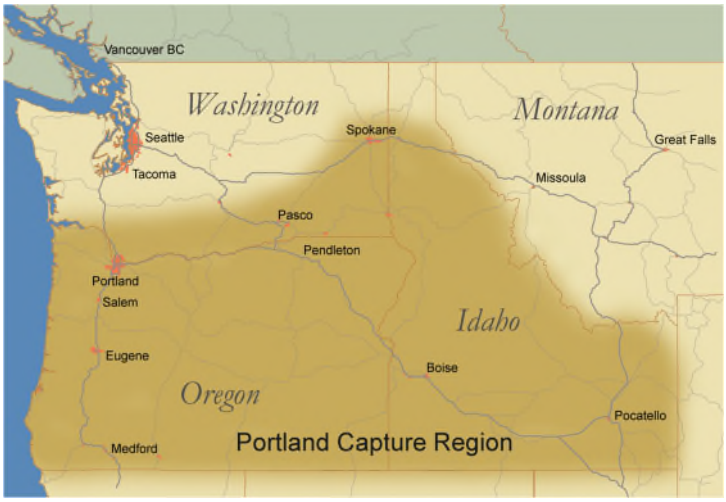
Compounding the problem for Portland was a rapid increase in the size of container vessels. The Columbia River navigation channel provides 43 feet of water depth, but the newest container vessels draw more than 50 feet of water. In addition, container lines have increasingly focused on load centering, in which container traffic is funneled through only a few select ports. However, the impact of Covid-19 has led to serious congestion at the major container ports, and forced shipping lines to re-consider using smaller, less-congested ports like Portland.

The larger vessels provide lower costs per container, if high load factors can be maintained. However, the smaller vessels now calling at Portland require fewer containers to operate at high load factors, and can be competitive with the larger vessels. A report prepared for Port Metro Vancouver (PMV) explored the expected vessel distribution with and without the proposed Roberts Bank Terminal 2 that is currently in the planning stages.[7] The report concluded that smaller vessels (i.e., 2,500 to 4,500 TEU) will likely continue to be operating in the Pacific Northwest (PNW) container trade in 2035, despite the rapid shift to larger vessels by most carriers. This size of vessel is well within the operating specifications of Columbia River navigation channel.

## Local/Regional Market Size

Portland's local container market mainly consists of an area that includes Oregon, southern Idaho, and the region served by the barge system in Southeast Washington and Northern Idaho, as shown in Figure 2-1. Products in this market area can move either via Columbia River ports (primarily the Port of Portland) or container ports in Puget Sound. Some cargo also moves through other ports (e.g., Oakland, Los Angeles and Long Beach, et al.) depending upon the location of the shipper and the trade route.

**Figure 2-1: Port of Portland Container Market Area**




[6] Portland popularity growing among trans-Pacific carriers, Journal of Commerce, September 8, 2021.

[7] Mercator. Roberts Bank Terminal 2 Container Vessel Call Forecast Study, prepared for Metro Port Vancouver, November 2018.

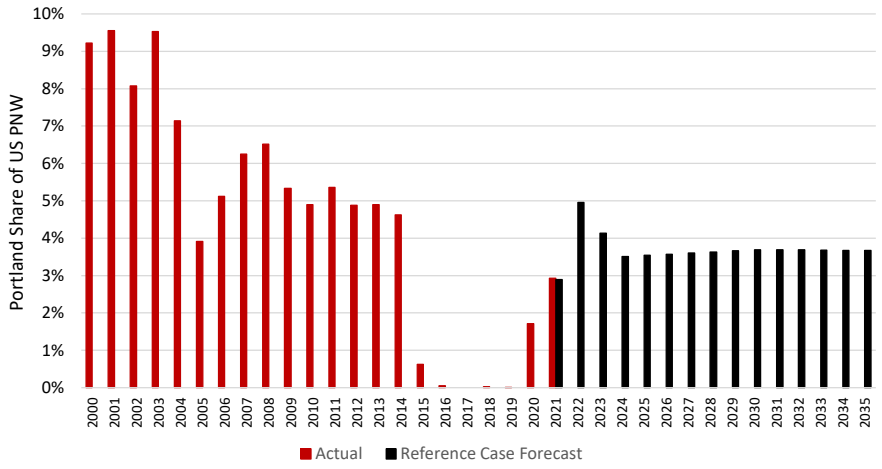
Source: Port of Portland

The local/regional market served by the Port of Portland imports and exports goods equivalent to approximately 261,000 full TEU each year [8] Portland is currently capturing about 7% of the potential local/regional market, with the rest going through NWSA terminals or other ports. It is anticipated that Portland will attract a larger portion of the local/regional market in future years.

The MSC service is also targeting the local/regional market, which increases the potential volumes moving through Portland.

The Port is expected to re-capture around 50% of the local/regional market within the forecast period. As a share of US PNW port container traffic, the Port is projected to have slightly less than 4% of the region's container traffic under the reference case. Portland consistently captured 4.0% to 9.5% of US PNW container traffic from 2000 to 2014, as shown in Figure 2-2.

**Figure 2-2: Port of Portland Share of US PNW Port Container Traffic**




## Ocean Service Forecast

BST Associates updated the container forecast by taking into account the services using the Port of Portland and updating annual growth rates. Projected volumes in 2022 and 2023 reflect expected additional cargo volumes from existing and new services. From 2025 to 2045, growth is projected at annual rates 1.8% growth is projected under the reference case.

The Port of Portland and its partners (State of Oregon, private sector firms) have worked to overcome past difficulties, and these efforts have produced substantial success. Container volumes in 2045 are projected to be 219,000 TEU under the reference forecast and 314,000 TEU under the high forecast.

Key assumptions include:

[8] Port of Portland estimates for full containers using data from PIERS for the period 2020-Q2 through 2021 Q-2.

