CANADIAN TRANSPORTATION SYSTEM - DO WE HAVE TO SHAKE IT UP TO MEET FUTURE NEEDS?

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I. Introduction

Canada is in the midst of a social and economic transformation. This transformation is being accelerated by deregulation, liberalization and globalization. It has resulted in: the growth and movement of people in and into cities; a restructuring of the economy, with new products, jobs, markets and geographies of production; a more dynamic, vibrant and competitive economy with new patterns of movement; and increased trade. These developments are having a major impact on the overall transportation network; transportation corridors; urban networks and transit; and transportation related assets. The transportation system that existed a quarter of a century had to change.

The theme of this paper is whether we have to shake the Canadian Transportation System to meet future needs? Section II describes the Canadian transportation system before the shake up. Section III describes the Canadian transportation after the shake up. Section IV describes the theoretical underpinnings for these changes. Section V envisions the future - the shortcomings and what should be done. In section VI, a few concluding remarks are made.

II. Canadian Transportation System - Before the Shake Up

In the 1980s, the Canadian transportation system was stagnant, in the stranglehold of the regulatory system. The Economic Council of Canada in its interim report stated "the hidden costs to the economy of poor regulatory performance provide, in our view, a strong justification for applying the underlying principles of competition policy, in suitably modified form to the regulated sector of the economy...". The Minister of Transport in his document *Freedom to Move* stated "...Many regulations appeared to have become obstacles to growth, innovation and competitiveness in Canadian transportation. Removing those obstacles, while protecting the public interest, became a priority in the government's national agenda for economic renewal."[1]

Given this background, we begin by reviewing the structural and regulatory situation in transportation that existed before the shake up i.e., pre-deregulation.

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* *The views expressed here are those of the authors and are not purported to be those of the Commissioner or the Competition Bureau, Industry Canada.*

A. Structure of the Canadian Transportation System: In air, there were four types of carriers: National Carriers (Air Canada and CPAir); Regional Carriers (Eastern Provincial Airlines, Quebecair, Air Ontario, Pacific Western Airlines and BC Air); Commuter and Service Local providers (several hundred); and Charter airlines. Air Canada was still a crown corporation. In rail, there were the two types of railways: Class I (CN and CP); and Class II (regional lines). More than 90% of the total trackage in Canada was owned by the two Class I carriers. CN was still a crown corporation. In trucking, the top four trucking companies in 1988 were: Federal Industries Transport Group, CP Trucks Group, TNT Canada and Delta Sierra Romeo Corporation. In international waters, in 1977 the share of cargo transported by 50 conferences (237 shipping lines) was 77% and 62% of inbound and outbound. The only significant Canadian companies (accounting for 90 percent of DWT) in 1984 were: Canada Maritime Limited, Cast (1983) Ltd., Papachristidis Maritime Inc., and Fednav Ltd.[2]

B. Regulatory Aspects of the Canadian Transportation System: In air, economic regulation in the airlines in the mid 1980s was governed by the *Aeronautics Act*, the *Air Carrier Regulations* and the *National Transportation Act* of 1967. At this stage, the major facets of economic regulation were: control of entry, prescription of routes and licence restrictions, cancellation or amendment of licences, tariff and toll regulations, base protection and positioning charges, suspension or disallowance of tariffs, appeal of freight rates, and acquisitions.[3] In rail, the railways were regulated by several federal acts[4]. The two major facets of economic regulation involved ensuring adequate quality of service to users,[5] and costing and rate matters,[6] apart from technical regulatory activities. In addition, they were subject to their respective provincial regulations. In trucking, the *Motor Vehicle Transport Act* (1954) and provincial motor carrier laws regulated highway transport. Regulation was extensive, covering: 1) Entry-Exit and Transfer Control; 2) Rate regulation; 3) Rate filing; and 4) Authority restrictions (i.e., restrictions on: commodities that could be carried, origin and destination points and routes, etc). In international waters, the *Shipping Conference Exemption Act* 1970 exempted shipping conference agreements from certain provisions of the *Combines Investigation Act*, subject to certain prohibitions. It allowed the use of tariffs, allocation of ports, regulation of times of sailings and services, and legalized pooling arrangements (revenue or of cargoes) by the shipping conference and sanctioned closed conferences. Activities such as the use of fighting ships and retaliatory action by conferences were prohibited. In domestic waters, the major facets of domestic shipping regulation were: entry control, tariff filing and control of the maximum level of rates that carriers could charge. It also covered acquisitions of shipping companies whether domestic or international.[7]

