



# Publication

## **POLICY PERSPECTIVES**

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### **TRANSPORTATION INFRASTRUCTURE FOR A GLOBALLY CONNECTED BC ECONOMY**

Infrastructure is the sometimes invisible and seldom discussed backbone of a modern economy. A region's infrastructure affects the quality of life enjoyed by citizens, the competitive position of businesses, and the potential for long-term gains in productivity and incomes. As a small economy, BC depends heavily on trade with other countries and provinces to generate income, employment and tax revenues. Both the profit margins on exports and the costs of imported goods are linked to the efficiency of the freight transportation system. As a gateway to the Asia Pacific, BC's transportation sector is more than a facilitator of trade. In connecting Asian countries with other North American jurisdictions, the industry generates its own export earnings, apart from the enabling economic activity more broadly. Transportation as an industry looms larger in BC than in other provinces.

A diverse mix of assets falls under the heading of physical infrastructure: bridges, roads, highways, public transit, airports, seaports, electric power generation and transmission networks, energy pipelines, telecommunications infrastructure, water supply and distribution systems, sewage collection and treatment, education and health care facilities, research laboratories, and buildings. Often, these assets are owned by or fall within the control of governments, giving rise to the commonly used term "public infrastructure." Here we focus on infrastructure that – regardless of ownership – produces collective benefits and lays the foundation for long-term economic growth, with a particular focus on transportation modes.

The reasons for concentrating on transportation infrastructure are two-fold. First, the evidence suggests that investing in this type of infrastructure yields sizable long-term payoffs in terms of economic growth and productivity gains.<sup>1</sup> And second, high quality, up-to-date transportation infrastructure is critical to the ability of small economies like British Columbia to trade and do business in larger North American and global markets.

#### **Background**

Transportation is crucial to British Columbia's prosperity. It is an important economic sector in its own right, ranking as one of BC's biggest industries and directly responsible

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<sup>1</sup> *Infrastructure and Productivity: A Literature Review*, report prepared for Infrastructure Canada by PricewaterhouseCoopers (February 2007). Also see Statistics Canada's recent study: Wulong Gu and Ryan Macdonald, *The Impact of Public Infrastructure on Multifactor Productivity Estimates*, Minister of Industry, (2009).

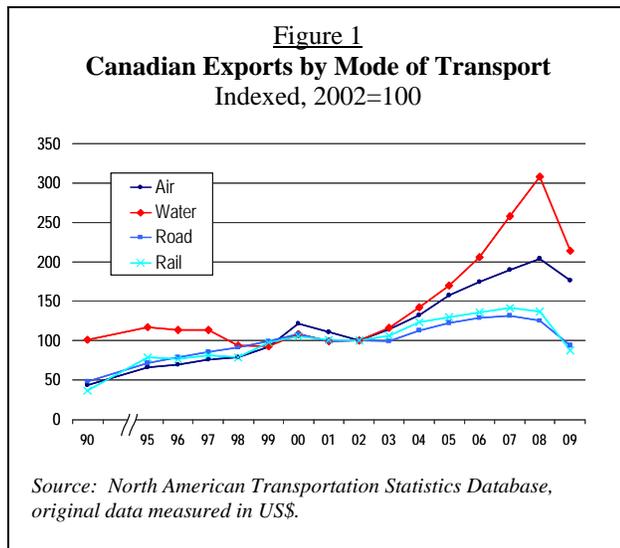


for roughly 6% of the province’s GDP and 112,000 jobs, according to the most recent data.<sup>2</sup>

BC’s roughly \$30 billion in international exports are shipped by a range of modes. The marine share of exports fell for many years as containerization became more prevalent and the road and rail modes benefited. More recently, however, the rise of Asia has resulted in large gains in marine exports.

Nationally, the value of merchandise shipped by water grew by more than 200% between 2002 and 2008.<sup>3</sup> In contrast, exports via the road network grew only 25% over the same period, while rail exports increased by 37%. Exports by air doubled over this period. These categorizations, however, simply represent the final mode used in exporting goods. The reality is that today’s transportation network is highly integrated.