- Existing container services remain in Portland and grow as projected under the reference and high case scenarios. This assumes that the Port of Portland regains shares of the local/regional market.
- Under the low forecast, container service would cease before 2045, assuming a combination of three factors: new vessels constructed for transpacific deployment trend larger than the capability of the Port to handle, the port does not maintain or upgrade existing equipment and infrastructure, and the Columbia River Navigation Channel is not deepened beyond its current authorized depth.
- Exports have traditionally represented the largest share of the Port's container traffic, accounting for more than 76% of containers from 1999 to 2005. However, in recent years, exports and imports have both accounted for 50% of the trade, which is beneficial to carriers.
- Exporters have been negatively impacted by US trade policy and the high cost and decreased capacity of ocean transportation. In the US PNW, containerized exports decreased by 18% in the last 4 years.[9] The reference and high forecast assumes that exporters will begin to increase export volumes as container service is restored to the level of prices and capacity that existed prior to Covid-19.
- Export opportunities for specialized products like chill and frozen meat and vegetable products could represent additional growth in Portland.
- US West Coast container imports increased by 25% in the last 4 years.[10] This overloaded the system at every stage of the supply chain, and as a result, the supply chain, based on just-in-time logistics, was overwhelmed. Recent efforts to address this situation include 24/7 operations at port terminals and other hubs, among other procedures. These solutions will increase the cost of using West Coast mega-ports and could present a cost advantage to Portland.
- Several major distribution centers are being located in the Portland metro area. There is an opportunity to serve these facilities via Port of Portland import container service.
- Local/regional importers and exporters have been very supportive of direct container service to Portland. The reference and high forecasts assume importers and exporters will continue to use these services.

[9] Source: PIERS global container report for US PNW ports [Q3/2016 to Q2 2017] compared with [Q3/2020 to Q2 2021].

[10] Source: PIERS global container report for US West Coast ports [Q3/2016 to Q2 2017] compared with [Q3/2020 to Q2 2021].

**Table 2-1: Portland Container Trade by Vessel (1,000 TEU)**

| | | History | | | Forecast | | | Compound Annual Growth Rate | |
|---|---|---|---|---|---|---|---|---|---|
| Direction | Case | 2000 | 2010 | 2020 | 2021 | 2030 | 2045 | 2000-2021 | 2021-2045 |
| | Low | | | | 57 | 68 | - | | 0.0% |
| Imports | Reference | 69 | 85 | 30 | 59 | 82 | 93 | -0.8% | 1.9% |
| | High | - | - | - | 64 | 107 | 163 | | 3.9% |
| | Low | - | - | - | 54 | 75 | - | | 0.0% |
| Exports | Reference | 221 | 96 | 28 | 56 | 96 | 126 | -6.3% | 3.4% |
| | High | - | - | - | 58 | 107 | 151 | | 4.1% |
| | Low | - | - | - | 111 | 143 | - | | 0.0% |
| Total | Reference | 291 | 181 | 58 | 115 | 177 | 219 | -4.3% | 2.7% |
| | High | - | - | - | 122 | 214 | 314 | | 4.0% |

Source: BST Associates

## Methodology

The container forecasts in this report are based on the Marine Cargo Forecast that BST Associates prepared in 2017 for the Washington Public Ports Association and the Freight Mobility Strategic Investment Board. The results of this forecast were compared with actual volumes for the most recent five years, as well as with the long-term growth rates in other, more recent forecasts.

### 2017 Marine Cargo Forecast Performance

The 2017 Marine Cargo Forecast was based on detailed short-term and long-term economic projections, including commodity forecasts for the US West Coast (supplied by IHS Markit), as well as trends and forecasts from the IMF, World Bank, USDA, and OECD. Based on these sources, trade forecasts were prepared for a reference case (base case) as well as for low and high cases. Forecasts were produced for containerized trade, as well as for other cargo handling groups (breakbulk, logs, autos, grain, dry and liquid bulks).

As shown in Table 2-2, the container forecast has performed well. The actual container volumes from 2016 to 2021 (estimated) were within the range of the forecast prepared in 2017, with the exception of 2020 (due to supply chain impacts related to Covid-19). This indicates that the model has worked effectively during the recent past.

**Table 2-2: US PNW Container Volumes, Actual versus Forecast (million TEU)**

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 est. |
|---|---|---|---|---|---|---|
| Actual | 3.62 | 3.70 | 3.80 | 3.78 | 3.32 | 3.81 |
| Forecast - Low | 3.62 | 3.64 | 3.66 | 3.68 | 3.70 | 3.74 |
| Forecast - Reference | 3.66 | 3.72 | 3.78 | 3.84 | 3.90 | 3.98 |
| Forecast - High | 3.69 | 3.79 | 3.89 | 3.99 | 4.10 | 4.27 |

Source: BST Associates, WPPA 2017 Marine Cargo Forecast

### Forecast Growth Rates for Container Trade

BST Associates applied the growth forecasts from the WPPA 2017 Marine Cargo Forecast to Port of Portland import and export volumes for future years. This resulted in an average

annual growth rate of 2.7% for the Portland reference case between 2021 and 2045. It should be noted that 2021 overestimates the Port's annual container traffic because MSC was only calling for a part of the year.

The Port of Portland reference growth rate for container traffic was also compared with two other recent studies, including one prepared for the San Francisco Bay Conservation and Development Commission (BCDC), and one prepared for The Vancouver Fraser Port Authority (VFPA) in British Columbia.

