Preparing for Success

FORECASTING SURFACE FREIGHT DEMAND

"Chance favours the prepared mind"
LOUIS PASTEUR

westac

NOTE TO READERS

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Published March 2006

WESTAC
is a non-profit association of major transportation organizations, represented by senior business, labour and government decision makers. Its objective is to promote transportation as a critical sector supporting trade, jobs and our high standard of living.

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BACKGROUND

Business and government decision makers require good data on anticipated demand for surface transportation in Western Canada. This project enables them to make **informed decisions with confidence** to capture the growth opportunities at hand and prepare for success. This report is the outcome of work undertaken in 2005 to assemble the history and forecasts of volumes of major commodities and container movements in Western Canada. Preliminary results were presented at a forum held December 7 and 8, 2005 in Vancouver. Subsequently they have been revised and are provided here with economic and market commentary and implications for transportation.

West coast transport problems in 2004 stemmed from a failure to anticipate extraordinary growth. The transportation industry had been lulled by a long period of excess capacity. Then in 2004, huge volumes of containerized goods arrived on our western shores from across the Pacific at the same time that hungry foreign demand for our natural resources stressed our export systems.

Questions were raised about whether the growth was a bubble, or a permanent shift. If permanent, what must the transportation community do to handle the higher volumes successfully? What must change so that exporters and importers are not limited by the availability and quality of their transport service?

THEMES

Canada is becoming increasingly trade dependent, as world trade growth outpaces general economic growth. China's exponential trade growth due to low-cost manufacturing prowess has led to Canada's sharp rise in import-driven trade with that country. As well, China's development has revitalized the western Canadian resource sectors.

The burgeoning trade with China has also affected the US. Capturing a larger share of China's US-destined container traffic is a strategic goal for our transportation industry and nation. A major risk to continued global economic expansion, however, is the ability of the US to sustain growth in its imports and manage its deficits, keeping its currency stable. A precipitous fall in the value of the US dollar would harm the entire global trading system.

Looking at global opportunities and threats, we are reminded that the US is our top trading partner, buying 79% of Western Canada's exports (on a value basis).

On the domestic front, two activities will dominate. **Transportation service providers will continue the drive for efficiencies, maximizing use of the existing system, while shippers will look for options in routes, modes, and methods, to secure good transportation service.**

Summary

FINDINGS

The forecasts were drawn from key organizations that are buying a lot of freight transportation service – shippers selling raw and semi-processed commodities to foreign buyers; and major retailers and freight forwarders importing goods from overseas manufacturers.

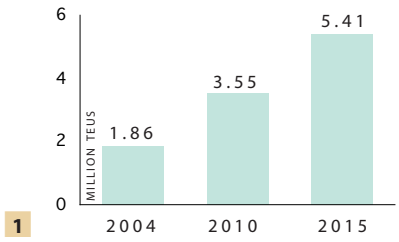
Currently, the **west coast** handles 48.5% of the commodities forecast, dominated by coal, grains and forest products, and this is expected to grow to 53.5% over the forecast period. The **eastbound** system handles 24.5% of the region's commodities, dominated by forest products and grains. The **southbound** system handles 27% of the forecast commodities, dominated by forest products and fertilizers.

Container throughput of BC ports is forecast to grow from 1.86 million TEUs (twenty-foot equivalent units) in 2004 to **5.41 million TEUs in 2015,** an average annual growth rate of 10.2% *(chart 1)*. Virtually all of the current container movements enter the region through four container terminals in the Vancouver area. By 2008, capacity at these terminals plus a new one in Prince Rupert will be 3.79 million TEUs. Predicted throughput demand in 2010 is 3.55 million TEUs rising to 5.41 million by 2015. Forecasts of container movements through Canadian west coast ports destined for US locations were not available.

Inbound containerized goods (2005) consist of consumer/retail products and industrial products which together make up almost 70% (by tonnage), with minerals, food, forest products and grains making up the balance. Laden outbound containers are loaded with forest products (50%) and specialty grains (22%). Forecasts for these movements are included with the commodities. Shippers say **the degree of use of containers will be determined by rates, service and availability of containers**, and good connecting infrastructure between mills and ports.

About **70% of the import containers through BC ports are destined for Central Canada**, and those providing forecasts assume that proportion will not change over the forecast period. The potential to develop business as a North American gateway from Asia to US destinations is widely raised; however, the forecast survey did not include US retailers and freight forwarders, the likely customers.

TOTAL THROUGHPUT



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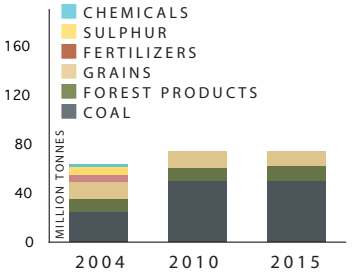
Summary

COMMODITY FORECASTS

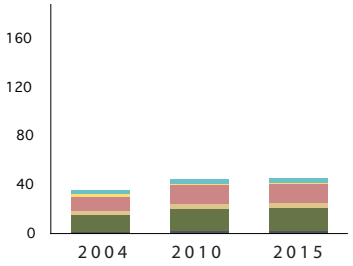
Westbound

	2004	2010	2015	AVG ANN GROWTH % 2004 to 2010	2004 to 2015
Coal	24.70	49.70	50.70	12.4	6.8
Forest Pr.	10.93	11.34	11.42	0.6	0.4
Grains	13.48	17.04	17.74	4.0	2.5
Fertilizers	6.21	7.30	7.30	2.7	1.5
Sulphur	6.20	7.00	8.00	2.0	2.3
Chemicals	1.64	1.22	1.22	-4.8	-2.7
Total	63.16	93.60	96.38	6.8	3.9



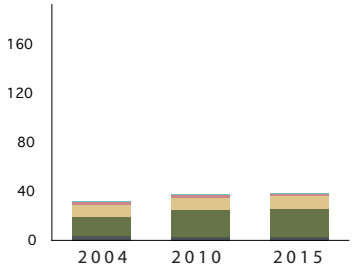
Southbound

	2004	2010	2015	AVG ANN GROWTH % 2004 to 2010	2004 to 2015
Coal	1.62	1.80	1.80	1.8	1.0
Forest Pr.	13.50	18.76	19.42	5.6	3.4
Grains	2.99	3.91	4.11	4.6	2.9
Fertilizers	12.09	15.09	15.29	3.8	2.2
Sulphur	2.00	1.10	0.90	-9.5	-7.0
Chemicals	2.93	3.40	3.40	2.5	1.4
Total	35.13	44.06	44.92	3.8	2.3



Eastbound

	2004	2010	2015	AVG ANN GROWTH % 2004 to 2010	2004 to 2015
Coal	3.33	3.55	3.55	1.1	0.6
Forest Pr.	16.45	21.03	21.94	4.2	2.7
Grains	9.85	10.74	11.12	1.5	1.1
Fertilizers	1.66	1.68	1.68	0.2	0.1
Sulphur					
Chemicals	0.57	0.55	0.55	-0.6	-0.3
Total	31.86	37.55	38.84	2.8	1.8



Total

	2004	2010	2015	AVG ANN GROWTH % 2004 to 2010	2004 to 2015
Coal	29.65	55.05	56.05	10.9	6.0
Forest Pr.	40.88	51.13	52.78	3.8	2.3
Grains	26.32	31.69	32.97	3.1	2.1
Fertilizers	19.96	24.07	24.27	3.2	1.8
Sulphur	8.20	8.10	8.90	-0.2	0.7
Chemicals	5.14	5.17	5.17	0.1	0.1
Total	130.15	175.21	180.14	5.1	3.0

Summary

Six commodity groupings were forecast: coal, forest products, grains, fertilizers and potash, sulphur and chemicals. Details appear in the individual commodity sections and the appendices. The many other export products were excluded due to their relatively low volumes or diversity.

Coal
is expected to experience a major resurgence over the forecast period. In 2004, the region exported about 30 million tonnes. By 2015, producers expect to ship 56 million tonnes, most through west coast ports. Westbound growth to 2015 will be 6.8% per year. Rail and terminal capacity will be challenged with these volumes.

Forest products
are expected to grow from the current 41 million tonnes to 53 million tonnes by 2015, or 2.3% per year. About 27% of the forest products are exported through the west coast. Fully 40% are destined for Central Canada and 33% to US markets. Lumber, plywood and p anels account for three-quarters of US-destined forest products.

Grain
exports from Western Canada were just over 26 million tonnes in 2004. They are expected to grow to 33 million tonnes, or 2.1% per year to the year 2015, with slightly stronger growth in movements west and east, and less growth in those to the US. Currently about half of the grain is shipped through west coast ports and 37% shipped east, for domestic consumption or export.

Fertilizers
totaling some 20 million tonnes were shipped from the region in 2004; this is forecast to grow to 25 million tonnes, or 1.8% per year to 2015. Potash dominates, making up 83% of fertilizers. It will grow at an average annual rate of 2.1% to the year 2015. Potash shipments to the US account for 57% of the total and will grow at a stronger rate of 2.6% per year.

Sulphur
volumes shipped from Western Canada are just over 8 million tonnes. None moves east, and southbound volumes are less than 2 million tonnes and declining. Westbound sulphur to Asian customers is expected to grow from 6.2 million tonnes to 8 million by 2015, an annual growth rate of 2.3%.

Chemicals
represent a smaller, diverse and valuable flow of shipments. Total volumes of the chemicals forecast will be about the same as today: 5.2 million tonnes, due to declining offshore exports. It is southbound movement that shows growth, averaging 1.4% per year to 2015.

Summary

ACTIONS

It falls to railways, trucking companies, terminal operators, ports, providers of trained employees, and governments making road investments to develop the business case and secure the money to make investments. Accuracy of the forecasts is a risk for these service and infrastructure providers, and carriers are cautious in adopting shippers' forecasts as the sole underpinning of their investments. Nevertheless, the opportunity created by the predicted growth is widely acknowledged, and all parties are taking actions:

- **Investing in equipment and infrastructure** such as rail sidings, locomotives, roads and bridges, distribution centres, terminal berths and cranes, technologies to manage traffic and track flows, and a new 500,000-TEU container terminal under construction in Prince Rupert to open in 2007.

- **Testing and using other routes and modes; forming new partnerships and alliances; and reorganizing** to be more efficient, such as through longer trains, balancing freight flows over directions, hours in the day and days of the week.

- **Government-initiated programs** such as the BC Port Strategy; corridor and gateway strategies; the Pacific Gateway program; and targeted investments such as in border infrastructure.

- **Holding events to educate, convince, increase the flow of information and coordination, and develop ideas.** For example, the Vancouver Port Authority, Canadian Pacific Railway, and CN initiated the Rail Logistics and Capacity Forum, where a small number of senior stakeholders across industry and government met in mid-2004 to discuss the problems and solutions. That event became a catalyst for further work to resolve problems.

Summary

CHALLENGES

Western Canada's transportation system will be challenged to handle the projected traffic increases when parts of the system are already bumping up against capacity constraints.

The forecasts indicate:

■ **Additional west coast terminal capacity for coal will be required.** Forest products capacity in all directions will be adequate, as long as the break-bulk option is retained. Grain, sulphur and chemicals handling capacity will be adequate; potash handling capacity is being increased in Vancouver (and Portland) and will be adequate. Very short shipping periods for some fertilizers are an on-going difficulty to handle efficiently.

■ **Container forecasts will require new capacity** beyond TSI Terminal Systems Inc.'s new berth at Deltaport and Prince Rupert's phase 1 terminal. This could be met by some combination of a new terminal at Deltaport, phase 2 of the Prince Rupert facility, changes at Fraser Surrey Docks to increase handling capacity, and potential development at Fraser River Port's Richmond properties. **The forecasts imply an additional 500,000 TEUs moved on Greater Vancouver road systems.**

■ **Additional train slots for both commodities and containers** will be needed. Some can be added on an incremental basis through co-production and other operational changes. The prospect of resurging bulk traffic on top of even higher container traffic raises concerns about the adequacy of rail capacity on some corridors.

IMPLICATIONS

■ **Better service and more transportation** in general will be needed as outsourcing grows.

■ **Land for transportation purposes**, whether for port facilities, rail lines, or roadways will be needed. Areas such as Vancouver's False Creek Flats will be needed to support rail operations and marine container terminal growth.

■ **Break-bulk facilities** will be needed for those markets and products that cannot utilize containers.

■ **Efficient border processes** are essential, in light of the significant cross-border trade with the US, and particularly impacting the very large volume of Canadian trade moved by truck.

■ **Global decisions** beyond our control affect local development. Investments by global firms (e.g. terminal operators, shipping lines) require returns that compare favourably with those earned in foreign jurisdictions.

■ **Cost control and asset utilization** must be exemplary. Cost and supply chain efficiency, reliability, consistency, and positive global perceptions about BC port gateways are imperative.

■ **Attracting sufficient talented people** will be critical to handle increased traffic.

■ **Legislative certainty** is essential, if transport system participants are to invest with confidence.

■ **Increased port borrowing limits** or other ways to give ports access to investment funds will be needed.

Rationale + SCOPE

"Real business is being lost. This calls for a strategic re-thinking of our transportation system, its role, its contribution, its needs. And then, a plan to deliver that system."

*Candid Views, 2005**

RATIONALE FOR THE FORECASTING INITIATIVE

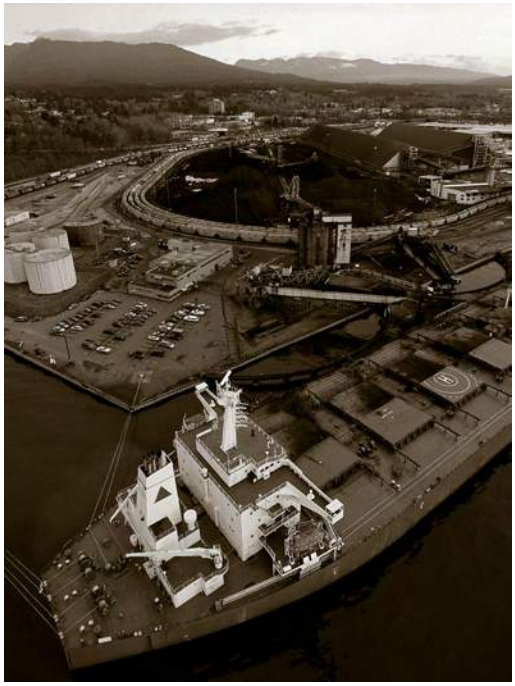
In 2004, the volume of container traffic exported from Asia, especially China, resulted in congestion in receiving ports and their inland connections in many countries. It occurred during the unexpectedly busy fall shipping period. As traffic volumes increased, the inability of the logistics system to adequately respond revealed a variety of problems. Congestion was worst on the west coast of North America, particularly in the ports of Los Angeles and Long Beach, but it also affected Vancouver.

Congestion was costly for shipping lines, terminal operators, inland carriers, logistics companies and the importers whose goods were delayed. The experience resulted in increased attention by all parties to the decisions and facilities that contributed to the problem. It has been recognized that there was no single cause.

Factors contributing to congestion:

- Lack of knowledge by carriers of the volume of freight to be moved during the peak
- Insufficient capacity in infrastructure
- Lack of effective integration among the transport, logistics and shipper organizations to collectively understand the full magnitude of growth to enable a full utilization of existing capacity
- Simultaneous and sustained growth in export bulk commodities and import container traffic

The experience of 2004 and early 2005 led all parties to review their facilities and strategies. To the extent that the 2005 peak season passed without major congestion is evidence that changes have been made. However, practices designed to avoid congestion over existing infrastructure and with current practices may not be the most efficient. They may not be adequate for the long run.



* A survey of 50 Canadian business, government and labour leaders on the status and state of transportation in Canada.

Rationale + SCOPE

3 aspects TO IMPROVEMENT

- **The approach to improving**
- **transport and logistics capacity and**
- **performance has 3 aspects:**

■ It must be multi-dimensional; considering infrastructure, the practices (including labour supply) of individual organizations, the integration among organizations, and the quality of long-term trade and transportation forecasting and short-term information exchange among organizations.

■ Both public and private participation is necessary.

■ The growth of all trade is important because pressures on infrastructure are the result of total traffic growth, not just container traffic. In particular, the capacity of the rail system and the demand for added port terminal capacity are functions of bulk as well as container traffic.

Trade growth of recent years leads to the reasonable expectation that prospective trade and traffic opportunities are great. Canadians will benefit from such growth, through jobs and income from servicing the trade. However, expectations for high growth rates also raise the specter of high risks if forecasts are wrong.

OUR GOAL

Our goal in forecasting freight demand is to help industry avoid the capacity and congestion problems like those experienced in 2004. The forecasts may not be 100% accurate but the process and the results are essential in preparing for the future. Forecasts play a role in planning the inputs for transportation, including infrastructure, transport equipment and labour supply, and in guiding the relationships among the many organizations involved in supply chains, including shippers, carriers and logistics providers.

Scope + RATIONALE

This report forecasts the demand for surface freight transport entering, leaving and transiting Western Canada. For this purpose, Western Canada is defined as encompassing the four western provinces plus the area of Ontario west of Thunder Bay.

Directional forecasts were gathered in the fall of 2005 by surveying the major exporters and importers. Commodity shippers, major retailers and freight forwarders were asked what they anticipate they will ship each year to 2010 and in 2015. Individual shipper forecasts for each commodity grouping were aggregated and adjusted to reflect non-participants and to remove duplication (where two or more shippers anticipated moving the same product). They are reported in a way that ensures confidentiality of shipper data. The results enable industry-wide estimates. These "bottom-up" forecasts were checked against information on demand conditions from other sources.

Containerized trade – Containerized trade is forecast on a TEU (twenty-foot equivalent) basis. Those who import containers (retailers and freight forwarders) were surveyed to obtain an inbound traffic forecast. This forecast was 'grossed up' to obtain total inbound and outbound container projections.

Definitions:

Containerized Trade Directions

Inbound – containers arriving in Canada through a west coast port; currently through Vancouver and Fraser River; by 2007 also Prince Rupert, from any foreign country

Eastbound – the more than two-thirds of inbound containers that are shipped east of Thunder Bay, by rail or road, whether destined for Central or Atlantic Canada, or the US

Outbound – containers leaving Canada through a BC port; forecast based on inbound traffic

Commodity exports – In 2004, nearly 160 million tonnes of products were exported from the region, excluding oil and gas products that primarily moved by pipeline and have little impact on the surface freight system. The top products on a tonnage basis that left the region by truck, rail, or ship are coal, forest products, grains, fertilizers, sulphur and chemicals. Commodity imports are not forecast as they are small relative to exports.

Definitions:

Commodity Exports Directions

Westbound – leaves Canada through any west coast port – whether destined for Asia, South America, Alaska or any other foreign country

Southbound – crosses the Canada-US land border by truck or rail

Eastbound – shipped east of Thunder Bay, by road, rail or water on the Great Lakes, whether destined for Central or Atlantic Canada, the US or overseas

LIMITATIONS AND AREAS FOR FURTHER WORK

Forecasts are provided to 2015. A longer time is desirable for some infrastructure planning but the trade-off is that it results in less reliable forecasts. The forecasts to 2015 provide a context to help infrastructure providers to plan and invest.

Forecasts were sought only for products recording at least five million tonnes moved into, out of, or through Western Canada in 2004.[1] These commodities represent more than 80% of the region's total exports. Products moved within the region, regardless of mode, were excluded. One implication of this is that products moved by long haul trucking are under-represented. A different method of gathering data to forecast demand on the road system is needed.

The forecasts are for general directions rather than specific corridors. They do not indicate the specific port, border crossing or, in the case of commodities such as forest products, the method of shipment (break-bulk or container) or mode that will be used. These are logistics choices that will depend on the quality and price of logistics alternatives available. This flexibility is one reason that Canada needs to make the right choices about the development of its transport system.

One area of great interest is the potential for the Canadian west coast ports to handle US-destined inbound foreign containers. None of the importers contacted had any projections on this. Future work could include surveying US-domiciled retailers who may welcome another routing option.

These forecasts are provided as a one-time estimate. However, given the importance of reliable forecasts of demand for transport service it is advisable they be considered as a start to a process of rolling forecasts. Because conditions are likely to change, regular updates are desirable.

THE REST OF THE REPORT

The major trade trends, which are the background for the forecasts, are provided in the next section of the report. The report then presents the **conditions and forecasts for container traffic** and for **bulk commodities**. The final section of the report deals with uncertainties that affect the forecasts and with issues that affect providing efficient logistics services to serve the trades.

1 The only major product category not forecast was "Other food products". It is too diverse to forecast by contact with shippers, as it includes everything from salmon to french fries.

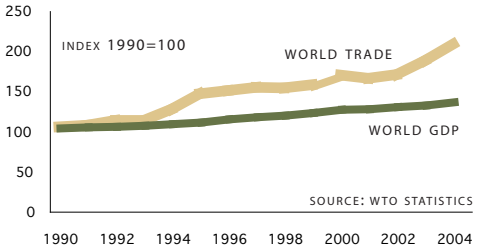
TRADE Trends

Canada's economy has always been dependent on trade. In recent years, trade liberalization through the North American Free Trade Agreement (NAFTA) and the reduction of global trade barriers through the World Trade Organization (WTO) have enabled the ratios of Canada's imports and exports to GDP to increase substantially.

This greater growth of trade than GDP has been a global trend. World trade grew more than three times as fast as GDP from 1990 to 2004 *(chart 2)*. Trade liberalization has spurred investment in manufacturing facilities in developing countries, and fostered the development of global supply chains as firms moved to take advantage of lower costs and more sophisticated logistics and communications networks.

WORLD TRADE OUTPACES ECONOMIC GROWTH

TRADE GROWTH TO GDP GROWTH



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The most striking recent change has been the rise of China as a manufacturing powerhouse. Since China joined the WTO in December 2001, China's trade with the rest of the world has been growing exponentially. Between 1993 and 2004, China's share of world exports increased from 2.5% to 6.7%, and its share of imports increased from 2.8% to 6.1% *(chart 3)*.[2] In 2004, China's inward foreign direct investment flows reached US $60.6 billion, 26% of total inward foreign direct investment flows to developing economies.[3]

The value of Canadian exports to China doubled between 1995 and 2005, while imports from China increased by more than 500% *(chart 4)*. Imports from China have been the major driving force behind the growth in international container traffic in Canada over this period.