Indeed, intermodality is a key trend in global freight transport. Intermodal transportation refers to the integration of shipments across modes, typically using single administrative systems and rates, where goods move in containers.<sup>4</sup> Containerization has produced sizable gains in productivity and is a key trend spurring the growth of global trade.<sup>5</sup> With the rise of intermodal systems for transporting goods and commodities over long distances, rail and truck modes have to some extent become more complementary than competitive.



In terms of ocean-going trade, increasing North American demand for finished goods manufactured in Asia presents an opportunity to strengthen BC’s competitive position among North American gateways. Most US west coast ports function essentially as import points and have a high proportion of empty containers on the return trip to Asia. Many backhaul containers leaving Los Angeles and Long Beach also often carry low-value backhaul commodities such as recyclable steel or paper. By some estimates, two-thirds of

<sup>2</sup> The GDP figure is for 2009 and the employment number is for 2010; these figures do not include warehousing, which is often aggregated into the transportation sector.

<sup>3</sup> North American Transportation Statistics Database. As evident in Figure 1, exports via all modes fell sharply in 2009 when global trade collapsed. Growth through 2008 is used because it better reflects underlying trends.

<sup>4</sup> Jack Short, “Challenges for Transport Policy in Europe: Supporting Intermodality,” European Conference of Ministers of Transport, Intermodal Summit (December 10, 2002).

<sup>5</sup> It is estimated that a 40,000 tonne container ship requires 750 person-hours to be unloaded; a similar cargo unloaded by traditional methods would have required some 24,000 person-hours. Ships that once had to spend 25 days in port can now be turned around in two days. Ibid.

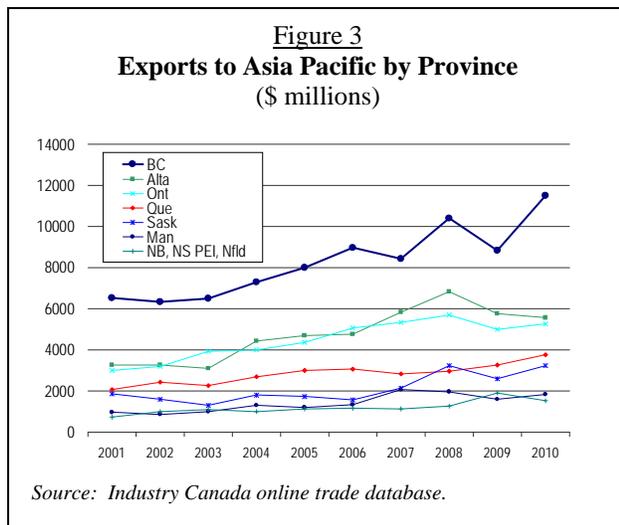
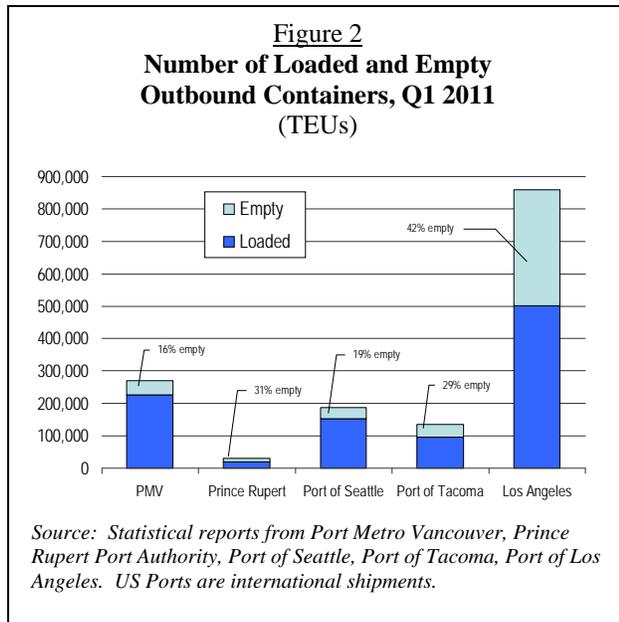


the containers leaving the large US west coast ports are either empty or filled with low-value products, resulting in economic inefficiencies and avoidable emissions.<sup>6</sup> BC’s potential advantage over the US west coast ports lies in the volumes of value-added outbound goods that can be shipped to Asia through Vancouver and Prince Rupert, thus boosting the efficiency of trade. The Port of Prince Rupert still has a relatively high share of empty containers on the backhaul, but the share has declined sharply over the past year with the growth of exports from western Canada to Asia.

