

# EXECUTIVE SUMMARY

## Project Introduction

Port Metro Vancouver commissioned Ocean Shipping Consultants (OSC) to provide a Container Forecast Study 2014. This Report follows previous work completed by OSC in 2012 and 2013.

The new 2014 Report is a stand-alone document that provides container traffic projections to 2050 and will be used by Port Metro Vancouver as it continues to evaluate its container expansion projects. It is also understood that the container forecasts will also be used as inputs into the environmental and other approval agencies for the permitting process for expansion and the development of new capacity.

This Executive Summary document provides the following information:

- Part 1 – an introduction to OSC and the members of the team who have provided the May 2014 Report to Port Metro Vancouver.
- Part 2 – a brief synopsis of the container forecasts to 2050 for Port Metro Vancouver for market regions served by the port and a supply-demand analysis to 2025.

## Part 1 - Introduction to Ocean Shipping Consultants

### **The Ocean Shipping Consultants Team**

OSC is the shipping and port economics division of Royal Haskoning of the Netherlands. OSC was acquired by Royal Haskoning in early 2011 and the management remain in place. Royal Haskoning and DHV recently merged to form a large international engineering and project consultancy firm with a global staff of some 8000 people.

Since 1985 OSC has successfully completed more than 275 individual projects in more than 60 countries for in excess of 200 different clients.

The OSC study team is led by Andrew Penfold, OSC Project Director, with assistance from Dean Davison, Principal Consultant and Johan-Paul Verschuure, Port & Transport Economist. The following represents a synopsis of the OSC team and skills brought to this project:

- **Andrew Penfold:**  
Andrew has over 30 years of direct experience as a shipping economist and provider of cargo forecasts. He jointly founded OSC in 1985 and developed a leading independent firm of market analysts with extensive expertise in shipping, port economics and development projects.

At the global level his clients include PSA Corporation, Hutchison Ports and the Ports of Rotterdam, Antwerp, Vancouver and Felixstowe. Considerable expertise has also been developed relating to container shipping operations and leading clients include Lloyd's Register of Shipping, Maersk Line and other major container liner operators.

Andrew has worked with Port Metro Vancouver since 2001 and has provided a number of forecast and market studies supporting the port's continued growth. He led and oversaw all components of the Container Traffic Forecast Study in 2014.

- **Dean Davison:**

Dean offers more than 24 years of port and consulting experience. He joined the Port of Tilbury, UK, in 1990 and worked as a container stevedore and operative on conventional/ro-ro terminals before switching to commercial activities. In 1998 Dean moved to Containerisation International magazine as North American writer before joining Drewry Shipping Consultants at the end of 2000 where he successfully completed a wide-range of port, shipping and intermodal projects on a global basis.

In 2005 Dean helped established Moffatt & Nichol's European presence in London before relocating to New York in 2007 where he spent almost six years working on projects for a wide range of North American ports including New York/New Jersey, Savannah, Virginia, Montreal, Oakland, Los Angeles, Wilmington (NC), Houston and Mobile.

Dean joined OSC in late 2012 to further enhance the company's consulting capabilities and worked on the Port Metro Vancouver Forecast Update Study in 2013. He is responsible for writing and editing the Container Traffic Forecast Study in 2014.

- **Johan-Paul Verschuure:**

Johan-Paul has over six years of experience in financial and economic feasibility studies and market studies. In his role as a Port & Transport Economist he combines his technical background as a Port Engineer with Financial Economic expertise.

He has a Masters Degree in Civil Engineering with a focus on port development and a Masters Degree in Financial Economics. With this combination he continues to assist on projects for business cases for various types of terminals including container terminals and bulk facilities. Johan-Paul supported the Port Metro Vancouver Forecast Update Study in 2013 and is responsible for generating the revised 2014 forecast model.

### The Ocean Shipping Consultants Forecasting Approach

Led by Andrew Penfold, OSC has substantial experience of successfully completing a high number of cargo forecasts on a global basis. This includes previously completing container projections for Port Metro Vancouver in 2012 and 2013.

The forecast approach to this modelling process utilises the following methodology:

1. The market study model forecasts the future container demand for the following levels of aggregation
  - Total for all North American container ports
  - Pacific Northwest region, which includes the US ports of Seattle and Tacoma, together with Port Metro Vancouver and Prince Rupert.
  - Pacific Gateway facilities of Port Metro Vancouver and Prince Rupert.
  - Port Metro Vancouver.
  - The scenarios underlying the forecasts are:
    - High, medium and low GDP growth scenarios for North America, Developing Asia and West Canada.
    - High, medium and low GDP-Demand Multipliers for North America and Developing Asia.
    - Application of four relevant specific risk factors (covering US markets, Pacific Northwest port capacity, intermodal issues and ship sizes).
2. The overall container demand outlook is formulated for North America and subsequently for the Pacific Northwest region by forecasting a market share for this area on the following basis:
  - The North American container demand consists of the container volumes handled on the North American Pacific Coast and Atlantic Coast, plus the US Gulf. The total container demand is generated using the North American outlook (scenarios) for GDP and multipliers.
  - The market share which ports in the Pacific Northwest region are able to attract from the total North American demand is subsequently determined.
3. The outlook for the Pacific Gateway area combines the container volumes for Port Metro Vancouver and Prince Rupert. The forecasts for import and export containers are split in two.

The approach taken for the imports consist of the following steps:

- The forecast for import demand is based on actual import volumes of both ports combined with the West Canadian GDP outlook and the North American multiplier scenarios. In addition, three of the identified risk factors are taken into account in this forecast, which can potentially affect Pacific Gateway imports.
- The effect of the increased intermodal potential is captured by means of estimating the increased penetration to capture container volumes in Central and East Canada. In the model these volumes are based on:
  - The share of Central and East Canadian cargo in the total Canadian imports.
  - The forecast of total imports over pacific gateway.
  - An outlook of the share of the Central and East Canadian volumes can be captured by the Pacific Gateway ports in the years to come.

- The combined forecast of the Base Case import volumes for the Pacific Gateway area, with the increased intermodal penetration, is then split by origin, destination and commodity type.