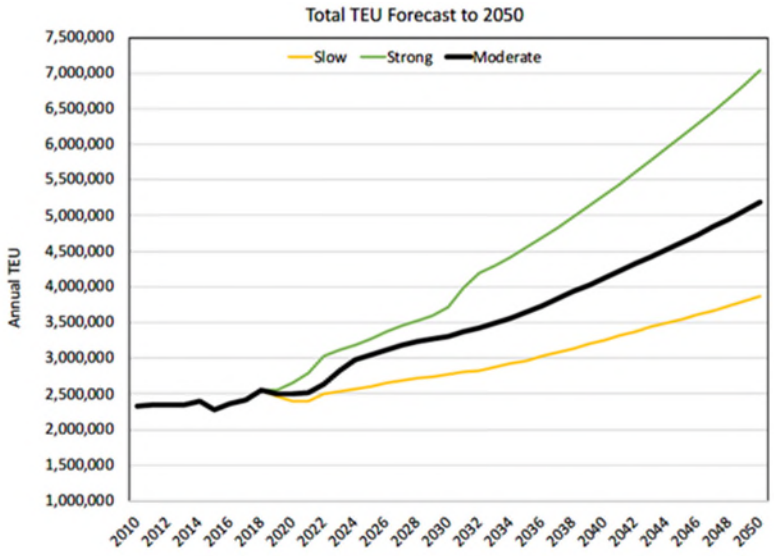
### BCDC Forecast

The BCDC is responsible for assuring that there is sufficient land for waterfront industrial uses (including port terminals) in San Francisco Bay. BCDC staff retain a consultant when needed to review the demand for and supply of marine terminals (including container terminals). The most recent forecast was developed by The Tioga Group and Hackett Associates.[11]

Figure 2-3, depicts the results of the forecast. Projected container volumes and annual growth rates from 2021 to 2045 are:

- Slow Growth forecast: 3.55 million TEU in 2045, with a CAGR[12] of 1.6%
- Moderate Growth forecast: 4.61 million TEU in 2045, with a CAGR of 2.6%
- Strong Growth forecast: 6.11 million TEU in 2045, with a CAGR of 3.5%

**Figure 2-3: BCDC 2020 Container Forecast**




### VFPA Forecast

The VFPA is charged with ensuring that there is sufficient terminal space on Canada's West Coast for projected trade volumes.

[11] 2019-2050 Bay Area Seaport Forecast Revised Draft Final. Prepared for San Francisco Bay Conservation and Development Commission by The Tioga Group and Hackett Associates, April 30, 2020.

[12] CAGR is Compound Annual Growth Rate

The VFPA contracts with consultants to produce independent forecasts of container volumes, and these forecasts consider long-term trends in global markets and trade, as well as a range of other drivers of container traffic demand. According to the VFPA, the findings of these forecasts have historically proven to be very accurate, with container traffic to and from the West Coast projected to grow significantly well into the future.

The most recent forecasts were developed in 2020, by WSP UK Ltd. and Drewry Shipping Consultants Ltd. This forecast updated the previous study, which was completed in 2016 by Ocean Shipping Consultants.[13] The VFPA reviewed the results of these forecasts and prepared their own summary forecast to guide container terminal planning and development.

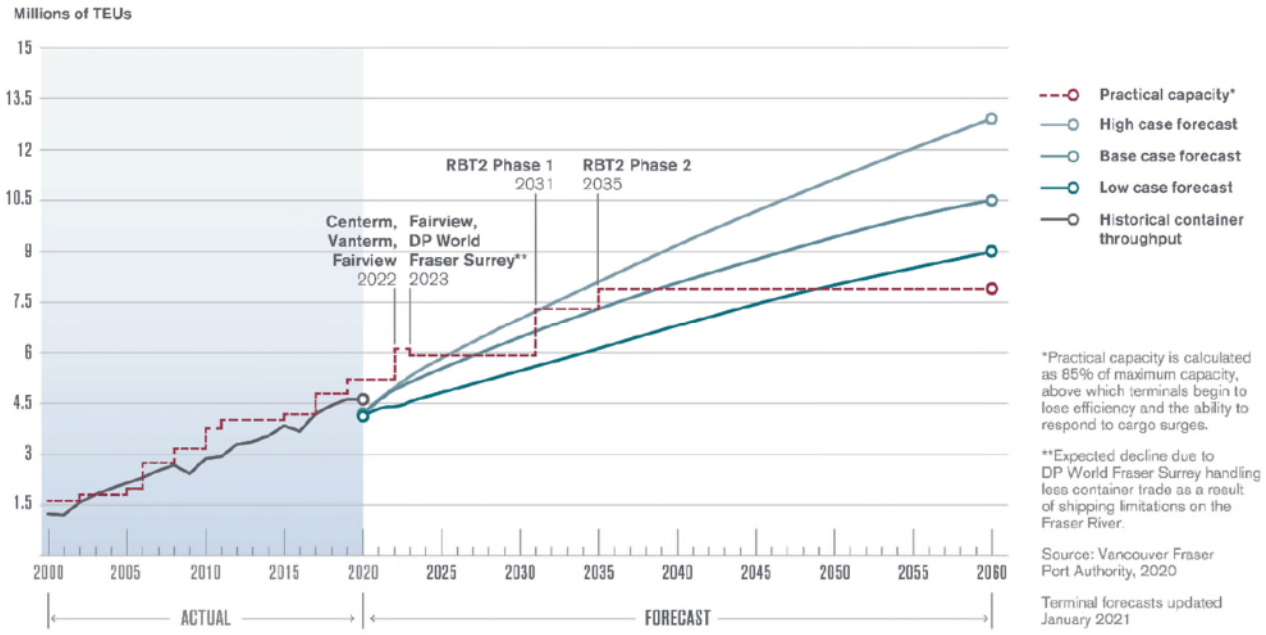
Figure 2-4 illustrates the results of the most recent forecast, which includes all container ports in British Columbia. Projected container volumes for 2045 and annual growth rates for 2021 through 2045 include:

- Low Growth forecast: 7.38 million TEU in 2045, CAGR of 2.1%.
- Base Growth forecast: 8.73 million TEU in 2045, CAGR of 2.7%.
- High Growth forecast: 10.05 million TEU in 2045, CAGR of 3.3%.

Under the reference case forecast, the VFPA projects that the practical capacity of Canada's West Coast ports will be fully utilized by 2037. This capacity assumes that all currently planned improvements are completed at terminals at the VFPA and at the Port of Prince Rupert. In order to meet the projected 2045 volume, this implies that additional port capacity will be needed. Since a growing portion of the container traffic moving through BC ports consists of intact ISO boxes (i.e., ocean containers) bound for US destinations (i.e., primarily the US Midwest and Southeast), this could create additional demand for US Pacific Northwest container service.

