OPENING THE ARTERIES FOR GROWTH

Transportation in the Economic and Social Lives of Canadians

November 2003

by
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On behalf of

westac

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The author remains fully responsible for the views and opinions expressed in this document.

Any errors or omissions are those of the author alone.

Disclaimer

The opinions expressed in this paper do not necessarily reflect the views of WESTAC, its Board of Directors or its members.

"Space without adequate transportation facilities presents a barrier; it is transport which breathes economic life into the space."

J.B. Thompson, Geographer

Executive Summary

This paper on "Opening the Arteries for Growth – Transportation in the Economic and Social Lives of Canadians" – examines the role that transportation plays in our quality of life. Cars, trucks, trains, ships and planes are more than just means of transportation – they are central to our standard of living.

Transportation is a diverse, complex and technologically sophisticated industry. This economic artery that is our transportation system is one of the most efficient in the world and a key reason that we have been able to create the quality of life that we now have. All aspects of our lives and work in Canada are built around transportation, from a visit to the supermarket or the doctor, to the bulk exports through our ports and across our borders. From the holidays we take across the country and around the world to the trips to school and the movies; from companies meeting the needs of their customers at home and abroad and the jobs that rely on those deliveries into the marketplace.

Sadly, we have taken our reliance on transportation for granted. A large and growing number of barriers threaten the continued health of our transportation system. We have deferred decisions on investment and other regulatory changes required to maintain the productivity improvements achieved in the past. The costs of deferrals are growing and threaten the foundation of our economy and our society. Finding solutions to these barriers must become a high priority for Canadians if we truly value the benefits that have come with our world class transportation system.

Graham Parsons
President, Organisation for Western Economic Cooperation
Regina, Saskatchewan
September, 2003

Priorities for Improving Canada's Transportation System

It is now important that Canada develop an industry-led vision for transportation including specific short and long term proposals for the industry and government changes to the regulatory and institutional framework in Canada. These would include a three part program consisting of:

1. A National Transportation Development Plan and related implementation instruments including a National Transportation Development Fund and Agency
2. A program of transport investigation and recommendations for improvement related to:
    - competitive fiscal and tax treatment
    - reducing congestion costs for Canadians
    - estimating capacity constraints across the system
    - evaluating investment options for infrastructure
    - evaluating demand management options as an alternative to capacity investment
    - identifying transportation technologies to improve the environment
    - the North American competitive environment for transportation
3. A new regulatory and institutional framework for transportation

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TRANSPORTATION: FOUNDATIONS OF OUR SOCIETY

Transportation – Our Personal Connections

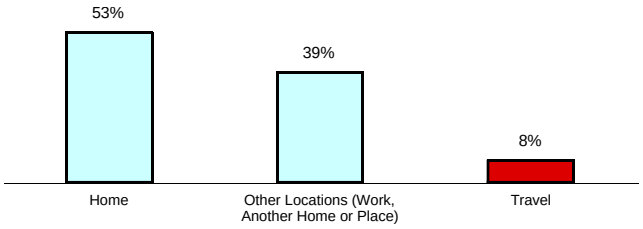
Canadians spend a great deal of time on transportation and travel in their daily lives. Statistics Canada conducts a Time Use Survey of how Canadians spend their time. Transportation activities take up about 8% of our waking time and are among the more important individual activities that we undertake after working in the home, at a job or at school.

Examined another way, the same Statistics Canada survey shows how we spend a little over one half of our time at home and 39% at other locations (work, another home or place) (Fig. 1). We therefore spend some 8% of our adult waking time traveling between locations – equivalent to nine hours spent traveling each week or the whole month of February traveling each year.

For the most part (61%) of our daily movements are made by driving a car. Eighty six percent of Canadians in 1998 reported that they spent an average of 78 minutes the previous day driving. A further 23% travel daily as passengers in cars for an average 66 minutes. Far fewer of us either walk (8%) or take some form of public transit (8%) to make our journeys (Fig. 2). Transportation is a daily necessity for mobile Canadians to live where they choose in the city or the country.

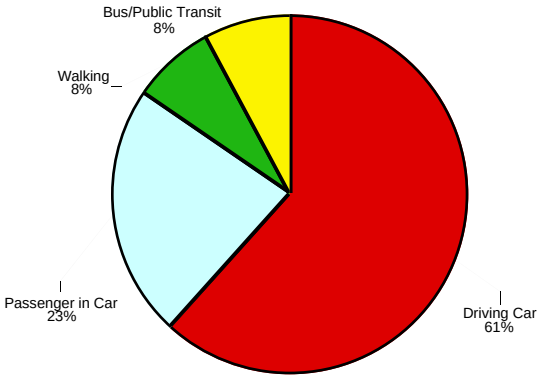
A similar story is apparent in how we spend our money – much of which is spent on travel. Of all Canadian household expenditures in 2001, transportation ranks second at 18% after shelter and household spending (37%) and just above food at 15% (Fig. 3).

Figure 1 – Time Use of Canadians, 1998



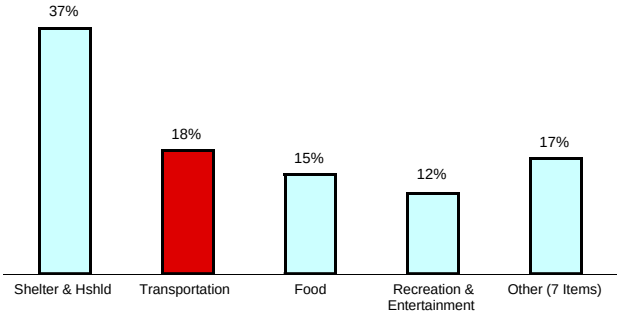
Source: Stastistics Canada, Time Use Survey, 1998

Figure 2 – Modes of Travel for Canadians, 1998



Source: Statistics Canada, Time Use Survey, 1998

Figure 3 – How Canadians Spend Their Money
Distribution of Average Household Expenditures, 2001



Source: Statistics Canada Household Expenditure Survey

Trade and Transportation – The Economic Heart

Canadians live in a world where the economies of specialisation provide us all with huge benefits in our standards of living, quality of life, employment and related sustainable incomes. These economic benefits come directly from the economics of trade in which we specialise at what we each do best.

The ability to specialise is made possible by the existence of transportation. The more efficient the transportation system, the higher the level of benefits we all receive from specialization.

Trade derives from being successful in accessing domestic and international markets. The delivered cost of any product includes a significant transportation cost that can vary from 10% to 50%. The efficiency of transportation is therefore a key factor in Canada's competitive position in the world.

As transportation costs rise, then the costs of our goods and services abroad become less competitive. It is our competitive position in the marketplace that creates a large number of jobs in Canada and underlies our standards of living, wherever we live across the country.

The low real cost of transportation in Canada is itself a direct result of several factors:

1. Economic effects of specialisation in which a few car, truck, aircraft, locomotive, railcar and ship assembly plants now supply the world.
2. Efficiency of individual modes and operators achieved by:
    - management expertise
    - timely pricing to meet market demands
    - investment to meet market demands and maintain and expand infrastructure and to introduce technological innovation

We see these developments clearly when we export our prairie grain, Alberta oil or oilfield equipment. We experience the system daily on our journeys to work, as passengers in airlines, cruise ships, ferries and even washing the car.

Without transportation, a massive re-organisation of our economy and our daily lives would be required. The transport system is at the very heart of Canada's economy and society.

The transport system is at the very heart of Canada's economy and society.

Transportation in the Canadian Economy

Direct commercial transportation activity is a major part of our economy in its own right. About 5% of the Canadian economy is directly engaged in transportation and handling - $40 billion employing some 756,000 people who on average support one and a half million Canadians (Fig. 4).

While transportation and handling may account for 5% of the overall economy, in practice certain industries with essential transportation and handling needs are fully reliant on the sector for their existence. These include, for example, all trade activities, manufacturing, mining and agriculture – the major goods producing industries which together account for some 39% of the Canadian economy (Fig. 4). Transportation is the essential prerequisite for Canada's tourism industry and all of its related economic activities in the travel business, hotels, restaurants, attractions and airlines.

In practice there are few industries where transportation services are not required for moving their staff to work each weekday, using postal and courier services, or moving by car, aircraft or train to meet clients and customers. Nearly the whole Canadian economy is fully reliant on transportation and handling services (Fig. 4).

These measurements of transportation and handling grossly underestimate the importance of transportation. Estimates of transportation demand within the Canadian economy suggest that in 2002 all transportation expenditures for the final demand of goods and services accounted for 14% of all expenditures in Canada. This high level of expenditure on transportation services reflects the widespread reliance that we place as individuals and industries on our transportation system.

In 2002 transportation services (grain handling, harbour and airport operations, baggage handling, rail car loading, postal and courier services) formed the largest single part of commercial transportation industries accounting for some 31% of economic activity in the sector. Trucking was the largest mode of commercial transport with 30% of activity, followed by rail (12%), and air (11%) and urban transit and bus (8%) (Fig. 5).

A further perspective on the degree to which transportation is integrated into our economy and personal expenditures can be seen from the breakdown of transportation demand in 2002 (Fig. 6). Individual consumers spent more than $100 million on transportation, most of which was in car payments (47%) but large amounts also on repairs and maintenance (27%) and commercial transportation (13%).

Figure 4
Transportation & Handling (T & H)
in the Canadian Economy, 2002

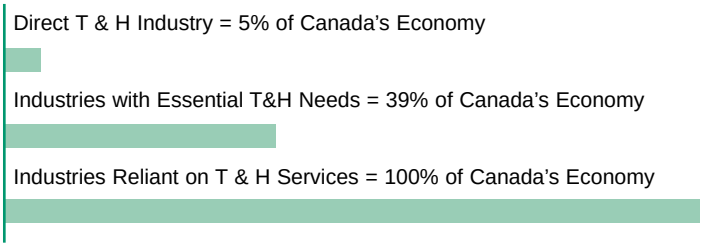
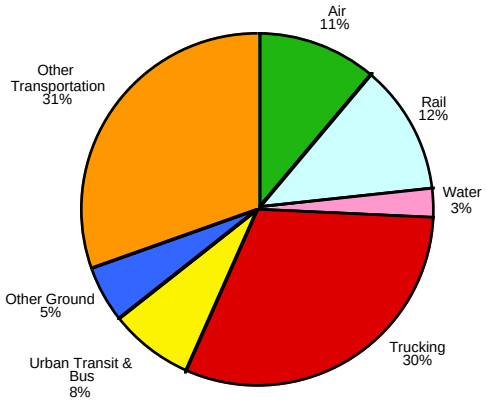


Figure 5
Distribution of Commercial Transportation in Canada, 2002



Source: Statistics Canada, Cansim Table 379-0019

Most transport final demand is made by people to buy, maintain, and operate their cars (Fig. 6). The export trade in vehicles also accounts for the 8% trade balance. Most of the investment in the sector derives from the private sector. Public investment, however, is the main source of infrastructure spending amounting to 18% of total investment. Nearly two-thirds of government spending is engaged in road maintenance, with a much smaller 20% going towards subsidizing urban transit operations.