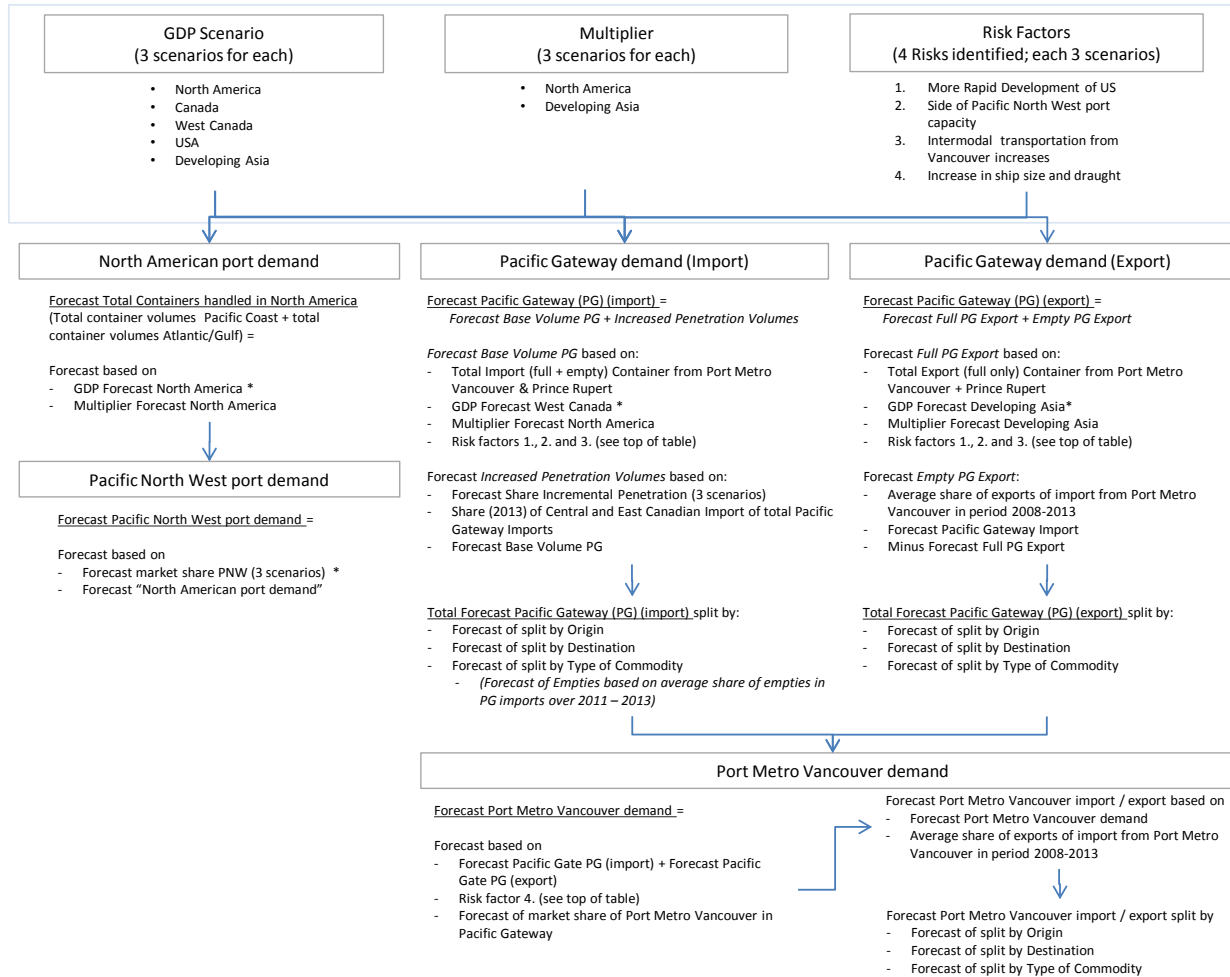
The outlook for the export volumes for the Pacific Gateway area follows a slightly different approach. The total export forecast is split in a forecast for the full and empty containers:

- The forecast for the full exports is based on the actual full exports projected using the Developing Asia GDP and Multiplier scenarios.
  - The total volume of exports over the Pacific Gateway area is derived by assuming the share of exports remains constant, using the average share over the 2008-2012 period.
  - By subtracting the full export forecast from the total container export forecast the projected empty container exports are estimated.
  - The total export container forecast is subsequently split by origin, destination and commodity type, based on the position for 2013.
4. The volumes for Port Metro Vancouver are determined by an outlook of the development of the market share which Port Metro Vancouver is anticipated to capture from the Pacific Gateway volumes. The risk factor of increased ship sizes and draught is applied to this forecast.

By keeping the import-export ratio constant and applying the anticipated split of origin and destination, detailed container forecasts for Port Metro Vancouver are produced.

The schematic shown in Figure ES1 provides a visual summary of this robust methodology used to determine the container forecasts for Port Metro Vancouver.

**Figure ES1: Port Metro Vancouver Forecast Demand Model Methodology**



Source: Ocean Shipping Consultants

**Part 2 – Port Metro Vancouver Container Forecasts to 2050**

**Introduction**

The following is a list of key components that make-up the container forecasts for Port Metro Vancouver:

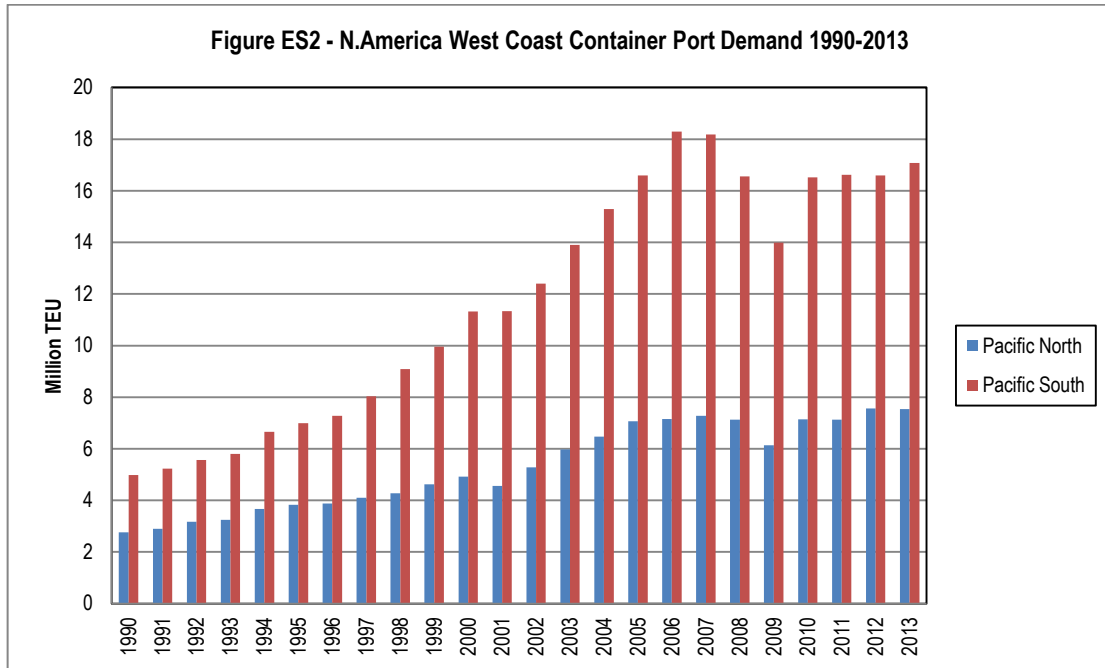
- North American Container Port Demand.
- Macro-Economic trends in North America.
- Economic Drivers – Key Vancouver Hinterlands, including Commodity Demand.
- Drivers of Demand to 2025.
- Demand Development 2025-2050.
- Container Port Demand Forecasts to 2025 and 2050.
- Supply-Demand Analysis at Port Metro Vancouver.

**North American Container Port Demand**

Between 1990 and 2007, total North American container port demand increased by 216 per cent to reach just under 50 million TEU, growing at 6.8 per cent per annum. The Global Financial Crisis saw the total fall to 40.2 million TEU for 2009, but a strong recovery saw the total rise to 49.9 million TEU by the end of 2013.

