The Economic Role of the Gateway Transportation System in the Greater Vancouver Region

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This report presents the findings of a study that examined the importance of the Gateway Transportation System to the economy of the Greater Vancouver region. Funding for the study was provided by Transport Canada through a grant to the Greater Vancouver Gateway Council[1]. The president of the Gateway Council, Bob Wilds, provided helpful guidance throughout the course of the study. The study was conducted by Glen Weisbrod and Tyler Comings of Economic Development Research Group. Any errors or omissions in the data collection, analysis, or interpretation of the study findings are solely the responsibility of the consultant.

[1] The opinions expressed in this study are those of the authors, not of the Government of Canada.

EXECUTIVE SUMMARY

The Economic Role of the Gateway Transportation System in the Greater Vancouver Region

Prepared for Greater Vancouver Gateway Council under funding provided by Transport Canada[2]
By Economic Development Research Group, September 2008

Overview

This study provides an analysis of the economic role of the Greater Vancouver Gateway Transportation System in light of recent changes in the regional economy and international trade. It is an update of a previous study completed for the Greater Vancouver Gateway Council in 2003. A summary of its findings are shown below, corresponding to pertinent chapters in the report.

Key Findings

- The Gateway Transportation System encompasses the marine ports, airport, rail, trucking and related activities that serve international trade and tourism in the Greater Vancouver region.
- The Gateway Transportation System directly contributes 82,000 jobs and over $6.5 billion in GDP annually to the regional economy. This was a 9% increase in direct job impact and a 29% increase in direct GDP impact (after adjusting for inflation) from the previous study.
- When including jobs supported by supplier orders and worker spending generated by the Gateway Transportation System, the total impact is over 157,000 jobs which represents 1 in 7 jobs in the region.
- International trade, and hence the importance of the Gateway Transportation System, is growing. The greatest growth has occurred at the marine ports. For instance, tonnage at Port of Vancouver has increased by 32% and container tonnage at Vancouver and Fraser has increased by 60% over the 2002 to 2007 period.

Chapter 2: *The Importance of Trade in Greater Vancouver*

- The value of BC international exports increased from $30 billion to $32 billion from 2002 to 2007; however, when adjusted for inflation, these values are similar.
- The mix of exports is changing—wood products have decreased while minerals have increased.

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- Manufacturing jobs frequently follow export trends—jobs in wood products decreased while those involved in minerals and metals increased.
- Jobs in transportation and warehousing (which support trade activity) grew 12% from 2002 to 2007—the region has 27% higher concentration in these jobs relative to Canada.

Chapter 3: *Performance of the Gateway Transportation Sector*

- Vancouver's seaport handled more than 80 million tonnes of cargo in 2007, an increase of 32% over 2002. Among the river ports, tonnage increased by 7% at Fraser and decreased by 37% at North Fraser.
- A 60% increase in container activity from 2002 to 2007 resulted from increased trade with Asia and containerization of goods previously found in bulk or breakbulk form.
- Vancouver International Airport remains the second busiest airport in Canada in terms of both cargo and passengers. While total tonnage decreased slightly, the value of international cargo increased by 25% from 2002 to 2007.
- Air passenger travel increased by 18% in the same period—mainly due to demand from domestic and European travelers.
- Rail tonnage in BC increased by 23% from 2001 to 2006, yet trade value decreased slightly. These trends reflected more cross-border trade in heavy metals (i.e. ores) and less with motor vehicles and wood products.
- Cross-border trucking activity has also decreased in terms of value. However, trucking jobs have grown significantly indicating increased demand within BC and the rest of Canada.

Chapter 4: *Economic Impacts of the Gateway Transportation System*

- The direct role of the Gateway Transportation System has increased by all measures since the last study for marine, air, and truck related activities (with the exception of a slight decrease in rail employment).
- More than half of the total impacts on the region occur outside Vancouver and Richmond, which represent the nexuses of transportation activity.
- This activity generates $428 million in annual property tax revenue for the region. Annual sales and income tax impacts include $934 million to the provincial government and $1.7 billion to the federal government.
- A small sample of facilities and related companies on the Gateway network contributed over $4 million in community investments in 2006 and 2007.
- Gateway businesses generate an estimated $1.8 billion in capital investment annually in BC.

1 INTRODUCTION

Objective

The objective of this new study is to measure the economic role of the Gateway Transportation System in supporting jobs and income to the Greater Vancouver region. Information on the setting for the transportation system and its economic consequences is provided in three subsequent sections in order to view the Gateway activity through several perspectives:

- **The Importance of Trade in Greater Vancouver** (Chapter 2). Recent trade trends are analyzed with a focus of their effect on employment.

- **The Performance of the Gateway Transportation Sector** (Chapter 3). Each mode is closely examined through changes in activity in recent years.

- **The Economic Impacts of the Gateway Transportation System** (Chapter 4). This is described in terms of direct economic role, broader economic impacts, fiscal impacts, and community investments made by Gateway-related businesses.

The facilities examined in the study include:

- **Port Metro Vancouver**--the newly consolidated marine ports of Vancouver, Fraser and North Fraser
- **Vancouver International Airport**
- **Trucking and rail facilities in the Greater Vancouver Region**

The report updates a prior study conducted in 2003 for the Greater Vancouver Gateway Council that addressed two topics: 1) the economic role of the Gateway Transportation System in Greater Vancouver and 2) the economic impact of investments in the regional transportation system. This report represents an update of the first part of that study. Results are provided (when available) for 2002 and 2007 in order to provide an extension of previous study results as well as a comparison of the economic importance of the Gateway Transportation System in the past and present. It is anticipated that the second part of the previous study (involving transportation investments) will be updated when new travel demand models and financial resources become available.

Study Perspective

All modes of transportation are particularly critical for the Greater Vancouver region given its role as an international gateway for freight and passengers. The increasing globalization has led to a heavier reliance on logistics for goods moving in and out of the region. While the marine ports and airport are the key elements for trade; rail and trucking services are also necessary for movements between ports, producers and consumers. Smooth movement of goods from origin to destination and between modes is critical to the success of the Gateway Transportation System. Therefore, marine, rail, air and trucking modes must work in concert to assure that there is effective functioning of the network.

This study develops the economic impacts of each mode separately while also including corresponding support activities such as warehousing and freight forwarding. These impacts are derived from Gateway activity only; they do not include other activities that happen to be located at ports in the region (e.g. restaurants) or those activities associated solely with local deliveries.

Methodology

This study compiled data from many sources and applied a series of economic models to provide new estimates of the impact of transportation related to the Greater Vancouver Gateway on the region. These estimates reflect changes within the last five years in marine port, airport and freight activities. These results also show additional details not contained in the prior study including impacts by municipality, tax impacts, and community investments.

The process consisted of the following steps (see Appendix for further description):

- **Initial Data Assembly** – information was collected on the following: regional and municipal employment (Statistics Canada Labour Force Survey, 2006 Census and Dun and Bradstreet), income and GDP (BC Stats), longshoremen work-hours (BC Maritime Employers Association), imports and exports (Statistics Canada International Trade Division), trade activity for each mode (*Marine* - Ports of Vancouver, Fraser and North Fraser; *Air* - Vancouver International Airport; *Rail* – Statistics Canada; *Truck* - US Bureau of Transportation Statistics, Statistics Canada)
- **Trends Analysis** – the initial data collection was analyzed to generate recent trends in trade and employment involving Gateway activity. The analysis reconciled the trends in trade activity with related industry jobs in the region. Also, each mode's performance was interpreted in light of changes in the global economy.