Growing Chinese demand for raw materials is contributing to rising prices for resource commodities such as coal and base metals. This has dramatically increased that country's interest in investing in western Canadian resource sectors. Bulk commodities will continue to comprise the vast majority of traffic using the western Canadian transportation system.

CHINA'S EXPONENTIAL TRADE GROWTH

CHINA'S FOREIGN TRADE

3

CANADA'S TRADE GROWTH WITH CHINA IMPORT LED

CANADA'S TRADE WITH CHINA

4

2 WTO Statistics.
3 United Nations Conference on Trade and Development (UNCTAD) statistics.

Trade across the Pacific is where much of the growth and new opportunities are. However, the opening up of economies to globalization has opened up a Pandora's box of risks. The possibility of a flu pandemic, an environmental disaster, terrorist act or regional war threaten the global trade scene. As the Conference Board of Canada (February 2006) puts it, "Our growing interconnectedness will bring a healthy flow of capital, trade, people and knowledge; it will also bring conflict, violence and uncertainty."

The more open and interconnected economies become, the more important appropriate contingency planning becomes. New costs for prevention and remediation affect all and are a feature of today's global trading landscape.

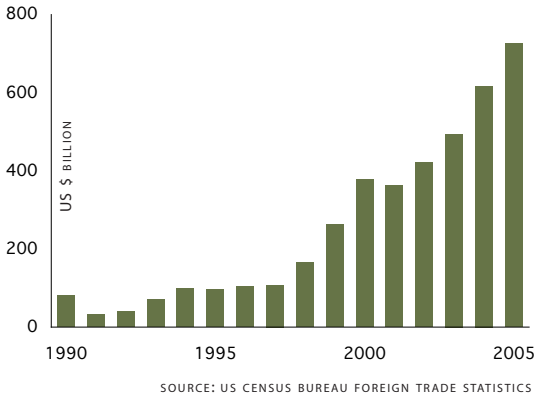
Nevertheless, the US continues to account for the lion's share of Western Canada's trade. In 2005, 79% of the value of Western Canada's exports were to the US, rising from 66% in 1996.

The ability of the US economy to sustain growth in its import demand is seen as a major risk to continued global economic expansion. Driven by high oil prices as well as soaring demand for foreign manufactured goods, the US trade deficit reached US $726 billion in 2005, an increase of 17.5% from 2004 *(chart 5)*. The expectation of continuing high trade deficits may put downward pressure on the US dollar, resulting in reduced US consumer demand and lower global economic growth. Dr. Bill Waters, in expressing concern about the massive 6-to-1 US trade deficit with China said, ***"the US has been able to run this incredible capital flow outward… it can't go on forever, although there are all sorts of forces out there to not let there be a run on the dollar… we worry that the US is pushing its luck."*** [4]

Although the commodity forecasts in this document assume short periods of fluctuation, they are built on expectations that the major trends evident in the world economy will persist over the forecast period.

US TRADE DEFICITS MOUNT

US TOTAL TRADE DEFICIT



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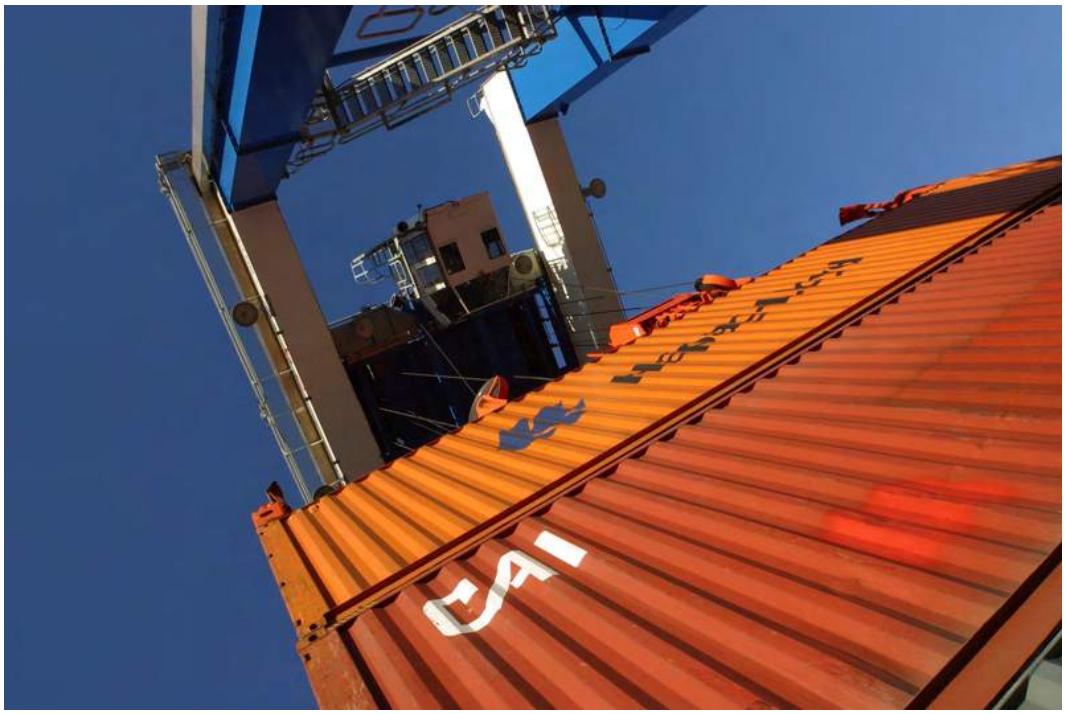
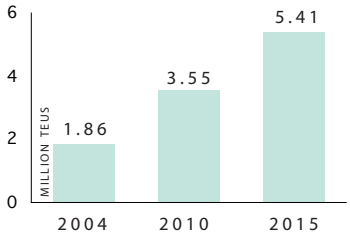
SOURCE: US CENSUS BUREAU FOREIGN TRADE STATISTICS

4 Professor Emeritus, University of British Columbia, and former Member, Canada Transportation Act Review Panel, in his address to the Freight Forecasting Forum, December 8, 2005 in Vancouver.

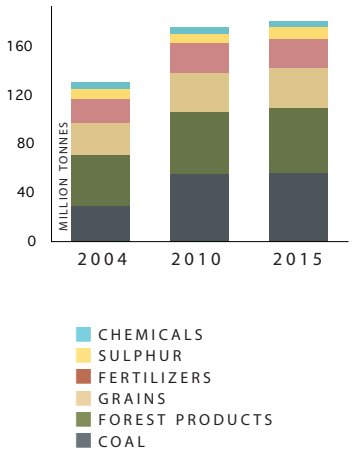
THE Forecasts



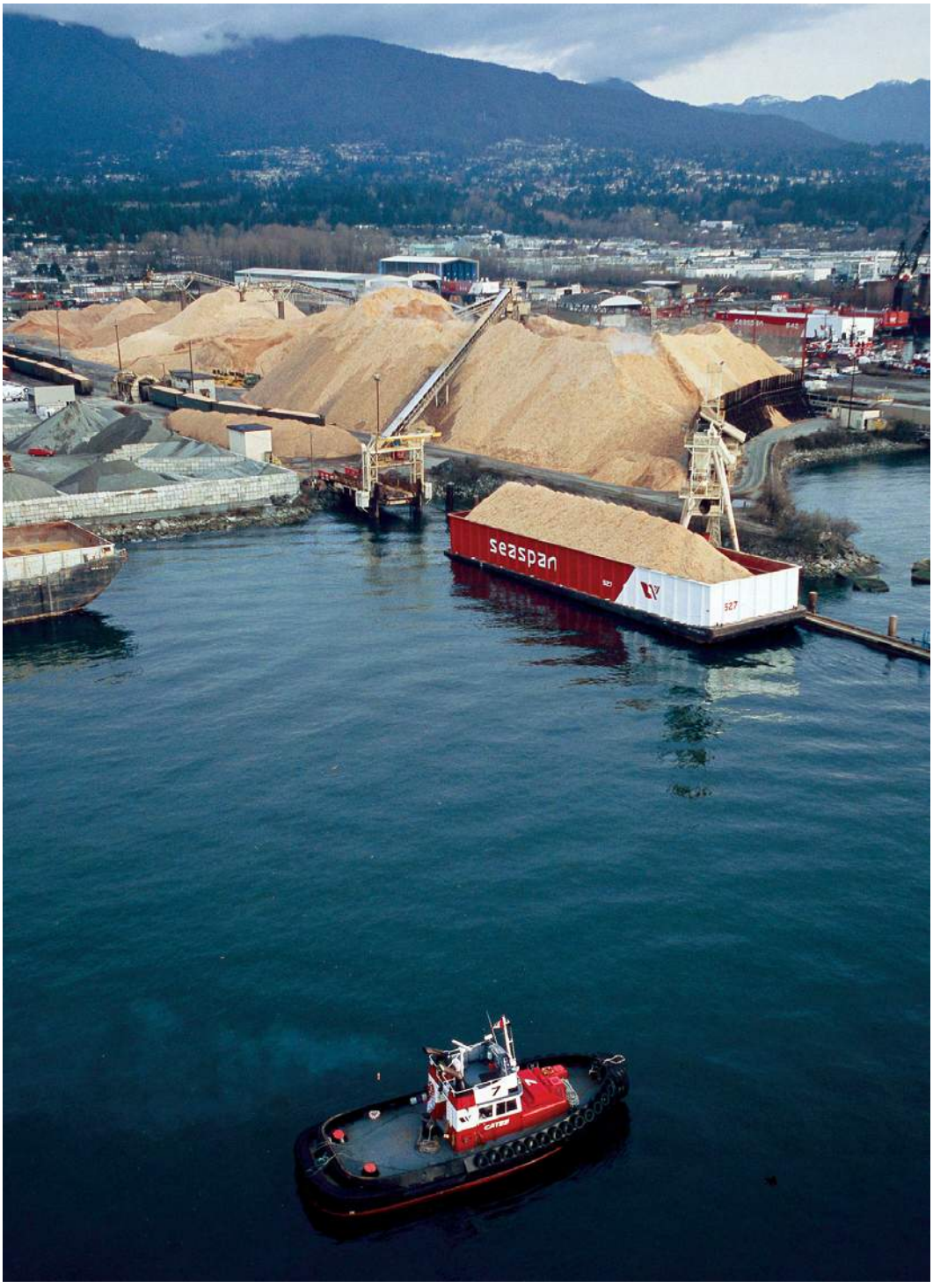
TOTAL CONTAINER THROUGHPUT



TOTAL COMMODITY EXPORTS [ALL DIRECTIONS]



THE Forecasts



Containerized TRADE

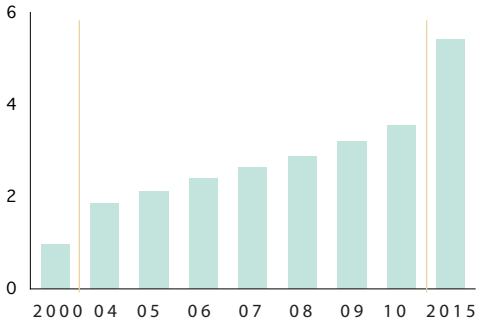
PROFILE

Container shipping is the most rapidly growing sector of the marine shipping industry. Its growth is being propelled by the globalization of manufacturing and the advantages in cargo protection and handling provided by containers to processed and manufactured goods. This growth in container trade has enabled economies of scale to be realized in transport by vessels and railways. The increase in container shipping capacity for manufactured goods has resulted in low backhaul rates so that commodities, previously shipped as break-bulk cargoes, are now moved in containers.

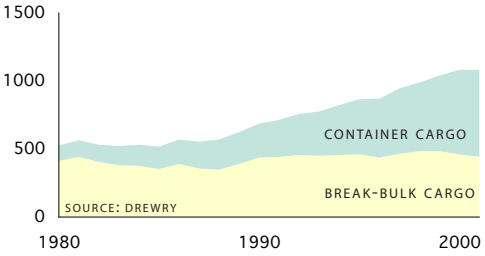
World container trade has had a long-run growth rate averaging 8.5% per year from 1980 to 2001 *(chart 6)*. Shippers enjoyed a situation in which transport and other logistics service providers were able to accommodate this growth with increases in capacity until the acceleration of Chinese exports after 2001 culminated in congestion during the peak season of 2004.

This report focuses on the container traffic of BC ports; however, it is important to note that the Canadian trade is less than 10% of the North American west coast trade. Consequently, the general conditions of shipping services will be subject to the major influence of US trade.

FORECAST: TOTAL THROUGHPUT
MILLION TEUs



WORLD SEABORNE CARGO TRADE [MT]



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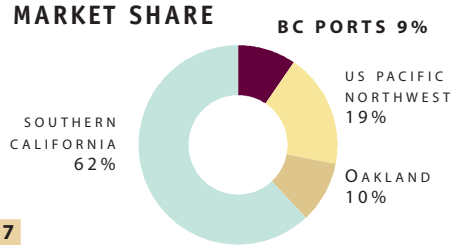
MARKET SHARE



7

Containerized

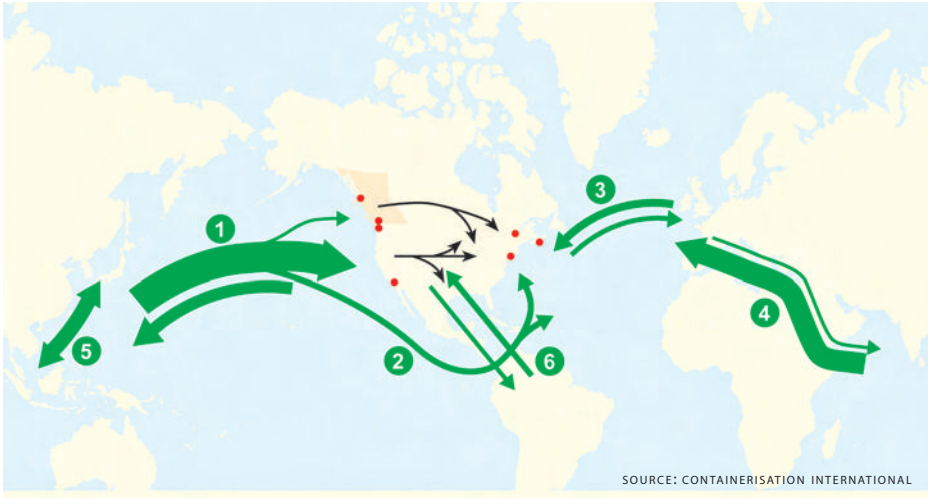
A GROWING ROLE FOR BC PORTS

During the period 1985 to 2005, Vancouver and Fraser River Port container traffic increased from 178,000 to 2.1 million TEUs and their share of the west coast container market increased from 3.8% to 9.3%. This rate of growth was achieved by growing Canadian trade and by capturing Canadian traffic that had gone through US ports. Nevertheless, Western Canada is a relatively small player in containerized shipping *(see diagram)*. Most of North America's container port traffic is handled through US west coast ports, mainly Los Angeles and Long Beach which have a combined 62% market share of North American west coast traffic *(chart 7)*.

Vancouver has, in fact, been the fastest growing container port in North America, registering an average annual growth rate of 13.5% from 1995 to 2005.[5] By comparison, Long Beach grew at 9% a year, Los Angeles 11.3%, Tacoma at 3.6% and Seattle's average growth was 3.9%. The completion of Prince Rupert's container terminal in 2007 will help BC ports capture additional traffic.

Vancouver's success is part of a broader increase in west coast traffic. The west coast increased its share of the combined Canada-US market by about 10% since 1985. There are two main reasons. First, trade with Asia has expanded much more rapidly than trade with Europe, which favours west coast gateways. Second, the first post-Panamax ships—those too large to transit the Panama Canal—came into service in 1988 and expanded rapidly since 1995. Consequently, all-water services between Asia and the Atlantic coast were replaced with west coast port calls and expanded intermodal rail service to inland markets.

WORLD CONTAINER SHIPPING PATTERNS



SOURCE: CONTAINERISATION INTERNATIONAL

1 TRANS-PACIFIC 2 ALL WATER 3 TRANS-ATLANTIC 4 ASIA-EUROPE 5 INTRA ASIA 6 NORTH AMERICA-SOUTH AMERICA
Note: Arrow thickness is approximately in proportion to trade volume. Total world laden volume = 41 million TEUs

TOTAL BC PORTS CONTAINER THROUGHPUT

[million TEUs]

2000	0.98
2004	1.86
2005	2.12
2006	2.39
2007	2.64
2008	2.88
2009	3.20
2010	3.55
2015	5.41

5 In 2005, Vancouver registered a slower 7.4% growth in total container throughput, compared to US west coast ports which grew by 18.7% in Seattle/Tacoma and 8.3% in LA/Long Beach.

Containerized TRADE

FORECAST: LOADED INBOUND CONTAINERS

[million TEUs]

2000	0.49
2004	0.93
2005	1.06
2006	1.20
2007	1.32
2008	1.44
2009	1.60
2010	1.78
2015	2.71

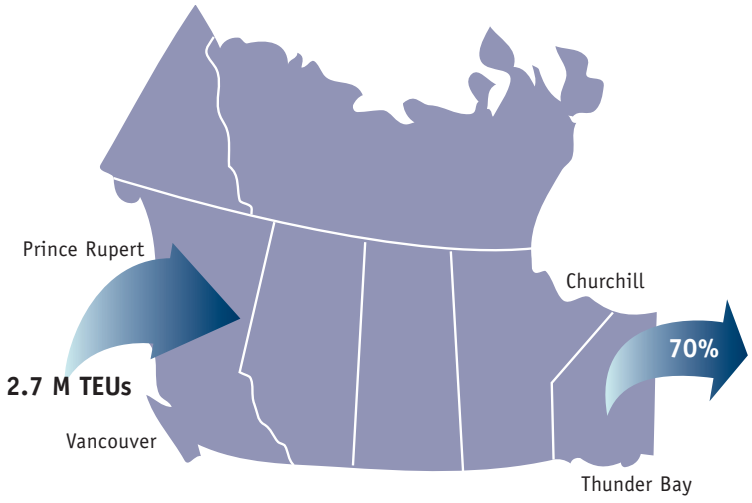
CONTAINERIZED PRODUCT TRENDS[6]

Inbound containerized products have been growing at 12.5% a year between 2000 and 2005, on a tonnage basis. Of the six categories, 'Consumer/Retail Products' and 'Industrial Products' together account for almost 70% of the weight of inbound container traffic, and have been growing an average of almost 13% per year.[7]

Outbound cargoes are not forecast by method of shipment. Exporters of goods that could move either as bulk or break-bulk or as container cargo, choose the method according to rate and service conditions at the time. The fundamental imbalance of trade means that more of the lower-value commodities are expected to shift further to container transport. This has implications for the volume and pattern of container movements in communities where the containers are stuffed.

The outbound container traffic volume increased almost 5% a year since 2000. Wood pulp, lumber and sawn timber contributed 60% of this growth. Outbound wood pulp from the Port of Vancouver accounted for 15% of the port's containerized exports in 2000; by 2005 this had risen to 22%. Today, some 55% of export pulp tonnage from Vancouver is shipped in a container.[8] Specialty grains are also shipped in significant volumes in containers. The majority of outbound cargoes of all types—some 66.7 tonnes—are not containerized.

LOADED INBOUND CONTAINERS 2015



6 These trends are drawn exclusively from Vancouver Port Authority data.
7 Data on a TEU basis are not available.
8 Large volumes of non-containerized forest products are also exported through several private port facilities on the BC coast.

MAJOR TRADING PARTNERS

In 2005, China and Hong Kong originated 64% of the inbound container traffic (by weight) handled at Vancouver Port Authority facilities, up from 41% in 1998. Imports from China and Hong Kong through the port have grown at 21.9% annually since 1998 and represented about 79% of the tonnage growth over this period. Other key origins of containers to the Port of Vancouver are: South Korea (at 6.2%), Japan (at 5%) and Taiwan (at 5.8%). The degree of containerization for inbound cargo has doubled from 31% to 61% between 1998 and 2005.

Outbound container tonnage is also dominated by China and Hong Kong, now surpassing Japan as the top export destination. Containerized exports to China and Hong Kong are growing at 18.8% a year, and represent 38% of Vancouver's total exports. Japan's share of outbound containerized tonnage has slipped from 39% to 26% between 1998 and 2005. Other key export destinations based on tonnage are Taiwan (9%) and South Korea (6.5%).

ORIGINS AND DESTINATIONS IN NORTH AMERICA

Approximately 70% of Vancouver's import containers carry cargo destined for Central and Eastern Canada. Some of these containers also require handling at warehouses in the Vancouver Lower Mainland because they have some freight for local distribution or because it's more efficient to transload freight into higher-cube domestic equipment. Therefore, the local movement of containers is important to local and national logistics performance. For export container traffic, 62% of the cargoes originate in British Columbia.

Some 57,000 TEUs, or 4% of the loaded containers handled in 2005 at Port of Vancouver terminals, had US origins or destinations.[9] Inbound traffic destined for the US could increase considerably once the Prince Rupert container terminal opens in 2007.[10] Capturing a larger share of the business of handling US-bound container traffic from Asia represents a significant opportunity for Canadian west coast ports. The Federal Governent's Pacific Gateway initiative will help make this a reality.

PORT OF VANCOUVER CONTAINERIZED CARGO PROFILE

	TOTAL - ALL DIRECTIONS			IMPORT			EXPORT		
metric tonnes	2005	2000	% Ann. Growth	2005	2000	% Ann. Growth	2005	2000	% Ann. Growth
Forest Products	4,501,737	3,249,373	6.7	292,317	97,347	24.6	4,209,420	3,152,026	6.0
Minerals	1,514,603	879,671	11.5	855,484	400,574	16.4	659,119	479,097	6.6
Grains / Pulses / Feeds	1,951,569	1,674,540	3.1	95,101	124,289	-5.2	1,856,469	1,550,252	3.7
Fresh/Froz/Processed Food	1,384,332	1,045,000	5.8	649,648	457,686	7.3	734,684	587,314	4.6
Consumer/Retail Products	2,697,347	1,569,241	11.4	2,469,219	1,361,738	12.6	228,128	207,503	1.9
Industrial Products	2,349,611	1,559,815	8.5	1,630,699	887,458	12.9	718,912	672,357	1.3
Total - All Commodities	14,399,200	9,977,641	7.6	5,992,468	3,329,091	12.5	8,406,733	6,648,550	4.8

9 Fraser Surrey Docks ran full unit-trains to Chicago in 2005. The percent of its traffic destined for the US was unavailable.
10 US Midwest traffic is Prince Rupert's principal target market, adding some 300,000-400,000 TEUs by 2010.