[13] WSP UK Ltd. and Drewry Shipping Consultants Ltd., Vancouver Fraser Port Authority View on Container Forecast Volumes 2020-2060.

**Figure 2-4: VFPA 2020 Container Forecast for British Columbia**




### Comparison of Forecasts

Annual long-term growth rates for the Port of Portland updated container forecast are comparable to the other forecasts. For the period from 2021-2045, the three forecasts are very similar:

- Portland 2021 2.7%
- BCDC 2020 2.6%
- VFPA 2020 2.7%

It should be noted, however, that 2021 represents a low start-up year for Portland relative to future projections. As a result, 2.7% annual growth overstates the expected annual growth. Using the period 2025 to 2045, Portland's container volumes are expected to grow at 1.8% per year under the reference case.

# Chapter 3. Economic Contributions

This section presents a summary of the economic impacts associated with container traffic at the Port of Portland, including contributions to:

- the supply chain in Oregon,
- related jobs associated with importers and exporters in Oregon, and
- transportation cost savings for importers and exporters.

## Economic Contribution from Container Service at Portland to the Supply Chain

The economic contributions of container service at the Port of Portland were estimated for the year 2030, based on the reference case forecast of 177,000 TEU. Results of this analysis are presented below.

### Employment

The number of direct, full-time-equivalent jobs associated with the container operations in 2030 is projected to be 719. The total employment impact associated with the container terminal is 1,619 jobs, with each direct job at the container terminal supporting 1.25 additional jobs.

Direct jobs include employment in the following sectors:

- Surface Transportation
  - Rail
  - Truck
- Maritime Services
  - Terminal
  - ILWU
  - Tug Assists
  - Pilots
  - Steamship Lines/Agents
  - Other Services (forwarders et al.)
  - Warehouse/Distribution Centers
  - Government agencies

### Income

Direct income resulting from the container operation is projected to be $57 million in 2030.

The jobs generated as a result of the container operation are relatively high-paying, with an average payroll (wages plus benefits) of $79,000 per job. This is 36% percent higher than the statewide average wage in Oregon.

Each $1.0 of direct income supports $2.8 of additional income. Total income (including direct, indirect and induced effects) is projected to be $215 million.

### Revenue

Direct revenues are projected to be $143 million, including revenue associated with the activity in key sectors of the supply chain serving the Port of Portland.

## State & Local Taxes

State and local taxes are projected to be approximately $21 million as a result of container operations at the Port of Portland.

**Table 3-1: Economic Impacts of Container Service at the Port of Portland**

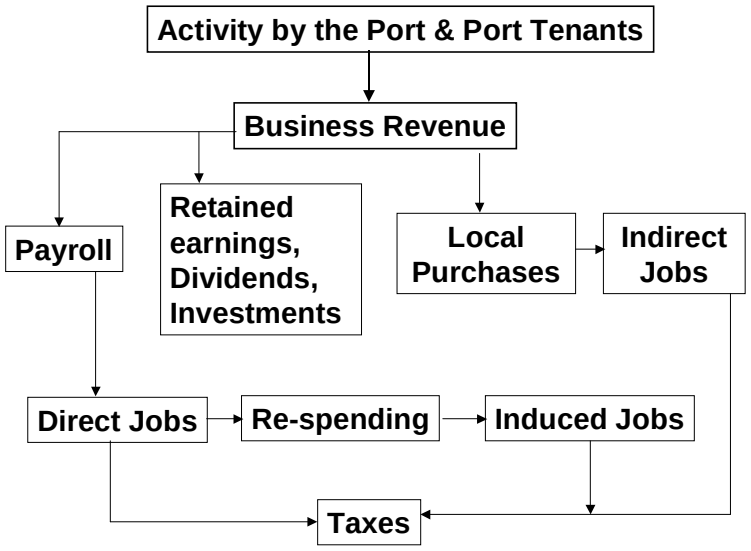
| Category | Amount |
|---|---|
| Jobs | |
| Direct Jobs | 719 |
| Total Jobs | 1,619 |
| Personal Income (1,000) | |
| Direct | $56,975 |
| Total | $215,404 |
| Revenue (1,000) | $143,023 |
| State/Local Taxes (1,000) | $20,685 |

Source: BST Associates, Port of Portland Reports for economic impact multipliers

## Methodology

The flow of economic activities is described in Figure 3-1. Economic activity generated by firms and individuals in container operations serving Portland creates business revenues, which in turn, creates spending on payrolls for people working directly for the firm, retained earnings/dividends/investments and local purchases of supplies, materials, and outside labor. The local purchases by firms create indirect jobs. Payroll for direct employees creates additional expenditures, which creates induced jobs. Finally, income associated with direct, indirect and induced activity generates state and local taxes.

**Figure 3-1: Flow of Economic Impacts**




The process for estimating economic impacts for this effort relied on existing economic impact reports prepared for the Port of Portland and other US West Coast ports engaged in container activity. These included:

- Economic Impact reports prepared by Martin & Associates for the Port of Portland in 2005, 2011 and 2015,
- Marine Cargo Economic Impact report prepared by Community Attributes, Inc. for the Northwest Seaport Alliance in 2019, and
- Economic impact report prepared by Martin & Associates for the Port of Oakland in 2018, among others.

These studies indicate the direct employment associated with container terminal operations ranges approximately from 4 to 5 direct jobs per 1,000 TEUs. BST Associates used 4.02 direct jobs per 1,000 TEUs in this report, which includes jobs in the following sectors:

- Surface transportation (rail and truck), and
- Maritime services (marine terminal, ILWU, tug assist, pilots, steamship lines/agents, warehouse/distribution centers, government agencies, and other related services.

Direct compensation was estimated for these sectors using the following sources:

- Recent Port of Portland terminal operations were reviewed to estimate compensation for workers at the marine terminal,
- Rail worker compensation was based on analyses conducted by the Association of American Railroads and the Union Pacific Railway for rail workers in Oregon, and
- Compensation for other workers was based on the Oregon OLMIS database providing data on employment and wages by industry (QCEW) for the Portland-Vancouver-Hillsboro OR-WA MSA, Oregon Portion Annual 2020.