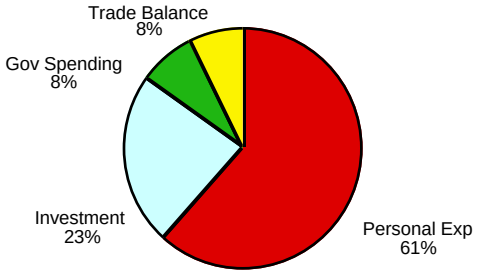
Input output tables measure the transactions between all sectors of the Canadian economy. These show that the transportation and handling sectors are present and therefore being used for the production and marketing of nearly all commodities. Accordingly any changes to the transportation system will have widespread effects throughout the economy.

Transportation is important in every province. The transport sector is largest as a share of GDP in Manitoba, New Brunswick and British Columbia. Ironically, Saskatchewan, one of the more landlocked provinces, assigns only 3.4% of its economy to transportation (Fig. 7). Individually, Canadians spend most on transportation in Alberta, the North and Ontario (Fig. 8).

There is hardly a single sector, or region of Canada that is not reliant on transportation to:

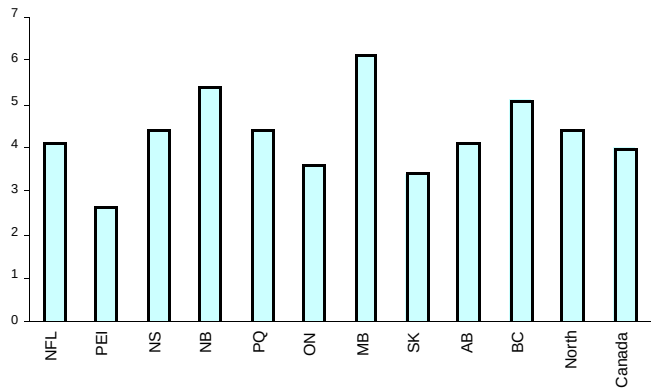
1. Bring its labour force to and from work each day
2. Assemble the materials for production at a single site
3. Distribute a product to its market
4. Service clients at either the point of production or in their marketplace
5. Provide for social and cultural ties

Figure 6
Transport Final Demand, Canada, 2002



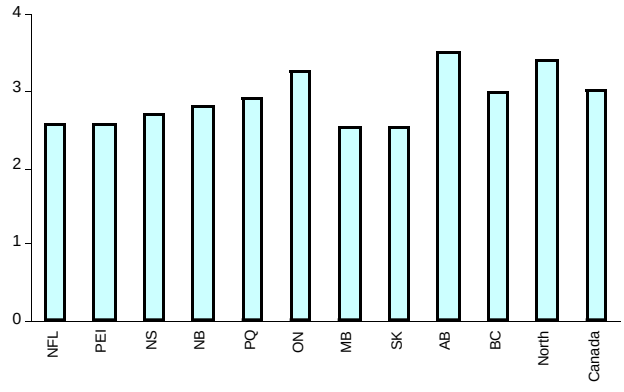
Source: Statistics Canada

Figure 7
Transportation Involvement in Provincial Economies, 2000
Transportation Expenditures as % of GDP



Source: Statistics Canada

Figure 8
Transportation Involvement in Provincial Economies, 2000
Transportation Expenditures per capita ($000's)



Source: Statistics Canada

Economic dependence on transportation extends well beyond our personal use of vehicles. Review of the inter-industry relationships within the Canadian economy shows many sectors that rely heavily on supplying the transportation sector, providing its services or using its services.

These have been summarized in Table 1. They include, for example, the automotive and airline assembly operations in central Canada, all of the major carriers and a variety of industries such as wholesaling, storage and tourism that could not operate without transportation. Beyond these economic linkages are all of these other industries that require transportation to access markets.

The high levels of economic integration of transportation within our society and economy are large. Input output analysis by Statistics Canada tells us that every $100 million of increased output of transportation and warehousing services creates ten jobs directly and another five jobs indirectly for a total of 15 jobs. Within some of the major industries supplying transportation services or equipment, employment effects can be much higher, as high as 45 jobs per million dollars in the provision of urban transit or 20 jobs in the courier and postal services (Table 2).

Every $100 million of increased output of transportation and warehousing services creates ten jobs directly and another five jobs indirectly.

Table 1
Major Transportation Elements in the Canadian Economy

Sector	Transportation Element
Construction	Transportation Engineering
Manufacturing	Engine, Turbine and Power Trans Equip. Automobile and Light-Duty Motor Vehicle Motor Vehicles - Heavy-Duty - Truck Manufacturing - Body and Trailer - Gasoline Engine & Parts - Electrical & Equipment - Steering & Suspension Equip - Brake System - Transmission & Power Train - Seating and Interior Trim - Metal Stamping - Other Parts Aerospace Product and Parts Railroad Rolling Stock Ship Building and Repairing Boat Building Other Transportation Equipment
Trade	Wholesale Retail
Transportation	Air Rail Water Truck Urban Transit Systems Interurban and Rural Bus Taxi and Limousine Service All Other Transit and Ground Passenger Natural Gas Pipeline Crude Oil and Other Pipeline
Support Activities	Support Activities for Transportation Automotive Equipment Rental and Leasing Rental and leasing (except Automotive Equipment)
Couriers and Messengers	Couriers and Messengers Postal Service
Repair and Maintenance	Automotive Truck Rail Air Transit Other
Warehousing and Storage	Farm Products All Other
Travel and Tourism	Travel Agencies National and Provincial Parks RV (Recreational Vehicle) Parks, Recreational Camps Accommodations Scenic and Sightseeing

Source: Statistics Canada

Table 2
Employment Effects Per Million $ of Output

Sectors	Employees (per $M)
All Other Transit and Ground Passenger Transportation	44.96
RV (Recreational Vehicle) Parks, Recreational Camps, and Rooming and Bo	37.68
Taxi and Limousine Service	33.90
Automotive Repair and Maintenance	27.98
Railroad Rolling Stock Manufacturing	25.92
Urban Transit Systems	24.84
Repair and Maintenance (except Automotive Repair and Maintenance)	24.65
Postal Service	23.23
Couriers and Messengers	19.99
Support Activities for Transportation	17.87
Motor Vehicle Brake System Manufacturing	17.58
Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	17.47
Truck Transportation	16.71
Rental and leasing	16.20
Motor Vehicle Electrical and Electronic Equipment Manufacturing	16.07
Other Transportation Equipment Manufacturing	16.05
Transportation Engineering Construction	15.91
All Other Warehousing and Storage	15.35

Transportation Employment

Direct employment in the transportation and warehousing sector accounts for around 800,000 jobs or 5% of Canada's total employment. The majority of people are employed in modal operations or their support services and the remainder in government. Fifty eight percent of these people work in the car, truck and road system, while other modes are much smaller employers – other, including public transit at 17%, air at 16%, rail at 5% and marine at 4% (Fig. 9).

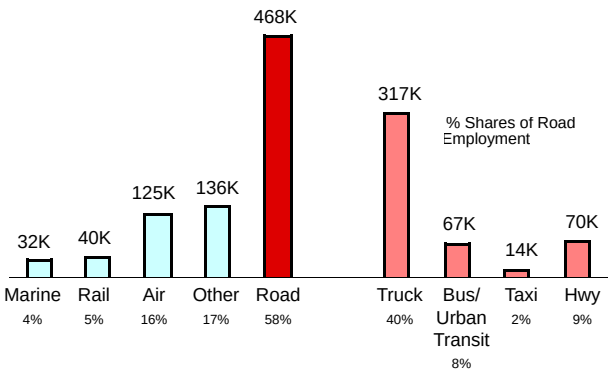
Truck driving is the most common job in Canada with 225,000 drivers and in the order of 400,000 people overall.

However, far more people than those directly employed in transportation and warehousing have employment in other sectors that are highly dependent on transportation.

These include the goods producing industries that generate Canada's bulk exports of grains, minerals and forest products and those who work in trade. These sectors raise employment dependency on transportation to 46% in Canada and to between 40% and 50% in all regions of Canada (Fig. 10).

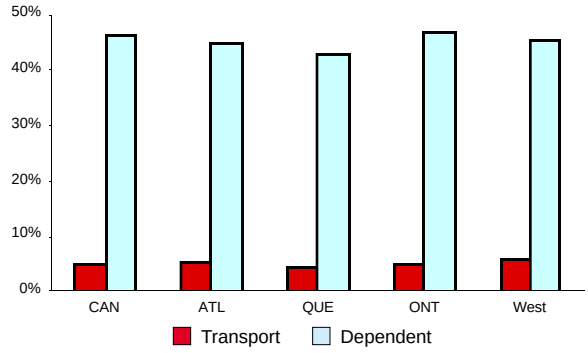
In practice, there are also many workers in other sectors who are fully reliant on an effective transportation system. These include, for example, the vast majority of employees who journey to work each day, the tourism industry that is based on accessing transportation to tourist destinations, the manufacturing workers who build cars, locomotives, rail cars and aircraft and all of the workers in the industries that supply them.

Figure 9 – Transportation Employment in Canada, 2001



Source: Transportation in Canada 2002, Annual Report Addendum, Transport Canada, 2003

Figure 10
Transport Employment Dependence Canada, Regions and Provinces, 2002



Source: Statistics Canada, Labour Force Survey, 2002

Truck driving is the most common job in Canada with 225,000 drivers and in the order of 400,000 people overall.

Commercial Transportation – Goods and People

The volumes and values of goods that move on Canada's transportation system each year are staggering. Some $1.3 trillion of goods and services are moved into trade each year, for the most part requiring the services of the transportation system to get goods to domestic and foreign markets and to carry passengers to provide services. Western Canada moved $381 billion of these goods and services.

The transportation system in Canada moves more in trade than all of the goods and services produced in Canada in any one year!

Trading activities (imports and exports), all of which require some form of transportation, was about one quarter larger than the national economy in Canada and eleven percent larger than the western Canadian economy in the year 2000.