The distribution of volumes between the Pacific North West region and ports in California has remained largely consistent, although the Californian ports were more severely impacted by the downturn, as Figure ES2 shows.

In 2013 PNW ports handled 7.56 million TEU, of which Port Metro Vancouver’s share accounted for 37.5 per cent, a rise from 31.5 per cent in 2011. Prince Rupert’s share is currently 7.1 per cent, although did decline slightly in 2013 as its total traffic fell. Since 2000, Port Metro Vancouver has seen container growth of 7.1 per cent per annum.

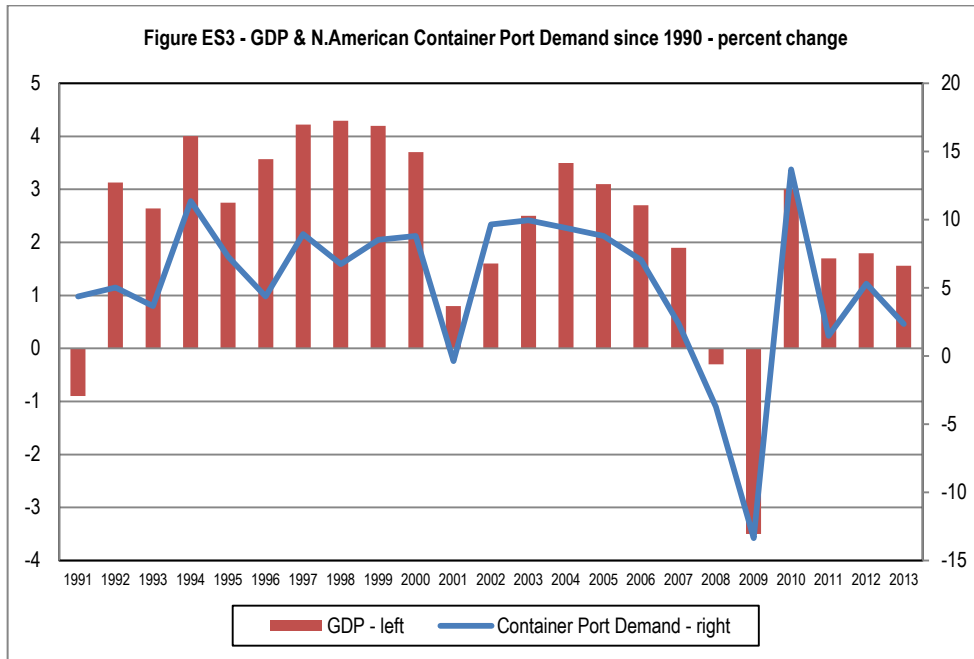


**Macro-Economic Trends in North America**

Container trade volumes (and port demand) are directly related to overall volumes of traded goods, especially in the manufactured sector. This is particularly true for cargoes imported into North America. For Port Metro Vancouver, the important containerised export sector is driven by the pace of demand for primary goods in the developing Far East markets.

The economic relation between GDP growth and trade growth (port demand) is noted in Figure ES3, which is of central importance, but is not the only driver of growth for containers. Other drivers include:

- Containerisation of general cargoes is more or less at saturation level as North America is a developed market.
- An imbalance of loaded inbound and outbound containers between North America and the Far East means shippers are continually searching for more cargoes on return legs to Asia – hence increasing use of container in sectors not historically regarded as suitable for containerisation, such as forest products, iron and steel scrap and waste papers. This is an important consideration for Port Metro Vancouver export demand.



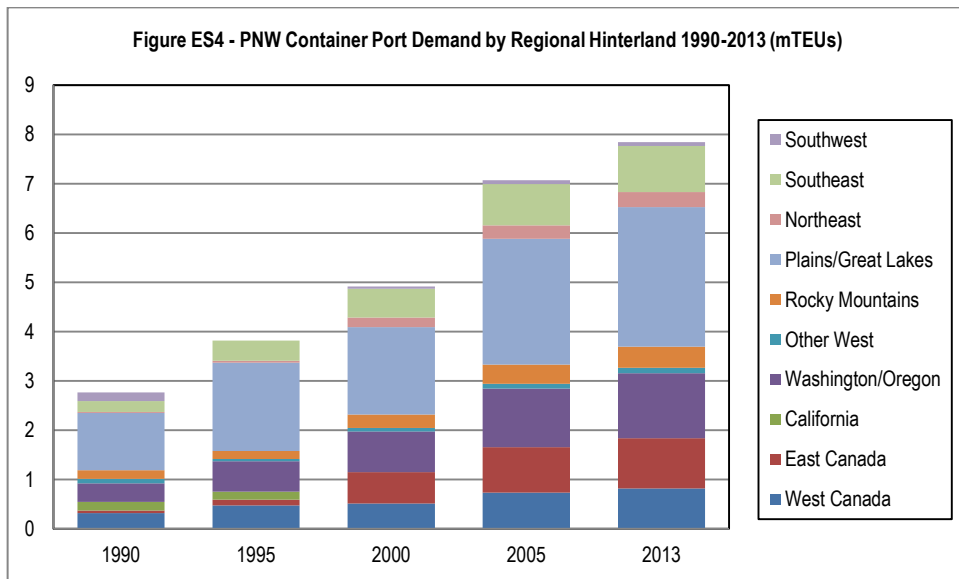
**Key Vancouver Hinterlands & Economic Drivers, including Commodity Demand**

The development of markets served by the PNW region is shown in Figure ES4. The overall growth of volumes handled is shown, along with the economic reach of the region’s ports extending. Other key trends include:

- Immediate markets (western Canada and Washington/Oregon) have grown, reflecting stronger economic development of region and declining importance of Californian ports serving these markets.
- Central continental markets have increased in importance and terminals in PNW region are serving more distant areas.

- Competition with Californian ports (and US East Coast ports) for more distant hinterlands remains intense, but economics of using PNW ports has improved.
- Considering ports in British Columbia and the US Pacific Northwest area as competitors is justifiable.

While the competitive overlap is primarily the most distant US hinterlands, the fact that traffic Port Metro Vancouver secures can be at the expense of Seattle or Tacoma means that competition exists and is reported internationally and regionally. In April 2014 the JOC reported that Puget Sound ports are “losing market share to Vancouver and Prince Rupert to the north” while in February 2013 Seattle-based news station, KiroTV 7, quoted Port of Seattle CEO (Tay Yoshitani) as saying that the “biggest threat to Seattle is growing competition from both Prince Rupert and Vancouver.” Hence while it is important to maintain a clear description of the markets for which Port Metro Vancouver is competing, it is prudent to include the role and capabilities of US ports as well as Prince Rupert.



In 2012 the GDP of Canada increased by 1.8 per cent over 2011 and reflecting average growth of 1.9 per cent per annum since 2000. Other key economic points include:

- The Western Canada region consists of British Columbia and the Canadian prairies of Alberta, Saskatchewan and Manitoba – collectively these states accounted for 12.6 per cent of the national economy and grew by 2.4 per cent between 2000 and 2012. Natural resources, such as oil, mining and farming dominate these local economies.
- The British Columbia manufacturing industry is dominated by forest products and processing natural resources harvested or extracted in the province (i.e. canning salmon, processing fruits/berries, producing lumber and paper) – these commodities remain a major anchor for containerised export volumes.
- The Central Canada/US Midwest region consists of Ontario, Quebec, the Great Lakes, Illinois and Chicago – Ontario and Quebec represent around 60 per cent of the Canadian economy and grew by 1.4 per cent and 1.6 per cent, respectively, between 2000 and 2012.



