

REPORT



Nova Scotia Port Competitiveness

Final report

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Renewal

and

ACOA

Prepared by:

CPCS

Acknowledgments / Confidentiality

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1 Introduction

Key Chapter Takeaway

- Industry players in the container transportation industry, including shipping lines and railways, are driving economies of scale using larger vessels and longer trains. To remain competitive, container ports must be able to respond to these trends effectively.
- The Provincial and Federal governments are faced with the question of how they can best support and develop Nova Scotia’s gateway assets in responding to these trends so that the gateway assets can continue to support the provincial economy.
- To this end, the objective of this study is to provide the governments with a better understanding of the container business, specifically with regards to competitiveness and future growth considerations relating to proposed container infrastructure development at Halifax, Melford and Sydney.

1.1 Background

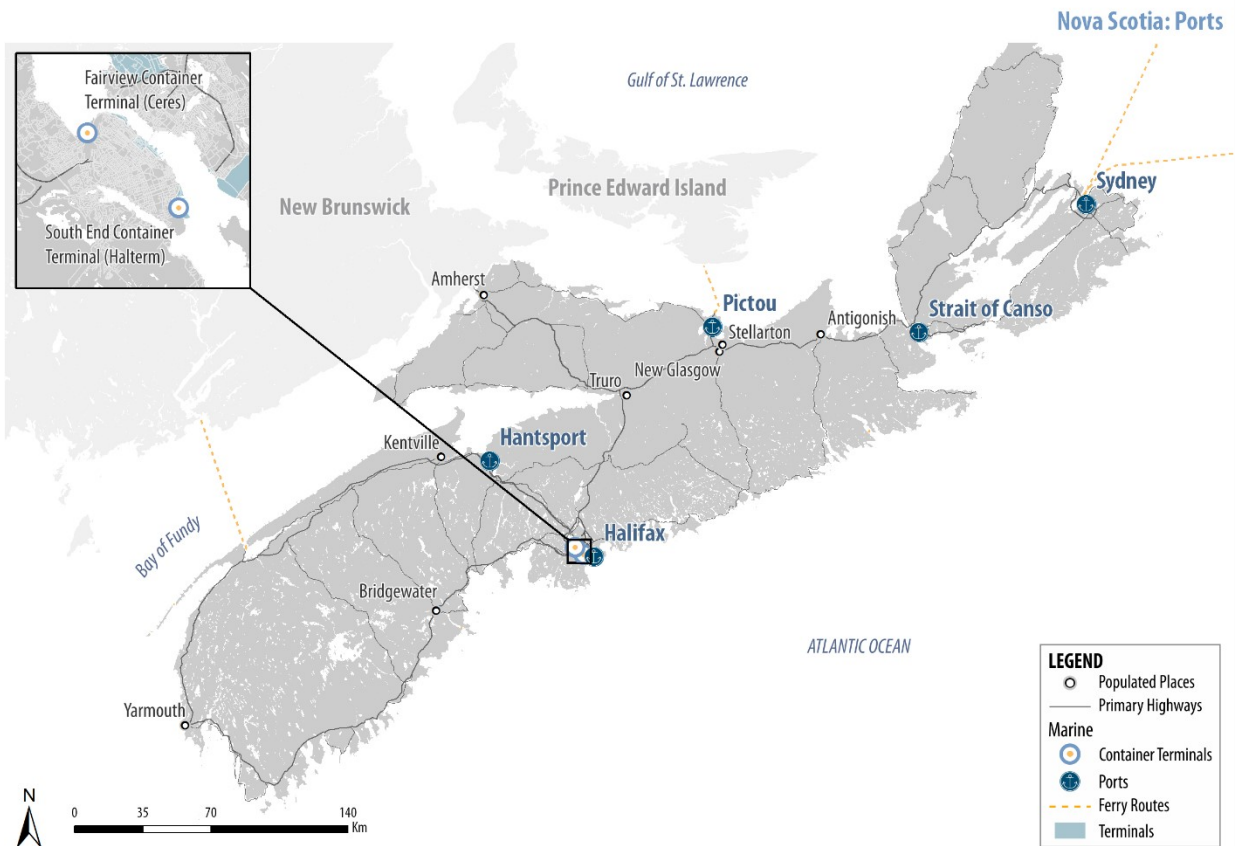
The Nova Scotia transportation system, and in particular its key trade-related “gateway” assets, are essential to the Province’s economy and also support regional and national trade more broadly. These assets include its port facilities designed to facilitate international container trade (shown in the inset in Figure 1-1, overleaf).

To ensure that port facilities can continue to support international container trade, they must be able to respond to a number of trends, some of which have been ongoing for several years. Container ships, for example, continue to get larger and shipping lines continue to order new ships, although the shipping industry is plagued with overcapacity. Partially to address this overcapacity, shipping lines are continuing to merge and consolidate, leaving fewer, but larger players. North American railways continue to focus on improving asset utilization and running fewer, but longer trains. Collectively, all these trends are motivated by the desire for greater economies of scale and the associated lower unit costs.

A number of proposals are being discussed to respond, in part, to these trends. The Halifax Port Authority (HPA) is now studying ways to relocate the truck traffic that presently traverses the

city’s downtown, and to accommodate the new ultra large ships’ capacity.¹ While a single ultra large container ship can be accommodated at Halterm today, the two objectives the HPA aim to achieve are: to accommodate two ultra large ships simultaneously and to reduce the number of trucks on downtown Halifax streets². New container terminals that would cater to the opportunity presented by the deployment of ultra large ships are also being proposed in Nova Scotia’s northeast: Melford Atlantic Gateway Terminal in the Strait of Canso and the Novaporte Container Terminal in Sydney. Both of these facilities would also be designed to efficiently accommodate growing container vessels. See Appendix B for more information on the Melford Atlantic Gateway and Novaporte projects.

Figure 1-1: Nova Scotia Ports



Source: CPCS, based on multiple sources.

In this context, the governments are faced with the question of how they can best support and develop Nova Scotia’s gateway assets in responding to these trends so that they can continue to support the provincial and Canadian economy.

¹ Source: Withers, Paul (November 2, 2016). Port of Halifax eyes relocation of container terminal to Dartmouth.

² While the study by WSP / Parsons Brinckerhoff has not been released, it is our understanding the latest plan is to modify berthing at Halterm to accommodate two ultra large ships and to rail truck traffic north of the city to reduce downtown truck traffic.

1.2 Objectives and Purpose of this Report

The objective of this study is to provide governments with a better understanding of the container business, specifically with regards to competitiveness and future growth considerations relating to proposed container infrastructure development at Halifax, Melford and Sydney. To this end, this report provides an overview of:

- containerization, including its history and trends;
- how decisions are made by transportation decision-makers;
- the market share of East Coast ports and how they have changed;
- the competitiveness of ports in Nova Scotia to serve various North American markets; and
- the relative trade-offs of specific port options in Nova Scotia.

The report is not intended to be a comprehensive review of all elements of competitiveness, but rather to provide an overview of the salient points for decision-makers. The discretionary³ nature of a Nova Scotia port call (Halifax or one of the two projects) as a gateway to Quebec, Ontario and the US Midwest means that it is critical to constantly remain competitive with alternative ports of call for these markets.

1.3 Methodology

This report was primarily prepared through the expert knowledge of the lead author, Pat Morin.

It is largely based on a review of relevant previous studies since 1991 (see Appendix A for summaries of the studies consulted), updated for recent developments such as the continued growth in container ship size and the competitive environment. It is supplemented by an analysis of relevant containerized traffic and economic indicators.

It is intended to be a review of salient issues and trends in containerized supply chain decision-making and how these could evolve but should not be considered a forecast of future conditions or interpreted as such.

³As a gateway to inland markets through intermodal rail, Nova Scotia ports are but one option to serve these markets and must offer the best alternative to shipping lines.

2 Containerization

Key Chapter Takeaway

- Containerization has facilitated globalisation by drastically reducing the cost of international shipping and other barriers to free trade.
- Efficiencies are sought largely through economies of scale particularly in regard to ship size.

2.1 Early Days

2.1.1 Malcolm McLean

Malcom McLean developed the concept of containerization on the basis that it would be more efficient if truck boxes were shipped rather than loading and unloading all cargo by hand. This process required an army of longshoremen and necessitated ships to sit idle for long periods of time. In 1956, the first shipment of containers from New York to Houston was made and the concept grew quickly.

Hand-loading a ship cost \$5.86 a ton at that time. Using containers, it cost only 16 cents a ton to load a ship, a 36-fold savings.⁴

Other benefits of this new way of cargo handling were soon evident. For example, between 1965 and 1970, the amount of capital locked up per tonne of inventory in transit between Hamburg and Sydney fell by half. Because containers were packed and sealed at the factory, losses to theft plummeted, which in turn drastically reduced insurance costs. Loading could also occur more quickly. In 1965 dock labour could move only 1.7 tonnes per hour onto a cargo ship; five years later they could load 30 tonnes in an hour.⁵

⁴ Source: Wikipedia

⁵ The Economist Explains May 22nd 2013 by E.H.

2.1.2 Containerisation in Canada

In Montreal

Manchester Liners was the first shipping line calling Canadian ports to switch to fully container ships. In 1968, it started calling on the Port of Montreal with 500 TEU (all below deck) ice class vessels.

CP Ships, which later became Canada Maritime,⁶ introduced container ships in 1971.

Cast (acquired by CP Ships in 1995) began its integrated (door-to-door) container service calling Antwerp and Montreal in 1972.

In Halifax

In 1969, Dart Container Line (a consortium comprised by Compagnie Maritime Belge (CMB), Charles Hill of Bristol, England and Clarke Traffic Services from Montreal) commenced operations with a transatlantic service between Antwerp and Southampton in Europe and Halifax, New York, and Norfolk in North America.

The same year, Halterm became the first common-user container Terminal in Canada when it commenced operations as a joint venture between Clarke Transport Canada, CN and Halicon (Halifax International Containers), to service the needs of Dart Container Line.⁷

2.2 Developments

2.2.1 Intermodalism

Containerization has facilitated the transfer of cargo between modes and enabled shipping lines to offer more than just the water transport part of the logistics chain to customers. Intermodal⁸ transportation has become the norm rather than the exception and many shipping lines offer door-to-door services either directly or using sub-contractors. Shipping lines such as CP ships and Cast in Montreal were partly owned by railways and naturally gravitated towards door-to-door shipping; Halterm was designed as primarily a direct ship-to-rail transfer facility.

For inland port markets (e.g. Toronto, Chicago etc.) it is particularly important for the shipping line to offer transportation to the inland destination to obtain volume discounts from rail carriers.

2.2.2 Efficiencies

Over the years, the various modes have become more efficient. They have reduced their costs and improved their service levels with the aim of capturing market share and volume. Most of

⁶ In joint venture with Compagnie Maritime Belge.

⁷ Port of Halifax website and Halterm Income Trust IPO prospectus.

⁸ Involving more than one mode.