### Ports and Airports

Port Metro Vancouver (PMV) is Canada’s biggest port measured by tons of total throughput. PMV is at the heart of the Greater Vancouver Gateway – one of BC’s most important economic engines. It plays a critical role in facilitating export shipments of many Canadian resource goods – lumber, pulp, potash, coal, sulphur, and a host of agricultural commodities. PMV is also a key container port, ranking third among west coast North American ports in container volumes handled in 2008. From 2000 to 2008, container volumes moving through PMV rose by 103%, the biggest gain among west coast ports. With the global recession, however, total container volumes dropped 14% in 2009. In 2010, trade recovered and the volume of container shipments through PMV surpassed the pre-recession peak. The merger of the three previously separate Lower Mainland ports – Vancouver, Fraser and North Fraser – is making it easier to brand and market the new amalgamated port around the world.

The creation of PMV is timely, as governments and businesses gear up to build on BC’s position as Canada’s Asia-Pacific Gateway. The opportunities to strengthen BC’s ports system by adding capacity and improving efficiency to capture a bigger share of Asia-Pacific trade are time-sensitive. They depend not only on capacity and backhaul efficiencies, but also on the fee and taxation structures in



<sup>6</sup> BC Stats, “Will BC Miss the Boat on Port Expansion?” *Exports* (June 2006).



place in competing US and Canadian jurisdictions. The completion of new container-handling facilities at the Port of Prince Rupert has further enhanced BC's gateway position. With a strong orientation to China and the container segment still in growth mode, Prince Rupert was the only west coast port to see higher business volumes during the recession. Container traffic through Fairview Terminals in Prince Rupert jumped 45% in 2009, followed by a 30% gain in 2010. BC shipments of lumber to China have soared over the past few years, helping to propel a record number of containers through Prince Rupert in 2010. Fairview was reportedly the fastest growing container terminal in North America in 2010, and the 8<sup>th</sup> fastest in the world.<sup>7</sup> The value of coal shipped to China has gone from close to nil a few years back to \$833 million in 2010, resulting in big gains in bulk commodity shipments through the port as well.

Four-fifths of the overseas cargo going into Prince Rupert is ultimately bound for the United States. The port, Canadian National Railway and other agencies are making significant investments that will eventually increase Prince Rupert's container capacity to 2 million TEUs<sup>8</sup> per year, putting it on a par with Seattle and Tacoma.

The port business is highly competitive. A number of US ports are mounting their own expansion plans.<sup>9</sup> To win new and maintain existing business, BC ports need to emphasize the twin advantages of two-way cargo capacity and proximity to Asia. Vancouver is one day, and Prince Rupert two days, closer to Asia than are the California-based US ports.

For freight goods, two-way trade with the United States is conducted primarily via truck. The Pacific Highway border crossing is BC's busiest road port of entry for freight, and the shipping point for about one-quarter of all goods entering or leaving the province. It should be noted, however, that trade has yet to return to its pre-2001 levels.<sup>10</sup> Growth of truck traffic at the Pacific Highway and other freight border crossings combined with the increased security measures implemented since September 2001 have magnified the problems of congestion and delays at Canada-US border crossings. This underscores the need to move forward with the new security perimeter initiative recently announced by the Canadian and US governments.

British Columbia's airports also contribute to the ability of local businesses and citizens to engage in international and domestic commerce. While past expansions at both the domestic and international terminals at Vancouver International Airport (YVR) have allowed the airport to handle more passengers, forecast increases in passenger travel are prompting YVR to develop plans for a third runway that will enable it to accommodate roughly double the number of passengers (33 million) and 484,000 takeoffs/landings by

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<sup>7</sup> Prince Rupert Port Authority, January 2011 press release, reported growth for September 2010.