Canada's trade is split between international and interprovincial domestic trade. About 70% of Canada's trade and 60% of western Canada's trade is destined for international markets. Significantly, western Canada remains more integrated with the rest of Canada and particularly within the west than does the rest of Canada. Over the past ten years our north-south trade with the US has grown much faster than our east-west trade within Canada.

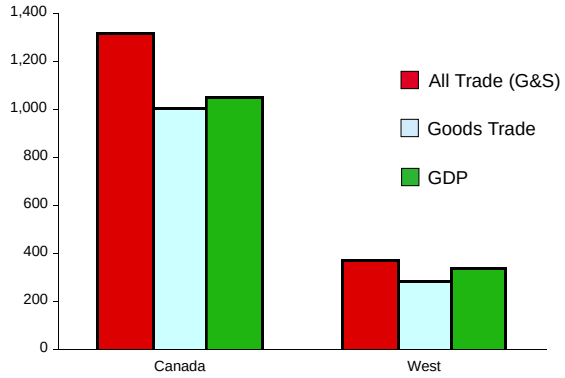
As western Canadians we see the trade: long trains of potash or grain snaking across the prairies and through the mountains to the west coast where they are loaded at Vancouver; the expanding container ports in our cities and at the coast; trucks of forest products traveling from the forests across the border into the US.

As a trading nation, Canada needs to sustain its efficient transportation network and competitive operating system. The bulk of Canada's trade is in goods that require physical movement.

The largest volume of goods entering international trade are the bulk cargoes of grain, coal, potash and sulphur, often moving through west coast ports. Marine carries 43% of the total 744 billion tonnes moved in 2002, followed by "Other", mainly pipelines, at 23% and road at 21% of the movements (Fig. 13).

Roads dominate the value of international trade movements accounting for 54% of the total movement, followed by Marine at 16%, Rail at 13% and Air at 11% (Table 4). Most international trade is destined for the US, where it moves mainly by road.

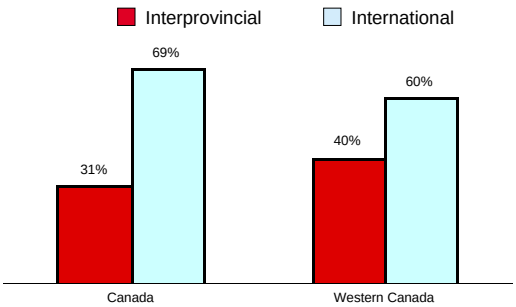
Figure 11 – Trade and the Economy
Canada and Western Canada, 2000, $ Billions



Source: Statistics Canada, National Accounts, 2002

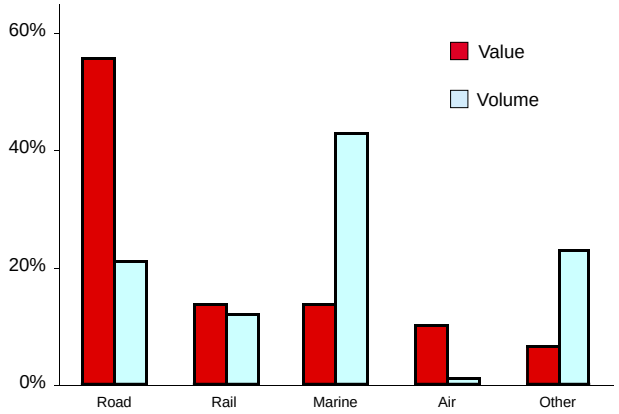
The transportation system in Canada moves more in trade than all of the goods and services produced in Canada in any one year!

Figure 12 – Share of Trade
Domestic (Inter-provincial) and International, 2002



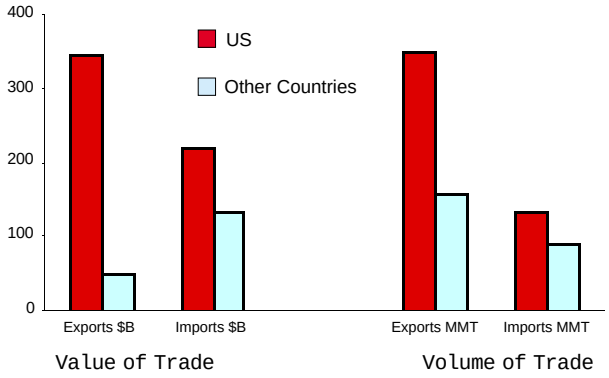
Source: Statistics Canada, National Economic Accounts

Figure 13
Share of International Trade by Mode, 2002
Total = 744 Billion Tonnes



Source: Transport Canada

Figure 14
Value and Volume of Imports and Exports
to the US and Other Countries, 2002



Source: Transport Canada

Table 3
Value of Trade in Goods and Services
Canada and Western Canada, 2000

All Trade ($ Billions)

	International	Interprovincial	Total
Canada	1,320	906	414
Western Canada	380	228	152
West as % of Canada	*29%*	*25%*	*37%*

Goods Trade ($ Billions)

	International	Interprovincial	Total
Canada	786	228	1014
Western Canada	197	83	280
West as % of Canada	*25%*	*36%*	*28%*

Table 4
Value and Volumes of International Commodity Trade
To and From Canada by Mode, 2002

Value ($ Billions)

Mode	Road	Rail	Marine	Air	Other	Total
Can-US Trade	371	97	15	36	44	563
Can-Other Trade	38	5	109	45	3	200
Total	409	102	124	81	47	763
Modal Share (%)	*54%*	*13%*	*16%*	*11%*	*6%*	*100%*

Volume (Million Tonnes)

Mode	Road	Rail	Marine	Air	Other	Total
Can-US Trade	140	85	97	3	155	479
Can-Other Trade	12	2	215	4	13	247
Total	152	87	312	7	167	726
Modal Share (%)	*21%*	*12%*	*43%*	*1%*	*23%*	*100%*

*Road dominates in the **value** of foreign trade moved; marine dominates in the **volumes** moved.*

CHANGES AND CHALLENGES

A Social & Economic Transformation

When societies and economies change, the infrastructure and institutions that support them must also change – including the transportation infrastructure.

Thinking on economic development around the world has identified the institutional and infrastructure framework (IIF) for economies as central to their success.[1] When the IIF does not adjust to changing economic and social needs, then it can act to hamper growth. When infrastructure and institutions adjust to the new markets and technologies, then growth is faster.

Canada's social and economic transformation has been dramatic and includes three central elements of change. They are:

1. The growth and movement of people into cities
2. Restructuring of the economy with new products, jobs, markets and geographies of production
3. A more dynamic and competitive economy with new patterns of movement

The Growing Urban Face of Canada

The movement of Canadians into large cities is creating special challenges for the transportation industries.

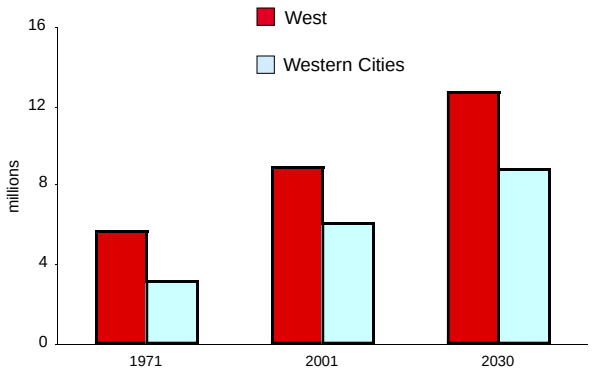
Canadians have moved to the largest cities and their surrounding hinterlands. We are leaving much of the country empty. We are traveling more abroad for both work and recreation and to maintain our social ties with relatives around the world. As a result we are concentrating our transportation demands into our cities.

In recent years, the economic geography of Canada, and particularly western Canada, has changed dramatically. Today 80% of both the Canadian and western Canadian population is urban and the vast majority of them are living in the largest metropolitan areas. Since 1966 nearly all of the population growth (97.1%) in western Canada has been in urban areas.

Westerners are rapidly moving into their largest cities. We know them as our homes – Victoria, Vancouver, Calgary, Edmonton, Saskatoon, Regina, Winnipeg. These cities have become the economic engines of western growth, accounting for seven out of ten jobs.

Metropolitan areas have become the origins and destinations for most freight movements and transshipment points. The concentration of people into cities has brought with it major development issues for those providing the transportation system.

Figure 15
Western Provincial Population Living in Cities



Source: Statistics Canada and Canada West Foundation

When societies and economies change, the infrastructure and institutions that support them must also change – including the transportation infrastructure.

[1] *World Bank, World Development Report 1994: Infrastructure for Development, Washington*

A Restructuring Economy

In the new economy, more people are employed in service activities. Increasingly, these services are being offered in our cities. The new goods and services we are producing are being sold into new markets in different parts of the world. Our connections with the US have strengthened under the North American Free Trade Agreement. Our trade with the rest of the world continues to grow throughout the Pacific Rim, Latin America, Europe and the former Soviet Union countries.

We take part in these trading links from our cities. Business and personal travel is increasing. Canadians have incorporated mobility as a central factor of our lives, work, recreation and our economy. Business activities require travel to meet clients in person. As our markets become global, so do our needs for new transport links to service them.

Canadians are incredibly mobile. Thirteen million travel to and from work each day making some six trillion trips each year and an equal number for personal recreational purposes. Nearly 20 million airline trips occur each year.

The cumulative effects of rising immigration into Canada increases demand for return and relative travel to and from the old country of origin. We expect that transportation services will be available when we want them at prices we can afford. When they are not, we complain.

The transformation of our economy has linked our society and economy to the world – it is transportation that must provide the connections.

Dynamic Patterns of Movement

Both social and economic mobility continues to rise. The competitive nature of the economy that has come with NAFTA and the globalization of world markets has brought with it changes in movement patterns on a daily, weekly and monthly basis as people and industries respond to price incentives for travel in the marketplace. These developments are creating far more dynamic and competitive travel patterns that are more difficult to predict and therefore to provide the most appropriate level of transport service and infrastructure.

These developments are arising from the concentration of socio-economic activities in our cities where many transportation systems are now working at close to capacity. As particular systems exceed capacity they become less efficient, creating congestion that may eventually result in gridlock on the roads, or bottlenecks on the rail system.

The new dynamics of competitive transportation have become apparent in the deregulation of grain handling and transportation. There has been a move away from branch line rail movements towards trucking to bring grain to fewer major unit train assembly points. Traditionally the country collection of grain had been highly predictable as administered by the Canadian Wheat Board, but not very competitive (Fig. 16).