- **Calculation of Economic Impacts** – trends in trade and employment involving Gateway activity, along with results from previous economic impact studies, were evaluated to represent *direct impacts* on the region in terms of jobs, income, GDP and output. These impacts were then analyzed using an economic model developed by the consultant that used input-output multipliers from Statistics Canada and BC Stats to estimate the *total economic impacts* of the Gateway Transportation System. These results were also compared to those of the previous study in order to capture the changing role of the Gateway in the region.
- **Calculation of Fiscal Impacts and Community Investment** - data on tax collections were assembled from BC Stats and Statistics Canada. This information, along with the economic impact results, was used to estimate tax revenue impacts of the Gateway Transportation System in terms of sales, income and property taxes at the federal, provincial and municipal levels (where applicable). Data on community investments from Gateway-related facilities was provided by the Greater Vancouver Gateway Council. Estimates for all community contributions and capital investment were made using data from Statistics Canada.

2 THE IMPORTANCE OF TRADE IN GREATER VANCOUVER

Overview

Trade is a key element of the economy of Greater Vancouver. The Gateway provides access for consumers and producers to global markets and its accompanying transportation system is responsible for movements going through the region and distribution in the local area. Jobs are needed for support of these movements along the transportation system but are also supported by production of export goods. Therefore, the composition and amount of trade activity in the region is inextricably connected to trends in employment. The Gateway also provides a critical linkage to other parts of BC, Canada and the US. Businesses and consumers in other cities and more remote areas rely on the Gateway Transportation System for access to key markets abroad. Therefore, these activities generate employment throughout Canada and the US; though this study focuses on impacts within BC.

Dependence on International Trade

The marine ports and airport of Greater Vancouver provide a vital link for trade between Asia and North America and also facilitate trade within Canada and the US. Imports coming through the Gateway Transportation System are needed for consumption and as inputs for production. Export businesses rely heavily on the Gateway for efficient movement of their goods; this provides a crucial component of the economy of BC and Greater Vancouver.

Export Base in BC

As seen in Table 2.1, BC exported over $32 billion in goods in 2007, ranking fourth in export dollars among provinces (behind Ontario, Alberta and Quebec). The primary exports in BC continued to be natural resource based goods which are in abundance in the province. In recent years, two of the top exports--wood and paper products--have dwindled in value due, in part, to increased competition from Asia and South America. There has also been a pine beetle epidemic that has drastically affected the forestry industry. However, there have been significant gains in the value of metals being exported including: ores, aluminum, and zinc. The rapid volume changes in many commodities' activities, coupled with the

relatively stagnant growth in total dollar value of exports[3], suggest an ever-changing mix requiring producers and transportation workers to continually adapt. These trends are no doubt driven by global competition, consumer tastes, and changes in technology, among others.

Table 2.1: Exports from BC, 2002 – 2007 ($CAD millions)

Commodity	2002	2007	% change	% change adj. for inflation
Wood	8,956	6,954	-22%	-28%
Petroleum and Minerals	3,714	5,952	60%	49%
Pulp	2,852	3,423	20%	12%
Industrial Machinery	1,313	1,742	33%	23%
Paper	2,223	1,698	-24%	-29%
Ores	579	1,689	192%	171%
Aluminum	606	1,012	67%	55%
Electric Machinery	947	975	3%	-4%
Seafood	994	882	-11%	-18%
Zinc	321	757	136%	119%
Plastics	510	487	-4%	-11%
Motor Vehicles	859	351	-59%	-62%
Instruments	469	416	-11%	-18%
Furniture	506	362	-28%	-34%
Iron & Steel Products	425	355	-16%	-22%
Subtotal Top 15	**25,273**	**27,057**	**7%**	**-1%**
Other Exports	4,795	5,059	6%	-2%
Total	**30,067**	**32,116**	**7%**	**-1%**

Source: Statistics Canada International Trade Division, values adjusted based on Industrial Price Index from Statistics Canada.

Export Base in Other Western Provinces

The reliance on export goods differs when looking at Canada and the other Western provinces—Alberta, Saskatchewan and Manitoba. It is important to note that all of these provinces rely primarily on the Pacific Gateway for access to overseas markets and the consolidated Port Metro Vancouver (including Fraser and North Fraser Ports) is the dominant port on the Pacific Coast in Canada[4]. As these Western provinces are geographically landlocked (with the exception of Manitoba[5]), they are heavily reliant on transportation in and out of Greater Vancouver.

[3] The actual dollar amount increased by 7%, however this is -1% when adjusted for inflation.

[4] The Port of Prince Rupert recently opened up to container ships in October 2007. However, its activity level is still significantly lower than the ports in Vancouver—10 mil. tonnes were moved at Prince Rupert compared to nearly 130 mil. in Vancouver in 2007.

[5] There is a marine port in Churchill, Manitoba that serves shipping routes through the Arctic.

The export goods from these other western provinces are also mainly in natural resources, as seen in Table 2.2. However, their top ten exports have all seen increases in the past five years whereas several of the top exports from BC decreased in activity. Petroleum and mineral products are the top export by value for these provinces. Since the majority of these goods must move through BC for export, the positive gains are indicative of further pressure on the Gateway Transportation System to expedite their movement.

Table 2.2: Exports from Alberta, Saskatchewan, and Manitoba, 2002 – 2007 ($CAD millions)

Commodity	2002	2007	% change	% change adj. for inflation
Petroleum and Minerals	34,512	63,126	83%	70%
Cereals	3,540	5,650	60%	48%
Industrial Machinery	2,855	4,876	71%	59%
Plastics	1,672	3,793	127%	111%
Fertilizers	2,878	3,672	28%	19%
Oil Seeds	1,592	3,086	94%	80%
Nickel	622	2,787	348%	316%
Organic Chemicals	1,711	2,719	59%	48%
Inorganic Chemicals	662	1,954	195%	174%
Animals	1,708	1,851	8%	1%
Meat	2,523	1,769	-30%	-35%
Electric Machinery	2,478	1,448	-42%	-46%
Pulp	1,558	1,419	-9%	-15%
Iron & Steel Products	543	1,369	152%	134%
Vegetables	640	1,283	101%	86%
Subtotal Top 15	**59,494**	**100,803**	**69%**	**57%**
Other Exports	10,905	12,654	16%	8%
Total	**70,399**	**113,457**	**61%**	**50%**

Source: Statistics Canada International Trade Division, values adjusted based on Industrial Price Index from Statistics Canada.

Export Base in Canada

Canada has had steady growth in exports in the past five years. Table 2.3 shows the top exports for Canada including minerals, motor vehicles, industrial machinery, and electric machinery. The minerals, as seen above, are mostly attributed to Western Canada. The latter three goods are more concentrated in Central and Atlantic Canada which depend less on natural resources than BC. These types of goods rely more on eastern ports (e.g. Montreal).

Table 2.3 Exports from Canada, 2002 – 2007 ($CAD millions)

Commodity	2002	2007	% change	% change adj. for inflation
Petroleum and Minerals	50,035	92,208	84%	71%
Motor Vehicles	85,718	68,448	-20%	-26%
Industrial Machinery	33,493	35,920	7%	0%
Electric Machinery	19,109	20,392	7%	-1%
Wood	19,004	13,518	-29%	-34%
Plastics	12,096	13,466	11%	3%
Paper	17,172	12,891	-25%	-30%
Aluminum	8,415	12,214	45%	35%
Aircraft	11,644	10,810	-7%	-14%
Nickel	2,371	10,353	337%	306%
Precious Stones	4,759	9,906	108%	93%
Pulp	7,116	7,315	3%	-4%
Furniture	8,561	6,663	-22%	-28%
Iron And Steel	4,414	6,563	49%	38%
Pharmaceutical Products	2,373	6,552	176%	156%
Subtotal Top 15	**286,279**	**327,220**	**14%**	**6%**
Other Exports	110,103	121,345	10%	2%
Total	**396,381**	**448,565**	**13%**	**5%**

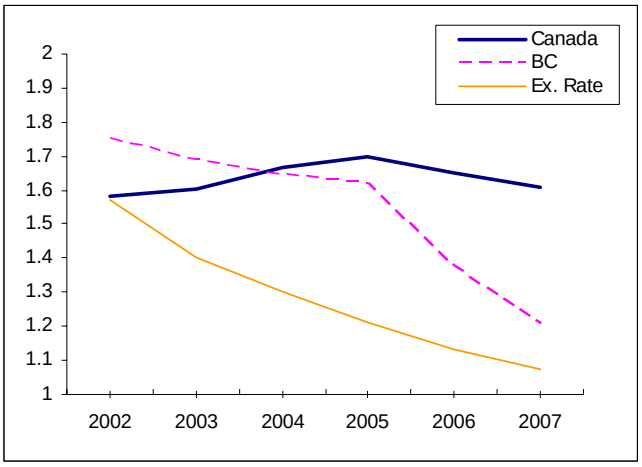
Source: Statistics Canada International Trade Division, values adjusted based on Industrial Price Index from Statistics Canada.