In sum, the structure of the transportation system was largely conditioned by the regulatory tenets that governed it. Competition was limited and regulations circumscribed the structure causing it to be inefficient and sub-optimal.

III. Canadian Transportation System - After the Shake Up

Twenty-five years later, the Canadian transportation system had changed dramatically. The old system had been shaken up as it was inadequate to deal with the social, economic and global transformation that was occurring. Given this transformation, the structural, regulatory, technological/ organizational and international situation in transportation that exists today, after the shake up (i.e., post-deregulation) will be reviewed.

A. Structure of the Canadian Transportation System: In air, the national, regional and local carriers were replaced by a hub and spoke network. Air Canada's family of carriers and Canadian Airlines International family of carriers (in the mid 1980s) struggled for supremacy. Ultimately, the competitive struggle between the two led to CAI's financial difficulties and to it being acquired by Air Canada (which was privatized in 1988) in 1999. Air Canada's problems continued partly due to upstart Westjet (1996). This ultimately culminated in Air Canada's bankruptcy and restructuring (2004). By 2007, WestJet had gained recognition as the second national carrier. The rail sector witnessed the birth of the shortline railways in the 1990s. CN was privatized (1995) and shorlines which had increased in number to 40 by 2007 controlled more than 25% of total trackage. Rationalization (discontinuance and transfers) and network improvements (mergers and alliances) had a significant effect on the structure. The railways were no longer just national. In trucking, none of the companies mentioned in 1988 in the top four were there by 2007. The top four companies now were: Transforce; Vitran Corporation Inc.; Mullen Group Inc.; and TransX. The initial structural changes that the industry witnessed were expansion through mergers, acquisitions or consolidations and rationalization of operations. There were application for new authorities (US), use of owner operator vehicles and change of patterns of traffic (TL vs. LTL). In water, the number of shipping conferences had fallen dramatically to 13 by 2007. Their market share for inbound and outbound liner traffic had also fallen dramatically to 36% and 12%. The process of commercialization and divestiture of Canadian Ports began in 1996 and the St. Lawrence Seaway Management Corporation was now responsible for the operation of the Seaway.

B. Regulatory Aspects of the Canadian Transportation System: In air, most of domestic economic regulation, first for Southern Canada and then in northern Canada, was removed. 'Public convenience and necessity' entry test was replaced by the test of 'fit, willing and able' for licence applications, domestic

tariffs no longer had to be filed and there was limited control over fares on monopoly routes. A new policy for international air passenger scheduled and charter service was introduced (in the latter case fences were removed). In rail, reforms were introduced in four basic areas: 1) competitive access; 2) tariffs [8]; 3) network rationalization; and 4) dispute resolution services. The new 1987 act signalled "a new era in Canada's transportation history - an era of greater competition, less regulatory intervention and more innovative transportation services. There will be more choices and greater competition in rail transportation." In trucking, important amendments were made to the *Motor Vehicle Transport Act, 1987* i.e., 1) relaxation of extra-provincial trucking regulation by easing market entry (P&C which was later removed); 2) discontinuation of rate regulation; and 3) expiration of restrictions on existing licence on January 1, 1993 (for example extra-provincial licences were not to be limited to specific commodities or specific routes). A number of provinces also began to introduce reforms for intra-provincial carriers. In international waters, the scope of the exemption to the *Shipping Conferences Exemption Act* was reduced by introducing pro-competitive provisions and by reducing the scope of the exemption. In domestic waters, a step backward was taken by restricting the transport of cargo and passengers to Canadian ships.