The growing use of trucking combined with deregulation has allowed for more route combinations and price incentives from grain handlers today results in dynamic movement patterns. The movements are highly competitive, have increased returns to farmers, and change daily but also increase the complexity of rural highway planning (Figs. 16 & 17).

Figure 16
Administered Grain Deliveries

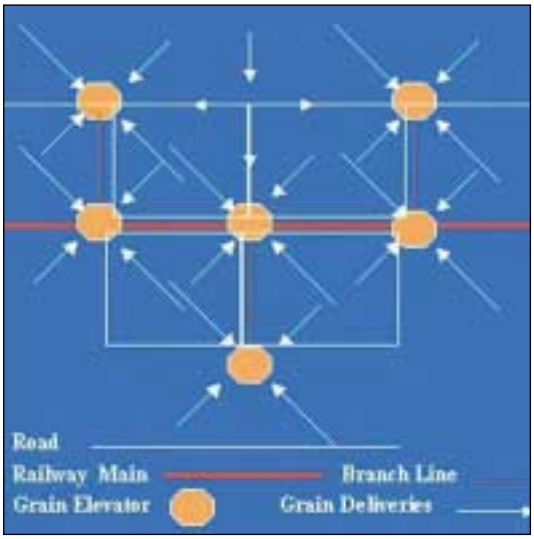
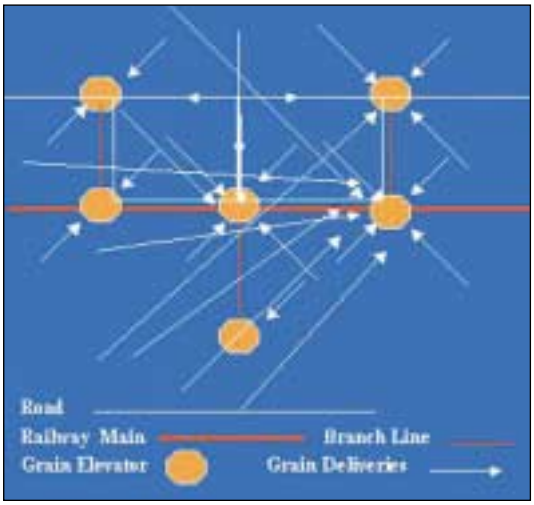


Figure 17
Dynamic Competitive Grain Deliveries



It has been estimated that this shift towards dynamic competitive markets in the country collection of grain has been worth millions of dollars to prairie grain farmers.[2] The developments in prairie grain handling are today repeated throughout the competitive economy. Just-in-time delivery, competitive bidding for supplies, multiple suppliers and competition between modes have removed much of the certainty that was traditionally associated with traffic planning. Understanding this competitive dynamic is now essential for effective investments in transportation infrastructure.

Transport Infrastructure for the New Economy

The economy of the 21st century is networked. New transportation and communication links are being built between all major cities in Canada and around the world, between the larger cities and smaller towns, into the hinterlands that surround the cities and within the cities. The old transportation network was not built for the new "city-centred" reality of Canada.

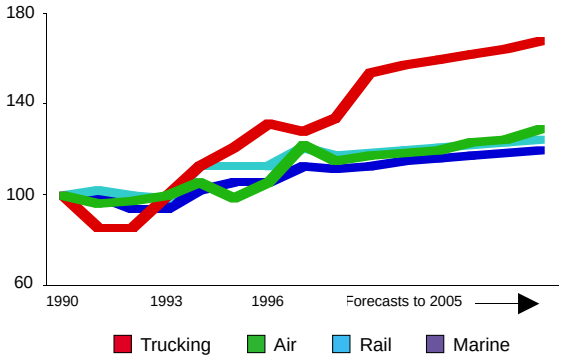
Huge investments by both industry and government will be needed for the new economy. The transportation sector must not only invest for the continued expansion of the economy and its traffic growth, but also to accommodate the concentration of people in the cities. At the same time, existing systems of transportation must be maintained.

Growth is expected to continue for nearly all modes of transportation. Figure 18 shows commercial traffic growth estimates by Transport Canada to the year 2005. Our use of roads is increasing and growth of the marine, air and rail systems is sustained - in short, more trucks, trains, planes and ships.

As a society we are turning towards the roads. Yet, freight and passenger vehicles compete for the increasingly scarce road space. Railway movements cut across roads and hold up road traffic. Access to airports becomes congested and more and more flights centre around fewer airline regional hubs. Some airports require expansion, others are not used sufficiently. Road–rail route separation requires land that is already in use. Intermodal terminals require construction. There seems to be no end to the infrastructure requirements as we build more freeways, interchanges, bridges, transit, ports and more large airports.

But money for such investments and spending is limited. Where should it go? Which cities? Which modes? When? Who should pay - government, drivers, the public, industry? These are difficult choices we all face as the economy grows and we choose among financing alternatives. Our way of life depends on making the right decisions.

Figure 18
Index of Freight Traffic Growth 1990 – 1999
Forecast to 2005 (1990 = 100)



Source: Transport Canada

The old transportation network was not built for the new "city-centred" reality of Canada.

[2] *Parsons, G., and Wilson, W., A Canada-U.S. Comparison of Grain Handling and Transportation, OWEC, Regina, 2001*

Difficult Decision-Making for Transportation

Addressing the Capacity Issues

Canada's transportation capacity issues are real. All modes of transportation are under stress. For many years the transportation industries of Canada addressed their capacity issues through increasing efficiency by investing in new technologies, better information management, just-in-time deliveries, improved management practices and fuel efficiencies. These measures allowed the industry to steadily increase productivity through most of the 1990s with productivity rising for the sector by 2.8% per year and output rising by 6.8%. However, by the year 2000 productivity growth was showing declines and the growth in output had fallen by 28%[3] (Fig. 19).

While increasing energy prices have been a factor in the declining productivity, it is also apparent that in many parts of Canada, such as Vancouver's Lower Mainland, the system is approaching physical capacity constraints.

A study by the Canada West Foundation on transportation capacity constraints in western Canada alone identified a transport infrastructure investment shortfall of $116 billion[4] (Table 5).

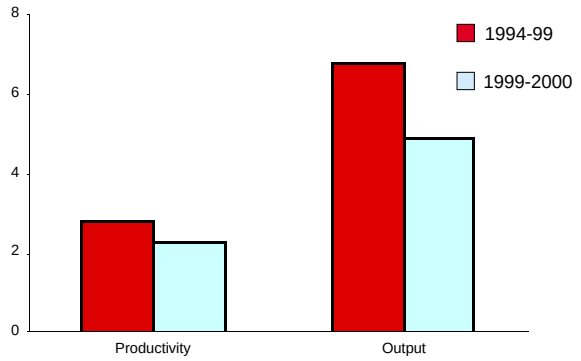
Transportation "hotspots" identified as growing congestion points in the western transportation system were:

- west coast container ports reaching capacity by 2005
- air, sea and road links in Victoria
- rapid transit and the Fraser River crossings in Vancouver
- transit capacity expansion in Calgary
- airport expansions
- road rehabilitation in all western cities

Across Canada the infrastructure investment shortfall is much larger and has for many years been well documented. In 1989, the Transportation Association of Canada's National Highway Study found that 40% of the national highway network was substandard. In 1998 the Council of Ministers Responsible for Transportation and Highway Safety estimated that $17 billion would be required to bring the national highway system to currently acceptable standards.

Financing for such huge transportation investments is unlikely to come from government alone. Transport Canada estimates that in 2001/2 federal and provincial governments combined collected some $13.8 billion from all transport users through fuel taxes, fees, leases, licenses and other sources and spent some $19.2 billion leaving a transportation deficit of $5.4 billion (Fig. 20). Such fiscal deficits cumulate each year and add to the total unfunded transportation infrastructure and maintenance liability.

Figure 19
Changes in Productivity and Output Growth
Transportation Industries, Canada, 1994-99 and 1999-2000

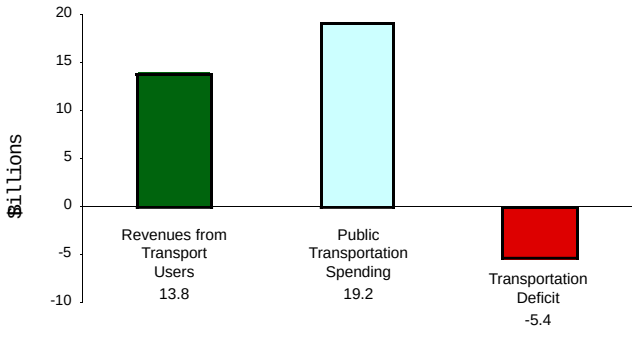


Source: Transport Canada

Table 5
Estimated Transportation Investment Shortfalls
Over 20 Years in Western Canada

Transportation Sector	Estimated 20 Year Investment Requirement
Road	$57 Billion
Rail	No estimate
Air	$31Billion
Marine	$4 Billion
Urban	$23.5 Billion
Total	**$116 Billion +**

Figure 20
Government Transportation Account
Federal and Provincial Governments, 2001/2



Source: Transport Canada

3 Transport Canada, Price Productivity and Financial Performance in the Transportation Sector, Transportation in Canada 2000

4 Canada West Foundation, Building the New Dream, Calgary, 2003

Investment in capacity alone is unlikely to resolve all of Canada's transportation capacity issues. For many years traffic planners estimated how much traffic was expected to grow, and then argued for capacity investments to cope. It was known as the "predict and provide" model of transport planning.[5] The problem was that building increased capacity alone is not enough. More roads, interchanges and freeways are not a guarantee for improved traffic movement. In the UK, Margaret Thatcher's "Roads to Prosperity Program", the largest since Roman roads were built, could not keep pace with the growth in traffic.

It becomes increasingly important for society to consider other alternatives to transportation investment, including demand management and modal competition.

Managing traffic at close to infrastructure capacity is made more difficult by the fact that, as the transportation systems approach their limits, they become increasingly unstable. Small failures can become system-wide problems.

We see this in a single malfunctioning traffic light or a crash creating gridlock in our big city traffic jams, or the lines at airports when computer systems fail, or a labour dispute shuts down a port.

Faced with continuous capacity limitations and limits on capital financing, it becomes increasingly important for society to consider other alternatives to transportation investment, including demand management and modal competition. In doing so, longer term sustainable solutions become possible.