Trends Affecting BC Export Growth

Canada has recently experienced a sharp appreciation in its currency against the U.S, dollar and the yen, among others, causing Canadian exports to become more expensive to other countries. This has specifically hurt BC's top exports which are more vulnerable to relative price changes since many of them are commodities. However, foreign demand is also important in swaying export activity. For instance, Canada's dollar has also appreciated against the Chinese yuan, yet export value to China has increased dramatically--largely as a result of China's increased demand for wood and pulp products.

As seen below in Figure 2.1, the ratio of export value to import value in trade with the US has fallen in BC along with the appreciation of the Canadian dollar. Despite the upsurge in the Canadian dollar, trade between the US and the province is still dominated by exports. Canada as a whole has been less affected than BC by the exchange rate. However, this is most likely due to the increase in oil prices (petroleum export value increased by 84%, as seen above in Table 2.3).

Figure 2.1: Ratio of Exports to Imports (Canada to/from US) and Exchange Rate ($CAD/$US)



Source: Bank of Canada, Statistics Canada International Trade Division, calculations by EDR Group

Table 2.4 shows industries with the highest share of Canadian exports coming out of the province. Almost all of the industries shown here are based on extraction of natural resources. These goods are more susceptible to changes in the exchange rate due to encroaching global competition. Lower production costs in other parts of the world make it difficult to compete on the price of these types of goods. However, export goods are also subject to consumer tastes, natural supply shocks, and foreign demand; all of which may allow their industries to flourish. Ultimately, these factors affect the rate of growth in demand for, and activity at, the Gateway transportation facilities in the Greater Vancouver region.

Table 2.4: Highest Share of Canadian Exports from BC, 2007 (by value)

Commodity	% of Canadian Exports
Wood	51%
Pulp	47%
Fruit & Nuts	44%
Zinc	34%
Ores	33%
Lead	27%
Seafood	25%
Plants	24%
Umbrellas	21%
Coffee, Tea & Spices	17%
All Exports	**7%**

Source: Statistics Canada International Trade Division

Businesses located within BC generate 7% of all exports from Canada. However, it provides a significant share of goods that are critical to the country's economy. The region also is a critical linkage for trade with Asia. The growth in trade activity makes the connections involved all the more important for the region. The economy of Greater Vancouver, therefore, continues to adapt to trade trends in order to provide a solid, diverse foundation for trade to grow.

Employment Trends in Greater Vancouver

Greater Vancouver has over 1.2 million jobs representing 54% of employment in BC. As seen in Table 2.5, there has been significant job growth in the region—14% since 2002. Almost all service industries have gained employment while manufacturing jobs have increased slightly in aggregate. However, manufacturing jobs have changed more dramatically in composition, exhibiting sharp increases and decreases in jobs amongst its industries in a short period. This volatility is driven by many factors including technological change, domestic and foreign demand, and global competition. Comparing trends in export activity in BC (Table 2.1) to related jobs in Greater Vancouver shows similarities in trends for some of the major export industries. Examples of similar trends in export and job growth include: wood and paper (negative growth) and minerals and metals (positive growth).

Table 2.5: Greater Vancouver Region Employment Trends, 2002-2007 (thousands)

Industry	2002	2007	2002 (% of total)	2007 (% of total)	% job growth
All Industries	1,072	1,222	100%	100%	14%
Goods-Producing Sector	180.4	226.3	16.8%	18.5%	25%
Agriculture	8.9	8.9	0.8%	0.7%	0%
Forestry, Fishing, Mining, Oil and Gas	3.8	8	0.4%	0.7%	111%
Utilities	5	5.5	0.5%	0.4%	10%
Construction	58.6	93.6	5.5%	7.7%	60%
Manufacturing	104.2	110.3	9.7%	9.0%	6%
Food, Beverage and Tobacco	17.8	18.3	1.7%	1.5%	3%
Textile Mills & Products	3	0	0.3%	0.0%	-100%
Clothing, Leather & Allied Products	5.1	6.9	0.5%	0.6%	35%
Wood Products	8.5	7.6	0.8%	0.6%	-11%
Paper	5.5	4.4	0.5%	0.4%	-20%
Printing and Related Support Activities	6.5	4.8	0.6%	0.4%	-26%
Petroleum & Coal	0	0	0.0%	0.0%	N/A
Chemical	5	4.4	0.5%	0.4%	-12%
Plastics & Rubber	4.2	6.4	0.4%	0.5%	52%
Non-Metallic Minerals	3	4.8	0.3%	0.4%	60%
Primary Metal	1.7	2.4	0.2%	0.2%	41%
Fabricated Metal	7.9	9.9	0.7%	0.8%	25%
Machinery	7.1	6.7	0.7%	0.5%	-6%
Computer & Electronics	8.2	5.7	0.8%	0.5%	-30%
Electrical Equipment	2.7	2.3	0.3%	0.2%	-15%
Transportation Equipment	6.2	6.9	0.6%	0.6%	11%
Furniture	5.4	6.5	0.5%	0.5%	20%
Miscellaneous Manufacturing	6.5	10.3	0.6%	0.8%	58%
Service-Producing Sector	891.7	996.5	83.2%	81.5%	12%
Trade	175.8	191.4	16.4%	15.7%	9%
Wholesale Trade	48.4	51.7	4.5%	4.2%	7%
Retail Trade	127.5	139.7	11.9%	11.4%	10%
Transportation and Warehousing	67.8	75.7	6.3%	6.2%	12%
Transportation	63.9	70.1	6.0%	5.7%	10%
Air Transportation	10.6	10.5	1.0%	0.9%	-1%
Truck Transportation	13.7	17.8	1.3%	1.5%	30%
Transit and Sightseeing Transportation	24.4	27.3	2.3%	2.2%	12%
Postal and Courier Services	9.5	10.4	0.9%	0.9%	9%
Marine, Rail, Other Trans. and Storage	9.6	9.8	0.9%	0.8%	2%
Finance, Insurance, Real Estate and Leasing	81.3	90.4	7.6%	7.4%	11%
Professional, Scientific and Services	96.2	114.8	9.0%	9.4%	19%
Business, Building and Other Support	40.6	56	3.8%	4.6%	38%
Educational Services	78.3	90	7.3%	7.4%	15%
Health Care and Social Assistance	110.1	117.2	10.3%	9.6%	6%
Information, Culture and Recreation	68.3	78	6.4%	6.4%	14%
Accommodation and Food Services	80.2	89.8	7.5%	7.3%	12%
Other Services	51.1	48.4	4.8%	4.0%	-5%
Public Administration	41.9	44.8	3.9%	3.7%	7%