- Ontario is the centre of Canada's financial services and banking, though auto industry manufacturing generates 40 per cent of export trade (all moving to the US). Quebec is a service centre location.
- The US Midwest (especially Chicago) remains a hub for intermodal distribution, so remains a crucial target market for all ports on the East and West coasts of North America, including Port Metro Vancouver.
- The US represents a strong market for Port Metro Vancouver's imported container tonnages. In 2008 it accounted for just 7.5% of the port's container tonnes but by 2013 this had increased to 22.9% (behind Central & East Canada with a 39.6 per cent share and British Columbia with 27.0 per cent of the total).
- For Port Metro Vancouver's containerised export tonnes a dominant 75.1 per cent are reported to originate in British Columbia, although this figure will include commodities stuffed into containers in the local area

The key drivers of import demand for ports on the West Coast of North America are household and other consumer goods which originate in China.

As Table ES1 shows, the total traffic for these commodities is currently just over three million tonnes, although the share of total imports has fallen - from 41 per cent in 2003 to 29.2 per cent by 2013. This decline has been offset by increases in construction materials.

**Table ES1**  
**Vancouver: Containerised Import Volumes 1995-2013**

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>Million Tonnes</b>															
Household Goods	0.31	1.19	1.31	1.90	2.02	2.18	2.42	3.11	3.21	3.20	2.57	3.14	2.88	2.89	3.03
Construction & Materials	0.09	0.26	0.27	0.38	0.45	0.51	0.59	0.83	0.91	1.05	0.77	1.07	1.16	1.28	1.41
Industrial, Vehicle Parts	0.11	0.25	0.27	0.39	0.40	0.45	0.51	0.67	0.68	0.70	0.61	0.83	0.93	1.07	1.17
Machinery	0.06	0.18	0.20	0.28	0.33	0.34	0.39	0.54	0.53	0.55	0.40	0.51	0.60	0.77	0.77
Basic Metals	0.03	0.14	0.15	0.19	0.18	0.23	0.22	0.34	0.34	0.34	0.17	0.24	0.30	0.4	0.33
Other Goods	0.67	1.31	1.33	1.61	1.59	1.69	1.86	2.46	2.47	2.87	2.59	2.91	2.91	3.22	3.68
<b>Total</b>	<b>1.27</b>	<b>3.33</b>	<b>3.53</b>	<b>4.75</b>	<b>4.97</b>	<b>5.40</b>	<b>5.99</b>	<b>7.96</b>	<b>8.15</b>	<b>8.72</b>	<b>7.11</b>	<b>8.70</b>	<b>8.78</b>	<b>9.63</b>	<b>10.39</b>
<b>Percentage</b>															
Household Goods	24.2%	35.8%	37.1%	40.0%	40.7%	40.4%	40.4%	39.1%	39.4%	36.7%	36.2%	36.1%	32.8%	30.0%	29.2%
Construction & Materials	7.1%	7.7%	7.5%	8.1%	9.0%	9.5%	9.9%	10.5%	11.2%	12.1%	10.9%	12.3%	13.2%	13.3%	13.6%
Industrial, Vehicle Parts	8.5%	7.4%	7.7%	8.1%	8.1%	8.3%	8.6%	8.4%	8.4%	8.0%	8.6%	9.5%	10.6%	11.1%	11.3%
Machinery	4.8%	5.4%	5.8%	6.0%	6.6%	6.2%	6.4%	6.8%	6.5%	6.3%	5.6%	5.9%	6.8%	8.0%	7.4%
Basic Metals	2.7%	4.2%	4.3%	3.9%	3.6%	4.3%	3.6%	4.3%	4.2%	3.9%	2.3%	2.7%	3.4%	4.2%	3.2%
Other Goods	52.6%	39.4%	37.5%	33.8%	32.0%	31.3%	31.1%	30.9%	30.4%	32.9%	36.4%	33.5%	33.2%	33.4%	35.4%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Port Metro Vancouver

In terms of exports, a summary is shown in Table ES2. Export tonnages exceed import volumes, with common commodities much denser. Lumber and woodpulp remain the most significant types of cargo, with these two commodities accounting for almost 50 per cent. Chinese demand remains the primary driver of this demand, with containerisation being the primary transport mode.

Table ES2

## Vancouver: Containerised Export Volumes 1995-2013

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>Million Tonnes</b>															
Lumber	0.42	1.22	1.15	1.38	1.35	1.55	1.27	1.50	1.73	2.19	2.51	3.32	4.15	4.26	4.50
Woodpulp	0.22	1.00	1.04	1.49	1.65	1.97	1.84	2.37	2.45	2.62	2.56	2.09	2.41	2.33	2.46
Specialty Crops	0.38	0.90	0.93	0.82	0.81	0.92	1.11	1.31	1.81	1.68	2.12	1.99	1.74	1.91	2.51
Meat, Fish & Poultry	0.15	0.37	0.41	0.47	0.43	0.44	0.47	0.50	0.53	0.62	0.65	0.61	0.64	0.55	0.54
Basic Metals	0.17	0.19	0.17	0.27	0.40	0.42	0.42	0.51	0.59	0.65	0.69	0.61	0.59	0.57	0.45
Other Goods	1.71	2.97	2.84	2.85	3.00	3.36	3.30	3.49	3.99	3.98	3.64	3.62	3.37	3.77	4.36
<b>Total</b>	<b>3.05</b>	<b>6.65</b>	<b>6.54</b>	<b>7.28</b>	<b>7.64</b>	<b>8.66</b>	<b>8.41</b>	<b>9.69</b>	<b>11.10</b>	<b>11.74</b>	<b>12.17</b>	<b>12.23</b>	<b>12.89</b>	<b>13.39</b>	<b>14.82</b>
<b>Percentage</b>															
Lumber	13.9%	18.3%	17.6%	19.0%	17.7%	17.9%	15.1%	15.5%	15.6%	18.6%	20.6%	27.1%	32.2%	31.8%	30.4%
Woodpulp	7.0%	15.1%	15.9%	20.4%	21.6%	22.7%	21.9%	24.5%	22.0%	22.3%	21.0%	17.1%	18.7%	17.4%	16.6%
Specialty Crops	12.5%	13.5%	14.2%	11.2%	10.6%	10.6%	13.2%	13.6%	16.3%	14.3%	17.4%	16.2%	13.5%	14.3%	16.9%
Meat, Fish & Poultry	4.9%	5.6%	6.2%	6.5%	5.7%	5.1%	5.6%	5.2%	4.8%	5.3%	5.4%	5.0%	4.9%	4.1%	3.6%
Basic Metals	5.5%	2.9%	2.7%	3.7%	5.2%	4.8%	5.0%	5.2%	5.3%	5.5%	5.7%	5.0%	4.6%	4.3%	3.0%
Other Goods	56.2%	44.6%	43.4%	39.1%	39.2%	38.8%	39.2%	36.0%	36.0%	33.9%	29.9%	29.6%	26.1%	28.2%	29.4%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Port Metro Vancouver

The importance of the Asian markets continues for Port Metro Vancouver, for both import and export containerised cargo:

- Chinese imports have increased from a share of 13.2 per cent in 1995 to 56.1 per cent by 2013. The second largest source in 2013 is South Korea, with just 11 per cent.
- China is also the largest destination for exports, rising from just 5.7 per cent in 1995 to 45 per cent for 2013.