Balancing Social, Economic and Environmental Interests

Decision-making for transportation is further complicated since we use our transportation systems for both social and economic purposes and finance them accordingly. As more and more of our transportation infrastructure concentrates into the geographically limited space of our cities, the conflicts between social, economic and environmental interests emerge.

The urban focus of our new and rapidly growing transportation requirements is a high-density, often congested, multi-use landscape. Within this environment there are a wide range of political interests, not all of whom have the same interest in transportation efficiency. Social and environmental costs may be high and not reflected in pricing.

For some people access to transportation is an essential social service as when the ambulance rushes to a hospital or the young catch the bus to school. At other times taking the kids to dancing or our vacation into the mountains may be discretionary, but we all make social use of a transportation network that may have originally been built for the needs of the economy. As we crowd into cities multiple users demand use of the networks for multiple purposes.

As our economy expands, urban transportation conflicts are becoming apparent in our use of the system. Traffic congestion grows daily, and air quality deteriorates in traffic jams. Public transit slows. Issues of road safety, travel to work times, and increased costs of movement are growing. Bottlenecks and long delays occur at difficult route intersections.

Our personal and natural environments are challenged with the noise, pollution and extended use of the transportation networks. At the other end of the spectrum, rural transportation services are no longer profitable, spending on maintenance declines and some paved roads revert to gravel.

Like it or not, decision-making for transportation has become far more complicated. It will in the years ahead involve many more groups with interests in the scale and direction of the system and the physical infrastructure that we live with daily.

5 Goodwin, P., Transport Planning Society Annual Lecture, Institution of Civil Engineers, London, 2002

Transportation and a Sustainable Environment

The concentration of transportation infrastructure into cities is generally seen as having a negative effect on the environment. Transportation industries do make major contributions to greenhouse gas emissions in Canada. They are estimated by Natural Resources Canada at 35% of all emissions or 157 megatonnes of carbon dioxide ($C0_2$) equivalents.

Most of the transportation emissions are from road transportation, through our personal love affairs with cars, SUVs and mini-vans, our preferred means of private transportation, as well as from commercial truck traffic. Cars and trucks are also a growing source of carbon dioxide emissions, although some progress is now being made to lower the emissions from light duty gas vehicles.

Significantly, in the Environment Canada current assessment of greenhouse gas emissions for transportation vehicles it is clear the air, marine and rail modes have far lower levels of emissions.

With transportation demands doubling through to 2020 it is likely that our mobile car-based lifestyles will burn even more fossil fuels in the form of gasoline, diesel and aviation fuels in the years ahead. In the close concentrations of our cities these emissions are known to have hazardous effects on our health.

It is not only the emissions from traffic. The expansion of paved roads throughout cities can have major effects on water run-off above and below ground where we look for clean water as a Canadian right.

Exhausts from airplanes regularly enter into our environment. Noise is an unintended by-product that we grow to accept, but not necessarily appreciate.

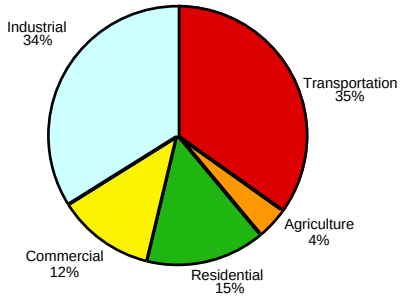
Three pressure points are now central to the future role of transportation in our environment:

1. The contribution to global warming
2. Physical contributions to the environment through air, noise and water pollution
3. Sustainability for transport and the environment

The transportation sector itself contains solutions to many of these environmental problems. Increased fuel efficiency, fuel cells and ethanol can all either reduce or look to zero emissions. Public transit and car pooling could substantially reduce trip requirements. Shifting freight traffic towards newer and cleaner modes can further reduce emissions.

The external environmental costs of transportation have become substantial, particularly in many of our larger cities. The status quo is not sustainable.

Figure 21
Sources of Greenhouse Gas Emissions in Canada



Source: Natural Resources Canada

The external environmental costs of transportation have become substantial, particularly in many of our larger cities. The status quo is not sustainable.

Table 6
Selected Domestic Transportation Vehicle
Greenhouse Gas Emissions 1990 to 2000

Vehicle Mode and Type	Share of 2000 Total	Share of 1999-2000 Growth
Road Vehicles		
Light-Duty Gas (cars)	27%	-16%
Light-Duty Gas Trucks (includes Mini Vans)	20%	44%
Heavy-Duty Gas	3%	8%
Heavy-Duty Diesel Trucks	21%	40%
Off-Road Diesel	10%	21%
Air	8%	9%
Marine	3%	0%
Rail	4%	-1%

Source: Environment Canada

Transportation planning in our cities and across Canada has no option but to incorporate environmental considerations into its design. There are therefore opportunities for residents and workers alike to adopt and support transportation practices that would sustain the environment. These can include such practices as:

- **Improved air quality and energy efficiency** through reduced emissions of lead, $C0_2$, and other pollutants, transit and pooling options, energy efficient engines.
- **Reduced noise pollution** by using quieter engines, building noise buffers into corridor design, and introducing noise standards for roads, railways and in the air.
- **Protecting water supplies** by controlling water run-off in new infrastructure development, extracting pollutants, applying absorbing pavement designs.
- **Reducing light pollution** through modern efficient street lighting and buffers.
- **Routing and construction** to protect historic, cultural and recreational sites, redeveloping brown field sites and removing pollutants during construction in environmentally sustainable ways.
- **Links to recycling sites** with improved transportation connections.

The transportation industry is already undertaking all of these activities to some degree in many parts of Canada. Whether environmental considerations are to become central to the operation of the industry will depend in large part on the views of the citizens who travel on the roads, fill up their cars with fuel at gas stations, too frequently choosing not to pay an environmental premium or not to use public transit.

Changing transportation to meet our collective needs for a sustainable environment is a question of our personal tastes, preferences and priorities as much as an industry decision.

Financing the System

The economy that creates our jobs and incomes has also financed much of the transportation system.

Private investments in transportation facilities are expected to make financial returns that are reflected in the price of the service offered. When prices are set appropriately, then transportation operations can be profitable, generating funds for future

Changing transportation to meet our collective needs for a sustainable environment is a question of our personal tastes, preferences and priorities, as much as an industry decision.

expansion, the application of new technologies and retaining our markets and competitive positions.

Most of the transportation system is privately financed. Rail has done so for many years, as have all private cars, trucking, shipping and private ports and, for at least ten years, all air business. Historically some sectors did receive significant federal subsidies, but this is no longer the case and federal contributions have shifted from being a net contributor to a net recipient of many funds that could have been previously invested. For example, the air sector now contributes in the order of $400 million each year to the federal government from rents, fuel taxes and other fees.

Some critical transportation investment decisions, are still made through governments, particularly in roads, as well as in airports, ports and to a lesser degree railways. Part of the rationale for these public investments lies in a recognition of the dual social and economic roles of transportation activities and their benefits for society.

The measuring sticks for transportation investments differ in the public and private sectors. Profitability is a clear measure of return for the private sector seeking revenues greater than costs and selecting between investment projects on this criteria. Government investments take into account broad public interests and are conceptually based on a comparison of the wider interests of society and the economy.

In many cases transportation projects are very large and expensive. While initial front-end costs of construction may be high for a new berth at a port, an airport or a road, the marginal costs of use are low. The widest collective public benefit is therefore found by encouraging high levels of public use by charging low or no prices for use of the system. For the most part our roads are free to drive on. This system of public pricing and financing has generally worked well where there has been spare capacity.

However, as our collective use of transportation systems grows for both economic and social purposes, we are approaching capacity limits on some infrastructure in some locations. These infrastructure capacity constraints are apparent now across Canada. In Vancouver, airport expansion and the growth of the city (and soon the 2010 Olympics) have created access and congestion problems for reaching or traveling through downtown during rush hours.

Neither the Port Mann nor the Knight Street bridges was constructed for the volumes, weights and sizes of vehicles that now pass over them. In both cases the bridge investments that have been considered for years have raised many questions of pricing, environmental impacts, and the real beneficiaries of the investments.

There are simple and well known economic lessons to address some of the capacity problems in our transportation infrastructure. Demand management through pricing in the form of toll roads, licenses, or other user charges can ration the scarce capacity. These prices make users aware of the costs they impose on society and of providing the capacity they use. Revenues from these sources provide clear signals to transport planners on the need for expanded capacity.

We regularly adopt these principles in paying for downtown parking in the core of our cities or to purchase airline fares, but we are less willing to consider the tolls, fees and payments for our own road movements.

After all, to date we have been able to use the infrastructure for free so why should we pay now? And haven't we already paid for our roads through our fuel taxes that most of us believe are never returned to road construction and maintenance anyway?

Around the world and across Canada we are moving slowly towards new approaches in infrastructure financing. Our airports charge departure taxes, the Confederation Bridge from the mainland to Prince Edward Island is a toll bridge, Highway 407 near Toronto is a toll freeway designed to allow commercial traffic to bypass the city. In London, England, daytime travel in and out of the City has now been priced with dramatic effects on capacity utilization.

Clearly, new transportation infrastructure is needed to accommodate new travel patterns, and a new society and economy. Yet there is little consensus on the method of financing these investments. Historically, funding for the required transportation investments was allocated to municipalities in the countryside and has not moved to the city with people and industry. Federal and provincial governments have for the most part not adjusted their financing instruments to meet the new urban municipal transportation needs.

Unlike many other industrialized countries, Canada does not have a national infrastructure program. In addition, there are structural financing issues that warrant our attention. Many of the capacity investment requirements are within the major cities, yet the provincially controlled financing base of cities, founded in the property tax, is totally insufficient for the needs of a modern urban economy. Other urban jurisdictions have a wider and more stable base for transportation funding. Funding sources available to Denver compared to Calgary provide a more stable environment for long term infrastructure planning (Table 7). Addressing the transportation financing crisis will therefore require an examination of metropolitan-provincial revenue sharing to determine a financing base consistent with the functions of each jurisdiction.

The capacity to finance major increases in transportation investments will depend in part on the sustainable financial health of the transportation industry. Recent years have seen each of the major components of Canada's transportation sector under financial pressure. Airport lease agreements with Transport Canada have in many cases left private and community airports under-capitalized. It has been estimated that the federal National Airport System is extracting a quarter of a billion dollars each year out of the airport system through its lease agreements. Air Canada is working around bankruptcy protection.

Haven't we already paid for our roads through our fuel taxes that most of us believe are never returned to road construction and maintenance anyway?