C. Technological and Organizational Changes: Technological - Four types of technological changes are described: containerization; intermodalism; ICT; and introduction of new vehicles. First, containerization climaxed in the 1980s and began to gain a firm hold thereafter. It transformed international trade. With containers, widespread use of mega-sized ships and Panamax and giant post-Panamax cranes emerged. Second, intermodal transportation provided a seamless flow to avoid the congestion from the growth of containerization. NTARC referred to intermodalism as "one of the most significant developments on the transportation scene in North America in recent years." Other examples include double stack trains, new innovative services, modification of trailers, etc. Third, ICT developments relating to EDI; Internet services; intelligent transport system (ITS); and CRS began to be introduced. EDI was used to enhance efficiency in several ways: expediting passage, lowering inventories and storage capacity, and enabling vehicle and cargo identification and tracking. The Internet's use became widespread enabling shippers and transportation providers to do business directly, saving shippers and companies time in providing cost estimates on the cargo to be shipped. The ITS was used to provide better communications and identification between carriers and service providers. Some of the ITS technologies are: automated vehicle location (AVL) and automatic vehicle identification (AVI); bar codes and transponders; global positioning satellites and spread spectrum technology. CRS, the nerve centre of airline marketing,

operations planning, revenue management and accounting witnessed dramatic changes. It led to new forms of distribution and is gradually replacing the brick and mortar travel agents. Fourth, new vehicles are being introduced to deal with efficiency and reduce green house gas emissions. Examples include Smart Cars (small) / Electric Cars / Hydrogen Cell cars / Solar powered cars; B- Train / 2 axile trucks /Trucks with cabins/Devices for trucks to reduce smog;/ fuel cells, solar powered aircraft and bio-fuels/ Airships, etc.

Organizational - Four types of organizational changes are briefly mentioned: alliances, networks, supply chains and gateways. First, alliances, partnerships, mergers and acquisitions have occurred across the transportation spectrum. A former Minister of Transport, stated "one of the most important trends now developing - one that we should all encourage - is the growing number of partnerships..." Second, networks in transportation became widespread and became engines of fast growth used as a strategic tool to gain competitive advantage. Third, supply chains or logistics organization began to grow in prominence. Fourth, gateways /corridors /superhighways began to be constructed to address the needs of the burgeoning increase in international trade. Significant investment in other infrastructure was also being made i.e., new container terminals, port dredging, tunnel clearance, etc. Examples of all four are extensive.

D. International Changes: The globalization of markets has tremendously affected the transformation of the Canadian transportation system. We shall briefly discuss trade agreements (GATT/WTO, FTA, NAFTA and Open skies); and non-trade agreements (Kyoto Protocol, and Security and Prosperity Partnership of North America i.e., SPP).

Trade Agreements - 1) GATT/WTO: The first major attempt at enhancing international trade since the Second World War was the General Agreement on Tariffs and Trade. Its main objective was the reduction of tariff barriers, quantitative restrictions and subsidies on trade. Two agreements relevant for the period under consideration were the Tokyo Round (1973-1979) and the Uruguay Round (1986-1993); 2) FTA - The Canada-US Free Trade Agreement's (1988) main objectives are: a) to obtain secure and predictable access to the US market; b) to impose appropriate discipline on the use of trade distorting contingency measures; and c) to establish a mechanism to deal with these distortions in an effective and timely manner.[9] Since the agreement was signed, trade with the US has increased from $155b in 1987 to $580b in 2005, placing an increasing strain on the North-South corridors; 3) NAFTA - In January 1994, Canada, the United States and Mexico launched the North American Free Trade Agreement (NAFTA) and formed the world's largest free trade area. Canada's merchandise

trade with its NAFTA partners increased 122% since 1993 reaching $598.7 billion in 2005. Bilateral merchandise trade with the US and Mexico reached $580b and $18 billion, respectively, a 296% increase for Mexico from pre-NAFTA levels (1993); and 4) Open Skies Agreements - New liberal air agreements were introduced beginning with the Open Skies Agreement with the US in 1995. It is estimated that transborder air traffic increased by 6.4 million passengers from 1994 to 1999.