### Drivers of Demand to 2025

Globalisation has boosted economic growth and intensified the link between GDP and trade, with the availability of low-cost transportation via containerisation a beneficiary of developments.

There is now renewed confidence in the outlook for the world economy, but the position remains fragile. The shorter-term outlook for Canada and the US is for sustained economic development:

- Canada's GDP growth will be 2.3 per cent in 2014 and 2.5 per cent for 2015, with an average of 2.2 per cent thereafter.
- The US has gathered pace and expected to increase 2.7 per cent for 2014 and 3.0 per cent in 2015 and an average of 2.8 per cent longer-term.

**Table ES3****Core Macro-Economic GDP Forecasts to 2025**

Real % change

	2014	2015	2016	2017-2020	2021-2025
<b>High Case</b>					
West Canada	2.99%	3.10%	3.22%	3.45%	3.45%
Canada	2.61%	2.89%	2.53%	2.88%	2.88%
USA	3.12%	3.48%	3.22%	2.76%	2.76%
<b>Base Case</b>					
West Canada	2.60%	2.69%	2.80%	3.00%	3.00%
Canada	2.27%	2.51%	2.20%	2.50%	2.50%
USA	2.71%	3.03%	2.80%	2.40%	2.40%
<b>Low Case</b>					
West Canada	2.08%	2.16%	2.24%	2.40%	2.40%
Canada	1.93%	2.14%	1.87%	2.00%	2.00%
USA	2.31%	2.57%	2.38%	1.92%	1.92%

Source: Various, incl. Ocean Shipping Consultants

Three drivers of demand have been considered to 2025, as shown in Table ES3 and form the basis of the container import traffic forecasts in this Study with three cases developed to 2025:

- The Base Case – consensus view, continued recovery towards trend growth – the most likely outcome.
- The High Case – a more rapid upturn, additional positive developments in 2014 and a return to higher rate of economic expansion.
- The Low Case – further macro-economic uncertainties in 2014 and 2015, possible stagnation, and after 2016 a more restrained pace of expansion.

For export demand from Port Metro Vancouver a strong link remains with Asian economic development. Table ES4 collates short-term IMF forecasts with longer-term ranges used in the export forecasting process.

**Table ES4**

**Core Asian Macro-Economic GDP Forecasts to 2025**

Real % change

	2014	2015	2016	2017-2020	2021-2025
<b>High Case</b>					
China	8.86%	8.63%	8.63%	8.63%	6.90%
Developing Asia	7.25%	7.48%	7.48%	8.05%	6.90%
<b>Base Case</b>					
China	7.70%	7.50%	7.50%	7.50%	6.00%
Developing Asia	6.30%	6.50%	6.50%	7.00%	6.00%
<b>Low Case</b>					
China	6.16%	6.00%	6.00%	6.00%	4.80%
Developing Asia	5.04%	5.20%	5.20%	5.60%	4.80%

Source: IMF/Ocean Shipping Consultants

The approach taken is to relate the development of GDP to container port demand in the import/export markets and use this as a basic driver of growth, as follows:

- Step 1 – identify relationship between GDP and port ranges.
- Step 2 – distribute demand by port ranges, using distribution costs and intermodal services – include the competitive position of the ports.
- Step 3 – generate continental and regional demand forecasts.
- Step 4 – apply general macro trends over the period to 2025.

**Demand Development 2025-2050**

Longer-term container projections have to adopt a scenario-based approach to overcome uncertainties associated with forecasts so far into the future. These scenarios include:

- Continuing Free Trade – globalisation will continue, further GDP expansion and Port Metro Vancouver’s market remains focused on China and key Asian markets. (Continuation of High Case).
- Partially Protectionist World – development of commonality of interests between Canada and the US and (most likely) the broader NAFTA grouping. (Continuation of Base Case).
- New Economic & Trade Paradigm – policy encouragement to re-orientate economic activity on a localised basis, with more limited economic growth in North America and container trade with Asia stagnating. (Continuation of Low Case).

The development of overall container demand has been forecast to the period to 2050 under these conditions to provide a general estimation of likely container traffic over such a long-term basis.

**Container Port Demand Forecasts to 2025 and 2050**

Container traffic forecasts are summarised for four regions:

- North American demand – derived from North American GDP forecasts and North American TEU growth/GDP growth multipliers.
- Pacific Northwest regional demand – covering both BC ports and US ports, estimated as a fixed share of North American traffic.
- Pacific Gateway (Port Metro Vancouver and Prince Rupert) – derived from Western Canada GDP and North American multipliers.
- Port Metro Vancouver demand – a fixed percentage of Pacific Gateway demand and key competitive conclusions established in this Report.

**Total North American Demand**

Table ES5 summarises the anticipated development of North American container port demand to 2025, with further estimations of the level of demand under each longer term scenarios to 2050. The Base Case growth option will see annual growth of 3.6 per cent per annum from 2013 to 2025 as traffic increases from 49.9 million TEU to 76.3 million TEU. By 2050 volumes could rise to 119.8 million TEU.

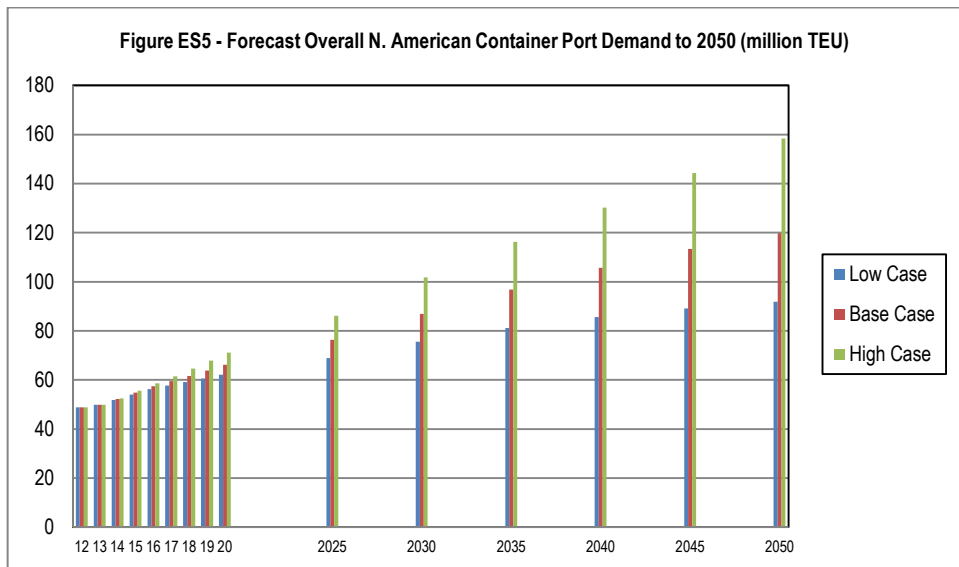
**Table ES5**  
**Forecast Overall North American Container Port Demand to 2050**  
 - million TEU