Direct income was estimated based on the expected number of jobs and employee compensation for each key sector in the supply chain that serves the container business.

Business revenue and state/local taxes were based on the recent economic impact studies, which take into account employee compensation and state/local taxes as percentages of business revenue, other factors.

BST Associates estimated the indirect and induced impacts based on the direct impacts, from the 2016 container terminal economic impact study prepared by Martin & Associates for the Port of Portland.

Indirect impacts refer to expenditures by firms engaged in the supply chain on outside goods and services. Induced impacts refer to purchases based on the employment earnings from direct and indirect economic activities. As wages are paid out, workers' families spend their income on a wide array of goods and services, much of which are supplied by the local economy.

Total impacts incorporate the sum of direct, indirect, and induced impacts. It is important to note that these effects are limited for any region because of spending "leakages" at each round of inter-industry and household purchases. That is, the goods and services required at each stage are partly purchased from outside the study area, thus reducing the total supplies provided locally.

## Related Impacts

Related impacts are the jobs, income, etc., at the importers or exporters that move goods through the Port of Portland. These impacts are separate and in addition to those from terminal operations (discussed above).

In 2020, the Port of Portland's total containerized trade was valued at $782 million.

Exports were valued at $111 million, and consisted of agricultural products, forest products, and other goods from Oregon. Key export cargoes include: hay and animal feed, frozen potatoes, paper & paperboard, metal scrap, wood pulp, softwood lumber, animal feed preparations, waste paper, and grass seed, among other goods.

Imports were valued at $671 million, and consisted of retail products, wholesale goods and inputs to manufacturing, and primarily served firms and consumers in Oregon. Key import cargoes include: furniture, tires, apparel, toys and games, glass articles, footwear, paper & paperboard, outdoor sporting equipment, and plywood, among other goods.

These trade volumes help to support nearly all of Oregon's Statewide Business Clusters:

- Agriculture and Food Processing
  - Agriculture
  - Food Manufacturing
  - Nursery Products
  - Breweries
- Forestry & Wood Products
  - Paper Manufacturing
  - Wood Product Manufacturing
- Manufacturing
  - Chemical Manufacturing
  - Fabricated Metal Product Manufacturing
  - Machinery Manufacturing
  - Plastics and Rubber Products Manufacturing
  - Transportation Equipment Manufacturing
- Retail and Wholesale goods
  - Athletic & Outdoor Gear & Apparel
- Energy Efficiency
  - Wind energy projects (MSC recently brought generators for an Oregon wind farm)

By 2030, exports are projected to reach $408 million and imports are projected to reach $1.6 billion, with total trade value of nearly $2 billion. The distribution of the cargo is assumed to be similar to that moving through the Port of Portland's T6 container terminal in 2020.

The projected 2030 import and export values were used to develop estimates of related impacts.

In order to estimate these related jobs, BST Associates used a model that was developed for the Port of Los Angeles and the Port of Long Beach.[14]

[14] BST Associates. Impacts of Tariffs on San Pedro Bay Ports, September 30, 2019

For imports, the first step summarizes the value of containerized cargo imported through Portland and destined for Oregon firms. Using commodity codes, these values were categorized as being destined for retail trade, wholesale trade or for use in the production of goods. Then, margins were applied to determine the share of import value associated with retail and production uses. The resulting margined values were multiplied with factors from the US Bureau of Economic Analysis RIMS II model (Regional Input-Output Modeling System) to estimate jobs and income.

For exports, the primary sources of data used for the export analysis were origin of export trade data from WISERTrade, and RIMS II impact multipliers. The trade impacts of exports (i.e., related jobs) moving through the Port of Portland were estimated by combining the value estimates derived from the WISERTrade data and economic impact multipliers from the RIMS II model.

Results of this analysis are presented in Table 3-2. The containerized trade moving through the Port of Portland in 2030, to or from Oregon importers or exporters, is estimated to support approximately 11,388 direct jobs, with related direct income of $447.4 million.

**Table 3-2: Container-Related Direct Impacts in Oregon (2030)**

| | Exports | Imports | Total |
|---|---|---|---|
| Trade Value ($1,000) | $408,415 | $1,568,613 | $1,977,028 |
| Jobs | 4,722 | 6,666 | 11,388 |
| Income ($1,000) | $148,250 | $299,160 | $447,410 |

Source: BST Associates

Container service at the Port of Portland promotes export and import for Oregon firms. In particular, container service at T6 helps provide capacity for imports and exports, and greatly reduces transportation costs. Exporters, in particular, have faced higher costs and lack of availability of service in recent months as the ocean freight rate for imports has skyrocketed. Carriers have chosen to bring empty containers on westbound return trips, which has limited service for exporters. A large component of Oregon exports is lower-valued commodities (straw, hay etc.), which cannot function with higher freight rates.

For each million dollars of exports, approximately 11.6 jobs are supported in Oregon. For each million dollars of imports, approximately 4.2 jobs are supported in Oregon. The export jobs are largely in agriculture/ crop production, forest products, manufacturing and other industrial sectors. The import jobs are largely in retail and wholesale trade, as well as inputs to manufacturing. The average wage is approximately $40,000, which is 28% less than the Oregon average wage in 2021.

## Transportation Cost Savings

The resumption of ocean container service at Portland has reduced transportation costs for many Oregon businesses. Prior to re-introduction of container service, shippers and receivers had to truck directly to NWSA ports or truck to Portland and use rail service to the NWSA. Before container service ended, approximately 53% of Oregon shippers used the container service at the Port of Portland in 2014.[15] BST Associates estimates that approximately 57,031

[15] Other options included ceasing international markets or using other ports (Oakland, among others).

containers sourced from Oregon businesses (importers and exporters) will choose container service at the Port of Portland by 2030:

- Imports = 27,628 full containers,
- Exports = 29,403 full containers.[16]

Transportation cost savings in 2030 are projected to be $31.5 million, as a result of ocean container service in Portland.