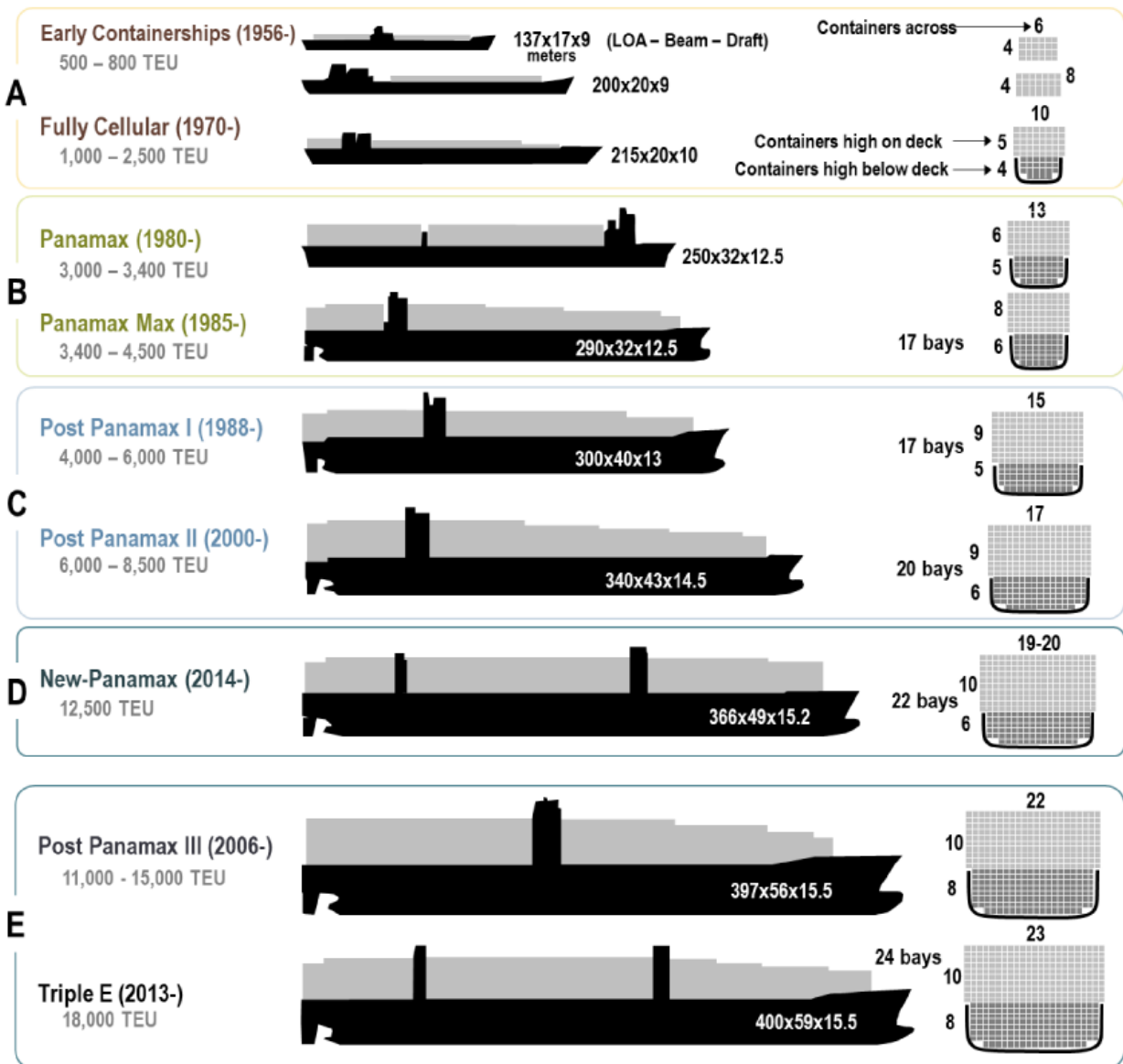
these efficiencies were achieved by increases in size/capacity. However, in some cases, costs were also transferred to other modes. For example, larger ships put more pressure on terminals and inland transportation providers by concentrating container volumes.

Ships

As shown in Figure 2-1, ship size has grown significantly from the early days of containerisation when ships were small, converted general cargo ships of 500 to 800 TEU capacity. Today, EEE class vessels of 18,000 TEUs have been in service since 2013, and 22,000 TEU ships are on order. There are also speculations of 50,000 TEU ships at some point in the future⁹.

⁹ A report by McKinsey and Company envisions ships up to 50,000 TEU by 2067. (Port Technology)

Figure 2-1: Container Ship Sizes



Source: Ashar and Rodrigue 2012

Terminals

Terminals have seen some improvement in handling equipment capacity and size, such as larger ship-to-shore cranes with double spreaders and larger reach stackers. There is also the implementation of higher stacking densities and integrated management systems that has resulted in higher capacities. Much of the improvements has been driven by the need to adapt to larger ships.

Rail

Railways have improved their efficiency by implementing double-stacking of containers on railcars, longer trains and technological improvements to locomotives.

Trucks

Trucking efficiency has also improved significantly through technological advances in engines, utilization of long combination vehicles (LCVs) and higher capacity trailers, etc.

2.2.3 Port development patterns

Many major cities started out as ports. As trading centers, they grew faster than other localities and resulting in more economic activity. The increased economic activity spurred further trade.

As a city grows, residential and commercial activities occupy more and more of the land surrounding the port, and some port activities are forced to move ever further away from their initial location. Ports are affected by the high cost of land for development and the congestion of roadways, while cities are concerned with pollution (e.g. noise, light and air) as well as the impact of port traffic through the city.

This displacement of port activities is often gradual, with port activities incrementally moving outside the developed areas of the city; however, there are many cases where the port activities were relocated elsewhere in their entirety. For example, port activities in New York were relocated to the neighboring state of New Jersey. Even port cities that are still very active are looking to expand further away from the city core. For example, the Port of Montreal is looking at developing Contrecoeur¹⁰ for expansion, the Ports of Rotterdam and Vancouver have developed their respective Deltaports, and Antwerp has built new facilities outside its locks.

2.3 Today

The size of ships continues to increase with no clear end in sight. Drewry had initially calculated that the optimum ship size would be approximately 16,000 – 18,000 TEUs. Beyond that size, port and terminal costs more than offset the gains to the lines. However, little of the cost to ports and terminals is passed on to shipping lines; in fact, lines often expect volume rebates when more cargo is associated with the call of a larger ship. In other words, shipping lines receive the benefit of larger ships but do not incur the additional port and terminal costs associated with the demands larger ships put on ports and terminals.

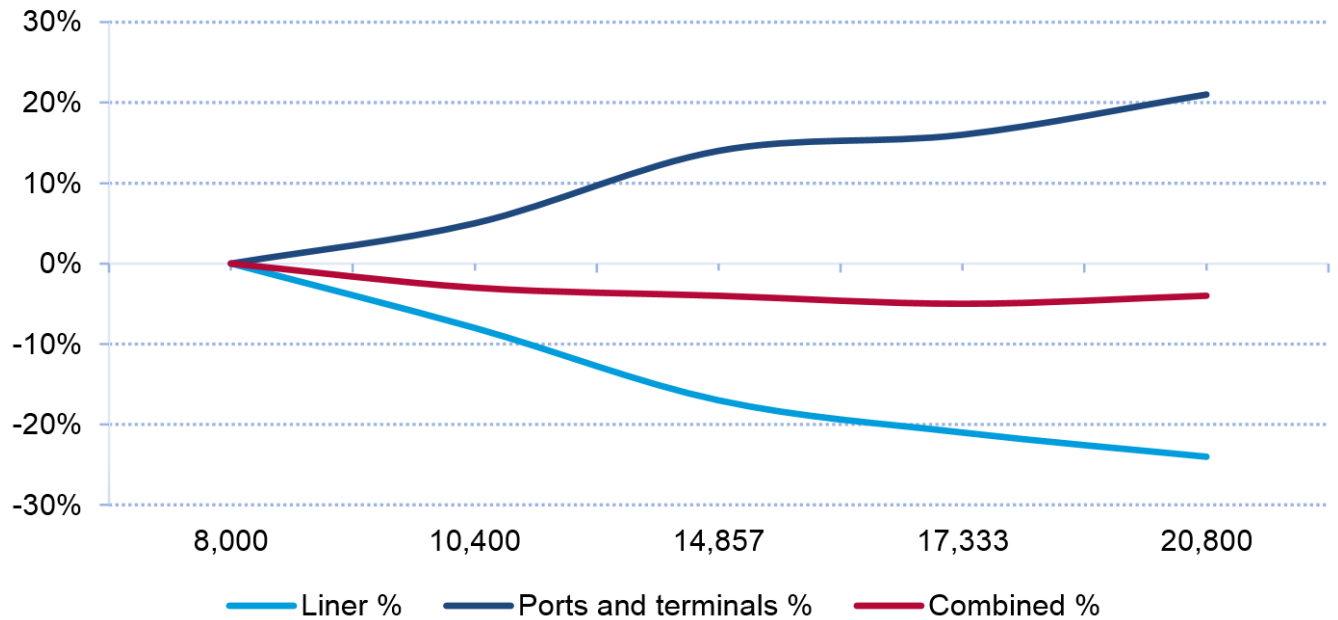
Ships make money at sea; time in port is a necessary evil viewed as a cost of doing business. As ship size grows, the time in port becomes more critical to minimise. All else being equal, a ship two times larger will cost nearly twice as much to build and, unless productivity is proportionally better, will need twice as long to load/unload. The net effect is that the cost of capital while in port is nearly four times more for the larger ship. Minimising time in port becomes more important to the shipping line and ports of call are eliminated to reduce this effect.

¹⁰ About 50 km east of Montreal on the South Shore

The requirement for faster loading and unloading times puts additional demand on the terminals, who also must handle more cargo on a single call.

Figure 2-2 shows the relative costs of larger ships, including the costs to the shipping line (liner) and port and terminals. Based on the analysis, the combined savings is maximised somewhere between 16,000 and 18,000 TEUs.

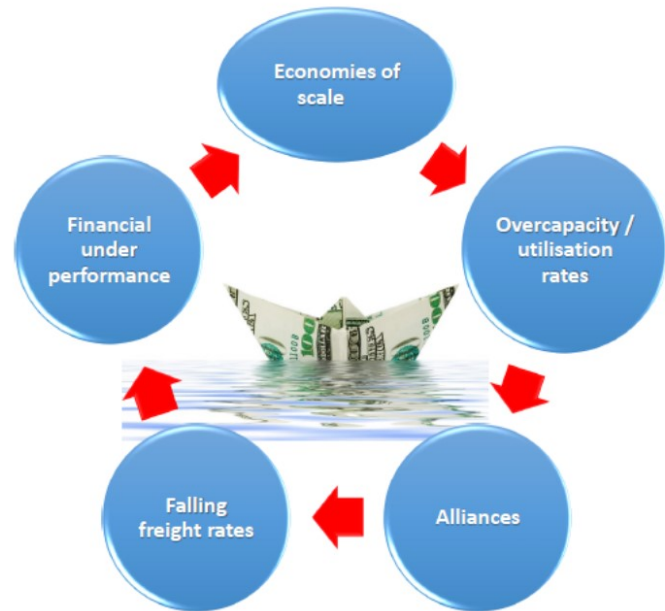
Figure 2-2: Reduction in Costs Possible with Larger Vessels



Source: Drewry

The deployment of ever larger ships not only puts pressure on ports and terminals, it also forces competing lines to find ways to also benefit from the economies associated with larger ships. Shipping lines have been forced to consolidate or at least form alliances to get the benefits associated with larger ships. This has resulted in ship orders exceeding growth and overcapacity reducing freight rates. In turn, the vicious cycle repeats and there is increasing pressure to reduce costs through economies of scale (Figure 2-3).