<sup>8</sup> One TEU is a 20-foot equivalent contained unit.

<sup>9</sup> Both Long Beach and Los Angeles ports have multi-billion dollar expansion plans, and under 2007 legislation the state of California made \$2 billion available for goods movement improvements across the state, including port and Alameda Corridor expansions (California Business, Transportation & Housing Agency and California Environmental Protection Agency, *Goods Movement Action Plan*, January 2007).

<sup>10</sup> BC Stats, "Border Congestion Threatens Trade," *Exports* (August 2004) and BC Trucking Association (2008).



2027.<sup>11</sup> Like the ports, the relative proximity of BC’s biggest airport to Asia provides a time saving for serving the trans-Pacific market, which furthers the goal of making YVR a more competitive hub within North America.

British Columbia’s geographic location vis-à-vis Asia is an advantage on which the province and Canada can capitalize. To do so, policymakers have to understand the competitive environment in the airline industry, including the cost structures facing carriers and airports in western US cities and the impact of Canadian air policy on the opportunity to attract more carriers to YVR and other BC airports. In contrast to the situation in Canada, major American airports often have access to infrastructure financing tools such as tax-exempt bonds and also benefit from significant direct public sector investments. The US has also been more aggressive than Canada in negotiating liberalized market access arrangements with other countries. Bilateral “open-skies” agreements with Pacific Rim trading partners like South Korea would facilitate trade and travel between Canada and key Asia economies. The Business Council believes there is a pressing need to overhaul Canadian air policy to foster greater connectivity with outside markets.

### **The Pacific Gateway Program and Strategy**

British Columbia’s west coast location and the rapid growth of trade between North America and Asia have fostered an interest in strengthening the province’s position as Canada’s Pacific Gateway. Over the past few years, the BC and federal governments have made building the Pacific Gateway a priority. This involves more than just investing in roads, bridges and public transit in the Lower Mainland. Moving commodities, intermediate and finished goods through Port Metro Vancouver and to and from the Port of Prince Rupert depends as well on rail infrastructure and service levels, the capacity of intermodal yards (where containerized goods can transfer between trucks and trains or onto or off of ships), and the scope of deepwater ports. The northern region of the province has begun to benefit, and stands gain more in the coming decade, from investments in the Port of Prince Rupert and the development of Prince George as a transportation hub for intermodal freight for finished goods arriving from Asia destined for the US “heartland” markets, as well as for commodities bound the other direction.

Globalization, the development of longer and more complex supply chains, and the shift to “just-in-time” manufacturing are all contributing to greater use of multiple freight conveyances. Efficient intermodal connections are important to the rest of Canada, as the Pacific Gateway is dominant channel for transporting Canadian exports to the Asia-Pacific region. British Columbia accounts for about 35% of all Canadian exports to Asia-Pacific markets, but fully 72% of all Canadian exports to this region go through the Pacific Gateway.

A cautionary note regarding the move toward seamless, just-in-time supply chains has been the “thickening” border with the United States in the post-9/11 period, a development which has led to delays and uncertainty in the delivery of intermediate inputs as well as

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<sup>11</sup> YVR (2006).



final goods. Delays caused by border security issues are now cited as a top concern of manufacturers on both sides of the border, as they seek to transfer parts, components and other inputs back and forth in the integrated North American economy. Many finished goods manufacturers are finding it prudent to warehouse stocks of intermediate inputs in order to reduce the risks associated with border delays.