Containerized TRADE

TRADE IMBALANCES

There was a time during the mid-1990's when containerized exports of Canadian products fairly evenly balanced the flow of inbound containers through the Port of Vancouver. Today, about 25% of outbound containers are empty. In comparison, about 50% of Seattle/Tacoma and 65% of Los Angeles-Long Beach outbound TEUs are empty. Such trade imbalances combined with increasing deadweight vessel transits and congestion delays, restrict the optimal use of two-way vessel capacity and this is a major concern for shipping lines.[11] The large local market in Greater Vancouver and domestic rail and truck repositioning programs to the west coast help improve asset utilization and efficiency.

FORECASTS AND DRIVERS

To develop the forecasts, Canadian importers were asked what their expected volumes through BC ports would be. Participants did not identify specific ports or terminals to receive the traffic; this is a decision that falls to the shipping lines. Individual inbound forecasts were aggregated and 'grossed up' based on current share of traffic. Throughput figures were then calculated based on a five-year average balance of inbound and outbound traffic through the Port of Vancouver.

The total container traffic forecast for 2015 is 5.4 m TEUs, almost triple the 2004 volume through BC ports. This represents an average annual growth rate of 10.2%. The import laden container volume forecast for 2015 is 2.7 m TEUs, with approximately 70% expected to move eastward to other regions in Canada by rail.

This forecast aligns favourably with the projections in the BC Port Strategy, which estimates 2010 volumes at 3.2 m TEUs and 2020 volumes between 5.2 and 7.1 m TEUs.

The principal drivers of west coast and BC port container trade are:

- Asia-Pacific trade growth, particularly the rapid economic and manufacturing growth of China;[12]
- The high US consumption rate and the related rapidly increasing imports;
- Availability of export container cargoes from Western Canada such as forest products and specialty grains that obtain low backhaul rates;
- Competitive port, stevedoring and intermodal rail charges for BC gateway ports, offset by the fact that most US port container terminals are leased by and operated for shipping lines.

11 A deadweight movement occurs when a ship is filled to capacity by tonnage before the optimal number of containers is loaded. This is more of an issue for exports from Western Canada where the average outbound loaded container is about 13 tonnes/TEU compared to full inbound containers that carry about 7 tonnes/TEU.

12 Many Chinese import and export cargoes are highly containerizable; trade in these cargo groups has been growing more than 20% a year. Between 1990 and 2002, container throughput at Chinese ports increased by 30% a year!

IMPLICATIONS FOR TRANSPORTATION

Tripling the current inbound container volumes will have significant implications for the transportation system – the rail and road networks and terminals. By 2008 terminals in BC may have the capacity to handle 3.79 m TEUs total throughput (about 1.9 m inbound), an increase of 1.5 m TEUs over 2005:

- **Fraser Surrey Docks** on the Fraser River can handle throughput volumes of 415,000 TEUs, possibly increasing to 600,000 by the end of 2006; ship size is a limiting factor; currently the largest ship that can navigate the river is 4,100 TEUs. Adequate dredging will be required to maintain and increase the size of vessels.

- **TSI Terminals** can handle throughput volumes of 1 m TEUs at Deltaport and 600,000 at Vanterm. It is in the process of obtaining environmental approval to increase the throughput at Deltaport to 1.3 m TEUs.

- **P&O Ports Canada's** Centerm terminal will handle throughput volumes of 785,000 TEUs by July 2006. This is a doubling of its 2005 capacity.

- **Maher Terminals** will operate the facility in Prince Rupert; Phase I calls for a throughput of 500,000 TEUs.

If all terminals operate near rated capacity, it should be possible to handle the 2010 forecasted volumes of 3.55 m TEUs. However, **without further expansion, terminals will be unable to handle the forecasted volume of 5.4 m TEUs in 2015.** Additional container terminal capacity will be required.

Additional terminal capacity could be provided through a combination of:

- a new terminal at Deltaport
- phase 2 of the Prince Rupert facility
- increasing capacity at Fraser Surrey Docks
- development of a new terminal at Fraser River Port Authority's Richmond properties

Forecasted growth would result in an additional 1,800 trains per year destined for Central and Eastern Canada, about five more trains per day. There will be increasing pressure on railways and governments to build grade-separations, for safety and to prevent vehicle traffic congestion at level-crossings in the Vancouver area.

Road improvements within the Vancouver Lower Mainland will be required. The forecasts call for a near tripling of the container truck traffic. The BC Government's Gateway Program improvements announced in early 2006 will be required. This program includes twinning the Port Mann Bridge, widening Highway 1 from Vancouver to Langley and constructing the South Fraser and North Fraser Perimeter Roads. These improvements will greatly improve the road network benefitting both local and commercial truck traffic.

Whether for expanded train assembly areas or inland distribution centres, it is critical that land for transportation and industrial purposes be protected.

OVERVIEW

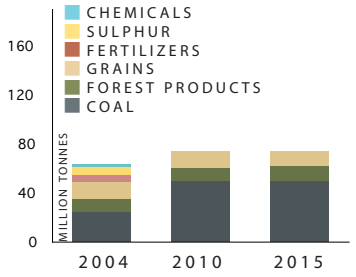
Commodities

The term 'commodities' refers to resource-based products in their natural or a semi-processed state, which then are used in producing manufactured and refined goods of all types. Canada is richly endowed with mineral, forest and agricultural resources. These products tend to be bulky and a challenge to transport cost-effectively. Rail transport dominates in moving commodities.

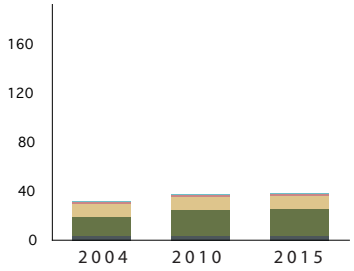
The following pages contain market profiles and volume predictions for key commodities from Western Canada – coal, forest products, grain, fertilizers and potash, sulphur, and chemicals. The selection of products was based largely on volumes.

MAJOR COMMODITY FORECAST SUMMARIES

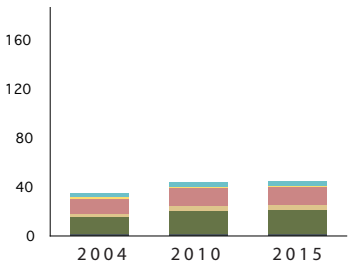
WESTBOUND VOLUMES



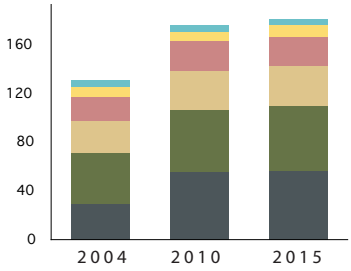
EASTBOUND VOLUMES



SOUTHBOUND VOLUMES



TOTAL ALL DIRECTIONS



Commodities

Many more products are exported from Western Canada. Some key ones are: crude oil; natural gas; uranium; fresh, frozen and processed food; livestock; and base metals. Generally these commodities place less demand, on a tonnage basis, on the surface transportation system. Some commodities such as crude oil and natural gas primarily move by pipeline; others are high value, low-weight commodities. See Appendix 9 for more information.

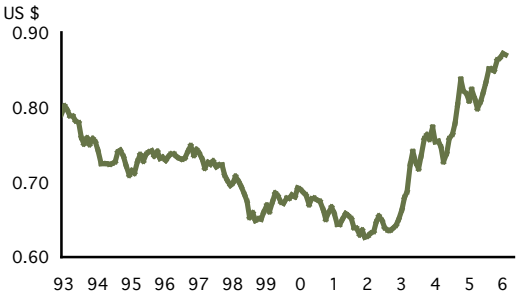
Exports of 'Other Commodities' from Western Canada 2004

[thousand tonnes]

Fresh, Frozen and Processed Foods	7,500
Livestock	225
Base Metals:	
Copper	165
Nickel	60
Zinc	319
Aluminum	277
Uranium	12

In the last three years, the Canadian dollar has risen about 40% against the US currency. Canada's dollar is often referred to as a 'petro-currency', as Canada has vast oil resources. Oil prices and, thus the Canadian dollar are expected to remain high. The possibility of a stronger dollar is of great concern to Canadian exporters as many commodities are generally priced in US currency terms in world markets and domestic costs are incurred in Canadian dollars. The result is severe financial pressure on commodity producers.

EXCHANGE RATE: CANADIAN DOLLARS IN US FUNDS



Coal

IMPLICATIONS FOR TRANSPORTATION

- **an additional 2,000 to 2,600 coal trains per year to west coast terminals**
- **additional west coast terminal capacity will be required**

PROFILE

There are two broad types of coal: **metallurgical or coking coal,** used for steel-making, and **thermal coal**, used for electric power generation. Worldwide coal exports exceeded 700 million tonnes (Mt) in 2004, of which 70% was thermal coal. Many countries produce thermal coal, but only a few produce metallurgical coal. Canada is the world's second largest supplier of metallurgical, with a 12% market share, and a small supplier of thermal coal with less than 1% of the global export market.

PRODUCTION

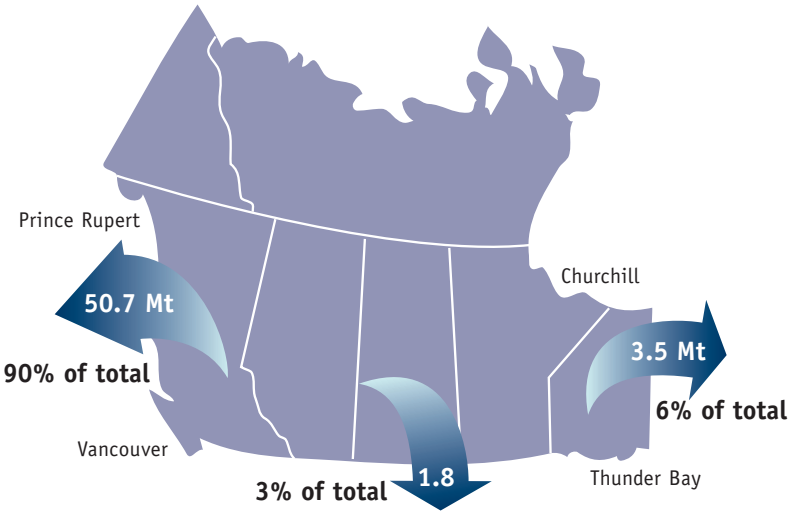
Coal is mined in Alberta and BC. Two companies dominate the industry: Elk Valley Coal Corporation (the world's second largest exporter of metallurgical coal) and Luscar Energy Partnership (Canada's largest thermal coal producer). Driven by record high coal prices – exceeding $120 US/tonne in 2005, up from $53 US/tonne in 2004 – a number of mines have been reactivated and new mines are being developed. Many of these are by relatively new firms (junior producers): Grande Cache Coal, Hillsborough Resources, Northern Energy & Mining, Pine Valley Coal and Western Canadian Coal.

TRANSPORT

Coal is transported by rail. A typical coal train of 100-124 cars carries 10,000 to 13,000 tonnes. Lighter aluminum rail cars can achieve a loading of 110 tonnes each and steel cars about 100 tonnes. Coal is moved through terminals in Prince Rupert: Ridley Terminals Ltd.; Vancouver: Neptune Bulk Terminals (Canada) Ltd. and Westshore Terminals Limited Partnership; and Thunder Bay: Thunder Bay Terminals. Typical west coast vessel sizes are 80,000 to 150,000 deadweight tonnes. Transportation costs typically represent 20% and 40% of the selling price.

FORECAST: METALLURGICAL AND THERMAL COAL 2015

WESTBOUND SHIPMENTS TO DOUBLE



Coal

CUSTOMERS

Asia is the main export market. In 2004, shipments to Japan, South Korea and China accounted for about 43% (10.3 Mt) of Canada's metallurgical coal shipments. Other important markets are: Germany (1.8 Mt in 2004), the US (1.7 Mt), Brazil (1.5 Mt) and Turkey (1.3 Mt).

COMPETITORS

Australia is the world's largest supplier of coal, shipping more than 224 Mt of metallurgical and thermal coal in 2004 – nearly ten times Canada's total coal exports. Australia dominates in both metallurgical and thermal coal. Canada's share of world metallurgical coal exports has declined by about 1.5% a year over the last decade. Meanwhile, Australia's share has increased by about 5% a year. Australian metallurgical coal exports could grow from the existing level of 117 Mt to 160 Mt by 2010.[13]

FORECAST AND DRIVERS

The primary export outlet for Canadian metallurgical coal will continue to be west coast ports. **The forecast indicates a doubling of westbound export volume from 24.7 Mt in 2004 to 50.7 Mt in 2015, an average annual growth rate of 6.8%.** Most of this growth would occur in the next five years. A significant portion of that traffic would logically be transported through Prince Rupert given the new production in northeast BC. Southbound and eastbound volumes are expected to be relatively flat over the forecast period.

Due to it's large absolute growth of 26 Mt, coal forecasts from other sources were examined as well. The Australian Bureau of Agricultural and Resource Economics projects slightly lower growth for Canada's metallurgical coal exports of 6.4% to 2010 compared with Australian export growth of 5.5% a year. The Energy Information Agency of the US Department of Energy forecasts total coal exports from Canada to reach 38.71 Mt by 2015, growth of 4.4%.

KEY DRIVER OF FORECAST

■ **increased world steel production, primarily in China which will account for 60% of the increase in world steel output**

COAL

	Westbound	Southbound	Eastbound	Total
2000	20.90	0.58	1.60	23.08
2004	24.70	1.62	3.33	29.65
2005	25.30	1.28	3.01	29.59
2006	32.60	1.80	3.15	37.55
2007	36.20	1.80	3.35	41.35
2008	38.60	1.80	3.45	43.85
2009	43.10	1.80	3.55	48.45
2010	49.70	1.80	3.55	55.05
2015	50.70	1.80	3.55	56.05
AAGR* 2004-2015	6.8%	1.0%	0.6%	6.0%

** Average Annual Growth Rate*

13 Australian Bureau of Agricultural and Resource Economics (ABARE).

Coal

The demand for metallurgical coal is driven by steel output. Global steel production underpinned by strong demand in China, India and Brazil. The long-term trend in world steel production has been growth of 1-2% a year for the last 30 years. This has recently accelerated to about 6% a year. Chinese steel production has increased more than 20% a year since 2001 in an attempt to keep pace with domestic needs for infrastructure projects such as railroads and bridges, shipbuilding and other capital goods. **Chinese steel production is expected to moderate to about 6.5% a year to 2010 and will likely account for nearly two-thirds of the total increase in global steel consumption.**[14]

Since China has traditionally been a large coal producer itself, Canadian metallurgical coal exports were somewhat limited. However, the rapid expansion of Chinese steel production combined with the need for diversification of supply may help boost Chinese demand for Canadian metallurgical coal. Australia, with its high quality coking coal, is still expected to continue as the major supplier to the Chinese market.

14 ABARE. China's total steel production is projected to increase from 220 to 431 Mt from 2003 to 2010.
15 Salman Partners, December 2005.

2004 World Metallurgical Coal Exports [Mt]	
Australia	117
Canada	24
US	22
Eastern Europe	12
China	6
Others	24
TOTAL	205

Canada's future metallurgical coal markets may be increasingly diverse with relatively small shipment volumes to a variety of countries. There are signs that Canada is making progress in coal markets previously dominated by US suppliers. US coal exports, currently on par with Canada at about 22-25 Mt, are expected to fall to about 16 Mt by 2010.

Continued high coal prices brought on the junior producers and will continue to impact the volumes. Other important factors affecting supply in the next few years are cost control, achieving production targets and making shipments on time. The price outlook for hard coking coal is in the range of $110/tonne in 2006 and $90/tonne in 2007/08.[15] Any significant price downturn would favour the larger, low-cost producers and could result in lesser volumes being shipped by the juniors. High capital costs of production and limited economies of scale could also trigger some consolidation of the emerging coal producers. There is more uncertainty today for northeast BC coal compared to when the mines were initially developed several decades ago, due to the lack of substantial long-term contracts with steel producers.

Coal

IMPLICATIONS FOR TRANSPORTATION

As eastbound and southbound volumes are forecast to be relatively flat over the forecast period, there will be sufficient terminal and rail capacity to service these volumes. Westbound trains would increase by 2,000 to 2,600 trains per year to service the forecasted volume - about six trains per day. Given the existing BC port terminal capacity of 50.5 Mt – Ridley Terminals 16 Mt, Neptune Bulk Terminals (Canada) Ltd. 8.5 Mt, Westshore Terminals Limited Partnership 26 Mt – there would be a minor shortfall of 200,000 tonnes by 2015 if all terminals were fully utilized at rated capacity. Coal terminals have not announced any expansion plans:

- Ridley Terminals is currently under-utilized: it expects to handle 3.5 to 4 Mt in 2006 and 6 Mt in 2007 – far below its capacity of 16 Mt. Capacity is expandable to 24 Mt, and would take at least two years to complete. Such expansion would only be considered when volumes approached capacity and a business case could be demonstrated.

- Neptune Bulk Terminals (Canada) Ltd. has room to expand its coal stockpile by about 15%. With stockpile expansion and train stacking improvements, Neptune could ship between 9 and 9.5 Mt annually, through a single berth.

- Westshore Terminals Limited Partnership has capacity to handle 26 Mt annually.

Forest Products

IMPLICATIONS FOR TRANSPORTATION

- **an additional 25,000 carloads per year of lumber southbound by 2015; additional 30,000 per year eastbound**
- **west coast break-bulk terminal capacity should be maintained**

PROFILE

Canada is the world's largest exporter of forest products representing 22% of total trade and 32% of world pulp exports. A wide variety of different products make up the total: wood products (lumber, plywood, and panels), pulp, paper and newsprint.

PRODUCTION

Solid wood products are manufactured in all four western provinces, dominated by production in BC. The BC Coast region produces a variety of high value products for US and overseas markets. The industry in the BC Interior, Alberta, Saskatchewan and Manitoba has been more recently developed. It relies on smaller logs than those on the BC Coast and it produces fewer and lower value products in high volume, mostly for the domestic and US markets.

BC and Alberta produce most of the region's pulp and paper. Pulp is either consumed in papermaking or sold as "market pulp". The pulp and paper industry (in both Western and Eastern Canada) faces aging mills, modest worldwide demand, low cost competitors and low selling prices. To survive, the newsprint industry is diversifying into specialty markets with new types of papers.

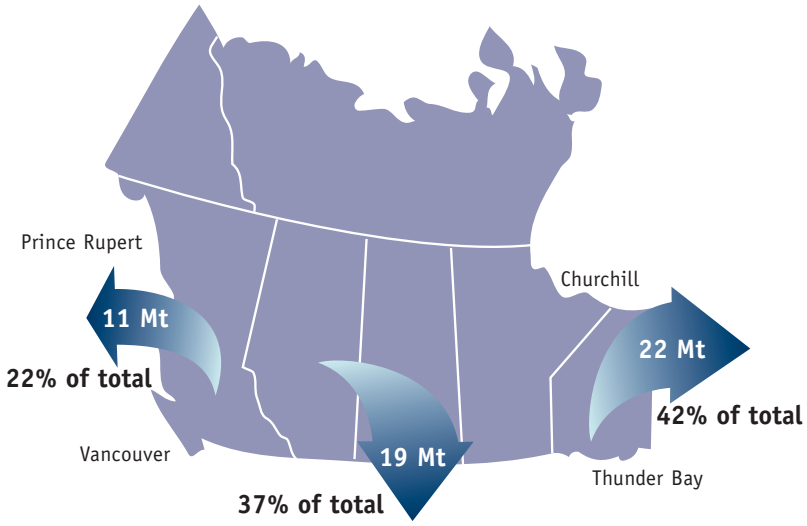
Based on value, most forest products exports originate in BC (78%) followed by Alberta (18%), Manitoba (4%) and Saskatchewan (under 1%).

TRANSPORT

Forest products are transported by truck, rail and ship. Trucking is used to transport logs to mills and finished products mainly to rail transload points. The BC Coast has many manufacturing facilities located at tide water of the Pacific Ocean allowing products to be shipped to world markets directly, while the other mills depend primarily on rail services.

FORECAST: TOTAL FOREST PRODUCTS 2015

STRONG GROWTH SOUTHBOUND AND EASTBOUND



Forest Products

Wood products are moved in a variety of rail cars (centrebeam cars, bulkhead flat cars, double-door boxcars and log cars), depending on the type of product. Some railcars carry up to 100 tonnes. Pulp and paper is moved in specialized equipment designed to carry a particular product: newsprint boxcars, wood pulp boxcars, and woodchip gondolas.

Ships are used for overseas delivery, and increasingly for shipments to the US.[16] Bulk and break-bulk terminals in Thunder Bay, Vancouver, and Prince Rupert transfer products from railcars to vessels. Increasingly, forest products are moved in containers, whether destined for the US or for overseas markets. In 2005, over half the wood pulp and two-thirds of the lumber exported through Vancouver were containerized. About 20 tonnes of lumber or pulp can be shipped in a twenty-foot container. Transportation costs across all products typically represent 15% and 20% of the selling price.

AT A GLANCE

- **Lumber** is manufactured from logs by sawing and planing; it is produced in a variety of types, grades and dimensions.
- **Plywood** is produced when veneer sheets are layered, glued and pressed together with grains at right angles.
- **Panels** include veneer, oriented strand board [OSB], particleboard, medium density fiberboard [MDF], and laminated veneers.
- **Pulp** is a mass of wood fibre reduced from wood chips by grinding, washing out impurities or removing them with chemicals and turning them into a slurry as the raw material for making **papers**.