Figure 2-3: Vicious Cycle of Economies of Scale



Source: Drewry Maritime Research

3 How Decisions are Made

Key Chapter Takeaway

- While timeliness and security are essential criteria for the choice of carrier by shippers, cost is ultimately the differentiator.
- Shippers choose the shipping line, and shipping lines choose the best (for them) routing of the cargo that meets their customer's expectations.
- There is a tendency for the operators of each link (mode) in the logistics chain to focus on optimising their portion of the transit, sometimes to the detriment of the chain as a whole.

3.1 Logistics chain

The logistics of container transportation can be broken down into three components:

- the ocean shipping component
- terminal (port) handling, and
- inland Transportation.

In many cases, each of these components is roughly equal in terms of cost, i.e. the ocean freight, the port costs and the inland costs would be comparable. When ports are relatively far away from inland origins/destinations such as in the case of Halifax, inland costs play a more important role.

This section looks at each part of the logistics chain from the point of view of how shipping line rates are set and how shipping lines¹¹ decide if their service should call a particular port. Elements of the entire logistic chain form the basis for the shipper choosing the carrier (shipping line) for their cargo. Origin and destination, timeliness, shipping schedule, departure date, arrival date, risk, etc. are the prerequisites carriers must meet to attract the booking.

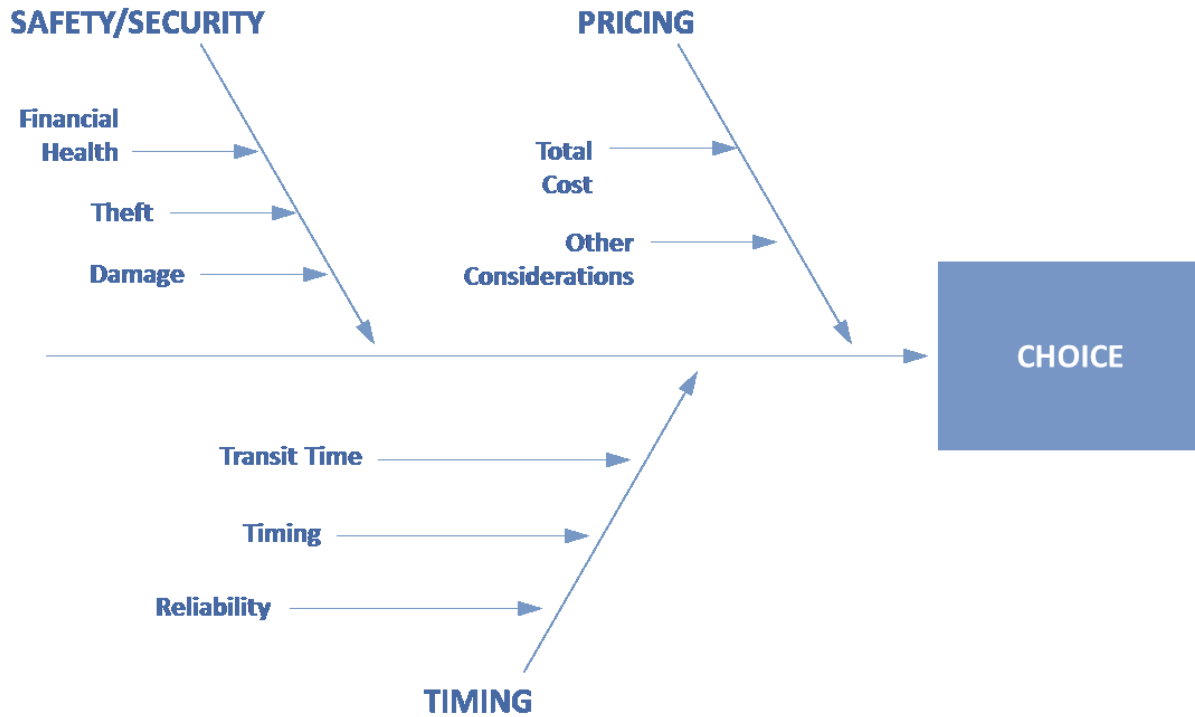
Once the prerequisites are met, price¹² is generally the determining factor for choosing a carrier. The freight owner (shipper) ultimately pays all the costs associated with the shipment. The next sections describe how rates are generally set within the industry.

Figure 3-1 sets out the inputs to the shipper's decision on carrier selection.

¹¹ Of course, each shipping line is different, but generally follow certain common principles.

¹² Shipper's total cost.

Figure 3-1: Elements of a Shipper’s Decision Regarding Choice of Shipping Line



Source: CPCS

3.2 Ocean rates

Ocean rates are made up of ocean shipping rates and port costs, and inland costs are made up of whatever combination of rail, truck, feeder and drayage is best suited to get the cargo to destination.

3.2.1 Ocean shipping rates

Shipping lines can be viewed as sales organisations looking to:

1. Fill ships on each leg of each voyage with paying cargo¹³; and
2. Maximise the ocean revenue generated on the vessels.

The ocean revenue per unit (per ship, per TEU, per container, per voyage, etc.) is the primary key performance indicator (KPI) used by shipping lines. Any empty container slot on a vessel is a missed opportunity to generate revenue for the shipping line. Once a ship sails, the vessel’s capacity cannot be reused. It should also be noted that the rates tend to be set for the longest ocean passage and little or no credit is given to shorter carriages¹⁴.

¹³ Shipping lines must also balance container flows by repositioning empties as required.

¹⁴ For example, on a Hamburg-Rotterdam-Liverpool-Halifax-New York-Savannah service, a Liverpool-Halifax booking would be expected to generate the same revenue as a Hamburg- Savannah booking.

The ocean revenue is typically defined as the overall ocean shipping rate paid by the shipper minus the costs of inland transportation and of port costs¹⁵. Some shipping lines will use sophisticated models that are constantly updated in terms of inland, port costs, empty repositioning costs etc., while others may use much simpler models based on historical averages and contract rates from terminal operators and inland carriers.

3.2.2 Port costs

Port costs in this context are all the costs associated with the vessel call to the port in question. These costs can include¹⁶:

- deviation¹⁷ costs, including Fuel, Time from schedule, and Coast Guard fees;
- call costs, including Pilotage, Tugs, Harbour dues, and Berthing fees; and
- terminal rates, including Handling Rate¹⁸, Wharfage¹⁹, Labour assessment²⁰, Overtime differential²¹, Balance minimum time, and Lines.

Particularly for smaller markets and discretionary ports, the ship exchange rate (i.e. the portion of the ship's containers handled in a port) can significantly increase the relative per unit cost of certain fees²² when these fees are based on ship size rather than cargo volume.

3.3 Inland Costs

3.3.1 Rail

Rail rates tend to be governed by two factors:

- What the market will bear; often a percentage of the next best alternative, sufficient to be attractive to the decision-maker and yet maximize revenues. The actual rates usually allow the railways to capture most inland routings that are more than 250 miles; and
- Railways are focussed on operating ratio, the operating cost as a percentage of the revenue. This ratio is followed by shareholders and drives the stock price as well as the executive compensation packages. As such, although some services may contribute to the overall profit of the railway, they can be less attractive if their operating ratio is above the target.

¹⁵ This is a simplified definition, as it does not consider the cost of sales, agency, husbandry, repositioning, etc.

¹⁶ Other costs than those shown exist but are either special cases or passed on to the shipper e.g. placarding, etc.

¹⁷ From the route that would be followed if the port was bypassed.

¹⁸ For simplicity we have assumed an all-in throughput rate.

¹⁹ This is also considered a port cost but since it is collected by the terminal, we are showing as a terminal cost.

²⁰ Mainly to cover pension costs.

²¹ Basic handling rates are based on straight time work periods. When work is outside these periods, the differential between straight time and the overtime rate is passed onto the shipping line.

²² E.g. harbour dues that are based on ship capacity.

3.3.2 Trucking

Trucking rates tend to track the cost of trucking more closely than rates for other modes. It is a very competitive environment with a low barrier to entry (e.g. owner-operators) and relatively low margins.

3.3.3 Short-Sea

Short-sea shipping is used quite extensively in Europe as an inland transportation mode but the regulatory environment in Canada generally makes this mode too expensive to be competitive with rail or trucking. Short-sea container transportation in Canada tends to be either subsidized or in competition with alternatives that also require a short-sea component such as to-from islands (e.g. Oceanex).

4 Market Share

Key Chapter Takeaway

- Container volumes through Halifax have been increasing over the last couple of years. However, over the previous two decades, container volumes were flat, and market share was declining.

4.1 Markets of Interest

The markets of interest for the competitiveness of Nova Scotia Ports are primarily those of Eastern Canada, Ontario, Quebec and the US Midwest and Northeast. These gateway markets have been served (at least partially) through the Port of Halifax. Other ports that are competitive in these markets include New York, Montreal, Saint John, Vancouver and Prince Rupert, each of which have their own captive market and/or markets in which there is little or no competition with ports in Nova Scotia. They are also not the only ports that compete with Nova Scotia ports, but they are judged sufficient for the purpose of comparing relative market share growth.

The Port of Halifax was expecting to benefit from the anticipated congestion in US West Coast ports and from the emergence of Suez routings for Far East Cargo to New York, in combination with water depth limitations in New York (2006 CPCS Transcom study). However, much of the growth in Trans-Pacific freight²³ was absorbed by the ports of Vancouver and Prince Rupert and the Suez routes did not grow as quickly as anticipated.

On trans-Atlantic routes (including Suez routes to North America), Nova Scotia ports offer first-in and last-out, a significant advantage for cargoes that are time sensitive. When the cargo can also benefit from the lowest door-to-door cost, there should be a strong preference to calling Nova Scotia Ports en route to New York.

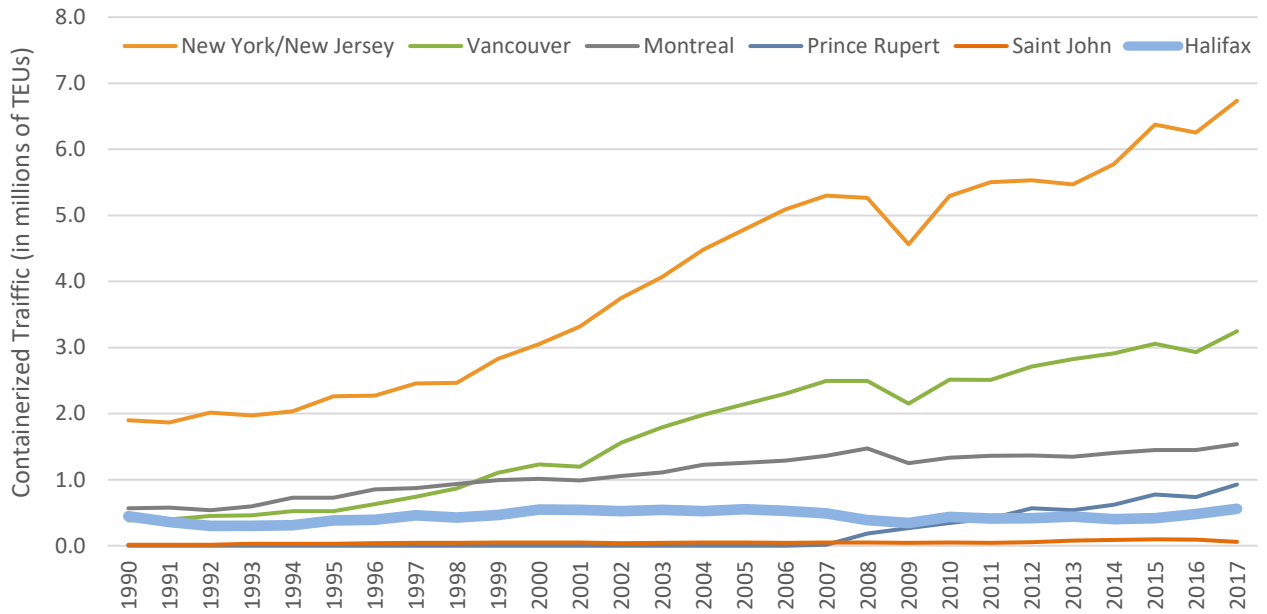
4.2 Overall volume and Market Shares

The overall market has grown (at rates comparable to container growth to North America overall) while Halifax and Saint John volumes have been flat (Figure 4-1).²⁴

²³ For cargoes that could have been handled through Nova Scotia ports.