<b>Table 1</b>			
<b>Share of Canada's Exports Through The Pacific Gateway</b>			
	Canada's total exports \$M	Total exports through BC \$M	Share through BC (%)
<b>Asia*</b>	<b>33,429</b>	<b>24,237</b>	<b>72.5</b>
Japan	8,314	7,156	86.1
Korea, South	3,527	2,795	79.2
Taiwan	1,109	839	75.6
Indonesia	972	709	73.0
China	11,160	8,045	72.1
India	2,146	1,174	54.7
Hong Kong	1,499	783	52.2
Other Asian countries	4,702	2,736	58.2

*Source: Transportation in Canada, Table EC19.*

Since each of the transportation modes operates under different governance and financing regimes, developing a highly competitive Pacific Gateway depends on integrated planning. The various modes must work together to efficiently move people and goods around a region, across BC, and to and from external markets. This can present a challenge for developing and managing transportation infrastructure. For example, decisions about increasing rail network capacity to handle a greater volume of imports cannot be made without reference to the impact of additional rail traffic on ports (where are the extra sidings going to go?) or the road network (how can congestion be managed with more trucks on the road?). This points to the benefits of an integrated approach to transportation infrastructure investment, such as the provincial government's Gateway Program.<sup>12</sup> More broadly, the emergence of an integrated, collaborative governance structure around the Gateway Strategy is a positive sign and serves as a promising model for other, multi-modal infrastructure projects.

For British Columbia, the economic benefits of becoming a leading Pacific Gateway will only be realized if governments cooperate and engage with private sector interests to ensure that infrastructure investments are made in a timely way and that the fiscal and regulatory climate is aligned with the goal of growing Gateway-related businesses. The Business Council sees the Gateway Strategy as critical to BC's economic future -- and to that of Western Canada as a whole. Success depends on taking action to make the province an efficient, cost-competitive port of entry, at a time when all Canadian gateways are grappling with public-sector-supported competition from American west coast points of entry. In its recent budget, the federal government included plans to allow the Ridley Terminals facility to borrow on capital markets to finance much needed expansion plans. Hopefully this measure will be implemented following the May federal election.

<sup>12</sup> The Gateway Program is a multi-sector and -stakeholder initiative that is intended to increase efficiencies of commercial goods movement within and through the Lower Mainland, and comprises rail, road and port improvements.



Box 1

**BC's Strategic Road Network**

Hwy 1 – Trans Canada Highway: Victoria to Alberta border  
Hwy 2 – Dawson Creek to Alberta border  
Hwy 3 – Southern Trans-Provincial/Crowsnest: Hope to Alberta border  
Hwy 5 – Coquihalla: Hope to Kamloops  
Hwy 5 – Yellowhead Highway: Kamloops to Tête Jaune Cache (junction w/ Hwy 16)  
Hwy 6 – Canada/US border south of Nelson to Vernon  
Hwy 16 – Yellowhead Highway: Prince Rupert to Tête Jaune Cache & Alberta border  
Hwy 19 – Island Highway: Nanaimo to Port Hardy  
Hwy 97 – Canada/US border at Osoyoos to Fort Nelson and Yukon border  
Hwy 97C – Okanagan Connector: Merritt to Peachland

*Source: BC Ministry of Transportation*

**The Provincial Road Network**

British Columbia's strategic road network encompasses the Trans-Canada Highway, other arteries of the national highway system, and a number of important provincial highways (Box 1). The province is responsible for over 7,500 kilometres of primary roads, while Parks Canada is responsible for all roads in national parks in BC (approximately 1,500 km), including 100 kilometres between Revelstoke and the Alberta border.<sup>13</sup> Aging of the province's primary highways, together with increased demands on them, indicates that highway expansion, if not new construction, is necessary in several areas of the province.

British Columbia's primary highway network is an essential part of the infrastructure that allows our economy and society to function. Lack of maintenance results in slower travel and prompts efforts by some users to find alternate routes. An inadequate major road network contributes to costly delays in moving goods, compromises the livelihoods of those servicing the trucking industry along the routes, and – for commodities bound for overseas market – increases the risk that BC ports could lose business to Seattle and other competing US gateways.

The recent impetus of governments to fund transportation infrastructure projects for short-term economic stimulus should be sustained over the medium-term, to ensure completion of needed improvements to the highway network. The federal government has committed to increase funding for municipalities through the Gas Tax Fund (\$2 billion per year), and it previously announced investments in gateways and border crossings. The 2011 federal budget proposed legislating the \$2 billion Gas Tax Fund for municipalities on a permanent basis. Significant infrastructure spending was a major component of the federal government's 2009 and 2010 "stimulus budgets" but these outlays will gradually wind down over the next year.<sup>14</sup>

<sup>13</sup> Transport Canada, *Freight Transportation in British Columbia, Final Report* (March 2002).