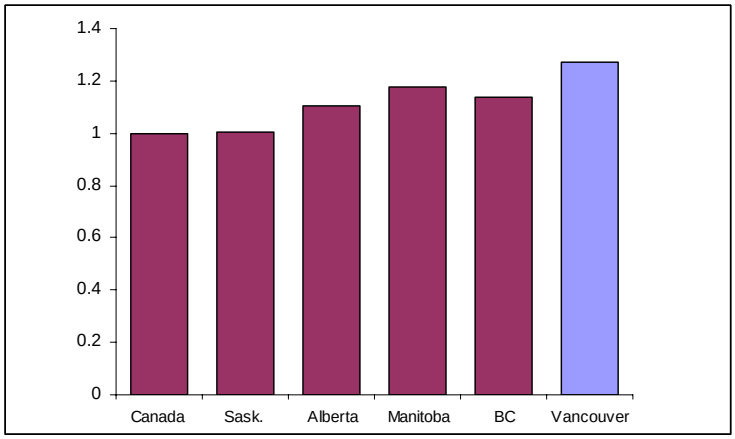
Source: Statistics Canada, Labour Force Survey

Employment Related to Transportation

There has also been significant growth in jobs supporting international trade activity—wholesale trade, transportation and warehousing. Jobs in the transportation and warehousing sector have increased by 12% since 2002. The largest increase in this sector comes from truck transportation which has jumped 30%. This is caused by an increasing amount of goods being moved by truck. The 2007 employment shown above differs from the estimates of direct employment in marine, air, rail and truck transportation derived in Chapter 4. This discrepancy occurs because the estimates found later in this study include supporting activities involved in each mode whereas the employment figures in Table 2.5 are only those employed in that specific industry. However, these trends of employment growth in Greater Vancouver were taken into account in the direct impact estimates.

The transportation sector continues to be more highly-concentrated in BC than in Canada. In the Figure 2.2 below, a value higher than one represents a higher concentration of jobs than in the rest of Canada. The comparison remains similar to the results from 2002— BC is ahead of Alberta and Saskatchewan but behind Manitoba in terms of transportation concentration. Not surprisingly, Greater Vancouver is more highly-concentrated in this sector than any of the Western provinces or Canada; it has a 27% higher concentration in transportation jobs than the Canadian average. This is further indication that the region is a nexus of trade activity.

Figure 2.2: Relative Concentration of Employment in Transportation and Warehousing in 2007, Relative to Canada



Source: Statistics Canada, Labour Force Survey

Transportation is a crucial element of the economy of Greater Vancouver. The sector continues to grow steadily in employment in the region. However, it also serves as the foundation for trade of commodities produced in the region. Therefore business in the region is dependent on the performance of the

transportation sector for timely delivery and efficiency. Conversely, transportation performance is also affected by changes in global commodity trends. Hence, there is a need for recognition of this interdependence and careful coordination of transportation investment and economic development.

3 PERFORMANCE OF THE GATEWAY TRANSPORTATION SECTOR

Overview

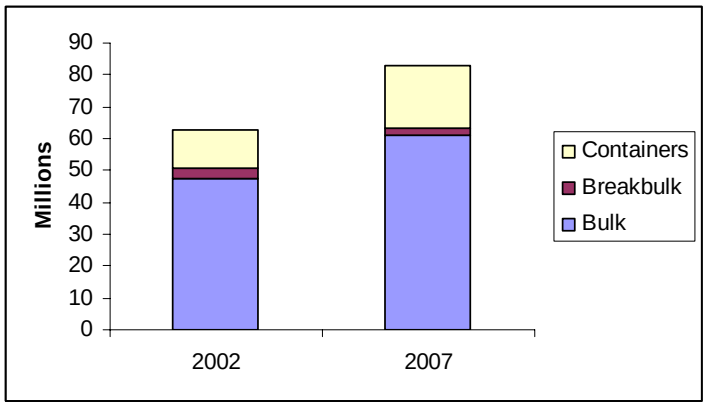
The Greater Vancouver region provides a large market for consumption of imports, generates a diverse set of commodities as exports, and provides a conduit for trade between other parts of North America and Asia. The Gateway Transportation System facilitates both transient goods from outside areas and distribution within Greater Vancouver. These movements require the use of all modes of transportation: water, rail, air, and road. It is important for each mode to run efficiently but also for them to work together to expedite trade within and outside the region.

In estimating the direct employment attributed to each mode of transportation it was necessary to take the changes in industry employment and freight activity into account. This section focuses on the activity of each mode in the Gateway Transportation System. Looking at the changes in each mode's performance and corresponding employment over time also gives an indication for changes in the dynamics of transportation in the region (see Appendix for further explanation).

Water Transportation

The Port of Vancouver is processing a continually growing level of international trade in the region. In 2007, it handled over 80 million tonnes of cargo, a 32% increase from 2002. The port has had a change in the composition of its cargo with large increases in bulk and container tonnage and a decrease in breakbulk tonnage. Figure 3.1 shows the breakdown of tonnage by type of cargo.

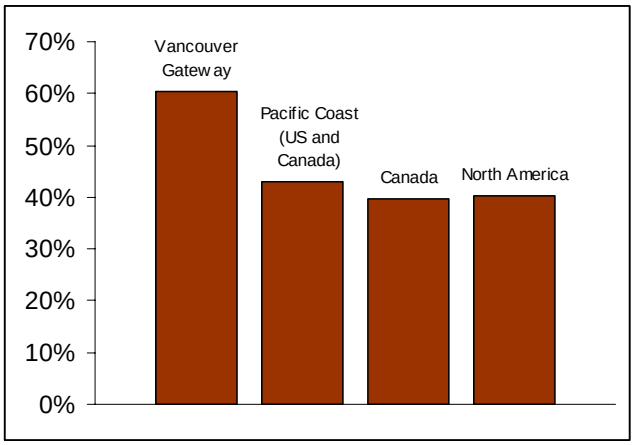
Figure 3.1: Cargo Composition at Port of Vancouver, 2002 and 2007



Source: Port of Vancouver

Both Fraser and North Fraser ports deal primarily with bulk cargo that moves domestically. From 2002 to 2007, tonnage in Fraser increased by 7% while decreasing by 37% at North Fraser as a direct result of being more dependent on logging. The Port of Vancouver continues to be the largest container port in Canada. Along with Fraser and North Fraser[6], the Gateway handled 54% of all containers in Canada—nearly 2.5 million TEU's (twenty-foot equivalent units). This represented an increase of 60% from 2002 to 2007. As seen in Figure 3.2, this change exceeded the percentage of increased activity for the Pacific Coast, Canada, and North America; this was primarily attributable to increased Asian trade and increased containerization of goods that were previously shipped in bulk or breakbulk form.

Figure 3.2: Growth in Container Traffic, 2002 – 2007
(% growth in TEU's)



Source: American Association of Port Authorities

[6] North Fraser port does not handle containers.

The upsurge in trade with Asia (especially China) has been to BC's advantage due to its shorter shipping route to Asia compared to most Pacific ports. The percentage of BC imports coming from China went from 13% in 2002 to 22% in 2007. This is mainly driven by demand for low-priced manufactured goods in Canada and the US. Maritime imports of apparel, industrial machinery, and iron and steel goods have more than doubled in value since 2002.

Exports to China of products originating in BC have more than doubled in value (adjusting for inflation) from 2002 to 2007—a majority of which consisted of pulp, wood products, and ores. In the same interval, exports to the top two destinations (US and Japan) from BC have decreased in value[7]. As previously mentioned, the drop in export value to these two countries is partially due to the appreciation of the Canadian dollar against the yen and US dollar. Issues like the exchange rate and repositioning of ships to Seattle from Vancouver have also affected the cruise industry in BC. The number of passengers served decreased by 15% from 2002 to 2007—this is not surprising given that much of this activity comes from US tourism.