²⁴ With the exception of the last couple of years

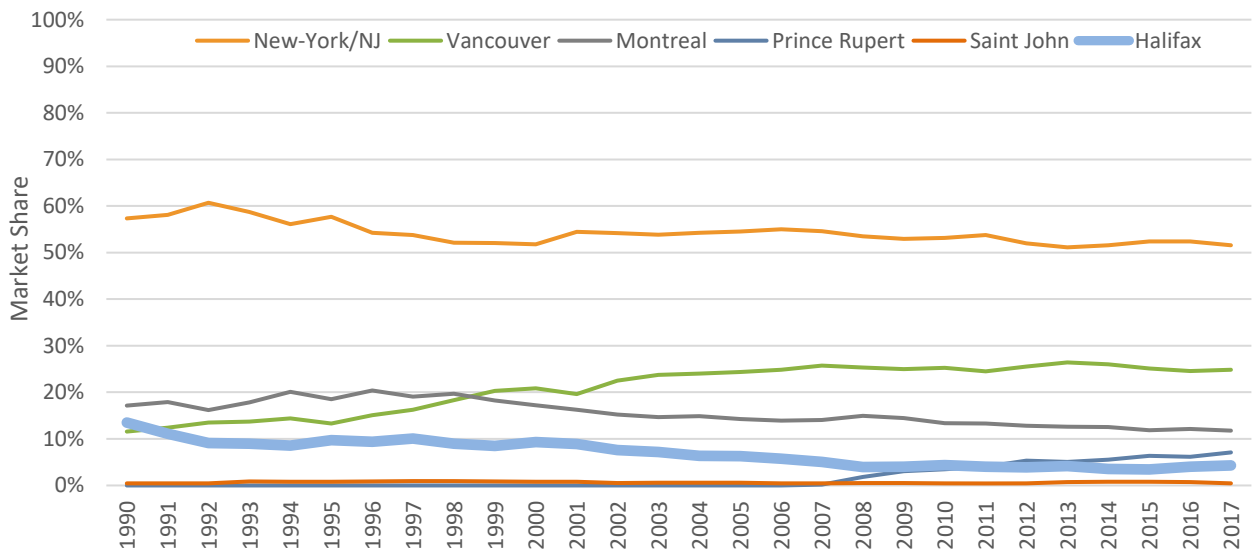
Figure 4-1: Containerized Traffic to All Ports Considered



Source: CPCS analysis of sources

As a consequence of the lack of growth, Halifax has lost market share (Figure 4-2).

Figure 4-2: Market Share of All Ports Considered

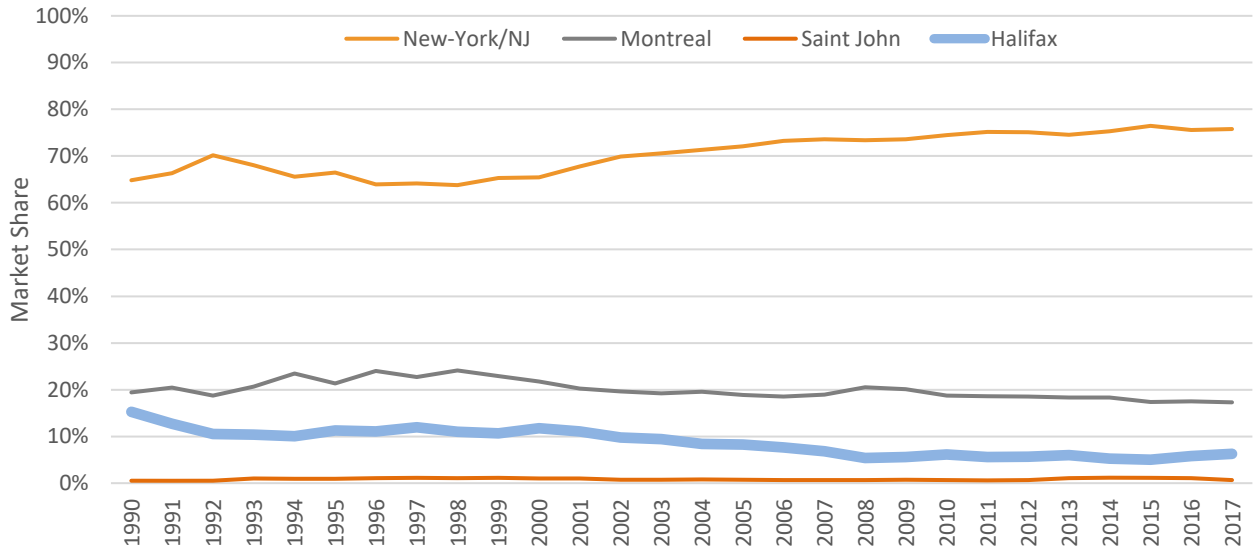


Source: CPCS analysis of sources

Although some Eastern ports have grown, only West Coast ports have gained market share

4.3 Halifax vs East Coast Ports

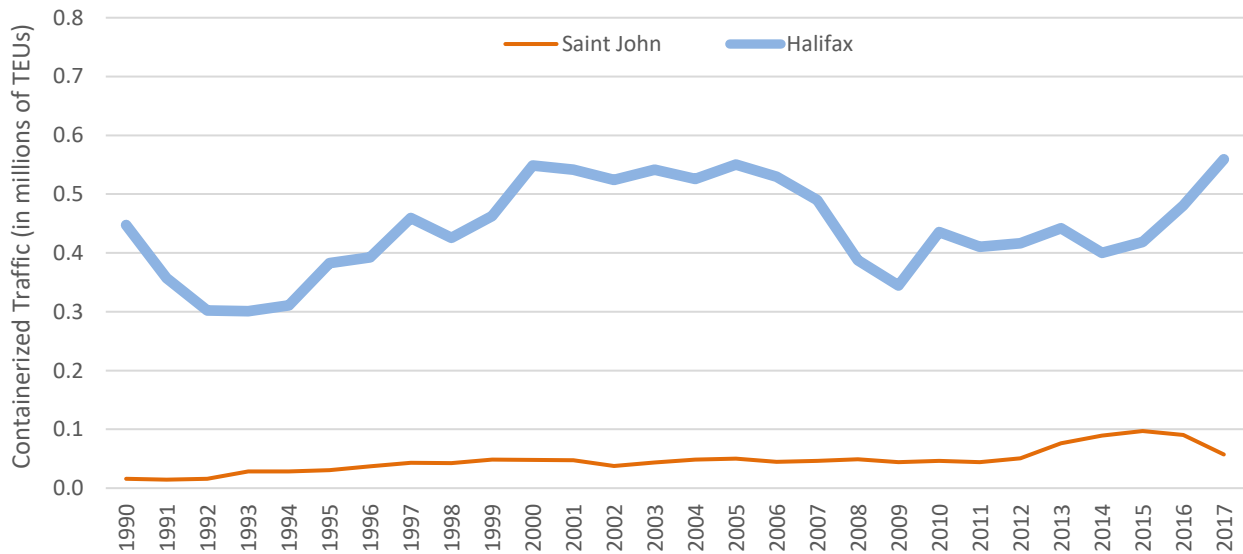
Figure 4-3: Market Share of East Coast Ports



Source: CPCS analysis of sources

4.4 Atlantic Canada Ports

Figure 4-4: Containerized Traffic to Atlantic Canada Ports



Source: CPCS analysis of sources

In 2016-2017 volumes grew significantly in Halifax. This growth is in part attributable to the reduction in fees for US cargo. The Halifax Port Authority, Labour and CN reduced some of the costs of shipping US cargo through the port. This has been quite successful and demonstrates the potential for increased gateway traffic when costs are reduced.

The recent growth is also partly the result of Tropical shipping shifting from Saint John to Halifax (circa 90,000 lifts in 2015). This is very positive for the Port of Halifax since Halifax is now well-positioned for transshipments to/from Puerto Rico and the rest of the Caribbean; however, this is a more of a one-time event than an indication of sustainable growth rate.

5 Competitiveness

Key Chapter Takeaway

- Nova Scotia ports (Halifax) offer shipping lines crossing the Atlantic a competitive alternative to US East Coast ports if they do not call Montreal.
- Until a critical mass of gateway cargo volume is achieved, Nova Scotia ports will remain discretionary.

As seen earlier, container volumes through the Port of Halifax have not really grown until recently. Halifax remains a discretionary port of call; the local market, although lucrative²⁵, is small and cannot sustain a port call²⁶ on its own. The study entitled “The Nova Scotia Transportation Sector: Global Market Challenges and Opportunities” by CPCS in 2016 concluded that a critical mass was necessary for Nova Scotia ports to be more than an optional port of call in the long term.

The amount of cargo that would constitute critical mass is not determined, but unless approximately 15% of containers can be regularly exchanged²⁷ per call, it is possible that a shipping line would consider dropping the call.

The Port of Montreal has, despite some competitive disadvantages, managed to grow, although has also lost some market share, particularly of US Midwest cargo.²⁸ Shipping lines that call Montreal despite the requirement to use smaller and ice-classed ships, benefit from an advantageous geographical location for inland transportation.

The table below shows the distances between key ports and inland markets by road and sea, using Halifax’s location as the basis for sea distances and assuming ships are arriving on Trans-Atlantic services (Figure 5-1).

Figure 5-1 clearly shows the significant advantage of the Port of Montreal over Halifax for cargoes to Montreal, Toronto and Chicago: for ships able to sail directly to Montreal, the port

²⁵ Fish, seafood and other specialty foods make up much of the local exports and, as high-end time-sensitive cargoes, command higher shipping rates.

²⁶ By ultra large container ships.

²⁷ I.e. the exchange ratio is approximately 15% or higher.

²⁸ Likely as a result of the deployment of larger ships on Trans-Atlantic routes.

is nearly 1,200 kilometres closer to these inland markets. The table also shows the favourable geographical position of New York for access to the US Midwest (Chicago) compared to Canadian ports. Fortunately, this geographical advantage is offset by generally higher port costs in New York. Finally, the table also shows Norfolk’s distance advantage relative to Halifax for containers to Toronto and Chicago by road/rail.

Figure 5-1: Distances

Port	Distance to Halifax by Sea (nautical miles)	Distance to Halifax by Road (kilometres)	Distance to Montreal by Road (kilometres)	Distance to Toronto by Road (kilometres)	Distance to Chicago by Road (kilometres)
Halifax	0	0	1195	1731	2544
Montreal	946	1195	0	536	1348
Saint John	263	417	911	1257	2069
New York	550	1479	589	771	1250
Norfolk	764	2142	1263	1073	1418

Source: CPCS

Figure 5-2 below shows the routings favoured by shipping lines on Trans-Atlantic Services. The left-most column shows the market for the containers (i.e. where they originate or are ultimately destined) and the columns describe the types of services. Although some of the carriers have changed, the decision-making process remains the same. This table illustrates the actual results of the various shipping lines’ port of call decisions in 2006; little has changed. The table shows that for services that have both Montreal and Halifax calls for the same trade, Montreal is the routing of choice for Montreal/Toronto and US Midwest cargoes. For those that do not have a Montreal service in the same trade, Halifax can be an option (discretionary) for Montreal/Toronto and US Midwest cargoes.