TOTAL FOREST PRODUCTS

	Westbound	Southbound	Eastbound	Total
2000	11.01	13.55	9.48	34.04
2004	10.93	13.50	16.45	40.89
2005	10.51	15.43	17.89	43.84
2006	10.74	16.43	19.18	46.48
2007	10.80	17.34	19.27	47.42
2008	11.06	17.79	19.97	48.91
2009	11.27	18.55	20.65	50.48
2010	11.34	18.76	21.03	51.13
2015	11.42	19.42	21.94	52.78
AAGR 2015/2004	0.4%	3.4%	2.7%	2.3%

16 In Feb 2006 Weyerhaeuser announced a new ocean shipping service between BC and Long Beach, primarily to by-pass the congested I-5 corridor in the US.

KEY DRIVERS AND SOURCES OF UNCERTAINTY

- **salvage logging of pine beetle-killed timber in BC Interior**
- **softwood lumber dispute with US**
- **US dollar's value**

Forest Products

CUSTOMERS

The US market is of crucial importance to Canada's forest sector, despite disputes, protectionist moves on the part of the US, and Canadian efforts to diversify. Western Canada has managed to find some overseas markets but remains highly dependent on the US market - about 71% of Western Canada's exports are destined for the US, including 84% of lumber and panels.

For lumber, the only significant offshore customer is Japan (representing about 20% of exports). With rising Russian and European shipments and maturing post-war plantations, in Japan, is less dependent on imports from North America. The UK and other EU countries were once large customers; today they are supplied by Scandinavia and Russia. While China may be an option as a market in the future, shipments to China are currently negligible.

Pulp, paper and newsprint are sold all over the world but Japan is by far the largest customer (about 12% of exports) after the US (at 48%).

COMPETITORS

The potential harvest of Russia is about equivalent to Canada's – 240 million m^3. Europe and the US each have double Canada's potential harvest. Worldwide efforts to increase wood stocks and the development of existing resources have brought about self-sufficiency and new export capacity in tropical areas. Europe has large amounts of maturing plantation and has become a net exporter of high quality wood products to Japan and the US (where they are not subject to tariffs), competing vigorously with Canada.

FORECAST AND DRIVERS

Sixteen companies participated in the survey in the fall of 2005. The forecast contributors represent a large part of the Western Canadian forest sector: their combined shipment of finished products is about 44 Mt. The individual forecasts were aggregated and adjusted to develop an industry forecast for each forest product. Detailed forecasts are provided in Appendix 5.

The US will remain the primary destination of Western Canadian forest products, with about 37% of exports moving southbound.[17]

Growing Dependence on US Market Western Canadian Exports:

percent to US

	1996	2005
Logs	69%	54%
Lumber & Panels	65%	84%
Pulp & Paper	45%	48%
Total	57%	71%

17 a significant portion of the eastbound shipments are also destined for US markets.

Forest Products

Total lumber exports will grow about 4.5% annually to 2015, driven by salvage logging of pine beetle ravaged forests. Once that source is exhausted (some estimate within seven to ten years), a very significant slowdown will follow. Traditionally exports to the US are driven by US housing starts. Today lumber export growth to the US is being driven by the need for salvage logging rather than housing starts.

For pulp and paper, the outlook is unfavourable. Producers foresee no significant growth, although there will be shifts in destinations. For example in 2004, 59% of pulp exports were shipped westbound, while in 2015, 55% of exports will move westbound. **Pulp may show some modest increase with the use of relatively inexpensive chips from pine beetle killed wood but newsprint and other paper products are likely to decline somewhat.**

IMPLICATIONS FOR TRANSPORTATION

With modest growth forecast, there should be sufficient terminal and rail capacity to serve forest products shipments in all directions. However, while containers are used for as much as half of overseas lumber and pulp shipments through the ports, forest companies are concerned about the continued availability of break-bulk facilities. Not all customers have the facilities to receive containerized forest products. In addition, shippers believe that break-bulk facilities provide an important source of competition for transport services.

Forest Products

Western Canada, and in particular the BC Interior, is in the midst of an unprecedented mountain pine beetle infestation of its large stands of pine (lodgepole pine and ponderosa). Consequently, for several years ahead, salvage logging will bloat the harvest to unsustainable levels in the long term. In less than a decade, the BC Interior will face reductions in logging and will require restructuring. Now, the infestation is threatening to spread beyond BC. The damaged timber stock already amounts to about ten years' total harvest. The BC Ministry of Forests estimates that 80% of the interior forests may die before this epidemic runs its course. In the centre of the infested area, value recovery from dying and dead trees may only be possible by logging for fuel.

Accelerated salvage logging requires extraordinary measures, including investment in new mill capacity. This results in increased protectionist response in the US to reduce the volume of Canadian lumber, as well as complaints from other Canadian regions, both the BC Coast and Eastern Canada that suffer competitive pressures from low market prices and rising costs. BC Coast pulp mills are affected because they must rely on whole log chipping which is higher cost.

The unfolding and handling of this extraordinary natural disaster injects significant uncertainty into these long-term forecasts. Some survey participants suggest that the forecast presented in this survey is too optimistic: it might not reflect the full extent of boom and bust that will follow the beetle epidemic.

Forest Products

SOFTWOOD LUMBER DISPUTE

A small number of powerful US protectionists, the Coalition for Fair Lumber Imports, is waging a campaign claiming that Canadian softwood lumber is subsidized. The significance of this can hardly be overstated. The US is collecting anti-dumping duties and countervailing duties from Canadian companies. Over $5 billion of deposits by Canadian forest products companies are in escrow and the amount is growing by some $50 million each month (it was over $100 million until the recent adjustment by the US).

There have been decades of negotiations, levies and refunds, quotas, expired agreements, legal challenges, legislative changes in BC to convert to market pricing of logs, international tribunals, non-binding WTO rulings partly favouring either side, and binding rulings in Canada's favour by NAFTA's Extraordinary Challenge Committee, ignored by the US.

The core issue is the fundamentally different ownership of forest resources in the two countries. About two-thirds of the forests in the US are privately owned, compared to 5% in Canada where most is owned by provincial governments, subject to unsettled native land claims. Public timber is generally sold by auction in the US, while in Canada governments are in effect business participants retaining resource ownership, issuing timberland management licences and charging stumpage fees (royalties) for timber, taking into account the price of the end products, the cost of production and the revenue objectives of government.

In the US, a timber supply shortage is exacerbated by environmentalists having tied up national forest timber auctions by court challenges. US mills that have relied on public timber lost access to lower cost raw material (as about 95% of the National Forest timber supply is 'locked up' in endangered species protection litigation) and are the ones opposing Canadian lumber entering their markets. This festering dispute continues to cause major financial damage to Canada's forest sector and provides a financial subsidy to US lumber producers. The punitive US levies prompted softwood lumber producers in Canada to invest aggressively and thereby reduce unit costs.

Grains

IMPLICATIONS FOR TRANSPORTATION

- **existing port terminal elevator capacity is sufficient to handle forecasted volumes**
- **challenge is how to improve asset utilization throughout the supply chain**

PROFILE

Many different grains are grown in Western Canada including: spring and durum wheats, barley, oats, canola, flax, and pulse crops (peas, lentils, beans, chickpeas). In 2004, about 53 Mt of grains were grown in all of Canada. The largest crop by weight is wheat; most is grown in Western Canada. In 2004, Western Canadian farmers produced 24 of the nearly 26 Mt;[18] this is significantly down from highs of 32 Mt in the early 1990s.[19] World wheat production amounted to 610 Mt in 2004-05 and the traded volumes were about 113 Mt.[20]

As the world's largest source of high-quality wheat, Canada accounts for over 55% of the world durum trade and nearly 20% of the bread wheat trade.

Livestock production in Western Canada has been growing and this has reduced the volumes of feedgrains and feed barley available for export.

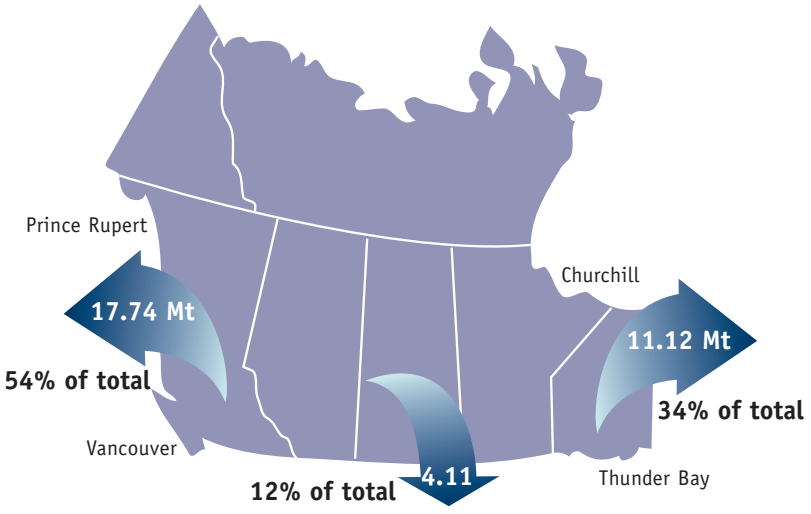
PRODUCTION

Grains, oilseeds and special crops are primarily harvested in the southern half of the prairie provinces: southeast, southwest and west-central Manitoba, all of Saskatchewan south of Prince Albert National Park, Alberta south of Lac la Biche, and in the Peace River region, from NW Alberta into NE British Columbia.

Depending on weather conditions, seeding occurs in early April to early June with the harvest in mid-August to mid-October. Year-to-year fluctuations in quality and volumes result largely from in weather, but are also affected by production decisions such as fertilizer usage and relative crop prices. A major development of the past decade is pressure from customers for specialization, e.g. organic crops, or milling or malting varieties for specific end-users. This has a major impact on the handling system.

FORECAST: TOTAL GRAINS SHIPPED FROM WESTERN CANADA 2015

SOLID GROWTH FORECAST



18 History and forecasts were prepared on a calendar year rather than a crop year (August to July) basis.
19 Statistics Canada, and Agriculture and Agri-Food Canada.
20 USDA Foreign Agricultural Service.

Grains

TRANSPORT

Grain, oilseeds and special crops rely on a combination of truck, rail and ship to get to the customer. Substantial volumes move by truck from the farms to primary elevators on the Prairies where the grain is consolidated and stored until loaded into a rail hopper car for longhaul domestic or export shipment. Terminal elevators at the ports (Vancouver, Prince Rupert, Thunder Bay and Churchill) store the grain before it is loaded onto ships destined for offshore customers or the Lower St. Lawrence.

Although containerization of grain products is increasing, lot sizes generally continue to support bulk shipments.

Most rail movements are in train blocks ranging in length from 50 to 112 cars. Each hopper car of wheat carries approximately 90 tonnes; some of the newer cars carry 100 tonnes. The average grain vessel serving west coast ports carries 30,000 tonnes, although terminals are capable of servicing much larger vessels.

Increasing pressure from customers to receive specialized products has a major impact on the forwarding system's 90-year history as a "bulk system"; the tradition of blending grades and varieties occurred, whether on farm, in primary elevators, or terminal elevators. Now "Identity Preservation", or IP[21], demands from sophisticated buyers and processors are forcing a major rethinking of on-farm storage and handling systems for storage and transport. Containers with 20 to 30 tonne lots offer more flexibility than 90-100 tonne rail hopper cars dumping into 1,000 tonne bins in 5,000 tonne cargo holds.

Transportation & Logistics Costs*

In 2003/2004 the costs to move wheat from a mid-prairie point (Scott, SK) to export position was $87/tonne via the St. Lawrence Seaway ports (mainly Thunder Bay) and $66/tonne through the west coast ports.

SOURCE: CANADIAN GRAIN COMMISSION.
**includes primary elevator, railway, marketing, terminal elevator, lake transportation, and transfer elevator costs*

TOTAL GRAINS

	Westbound	Southbound	Eastbound	Total
2000	17.40	3.58	11.05	32.03
2004	13.48	2.99	9.85	26.32
2005	14.26	2.45	9.67	26.37
2006	15.14	3.19	10.12	28.44
2007	15.59	3.44	10.28	29.30
2008	15.99	3.55	10.45	29.98
2009	16.54	3.76	10.61	30.90
2010	17.04	3.91	10.74	31.68
2015	17.74	4.11	11.12	32.96
AAGR 2004-2015	2.5%	2.9%	1.1%	2.1%

KEY DRIVERS OF FORECAST

- **rising population and thus demand for foodstuffs**
- **income growth and thus a rise in effective demand**
- **agricultural and trade policies among developed and developing nations**
- **WTO impact**

21 Some customers are willing to pay premium prices for grains that have special characteristics (e.g. food-grade corn or soybeans, or organically produced crops), some customers are unwilling to accept grain that has certain traits (e.g. genetically modified crops). To meet the demands of these customers, farmers and grain handlers must be able to keep special crops separate and free from contamination by other crops, and prove that they have maintained separation (identity preservation, or IP).

Grains

GRAIN TRANSPORTATION BACKGROUND

Decades of rail freight rates frozen at well below cost applied to all grain shipments from 1897 (the Crows Nest Pass Agreement) until the 1980's (the *Western Grain Transportation Act*, 1983). By the late 1970's the railways were losing $300 million/year, and the federal government had to step in with ad hoc branchline subsidies, branchline rehabilitation programs, boxcar repairs and hopper car purchases.

Current issues:

■ **network consolidation**: with the implementation of commercial rates and unit train discounts (since 1987), the once 5,300 primary elevators on a 23,000 route-miles western Canadian network has consolidated to fewer than 400 elevators on a 18,800 route-miles network, 3,300 miles of which are operated as shortlines.*

■ **shift in export zones** (from SK to AB) and **livestock feeding areas** (from AB to SK to MB) due to full distance-related rail freight rates.

■ **railway revenue is regulated** under the *Canada Transportation Act* which puts a 'revenue cap' on hauling grain to 'western ports'. If a railway's revenue from hauling grain exceeds the limit prescribed annually by the Canada Transportation Agency, penalties are imposed on the railway, and the 'over-payment' is paid to the Western Grains Research Foundation.

* SOURCE: QUORUM CORPORATION

CUSTOMERS

Western Canadian grains are sold in more than 70 countries. Trade flows have changed dramatically in the last 25 years. Until the 1980's more than two-thirds of grain shipments were moved eastward from Thunder Bay. Since then the west coast has handled two-thirds; and since implementation of NAFTA and commercial freight rates, some 3 Mt or 10-13% flow south to the US and Mexico.

China has become the largest single importer of Canadian wheat, importing about 15% of Canadian exports in 2003-2004 (about 1.5 Mt, up from only 185,000 tonnes in 2002-03[22]). Japan continues to be a large importer of wheat, representing about 9% of western Canadian exports in 2003-04, and the largest importer of other grains (oats, barley, flaxseed, canola, soybeans, and peas) at 23%.

Other large importers of these other grains are the US at 19%, Mexico at 12.5% and China at 8%.

With the removal of the Crow transportation subsidy (see this page), there began a significant increase in livestock production on the Prairies, resulting in a surge in the domestic consumption of feed grains. Expansion of hog finishing in Manitoba and Saskatchewan are increasing local demand for feed grains.

22 Canadian Wheat Board.

Grains

COMPETITORS

Western Canada's market share of world grain trade has eroded from 25% in the 1970's to 18% in 1991-92 to 14% in 2003-04. Former importers (India, Brazil) and minor exporting countries are increasing their share of global grain trade:

■ Russia, Ukraine, and Kazakhstan (FSU) will increase their share of the global wheat trade to 21% in 2011 from 12% estimated in 2006-07;

■ Syria and Australia will increase their share of the durum wheat market from 20% in 2006-07 to more than 30% in 2011-12;

■ Russia and Ukraine will increase their share of global feed barley from 28% to 52% in the same time period.[23]

Our competitors often have several advantages:

■ higher yields and thus lower production costs, (better seasonal rainfall or irrigation and less regulation of higher yielding varieties); or more generous farmer support systems;

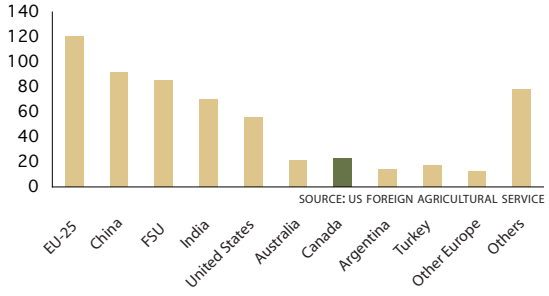
■ closer proximity to markets, (production in the US, EU, Australia, and Ukraine are all much closer to tidewater than the land-locked Canadian prairies requiring a 1,000 mile haul to ocean vessel);

■ enhanced ability to deliver in a timely and consistent manner.

For wheat and durum, the US is the largest exporter, representing 25% of the total exports; Canada's market share is about 15%. The US and EU-25 are increasing their exports of wheat, aided by an average export subsidy of US $8 per tonne. Canada does not have such export subsidies.

Canada is the third largest producer of canola. In 2004, canola was Canada's largest crop by value.[24] Australia and the US have entered this market once dominated by Canada. Australia is now the world's fourth largest producer; in the last decade, US canola seed production has more than tripled.[25] Asian markets for canola oil are limited by tariffs that favour soy oil and palm oil in markets such as India and China.

WORLD WHEAT PRODUCTION Mt
(5 YEAR AVERAGE 2001/02 to 2005/06)



23 Canadian Wheat Board, Grain Trade Forecast to 2011-12.
24 Canola Council of Canada.
25 Agriculture and Agri-Food Canada, Bi-weekly Bulletin, The United States Canola Industry: Situation and Outlook February 27, 2004 Volume 17 Number 4.

WESTERN CANADIAN GRAINS*

Foodgrains: milling grades of wheat, durum, oats, and barley for malt

Feedgrains: low grades of wheat, barley, oats, corn

Oilseeds: canola, flax, safflower

Special Crops (pulse crops): peas, beans, lentils, chick peas

Other: mustard seed, sunflower, buckwheat

Average prices per tonne 2004-05[26]

Wheat (ex durum)	$190
Durum	$201
Barley	$112
Oats	$131
Canola	$309
Soybeans	$248
Dry peas	$135
Lentils	$310

** of these grains, wheat and durum, barley and malt, oats, canola, dry peas, and other grains & special crops (lentils, soybeans and flax) were forecast*

26 Agriculture and Agri-Food Canada, crop year average prices: No. 1 CWRS 11.5% protein and No. 1 CWAD 11.5% (CWB final price I/S St. Lawrence/Vancouver), Barley (No. 1 feed, WCE, cash, I/S Lethbridge), Oats (US No. 2 Heavy, CBoT nearby futures); Canola (No. 1 Canada, WCE, cash I/S Vancouver); Soybeans (No. 2, I/S Chatham); Dry peas and lentils (producer price, FOB plant, average over all types, grades and markets).

Grains

FORECASTS AND DRIVERS

The forecasts were gathered by Quorum Corporation in the fall of 2005; they are the amalgamation of confidential estimates received from surveying the largest agricultural marketers in Western Canada. Projections were received on the basis of August-July crop year; adjustments to calendar year were minimal. Detailed forecasts are provided in Appendix 6.

Offshore markets will continue to be the primary customers for Western Canadian grains. Overall, there will be modest growth to 2015, when total grain exports should reach the previous higher levels of 2000. However, the proportions of individual crop exports will shift; wheat and durum – which in 2000 represented about 61% of grain exports, will fall to 56% by 2015.

Grains Outlook

wheat and durum – exports will remain flat until 2007; exports will be pressured by increased production in the expanded EU, the FSU, and India.

barley and malt – eastbound and westbound exports will increase. China will soon overtake the US as the largest producer of beer. Feed barley exports will vary depending on the level of Canada's countervailing duty on corn from the US and the viability of the domestic hog and livestock industry.

oats – largest market will continue to be the US; significant annual growth of 7.5% to 2015 is anticipated.

Oilseeds Outlook

canola – significant growth of 5.5% average per year to 2015 is anticipated for westbound shipments, primarily to Mexico and Japan; China purchases some Canadian canola despite a 6% tariff discrimination (i.e. 6% higher than the soybean tariff); sales to the US will decline sharply as the US has become more self-sufficient, decade Canadian canola is a "genetically-modified organism" (GMO) crop and can-not currently be shipped to Europe (awaiting GMO approval); bio-diesel production may lead to further canola processing on the prairies and to increased exports of canola oil to Europe to supply bio-diesel production.

soybeans and flax (included in other grains & special crops) – offshore exports will remain stable while exports to the US will decline sharply.

Pulse Outlook

dried peas – modest annual growth of 2.5% annually to 2015 is anticipated; largest growth will be in Asia-Pacific markets; inclusion of peas in the 2002 US Farm Bill has already significantly increased US production, and this will continue to pressure markets; e.g. production of peas and lentils in Montana increased by 78% in 2005, up five times since 2003.[27]

lentils (included in other grains & special crops) – in the near term, exports are expected to increase, driven by exporting current inventory and increased demand for red lentils.

27 Agriweek, February 20, 2006

Grains

2004 Volumes [Mt]	
Wheat and durum	16.19
Barley and malt	2.61
Oats	1.10
Canola	3.66
Dried peas	1.59
Soybeans, lentils and flax	1.14

There are four key drivers of the grain forecasts:

■ **Rising population**. The US Census Bureau International Database projects an increase of 750 million people by 2015, with the global population reaching 7.2 billion by 2015. China alone is expected to continue growing by 12 million people each year. India will grow by 10 million per year.

■ **Rising GDP around the world.** China continues to lead the world with a 9.9% reported increase in GDP in 2005. As incomes rise, people tend to increase their consumption particularly of meat products; they may consequently consume less grain-based products. This conversion of exports from grains to meats (as more grain is consumed by livestock) may mean a lower demand for bulk grain export facilities and a higher demand for containerization and refrigeration facilities for meats (if the livestock is raised in Canada as opposed to being produced in China or other meat consuming countries).

■ **Agricultural policies shift production.** Throughout the world, countries provide varying levels of support for their farmers. Support is provided through means such as trade barriers (quotas and tariffs) and subsidies. These policies can have a significant impact on production decisions, by encouraging overproduction of a particular crop (compared to a laissez-faire policy where the market self-regulates in response to supply and demand).