<sup>14</sup> Government of Canada, *Budget 2009 and Budget 2010*.



The combination of neglected maintenance and steady growth in truck traffic and other travel on the NHS and other primary highways has taken a toll on the roadbed, due in part to the increased popularity of containerization and the greater length and weight of trucked cargo. Severe weather conditions during portions of the year add to the maintenance and repair requirements of many BC highways. For example, the original segment of the Coquihalla Highway between Hope and Merritt is over 20 years old and requires upwards of \$2 million in repairs per year. The longer a highway is left before major maintenance is conducted, the more costly it becomes. According to a study by the BC Ministry of Transportation, one kilometre of highway costs \$65,000 to rehabilitate after 12 years, but the figure rises to over \$400,000 after 20 years.<sup>15</sup>

In the lower mainland the Port Mann Bridge and the South Fraser Perimeter Road projects will significantly enhance the region's transportation network. Replacement of the Port Mann Bridge and the related Highway 1 expansion will alleviate congestion on the region's main road connection with the rest of the province and country, improve safety, and reduce commuting times. The project will allow for rapid bus service along the corridor. Transit does not currently cross the bridge, because congestion does not permit transit schedules to be maintained. The South Fraser Perimeter Road is a new, four-lane highway running along the south side of the Fraser River from Deltaport Way in southwest Delta to 176th Street (Hwy 15) in Surrey, with connections to Highways 1, 15, 17, 91, 99, and TransLink's Golden Ears Bridge. This project has received strong support from the Business Council and many other industry organizations.

### **Principles for Transportation Infrastructure Planning**

Transportation infrastructure projects like those included in the Gateway Strategy give rise to a number of observations on strategic infrastructure planning and investment in today's economic and fiscal climate.

First, the types of financing contemplated for the infrastructure projects will certainly include arrangements that take advantage of private sector expertise, under the general category of public private partnerships (P3s). Historically, funding transportation projects in Canada has been the responsibility of senior levels of government, with little role for private finance. This situation has been changing over the past decade, notably in BC and Ontario, as governments pursue opportunities to tap private sector funding and expertise to accelerate infrastructure development and better manage the risks of large capital outlays.

In British Columbia, Partnerships BC is responsible for reviewing public projects over \$20 million for their potential structuring as P3s. It brings together provincial ministries and agencies and private sector partners, and structures and implements agreements among the parties to conduct major public projects that benefit the public interest. The rationale is that in some cases, using P3s allows desired infrastructure improvements can be done faster,

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<sup>15</sup> Ministry of Transportation, "Coquihalla Maintenance and Operations Arrangement", *Backgrounder* (May 6, 2003).



more efficiently and at a lower direct cost (and risk) to taxpayers. At the federal level, the 2008 budget announced the creation of a federal P3 office which has since become operational. Other provinces are moving in the same direction. All of this underlines the growing interest across the country in tapping private sector expertise and finance for needed infrastructure projects. The same trend is becoming evident in the United States.

A second point concerns the manner in which transportation

projects are expected to help pay for themselves: several of the road projects comprising part of the Gateway Program are proposed to be tolled (including the Port Mann), both to generate revenue and as a demand-side management (DSM) measure. There is little doubt that capacity expansions on Greater Vancouver's roads are necessary. However, as governments move ahead with new road and bridge investments, it is important not to overlook DSM. Various studies and the experiences of other jurisdictions suggest that well-designed measures that moderate demand can influence traffic patterns and ease congestion. Demand side management techniques, such as HOV (high occupancy vehicle) and HOT (high occupancy/toll) lanes, should be incorporated into planning, as they can reduce congestion and provide for better overall life-cycle costing for new transportation infrastructure.