Figure 5-2: Hierarchy of Transatlantic/Mediterranean cargo routing decisions - North Eastern ports of the East

Market Sector	Lines with Montreal services only	Lines with Montreal and ECNA main-port services, including Halifax call	Lines with Montreal and ECNA main-port services, with no Halifax call	Lines with ECNA mainport services only, including Halifax call	Lines with ECNA mainport services only, with no Halifax call
Atlantic Provinces	Do not carry cargo	Route via Halifax	Do not carry cargo	Route via Halifax	Do not carry cargo
Montreal/Toronto	Route via Montreal	Route via Montreal	Route via Montreal	Route via Halifax or New York	Route via New York
US Midwest	Route via Montreal	Route via Montreal	Route via Montreal	Route via Halifax or New York	Route via New York
Transatlantic (North Europe) Trade					
Main Carriers		Hapag Lloyd/CP OOCL NYK*	Maersk MSC APL* MOL* Evergreen* CMA CGM*	ACL	HMM CSCL Cosco K-Line Yang Ming Hanjin Zim
Mediterranean Trade					
Main Carriers		Hapag Lloyd/CP	MSC* Hanjin	Maersk Zim	CMA CGM Evergreen Cosco K-Line Yang Ming APL UASC

Source Drewry (2006)

Except for Atlantic Container Line (ACL), that carries a mixture of containers and Roll-on Roll-off cargo (RoRo), all shipping lines chose Montreal as their gateway to Quebec, Ontario and the US Midwest for North Europe transatlantic trades. This despite the fact that services calling the Port of Montreal generally call only Montreal because of its location²⁹. The necessity to fill ships for a single port call was initially a disadvantage but, as cargo volumes grew³⁰, the efficiency of a single direct call³¹ and the port’s proximity to market attracted most shipping lines.

²⁹ Montreal is too far off the usual ship routing (great circle route) to combine with other ports of call.

³⁰ In part due to alliances and consolidation of the shipping lines.

³¹ On a per voyage basis, pilot fees, harbour dues and certain labour expenses (e.g. balance minimum time) are reduced on a per TEU basis.

Coast of North America (ECNA) seaboard

Figure 5-3 shows the routing decisions that were made by shipping lines for the Asian trade in 2006. Since then, little has changed except that the long-awaited Suez routings, as an alternative to trans-Pacific routings, are finally developing. The table shows that Halifax is not competitive with US East Coast ports as a gateway for Panama services. It also shows that Halifax is in competition with the Port of New York/New Jersey when shipping lines on Suez services include a Halifax call. Since most of the Suez services that call Halifax also call Norfolk, one must conclude³² that routing via Halifax is favourable to routing via Norfolk on Suez services.

Figure 5-3: Hierarchy of Asian cargo routing decisions - North Eastern ports of the ECNA seaboard

Market Sector	Panama services, including Halifax call*	Suez services, no Halifax call	Suez services, including Halifax call
Atlantic Provinces	Route via Halifax	Route via New York	Route via Halifax
Montreal/Toronto	Route via Norfolk or New York	Route via New York or Norfolk	Route via Halifax or New York
US Midwest	Route via Norfolk or New York	Route via New York or Norfolk	Route via Halifax or New York
Main Carriers	Hapag Lloyd/CP OOCL NYK Zim		Hapag Lloyd/CP OOCL NYK Maersk CSCL

Source: Drewry (2006)

The ports of New York, Montreal and Halifax are difficult to compare directly given that they offer different services and target specific markets:

Montreal is considered a niche destination port that is limited in terms of ship size and ice capability but closer to markets³³ and has been able to attract most shipping lines participating in the North Europe-North American trade.

Halifax is a discretionary port of call that offers shipping lines participation in a small but lucrative local market and a competitive alternative to inland markets for lines crossing the Atlantic on traditional great circle routes. Its use as a gateway to the Quebec, Ontario and Midwest markets is dependant on the overall³⁴ cost to market being the best alternative available to the shipping line.

³² Given that these services choose routings via Halifax or New York to Montreal/Toronto and US Midwest.

³³ Quebec, Ontario and US Midwest.

³⁴ Including ship costs associated with the port call, port and handling costs and inland (rail) costs.

New York is a must-call port given the size of its local market; as such, costs to inland markets may be viewed as incremental costs, not burdened with some of the fixed costs associated with the port call, particularly when shipping lines are trying to build up volume to fill larger ships. It is also one of the most expensive ports in terms of handling costs on the east coast.

6 Nova Scotia Port Alternatives

Key Chapter Takeaway

- Greenfield projects offer some significant advantages, notably in terms of productivity, environment and land availability.
- Halifax is a better geographical location.

This chapter compares the options for Nova Scotia gateways to the markets of Quebec, Ontario and US Midwest. It considers the alternatives of the existing Port of Halifax with its foreseen short-medium term projects with the greenfield projects of the Melford Atlantic Gateway Terminal and the Novaport Terminal in Sydney. It considers the advantages and disadvantages of each alternative from the point of view of the shipper or the shipping line; particularly in terms of cost to reach the target market. It identifies the criteria deemed most important in terms of comparing a port as a gateway alternative and presents a visual representation of some of the advantages and disadvantages of each port option.

The choice of criteria, their relative importance and particularly the evaluation of the relative ranking of each port option to the various criteria is subjective and reflects the expert opinion of the consultant.

The alternatives are compared in the context of the following assumptions.

- Larger ships (13,000 TEUs and more) will be deployed on the North Atlantic and are here to stay.
- The deployment of larger ships does not significantly increase the import-export market but can offer opportunities to capture a larger share of these markets.
- The existing business conditions³⁵ in the Port of Halifax remain essentially the same.

³⁵ HPA tariffs, labour agreements, etc.

- Little consideration is given to secondary opportunities such as distribution centres, etc. these opportunities would be similar for any alternative that can generate the critical mass of cargo volume such opportunities would require.

Apart from the obvious cost considerations (handling costs, inland costs, dues and assessments), proximity to the great circle route and productivity³⁶ are important because together they can make or break a port call decision. In addition to the standard considerations associated with the incremental cost of time and fuel required for a call, one must also consider the possibility that the extra time required for a port call could require an extra ship to be added to the service in order for it to maintain a weekly schedule. In this situation, it is unlikely that a shipping line would consider the call.

The below table shows the relative advantages and disadvantages of the Port of Halifax and of the Melford Atlantic Gateway Terminal and Novaport projects.

Colours are added to highlight ranking and the potential importance of the differences between port characteristics. Green indicates a significant advantage or opportunity, red indicates a serious or potentially serious disadvantage, while yellow indicates a less significant advantage/disadvantage or an unknown difference.

Some examples of the choice of colours include:

- Handling costs: both the Melford and Novaport projects have an opportunity to significantly reduce handling costs by using currently available technology, so are shown in green; Halifax is shown in yellow as its handling costs are in line with industry standards;
- Inland rail distance is shortest from Halifax but Melford is not much further in terms of transportation time, as trains into Halifax need to be split and railcars sent to their respective terminals. Therefore, Melford and Halifax are shown in yellow while Sydney is shown in red given its significantly farther distance;
- Proximity to residential areas is an environmental consideration that may, over time, constrain a terminal's operations, so Halifax is shown in red, while Melford and Sydney, are shown in green; and
- Proximity to local market: while Halifax is closest to most of the local cargo, Melford is closer to part of the local market freight, so both are coloured yellow, whereas Sydney is further from nearly all the local market freight than either Halifax or Melford and is coloured red.

³⁶ In this context, productivity is defined as the number of lifts divided by the total time in port.

Port Evaluation Criteria			
	Halifax	Melford	Sydney
Handling costs	Average for industry	New technology, adapted labour contract	Existing labour scheme
Inland rail	Long rail haul	Slightly longer	Longest
Proximity to Great Circle Route	Closest	More deviation	Most deviation
Productivity	Good	Best	Unknown
Proximity to residential areas	Urban Setting		
Dues and Assessments	HEA and HPA	Lower	Lower
Proximity to major market	Small local market accessible	Small local market accessible	Furthest
Ice	None	Occasional in approaches	Possible

7 Analysis and Conclusions

Key Chapter Takeaway

- The Suez opportunity is finally emerging and could drive growth through Nova Scotia ports.
- Having the ability to service the ultra large vessels that are expected on Suez routings is a prerequisite to participating in this opportunity but does not guarantee additional gateway traffic.
- To capture market share, ports, terminals and inland carriers must offer the best inland routing of the cargo available to the carrier.
- Halifax is the only active container port in Nova Scotia; its capacity to handle ultra large ships is limited by air draught constraints of bridges en route to Ceres and continuous berth length at Halterm, effectively reducing the Port's capacity to a single berth for the ultra large ships.
- Greenfield container terminal projects in Nova Scotia offer the prospective of significantly operating efficiencies that could improve the competitiveness of Nova Scotia ports as gateways.
- Any new terminal development is risky and should be driven by firm commitments from private sector industry stakeholders who fully understand the shipping business and are prepared to shoulder most of the risk.

Little has changed since the first study from Booz Allen (20 years ago). Container traffic continues to grow at rates of two to three times real GDP growth and ships keep getting bigger. Each stakeholder is trying to grow their business and reduce their own costs, often through economies of scale that can have a negative effect on other stakeholders.

7.1 Suez Opportunity

The long-anticipated shift towards Suez Canal Services for Asian cargo has begun and is expected to grow as shipping lines deploy larger ships at a controlled rate so they can fill them. Data analysis obtained from ACOA indicates that ships of more than 9,000 TEU capacity calling New York from Suez routings have grown from 5 per month after the dredging of the Suez Canal

to 7 per month following the opening of the new Panama Canal and finally 10 per month since the raising of the Bayonne bridge³⁷.

The Port of New York-New Jersey serves such a large market that it is automatically a must call port on any route that has multiple ports of call. It also makes most economic sense to deploy the largest ships on the longest routes. Consequently, we can expect ship size to grow to approximately 18,000 TEUs (reportedly the ship size that can navigate under the Bayonne bridge following its raising).

Increased use of the Suez for south East Asian and Indian cargoes to/from North America will offer a real opportunity for Nova Scotia as its ports are first-in last out on this routing. Big ships will be deployed on this trade lane as evidenced by the growth of 9,000+ TEU ships into New York. Having the ability to handle the large ships is a prerequisite to participating in this trade, but the ability to handle large ships does not guarantee an increased market share; since other ports competing for this traffic can also service the larger ships.

Ship size does not in itself create more cargo³⁸ but creates competition between ports trying to grow or preserve their market share as the deployment of larger ships is also usually accompanied by a reduction in number of ports of call.

Ports feel obligated to adapt to worldwide shipping trends for fear of being left behind and use the economic impacts (both direct and indirect) of container transportation as justification for the necessary investments in infrastructure.

A Nova Scotia port of call for ships en route to-from the Port of NY/NJ allows the shipping line to:

- participate in the small but lucrative local market;
- rail containers to/from the Canadian and Mid-West US market;
- reduce volumes to be handled in the Port of NY/NJ and avoid congestion when the Port of NY/NJ starts to reach capacity³⁹; and
- transship between services without infringing cabotage regulations.