■ **WTO impact.** As a consequence of the Uruguay Round of GATT (signed in 1994, fully effective in 2001), major developed countries demonstrated a willingness to limit their fiscal policies which tamper with market supply and demand. The WTO commenced the Doha Round in 2001. By 2003 the less developed countries (LDCs) demanded further significant or "ambitious" reforms to agricultural trade practices – especially by the developed nations, before they would consider parallel reforms in non-agricultural services such as banking and finance. These LDCs are still driving the Doha agenda, which if signed by the end of 2006 could see an end to export subsidies, drastic reductions in domestic production subsidies, changes to state monopoly trading practices and subsidized credit terms (such as with the Canadian Wheat Board), and a much increased market access through tariffication of all quotas, and through ambitious 70% cuts in agricultural tariff levels among EU, Japan and US.

Such an agreement, if achieved, would enhance Canada's opportunity to expand exports of grains, oilseeds and meat products. Some estimate a $1.3 billion increase in revenues as a consequence; such would be felt initially in the 2010 to 2013 period, and in its entirety by 2015 to 2020.

Grains

IMPLICATIONS FOR TRANSPORTATION

Some question whether Canada's existing infrastructure of prairie elevators and export terminals will be kept busy enough to allow that part of the industry to remain competitive globally. Existing grain transportation and handling capacity has not been strenuously tested for over ten years. **Based on the forecasts, there is sufficient port terminal elevator capacity to handle Western Canada's grain and oilseed exports; however the capacity of the transportation system leading up to the ports is questioned by some.**

Lach Coburn of Cargill Ltd., speaking at WESTAC's Forecasting Freight Demand Forum in December 2005 stated the grain industry is concerned about the reliability and efficiency of the transportation system. He commented that in recent years, there have been instances of rail car shortages and labour disruptions at the ports. Actual and potential disruptions harm Canada's reputation as a consistent supplier.

One challenge is to improve asset utilization throughout the supply chain. Asset utilization is dependent on several factors including efficiency of loading at country elevators and unloading at terminals, terminal space and vessel arrivals, 24/7 operations and line disruptions.

Fertilizers

POTASH + NITROGEN

KEY DRIVERS OF FORECAST

- declining agricultural land per capita
- global economic growth
- agricultural growth in China and India

■ Potash

PROFILE

Potash dominates the fertilizer industry, representing 80% of Canada's fertilizer exports in 2004. Canada is the world's largest exporter of potash, shipping 39% of the 42.5 million tonnes (Mt) traded in 2004. Production is concentrated in Saskatchewan (ten mines) and one mine in New Brunswick. More than half of the world's estimated potash reserves are in Saskatchewan.[28]

The Saskatchewan potash producers (Agrium Inc., The Mosaic Company, and Potash Corporation of Saskatchewan Inc.) jointly own Canpotex Limited, which markets and distributes all Saskatchewan potash to offshore markets. These companies market individually into the US. Canpotex owns a share of Neptune Bulk Terminals (Canada) Ltd. in Vancouver and wholly owns a terminal in Portland, Oregon. About 56% of 2004 volumes moved to or through the US.

PRODUCTION

Potash deposits occur in only a few locations around the world – the largest is in Saskatchewan. This deposit ranges from 2.7 to 23.5 metres in thickness and is found at depths ranging from one to three kilometres below the surface. Giant electrically powered machines drill for potash. The ore is cut up by blades, broken into smaller pieces, moved by conveyor belts to the mineshaft, and then lifted to the surface and processed into finished fertilizer products.

At current production levels, there is sufficient potash in Saskatchewan to mine for thousands of years.

28 US Geological Survey, Mineral Commodity Summaries, January 2006.

Fertilizers

POTASH + NITROGEN

"Saskatchewan is the Saudi Arabia of the potash industry"

ROGER LARSON /*CANADIAN FERTILIZER INSTITUTE*

IMPLICATIONS FOR TRANSPORTATION

- **an additional 75 to 80 trains of potash to move to Vancouver each year by 2015**
- **sufficient terminal capacity in Vancouver and Thunder Bay to handle the forecast volumes is planned**
- **greater smoothing of the flow of fertilizer shipments over the year is a priority**

TRANSPORT

Potash transportation is multimodal, making the best use of available rail, truck and water transportation options to meet customers' needs in a timely manner. As a bulk commodity, potash is transported by rail directly to customers within North America (the final trip to the farm is almost always by truck) and to offshore customers through bulk terminals in Vancouver, Thunder Bay and Portland, Oregon. North American distribution is discussed in the next section; the offshore exports offer a unique distribution situation. Each covered hopper car of potash carries approximately 100 tonnes, with 120-125 cars making up the typical unit train set. Potash must be protected from high amounts of moisture to retain its structure. It is therefore transported in covered rail cars, stored in large sheds at the export terminals, and placed in covered holds on ships.

Canpotex has a dedicated railcar fleet that can handle more than 10 Mt per year. The average ship destined to offshore markets carries 45,000 tonnes of potash.

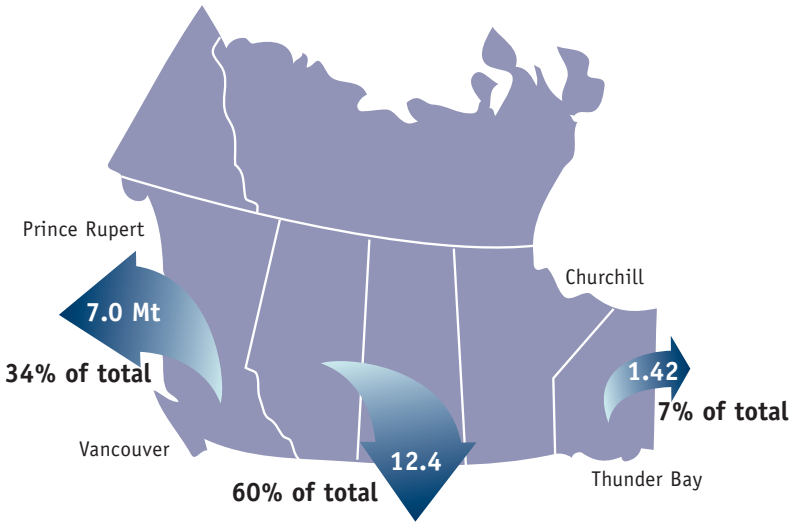
World Potash Production 2004 [Mt]

Canada	16.8
Russia	9.3
Belarus	7.7
Germany	6.0
Israel	3.6
Jordan	1.9
UK/ Spain	1.8
China	1.8
US	1.5
Brazil	0.6
Chile	0.6
TOTAL	51.6

SOURCE: INTERNATIONAL FERTILIZER INDUSTRY ASSOCIATION

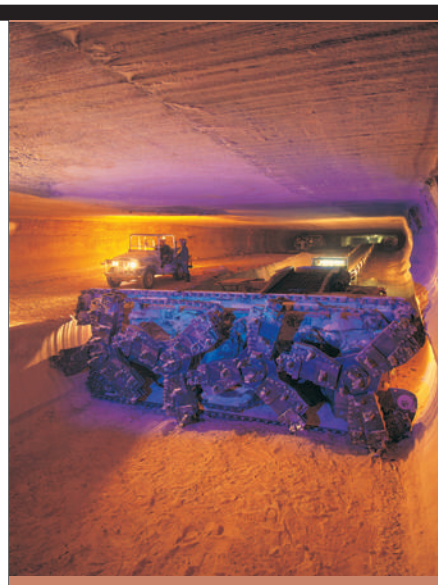
FORECAST: POTASH FROM WESTERN CANADA 2015

LARGE GROWTH IN SOUTHBOUND SHIPMENTS



Fertilizers

POTASH + NITROGEN



CUSTOMERS

The US is Canada's largest single export market – accounting for almost half of Canada's total 16.6 Mt of potash shipped in 2004. Other key markets are China, Brazil, India, Indonesia, Japan, Korea, Australia and Malaysia. World potash demand has increased almost 25% in the last three years to over 50 million tonnes. Rising demand in China and India has resulted in record levels of Canadian potash exports in 2005. According to the Potash and Phosphate Institute of Canada, both countries have the potential to triple their potash consumption.

COMPETITORS

There are only 12 potash-producing countries in the world. Canada, Russia and Belarus account for two-thirds of world production. Many producers are operating at or near capacity and have announced expansions. Expansions worldwide should result in an additional 4 Mt by the end of 2007. Expansion announcements include 2.57 Mt from producers in Saskatchewan, 1.05 Mt in Russia, and 0.4 Mt in Jordan. No greenfield projects are expected in the short or medium term.

AT A GLANCE

Fertilizer is commonly referred to with its values for NPK [N for nitrogen, P for phosphate, and K for potash].

Potash, also known as potassium chloride or muriate of potash, is used as an ingredient in fertilizer. It can be applied directly on soil or combined with other crop nutrients.

Potash is also used as a water softener and to manufacture detergents, glass and pharmaceuticals.

In the refining process, sodium chloride is separated from the potash ore and used for de-icing salt.

POTASH

	Westbound	Southbound	Eastbound	Total
2000	3.88	9.11	1.48	14.47
2004	5.91	9.32	1.35	16.58
2005	6.05	9.62	1.28	16.95
2006	6.00	10.26	1.37	17.63
2007	6.30	11.12	1.38	18.80
2008	6.30	11.88	1.39	19.57
2009	6.80	12.04	1.41	20.25
2010	7.00	12.20	1.42	20.62
2015	7.00	12.40	1.42	20.82
AAGR 2004-2015	1.6%	2.6%	0.5%	2.1%

Fertilizers

POTASH + NITROGEN

Transportation and logistics costs for fertilizers represent between 25% and 45% of the delivered price.

■ Nitrogen + Other Fertilizers

PROFILE

Nitrogen fertilizers include anhydrous ammonia or NH3, which is a gas moved as a pressurized liquid. Nitrogen from the atmosphere is combined with hydrogen in natural gas to produce anhydrous ammonia, the building block for all nitrogen fertilizers.

The other nitrogen fertilizers, which include urea, ammonium nitrate, ammonium sulphate (all dry bulk) and nitrogen solutions (liquid bulk), are produced by combining carbon dioxide and sulphur.

PRODUCTION

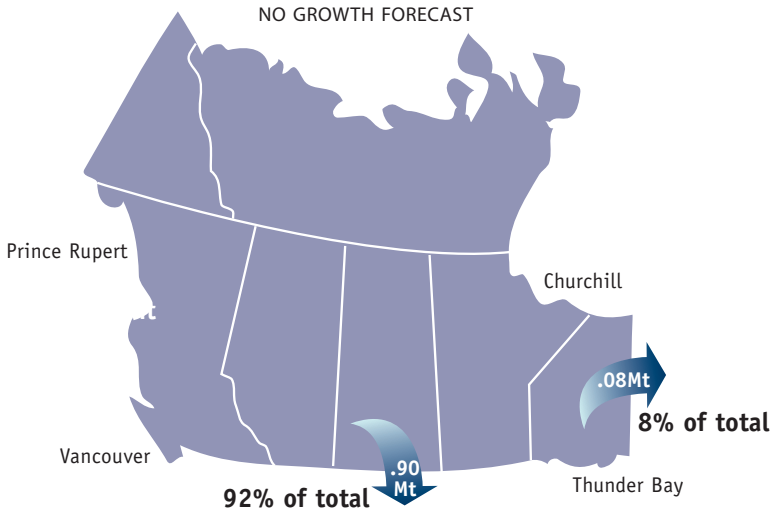
Nitrogen fertilizers manufactured in Western Canada supply approximately 25% of North America's total needs.

Anhydrous ammonia and the other nitrogen fertilizers are produced at eleven facilities in Alberta, Saskatchewan and Manitoba.

TRANSPORT

Anhydrous ammonia for export moves mainly by rail, with small amounts transported by truck to nearby customers in the US. It is transported in pressurized tank cars which hold up to 90 tonnes. The logistics of transporting nitrogen and other fertilizers, including potash, throughout North America is complex: about 19,000 origin-destination pairs, less than unit train movements (typically 5-10 cars), and inter-line rail movements. In addition, it is a highly seasonal market with 70% of the product moving in just 70 days in the spring and fall.

FORECAST: ANHYDROUS AMMONIA SHIPMENTS 2015



Fertilizers

POTASH + NITROGEN

CUSTOMERS

Farmers in Western Canada use about 40% of the nitrogen fertilizers produced in the region. Virtually all nitrogen fertilizers shipped from Western Canada are destined for customers in the US and Central Canada.

Total exports of anhydrous ammonia, exclusively to the US were about 1 Mt in 2004. The greatest majority of the other nitrogen fertilizer exports are also to the US, totalling about 2.4 Mt in 2004.

COMPETITORS

Competitors include countries in the Arab Gulf and Russia. These regions, with low-cost natural gas, are able to export nitrogen fertilizers globally.

AT A GLANCE

Anhydrous ammonia is a high analysis nitrogen source, most often used in fertilizer to help boost crop yields.

Other nitrogen fertilizers contain the same crop nutrients, but in different physical forms for agronomic purposes.

Other uses of these products include 'smelling salts', airport de-icing and commercial explosives.

ANHYDROUS AMMONIA

	Westbound	Southbound	Eastbound	Total
2000	nil	0.69	0.09	0.79
2004	nil	0.87	0.10	0.97
2005	nil	0.82	0.08	0.90
2006	nil	0.89	0.08	0.97
2007	nil	0.90	0.08	0.97
2008	nil	0.90	0.08	0.98
2009	nil	0.90	0.08	0.98
2010	nil	0.90	0.08	0.98
2015	nil	0.90	0.08	0.98
AAGR 2004-2015		0.4%	-2.2%	0.1%

Fertilizers

POTASH + NITROGEN

FORECASTS AND DRIVERS

In the fall of 2005, the Canadian Fertilizer Institute surveyed fertilizer producers and aggregated each producer's forecast of the individual fertilizer commodities to determine the industry totals. Producers representing more than 90% of the fertilizer industry's exports participated in the survey.

Potash exports will average a 2.1% yearly increase to 2015. Shipments southbound, either to or through the US (i.e. for use in the US or exported via Portland) are expected to increase the most at 2.6% average annual growth, with 1.6% annual growth westbound through Vancouver and a modest 0.5% through Thunder Bay. These forecasts are in line with the International Fertilizer Industry Association's projection of 2-3% annual growth to 2010. Although the growth in US potash demand is flat, the US will need to increase its imports from Canada to replace the potash currently being mined in New Mexico. The US reserves are becoming depleted and uneconomic to recover.

The forecasts for anhydrous ammonia and other nitrogen fertilizers demonstrate that the market is flat. Exports southbound to the US are forecast to increase only 0.4% per year to 2015. However, a closer look at the forecast shows that the increase in exports of anhydrous ammonia will occur between 2004 and 2007, with no increase after 2007. Shipments eastbound include those destined for Central Canada, as well as those ultimately destined for the US. Anhydrous ammonia and other fertilizer shipments eastbound are small (only 310,000 tonnes per year) and are forecast to decline marginally between 2005 and 2015.

The primary driver for nitrogen and potash fertilizers is the demand for food. As the world population increases, and as the growth in incomes in developing countries accelerate, food demand will also increase.

Fertilizers

POTASH + NITROGEN

Declining land per capita increases the need for fertilizer use – the world's population relies on fertilizer to boost the yield of crops. The amount of land available to farmers around the world has fallen from just below 0.4 hectares per person in 1970, to 0.2 hectares per person projected in 2020. Population growth and urbanization are reducing the land available for agricultural production.

Global economic growth has been strong in recent years. In 2004, global GDP growth was 5.1%, according to the IMF, which projects several more years of growth – 4.3% per year average until 2010. Strong growth raises incomes in developing nations and helps provide people there with the means to improved diets. Studies show that as incomes rise, food production will rise faster to meet the increasing demand for higher quality diets. This means more meat will be consumed, and more meat production requires grain, which requires fertilizers.

Tremendous growth in China and India drives the positive outlook for potash. For the last six years, China's consumption of wheat and coarse grains has exceeded its production. Crops in China would benefit from increased applications of potash to increase yields. China's demand for potash may increase by 2 Mt by 2010, according to Scotiabank. Other countries are also increasing agricultural production, and thereby their potash use to feed the populations of China and India. Increasingly, for example, Latin America is supplying grains to Asia.

IMPLICATIONS FOR TRANSPORTATION

There will be sufficient terminal capacity in Vancouver to handle the projected westbound potash volumes. Neptune Bulk Terminals (Canada) Ltd. has approval to construct an additional 190,000 Mt of storage. The first 90,000 Mt will be constructed by the end of 2007. In 2008 or 2009 work will begin to increase storage by the remaining 100,000 Mt. With the additional storage, throughput capacity will increase from 6 Mt to 8.5 Mt. In terms of the impact on the railways, an additional 9,500 covered hoppers, about 75 to 80 trains per year, will travel between Saskatchewan and Vancouver's north shore.

The transportation system will have enough capacity to handle the eastbound potash volumes which are forecast to increase by only 70,000 tonnes. Canpotex is expanding its potash terminal in Portland (from which a portion of the southbound volumes flow through) to handle about an extra 1 Mt annually.

As stated above, about 70% of nitrogen fertilizer shipments move in a seventy-day period. To increase asset utilization, it is critical that every effort be made to better balance the movement. It is challenging, from an investment point of view, for a transportation provider to have assets available for this type of peaking capacity.

Sulphur

"Sulphur is where you find it, but never where you would like to find it – logistics is key."

BARRY CLARKE /*PENTASUL*

IMPLICATIONS FOR TRANSPORTATION

- **sufficient terminal capacity exists in the Vancouver area**
- **an additional 170 trains westbound annually by 2015**
- **southbound destination to shift to the US Mountain region**

PROFILE

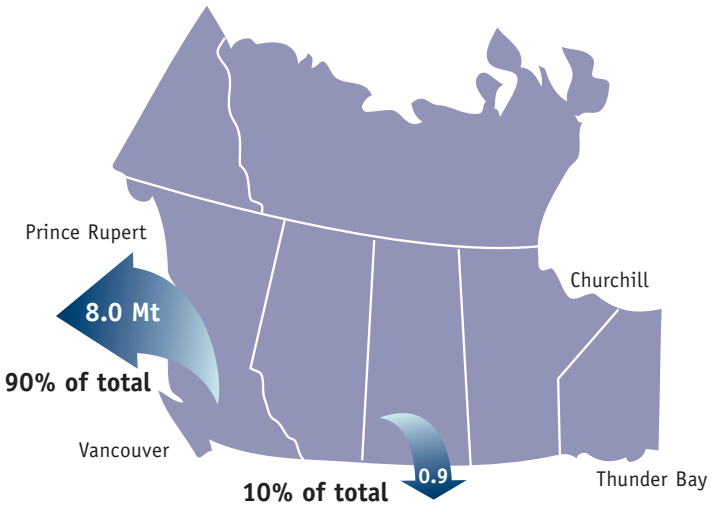
Canada is the world's largest exporter of sulphur, shipping 8.3 of the 26.4 million tonnes (Mt) traded in 2004. Trade is essential – only 10% of Canadian production is used domestically. Sulphur from Canada is among the highest purity in the world. There are two types of traded sulphur: **formed sulphur**, the dry bulk, bright yellow solid, transported in conventional bulk carriers; and **molten (liquid) sulphur** transported in specialized heated tank cars.

PRODUCTION

Most Canadian sulphur is recovered as an involuntary by-product of natural gas processing in Alberta and BC. In addition, processing of bitumen from the oil sands in Northeastern Alberta produces about 1 Mt of sulphur per year. However, much of this cannot reach the market due to lack of forming and transportation infrastructure. As a by-product, production is linked to the demand for oil and gas processing and there are periods of time when sulphur production exceeds demand. Excess liquid production is solidified in massive blocks adjacent to gas plants. The largest sulphur block in Alberta at Syncrude, Ft. McMurray now contains nearly 6 Mt of sulphur and there are other blocks in Central Alberta that exceed 1 Mt.

FORECAST: SULPHUR FROM WESTERN CANADA 2015

SOLID GROWTH WESTBOUND, SIGNIFICANT DECLINE SOUTHBOUND



Sulphur

TRANSPORT

Sulphur is generally recovered great distances from where it is demanded; therefore logistics becomes the single most important consideration in the marketability of recovered sulphur. Within North America sulphur is transported and consumed in its liquid form, but for offshore export it has to be formed into solid pieces – slates, prills, pellets, pastilles, or granules – transported by rail to bulk terminals in BC (Pacific Coast Terminals and Vancouver Wharves) in dedicated 100+ car unit trains, each train carrying about 10,000 tonnes of sulphur. There are five major export marketers through Vancouver – Shell, Prism, Petrosul, BP and Husky. All sulphur for export is handled from plant site to ships by Sultran Ltd.

Molten sulphur is sold to customers in the US and is transported in 100-tonne rail tank cars. Eastbound shipments (liquid form) are negligible as demand in Central and Eastern Canada can be easily satisfied with local sulphuric acid from metal smelters. Marketing of liquid sulphur to the US market is handled directly by producers such as Shell, Husky, BP, Nexen and by aggregators (traders) such as Petrosul, ICEC, and Marsulex.

AT A GLANCE

Sulphur is used to make sulphuric acid which is used in the manufacture of fertilizers.

Sulphuric acid is also used in petroleum refining, pigments and paints, paper, and plastics.

Sulphur is also being used in the production of metals such as copper and nickel; the metal values can be extracted from ores through leaching with sulphuric acid.

KEY DRIVERS OF FORECAST

- **southbound: declining exports of US phosphates**
- **westbound: world population growth, increased demand for fertilizers**

SULPHUR

	Westbound	Southbound	Eastbound	Total
2000	5.3	1.7	neg.	7.0
2004	6.3	2.0	neg.	8.3
2005	6.1	2.0	neg.	8.1
2006	6.5	2.1	neg.	8.6
2007	6.5	1.7	neg.	8.2
2008	6.0	1.6	neg.	7.6
2009	5.4	1.4	neg.	8.1
2010	7.0	1.1	neg.	8.1
2015	8.0	0.9	neg.	8.9
AAGR 2004-2015	2.3%	-7.0%		0.7%

Sulphur

WORLD SULPHUR TRADE – 2004

EXPORTERS	
Canada	8.3
Middle East	6.3
Russia	4.3
W. Europe	1.9
Japan/Korea	1.4
L. America	1.4
Kaz./Other FSU	1.0
US	0.8
Poland	0.6
Others	0.4
TOTAL	**26.4**

IMPORTERS	
China	7.0
Morocco	3.4
US	3.0
India	2.1
Brazil	2.0
Tunisia	1.5
Jordan, Israel	1.2
S. Africa	0.6
Others	0.4
Australia	0.6
Others	5.0
TOTAL	**26.4**

SOURCE: PENTASUL

CUSTOMERS

China has become the largest single customer of Canadian sulphur – accounting for nearly 70% of Canada's export sales in 2005. As shipments to China have increased, the number of markets Canada serves has declined from 23 in 1998 to only 10 in 2005. This trend of diminishing market diversity is expected to continue – by 2010 Canada may be limited to a few major offshore markets (China, Australia, Brazil and South Africa) and overland to the US.