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035	2040	2045	2050
Low Case*	48.79	49.93	51.86	54.10	56.25	57.66	59.11	60.59	62.10	68.97	75.59	81.13	85.63	89.18	91.81
Base Case**	48.79	49.93	52.20	54.85	57.42	59.49	61.64	63.87	66.18	76.30	86.88	96.78	105.69	113.43	119.78
High Case***	48.79	49.93	52.54	55.61	58.60	61.53	64.59	67.81	71.19	86.11	101.81	116.24	130.18	144.29	158.36

\* - Low Case + 'New Paradigm' from 2025  
 \*\* - Base Case + Partially Protectionist from 2025  
 \*\*\* - High Case + 'Continuing Free Trade' from 2025

Source: Ocean Shipping Consultants

The general outlook is further shown in Figure ES5, with the range of demand in 2025 placed at 69-86.1 million TEU. A slowdown in the pace of demand growth reflects the maturity of the Transpacific trades.



**PNW Region Market**

The PNW share of total North American container traffic is shown in Table ES6. Under the Base Case scenario total demand via ports in the region will increase from 7.5 million TEU to 11.8 million TEU by 2025 and almost 18.6 million TEU by 2050. Growth will be influenced by:

- Asian trades will continue to dominate container demand.
- Availability of export cargoes, particularly from British Columbia.
- All-Water services and the larger Panama Canal will impact ports in California more than the PNW region.

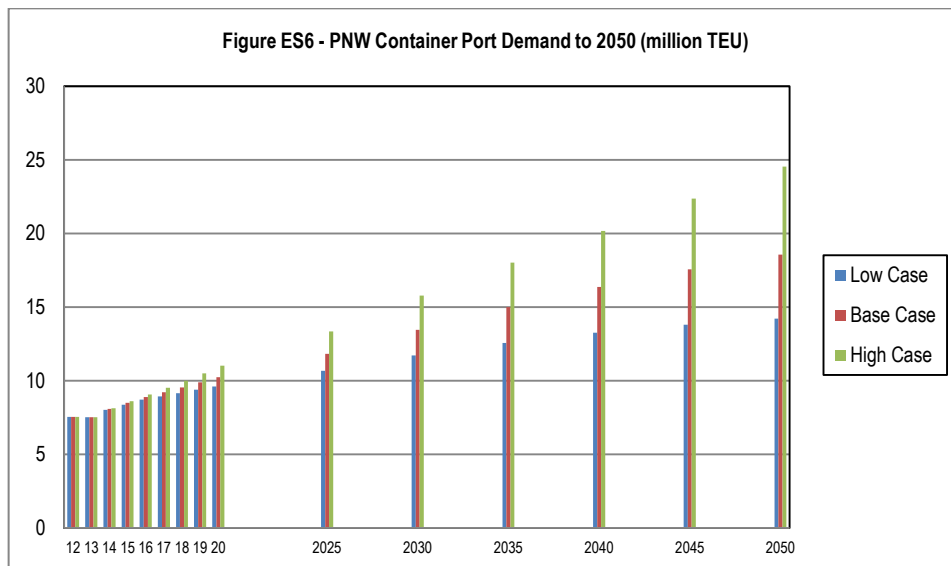
**Table ES6**  
**Forecast Pacific Northwest Container Port Demand to 2050**  
 - million TEU

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035	2040	2045	2050
Low Case*	7.56	7.54	8.04	8.39	8.72	8.94	9.16	9.39	9.63	10.69	11.72	12.58	13.27	13.82	14.23
Base Case**	7.56	7.54	8.09	8.50	8.90	9.22	9.55	9.90	10.26	11.83	13.47	15.00	16.38	17.58	18.57
High Case***	7.56	7.54	8.14	8.62	9.08	9.54	10.01	10.51	11.03	13.35	15.78	18.02	20.18	22.36	24.55

\* - Low Case + 'New Paradigm' from 2025  
 \*\* - Base Case + 'Partially Protectionist' from 2025  
 \*\*\* - High Case + 'Continuing Free Trade' from 2025

Source: Ocean Shipping Consultants

Figure ES6 highlights the considerable range of demand for the PNW region of 10.7-13.4 million TEU in 2025 and between 14.2-24.6 million TEU by 2050, depending on the economic growth scenario.



**Pacific Gateway Market**

The Pacific Gateway market comprises Port Metro Vancouver and Prince Rupert. Import demand is driven by the development of Western Canada GDP and projections to 2050 are shown in Table ES7, with the following key points of note:

- Current container import distribution to different North American regions will remain stable.
- There may be scope for Pacific Gateway ports to further increase transit flows to US markets.
- The current split of containerised imports by commodity grouping will largely remain – i.e. emphasis on household goods, components and construction materials.
- Exported goods will continue to focus on commodities grown and manufactured in (primarily) British Columbia. The diversity of container shipping services and many export transloading facilities favour Port Metro Vancouver over Prince Rupert.
- Increased intermodal potential for container volumes in Central and East Canada are included.

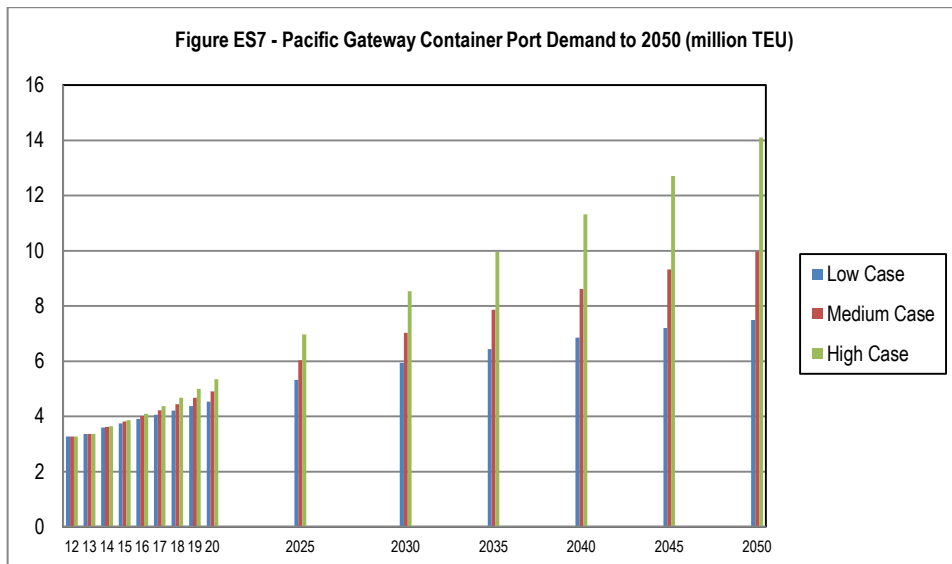
**Table ES7**  
**Forecast Pacific Gateway - Vancouver + Prince Rupert - Container Port Demand to 2050**  
 - million TEUs

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030	2035	2040	2045	2050
Low Case	3.28	3.36	3.59	3.75	3.91	4.06	4.21	4.37	4.53	5.32	5.94	6.44	6.85	7.20	7.49
Medium Case	3.28	3.36	3.62	3.81	4.02	4.23	4.44	4.67	4.91	6.03	7.02	7.87	8.62	9.32	9.97
High Case	3.28	3.36	3.65	3.86	4.10	4.38	4.68	5.00	5.34	6.97	8.54	9.96	11.32	12.70	14.09

(Includes empties)

Source: Ocean Shipping Consultants

Under the Base Case growth option, annual growth of 5.0 per cent is projected for the Pacific Gateway region as 2013 container volumes of almost 3.4 million TEU increase to over 6.0 million TEU by 2025 and then almost 10.0 million TEU by 2050. Figure ES7 shows the range of potential growth in more detail.