As stated earlier, container volumes themselves are not sensitive to the cost of transportation. However, the volume of inland containers⁴⁰ passing through a particular port is very sensitive to the cost of moving the containers from the ship to destination, as evidenced by the recent increase in container traffic through the Port of Halifax following recent concessions by Labour, the Port and CN.

³⁷ An estimated growth rate of more than 50% annually.

³⁸ Cost of shipping is small relative to value of cargo and does not have much effect on volumes of cargo.

³⁹ As ports/terminals near capacity, costs and waiting times tend to increase.

⁴⁰ Since port choice is primarily cost based.

To be chosen as a gateway for inland traffic, ports need to offer the best alternative for the shipping line in question. To capture market share, ports, terminals and inland carriers must offer the best routing of the cargo available to the carrier.

7.2 Capacity

The Port of Halifax is presently underutilized (37% utilisation in 2017). The capacity of its two main terminals is estimated at 1,530,000 TEUs⁴¹ per annum and Halterm has announced investments in handling equipment with three new 1 over 5 rubber-tired gantries (RTGs) that will span six lanes and effectively increase yard capacity by 160,000 TEUs, up 40% overall⁴².

However, the Port of Halifax's capacity to handle containers on very large container carriers (circa larger than 10,000 TEUs) is limited by the air draught under the bridges, effectively reducing the large carrier capacity of the port to that of Halterm. As some 25%⁴³ of containers through Halifax are shipped on services that are not expected to deploy greater than 10,000 TEU ship sizes in the foreseeable future, the practical yard capacity of the port, once ultra large ships are fully deployed, would be closer to 1,300,000 EUs⁴⁴.

Another limitation is that, even for the present size of ships, Halterm can only berth one large ship at a time. One way of calculating berth capacity is to consider that wharf capacity is reached once the berth occupancy is such that a randomly scheduled (large) ship would have a less than 50% chance of berthing on arrival. Using this method, the capacity limit of berths for ultra large vessels would be significantly less, somewhere in the 500,000 - 600,000 TEUs per year range depending on the assumptions⁴⁵ used.

7.3 Melford Atlantic Gateway and Novaport Port Projects

One of the significant advantages of the proposed greenfield projects of Melford and Novaport is that they could be designed for the ultra large ships. A single dock face long enough to berth two of the largest ships and sufficient ship-to-shore cranes to work both ships simultaneously along with unrestricted land area could handle some 1.6 million TEUs based on similar assumptions and calculations⁴⁶.

⁴¹ 750,000 for Halterm and 780,000 for Ceres. Source: Halifax Port Authority website.

⁴² Halterm Media Release 17-002 dated October 24 2017.

⁴³ ACL, Oceanex, Tropical, St-Pierre and Miquelon feeder, etc.

⁴⁴ Assuming the 40% yard capacity increase is achieved and that most of the smaller ships are handled at Ceres.

⁴⁵ 561,000 TEUs based on 50% occupancy of a single berth, 18,000 TEU ships, 15% exchange, 1.5 TEUs per container, 100 lifts per hour alongside and working 19 hours per day.

⁴⁶ Based on 71% occupancy of 2 berths, 18,000 TEU ships, 15% exchange rate, 1.5 TEUs per container, 100 lifts per hour alongside and 24 hours per day.

Labour rules would also likely be designed around efficiently working larger ships 24 hours per day, starting upon arrival with sufficient flexibility to deploy labour to suit the work to be accomplished.

The port projects would also be relatively free of the friction that can develop between container handling terminal activities and residential areas such as light, noise and air pollution concerns of nearby residents.

7.4 Critical Mass

There must be sufficient commercial, strategic and tactical advantages to calling a given port over the long term in order for a shipping line to be comfortable in making a firm, ongoing volume commitment. This is in contrast to discretionary ports, which can be added or removed from a shipping line's port rotation according to the prevailing circumstances. Critical mass is the key difference between discretionary and must-call ports.

Unlike the Port of NY/NJ that has more than enough local cargo to achieve such critical mass, Nova Scotia's market (Atlantic Canada) is too small to constitute critical mass on its own and it is divided up amongst all the carriers calling Nova Scotia ports. As ships get bigger, the volume of container throughput necessary to attain critical mass also grows.

7.5 Risks

Given the quantity of unknowns (e.g., ship size, timing, possible other projects), CPCS has recommended that "investment in major projects facing long term market uncertainties should be left to private sector actors who are better able to plan for, manage and adapt to market risks".⁴⁷

A large investment in infrastructure, such as the construction of a new terminal,⁴⁸ is risky and should be driven by private sector stakeholders that understand the business and are prepared to take on most of the risk.

Firm commitments by a credible terminal operator and railways⁴⁹ will likely be required to make such an investment commercially feasible. Terminal operators and railways will likely secure firm commitments from at least one major shipping line before taking such risks.

7.6 Isolationism

While it is natural for separate commercial entities to try to optimise their own systems, all stakeholders in the transportation chain benefit from increased volume.

⁴⁷ NS Transportation Sector: Global Market Challenges and Opportunities. (CPCS 2016)

⁴⁸ For example, one of the projects or a new terminal in Halifax.

⁴⁹ CN and possibly Genesee & Wyoming.

The container transport service offered through a gateway such as the Port of Halifax is the transportation of cargo from a vessel to an inland terminal. Its components cannot be considered in isolation: CN is an essential component of any shipping line's decision to call the Port of Halifax, as is the handling by the container terminal.

Yet, each component tends to be offered in isolation: the Port Authority cannot play favourites with a particular terminal and can not speak for CN, thus can only provide information on fees and contacts; CN is motivated to ensure that any offer does not deteriorate its operating ratio; and terminals seek to commit their limited⁵⁰ capacity wisely.

Although a difficult undertaking, it would be beneficial for all service providers to work together to build the best "system" that can be offered and seek win-win compromises that will maximise volumes for all involved.

For the projects of Melford and Novaport, this cooperation may be easier to arrange as fewer players are involved but it is still a difficult undertaking.

It would seem to make sense for the two terminals in Halifax to work together particularly with McQuarrie's involvement with NYK terminals⁵¹.

7.7 Government involvement

Nova Scotia's marine gateway is essential for Nova Scotia, but discretionary for shipping lines.

Governments can best support gateway activities that contribute significantly to the provincial economy by:

- understanding that the competition is with New York⁵² and other US gateway ports⁵³;
- working towards creating the necessary critical mass that will ensure long term sustainability of gateway ports in Nova Scotia;
- supporting incremental improvements to existing facilities (Halifax) so that a Nova Scotia port call continues to be a viable option for shipping lines;
- supporting more major projects only when the lion's share of risk is taken by the private sector;
- promoting trade and supporting marketing efforts; and
- facilitating cooperation between service providers/stakeholders.

⁵⁰ A terminal's capacity can be limited in terms of schedule, availability of labour, storage, etc., as well as throughput capacity.

⁵¹ In 2015, Macquarie (owner of Halterm) acquired a 49% stake in NYK's terminals of Los Angeles, New Orleans and Montreal but the deal excluded NYK/Cerescorp Co., operator of the Fairview Cove container terminal in the city's north end.

⁵² The Port of New York/New Jersey is working on a Master Plan that should be available sometime in 2018.

⁵³ As opposed to competition between terminals in Halifax or between container port projects.

Appendix A

Summary of selected studies⁵⁴

1. A Strategic Analysis of Nova Scotia's Trade Facilities & Services

Prepared by Booz-Allen & Hamilton, Inc. & the ARA Consulting Group, Inc. for the Province of Nova Scotia Department of Industry, Trade and Technology
March, 1991

- Used existing research to identify opportunities for future trade and economic development strategies.
- Assessed Halifax's container port in relation to ports in Montreal and the US East Coast.
- Noted several ways to sustain or augment the Port of Halifax's container throughput
 - Halifax's high inland costs put it at a disadvantage – actions to improve throughput should focus on improving inland connectivity in partnership with CN.
- Assessed three trade related opportunities.
 - Adding value to products through in-transit manufacture or assembly.
 - Adding value through assembly or additional processing of indigenous materials or products.
 - The exportation of trade services.
- Had five recommended components for a trade related development program.
 - Rail/port joint venture/ownership (near term).
 - In-transit manufacture or assembly (near term).
 - Export trading services and company (near term).
 - Sea-air cargo operation (longer term).
 - Distribution centre (longer term).

2. The Greater Halifax Multi-Modal Transportation Study

Prepared by Booz-Allen & Hamilton in cooperation with ATi Consulting for the Greater Halifax Partnership
November 14, 1996

- The study was commissioned to answer the following questions:
 - Are the dynamics present that will allow Halifax to become a significant multi-modal North Atlantic gateway?

⁵⁴ Source : ACOA

- How can Halifax leverage its assets to assume a position of transportation importance?
- Would Shearwater, as a second airport best serve the purposes of the community?
- What is an appropriate role for Shearwater?
- Outlines Halifax's potential as a global transportation centre, its position relative to other ports, relevant changes in the global transportation industry, and initiatives that Halifax would need to undertake to become a multi-modal gateway (many of which involve establishing strategic alliances and investing in new equipment and facilities).
- Authors see Shearwater's short-term role as a centre for niche aviation opportunities and its long-term role as a maritime/intermodal/global trade centre.
- Lists a set of immediate actions for Halifax.

4. Greater Halifax Distribution Study

Prepared by MariNova Consulting Ltd. for Greater Halifax Partnership and Halifax Port Authority
March, 2004

- The study investigates whether the Port of Halifax's location and services can be leveraged to enhance the port's and the Halifax-Moncton Corridor's role as a North American distribution centre (DC).
- Notes the many factors that influence the choice of location for DCs and outlines the current DC network in Canada.
- Identified the most advantageous shipping links and relationships for Halifax to develop in the near term.
- Found that mainstream DCs are likely to continue to concentrate in Central Canada, partly because Halifax is not very competitive due to high taxes and lack of financial incentives.

6. Building an Efficient Transportation System: Atlantic priorities for transportation policy reform in Canada

Prepared by Dr. Joseph Schulman and David Chaundy with assistance from other Atlantic Provinces Economic Council staff
September, 2005

- The report provides an overview of developments in federal transportation policy and the transportation policy issues currently facing Atlantic Canada.
- The demands on the region's transportation system include structural shifts within the economy, including the rapid growth of international trade and investment, the development of new industries such as offshore oil and gas, the continued shift towards services and the ongoing concentration of people and economic activity in cities.

8. Halifax Gateway Council Economic Impact Study

Prepared by InterVISTAS Consulting Inc. for Halifax Gateway Council

November, 2005

- Goal of the study is to quantify the Halifax Gateway's economic importance to help with its development and promotion, specifically by measuring:
 - employment and wages generated by Halifax Gateway businesses;
 - GDP and economic output contribution of the Halifax Gateway to the NS economy; and
 - taxes and fees paid to the federal, provincial and municipal governments.
- The main findings are:
 - the Halifax Gateway generates 11,930 direct, high-wage jobs in the province;
 - the total amount of employment generated by the Gateway reaches 28,490 jobs when it includes direct, indirect, and induced employment;
 - the Halifax Gateway makes significant contributions to Nova Scotia's GDP and economic output;
 - the Gateway is driven largely by ships docking at the Port of Halifax and aircraft landing at the Halifax International Airport;
 - the Gateway generates tax and other revenues for all levels of government totaling over \$254 million; and
 - capital investment plans of Gateway businesses will support jobs in construction and other industries.