COMPETITORS

Canada remains the world's largest exporter of sulphur. The Middle East and Russia also export significant volumes of sulphur (see sidebar). Exports are increasing from the Middle East, Russia and Kazakhstan. Exports from US Gulf Coast are also forecast to increase.

FORECASTS AND DRIVERS

Westbound sulphur shipments are forecast to remain stable with solid annual growth of 2.3% until 2015. The forecast is based on demand side factors (sharing the demand drivers of the grain and fertilizer industries, namely population growth and higher incomes) and increasing competition for market share from Canada's offshore competitors. In 2008, it is expected that world supply will exceed demand, leading to lower prices. Some high cost (transportation is the largest cost component) Canadian sulphur products will likely be withdrawn from the market and poured to block.

Currently, Canadian sulphur forming plants are operating at close to maximum capacity. In order to achieve forecasted growth of an additional 2 Mt per year, investments in forming plants must be made.

Southbound sulphur shipments will likely peak in 2006 and are forecast to decline annually by 7%. US demand for Canadian sulphur is directly related to the ability of the US phosphate industry to export fertilizers. Sulphur is used in the production of phosphate fertilizers. Until recently, China was the largest customer for US processed phosphate. However, as China has built its domestic phosphate industry, US phosphate exports to China have dropped significantly. China will become a net exporter of phosphate in 2006 and will compete with US exports. Future sales of Canadian sulphur to the US will be largely linked to domestic (North American) phosphate demand. US production of sulphur from oil refining is increasing, and the surplus from the US Gulf will enter the offshore export market.

The destination of Canadian sulphur shipments is expected to change from the Atlantic states and Florida to the Mountain region (Idaho, Wyoming). This will be a more stable market for Canada as the need for sulphur is linked to US domestic fertilizer use as opposed to phosphate exports.

Sulphur

IMPLICATIONS FOR TRANSPORTATION

There is sufficient terminal capacity in Vancouver to handle the projected westbound volumes. Pacific Coast Terminals (PCT) in Port Moody has a rated capacity of 6 Mt and Vancouver Wharves' capacity exceeds 3 Mt.

The forecasted increase of 1.7 Mt westbound by 2015 will equate to an additional 170 trains to the west coast annually.

Chemicals

IMPLICATIONS FOR TRANSPORTATION

- **no additional terminal capacity is required**
- **westbound petrochemical traffic to decline in 2008**

PROFILE

Chemicals are fundamental to the manufacture of many products – including plastics, paper, textiles, vehicles and computers. In 2004, Western Canada exported more than $6 billion worth of chemicals, weighing 8.6 million tonnes (Mt).

The major chemicals exported from Western Canada can be classified as **petrochemicals** or **inorganic chemicals**.[29]

PRODUCTION

Chemical production in Western Canada is concentrated in Alberta, where it is that province's largest manufacturing sector. About 22% of Canadian chemical production occurs in Alberta, with 3% in BC and the balance in Central Canada.

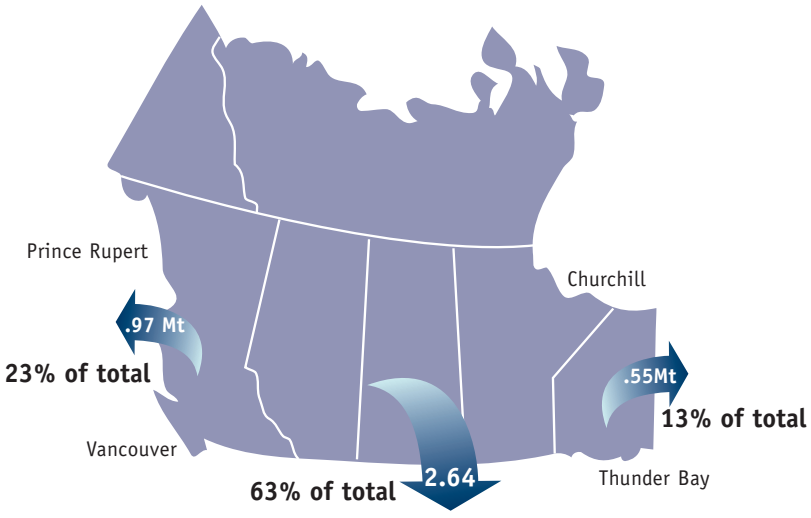
Ethane, extracted from natural gas, is the basic raw material, or "feedstock", that Western Canadian petrochemical producers use to manufacture their products. In other areas, petrochemicals are produced from oil. The supply of ethane feedstock has tightened, thereby limiting major new petrochemical additions. In 2005, due to higher demand, plants were running at or near capacity. Oil from Alberta's tar sands is also being increasingly used to manufacture petrochemicals such as styrene.

Chlorine, sodium hydroxide (caustic soda), and sodium chlorate are produced through an electrolysis process.

The key chemical producers in Western Canada are: Dow Chemicals, MEGlobal, NOVA Chemicals and Shell Chemicals.

FORECAST: PETROCHEMICALS FROM WESTERN CANADA 2015

STABLE SHIPMENTS OVERALL



29 chemicals included were those chemicals whose total exports exceeded 100,000 tonnes per year from Western Canada

Chemicals

TRANSPORT

Chemicals are transported by truck, rail, and in pipelines, depending on the type of chemical and its destination. Liquid chemicals are transported in tank cars, solid chemicals in hopper cars. Some are even moved in specialized containers. Because of the potentially harmful effects of a chemical spill, extra care is taken during transportation to reduce risks.

AT A GLANCE

Petrochemicals are organic chemicals (carbon-based) that are made from petroleum and natural gas.

Petrochemicals included in the scope of this project are: ethylene glycol, diethylene glycol, ethylene dichloride, styrene and polyethylene.

These are high value products, selling for up to $2,000/tonne.

Inorganic chemicals are derived from materials in the earth's crust: minerals, metals and salt.

Inorganic chemicals included are: chlorine, sodium chlorate, and sodium hydroxide. These three chemicals can also be classified as electrochemicals. (Sulphur and anhydrous ammonia, two types of other inorganic chemicals, are discussed elsewhere in this report).

These inorganic chemicals sold for between $500 and $825/tonne in 2005.

	Westbound	Southbound	Eastbound*	Total
2000	1.66	1.55	0.57	3.77
2004	1.45	2.21	0.57	4.23
2005	1.56	2.11	0.54	4.21
2006	1.57	2.36	0.55	4.48
2007	1.51	2.64	0.55	4.70
2008	1.31	2.66	0.55	4.52
2009	1.15	2.62	0.55	4.32
2010	0.97	2.64	0.55	4.16
2015	0.97	2.64	0.55	4.16
AAGR 2004-2015	-3.6%	1.6%	-0.4%	-0.2%

* incomplete

KEY DRIVER OF FORECAST

■ **relatively higher natural gas prices compared to Middle East**

Chemicals

There are more than 65,000 chemicals. The major chemicals *(in terms of volume, not value)* **exported from Western Canada are:**

Chemical	Physical Properties	Common Uses	Transportation
Petrochemicals			
ethylene glycol	liquid	polyester; coolant & antifreeze; brake fluid; paints	tank car
diethylene glycol	liquid	antifreeze; plastic resins	tank car
ethylene dichloride	liquid	vinyl resin	tank car
polyethylene (high-density and low-density)	solid	shopping bags; packaging film & liners; containers, toys; chewing gum	hopper car
styrene	liquid	home insulation	tank car
Inorganic			
chlorine	liquefied gas	water purification; bleaching of paper; pharmaceuticals	pressurized liquid tank car
sodium chlorate	solid	pulp bleaching; water treatment	hopper car
sodium hydroxide (caustic soda)	solid or liquid	pulp refining; textile processing; soap & detergents; drain cleaner	tank car

CUSTOMERS

The US, the world's largest consumer of chemicals, is our largest export market, representing about 70% of total chemical exports. China is also a customer and will continue to be a net importer of chemicals for the foreseeable future. Chemicals are also shipped east to Central Canada for use in various manufacturing operations.

COMPETITORS

Canada is a small player in the worldwide chemical trade, representing less than 3% of exports. Germany is the largest exporter of chemicals worldwide. The Middle East, another major producing area, supplies Asian markets and this will continue, with Canada a swing supplier to Asia – supplying chemicals at the top of the business cycle.

Chemicals

FORECASTS AND DRIVERS

In the chemical industry, there are typically a small number of companies which manufacture a particular chemical. Many of the chemicals in this project had only one or two producers. To protect confidentiality, the forecasts and the following commentary were prepared on an aggregated basis: petrochemicals and inorganic chemicals.

Exports of petrochemicals will remain relatively flat to 2015; most Western Canadian producers are currently producing at or near maximum capacity and have limited opportunity to increase production. Investors are less likely to invest in plants in North America with its relatively high and volatile natural gas prices compared with Europe, Asia, and the Middle East.

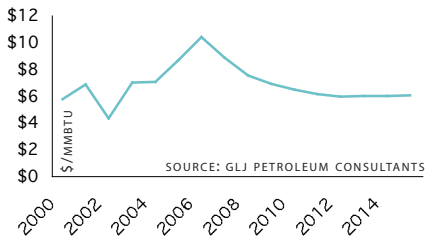
Inorganic chemicals are forecast to increase 2.3% annually on average to 2015, reaching 1 Mt (see Appendix 8 for details). Some chlorine and sodium hydroxide production will shift from Ontario to Alberta and Manitoba, provinces with more favourable hydroelectricity rates.

High energy prices impact competitiveness. In North America, natural gas used to be relatively inexpensive. Most of the newer petrochemical capacity was built based on this lower priced natural gas feedstock. In other parts of the world, oil is the dominant feedstock.

In late 2005, North American natural gas prices were at an all-time high, reaching prices 80% higher than in the Middle East. In fact, North American natural gas prices have risen to become the highest in the world. Oil is a globally traded commodity with prices tending to be more or less equal in all western economies; natural gas is a regional commodity with wide variations in price.

In response to relatively high natural gas prices, global chemical producers have shifted their focus for new investments to the Middle East and Asia Pacific. For the most part, chemical producers are large, multi-national corporations, often divisions of US firms.

NATURAL GAS PRICE FORECAST
AB PLANT GATE SPOT CONSTANT 2006 $



IMPLICATIONS FOR TRANSPORTATION

There is sufficient terminal and rail capacity to handle the forecasted volumes of petrochemical and inorganic chemical shipments. The forecasted growth of petrochemicals southbound amounts to about 500,000 metric tonnes and should be able to be transported on the existing road and rail networks.

Chemicals

RESPONSIBLE CARE®

Through the Canadian Chemical Producers' Association, the chemical industry and its business partners have adopted the "Responsible Care" initiative to meet the public's expectations for the safe, environmentally sound and socially responsible management of chemicals over their entire life cycle.

Responsible Care is a voluntary industry-wide commitment to safely handle chemicals from inception in a laboratory to ultimate disposal. There are codes of practice covering the research, manufacturing, transportation, distribution, use, purchase and disposal of chemicals, and engagement with and protection of citizens near plant sites and along transportation corridors.

Each Responsible Care company is publicly verified every three years to be living up to the Responsible Care ethic and meeting the codes using a comprehensive and effective management system.

Shipper Viewpoints:

SEEKING SUPPLY CHAIN EXCELLENCE

During the gathering of forecasts, producers offered candid and constructive opinions on the adequacy of transportation services. This is a synthesis of their comments:

■ Commodities are highly interchangeable. Canadian producers differentiate themselves from the competition by excellence, as they have done over the years. The long-term health of commodity export sectors depends on maintaining the reputation for excellence, through consistently high quality supply chain excellence, delivery on time and on agreed-upon terms, with integrity and ethical conduct. Many shippers said the reliability and efficiency of transportation services have slipped recently and need to improve to the high level maintained in the past. In the decade ahead excellence in logistics will be the critical competitive element. Large inventories overseas will not be an option.

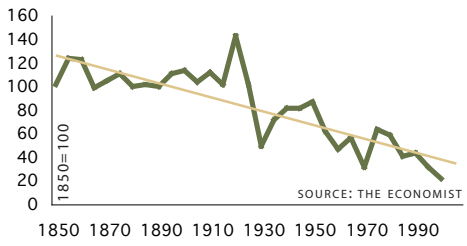
■ All shippers seek to transport their products in the most efficient and least costly manner. This is particularly true for commodity shippers where transport cost is a large fraction of the product's delivered price, such as for coal. Prices are set by the market and extra freight costs cannot be passed on to the customer.

■ The structural shift to offshore manufacturing in Asia is well entrenched. Manufacturers wishing to remain competitive have little alternative but to reduce production costs by relocating to countries with lower production costs. Longer, more complex distribution channels critically impact a company's competitive position. Importers need competitive supply chains end-to-end (see Retail Supply Chains text box overleaf).

■ Trade growth with China and India has led to port capacity challenges in Greater Vancouver. Exporters want to be included in finding solutions, by taking part in formulating and implementing strategies. There are concerns about moving trains and trucks through the Lower Mainland because of perceived shortcomings in the area's total transportation infrastructure. Shippers say investment in the Port of Vancouver is needed but it, alone, is not sufficient. The development of the container terminal in Prince Rupert is viewed as one solution. Proper infrastructure development including rail, road and bridge investments in the Lower Mainland is in the region's and the nation's economic interest and should not fail because of local political pressure.

COMMODITY PRICE INDEX

Commodities have displayed a declining price trend over a very long time, a tangible sign of improvements in productivity in a competitive market.



TRANSPORT COST AS % OF SELLING PRICE

Coal	**20-40%**
Forest Products	**15-20%**
Fertilizers	**25-45%**
Sulphur	**70%**
Wheat	**20-30%**
Canola	**10-15%**

These are typical transport and logistics costs as a percent of selling price.

Shipper Viewpoints:
SEEKING SUPPLY CHAIN EXCELLENCE

■ The dramatic increase in containerized goods from China makes containers available for some shipments back to Asia. Greater use of containers is desired by exporters of some products, notably grains. Constraints include areas where there are inadequate facilities and equipment to load containers, the volumes are insufficient, and the costs and time involved in repositioning empty containers is high.

■ Shippers expressing concern about service levels suggested there is a need for efficient contracts between parties. Incentives for supply chain participants – whether management or labour, carrier or shipper – to coordinate with others, matched by penalties if poor performance hampers the performance and profitability of other links in the chain, can improve service and system efficiency.

RETAIL SUPPLY CHAINS - SPREADING THE RISK

Retailers have spent the past fifteen years or so transforming logistics from a 'push' system to a just-in-time 'pull' system in order to reduce inventory costs and better serve customers. In this context, logistics cannot fail. The entire system must be efficient, consistent and reliable. As supply chains have become more global and therefore longer, disruptions have a greater impact because of the greater costs and time involved.

Major retailers continue to develop alternate gateways and open new distribution centres, giving them greater logistical flexibility and closer proximity to their retail outlets. Cargo volumes are now shipped in smaller quantities over several ships and shipping lines. All-water services from Asia to the east coast of North America are growing in use. These trends have benefited Pacific Northwest, Gulf and Atlantic ports, including Halifax, as shippers avoid congested/uncertain routes (e.g. Los Angeles/Long Beach).

Port gateway competition/selection depends on:

■ **Terminal operation** – suitable berthing windows, cost, equipment, space, productivity

■ **Supporting infrastructure** – road and rail network connecting port terminal and markets

■ **Labour** – stability and supply and the perception of such, appropriately trained/skilled

■ **Market conditions** – size of the local and inland markets, availability of distribution centres

IMPLICATIONS FOR Transportation

Western Canada's transportation system will be challenged to handle the projected traffic increases when parts of the system are already at times bumping up against capacity constraints. Steps are being taken to expand capacity and introduce more efficient operating practices. At the same time, shippers are managing their supply chain risks by shifting some traffic to competing gateways. It's a complex and rapidly changing environment. Implications specific to containerized trade and individual commodities appear in earlier sections of this report. Here, broad implications for the transportation system are presented.

LAND FOR TRANSPORTATION PURPOSES

Whether for port facilities, rail lines or roadways, the availability of land for transportation purposes will be increasingly important. With the growth of urbanization, citizens experience congestion, noise and air pollution. Residential and commercial growth around long-standing industrial centres, rail yards, rail lines and port facilities cause friction. Development of sites and investments in improvements cause protests and opposition unheard-of in the past.

It is vital that governments take steps to ensure appropriate and sufficient land is retained for industrial purposes. Once land is converted to residential or commercial use, it cannot be recovered. As a Vancouver example, there is pressure to develop an area known as the False Creek flats. Rail operations to support the marine container terminals and waterfront industries will need to utilize this for efficient train assembly.

High property taxes levied on land used for transportation purposes, such as marine terminals and rail rights-of-way, can harm the competitiveness of facilities which generally cannot move elsewhere.

EFFICIENT BORDER CROSSINGS

Two-way Canada-US trade will continue to dominate our trade relationships. Shippers critically require timely movement of goods across the border, while recognizing the importance of security measures. Efficient border processes are especially important for the trucking industry. The Canadian and US governments should ensure that improvements to border infrastructure are coordinated and that crossings have adequate and well-trained staff.

BREAK-BULK FACILITIES

Although many products, especially forest products and grains, are increasingly shipped in containers, break-bulk handling capacity should be maintained. Residual break-bulk capacity is strategically important as it allows shippers to access world markets not served well by containers and provides competition to the container shipping lines that keeps backhaul rates in check.

IMPLICATIONS FOR Transportation

ATTRACTING AND RETAINING A SUFFICIENT WORKFORCE

Labour is a key component in ensuring success of the transportation industry. With the forecasted traffic growth and acknowledged shortages of skilled people across modes, it is clear that recruiting new employees is vital. The industry will need to ensure that transportation is recognized as a positive career choice and workers will want to stay in the field.

LEGISLATIVE CERTAINTY

The absence of legislative certainty, especially the *Canada Transportation Act*, reduces investor confidence in the ability of affected parties to earn a reliable rate of return on their investments. Exposure to legislative risks can reduce or delay investment decisions, particularly in much needed rail capacity expansion.

BEYOND OUR CONTROL

Decisions about investments, ports of call, and shipping schedules are often made outside Canada:

■ Private sector investment decisions are increasingly made through multinational corporations. P&O Ports Canada, the operator of Centerm in Vancouver, is owned by P&O Ports, a global company with 28 container terminals and operations in more than 100 ports.[30] These global firms make investments in locations with growth opportunities and the best financial returns.

■ Decisions that affect which port or which terminal a shipping line calls at are made by multinational shipping lines. For example, with Hapag-Lloyd's acquisition of CP Ships, a decision was made to deploy the CP Ships vessels elsewhere, resulting in Fraser Surrey Docks losing a key customer.

■ Shipping lines are under pressure by their offshore owners to keep vessels utilized and to clear goods from foreign ports. Trans-Pacific carriers often build their schedules to suit Asian factory cut-off times and no-work practices on Sundays (e.g. Japan). The logistics of Canadian importers is thus driven by decisions beyond their control. As well, many ships are on similar schedules, arriving at west coast ports during narrow windows that cause short-term demand peaks and congestion. Adjustments require close coordination among overseas manufacturing plants, importers and cargo consolidators, ocean carriers, port terminals, truck carriers and railways.

30 The P&O Group is also in the process of being acquired by Dubai Ports World, a United Arab Emirates government-owned company in a US$6.8B deal.

IMPLICATIONS FOR Transportation

FUNDING PORT CAPACITY INVESTMENTS

Significant investments in terminal capacity will be required, especially to handle the forecasted growth in container traffic. The port authorities have limited ability to borrow money to finance investments. A solution must be found to enable port authorities to access the funds that will be required, either through increased borrowing limits, direct government investment or other financing arrangements such as tax-free bonds.

PUBLIC SUPPORT

The public must be fully briefed in order to be supportive of commercial transportation's activities – whether it be for more trains on a rail corridor or an expanded container terminal. Consultations and communication with the public and the media are imperative. Peter Ladner, Vancouver City Councillor, in his presentation to WESTAC's Freight Forecasting Forum, urged industry to spend time educating municipal councils about industry's plans. He urged the transportation industry to inform the public of the changes taking place and the economic benefits its activities provide.The public has legitimate concerns about noise, congestion and air pollution. It is critical that the transportation industry address these concerns and inform the public in order to gain support.

INDUSTRY CONSOLIDATION

The recent mergers – A.P. Moller-Maersk's acquisition of P&O Nedlloyd, and Hapag-Lloyd's acquisition of CP Ships – have created two giant carriers. This trend may be viewed as a result of globalization, shipper demands for more far-reaching services and the carriers' desire for larger economies of scale. Yellow Roadway, the largest less-than-truckload carrier in the US, has been expanding rapidly and changed its name to YRC Worldwide. This is the holding company for a range of trucking, freight forwarding and logistics firms with operating revenues of US$8.7 billion. A merger is also pending between two major container terminal operators and there has been speculation about another round of railway mergers in North America.

Industry consolidation is a concern for shippers because of market concentration and the potential impact on rates and service. It may also change the relative bargaining power of supply chain service providers and potentially impact individual port traffic projections. Shipping lines would also like to have greater control of their transportation network and those with more financial clout may own their terminals and attempt to exert greater influence over railways.

IMPLICATIONS FOR Transportation

COST CONTROL AND ASSET UTILIZATION

In response to market, customer and shareholder pressure, carriers and other service providers will continue taking steps to control costs, improve efficiency and optimize assets. Increasing fuel costs are a major concern. Ports and governments are also questioning how to pay for the costs of cargo security. The key trends and concerns driving each sector are outlined below.

The system is only as good as its weakest link. Each party must balance asset utilization with reliability in a way that optimizes the entire supply chain.