Non Trade Agreements - 1) Kyoto - On December 17, 2002, Canada ratified the Kyoto Protocol that came into force in February 2005, requiring it to reduce emissions to 6% below 1990 levels during the 2008-2012 commitment period. The objective of the protocol is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"; and 2) Security - On March 23, 2005, the governments of Canada, Mexico, and the United States reached an Agreement - *Security and Prosperity Partnership of North America* (SPP). The agreement's stated purpose is to establish a cooperative approach across the continent to advance common security and prosperity. It is based on the belief that prosperity is dependent on security.

In sum, with the loosening up of the regulatory system at both the domestic and international level, the structure of the transportation system began to become more optimal. The old transportation system had being shaken up as it was no longer adequate. It was not built for the new 'city-centered' reality of Canada. Nor was it built for the present volume of trade. Technological and organizational changes were enabling it to become more efficient and growing international competition compelled it to become so. All these developments were being spurred by international agreements without which the volume of trade would not have increased nor would there be need to dramatically shake up the transportation system.

IV. Theoretical Underpinnings for these Changes

The shake up from one equilibrium to another was based on various theoretical notions. These theoretical notions will be succinctly described.

Monopoly vs competitive service providers: Firms engaged in perfect competition are considered by economists to be "price-takers", which means they take the market price as given and then adjust their quantities accordingly. Graphically, the perfectly competitive equilibrium for an individual firm is shown in Figure 1 to be where its demand curve, P(Q), intersects the MC curve at the market price, P^C. Thus, Quantity Q^C is provided at Equilibrium E.

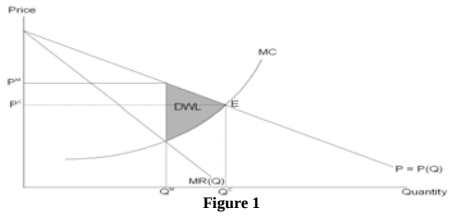

Figure 1

On the other hand, a monopolist will reduce its quantity and increase its price from the perfectly competitive equilibrium until its marginal revenue MR(Q), equals its marginal cost, MC; it supplies Q^M at a price of P^M. As a result, a "Deadweight Loss" (DWL) will be created, which represents the welfare losses to the economy due to the reduced quantity and increased price, and which is shown as the shaded area in Figure 1. While the perfectly competitive ideal is unlikely to be achieved in most markets, the deadweight loss is predicted to be maximized by a monopolist.

Regulation: When a firm is able to exercise market power by pricing above marginal cost, as shown in the example in Figure 1, then one might argue that the firm should be regulated. However, two counter-arguments can be made to this pro-regulatory stance, which suggest that regulation might not only fail to increase social welfare, but might actually reduce it.

First, it is reasonable to expect that a regulator will not have the same information that a privately-operated firm will possess. In an unregulated setting, basic economic theory predicts that a firm will determine its prices and quantities by maximizing its profits. In this quest for profits, a firm has a strong motivation to collect as much information as it can in order to understand its consumers and the other conditions of the market in which it competes. A regulator, on the other hand, will likely not have this same level of information, due at least in part to lack of resources. Thus, it is likely that a regulator will not be able to determine the socially-optimal price-quantity combination.

Second, as discussed by Church and Ware (2000, 772-75), one can analyze the relationship between voters and politicians using a "principal-agent" framework. In theory, politicians (the agents) will make decisions that are socially optimal, because otherwise they will be voted out of office during the next election by voters (the principals). However, in reality, voters must incur monitoring costs in order to evaluate the politicians' actions, and therefore will have an incentive to organize special interest groups to reduce these monitoring costs. As a result, larger interest groups will likely have more information than smaller interest groups, which can give them more influence over the politicians. Thus, unless these interest groups truly speak for the majority of the voters, politicians might

be influenced into regulating firms such that social welfare might actually be *lower* than under a free-market system.