Air Transportation

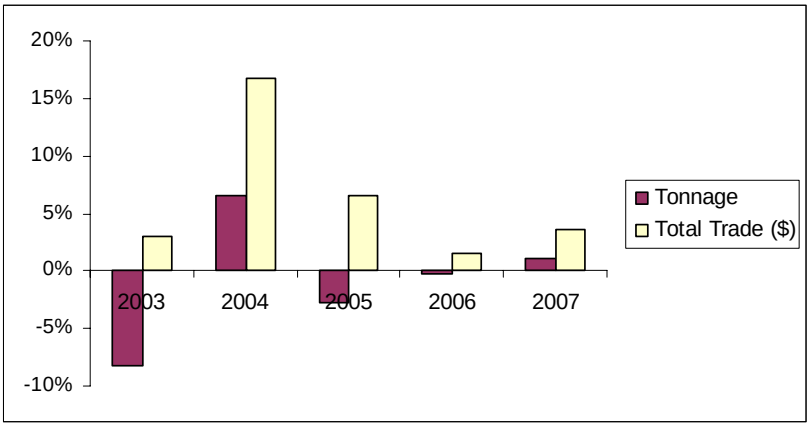
Vancouver International Airport is the second largest airport in Canada in terms of both cargo and passengers[8]. The size of operations and geographic location make the airport a critical link for trade abroad and also within North America. In 2007, the airport handled over 225,000 tonnes of cargo, a slight decrease from 235,000 tonnes in 2002. In terms of value, however, international trade by air has increased by 25% (adjusted for inflation) to over $5 billion in 2007[9]. Figure 3.3 shows the annual trends in air cargo tonnage and trade. The rate of growth of cargo value tends to be higher than growth in tonnage. This is indicative of the types of goods that are sent by air which are generally lighter and have higher value. Almost all of the top exports sent by air have seen robust growth in value including electrical machinery, industrial machinery, medical instruments, and seafood.

[7] Statistics Canada, International Trade Division.

[8] Statistics Canada – Catalogue no. 51-203-X – Air Carrier Traffic at Canada Airports

[9] Statistics Canada, International Trade Division, includes trade at all airports of which Vancouver International Airport is by far the largest.

Figure 3.3: Annual Percentage Change in Air Tonnage and Trade, 2002-2007 (% change in tonnage and value of trade)



Source: Vancouver International Airport and Statistics Canada, International Trade Division. Data for international trade is for all of BC and therefore includes goods traded at other small airports in the province.

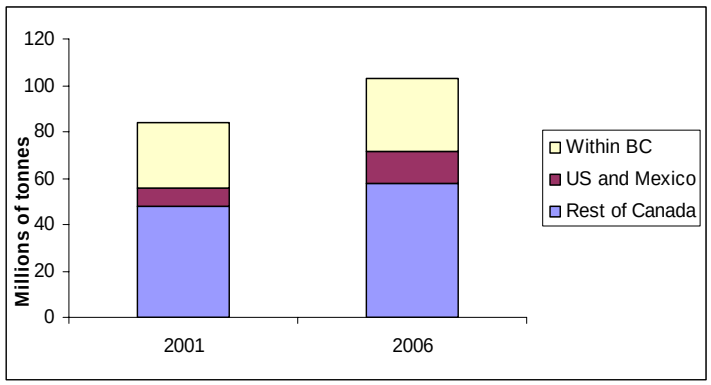
Greater Vancouver continues to be a major destination for business passengers and tourism. Demand for air travel to the region continues to grow. Vancouver International Airport handled nearly 17.5 million passengers in 2007, an increase of 18% from 2002. Passengers on European aircraft increased by 35% while domestic air passengers increased by 21%. There was slower growth in air passengers from US and Asia increasing by 13% and 3%, respectively[10]. The increase in air travel along with the decrease in cruise travel indicates that more people are visiting Vancouver from longer distances partly due to business trips.

Rail and Truck Transportation

The airport and seaports that serve the Gateway are nexuses of activity. However, they depend on rail and trucking for distribution and gathering of goods. Railroads and trucks facilitate ground movement needed in order for the ports to serve the ultimate shippers and receivers. These modes are also used extensively for trade within Canada and between the US. The increase in activity at the ports has resulted in more rail and truck movements throughout the region. As seen in Figure 3.4, rail tonnage originating or destined for BC increased by 23% from 2001 to 2006. Most of the activity continues to be involving the rest of Canada while there has been an increase in the share of rail freight between BC and the US and Mexico.

[10] Vancouver International Airport

Figure 3.4: Rail Freight Movement by Origin/Destination, 2001-2006 (millions of tonnes)



Source: Statistics Canada, Rail in Canada 2006

The value of international trade on rail in 2007 was over $7.5 billion, this represented a 6% decrease from 2002 to 2007 (adjusting for inflation). The top export by rail—wood products—has seen a large decrease in activity in recent years while other top exports have grown significantly including pulp, zinc and lead. These products are heavy, carried in bulk and therefore typical of those goods usually carried by rail. Motor vehicles, the top import by rail, have decreased dramatically (60%) in value while imports of iron, steel, and plastics continue to grow[11]. The changes in composition of goods moved by rail, most importantly the growth in heavy metals, helps to explain the increase in tonnage coupled with the decrease in value of goods moved internationally by rail.

The value of international trucking activity has decreased slightly since 2002. This comes from a 28% drop in export value with an 18% increase in imports—another indication of the effect of Canadian dollar appreciation. In 2007, an estimated 56% of the total truck activity in BC ($14 billion in value) passed through the Blaine, Washington border crossing[12]. However, the slight drop in cross-border activity--along with a large increase in trucking jobs in Greater Vancouver--indicate that there is greater demand for trucking for trade within BC and with other provinces in Canada.

This activity level of each mode shown in this chapter along with the trends outlined in Chapter 2 show that there is increasing demand for transportation of goods within and outside Greater Vancouver. In the next chapter, these results will inform the examination of the change in impacts on the economy.

[11] Statistics Canada, International Trade Division.
[12] Bureau of Transportation Statistics, TransBorder Freight Data

4 ECONOMIC IMPACTS OF THE GATEWAY TRANSPORTATION SYSTEM

Overview

This section provides estimations of the impacts resulting from activity for each mode in the Gateway Transportation System. First, the direct impacts for each mode were derived using information from the previous sections on employment trends and level of activity. However, it should be noted that these estimates do not include all transportation activity in the Greater Vancouver region. Certain activities such as transit and some local deliveries are not directly related to the Gateway. Since the Gateway Transportation System is integrated with the local economy it becomes difficult to disentangle those activities that are related and unrelated. Therefore, these represent the estimated stimulation on the economy created only by Gateway activity. This stimulation in turn generates spin-off activity which includes indirect (i.e. suppliers) and induced (i.e. worker spending) effects. When combined, these effects comprise the total economic impact of the Gateway. Finally, there is also a brief discussion on the charitable giving of a small number of facilities involved in the Gateway.

The results differ in the following ways from the previous study:

- Economic impacts are given for Greater Vancouver and BC (instead of BC only).
- Economic impacts by municipality within the region have been added, when available.
- Fiscal impacts (property, income, and sales) based on economic impacts have been added.
- The community investment made by Gateway-related facilities and employees is discussed (actual results are only available for a small sample of these businesses).

The changes in reporting provide more rigorous results for the Greater Vancouver region. The intention was to capture as fully as possible the role of the Gateway transportation in the region's economy. Results are also compared to those found in the previous study where applicable.