Ocean Carriers	Terminals	Railways	Trucking
Key concerns: ■ fully utilizing bigger ships ■ denser networks ■ increased throughput ■ balancing cargo flows	**Key concerns:** ■ berth/inland terminal capacity utilization ■ storage capacity turnover ■ rail & truck service ■ labour/equip. productivity	**Key concerns:** ■ operating, cost control ■ optimizing capital – defer or avoid investment ■ increasing velocity	**Key concerns:** ■ number of turns/day ■ cost control (fuel) ■ driver shortage ■ road congestion
Ability to utilize ship capacity constrained by landside throughput limitations. Deploy assets to port/inland networks that can handle the volume.	Caught in the middle between shipping lines & railways in efforts to improve throughput & manage empty containers.	Disciplined (scheduled) operations & balanced use of locomotives/cars to reduce cost and increase velocity, resulting in higher capacity & better service.	Pressures to cut costs & relative ease of entry to the industry make it difficult to increase compensation for drivers. Congestion & delays reduce productivity.

Common Concerns:

■ cost efficiency to enhance gateway competitiveness & allow shippers to compete
■ global perceptions about BC port gateways & supply chain efficiency
■ reliability & consistency

Can the industry handle THE FORECASTED VOLUMES?

Bulk commodities will continue to comprise the vast majority of traffic using the western Canadian transportation system. However, **the prospect of resurging bulk traffic on top of even higher container traffic raises concerns about the adequacy of rail capacity on some corridors.**

Delivering on service performance means that every link in the supply chain is able to accommodate the demand. This is difficult when different parts of the system expand at different rates. Global container ship capacity is expected to increase at 12-15% each year for the next four years.[31] Shippers and container lines are concerned that ports, terminal operators and railways will not develop container handling and intermodal capacity to match ship capacity expansion.

Total system capacity is difficult to measure. Capacity is determined by variables such as:

- physical infrastructure: e.g. land base, berths, cranes, rail cars, motive power, sidings, roadways
- hours of service and balance of flows
- labour availability and efficiencies
- weather disruptions
- local regulations

Capacity expansion may take years to implement and must be justified by the return on invested capital. In some cases, environmental challenges and community opposition can extend the process. There is a role for governments to ensure that appropriate land use, policy and investment conditions are in place. There is a growing recognition that the industry must work together to increase throughput. **Several operational improvements are already underway to optimize the use of existing infrastructure, for example:**

- railway track sharing arrangements in the Lower Mainland (between CN and Canadian Pacific Railway, and CN and BNSF)
- truck reservation systems
- port terminal initiatives to discourage empty container dwell time

31 Drewry Shipping Consultants; based on container ship orders. Deployment of the new capacity will depend on trade requirements and imbalances in different markets, as well as other competitive and cost factors.

IMPLICATIONS FOR Transportation

To meet expected demand for transport, service providers are:

■ **creating operational efficiencies** – truck reservation systems, track sharing arrangements, seeking off-dock storage of empty containers

■ **making investments including:**

- *provincial road and bridge improvements* such as Alberta's ring roads around the cities of Edmonton and Calgary, and the BC Government's Gateway Project to improve freight and traffic flows in the Greater Vancouver area; the proposed federal Pacific Gateway funding for $590 million of improvements in Western Canada
- *border and highway infrastructure* investments under the federal Strategic Highway Infrastructure Program and the Border Infrastructure Fund
- *new container terminal* in Prince Rupert will be built with financial support from Maher Terminals, CN, the federal and provincial governments, as well as the Prince Rupert Port Authority
- Vancouver Port Authority's addition of *third berth at Deltaport*
- Canadian Pacific Railway's recent completion of $160 million for *capacity improvements* in Western Canada
- Neptune Bulk Terminals (Canada) Ltd.'s investment to increase *potash capacity*
- CN's *investment in sidings* from Winnipeg to Vancouver to accommodate 11,000 foot trains

■ **working to smooth traffic flows:** over more of the 24-hour day and the 7-day week, over the road-rail-port system through better timing of ship, rail and truck arrivals, through weekend and evening loadings

Other concepts such as off-dock terminals and short-sea shipping are being used in other parts of the world to improve system efficiency and increase the fluidity of port terminals. These concepts are largely still in the analysis or development phase in Canada. In the case of off-dock terminals, further work is required to determine the role, potential locations and how they would support container logistics.

A related capacity concern is the large size of container ships coming on stream. Container lines will add 123 new vessels in 2006, ranging in size from 6,000 TEUs to more than 9,500 TEUs (see Appendix 3). There will be huge pressure on ship owners to keep these mega-vessels fully utilized and avoid having them become 'floating warehouses' when landside constraints prevent them from discharging more cargo at port. As a result, traffic could shift to gateways that are capable of handling larger volumes efficiently.

SHIP SIZES ARE INCREASING

[BASED ON WORLD FLEET AS OF OCTOBER 2004]

TEU	Rows Across: # of containers	Present # of Ships	Percent	Slots on Order[3]	Percent
< 5,000[1]	13	2,996	90.8	1,496,051	40.7
5,000 – 5,999	14 - 15	178	5.4	493,248	13.4
5,000 – 6,999	16 - 18	111	3.4	461,456	12.6
+ 7,000[2]	18 – 22	16	0.4	1,220,553	33.2
Total		3,301	100.0	3,671,308	

SOURCE: CONTAINERISATION INTERNATIONAL

Notes:

1. Ships in this category are known as Panamax vessels. There is no absolute TEU capacity that defines the dividing point between Panamax and post-Panamax vessels. However, there are few Panamax ships with capacities greater than 5,000 TEUs.
2. Ships with 18 rows across and a capacity of about 9,200 TEUs are the largest in operation today.
3. The total carrying capacity of ships >5,000 TEUs will increase by 115% during the period 2006-2008.

Questions
FOR THE FUTURE

■ Good forecasts should improve the accuracy of capacity planning. Can those same forecasts be translated into **forecasts of other elements**, such as labour requirements? Ship arrivals? Ship sizes? If so, efficiently designed training programs can ensure the right workforce, with the right training, in the right locations is available.

■ Can the directional forecasts be translated into **predictions for specific corridors** and gateways? Should it even be attempted, or is it best left to the innovation, energy and competitive spirit of those in the respective gateways?

■ Can the forecasts be used to guide **modal planning**? Road, rail – and what about air cargo or short sea shipping, both likely factors in inbound goods, more than export commodities? What will determine the use of air cargo and short sea shipping?

■ What will determine the **split between containers and break-bulk** for outbound freight?

■ How much **involvement of one or more levels of government** should be expected in developing the right capacity? Who should determine the shape of that involvement? The Pacific Gateway program is the federal initiative that has proposed $590 million to fund projects to capture more of growing Asian trade for Canada's benefit. What should be the process and the criteria to make sure the money is well spent?

■ Exporters and importers have an **incentive to be optimistic** about their transportation needs. Those who will invest, hire and maintain the transport system have an **incentive to be cautious** about such investing. How can reality be injected into the process? What incentives are available to share the risks of over or under investing?

■ **Long term planning** beyond the next 10 to 20 years is desirable. What sort of "big picture" planning should be attempted? What elements should be considered? Land reserves? Other ideas? Once created, how can long term plans stay fluid and nimble, reflecting changed conditions, yet still provide the framework for short term investments?

■ These forecasts imply the need for added investments in the transport and handling systems. Will the growth in business deliver benefits to shippers, service providers, employees, governments and the public at large? **Will returns be adequate for all?**

THE Appendices

Appendix NUMBER ONE

ACKNOWLEDGEMENTS

An endeavour of the magnitude of this report is not the result of one person or one organization. It results from the collective contributions of dozens of people. Those organizations that supplied their forecasts are listed as Contributors (facing page). In addition, those listed below have provided research and writing, data analysis, extensive reviewer input, or broad content advice. Our sponsors shown on page 80 have provided the necessary financial support. Many others have helped in various smaller ways, and we are grateful to all.

I recognize the efforts of my staff on this project: Lisa Baratta, Dario Valdivia, Melerie Ingram and Jennifer Perih. In particular I commend Lisa Baratta, as the project leader, for her diligence, perseverance and integrity in completing this ten month project.

Ruth Sol, President

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Allen Foster, CN
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Todd Hirsch, Economist
Roger Larson, Canadian Fertilizer Institute
Alix Li, Vancouver Port Authority
Bruce McFadden, Quorum Corporation
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Keir Packer, Alberta Infrastructure and Transportation
David Shearing, Canadian Chemical Producers Association
Doug Stewart, CRSA Logistics Ltd.
Dr. Bill Waters, Professor Emeritus, University of British Columbia

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p. 66 North Shore Terminals
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Canadian Pacific Railway *p. 60, 64*
TSI Terminal Systems *p.61*
CN *p.63*

Appendix NUMBER TWO

CONTRIBUTORS

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Alpac Forest Products Inc.
Canadian Fertilizers Limited
Canadian Forest Products Ltd.
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Canpotex Limited
Cargill Ltd.
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Catalyst Paper Corporation
CRSA Logistics Ltd.
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Hudson's Bay Company
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Loblaw Companies Ltd.
Locher Evers International
Luscar Energy Partnership
Millar Western Forest Products
Neptune Bulk Terminals (Canada)
Nexen Chemicals
Northern Energy & Mining
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Parrish & Heimbecker, Ltd.
Paterson Grain
Pine Valley Coal
Potash Corp.
Saskatchewan Wheat Pool
Saskferco
SCM Inc.
Shell Chemicals Canada
Simplot Canada Limited
The Home Depot
The Mosaic Company
Tiger Industries
TimberWest Forest Corporation
Tolko Industries
West Fraser Timber
Westco Fertilizers
Western Canadian Coal
Western Forest Products
Westfair Foods

Appendix NUMBER THREE

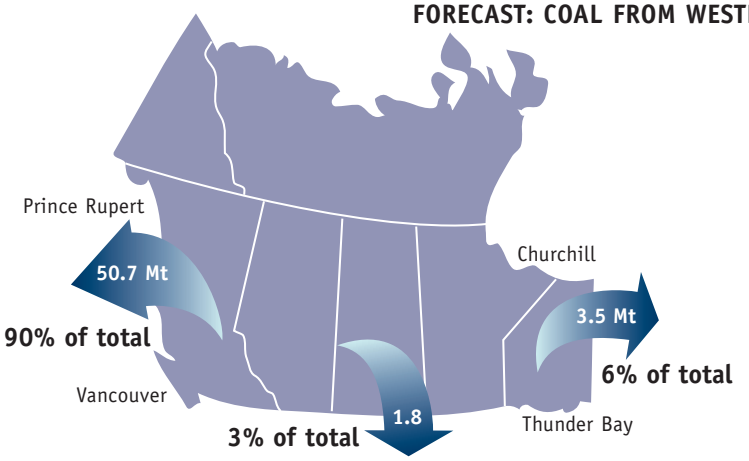
CONTAINER LINES

TOP 15 OCEAN CARRIER RANKING BY TEUs IN SERVICE

Company	Ranking	TEUs	Ships	Order Book TEU	Order Book Ships
Maersk Line	1	1,470,183	487	587,066	103
MSC	2	799,463	273	239,000	33
CMA CGM	3	420,751	151	328,500	61
Evergreen	4	355,265	122	19,646	3
Cosco	5	335,357	124	190,913	22
CSCL	6	328,239	94	127,630	15
APL	7	314,784	99	89,908	26
Hanjin	8	310,485	76	69,100	12
MOL	9	268,096	87	87,400	13
NYK	10	259,013	82	146,600	25
HLCL	11	245,805	61	52,500	6
OOCL	12	238,230	66	109,504	19
K Line	13	228,410	76	103,506	21
Yang Ming	14	198,472	72	130,642	29
CP Ships	15	175,018	74	29,771	7

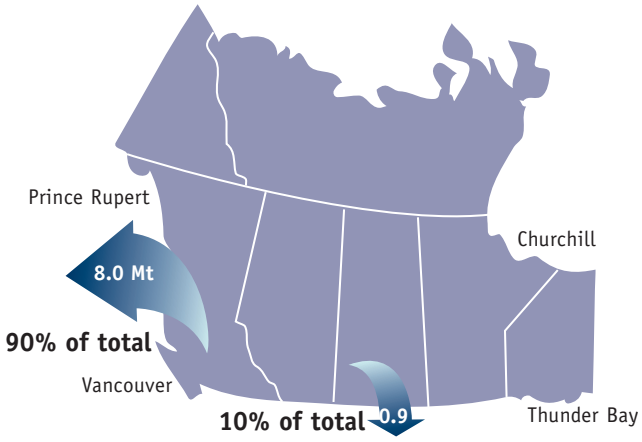
SOURCE: CONTAINERISATION INTERNATIONAL, MARCH 26, 2006

FORECAST: COAL FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	20.90	0.58	1.60	23.08
2004	24.70	1.62	3.33	29.65
2005	25.30	1.28	3.01	29.59
2006	32.60	1.80	3.15	37.55
2007	36.20	1.80	3.35	41.35
2008	38.60	1.80	3.45	43.85
2009	43.10	1.80	3.55	48.45
2010	49.70	1.80	3.55	55.05
2015	50.70	1.80	3.55	56.05
AAGR 2004-2015				
	6.8%	1.0%	0.6%	6.0%

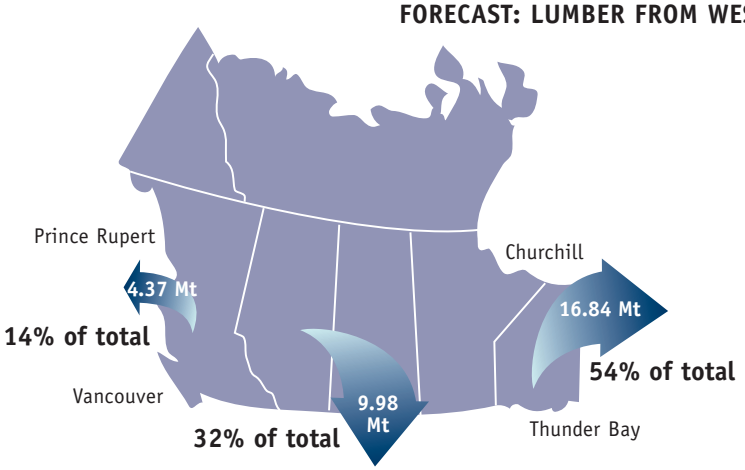
FORECAST: SULPHUR FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	5.3	1.7	neg	7.0
2004	6.3	2.0	neg	8.3
2005	6.1	2.0	neg	8.1
2006	6.5	2.1	neg	8.6
2007	6.5	1.7	neg	8.2
2008	6.0	1.6	neg	7.6
2009	5.4	1.4	neg	8.1
2010	7.0	1.1	neg	8.1
2015	8.0	0.9	neg	8.9
AAGR 2004-2015				
	2.3%	-7.0%		0.7%

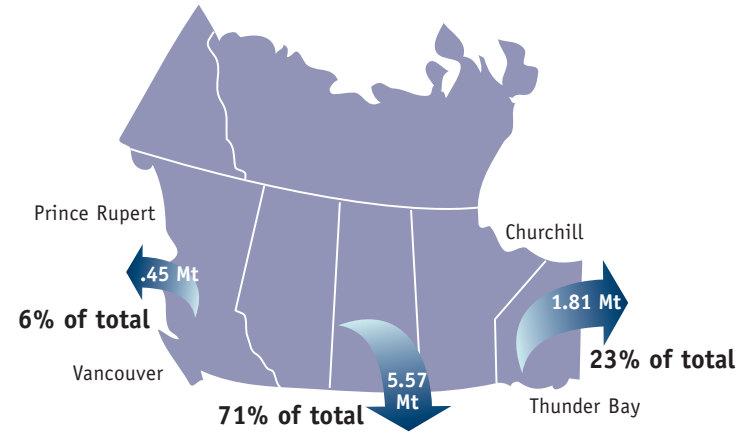
Appendix NUMBER FIVE

FORECAST: LUMBER FROM WESTERN CANADA 2015



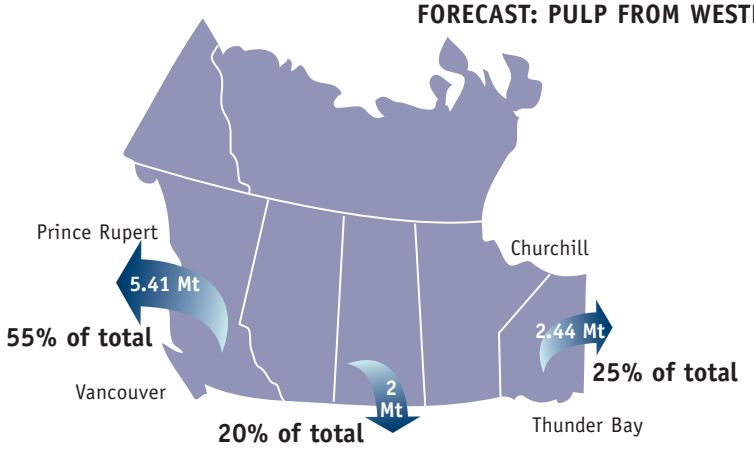
Year	Westbound	Southbound	Eastbound	Total
2000	2.66	7.20	6.47	16.33
2004	2.67	6.14	10.31	19.12
2005	3.49	7.73	13.72	24.94
2006	3.82	7.90	14.48	26.34
2007	3.78	8.65	14.59	27.02
2008	3.97	8.81	15.10	27.96
2009	4.08	9.32	15.73	29.12
2010	4.16	9.52	16.06	29.74
2015	4.37	9.98	16.84	31.18
AAGR 2004-2015				
	4.6%	4.5%	4.6%	4.5%

FORECAST: PLYWOOD + PANELS FROM WESTERN CANADA 2015



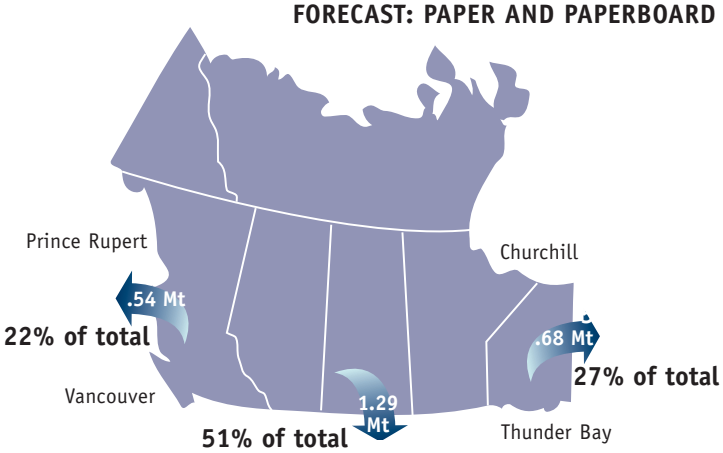
Year	Westbound	Southbound	Eastbound	Total
2000	0.58	2.28	0.59	3.45
2004	0.46	3.76	1.23	5.45
2005	0.46	4.26	1.22	5.93
2006	0.46	4.93	1.66	7.06
2007	0.46	5.01	1.62	7.09
2008	0.45	5.23	1.71	7.40
2009	0.44	5.43	1.74	7.62
2010	0.45	5.44	1.77	7.65
2015	0.45	5.57	1.81	7.82
AAGR 2004-2015				
	-0.2%	3.6%	3.6%	3.3%

FORECAST: PULP FROM WESTERN CANADA 2015



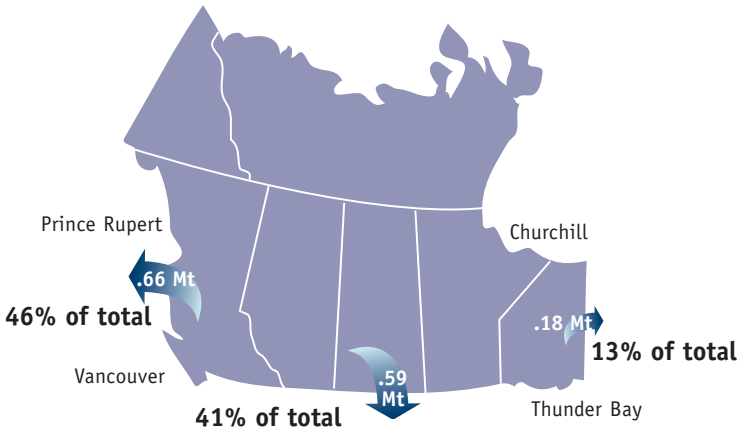
Year	Westbound	Southbound	Eastbound	Total
2000	5.53	1.74	1.32	8.59
2004	5.27	1.56	2.07	8.90
2005	5.37	1.66	2.08	9.12
2006	5.25	1.72	2.23	9.21
2007	5.36	1.81	2.25	9.42
2008	5.45	1.87	2.33	9.65
2009	5.55	1.92	2.35	9.82
2010	5.54	1.93	2.36	9.83
2015	5.41	2.00	2.44	9.84
AAGR 2004-2015				
	0.2%	5.1%	0.6%	2.3%

FORECAST: PAPER AND PAPERBOARD FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	0.51	1.29	0.86	2.66
2004	0.57	1.16	0.84	2.57
2005	0.54	1.21	0.75	2.50
2006	0.54	1.29	0.68	2.51
2007	0.54	1.29	0.68	2.51
2008	0.54	1.29	0.68	2.51
2009	0.54	1.29	0.68	2.51
2010	0.54	1.29	0.68	2.51
2015	0.54	1.29	0.68	2.51
AAGR 2004-2015				
	-0.5%	0.0%	0.0%	0.0%