**Table 3-3: Transportation Cost Savings in 2030 (using 2021 dollars)**

| | | Transportation Costs ($ million)[17] | | |
|---|---|---|---|---|
| Region | Containers | With service | Without service | Savings |
| Portland- North Willamette | 26,297 | $4.9 | $18.03 | $13.11 |
| Middle Willamette | 23,882 | $11.1 | $25.38 | $14.31 |
| Southern Oregon | 879 | $1.0 | $1.57 | $0.53 |
| Central Oregon | 5,230 | $4.6 | $7.69 | $3.14 |
| Eastern Oregon | 743 | $1.1 | $1.56 | $0.45 |
| Oregon Total | 57,031 | $22.7 | $54.23 | $31.53 |

Source: BST Associates, Port of Portland Reports, Tioga Group

The state regions are defined as follows:

- Portland - North Willamette (Clackamas, Clatsop, Columbia, Multnomah, Tillamook, Washington, Yamhill)
- Middle Willamette (Benton, Lane, Lincoln, Linn, Marion, Polk)
- Southern Oregon (Coos, Curry, Douglas, Jackson, Josephine, Klamath)
- Central Oregon (Crook, Deschutes, Morrow, Sherman, Hood River, Jefferson, Wasco, Wheeler)
- Eastern Oregon (Baker, Gilliam, Grant, Harney, Lake, Malheur, Umatilla, Union, Wallowa).

It should be noted that shippers do not rely solely on price in making transportation mode/route selections, but also consider other factors such as long-term relationships, timely service, flexibility to adjust schedules, and reliability, among other factors.

## Methodology

The methodology for estimating transportation cost savings is described in this section.

BST Associates evaluated several sources for data and analysis relevant to the cost of container service at the Port of Portland, including:

- PIERS data for Oregon exports and imports provided by the Port of Portland,
- Port of Portland Terminal Operation reports,
- Relevant studies completed in the recent past:

[16] Identifying the actual origination location of containers is complicated by headquarters location. In Oregon, two examples of this are exports by Weyerhaeuser and by Anderson Hay and Grain show headquarters in Washington state for exports that originate in Oregon. As a result, the estimates provided in Table 3-1 are considered to be conservative.

[17] Includes imports and exports.

  - Oregon Port of Willamette Brooks Intermodal and Transload Facility Proposal Summary Report prepared by Tioga Group for Oregon DOT (01/08/19),
  - Port of Portland Terminal 6 Container Business Strategy Final Report prepared by Advisian for the Port of Portland, February 2018,
  - Feasibility of an Intermodal Transfer Facility in the Willamette Valley, Oregon, Executive Summary, prepared by ECONorthwest for Business Oregon Infrastructure Finance Authority, December 14, 2016,
  - Competitive Market Analysis for Brooks ITF prepared FCS Group for the Oregon Port of Willamette Brooks Intermodal & Transload Facility, September 24, 2018, and,
  - Port of Portland Marine Economic Impact Study: Container Transportation Cost-Benefit Analysis, prepared by HDR for the Port of Portland, among other reports.
- US trade data, including Origin of Exports by state and WISER trade data on imports and exports.

**Estimate Oregon Containers**

The first step was to estimate the number of containers associated with container service via the Port of Portland. BST Associates used the 2030 projections for container service in the revised container forecast (above), and drilled down to the number of full import and export boxes. In 2030, approximately 80% of 2030 full import containers (34,536 boxes) are estimated to be received by firms in Oregon, resulting in 27,628 full import boxes of goods bound for Oregon firms. Approximately 75% of the full export containers (39,204) are estimated to be shipped by firms located in Oregon, resulting in 29,403 full export boxes of sourced with goods from Oregon.

These boxes are arrayed by region based on the distribution by county and region by the by the Tioga Group, as shown in Table 3-3.[18]

**Table 3-4: 2030 Container Volumes by Oregon Region (Full Containers)**

| Region | Imports | Exports | Total |
|---|---|---|---|
| Portland- North Willamette | 20,595 | 5,703 | 26,297 |
| Middle Willamette | 3,291 | 20,591 | 23,882 |
| Southern Oregon | 431 | 448 | 879 |
| Central Oregon | 3,141 | 2,089 | 5,230 |
| Eastern Oregon | 171 | 573 | 743 |
| Oregon Total | 27,628 | 29,403 | 57,031 |

Source: BST Associates, Tioga Group model

The cost of shipping was estimated by updating the Tioga Group analysis in the Oregon Port of Willamette Brooks Intermodal and Transload Facility Proposal Summary Report. BST Associates updated cost factors for the Tioga Group drayage model based on new estimates by

[18] Oregon Port of Willamette Brooks Intermodal and Transload Facility Proposal Summary Report prepared by Tioga Group, 2019

the American Transportation Research Institute (ATRI).[19] Drayage factor components are shown in Table 3-4, including hourly and mileage costs as well as administrative cost per load and a typical surcharge.

**Table 3-5: ATRI Drayage Cost Factors**

| Cost per Mile | Per hour | Cost per Mile | Per mile |
|---|---|---|---|
| ***Driver Labor Cost*** | | Fuel Costs | $0.40 |
| Driver Wages | $21.01 | Tires | $0.04 |
| Driver Benefits | $6.31 | Average Cost per Mile | $0.43 |
| Subtotal | $27.32 | | |
| ***Tractor Costs*** | | | |
| Truck/Trailer Lease or Purchase Payments | $10.21 | **Other factors** | |
| Repair & Maintenance | $5.62 | **Administration cost per load** | $25.00 |
| Truck Insurance Premiums | $2.68 | | |
| Permits and Licenses | $0.90 | **Surcharge** | 20% |
| Subtotal | $19.41 | | |
| Average Cost per Hour | $46.73 | | |

Source: BST Associates, ATRI (2019$), Tioga Group model

These costs were used to estimate the trucking cost from the Oregon origin/destination to Portland and to Tacoma. Assumptions in the Tioga truck drayage model include:

- A complete drayage trip includes:
  - time spent at the customer location, typically around 30 minutes;
  - time spent at a port terminal, typically around 90 minutes; or time spent at a rail terminal, around 30 minutes; and
  - time spent driving both ways, averaging around 30 mph over a mix of streets, roads, and highways (BST Associates used 39 mph based on recent ATRI estimates).
- An administrative or overhead cost including profit is estimated at $25 per trip (a common rule-of-thumb). The Drayage Directory shows that Oregon drayage firms typically add a fee or surcharge of about 20% to cover rising fuel costs, longer times at port terminals, etc.[20]

The alternative of trucking to Portland with intermodal service to Tacoma was also considered, based on the ECONorthwest estimates of $600 per container.