Privatization vs government ownership: Instead of regulating a private firm, the government might decide to own and operate the firm itself. However, the problems with public ownership are similar to those discussed above in regard to economic regulation. For example, the incentives of the public provider of a good or service might not be to maximize profits (and minimize costs), but might instead be nationalistic. If cost minimization is indeed not a primary goal of the government, then prices might be higher (and quantities lower) than under privatization.

Subsidization: An alternative to direct regulation or outright government ownership is for a government to subsidize certain players in the market. In other words, the government could provide funding to these firms in such a way as to change their incentives to the benefit of society.

For example, suppose that absent subsidies, a firm sells Quantity Q^M at Price P^M, as shown in Figure 2. Therefore, the deadweight loss to the economy in this market is Triangle AEB. Now suppose that the government provides a subsidy to the firm, such that its marginal cost curve shifts right to MC'. The new equilibrium is shown at Quantity Q^S and Price P^S in Figure 2, and the new (smaller) deadweight loss to the economy is Triangle A'EB'.

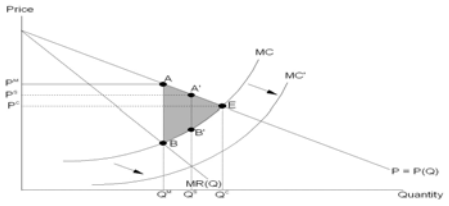

Figure 2

Therefore, if the government knows the competitive equilibrium, it can provide a subsidy to the firm that is just large enough to move the equilibrium to Point E, where there is no deadweight loss. However, even if the government can accurately determine the appropriate subsidy (which is unlikely) it is possible that these subsidies are affecting the market such that the subsidized firms are less efficient than would be the case absent the subsidies. For example, if the firm was not subsidized, and therefore went out of business, then a more efficient firm might enter the market and operate closer to the competitive equilibrium without government assistance.

Network theories: Greater competition, and therefore welfare improvements,

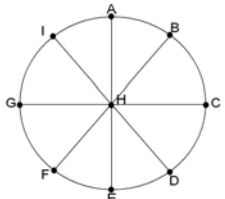

Figure 3

can also be realized via more efficient network systems. For example, suppose that airline passengers can travel between any two points on the border of the circle in Figure 3, but cannot travel to Point H. In other words, a passenger can travel from Point A to Point B, Point B to Point D, Point E to Point A, etc, as long as it is not through Point H. This is known as a point-to-point (PP) network.

Now suppose that passengers can also travel through Point H to get to their destinations. This system is known as a hub-and-spoke (HS) network, where Point H is the hub, and the lines connecting this hub to the other eight points are the spokes. Arguments have been made in the literature that these hub-and-spoke networks can possibly lead to welfare improvements via greater competition, by enabling an airline to enter a market by simply adding a spoke onto its existing hub (e.g., Brueckner and Spiller, 1994); they can also be more cost-efficient by reducing the overall cost of transporting consumers, as well as lead to greater flight frequencies than under PP networks (e.g., Brueckner and Pels, 2007).

Externalities/social costs: In Figures 1 and 2 above, private costs and benefits were examined without any consideration of the social costs of such actions. For example, it was argued that the quantity supplied of a good or service might be increased (and therefore the price of that good or service decreased) through direct regulation, subsidies, or outright government ownership. However, in certain industries such as the transportation sector, increasing the quantity of transportation services can cause negative externalities, such as pollution.

To demonstrate the basic theory of externalities, suppose that the competitive equilibrium is where quantity is Point E^P in Figure 4, which is where the

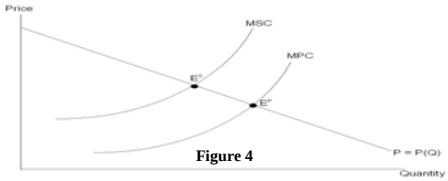

Figure 4

Marginal Private Cost (MPC) to the firm intersects the demand curve. However, the provision of this good or service might have negative implications for a third party, such as emissions. Therefore, if the costs to this third party are taken into

account, then the Marginal Social Cost (MSC) curve might be as shown in Figure 4; the social optimum is therefore at Point E^S, which has a lower quantity and higher price than the competitive equilibrium where only private interests are taken into account.