**Forecast Container Handling Volumes at Vancouver**

Potential container demand for Port Metro Vancouver is determined by the following factors:

- Overall capacity available at the port’s terminals to meet potential demand.
- Trends and developments in deepsea containerisation – i.e. vessels sizes and market issues.
- Competitive position of Vancouver terminals in terms of marine accessibility.
- Relative costs and capacity of intermodal links to/from the broader hinterland compared to other port options.

The relative competitive position of Vancouver and its container terminals is summarised in Table ES8.

**Table ES8**  
**The Relative Competitive Position of Vancouver Versus Competing Terminals**

	Vancouver	Prince Rupert	Seattle	Tacoma
Physical Capability of Terminals	*****	*****	****	****
Planned Capacity Development	*****	*****	**	**
Productivity of Terminals	****	****	***	***
Cost of Transiting Terminals	*****	*****	****	****
Delivered costs to Midwest	****	****	***	***
Intermodal Capacity	*****	*****	***	****
Import/Export Balance	*****	***	****	****
Local Demand	*****	**	*****	*****
Location as a Regional Hub	*****	**	*****	*****
Existing Customer Base	*****	***	*****	*****
<b>Total</b>	<b>48</b>	<b>38</b>	<b>38</b>	<b>39</b>
<b>- percentage</b>	<b>96.0%</b>	<b>76.0%</b>	<b>76.0%</b>	<b>78.0%</b>

Source: Ocean Shipping Consultants

The potential container volumes for Port Metro Vancouver to 2050 are shown in Table ES8 and also Figure ES8. The underlying demand is estimated as a fixed percentage of the Pacific Gateway forecast, including the intermodal additional estimated for the Pacific Gateway that allows for further penetration of the Central and Eastern Canada market, with the balance of the Pacific Gateway traffic attributable to Prince Rupert.



Total Base Case traffic is projected to increase from the 2013 figure of 2.8 million TEU to almost 5.0 million TEU by 2025 and 8.3million TEU by 2050.

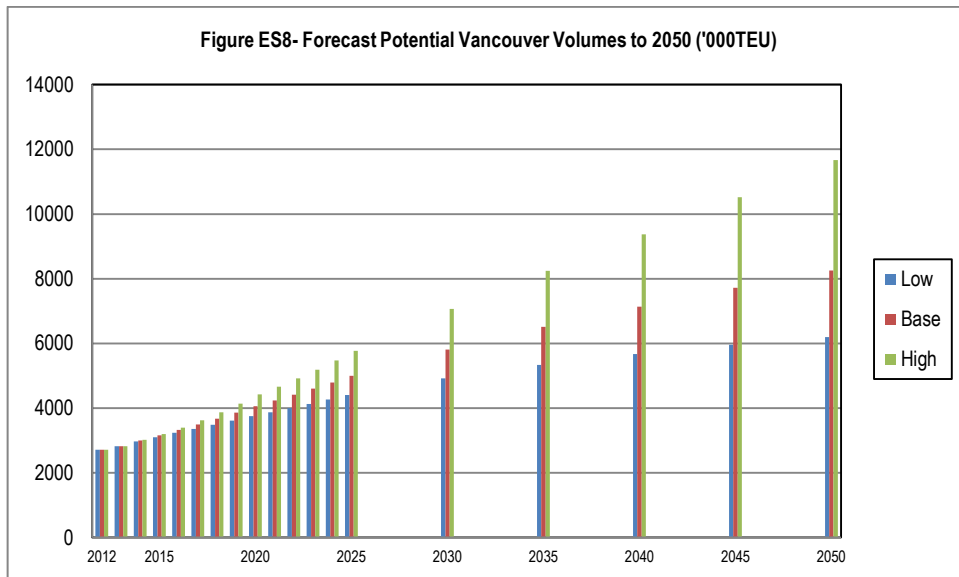
The range in 2025 will be between 4.4-5.8 million TEU and by 2050 will be 6.2-11.7 million TEU, depending on economic growth scenario. These projections include both underlying demand and intermodal addition traffic.

**Table ES9**  
Forecast Potential Total Vancouver Volumes to 2050  
-'000 TEUs

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045	2050
<b>Underlying Demand</b>																			
High	2713.2	2825.5	3008.9	3176.7	3360.4	3579.6	3812.9	4061.5	4326.2	4548.3	4781.7	5027.0	5284.9	5556.0	6809.1	7941.9	9026.1	10131.7	11238.2
Base	2713.2	2825.5	2989.9	3135.8	3294.7	3453.0	3618.9	3792.7	3974.9	4129.9	4290.9	4458.1	4631.8	4812.3	5600.9	6272.9	6872.1	7435.5	7951.6
Low	2713.2	2825.5	2964.6	3082.4	3209.2	3319.0	3432.5	3549.9	3671.3	3779.1	3890.0	4004.2	4121.7	4242.6	4738.9	5136.8	5463.8	5741.8	5969.5
<b>Intermodal Addition</b>																			
High	0.0	0.0	9.8	20.6	32.6	46.2	61.3	78.1	96.8	116.0	136.8	159.3	183.7	210.1	257.5	300.3	341.3	383.1	424.9
Base	0.0	0.0	9.7	20.3	32.0	44.5	58.2	73.0	88.9	105.3	122.7	141.3	161.0	182.0	211.8	237.2	259.8	281.1	300.7
Low	0.0	0.0	9.6	20.0	31.1	42.8	55.2	68.3	82.1	96.4	111.3	126.9	143.3	160.4	179.2	194.2	206.6	217.1	225.7
<b>Total</b>																			
High	2713.2	2825.5	3018.6	3197.3	3393.0	3625.7	3874.2	4139.6	4423.0	4664.2	4918.4	5186.3	5468.6	5766.1	7066.5	8242.2	9367.4	10514.8	11663.2
Base	2713.2	2825.5	2999.6	3156.1	3326.6	3497.5	3677.1	3865.7	4063.8	4235.2	4413.6	4599.4	4792.9	4994.3	5812.7	6510.0	7131.9	7716.6	8252.2
Low	2713.2	2825.5	2974.2	3102.4	3240.3	3361.8	3487.7	3618.2	3753.4	3875.4	4001.3	4131.1	4264.9	4403.0	4918.1	5331.0	5670.4	5959.0	6195.2