An example of the analysis of the transportation cost analysis that shows the estimated costs between Albany and either the Port of Portland or Port of Tacoma is presented in Figure 3-2 and Table 3-6. Summary results indicate:

- The least expensive option is direct trucking to the Port of Portland, which is estimated to cost $465 per container, which is lower than the $600 per container estimate by ECONorthwest.

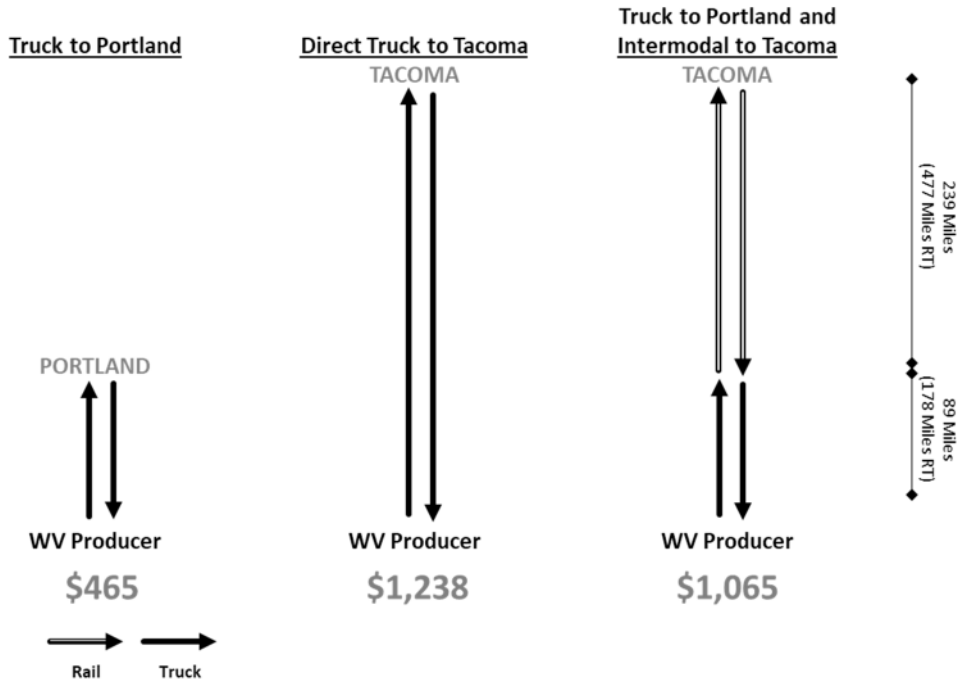
[19] An Analysis of the Operational Costs of Trucking: 2020 Update, American Transportation Research Institute, November 2020

[20] Oregon Port of Willamette Brooks Intermodal and Transload Facility Proposal Summary Report prepared by Tioga Group

- The next least cost option is trucking to Portland and intermodal rail to Tacoma, estimated at $1,065 per container, compared with $1,200 per container (ECONorthwest).
- The most expensive option is direct trucking to Tacoma, which is estimated at $1,238 per container. This is lower than the estimated cost of $1,450 per container (ECONorthwest).

The ordering of costs from least to most expensive is similar in both analyses as are the cost differentials between routes in both analyses.[21]

**Figure 3-2: Estimated Costs for Three Container Shipping Options**




Source: BST Associates, ECONorthwest

Applying the cost per box to the 11,946 imported to or exported from Linn County (Middle Willamette) produces the following results:

- Direct trucking to Port of Portland costs shippers an estimated $5.6 million,
- Trucking to Portland and intermodal rail service to Tacoma costs an estimated $12.7 million, $7.2 million more than direct trucking to Portland,
- Direct trucking to Tacoma costs an estimated $14.8 million, $9.2 million more than direct trucking to Portland.

[21] Tioga report: "As would be expected, the estimated cost-based rates are somewhat lower than the spot rate averages from the Drayage Directory, or those used in the OPW proposal."

**Table 3-6: Transportation Costs Albany to/from Portland or Tacoma**

| Drayage Model Cost Estimates | | Truck to Port of Portland | | Direct Trucking to Tacoma | | Truck to Port of Portland and Intermodal service to NWSA | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Rate** | **Value** | **Cost** | **Value** | **Cost** | **Value** | **Cost** | **Value** | **Total** |
| Miles | $0.43 | 178.2 | $77 | 477.4 | $206 | 178.2 | $77 | | $77 |
| Hours | $46.73 | 6.1 | $286 | 17.1 | $800 | 6.1 | $286 | | $286 |
| Loads | $25.00 | 1.0 | $25 | 1.0 | $25 | 1.0 | $25 | | $25 |
| Subtotal | | | $388 | | $1,031 | | $388 | | $388 |
| Fee/surcharge | 20% | | $78 | | $206 | | $78 | | $78 |
| Total Truck | | | $465 | | $1,238 | | $465 | | $465 |
| Intermodal | | | | | | | | $600 | $600 |
| Total Cost est. | | | $465 | | $1,238 | | | | $1,065 |
| Comparison with other estimates | | | $600 | | $1,450 | | | | $1,200 |
| **Estimated Savings by Mode** | | | | | | | | | |
| # Boxes | 11,946 | | | | | | | | |
| Cost by Mode ($mils) | | | $5.6 | | $14.8 | | | | $12.7 |
| Savings ($mils) | | | | | -$9.2 | | | | -$7.2 |

Source: BST Associates, Tioga Group model, ECONorthwest

This methodology was utilized for each county with export and import containers. Across all regions in Oregon, the cost savings for Oregon shippers/receivers is estimated to be $31.5 million less than the next best alternative (truck to Portland and use of intermodal rail to NWSA), as shown in Table 3-7.