A third and related point is that as the road elements of the Gateway Strategy and Gateway Plan are developed, an opportunity is emerging to shift users' thinking about the costs of providing infrastructure. Major roads around the province are not yet priced in any way, reflecting the prevailing view that they are "public goods" which ought to be paid for by all taxpayers, not users. The only toll road – until recently – was the Coquihalla Highway between Hope and Merritt. The Golden Ears Bridge spanning the Fraser River between Langley and Pitt Meadows is tolled, and this will also be the model for the replacement Port Mann Bridge. An examination of options for reducing traffic congestion in Canadian cities concluded that "appropriately designed road-pricing schemes are the best instrument."<sup>16</sup> Revenues raised can be allocated to help finance infrastructure development and maintenance.<sup>17</sup>

**Box 2**

**Transportation Infrastructure Planning Principles**

1. The P3 development model is suitable for most large transportation infrastructure projects, and will likely be pursued
2. Tolls raise revenue to offset development costs, and when set at the right level represent a demand side management measure to mitigate over-usage.
3. Pricing the usage of roads and/or bridges helps shift users' thinking about the costs of providing public infrastructure.
4. Planning for transportation infrastructure should incorporate realistic life-cycle cost estimates and allow for maintenance and upgrades. Canadian governments (all levels) choose new construction over renovation by an 80:20 ratio (Infrastructure Canada (2006)).

<sup>16</sup> Robin Lindsey, "Congestion Relief: Assessing the Case for Toll Roads in Canada," *C.D. Howe Institute Commentary* (May 2007).

<sup>17</sup> This is done in Arizona, where the Highway User Revenue Fund provides monies for highway and bridge improvements. One difference from the proposal suggested here is that in the case of the Arizona Fund



Lastly, planning for the expansion of transportation infrastructure should incorporate realistic life-cycle cost estimates. Canada's aging public infrastructure has not been properly funded for maintenance and repair. Infrastructure Canada estimates that the average age of roads and highways in the country rose from 14.1 years in 1974 to 17.0 years in 1992, before edging down to 16.6 years in 2003. Provincial roads and highways aged the most over the study period, and during this time a substantial portion of the road network stock was shifted from provincial to municipal governments. Infrastructure Canada calculates that public investment in road infrastructure has favoured new construction over renovation by an approximate 80:20 ratio, for all levels of government.<sup>18</sup> The temptation to build new capacity at the expense of properly maintaining and improving existing infrastructure is a recurring theme in the management of public assets. Deteriorating road infrastructure has a negative impact on the regional economy, business competitiveness, and residents' quality of life.

### **Conclusion**

While transportation is a large industry and one of the province's leading employers, its economic impact is broader and more significant as a facilitator/enabler of trade and travel for BC firms and residents. Transportation infrastructure and services make possible the movement of the goods and people that sustain and drive British Columbia's economy.

The pressures on BC's core economic infrastructure are undeniable. Steady population growth, urbanization and greater participation in international trade and global supply chains are putting demands on BC's transportation infrastructure. And while there has been significant investment in transportation infrastructure over the past decade, new pressures will emerge and need to be addressed to build a foundation for BC's economic success in the 21<sup>st</sup> century.

From a planning perspective, it is essential to understand the industrial structure of the economy that infrastructure is intended to service. In BC this means recognizing the province's role as a gateway to the Asia Pacific and that the volume of goods flowing through the province in both directions will expand over the next decade. It also means putting infrastructure in place to move BC commodities to their ultimate markets. While the US is still our largest trading partner, merchandise trade is increasingly oriented to China and other Asian countries. It is also important to recognize that the BC's airports form part of the province's gateway system. Vancouver International Airport is a key hub and connection for business people and international tourists. The airport in Prince George is positioned to take advantage of its strategic location and to advance its role as a cargo hub between Asia and other North American destinations.

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sources of revenue include gasoline taxes, other fuel taxes and vehicle license fees, but not tolls. (Arizona Department of Commerce, *Arizona's Transportation Infrastructure* (September 2002).

<sup>18</sup> Infrastructure Canada, *The Age of Public Infrastructure in Canada* (2006).