Direct Impacts

The direct economic impacts represent the contributions of each component of the Gateway Transportation System. The direct impact can also be expressed in terms of dollar concepts – i.e., the wages, GDP and output which are driven off of direct jobs. These measures allow for a multi-dimensional view of the Gateway Transportation System's impact on the economy. These dollar values do not reflect the value of cargo moved by each mode; rather they are taken from activities associated with movement of these goods. The value of impacts by mode, therefore, is not indicative of the shares of cargo carried by each mode.

Classification of Direct Jobs

It is important to note that these numbers include not only transportation industry jobs, but also jobs in closely-related industries such as warehousing, logistics, maintenance/repair and other services that form an integral part of the Gateway transportation system. However, they do not include transportation jobs associated with local deliveries that are unrelated to the Gateway functions. For these reasons, the employment numbers that are shown (by modal element of the Gateway Transportation System) are different from the numbers of jobs by industry group that are reported by Statistics Canada (as previously shown in Table 2.5).

It is also important to note that some elements of the Gateway Transportation System are complementary and overlapping among categories. For example, portions of the trucking and railroad industries directly serve marine port functions, and in that sense they can be counted as port-related jobs. However, some activities occurring at marine ports could also be viewed as railroad-related jobs. So while all of these different ways to characterize jobs can be valid in certain situations, this report takes the perspective that each element of the Gateway Transportation System (including marine, air, truck and rail modes) should be recognized separately.

Thus, this report takes a multi-modal perspective in documenting job impacts, rather than the viewpoint of a single mode or facility. In addition, it should be noted that the job numbers represent the number of people employed, not "person years" which are used in some other studies.

Results

The jobs associated with each mode's activities are shown in Table 4.1. Overall, the Gateway Transportation System accounted for nearly 82,000 jobs annually in Greater Vancouver--representing nearly 7% of all jobs in the region. These jobs

led to over $5 billion paid in wages, $6.5 billion in GDP[13] and $14.8 billion in output annually[14]. The jobs associated with Gateway activities are generally high paying with an average wage per worker of $61,000 compared to the BC average of $46,000. Therefore, viewing the impact of employment alone would diminish the Gateway's true effect on the economy.

Table 4.1: Direct Annual Impacts of Greater Vancouver Gateway Transportation System, 2007 (dollars in millions)

Transportation System	Jobs	Wages	GDP	Output
Maritime	36,042	2,714	2,860	7,951
Air	25,022	1,371	2,175	3,509
Truck	17,428	668	1,115	2,493
Rail	3,323	270	369	799
All Modes	81,815	5,023	6,519	14,753

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003), BC Stats, Port of Vancouver, Fraser Port, North Fraser Port, Vancouver International Airport, Dun and Bradstreet, calculations by EDR Group.

These direct impacts were estimated using results of the previous study along with each mode's changes in employment and trade activity. They also take into account recent shifts in wages, GDP and output per worker. Therefore, they provide more precise dollar values that take recent trends in productivity into account (see Appendix for further explanation).

The Gateway Transportation System's influence has increased in recent years. Tables 4.2a shows the differences in direct impacts from 2007 to 2002 for all categories of impact (compared to results from the previous study). There is an additional direct annual impact of 6,600 jobs, $1.5 billion in GDP, and $3.3 billion in output (after adjusting the old results to 2007 dollars). Table 4.2b provides the jobs impacts from 2002 and 2007 including the percentage change. Direct employment in both maritime and air transportation increased by 7%, while employment in trucking increased by 23%. The rail sector, however, has recently undergone job losses which would indicate that productivity has improved, due in part to technology enhancements. There have also been recent system enhancements that have provided more fluid movements through increasing rail capacity, decreasing the need for switching and consolidating freight trips on longer trains.

[13] Estimates for GDP may differ from other studies. See Appendix for more explanation.

[14] Output includes the costs of inputs necessary for production. Therefore, it is a gross measure that contains double-counting.

Table 4.2a: Differences in Direct Annual Impacts, 2007 to 2002 (dollars in millions, adjusted for inflation)

Transportation System	Jobs	GDP	Output
Maritime	2,515	724	2,012
Air	1,637	543	876
Truck	3,214	179	400
Rail	-741	7	14
All modes	6,625	1,452	3,303

Table 4.2b: Differences in Direct Annual Job Impacts, 2007 to 2002

Transportation System	2002	2007	Difference	% change
Maritime	33,527	36,042	2,515	7%
Air	23,385	25,022	1,637	7%
Truck	14,214	17,428	3,214	23%
Rail	4,064	3,323	-741	-18%
All modes	75,190	81,815	6,625	9%

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003)

Total Impacts

The total impacts represent the full economic influence of the Gateway Transportation System on the region. These impacts have three components:

- **Direct impacts** – refer to activities occurring at each mode's facility in the Gateway network and at the sites of supporting services.
- **Indirect impacts** – refer to money spent on construction, machinery and other equipment (known as "capital spending") as well as supplies used in business operations and production (known as "non-capital spending").
- **Induced impacts** – refer to additional business activity generated by workers (involved in direct and indirect activities) re-spending their wages on consumer purchases in the region.

The total impacts are the sum of direct, indirect and induced impacts. These were estimated by applying provincial input-output multipliers to the direct impacts[15]. The impacts are provided in terms of jobs, wages, GDP, and output. It is worth

[15] Multipliers were provided by BC Stats and Statistics Canada.

noting that the Gateway Transportation System has a significant influence outside of BC. As previously mentioned, other regions, especially parts of the northwestern US and other western Canadian provinces, also have some economic dependence on the Gateway Transportation System. These other areas benefit from using the Gateway as a conduit for international trade; however, impacts on these other areas are not captured in this study.

Total Impacts in British Columbia

This study focuses on the impacts of the Gateway Transportation System on the Greater Vancouver region. However, the previous study showed impacts on British Columbia. Therefore, for purposes of comparison, the total impacts on the province were also generated—these are shown below in Table 4.3. It is important to note that the impacts shown for each category are the activities attributed to that category. Therefore, they include the indirect and induced effects caused by each mode along with that mode's direct contribution. The Gateway Transportation System accounted for over 160,000 jobs annually in BC[16], contributing $12.5 billion in GDP and nearly $30 billion in output annually. In terms of both jobs and GDP, this represents 7% of the economy of the province.

Table 4.3: Total Annual Impacts of Greater Vancouver Gateway Transportation System on BC, 2007 (dollars in millions)

Transportation System	Jobs	GDP	Output
Maritime	78,633	6,340	15,213
Air	47,649	3,728	6,363
Truck	27,055	1,793	4,039
Rail	7,873	702	1,344
All Modes	**161,209**	**12,562**	**26,959**

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003), BC Stats, Port of Vancouver, Fraser Port, North Fraser Port, Vancouver International Airport, Dun and Bradstreet, calculations by EDR Group.

Not surprisingly, the total impacts have grown as well. Table 4.4a below shows an increase in annual impact of over 21,000 jobs and $3 billion added annually to the provincial GDP from 2002 to 2007. Table 4.4b shows the total job impacts from the previous study, the new estimates and the changes in growth. The total growth in employment related to the Gateway Transportation System was 16% which was slightly higher than total job growth in the province. However, as explained below, job growth is only part of the story as most sectors involved in Gateway activity have shown improvements in productivity. These findings show that the province is becoming more reliant on the Gateway Transportation System; it

[16] This estimate differs from other studies' estimates due to methodology (see Appendix).

appears to have become an even more critical element of the economy as markets have become more globalized.

Table 4.4a: Differences in Total Annual Impacts on BC, 2007 to 2002 (dollars in millions, adjusted for inflation)

Transportation System	Jobs	GDP	Output
Maritime	12,720	1,751	3,518
Air	7,522	1,019	1,451
Truck	2,221	169	418
Rail	-802	54	24
All Modes	**21,660**	**2,993**	**5,411**

Table 4.4b: Differences in Total Annual Job Impacts on BC, 2007 to 2002

Transportation System	2002	2007	Difference	% change
Maritime	65,913	78,633	12,720	19%
Air	40,127	47,649	7,522	19%
Truck	24,834	27,055	2,221	9%
Rail	8,675	7,873	-802	-9%
All Modes	**139,549**	**161,209**	**21,660**	**16%**

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003).