Table 7
Comparison of Transportation Funding Sources
Calgary and Denver, 2003

Denver, United States	Calgary, Canada
Property tax	Property tax
Employee head tax	Business tax
Franchise/business taxes	Franchise taxes
Federal/State Grants	Fuel tax sharing
General retail sales tax	Federal provincial grants
Local lodging sales tax	
Other selective sales/excise taxes	
Real estate transfer tax	
State tobacco tax sharing	
State liquor tax sharing	
State fuel tax sharing	
State lottery revenue sharing	
State vehicle registration revenues	
State sales tax sharing	

Source: Canada West Foundation

Trucking companies are working at margins that are well below half of their US competitors. Marine operators have shifted some operations offshore in order to increase returns. Railway companies have seen financial returns reduced by the appreciation of the Canadian dollar against the US dollar. Governments have commonly deferred major decisions on infrastructure investments. All modes have seen profits reduced because of high fuel costs, despite the introduction of energy surcharges.

The current financial environment is not supportive of a stable long term planning framework for transport infrastructure investments. New approaches are required.

Equity Issues – Who Owns the Infrastructure?

Financing issues of transportation infrastructure are made more difficult by the differential treatment of infrastructure ownership. Put simply, roads are used by the public and thousands of commercial carriers and with a very few exceptions are paid for by the state. Via Rail remains a state funded organization. Other carriers like railways and increasingly airlines raise capital privately to pay for their infrastructure in the form of railway lines or airline terminals.

Major changes are underway with respect to ownership and financing. Air Canada has been privatized. The federal government moves towards full cost recovery at ports and airports through a combination of fees and lease payments. Public, private and partnership toll roads are being used. There are also movements for smaller private rail users to gain forced access to the private rail lines of the major carriers owned by CN and the CPR.

The New Political Economy of Transportation

The economics of decision-making for transportation is complex at the best of times. Decisions involve public and private interests, many ownership, pricing and financing options, administered and free markets, and government interventions for the priority of the day.

Transportation decisions have always had a strong political element, since much of the funding for the system is derived from the public sector. As we have moved to the cities, however, the political science of transportation is coming to the forefront. Overt external economies and diseconomies are now involved in most transportation decisions. Stakeholder interests emerge in connection with major new projects and rarely is there any unanimous view. Environmental, economic and social considerations all mix together into the political decision-making basket. Our decision-making frameworks for transportation have often become so complicated that we no longer make any decisions. Yet in the absence of decisions we carry both public and private costs.

In making our decisions on transportation we have for too long forgotten about our wider social and economic interests in transportation. Our civil engineering and scientific knowledge can be world class, but this alone will not make for good decisions.

The current financial environment is not supportive of a stable long term planning framework for transport infrastructure investments. New approaches are required.

"We can address all the technical issues …. But the complexity of decision-making is enormous."

John Mason, Mayor, Fairfax City, Virginia, U.S.A.

US Border and Security Issues

Canada is now highly integrated with our US neighbour. Canada-US trade is growing at about 10% each year. 85% of Canada's exports go to the US; half of the air cargo and more than 28% of the rail freight. The most common movement across the border is by trucks which carry nearly two-thirds of our US exports south and 80% of our imports north.

US homeland security issues have complicated border crossings. Long lineups have developed at peak times. Automated controls and off border customs facilities and clearances will be required at border crossing points to reduce waiting times. Increased surveillance and security is required at airports. The introduction of these procedures to date has clearly reduced efficiency at both borders and airports.

Increased investment, however, will be required to remove this constraint that has now simply become a pre-condition of Canada-US trade (Fig. 22).

Our National Connections

The border issues are symptomatic of a longer term trend for Canada to develop north-south trading and transportation connections rather than east-west routes. The Pacific Northwest Economic Development Council on the west coast, the Rocky Mountain Corridor from Alberta south, the Red River Corridor from Manitoba south, the acquisition of Illinois Central Railroad by Canadian National are visible evidence of the growing north-south trading links from Canada.

Inter-provincial and international trade in Canada were about equal through the 1980s. Through the 1990s the growth rate of international trade was more than double that of domestic trade. In western Canada international exports' share of the national economy (GDP) rose from 18.8% in 1981 to 34.0% by 2001. In contrast interprovincial exports, or the west's connections with the rest of Canada, fell from 22.5% to 19.9% (Figure 23). Similar trends existed through the rest of Canada.

This is a significant realignment of national trading patterns and has major long term implications for the transportation connections within Confederation. As the "economic glue" of Confederation weakens then so does the need for the transportation connections.[6]

In 1995 Helliwell and McCallum were able to write: "the trade generating powers of the Canadian economic union are an order of magnitude greater than the trade generating powers of both NAFTA and the European Union." [7] This is no longer the case.

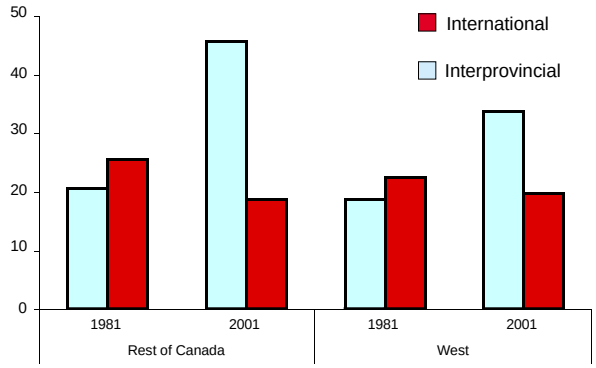
Earlier in our country's history the building of the railway was part of a political and economic strategy to provide physical links across Canada's seven thousand kilometer expanse. Transportation infrastructure tied Confederation together then and it still does today. The real cost of movement from western Canada is today lower into many parts of the US than to the rest of Canada and in many cases is also more convenient, in spite of cross border security issues.

As was the case earlier in our history, investment in our east-west transportation connections within Canada, may be an important pre-requisite to strengthening the human, social, economic and therefore political ties within Confederation.

Figure 22
Canada-US Border Crossing Points

Source: Statistics Canada

Figure 23
Interprovincial and International Exports as % of GDP
Western Canada & the Rest of Canada, 1981 and 2001



Source: Statistics Canada

[6] *Arcus, P., and Parsons, G., Interprovincial Trade and National Unity, Canada West Foundation, Calgary, 1996*

[7] *Helliwell, J.F., and McCallum, J., National Borders Still Matter for Trade, Policy Options, Ottawa, 1995*

THE PRESCRIPTIONS

A Prescription for Health in Transportation

Allowing our transportation system to change and grow, taking into account our social, economic and environmental concerns, will not be an easy task. Current practices and the status quo are not leading to timely decisions for society, the economy, the environment or the transportation industry. This situation is not healthy and we all lose.

In the absence of decisions, the transportation system must operate within its rapidly emerging infrastructure constraints. Maintaining the status quo continues some peak capacity constraints, financial transfers out of the industry and a range of social preference and environmental physical health issues. Most of us are aware of many of the problems, but it is time a more prescriptive agenda was developed to proactively address the problems in transportation.

Restoring health to transportation requires comprehensive approaches for transportation evaluation and development to re-open the slowly closing social and economic arteries of the nation. The prescription contains several medicines. These are:

1. Comprehensive project evaluations
2. Adopting new technologies
3. The right environment for investment
4. Providing for competition & economic competitive regulation
5. A priority for transportation

Restoring health to transportation requires comprehensive approaches for transportation evaluation and development to re-open the slowly closing social and economic arteries of the nation.

Without investments to upgrade the performance and capacity of the BC Lower Mainland's transportation system, there will be significant losses… by 2021, a loss of Gross Domestic Product exceeding $475 million/year (with an upper range of $1.1 billion). That translates to a loss of over 7,000 jobs (with an expected range of up to 16,000 jobs).

Greater Vancouver Gateway Council, 2003

Social Cost Benefit Analysis (CBA)

(Established economic evaluation techniques for projects with broad private and public effects, typical of transportation investments)

When private firms make investments they typically:
- identify investment options and opportunities;
- compare an estimated stream of revenues and costs over the life of the project by discounting the value of the future to create a net worth of each project; and
- select projects with the highest net worth and always with a positive financial return.

Many larger investments, such as transportation projects have significant public benefits and costs associated with them. For example, road congestion may create acid rain with consequences far distant from the location of the congestion. Road improvements may reduce private maintenance costs. Expanded port capacity may reduce transport costs by ship, gain market share for shippers and create sustainable employment. Transit investments may reduce road congestion. The list of impacts both positive and negative can be large and diverse.

These public impact transport projects are also amenable to systematic evaluation using social CBA to make decisions on alternatives. This requires the normal financial evaluation of private costs and benefits, supplemented by a similar evaluation of imputed and estimated values for the public costs and benefits. The imputed dollar values of the public effects are usually estimated on the basis of what consumers are willing to pay for them. However, prices set in the marketplace do not always reflect the true social costs and benefits. Imputed dollar estimates must therefore be adjusted to reflect these differences.

Social CBA is a well-established tool for investment decisions in many international projects. Procedures are well established and accepted. The methodology is important in transport project evaluation since it combines private values and preferences with public values and preferences. It also has the capacity to accommodate a wide range of private and public preferences within one evaluation framework and still allow decisions to be made.

Some Illustrative Examples of Cost Benefit Analysis in Transportation

1. Paving of Gravel Roads

Costs	Benefits
Construction	Reduction in vehicle operating costs and driving times
Maintenance of pavement	Avoidance of maintenance costs on gravel roads
Environmental impacts on wildlife and water	Reduction of dust
Safety effects of speed	Increased comfort and safety

2. Expanding a Port

Costs	Benefits
Construction	Ship and Freight Revenues
Operating costs	High wage employment
Traffic congestion to port	New market opportunities
Land development options	Fiscal effects
Environmental impacts	Environmental impacts

3. A New Freeway

Costs	Benefits
Construction	Reduced travel time
Maintenance	Reduced repair and maintenance
Traffic congestion	Congestion relief elsewhere
Environmental impacts	Environmental
Land use	

1. Comprehensive Project Evaluation

As transportation concentrates into our cities, it becomes critical that we adopt more comprehensive evaluation frameworks to ensure that all sociol, economic, and environmental considerations are taken into account. In practical terms this is a social cost-benefit evaluation with a clear environmental and secondary economic component. Many countries and cities are already adopting more comprehensive evaluation frameworks to accommodate the wider set of stakeholder interests now more apparent and vocal in our cities.