9. Looking to the Future: A plan for investing in Canada's transportation system

Prepared by Wilbur Smith Associates et al. for the Council of the Federation

November, 2005

- The report outlines a national transportation strategy by identifying a strategic network, detailing provincial and territorial priorities, recommending changes to the policy framework, and calling for a new funding partnership with the federal government.
- In Atlantic Canada, the roadways are identified as a major area of focus for transportation to and from the United States.
- Notes that Canada Port Authority (CPA) ports are constrained by the amount that they can borrow for capital projects by the terms of their Letters Patent; indicates that this may soon change thanks to *Bill C-61*.

10. The Emergence of Cross-Border Regions: Interim report

Prepared by the Policy Research Initiative (PRI)

November, 2005

- This is an interim report – see final synthesis below (published May, 2006).
- The study provides an overview of the nature of cross-border regional relationships between Canadian provinces and American states both in theory and in practice and lists potential policy implications for regional management.

11. Characteristics of Tomorrow's Successful Port

Prepared by Michael C. Ircha for the Atlantic Institute for Market Studies
January, 2006

- Outlines the attributes that container hub terminals will require to be successful as container traffic and ships both grow in size and as security considerations boost interest in siting major container transshipment ports in non-urban areas.
- Identified attributes include a considerable volume of captive traffic, a location central to main shipping routes and feeder ports, sufficient water depth and harbor space to accommodate the very large container ships under consideration, appropriate infrastructure and superstructure, including good intermodal linkages and appropriate container lift equipment, sufficient capacity to meet peak demand, high productivity, competitive rates and tariffs, a reliable and trouble-free labour force, and good security.

12. Building the Halifax Gateway: A new vision for the future

Prepared by InterVISTAS Consulting Inc. for Halifax Gateway Council
February 2006 (?)

- The report emphasizes the potential benefits of developing the Halifax Gateway as well as the following key challenges: market awareness, border processes, growing competition, and infrastructure investment.
- It is a strategic plan for the Gateway that is based on market research, industry analysis, a strategic assessment of the Halifax Gateway, and consultations with industry and government leaders at the regional, provincial, and national levels.
- Writes that the Halifax Gateway's vision is "to become North America's preferred eastern gateway for the economic and social benefit of Atlantic Canada."

13. Short Sea Shipping on the East Coast of North America: An analysis of opportunities and issues

Prepared by Mary R. Brooks, J. Richard Hodgson, and James D. Frost for the Canada-Dalhousie University Transportation Planning/Modal Integration Initiative
March 31, 2006

- The study identified and explored four main requirements for a successful short sea service to be established.
 - The demand for the service must be large enough to support service development.
 - The service must meet the requirements of shippers.
 - A short sea operator must be sufficiently convinced of the commercial potential to decide to offer the service.
 - The business and regulatory climate must support its development.

- The study reported key findings in all four of the above-mentioned areas. One notable finding was that one-half of companies that noted road congestion indicated that it was a serious enough issue for them to consider switching to short sea shipping.

14. Shipping Out: The development of a gateway hub at the Port of Halifax

Prepared by James D. Frost for the Atlantic Institute for Market Studies

April, 2006

- Outlines the need for new port facilities in Halifax that can handle potential increased transshipment traffic, particularly if container vessels continue to grow in size and are no longer able to enter the harbours of Boston, New York, or Philadelphia.
- Includes details on world hub port developments and Halifax's opportunities as a gateway and transshipment hub.

15. The Emergence of Cross-Border Regions between Canada and the United States: Roundtables synthesis report

Prepared by the Policy Research Initiative (PRI)

May, 2006

- Synthesizes research and roundtable discussions on the topic of challenges, opportunities, and policy implications associated with cross-border regions.
- The scope includes cross-border regions in the West, the Prairies-Great Plains, the Great Lakes-Heartland, and the East, which was further divided into the two overlapping sub-regions of Quebec-Northern New England and Atlantic-New England.

16. Atlantica and Trends in World Trade: The opportunity and the barriers

Prepared by Brian Lee Crowley and Stephen Kymlicka for the Atlantic Institute for Market Studies

June, 2006

- As other transportation routes become clogged, the Atlantica region is becoming a vital route in the context of NAFTA.
- The study outlines the current position of Atlantica as well as trade trends, opportunities, and potential benefits of an Atlantica Gateway.
- Key topics include the barriers and opportunities facing the Port of Halifax, the structure and evolution of crossborder regions, the definition of gateways and corridors, border policies and infrastructure, and the effect of trade on economic growth both regionally and continentally.

19. Gateway Strategy Development Initiative

Prepared by CPCS Transcom for the Government of Nova Scotia
November, 2006

- The main objectives of the study were to identify and evaluate gateway-related opportunities and to develop a strategy and action plan that will position the province to take maximum advantage of these opportunities.
- The main identified opportunity is the development of Suez Canal routings for containers from Asia and the Indian Sub-Continent (ISC).
- Other opportunities include home porting for small niche cruise lines and opportunities on the air side for a Nova Scotia gateway strategy and in the cruise business to increase port of call business.
- Once container capacity of the Port of Halifax is consumed, propose the expansion of existing terminals and the creation of a new greenfield terminal, an inland terminal in Halifax, and a third terminal in Halifax.
- For air, suggest investment in specialized air cargo processing facilities and addressing cumbersome regulatory process for international carriers.

20. The Changing Global Economy: The implications and opportunities for transportation in Atlantic Canada

Prepared by the Atlantic Provinces Economic Council
November, 2006

- The purpose of this report is to provide an overview of the current transportation system in Atlantic Canada, to identify the key transportation issues in the region, and to highlight how the region's trade and transportation flows are being affected by the changing global economy.
- Focuses on a marine gateway for freight shipments.
- Describes the key elements of Atlantic Canada's transportation system.
- Outlines how the emergence of global supply chains has impacted Atlantic Canada.
- Lists global trade and shipping trends that could show potential for North American East Coast ports via the Suez Canal, developments that could affect the scope or timing of these opportunities, and reasons why the Port of Halifax is well positioned to take advantage of these opportunities.
- Highlights the opportunity for the Port of Halifax to become a gateway for containerized Asian imports along with other opportunities for the Port of Halifax to expand (e.g. developing a transshipment container terminal).
- Lists potentially beneficial activities that regional stakeholders could undertake to improve gateway activity and the potential economic benefits of this activity.
- Names certain gaps that must be addressed to improve gateway activity.

21. Embracing the Future: The Atlantic Gateway and Canada's trade corridor

Prepared by Charles McMillan for the Asia Pacific Foundation of Canada

November 30, 2006

- This study addresses the Atlantic Gateway initiative and how it relates to Canada's global trading position as a national policy priority. It is based on a series of interviews with provincial and federal trade officials, experts in the transportation sector, major Canadian retailers, and leading academic researchers.
- It addresses ocean-based transportation, port development and infrastructure, and inter-modal rail and trucking.
- The main question is how goods can flow most easily between Pacific Rim trade and investment partners of Canadian industry. The study claims that the answer to this question lies in maritime shipping and ocean-based transportation and provides a suite of recommendations to various stakeholders and transportation-related industries.

22. The Bangor-Saint John Trade & Growth Corridor Economic Assets Map

Prepared by ShiftCentral Inc. for the Foundation for the "Atlantica" International Northeast Economic Region

December, 2006

- Describes the Bangor-Saint John Trade & Growth Corridor, which represents a vital link in the emerging Atlantica economic zone that spans from Sussex, New Brunswick to Bar Harbor, Maine.
- The report builds on and compliments the Halifax Moncton Growth Corridor.
- The document provides an overview of the Bangor-Saint John Trade & Growth Corridor, including corridor-based industries, demographics and labour force, economic development agencies in the Corridor, education and training, major infrastructure, municipalities, operating cost environment, other economic assets, R&D and innovation capacity, tourism, trade & commerce, and utilities.

23. The Use of Containers in Canada

Prepared by MariNova Consulting Ltd. and partners for Transport Canada

December, 2006

- This report is the first phase of a two-phase study that describes container usage in Canada. As such, it describes the flow and use of containers and was commissioned to identify state of play, major issues and recommended areas for further study. Phase II will examine recommended solutions.
- This report addresses the existing context, and provides a thorough understanding and description of container movements and logistics in Western Canada in particular, as well as in Central Canada and the Atlantic Region. The study also provides several illustrations of best practices in similar jurisdictions in Canada and around the globe.

24. Building the Container Transload Sector in Halifax

Prepared by MariNova Consulting Ltd. and others for the Greater Halifax Partnership and Partners

May, 2007

- In light of Maersk's decision to withdraw from Halifax in favour of Savannah, which has 19 major distribution centres (DCs) within 5 miles of the port, the study outlines:
 - the state of Halifax's current transportation sector;
 - a transportation market assessment;
 - case studies of other ports;
 - an assessment of the Halifax Industrial market;
 - Port of Halifax transportation networks;
 - an analysis of issues for the Port of Halifax; and
 - a recommended implementation strategy.
- The authors note that it is critical to the future of the Atlantic Gateway that Halifax build a transload and a distribution sector.

25. Halifax Air Cargo Market Study and Business Case

Prepared by Jacobs Consultancy Canada Inc. for the Halifax Gateway Council

May 1, 2007

- Sections of the presentation include global trends in air cargo, US trends, cargo challenges, Canadian regulatory challenges, current competition, case studies, YHZ current cargo services, air cargo demand, air cargo infrastructure, business case, and next steps.
- The aim of the Halifax Gateway Air Cargo Business Plan goes beyond air cargo operations to develop routes, distribution, and logistics entities to establish YHZ as a value-added hub and an entrance point to the NAFTA area.
- The presentation includes six recommendations for next steps in pursuing Halifax's air cargo opportunity.

26. Atlantic Gateway Business Case

Prepared by InterVISTAS Consulting Inc. in association with MariNova Consulting Ltd. and TranSystems for ACOA

September, 2007

- The purpose of this report is to set the global context for the Atlantic Gateway, align the initiative with national and regional interests, identify related opportunities for Atlantic Canada, describe supportive legislative and regulatory environments, develop an action plan, and evaluate the impacts of the action plan.
- The main conclusions are:
 - there is a compelling case for an Atlantic Gateway with initial emphasis on growing international container trade;
 - competitive transit times, reliability, and cost competitiveness are three key aspects of the value proposition;

- challenges must be faced through public and private sector collaboration; and
- the national supply chain stands to benefit from the Atlantic Gateway.

27. Charting the Course: Atlantic Canada Transportation Strategy

Prepared by the Atlantic Canada Ministries of Transportation

2008

- The document is a 10-year transportation strategy for the Atlantic region. It covers road, rail, air, and marine transportation and is meant to complement a comprehensive national transportation strategy entitled *Looking to the Future: A plan for investing in Canada's transportation system*.
- The strategy identifies funding, policy, regulatory, and service challenges to be addressed.
- Main sections include:
 - the Vision: considers the present and future vision for transportation in Atlantic Canada;
 - Atlantic Canada's Strategic Infrastructure: includes highways, railways, airports, and marine ports and ferry services;
 - challenges Facing Transportation in Atlantic Canada: identified funding, policy and regulation, and service challenges;
 - Action Plan; and
 - A Call for Action: includes necessary actions from the provincial, federal, and municipal governments as well as the private sector.