Total Impacts in Greater Vancouver

The direct impacts of the Gateway Transportation System, by definition, take place in the Greater Vancouver region. The total economic impact on BC (shown in Table 4.3) includes these direct impacts as well as additional (indirect and induced) impacts occurring throughout the province. However, due to the concentration of economic activity in Greater Vancouver, most of this spin-off activity does not leave the region. Table 4.5 shows a detailed breakdown of the direct, indirect and induced impacts for each mode on the Greater Vancouver region.

The results below show the extent of the Gateway's importance to the region. In 2007, the transportation system contributed over 157,000 jobs in Greater Vancouver representing one out of every seven jobs in the region. These jobs were responsible for $8.8 billion in annual wages and $12.3 billion in annual GDP in the region's economy. Also note that these figures do not take into account the value of cargo moving through the transportation network—including over $32 billion in exports in 2007 (see Table 2.1).

Table 4.5: Total Annual Impacts of Greater Vancouver Gateway Transportation System on Greater Vancouver Region, 2007 (dollars in millions)

Transportation System	Jobs	Wages	GDP	Output
Maritime				
Direct	36,042	2,714	2,860	7,951
Indirect	26,934	1,696	2,312	5,386
Induced	13,527	844	994	1,512
Total	76,503	5,255	6,166	14,850
Air				
Direct	25,022	1,371	2,175	3,509
Indirect	15,171	462	1,059	2,143
Induced	6,325	235	416	568
Total	46,518	2,067	3,650	6,220
Truck				
Direct	17,428	668	1,115	2,493
Indirect	5,833	247	415	995
Induced	3,311	137	228	474
Total	26,573	1,052	1,759	3,962
Rail				
Direct	3,323	270	369	799
Indirect	3,003	121	225	381
Induced	1,318	60	92	137
Total	7,645	451	685	1,317
All Modes				
Direct	81,815	5,023	6,519	14,753
Indirect	50,942	2,526	4,011	8,905
Induced	24,482	1,276	1,730	2,691
Total	***157,240***	***8,825***	***12,260***	***26,348***

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003), BC Stats, Port of Vancouver, Fraser Port, North Fraser Port, Vancouver International Airport, Dun and Bradstreet, calculations by EDR Group.

Impacts by Municipality

The effects of the transportation system on Greater Vancouver are not evenly distributed throughout the region. Estimated job impacts on the region are shown below in Table 4.6, broken down by each municipality. The annual direct jobs are highly concentrated in municipalities where transportation facilities operate such as Richmond (Vancouver International Airport and North Fraser Port), Vancouver (Port of Vancouver), and Delta (Fraser Port). They also take into account the location of supporting jobs in rail and trucking, and general freight. Indirect jobs represent those supported by supplying the transportation facilities and operations.

Therefore, these are more concentrated in major business centers. Induced jobs are more evenly distributed than the direct and indirect jobs since they are estimated based on where workers live and shop--assuming that most of their spending occurs close to home[17].

Table 4.6: Estimated Annual Job Impacts by Location of Employment in Greater Vancouver Region, 2007

Municipality	Direct	Indirect	Induced	TOTAL
Anmore	16	10	25	51
Belcarra	6	5	7	18
Bowen Island	42	53	25	120
Burnaby	3,125	6,116	2,069	11,310
Coquitlam	1,288	2,088	1,231	4,607
Delta	11,532	2,495	1,451	15,478
Langley City	607	792	265	1,664
Langley DM	1,694	2,170	1,155	5,018
Lions Bay	0	16	10	25
Maple Ridge	897	1,025	785	2,706
New Westminster	1,596	1,248	749	3,593
N. Vancouver City	1,609	1,310	501	3,420
N. Vancouver DM	1,454	1,168	768	3,390
Pitt Meadows	336	233	202	770
Port Coquitlam	1,729	966	654	3,349
Port Moody	691	344	272	1,308
Richmond	32,314	5,748	2,421	40,484
Surrey	6,630	6,346	5,453	18,428
Vancouver	13,498	17,616	5,944	37,059
West Vancouver	2,707	859	285	3,851
White Rock	45	314	208	567
Greater Vancouver	**81,815**	**50,921**	**24,481**	**157,217**

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003), BC Stats, Port of Vancouver, Fraser Port, North Fraser Port, Vancouver International Airport, Dun and Bradstreet, calculations by EDR Group.

Table 4.7 shows the total impacts for wages, GDP and output, as well as jobs, by municipality. It is not surprising that the total impacts are most highly concentrated in areas where there is significant transportation activity, mainly Vancouver and Richmond. However, it is notable that over half of the total impact (in jobs and dollar terms) is distributed elsewhere throughout the region.

[17] Jobs by place of work and residence for the region are provided in the Appendix in percentage terms.

Table 4.7: Estimated Total Annual Impacts by Location of Employment in Greater Vancouver Region, 2007 (dollars in millions)

Municipality	Jobs	Wages	GDP	Output
Anmore	51	2	4	5
Belcarra	18	1	1	2
Bowen Island	120	7	9	22
Burnaby	11,310	568	846	1,814
Coquitlam	4,607	227	339	661
Delta	15,478	977	1,199	2,715
Langley City	1,664	80	122	226
LangleyDM	5,018	242	367	671
Lions Bay	25	1	2	5
Maple Ridge	2,706	150	206	459
New Westminster	3,593	211	287	648
N. Vancouver City	3,420	207	270	667
N.Vancouver DM	3,390	202	265	633
Pitt Meadows	770	38	57	94
Port Coquitlam	3,349	191	265	537
Port Moody	1,308	82	101	251
Richmond	40,484	2,273	3,345	6,274
Surrey	18,428	936	1,359	2,516
Vancouver	37,059	2,141	2,869	7,234
West Vancouver	3,851	260	302	811
White Rock	567	29	43	98
Greater Vancouver	**157,217**	**8,824**	**12,258**	**26,343**

Source: "Economic Impact Analysis of Investment in a Major Commercial Transportation System for the Greater Vancouver Region," (EDR Group and Delcan, 2003), BC Stats, Port of Vancouver, Fraser Port, North Fraser Port, Vancouver International Airport, Dun and Bradstreet, calculations by EDR Group.

The results shown in this section indicate the importance of the Gateway Transportation System to the regional and provincial economies. There is no doubt that the Gateway serves as a backbone of Greater Vancouver's economy. The next section examines the fiscal impacts resulting from this activity. In this manner, the extent of the Gateway's role for business, individuals, and government will be captured.

Fiscal Impacts

The preceding sections have shown the Gateway's influence on the regional and provincial economies. These impacts also have fiscal implications by generating revenue for local, provincial, and federal governments. The size of the Gateway Transportation System's influence gives way to considerable fiscal impacts which are shown below. In this study, the focus of fiscal impacts was on property taxes, income taxes, and sales taxes. These impacts are not exhaustive but are illustrative of the magnitude of the Gateway's impact on government revenue.

Property Taxes

Businesses and individuals related to the Gateway network pay property taxes (i.e. municipal taxes) in the form of business and residential taxes to local governments. Businesses pay property taxes to the municipality of their location as do home-owners where they live. Table 4.8 shows these impacts by municipality which are driven off of the direct and total economic impacts above, reflecting location of businesses and residence of workers.

The direct impacts show that direct Gateway activity is responsible for over $200 million in annual property taxes paid in the Greater Vancouver area. This includes payments to municipalities where Gateway facilities, supporting businesses and workers' residences are located. If the indirect and induced impacts are included then the total impact is nearly $430 million dollars in the region, annually. Both direct and total impacts represent a significant portion of total property taxes paid in the region—6% and 12% respectively.