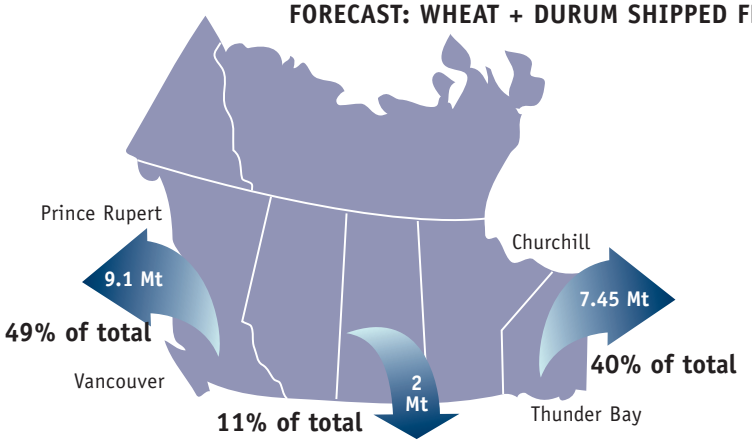
FORECAST: NEWSPRINT FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	0.76	0.66	0.13	1.55
2004	0.75	0.57	0.12	1.45
2005	0.65	0.57	0.12	1.34
2006	0.66	0.58	0.13	1.37
2007	0.66	0.59	0.14	1.38
2008	0.66	0.59	0.15	1.39
2009	0.66	0.59	0.16	1.41
2010	0.66	0.59	0.16	1.41
2015	0.66	0.59	0.18	1.43
AAGR 2004-2015				
	-1.2%	0.2%	6.4%	0.7%

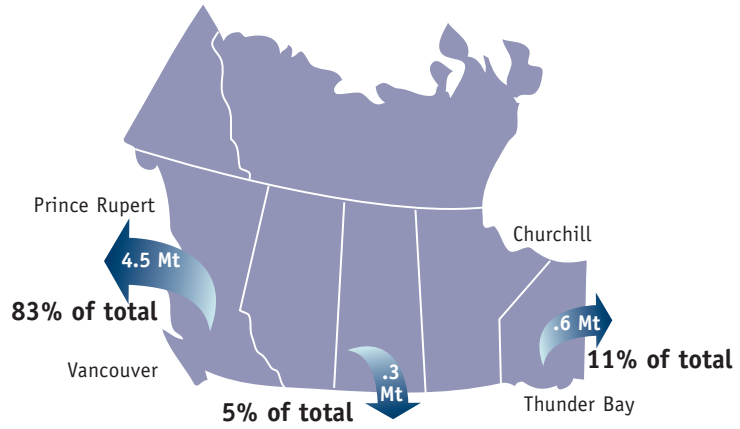
Appendix NUMBER SIX

FORECAST: WHEAT + DURUM SHIPPED FROM WESTERN CANADA 2015



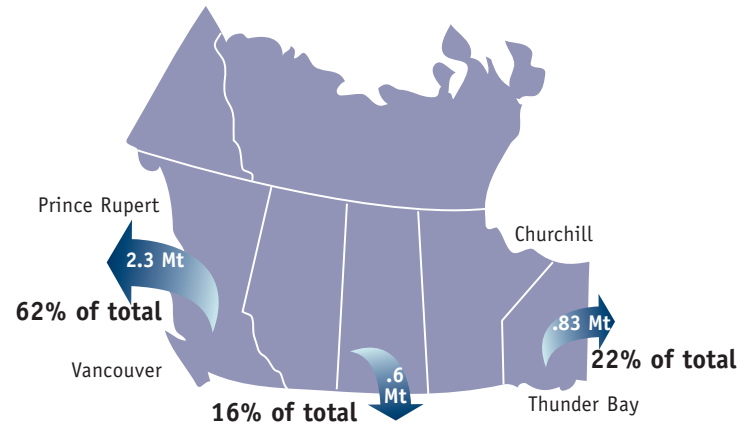
Year	Westbound	Southbound	Eastbound	Total
2000	10.80	1.65	7.24	19.69
2004	8.00	0.90	7.29	16.19
2005	7.60	1.00	6.50	15.10
2006	8.00	1.55	6.65	16.20
2007	8.20	1.65	6.80	16.65
2008	8.30	1.75	6.95	17.00
2009	8.50	1.85	7.05	17.40
2010	8.70	1.90	7.15	17.75
2015	9.10	2.00	7.45	18.55
AAGR 2004-2015				
	1.2%	7.5%	0.2%	1.2%

FORECAST: CANOLA SHIPPED FROM WESTERN CANADA 2015



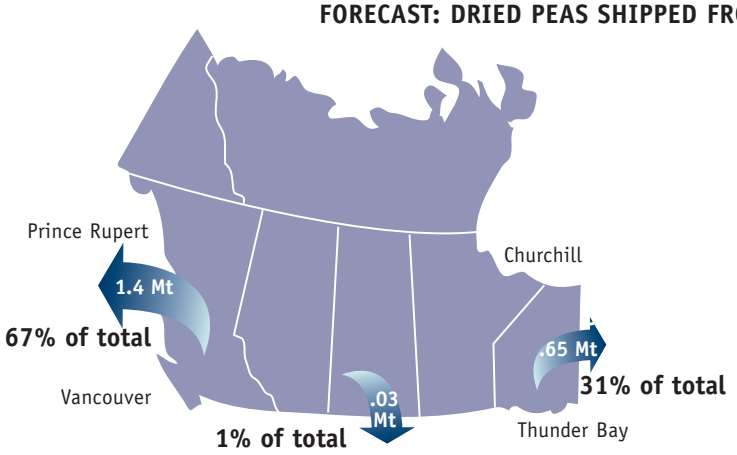
Year	Westbound	Southbound	Eastbound	Total
2000	3.43	0.22	0.42	4.07
2004	2.50	0.72	0.44	3.66
2005	3.20	0.36	0.60	4.16
2006	3.70	0.40	0.60	4.70
2007	3.80	0.40	0.60	4.80
2008	4.00	0.30	0.60	4.90
2009	4.20	0.30	0.60	5.10
2010	4.40	0.30	0.60	5.30
2015	4.50	0.30	0.60	5.40
AAGR 2004-2015				
	5.5%	-7.7%	2.9%	3.6%

FORECAST: BARLEY + MALT SHIPPED FROM WESTERN CANADA 2015



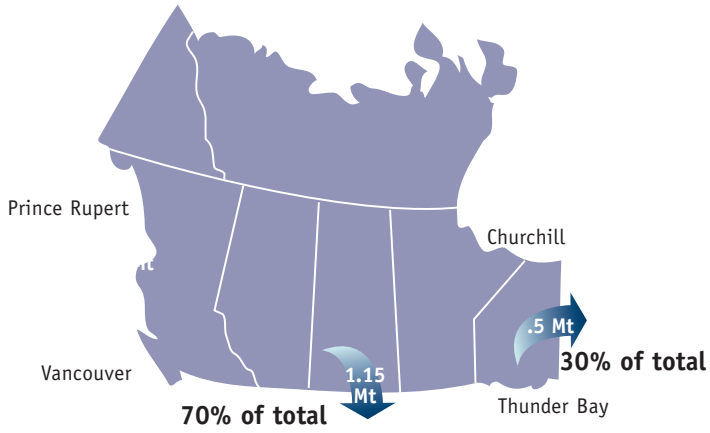
Year	Westbound	Southbound	Eastbound	Total
2000	1.71	0.64	0.85	3.20
2004	1.52	0.71	0.38	2.61
2005	1.82	0.30	0.83	2.95
2006	1.80	0.40	0.73	2.93
2007	1.90	0.45	0.73	3.08
2008	2.00	0.50	0.75	3.25
2009	2.10	0.55	0.78	3.43
2010	2.20	0.60	0.80	3.60
2015	2.30	0.60	0.83	3.73
AAGR 2004-2015				
	5.5%	-7.7%	2.9%	3.6%

FORECAST: DRIED PEAS SHIPPED FROM WESTERN CANADA 2015



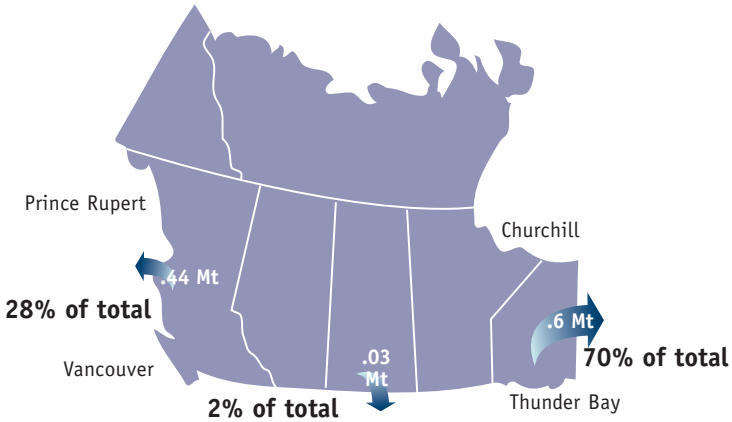
Year	Westbound	Southbound	Eastbound	Total
2000	1.00	0.02	0.80	1.82
2004	1.00	0.05	0.54	1.59
2005	1.20	0.02	0.50	1.72
2006	1.20	0.02	0.60	1.82
2007	1.25	0.02	0.60	1.87
2008	1.25	0.03	0.60	1.88
2009	1.30	0.03	0.62	1.95
2010	1.30	0.03	0.63	1.96
2015	1.40	0.03	0.65	2.08
AAGR 2004-2015				
	3.1%	-4.5%	1.7%	2.5%

FORECAST: OATS SHIPPED FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	0.05	0.95	0.83	1.83
2004	negligible	0.52	0.58	1.10
2005	negligible	0.70	0.50	1.20
2006	negligible	0.80	0.50	1.30
2007	negligible	0.90	0.50	1.40
2008	negligible	0.95	0.50	1.45
2009	negligible	1.00	0.50	1.50
2010	negligible	1.05	0.50	1.55
2015	negligible	1.15	0.50	1.65
AAGR 2004-2015				
	n/a	7.5%	-1.3%	3.8%

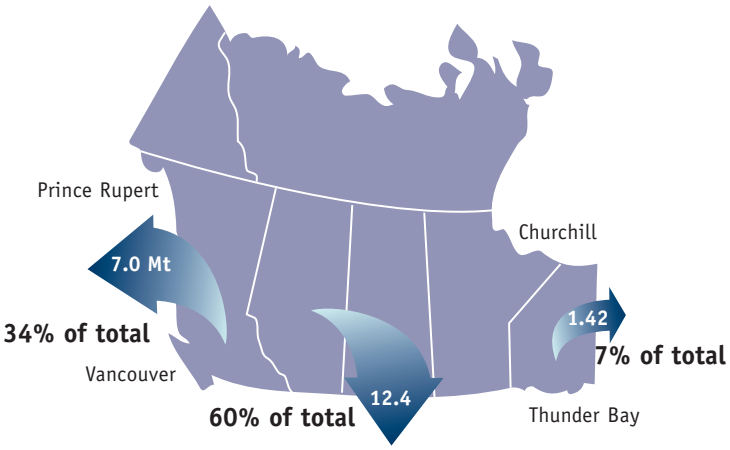
FORECAST: OTHER GRAINS + SPECIAL CROPS [LENTILS,SOYBEAN,FLAX] SHIPPED FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	0.41	0.10	0.91	1.42
2004	0.46	0.09	0.62	1.14
2005	0.44	0.07	0.74	1.24
2006	0.44	0.02	1.04	1.49
2007	0.44	0.02	1.05	1.50
2008	0.44	0.02	1.05	1.50
2009	0.44	0.03	1.06	1.52
2010	0.44	0.03	1.06	1.52
2015	0.44	0.03	1.09	1.55
AAGR 2015/04				
	-0.4%	-9.5%	5.2%	2.6%

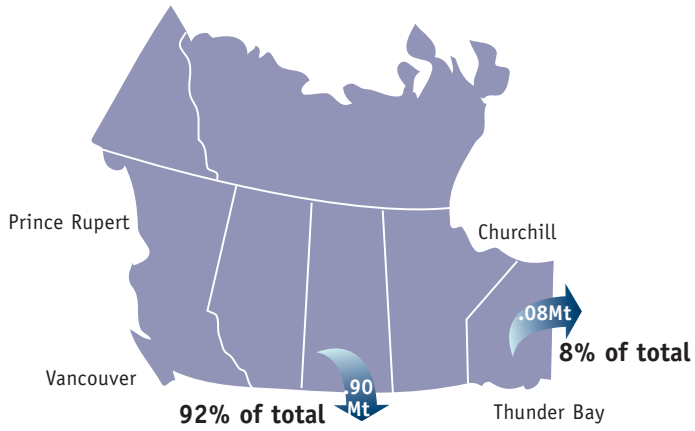
Appendix NUMBER SEVEN

POTASH FROM WESTERN CANADA 2015



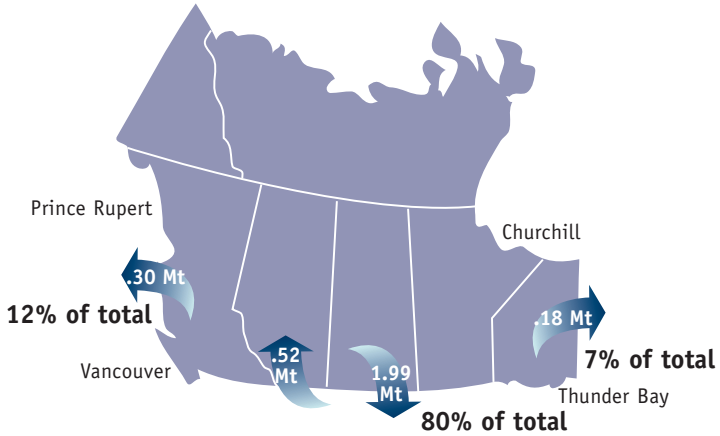
Year	Westbound	Southbound	Eastbound	Total
2000	3.88	9.11	1.48	14.47
2004	5.91	9.32	1.35	16.58
2005	6.05	9.62	1.28	16.95
2006	6.00	10.26	1.37	17.63
2007	6.30	11.12	1.38	18.80
2008	6.30	11.88	1.39	19.57
2009	6.80	12.04	1.41	20.25
2010	7.00	12.20	1.42	20.62
2015	7.00	12.40	1.42	20.82
AAGR 2004-2015				
	1.6%	2.6%	0.5%	2.1%

ANYHDROUS AMMONIA FROM WESTERN CANADA 2015



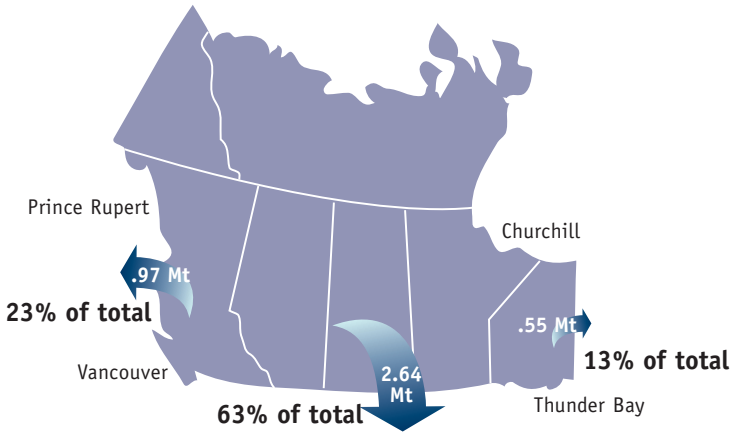
Year	Westbound	Southbound	Eastbound	Total
2000	nil	0.69	0.09	0.79
2004	nil	0.87	0.10	0.97
2005	nil	0.82	0.08	0.90
2006	nil	0.89	0.08	0.97
2007	nil	0.90	0.08	0.97
2008	nil	0.90	0.08	0.98
2009	nil	0.90	0.08	0.98
2010	nil	0.90	0.08	0.98
2015	nil	0.90	0.08	0.98
AAGR 2004-2015				
		0.4%	-2.2%	0.1%

OTHER FERTILIZERS FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	.30	1.92	0.32	2.53
2004	.30	1.91	0.21	0.36
2005	.30	1.94	0.18	2.42
2006	.30	1.96	0.18	2.44
2007	.30	1.99	0.18	2.47
2008	.30	1.99	0.18	2.47
2009	.30	1.99	0.18	2.47
2010	.30	1.99	0.18	2.47
2015	.30	1.99	0.18	2.47
AAGR 2004-2015				
	0%	0.4%	-1.4%	0.2%

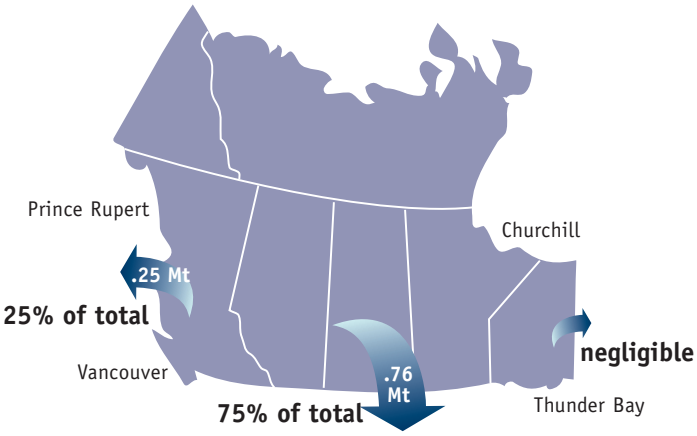
FORECAST: PETROCHEMICALS SHIPPED FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound*	Total
2004	1.45	2.21	0.57	4.23
2005	1.56	2.11	0.54	4.21
2006	1.57	2.36	0.55	4.48
2007	1.51	2.64	0.55	4.70
2008	1.31	2.66	0.55	4.52
2009	1.15	2.62	0.55	4.32
2010	0.97	2.64	0.55	4.16
2015	0.97	2.64	0.55	4.16
AAGR 2004-2015				
	-3.6%	1.6%	-0.4%	-0.2%

* incomplete

FORECAST: INORGANIC CHEMICALS SHIPPED FROM WESTERN CANADA 2015



Year	Westbound	Southbound	Eastbound	Total
2000	0.19	0.72	neg.	0.92
2004	0.19	0.67	neg.	0.87
2005	0.21	0.65	neg.	0.86
2006	0.25	0.76	neg.	1.01
2007	0.25	0.76	neg.	1.01
2008	0.25	0.76	neg.	1.01
2009	0.25	0.76	neg.	1.01
2010	0.25	0.76	neg.	1.01
2015	0.25	0.76	neg.	1.01
AAGR 2004-2015				
	2.3%	0.5%	-0.4%	0.9%

PETROCHEMICALS - diethylene glycol, ethylene dichloride, ethylene glycol, polyethylene, and stryrene monomer

INORGANIC CHEMICALS - chlorine, sodium hydroxide, sodium chlorate

Appendix NUMBER NINE

OTHER COMMODITIES

■ Crude Oil

In 2004, Western Canada exported about 75Mt of crude oil. Production of crude oil in Western Canada will continue to be dominated by production out of northern Alberta's oil sands, which is already responsible for more than half of that provinces total crude oil production. With over $C 100 billion in new investments over the next decade (planned and underway), the region is poised to provide almost all of Canada's new crude oil. However, much of these investment proposals are contingent on continued strength in world prices. Nearly all crude oil exports are destined for the U.S. – Canada is the largest supplier of crude oil to the U.S.

■ Natural Gas

Alberta is the largest producer of natural gas in Canada, followed by northern British Columbia. Canada is the third largest producer of natural gas in the world. Natural gas production from the Western Canada Sedimentary Basin is declining slightly as a result of the basin's maturity. New pools have been more difficult and costly to find, and most of the new gas is deep gas found on the eastern slopes of the Rockies. Huge amounts of coalbed methane (CBM) gas have been identified, but it is difficult to extract. Some companies are currently researching and testing CBM extraction techniques in hopes that Western Canada's CBM deposits will soon be commercially viable.

Northern gas from the Canadian arctic will eventually bring vast amounts of new gas into the North American market. However, the gas is currently "trapped" without a pipeline – all natural gas is currently transported through pipelines. The proposed Mackenzie Valley Pipeline is currently in regulatory hearings, and will take several years before it is built and operating.

■ Uranium

Saskatchewan is the world's largest uranium producer, accounting for about 30% of total global production. About 80% of the 11,580 tonnes mined in Saskatchewan in 2005 was exported.

Nuclear power (which uses enriched uranium as a feedstock) had fallen out of favour after the near accident in the US (Three Mile Island) and the Chernobyl disaster in the 1980s. However, nuclear power is experiencing a bit of a renaissance and the world's attention is once again turning towards nuclear power as a means of generating low-cost, clean energy. Several countries and jurisdictions (including Ontario) have announced plans for new reactors.

There may be additional upward demand if opinion strengthens that nuclear energy is one of the most effective ways to lower greenhouse gas emissions.

■ Base Metals

Western Canada's base metal production is concentrated in northern Manitoba, in the interior of British Columbia, at Kitimat, BC (for aluminum smelting), and to a small extent in northern Saskatchewan. New exploration and development for base metal mines has increased lately, reacting to more business-friendly regulations and tax incentives in BC and Manitoba. Future

mining and smelting activity will continue to be correlated very closely with movements in global prices. In the short- and medium-term, activity will continue to be fairly positive.

Base metal production and exports is very small when compared to the commodities discussed in the report.

Copper has often been regarded as a good bellwether commodity by which to gage economic vitality because it is so closely linked with overall industrial, construction, and consumer demand.

Nickel prices have shown dramatic increases over the past few years, rising from an annual average of $US 2.71/lb on the LME in 2001 to an average of $US 6.64/lb in January 2006.As nickel prices have escalated, industrial users have been switching to other nickel substitutes in stainless steel alloys; this has also acted to balance the tight supply and limit price increases.

Zinc, used primarily for corrosion-resistant plating for steel, prices have risen most dramatically in the last two years, shooting up from an annual average of $US 0.376 in 2003 to an average of $US 0.948 in January 2006. Strong demand and limited supply (particularly because of a drop in production at a plant in China and a labour disruption in Peru) have been credited for the steep price hike.

Aluminum is produced at tidewater in Kitimat, BC. Softer demand by the US automotive sector—an important market for aluminum—has been offset by rising demand in China.

Base metal prices in general are expected to soften somewhat in the coming years as demand in the US is moderating and global production is increasing (including in Canada); this will bring supply and demand fundamentals closer into balance.

However, perhaps unlike other cycles of rising-and-falling prices for base metals, this cycle will be marked by strong and rising demand from China—a factor that was not present in previous cyclical price downturns. This should cause the coming downward price correction to be fairly moderate.

2004 Western Canada Base Metal Exports

[thousand tonnes]

Copper	165
Nickel	60
Zinc	319
Aluminum	277

Appendix NUMBER TEN

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