Demand management and pricing alternatives require far more evaluation in transportation assessments. As a society we have been loathe to consider pricing in our personal road transportation, yet the principle is applied each day when we pay for airline tickets, commercial freight rates, downtown parking, or hotel rooms. The application of demand management to the most congested parts of our urban roads could have dramatic consequences for the national transport infrastructure investment requirement.

Longer term transportation system planning should become a normal part of the transport investment evaluation procedures, developed cooperatively among government, industry, the transportation system and the public. The longer context is really the only framework in which such important transportation considerations as modal alternatives, economic opportunity, competition, environment, health, safety and pricing instruments can be fully evaluated.

Evaluation frameworks are important not simply to obtain good decisions. They are equally important because they provide a decision-making framework to accommodate far more of the costs and the benefits of transportation projects. Too often decision-making has been based on simple project costs and revenues, and not included the wider effects of these projects. Both decision-makers and the public should expect that a full range of considerations are taken into account in any major investment decision.

Transport projects are often expensive to start with. Wrong decisions further increase costs to the economy and society and wastes scarce investment capital.

In practice more rigorous evaluation frameworks can help provide a better way of choosing among scarce resources. Equally important, more open evaluation procedures provide the public input required now under the prevailing federal and provincial environmental assessment laws. They allow the political process to make timely decisions – this has not always been the case.

When more comprehensive decision-making procedures have been agreed to, it is more likely that decisions can be implemented without court and public challenges and the related costs of continuing uncertainty for the economy and the traveling public.

2. Adopting New Technologies

Transportation industries have been leaders in adopting new technologies. From the steam engines to the diesel locomotive, to fuel efficiencies in the air and on the water, the track record of Canadian carriers is very good.

The 21st century offers new innovative technologies to address many of today's transportation issues:

- rapid urban transit competing with road through lower environmental costs
- clean, quiet engines and fuels, (hydrogen, fuel cells, electric, hybrid and conventional) that it is suggested could lower commercial fleet emissions by 70% [8]
- information systems to allow users to avoid bottlenecks
- "intelligent" border crossing technologies
- smaller and larger vehicles
- advanced multi-modal container technologies

[8] *Organisation of Motor Vehicle Manufacturers, Paris, 1998*

3. The Right Environment for Investment

Investments will not be made unless there is the right fiscal and regulatory environment.

All infrastructure or new technology advances cost money to develop and deploy. Their application will depend on financial returns that must be accepted in either social or economic terms for the investment decisions to be made. At present several issues restrain investment into the sector.

There is a widespread public perception that tax funds collected in transportation related activities are not returned into the sector. It is suggested that changing this alone will satisfy the transportation investment gap.

In practice the financing framework for transportation is far more complex. Federal and provincial governments collected some $13.8 billion in revenues from fuel taxes, license and lease fees and other charges. They spent some $19.2 billion in operating, maintenance, capital and subsidies, primarily on the public road system.

All governments in Canada combined spend a little more ($1 billion) than they collect from transportation activity. The public road and transit systems account for nearly all public revenues and government spending. For the other modes, subsidies such as the Crows Nest Freight Rate and Western Grain Transportation Act payments to railways and various port subsidies were mostly removed in the 1990s.

Transportation pressures warranting government attention exist at specific points in the system. Often, however, spending by governments has not been swift to respond to these pressure points.

Significant anomalies exist within government fiscal regimes towards transportation. In 2001/2 the federal government collected $4.7 billion in fuel taxes, primarily from road users, and returned only $0.4 billion in direct federal spending on roads. At the same time, provincial governments collected some $7 billion from their share of the fuel taxes and spent nearly twice as much ($13 billion) on roads through their governments and local municipalities.

This situation is not keeping pace with other developed industrial countries. In the US, the Transportation Equity Act provides for $248 billion (Canadian dollars) over six years for federal aid to highways – the equivalent in Canada would be $41.3 billion each year or $4.6 billion after adjusting for the smaller size of Canada's population and economy.

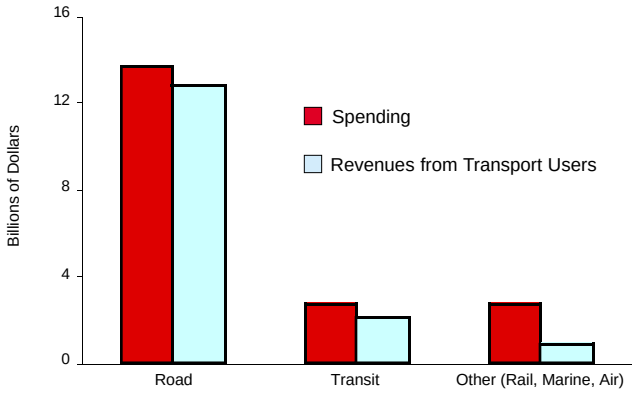
Clearly there is a stronger US federal commitment to roads than exists in Canada. Even the recent $2 billion federal infrastructure program, not all of which will go to roads, will not make up a difference of this magnitude.

In another arena, some provinces use diesel fuel taxes as a means of taxing out-of-province users of their transportation system with significant economic consequences for other provinces.[9] Far more neutrality and stability in taxation is required between modes and regions of Canada for a stable infrastructure investment program to develop.

Flexible financing instruments should be examined to help meet the rapidly changing transportation demands of society and the economy.

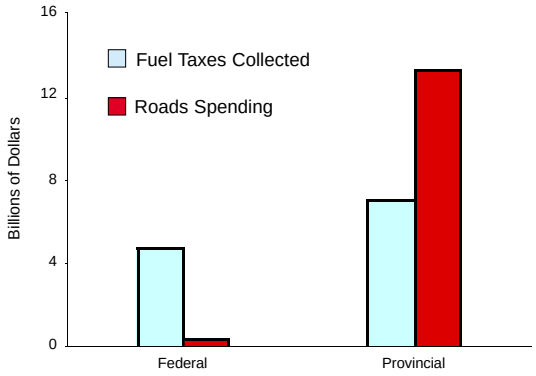
For too many years in Canada, infrastructure spending has been a politically attractive platform for the latest election. Transportation spending should not be seen as a short term electoral fix, but rather a sustained re-investment into our society and economy.

Figure 24
Federal and Provincial Transportation Revenues and Expenditures by Mode, 2001/2



Source: Transport Canada, 2002

Figure 25
Federal and Provincial Fuel Tax Revenues & Roads Spending, 2001/2



Source: Transport Canada, 2003

[9] *Parsons, G., and Howe, E., Provincial Rail Taxes in Western Canada, Regina, 1996*

Some of these fiscal issues have been addressed in other developed countries through a framework for national transportation planning. While Canada does have a Council of Highways and Transportation Ministers, this does not represent a stable long term non-political planning forum.

National transportation plans exist for the US and in the national governments of Europe. The European Union is now embarking on a European Plan for Sustainable Transportation.

A National Transportation Investment Fund

The national transportation system is mainly financed by the private sector. However, deferred public sector investment decisions, or an inability to make any decisions on critical public sector transport infrastructure requirements, now too often constrain transport capacity and lead to bottlenecks in the system with adverse effects on the economy and the related private sector investments.

It is time Canada established a National Transportation Investment Fund for federal, provincial and even private contributions through public-private partnerships (P3s) with the public sector. The Fund administration would develop a 20-year National Transportation Plan to be revised every five years and operated as a non-government agency, with a mandate to make transport infrastructure investments in all modes of transportation through the public and private sectors and also into P3s.

Modal elements within the National Transportation Plan would provide for a national highways program and other programs as needed. The agency would be expected to employ the latest evaluation techniques and advanced technologies to retain Canada's global position as a leader in transportation. It would therefore incorporate social, economic and environmental effects into its project evaluations.

Non-political application procedures would be required to allow for applications for funds to be made by the public, private and P3 sectors. A range of innovative solutions for both the public and private sectors would be required to solve Canada's emerging transportation problems. They should not be confined by ideological constraints within any financing system and should provide for timely decisions.

4. Providing for Competition & Economic Competitive Regulation

The need for competition is recognized clearly in the *Canada Transportation Act* when it states:

> *competition and market forces are, whenever possible, the prime agents in providing viable and effective transportation services*
>
> Section 5 (b) 1996

For many years transportation operated under a highly regulated framework. Much progress has been made in recent years to open up the industry to competition – Open Skies in the air, deregulating grain handling in the prairies, the federal privatizations of marine and air facilities.

Ominously, the transportation pressures emerging for the Canadian economy and from security concerns could bring about a return to a world of greater regulation and administered markets as a solution. This might have short term appeal but, in the longer term will not be sustainable.

The pressure of market forces in a competitive environment will provide economic efficiency, the financing to address capacity constraints and the innovation to adopt new technologies.

Government regulation, federal and provincial, remains a barrier to swift adjustment by Canada's transportation system to new social and economic realities. It will be important in the years ahead that the process of regulatory decision-making be simplified and allowed to adjust more rapidly.

Keep Canada Moving...

- Create a National Transportation Investment Strategy. This strategy should be multi-modal and funding should come from within the current spending envelope without raising taxes.
- Commit the revenues collected from fuel excise tax towards a fund for the maintenance and renewal of infrastructure. Funds should be directed towards the mode from which they were derived.

Source: The Canadian Chamber of Commerce, *Keep Canada Moving: The Transportation Infrastructure and the Economic Realities for Canada's Transportation Policy*, 2001

The process of deregulating grain began in the 1960s with the MacPherson Royal Commission and continues to the present day. This slow pace of regulatory change is no longer satisfactory to the highly vocal residents of our cities waiting in line to go to work in the morning or to go home at night. Far faster – non-political regulatory procedures and more cooperation between federal and provincial governments will be required particularly for transportation and the environmental review procedures.

5. A Priority for Transportation

Serious attention must be given to the administrative overlaps that exist between federal, provincial and municipal governments on transportation matters. The cities have become the sites of congestion and capacity constraints, yet the funding and jurisdiction to address these issues lies outside their boundaries. Governments should attempt to be neutral among modes of transport and to set their regulatory frameworks accordingly.

Our collective interests in an improved transportation system are widespread. Decisions on transportation not only affect our daily lives, but also the long term economic prospects and jobs for our children and grandchildren after them. Certainly, poor transportation decisions have the capacity to increase our environmental risks and create hazards for the ozone through greenhouse gas emissions. The status quo and the lack of new investment decisions in many areas also hold significant costs for us in terms of time spent waiting in traffic jams and lost economic opportunities.