28. Atlantic Gateway Distripark Plan

Prepared by MariNova Consulting Ltd., UMA Engineering, CPCS Transcom, Dillon Consulting, and Colliers International for Halifax Regional Municipality and others

March, 2008

- The study was originally meant to follow up the *Halifax Inland Terminal and Trucking Options Study*, which suggested that an inland terminal and container shuttle to a site at Rocky Lake was a good idea.
- Many events have happened since the original study which make the reduction of truck traffic from city streets the new priority.
- This study seeks to leverage Halifax's transload activity to reduce truck traffic without increasing the overall cost of transportation.
- Proposed solution is a commercially driven Distripark adjacent to a proposed transportation node in Burnside Industrial Park that would work as a transload service, empty yard container terminal and possibly a Long Combination Vehicle (LCV) yard in the future.

29. The Suez Canal Potential Alternative Route to North America's East Coast

Prepared by Mahmoud Rezk of the Suez Canal Authority for the Transportation Situation and Outlook Conference

May 12, 2008

- The presentation includes a history of the development of Suez Canal traffic, an analysis of container traffic in 2007, an overview of trade routes between the east coast of North America and Asia, and a potential redesign of supply chains through the Suez Canal.
- The presentation has three main take-away points.
 - The Suez Canal is not a potential alternative route to North America's east coast; it is the main route for South and South East Asia.
 - The Suez Canal is the future alternative route to North America's east coast from Hong Kong and Pearl River Delta.
 - The Suez Canal can be a potential alternative route to North America's east coast from North Asia.

30. Port of Halifax Economic Impact Report

Prepared by Chris Lowe Planning & Management Group for the Halifax Port Authority

February, 2009

- The study estimates the port's impacts on: economic output, GDP, employment, wages and salaries, the rail transportation sector, the trucking sector (long haul and local), renovation and new construction capital projects, and urban integration and other positive impacts.
- It also calculated impacts on such fiscal measures as personal and consumption taxes, retail sales tax (HST), and taxes paid to the HRM.

31. Integrated Transportation Corridor: Phase 1 feasibility study

Prepared by McCormick Rankin Corporation for the Province of Nova Scotia

February 25, 2009

- The purpose of the study is to examine the feasibility of introducing a roadway into the CN rail corridor on the Halifax peninsula to provide an efficient, free-flow route for trucks serving Halterm and nearby port services.
- Looks at the rail corridor and trucking demand projections to the year 2026.
- Took the following into consideration:
 - Marine cargo forecast
 - Roadway network impacts
 - Engineering costs, requirements, and impacts
 - Accommodation of the Halifax Urban Greenway
 - Impacts on public transit
 - A cost/benefit analysis, and
 - A feasibility and risk management analysis.

32. Atlantic Gateway and Trade Corridor Strategy

Prepared by the Governments of Canada, Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador

2010

- The document is meant to provide a long term strategy to establish the Atlantic Gateway and Trade Corridor. It includes an action plan that incorporates governments and private sector stakeholders.
- The objectives of the strategy are to: attract global commerce, advance a multimodal transportation system, and promote the Atlantic Gateway and Trade Corridor's unique assets and opportunities.

33. 2010-2015 Strategic Plan: Building the Halifax Gateway

Prepared by InterVISTAS Consulting Inc. for Halifax Gateway Council

January 17, 2010

- The plan provides a broad roadmap for the Halifax Gateway Council.
- The plan outlines current infrastructure and services as well as trade significance and impact.
- It then describes the economic, policy, transportation, security, and technology environments.
- The main priority areas are: providing efficient transportation networks, improving infrastructure, ensuring supportive government policy, establishing the Halifax Gateway brand, and coordinating with other gateway councils and organizations.

34. Final Report: Halifax Transload Mapping Study

Prepared by MariNova Consulting Ltd. for Transport Canada

March 24, 2011

- The report includes an overview of the Halifax Container Market, including:
 - a summary of the port's container traffic and significant impacts on the market;
 - changes in import container volumes and truck and rail volumes;
 - changes in export container volumes; and
 - a description of the Halifax import transload market.
- The report ends with some future prospects, including:
 - considerable growth potential of the transload market; and
 - expanded reach of the Halifax Gateway.

35. Transportation and Logistics Sector Profile

Prepared by the Halifax Gateway Council

April, 2012

- The report is addressed to prospective investors and makes the business case for businesses to relocate or expand in Halifax.

- Outlines Halifax's value proposition, with reference to intermodal transport, air transport, the time zone, the cold chain advantage, and the shipbuilding opportunity.
- Describes gateway assets, including the Halifax Stanfield International Airport, the Port of Halifax, the Halifax Logistics Park, rail infrastructure and service, and road infrastructure and trucking.
- Details the nearby educational assets and labour wages and supply.
- Outlines costs (e.g. taxes and industrial real estate) and incentives (provincial and federal).

36. Situational Analysis of the Container Trucking Sector at the Port of Halifax

Prepared by Mary R. Brooks Transportation Consulting with MariNova Consulting Ltd. for Transport Canada
March 28, 2013

- This situational analysis examined the current state of port-related trucking in Halifax. It explored many ideas found in the literature with focus group participants and clarified local sentiment via follow-up contact.
- The literature review found that many ports and terminals were making efforts to reduce environmental impacts and make more efficient use of existing transportation infrastructure to accommodate for growing demand, rather than investing in infrastructure.
- Most participants in this situational analysis thought that the greatest greenhouse gas (GHG) reductions would be from investments in newer container yard equipment.
- One participant indicated that interesting CN in short line moves from Moncton to Halifax would also reduce GHGs.

37. Assessment of Rail/Truck Shipping Between Cape Breton and Mainland Nova Scotia

Prepared by MariNova Consulting Ltd. for Minister's Rail Advisory Committee (MRAC)
September 23, 2015

- This study provides an assessment of the impacts of cargo diversion from rail to trucking for inbound and outbound shipments between Sydney and mainland Nova Scotia and points beyond.
- Key findings include:
 - increased shipping rates have had a big impact on shippers;
 - Sydney-area shippers are now shipping by rail to Port Hawkesbury and transloading at the Port Hawkesbury Paper facility before completing the journey to Sydney by truck, which is not an optimal strategy;
 - costs associated with shipping impact companies' profitability;
 - shipping by rail to Port Hawkesbury and transloading to truck is more expensive than shipping all the way by rail. The next best option is intermodal transport;
 - for outbound shipments, there seem to be few issues, and companies are generally happy with both rates and service. There is also lots of capacity in the marketplace; and

- the additional truck traffic as a result of the loss of train service amounts to 1,500 one-way moves, which represents a very small percentage of the traffic on the highway between Port Hawkesbury and Sydney

38. Assessment of the Upcoming Economic Opportunities in Cape Breton in Relation to Rail Services

Prepared by Group ATN Consulting Inc. for Minister's Rail Advisory Committee
September 23, 2015

- The study was developed concurrently with studies on the use of trucks as an alternative to rail and on the current condition of rail infrastructure in the subdivision.
- This study sought to determine whether there might be sufficient rail traffic to create a viable base load on the Sydney Subdivision.
- The study detailed the potential major developments identified for Cape Breton in the next 3-5 years, including: Donkin Mine, Provincial Energy Ventures, International Iron Beneficiation Group Ltd., intermodal traffic with a potential to convert to rail, Sydney Container Terminal, and other projects identified by the Cape Breton Regional Municipality and the consultants.
- The analysis revealed that there are possible opportunities for a viable base load, though the projects are in early stages of development and their future is uncertain.

39. The Nova Scotia Transportation Sector: Global market challenges and opportunities

Prepared by CPCS for the Province of Nova Scotia
September 14, 2016

- The paper studies global and regional trends in trade and transportation, as well as Nova Scotia's trade related transportation assets, competitive positioning of the province's marine and air gateways, and a recommended strategy.
- Key conclusions include:
 - Nova Scotia's share of international trade is getting smaller;
 - there are numerous potential gateway opportunities;
 - bigger is better in global transportation;
 - Nova Scotia's primary challenge is its small regional market;
 - Nova Scotia's marine gateway is essential for Nova Scotia but discretionary for shipping lines; and
 - the Halifax Stanfield International Airport is a regional hub for passengers and air cargo.
- The recommended gateway strategy is twofold: (i) trade promotion and marketing support, and (ii) conduct incremental improvements that fall within provincial jurisdiction.

40. Regional Goods Movement Opportunity Scoping Study Final Report

Prepared by Davies Transportation Consulting and others for the Halifax Regional Municipality
November 16, 2016

- The report studies goods movement issues in the context of development of a new Integrated Mobility Plan which will expand the focus of regional transportation planning.
- The report recommends that the focus of regional transport planning be expanded beyond traditional transportation needs to include goods movement, higher-order transit, parking management, active and healthy communities, connected and autonomous vehicles, emerging options for ride sharing, and the long-term potential for car sharing.
- It recommends that the HRM look into two potential solutions to port-related truck traffic in downtown Halifax:
 - a cross-harbour ferry to transport containers to and from Halterm; and
 - a Ceres-Halterm rail shuttle.

41. Port of Halifax 2015-2016 Economic Impacts

Prepared by Halifax Port Authority
April, 2017

- The report assesses the Port of Halifax's economic and fiscal impacts on the local and regional economy. This includes both on-going port operational impacts as well as one-time construction projects
- Key findings include:
 - figures for the port's total economic output from operations, contribution to the province's gross output, percentage of exports, and impact on Nova Scotia's GDP;
 - Nova Scotia's largest trading partner is the United States with most transborder exports moving by truck or rail;
 - findings related to employment and impacts of wages and salaries;
 - economic impacts of renovation and new construction projects; and
 - the Halifax Seaport attracts between 1.265 and 1.285 million visitors annually.

Appendix B Port Projects

Melford Atlantic Gateway Container Terminal

Source: <http://www.ssamarine.com/locations/melford-atlantic-gateway-container-terminal-and-logistics-park/>

The terminal will be constructed to optimize the efficient loading/unloading of the largest container vessels, with an emphasis on direct vessel-to-rail transfer. The Melford Atlantic Gateway will be the closest port to Europe and Asia (via Suez). The terminal will be owned and operated by a private entity, not a port authority.



Specifications

Location: Guysborough County, Nova Scotia (in the vicinity of Port Hawkesbury).

Size: Phased construction of an approximately 172-acre (69-hectare) Container Terminal with the ability to expand in the future.

Water Depth: 60 feet (18 meters).

Berths & Length: Three berths / 3,592 feet (1,095 meters).

Cranes: Up to nine post-panamax container handling gantry cranes (minimum of four at start up).

Rail Services: Canadian National Railway, Class 1 railway with Genesee & Wyoming, Short Line railroad capable of accommodating unit trains of up to approximately 12,000 feet (3,657 meters). On-dock intermodal rail yard with 18,000 feet of track (5,486 meters).

Novaporte Deep-Water Mega-Terminal

The Novaporte project includes the development of a Mega-Terminal alongside an existing 16.5m deep-water harbour. The site will have a total wharf area of 63,200 m² and a land area of 1,174,800 m².

The marine terminal is expected to be developed in two phases, with two berths constructed in the first phase and an additional two berths completed in the second.

All four berths will have a length of 1,600m. Novaporte will include a container stacking yard area of 559,200m² upon completion of both phases.

Designed to accommodate ultra large container vessels carrying 18,000 TEUs, the new container transshipment terminal is projected to handle approximately 3.2 million TEUs per annum once fully developed. Novaporte will be one of the first semi-automated terminals in Canada.

The marine terminal will offer direct rail service, accommodating unit trains 3,000m-3,500m in length. As an on-dock intermodal container transfer facility (ICTF), loading containers onto a rail car from vessels can be done easily and efficiently.



Source: www.novaporte.ca