**Table 3-7: Transportation Cost Savings in 2030 (Using 2021 Dollars)**

| | | Transportation Costs ($mils)[22] | | |
|---|---|---|---|---|
| **Region** | **Containers** | **With POP container service** | **Without POP container service** | **Savings** |
| Portland- North Willamette | 26,297 | $4.9 | $18.0 | $13.1 |
| Middle Willamette | 23,882 | $11.1 | $25.4 | $14.3 |
| Southern Oregon | 879 | $1.0 | $1.6 | $0.5 |
| Central Oregon | 5,230 | $4.6 | $7.7 | $3.1 |
| Eastern Oregon | 743 | $1.1 | $1.6 | $0.4 |
| Oregon Total | 57,031 | $22.7 | $54.2 | $31.5 |

Source: BST Associates, Port of Portland Reports, Tioga Group

[22] Includes imports and exports.

# Chapter 4. Summary of Economic Contributions from the Project

This section presents a summary of the economic impacts associated with the proposed project at the Port of Portland.

This project will increase the space available for container operations at Terminal 6 by approximately 10 acres. This additional space will increase throughput capacity by an estimated 24,000 containers, or 43,920 TEU.

## Economic Contribution from Supply Chain

The project-related economic contribution from the supply chain that serves container operations is includes the following:

**Employment**

- The project contributes 178 direct jobs and 401 total jobs.
- Each direct job at the container terminal supporting 1.25 additional jobs.

**Income**

- The project helps generate $14.1 million in direct income and $53.4 million in total income.
- Each $1.0 of direct income supports $2.8 of additional income.
- The jobs generated as a result of the project are relatively high-paying, with an average payroll (wages plus benefits) of $79,000 per job. This is 36% percent higher than the statewide average wage in Oregon.

**Revenues**

- Direct revenues are projected to be $35 million, including revenue associated with the activity in key sectors of the supply chain serving the Port of Portland.

**State and Local Taxes**

- State and local taxes are projected to be $5 million.

These impacts are summarized in Table 4-1.

**Table 4-1: Supply Chain Economic Impacts Associated with the Project**

| Category | Amount |
|---|---|
| Jobs | |
| Direct Jobs | 178 |
| Total Jobs | 401 |
| Personal Income (1,000) | |
| Direct | $14,125 |
| Total | $53,401 |
| Revenue (1,000) | $35,457 |
| State/Local Taxes (1,000) | $5,128 |

Source: BST Associates, Port of Portland Reports for economic impact multipliers

## Related Impacts from Project

Firms that engage in export and import activity through the Port of Portland provide additional economic contributions. These related impacts are estimated based on the projected value of the additional project-related container traffic. The related impacts include the following

**Trade Value**

The project is associated with:

- $102 million of exports,
- $386 million of imports, and
- $491 million of total trade value.

**Jobs**

The project is associated with:

- 1,181 export-related jobs,
- 1,643 import-related jobs, and
- 2,828 total related jobs.

**Income**

The project is associated with:

- $37.1 million of income from export-related jobs,
- $73.7 million from import-related jobs, and,
- $111.1 million combined export and import impacts.

These impacts are summarized in Table 4-2.

**Table 4-2: Related Impacts Associated with the Project**

| | Exports | Imports | Total |
|---|---|---|---|
| Trade Value ($1,000) | $102,197 | $386,512 | $491,044 |
| Jobs | 1,181 | 1,643 | 2,828 |
| Income ($1,000) | $37,096 | $73,714 | $111,125 |

Source: BST Associates

Container service at the Port of Portland facilitates exports and imports by Oregon firms, and supports jobs throughout the state. For each million dollars of exports, approximately 11.6 jobs are supported in Oregon. For each million dollars of imports, approximately 4.2 jobs are supported in Oregon. The export jobs are largely in agriculture/ crop production, forest products manufacturing and other industrial sectors and the import jobs are largely in retail and wholesale trade, as well as inputs to manufacturing.

## Transportation Cost Savings

The resumption of ocean container service at Portland has reduced transportation costs for many Oregon businesses. Transportation cost savings of $7.8 million are projected as a result of proposed project improving ocean container service in Portland.

**Table 4-3: Transportation Cost Savings Associated with the Project**

| | | Transportation Costs ($ million)[23] | | |
|---|---|---|---|---|
| Region | Full Containers | With service | Without service | Savings |
| Portland- North Willamette | 6,502 | $1.22 | $4.46 | $3.24 |
| Middle Willamette | 5,963 | $2.76 | $6.34 | $3.57 |
| Southern Oregon | 218 | $0.26 | $0.39 | $0.13 |
| Central Oregon | 1,297 | $1.13 | $1.91 | $0.78 |
| Eastern Oregon | 185 | $0.28 | $0.39 | $0.11 |
| Oregon Total | 14,165 | $5.65 | $13.48 | $7.83 |

Source: BST Associates, Port of Portland Reports, Tioga Group

Reducing transportation costs is especially critical for Oregon exporters, because a large share of Oregon exports is lower-valued commodities (straw, hay etc.), and higher freight rates negatively impact the competitiveness of Oregon products. Exporters have been hit hard in recent months due to constraints in the container shipping industry. These constraints have led to sharply higher rates for import containers, and these high import rates have caused shipping lines to prioritize returning empty containers overseas rather than filling them with exports for backhaul. As a result, exporters have faced lower capacity and higher shipping costs

It should be noted that shippers do not rely solely on price in making transportation mode/route selections, but also consider other factors (long-term relationships, timely service, flexibility to adjust schedules, and reliability, among other factors).

[23] Includes imports and exports.