Good transportation decisions have much to offer by strengthening Canada's competitive position, improving the environment, providing social welfare and improving the quality of life for ourselves and our children. Too often we are not providing ourselves with a decision-making framework to examine these benefits.

Periodically transportation becomes a high priority for government. Recently this has occurred in some of our major cities when gridlock increases travel times with immediate effects on incomes and available recreational and family time.

It was exactly this type of public groundswell in Calgary that made extensions to the Light Rapid Transit system and Crowchild expressway expansions civic priorities.

Yet our interests in transportation extend well beyond personal inconvenience – they are also economic. Raising the priority of transportation requires that we all obtain a deeper understanding of our interests in the sector. The problems of Canada's transportation system have been known for many years within the industry.

Governments should attempt to be neutral among modes of transport and to set their regulatory frameworks accordingly.

It is now necessary for ordinary citizens to understand their own interests in the system before governments will place greater priority on transportation.

WHY WE SHOULD CARE

There are four compelling reasons why Canadians should be concerned about the future of their transportation system:

1. The costs of doing nothing
2. Our economic future
3. Our national unity
4. Sustainable livable cities

1. The Costs of Doing Nothing

The status quo is costing us right now – more than we would like to believe. In our cities, pollution costs us in drycleaning bills, auto repair charges and our stays in hospitals after accidents. The journey to work gets longer and we all have less time for family or work. We are simply en route.

Commercial traffic is also facing, in specific locations, the costs of access and congestion. As a privately funded commercial system, these costs are often passed back to consumers in higher prices at the supermarket and the department store. The full costs of this congestion is not fully known for Canadians. But a few examples can illustrate the magnitude.

In Europe, studies of the external costs of transport have suggested that from 2-8% of EU GDP could be assigned to transportation.[10] In Canada this would amount to external transportation costs of from $12-48 billion. The estimates are primarily from road traffic (89%) and to much smaller degrees from air (6%) and rail (2%) and create external costs in climate change, air pollution and traffic accidents. While the estimates are highly uncertain, they do suggest the external costs are now significant to society (Fig. 26).

Perhaps more reliable are the recent experiments with electronic social cost roads pricing in London and Paris, where the net benefits from road pricing in London has been estimated at £UK225 ($C 500 million) after implementation costs and in Paris at 2.5 billion francs ($C 600 million) before implementation costs.[11]

Congestion costs associated with reaching capacity can be large. Foregone economic opportunities or lost markets are far more difficult to estimate.

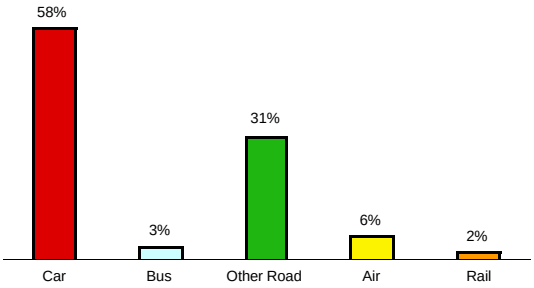
Closer to home in Vancouver, Transport Canada working with TransLink has estimated that traffic congestion in Greater Vancouver costs residents and businesses between $800 million and $1.2 billion annually and that cost is growing. Between 7,000 and 16,000 jobs are estimated to be associated with this lost economic activity.[12]

Congestion goes beyond a simple social inconvenience or personal health issue. Congestion creates very real costs for the economy. When we can't get our goods to market, we lose sales and our reliability as a secure supplier of grains, livestock or any other commodity is challenged. Our competitive position is threatened. Investment flows into more reliable transportation facilities and locations. Canada's competitive position weakens. The country loses jobs, incomes, exports and tax revenues. We all lose.

Renewing Canada's transportation infrastructure, pricing and investment frameworks can directly address many of the pressing transportation issues and create benefits across the country in both urban and rural areas.

Specifically the very process of transportation renewal will create economic, social and environmental benefits for Canadians.

Figure 26
Estimated Sources of Costs to Society from Transportation, Europe, 2000



Source: INFRAS-IWW(2000)

10 NFRAS, External Costs of Transport, Paris, 2000
European Conference of Ministers of Transport, Paris, 1998
11 MVA Consultancy, London Congestion Charging Research Programme: Principal Findings, London, 1995. Prud'homme R., Potential Welfare Gains of Road Congestion Pricing, Paris, 1999
12 The Greater Vancouver Gateway Council, Economic Impact Analysis of the Major Commercial Transportation System, Vancouver, 2003

SOME BENEFITS THAT CAN FLOW FROM TRANSPORTATION INVESTMENTS

1. INCREASED INDUSTRY COMPETITIVENESS

   Reduces costs of production and distribution. Lowers barriers to mobility.

   Increased natural resource production, manufacturing, retail and service sector access to:

   - markets and customer base at home and abroad
   - productive sources of labour
   - diverse selection of inventory and raw materials
   - competitive stimulous for productivity gains to retain markets

2. IMPROVED HOUSEHOLD WELFARE

   From access to:

   - a wider range of higher paying jobs
   - wider selections of:
     - competitively priced consumer goods
     - housing
     - health and social services
   - well maintained roads reducing personal vehicle repair costs
   - efficient public transit reducing personal car and ownership costs

3. STRONGER ECONOMIES

   - direct transportation spending
   - geographic renewal
   - access to markets for depressed regions
   - employment and incomes
   - tax revenues
   - business and leisure travel
   - expanded markets

4. REDUCED CONGESTION COSTS

   - time delays incurring costs for governments, individuals, households and companies
   - increased fuel and environmental costs and lost incomes

5. REDUCED COSTS IN ACCIDENTS

   - direct health care costs for the province and for households - major fiscal effects
   - lost time from work
   - car repair and incremental insurance

2. Our Economic Future

Canada's competitive position in the world economy is founded on the efficiency of our transportation system. Nothing will change Canada's size and physical location in the world. Efficient transportation can bridge the distance.

Accessing world markets has provided Canadians with a standard of living and quality of life that is among the highest in the world. We are rightly proud of our achievements. It is important that we understand, however, that this quality of life is fully conditional on our ability to keep delivering goods and services to the world on our transportation system, that is now lagging behind other countries. When the transportation system is threatened then so is our quality of life.

While we accept our natural mobility and right to travel on a daily basis for work, recreation or pleasure, we are far less willing to consider the degree to which we are already dependent on our transportation efficiency. Many Canadians are directly employed in transportation or its supplying industries. Nearly all Canadians use the system.

Our economic futures are more closely tied to the sustainability of our transportation networks than we might care to admit. Continuing to develop the system must become our priority simply to protect the standard of living that will be available to our children and grandchildren.

3. Our National Unity

Canada's national unity depends in large part on the country operating as a single economic union and for us as individuals to visit our relatives and friends across the land. Transportation is the physical reality of those national connections.

When transportation works well it is cheaper and easier for Canadians to operate as one country. When the transportation system has a virus in the form of bottlenecks, prohibitive pricing or simple lack of accessibility or capacity then it becomes more difficult for the country to operate as a single entity. Regionalism grows and our union is threatened.

In today's global environment with our developing US trading priority, it is all the more important to once again consider our east-west national connections within Confederation.

In 2003, one hundred and eighteen years after the last spike was hammered home to connect the east with the west on the Canadian Pacific Railway there is still no coast to coast continuous divided Trans-Canada Highway. It is as or more convenient today for western Canadians to fly to Washington, DC, as it is to fly to Ottawa. It is time to reconsider the cost and efficiency of our internal national network.

This quality of life is fully conditional on our ability to keep delivering goods and services to the world on our transportation system.

4. Sustainable Livable Cities

Investment and renewal of our transportation systems offers much for the sustainability and livability of our increasingly crowded cities.

In cities around the world, new transportation investments and pricing practices are being used to lead renewal. In doing so, transportation helps develop urban benefits:

- increased mobility and access for all classes in society by overcoming distance and improving access to services
- encouraging modal competition to reduce costs for all modes, increase disposable incomes and offer more route and modal choices
- safety benefits from reduced accidents through the separation of modes, developing integrated movement models
- community identities strengthened as increased internal interactions are encouraged within neighbourhoods and local social ties and interactions grow

Bringing About a Change

The status quo is no longer an acceptable option for the future of transportation in Canada. Change is already underway in every city and region of our country. We all have a stake in transportation solutions. We have personal connections for our mobile way of life. We have jobs that are dependant on maintaining an efficient network at prices we can afford.

The status quo is already costing Canadian business too many lost opportunities for access to markets, efficiency gains and competitive position. Individually, we carry an equally high burden of personal, income and environmental costs that now encroach on our way of life.

It is time to improve our decision making, financing and pricing systems, particularly for the public road systems. Part of the solution will lie in the wise use and allocation of public funds, but this alone will not bring back health and efficiency to transportation. More innovation, cooperation and coordination will be required. Patience, flexibility and understanding will be necessary to accommodate the diverse interests in reform.

Decisions on transportation are no longer simple economic decisions. They have great social and environmental consequences for all Canadians. Today it is more important than ever that we all understand our personal, local and national interests in improving the system.

Transportation is so central to our Canadian quality of life and current and future economic prospects that it is time for it to rise up the public policy agenda of federal and provincial governments.

This requires that more Canadians understand and express their views on their interests in transportation reform. For example:

Should Canada have a National Transportation Plan and Fund?

Are Canadians willing to consider user fees for a cleaner urban environment?

Will Canadians give up their cars for mass transit?

Can integrated intermodal transport planning cut through the Gordian transportation knot that is Vancouver's Lower Mainland?

Does traffic congestion warrant spending millions of dollars on increased capacity or should we instead stagger our working hours?

Many solutions are available to improve the health of Canada's transportation system. Both industry and governments need to hear from you on future directions for the system. We all need to become more involved in the decisions.

Talk over the questions and issues raised in this discussion paper with your fellow employees and neighbours. Become more informed on the background to these issues. Ask your elected officials about new directions in transportation.

For more information on this and other transportation issues in Canada today please contact one of the following organizations with major transportation interests.

WESTAC	www.westac.com
Air Transport Association of Canada	www.atac.ca
Association of Canadian Port Authorities	www.acpa-ports.net
Canada West Foundation	www.cwf.ca
Canadian Airports Council	www.cacairports.ca
Canadian Trucking Alliance	www.cantruck.com
Canadian Urban Transit Association	www.cutaactu.on.ca
Chamber of Maritime Commerce	www.cmc-ccm.com
Railway Association of Canada	www.railcan.ca
Transportation Association of Canada	www.tac-atc.ca
The Van Horne Institute	www.vanhorne.info

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