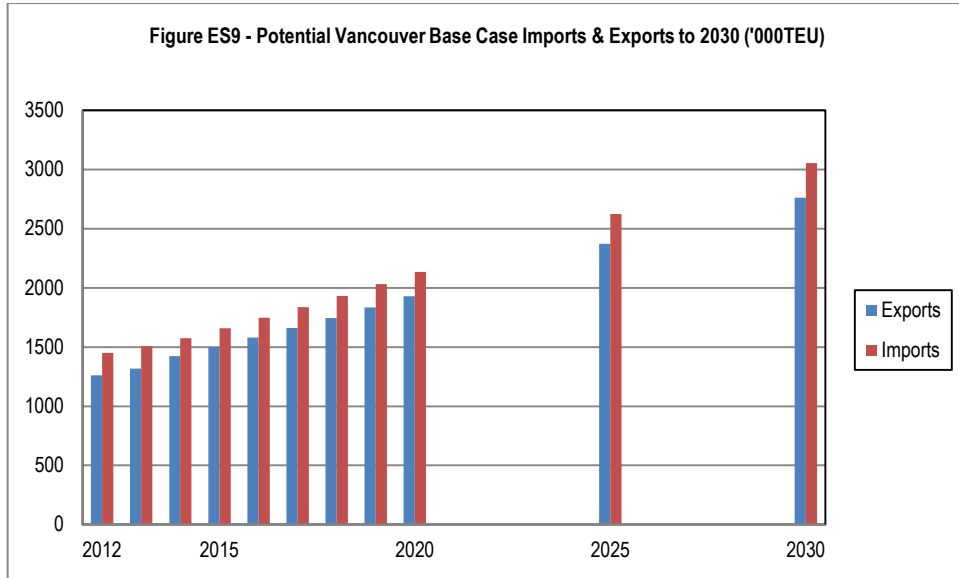
(Includes empties)

Source: Ocean Shipping Consultants



A summary breakdown of imports and exports under the Base Case demand is also shown in Figure ES9.

It is important to note that there is some discontinuity in the forecasts developed to 2025 and the much longer-term projections. The period 2025 to 2050 adopts a scenario-based approach and is to be regarded as a snapshot of potential demand only.



**Comparison of Forecasts by CAGR**

Table ES10 compares the annual growth rates (CAGR) for the following regions and time periods, with assumptions and conclusions added:

- North America, Pacific Northwest Region and Port Metro Vancouver are listed. The Pacific Gateway region (of Port Metro Vancouver and Prince Rupert) is excluded because historic data is unavailable for Prince Rupert as the facility only opened during 2007.
- Port Metro Vancouver has outperformed the North American and Pacific Northwest region historically between 1990 and 2000 but also for the period 2000 to 2013.
- Between 2013 and 2025, and also for the 2025 to 2050 period, Port Metro Vancouver will continue to see its total container demand growth surpass projections for North America and the Pacific Northwest region.
- North America, the Pacific Northwest region and Port Metro Vancouver are all mature markets, which is reflected in the lower growth in overall terms (if compared to emerging or developing economies).

**Table ES10**

**Comparison of Annual Growth Rates of Total TEU - Historic Container Demand and Projected Volumes, 1990 to 2050**

<u>North America</u>			<u>Pacific Northwest Region</u>			<u>Port Metro Vancouver</u>		
Time Period	Scenario	Annual Growth Rate	Time Period	Scenario	Annual Growth Rate	Time Period	Scenario	Annual Growth Rate
1990-2000	Historic	6.9%	1990-2000	Historic	7.1%	1990-2000	Historic	13.7%
2000-2013	Historic	3.8%	2000-2013	Historic	3.3%	2000-2013	Historic	7.1%
2013-2025	High Scenario	4.6%	2013-2025	High Scenario	4.9%	2013-2025	High Scenario	5.8%
	Base Scenario	3.6%		Base Scenario	3.8%		Base Scenario	4.5%
	Low Scenario	2.7%		Low Scenario	3.0%		Low Scenario	3.4%
2025-2050	High Scenario	2.5%	2025-2050	High Scenario	2.5%	2025-2050	High Scenario	3.0%
	Base Scenario	1.8%		Base Scenario	1.8%		Base Scenario	2.2%
	Low Scenario	1.2%		Low Scenario	1.2%		Low Scenario	1.5%

Source: Ocean Shipping Consultants

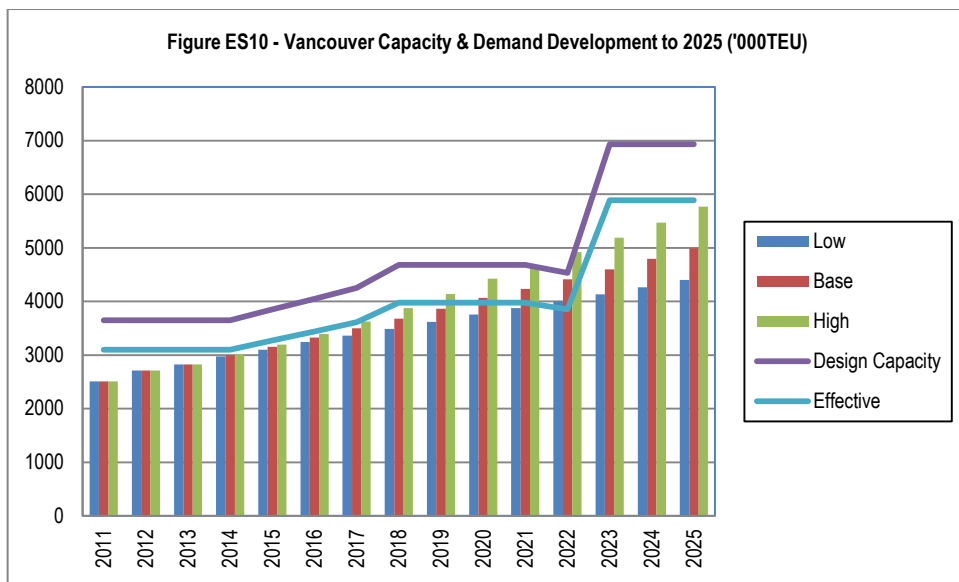
**Supply-Demand Analysis at Port Metro Vancouver**

The scope of this Report is not to conduct a detailed capacity analysis of the Port Metro Vancouver container terminals. However, it is still very useful to offer a summary of the projected supply-demand position to 2025.

Figure ES10 compares the Port Metro Vancouver container forecasts with known capacity at the port to 2025.

An effective utilisation rate of around 85 per cent of the maximum or “design” of terminal capacity typically indicates less than optimal use and the first signs of congestion and is shown.

It should be noted that there is already a pressing need for further investment in capacity at container terminals in Vancouver if potential demand is not to be lost.



**Key Conclusions for Port Metro Vancouver**

Port Metro Vancouver remains a highly-competitive option for import and export container volumes moving forward. By 2025, the port’s terminals are projected to be handling almost 5.0 million TEU per annum in total (under the Base Case growth scenario), compared to the 2013 total of 2.8 million.

Continued growth of Asian imports, together with more locally-sourced exports, are anticipated to continue, with the port able to serve more distant import intermodal markets in both Canada and the US. However, it will need intermodal rail capacity to continue to serve these important locations.

It can be concluded that there is already a pressing need for investment at Port Metro Vancouver if potential demand is not to be missed.