Table 4.8: Annual Property Tax Impacts by Municipality in Greater Vancouver Region, 2007 (dollars in millions)

Municipality	Direct Impact	Total Impact
Anmore	0.2	0.4
Belcarra	0.1	0.1
Bowen Island	0.1	0.5
Burnaby	11.6	31.6
Coquitlam	1.6	4.2
Delta	26.1	38.0
Langley City	8.8	20.6
LangleyDM	6.1	16.3
Lions Bay	0.1	0.2
Maple Ridge	4.7	10.6
New Westminster	5.6	11.6
N. Vancouver City	4.1	9.1
N.Vancouver DM	6.1	14.8
Pitt Meadows	1.6	3.4
Port Coquitlam	5.2	10.3
Port Moody	2.6	5.7
Richmond*	37.8	55.2
Surrey	32.9	65.1
Vancouver	45.5	116.3
West Vancouver	4.0	10.4
White Rock	1.7	3.6
Greater Vancouver	**206**	**428**

Source: Statistics Canada, calculations by EDR Group.
*Includes actual taxes paid by Vancouver Int'l Airport

Income Taxes

The impacts generated by the Gateway Transportation System also create income tax revenue at the federal and provincial levels. This revenue is comprised of personal income tax (paid by workers) and corporate income tax (paid by businesses). The income tax impacts for both categories were estimated at the provincial level based on worker and business income impacts. This was done to capture the full effects on the provincial income tax revenue. However, it should be noted that total impacts were not estimated for the rest of Canada; therefore the estimated federal tax impacts shown here do not include those generated outside of BC.

The income tax impacts are shown below in Table 4.9. The Gateway's direct activities contributed an estimated $841 million in annual federal income tax revenue and $361 in annual provincial income tax revenue. When including indirect and induced impacts, the annual contributions increase to $1.5 billion and $623 million for Canada and BC, respectively. Personal income tax represents 79% of the income tax impacts while corporate taxes are the remaining 21%. For the province, the total income tax impacts shown here represent over 7% of the total collections in income tax revenue.

Table 4.9: Annual Corporate and Personal Income Tax Impacts, 2007 (dollars in millions)

Impact	Federal	Provincial
Corporate Income		
Direct	169	56
Total	334	109
Personal Income		
Direct	672	306
Total	1,149	514
Total Income Tax		
Direct	**841**	**361**
Total	**1,483**	**623**

Source: Statistics Canada, calculations by EDR Group.

Sales Taxes

Finally, the fiscal impacts were estimated for GST (goods and services tax) and PST (provincial sales tax). These are paid by businesses and residents based on the consumption and sale of goods. As with the property and income tax impacts, these are presented using both the direct and total economic impacts as a basis.

The results, seen in Table 4.10, show that business generated from direct Gateway activity was responsible for $139 million annually in GST paid to the federal government and $165 million annually in PST to the provincial government. When including indirect and induced impacts, these amounts become $263

million and $311 million paid annually to the federal and provincial governments, respectively.

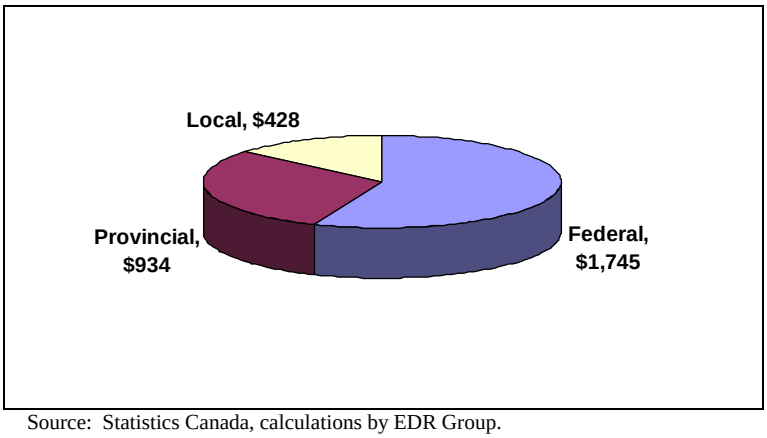
Table 4.10: Annual Federal and Provincial Sales Tax Impacts, 2007 (dollars in millions)

Impact	Federal (GST)	Provincial (PST)
Direct	139	165
Total	**263**	**311**

Source: Statistics Canada, calculations by EDR Group.

In sum, the Gateway's direct, indirect and induced activities generated over $3 billion in annual government revenue due to property, income and sales taxes. Figure 4.1 shows the distribution of this impact among the types of government. These numbers illustrate the importance of the Gateway network to businesses, workers, and all levels of government.

Figure 4.1: Annual Local, Provincial and Federal Impacts based on Total Economic Impacts in 2007 (dollars in millions)



Source: Statistics Canada, calculations by EDR Group.

Community Contributions by Gateway Businesses

The previous sections showed that the Gateway Transportation System has a large "footprint" on the economy of the Greater Vancouver region. It has exhibited a large impact in terms of jobs and dollars generated in the economy. However, companies that are a part of the Gateway Transportation System are also directly involved in giving back to the region through providing donations to local communities.

A survey sample of Gateway-related facilities contributed over $4 million to local communities in 2006 and 2007. However, this number only represents the charitable donations of 11 facilities; therefore this vastly understates the giving of all companies involved. This figure also does not include personal, charitable donations made by employees of these facilities. Since this detailed information is not available, an estimated range of the donations of these employees would be $43 million to $86 million in 2007[18].

Capital Investments by Gateway Businesses

Businesses that use the Gateway Transportation System also contribute to the region through their investment in capital improvements. This includes spending on construction, machinery and other equipment. Every sector's value-added (i.e. GDP) is comprised of labor income, profits, and capital spending. However, capital spending is more significant for the transportation sector due to the unrelenting demand for improvement and expansion.

Industries and housing in BC invested over $42 billion in 2007, including $30 billion in construction and $12 billion in machinery and other equipment. The transportation and warehousing sector spent $3.3 billion during that period. This included $1.8 billion on machinery and other equipment, ranking third among sectors in the economy (behind only the manufacturing and real estate). The sector also spent nearly $1.5 billion on construction, which was exceeded only by the utility, government and mining sectors[19].

The Gateway Transportation System relies on constant improvements in order to meet future demands. For instance, Vancouver International Airport is in the process of spending $1 billion (over several years) for terminal expansion and linkage improvements in anticipation of future travel demand[20]. Other types of improvements in the region would include new highways, rail spurs, and container facilities. The entire Gateway Transportation System's capital investment is estimated to be approximately $1.8 billion annually[21]. The breakdown is shown below in Table 4.11.

[18] This estimate is based on $1.2 billion donated in BC in 2006 (adjusted for inflation to 2007 dollars). The range is derived from the share of total employment in BC related to the Gateway in terms of direct employment (3.6%) and total employment (7.1%).

[19] Statistics Canada

[20] Vancouver International Airport: http://www.yvr.ca/authority/news/whatsnew.asp

[21] This is estimated on the basis of the Gateway Transportation System portion of the total province-wide GDP in transportation and warehousing.

Table 4.11: Capital Investment by Gateway Transportation System, 2007 (dollars in millions)

Type of Spending	
Machinery and Other Equipment	972
Construction	799
Total Capital Spending	**1,772**

Source: Statistics Canada, calculations by EDR Group.

It is important to note that this number should not be added to the total economic impacts shown previously in this chapter. Capital spending from Gateway-related industries is included (along with non-capital spending) in the indirect economic impacts. The estimates of capital spending are only shown here for illustrative purposes.