Porter and van der Linde Hypothesis: Porter and van der Linde (1995) argue that if one examines the tradeoff between environmentalism and industry competitiveness in a dynamic setting instead of a static framework, then there might be no tradeoff. In fact, they hypothesize that adopting cleaner technologies can actually lead to *increased* efficiency, since properly designed environmental standards can trigger innovation that might partially (or even more than fully) offset the costs of complying with them.

More specifically, the authors argue that innovation in response to environmental regulation can take two broad forms. One is that companies simply become more knowledgeable about how to deal with pollution once it occurs, thus reducing the cost of compliance with the regulations. Second, the firm will simultaneously address the environmental impacts and improve the affected product itself and/or related processes, which can lead to *increased* industrial competitiveness.

In sum, sound theoretical underpinning have provided the foundation for the changes.

V. Future

A. Shortcomings

The shortcomings of the present transportation system that will be emphasized fall into three groups: 1. Sustainable transportation; 2.Infrastructure; and 3. Other.

1. Sustainable transportation shortcomings - Despite the federal government's claim to have spent or committed $3.7 billion on climate change programmes as of 2003, Canada has failed to make significant progress. Canada was criticized by environmental groups and other governments at the Climate Change Conference in Nairobi in November 2006 and in Bali in December 2007 for its climate change position. The need to take the matter seriously was highlighted in the recent fourth report by the United Nations on the *Global Environment Outlook*. It indicates that environmental damage will soon be irreversible. The popular song *Its Now Or Never* has been used by several newspapers to describe the current environmental status that the earth is in, if we want to save it. Therefore, unless governments develop comprehensive strategies to promote sustainable growth, the planet is in danger of crossing a 'tipping point' of irreversible damage to its atmosphere, climate, water and ecosystems.[10] In this

regard we mention four failures in transportation.

The **first** failure in transportation is to reduce GHG (Green House Gas) or CO_2 emissions. Transportation is the largest contributor of GHG emissions. GHG emissions in the economy rose to 758 megatonnes in 2004 or 27% above the 1990 levels, instead of falling. Of this total, transportation was responsible for 190 megatonnes or 25% of GHG emissions. Road, off-road and pipelines, air, rail, and domestic marine accounted for 76%, 15%, 4%, 3% and 3%, respectively. Therefore, road transportation has been mainly responsible for the increase since 1990 followed by aviation. Further, in road transportation, freight transportation is not only responsible for most of it but also for an increasing level (five times more) of it since 1990.[11] Furthermore, most of it occurred in urban areas. The **second** failure has been to develop or encourage the use of cleaner technologies in transportation . In this regard, one we have been slow to develop and encourage the use of new vehicles that produce fewer GHG emissions. Two, we have been slow to develop and encourage the use of fuels that produce fewer GHG emissions. The **third** failure has been the lack of success in encouraging the use of alternative means of passenger travel. It appears that the car culture developed in the 1920s continues to have a firm grip on the Canadian population and the use of mass transit or other forms of passenger transport such as car pooling and bicycle use have not been as rapid as in some European countries. The **fourth** failure has been lack of success in developing more efficient transportation i.e., efficiency in the patterns of movement and in the use of energy consumption for transportation. While David Suzuki goes on his crusade on how to save electricity, perhaps other gurus are needed in transportation to show how to choose the most efficient pattern of movement and how to use fuel the most efficiently.

To add to our failures, Canada's population is expected to increase by 2.9, 7.7 and 10.2 million in 10, 25 and 50 years from now. With this increase in population, the volume of passenger movement and the increase in trade both within cities and with the rest of the world will increase tremendously. This all means that the total GHG emissions will increase even if the amount of emissions per capita or per tonne kilometre remain the same or decline slightly.

2. Infrastructure shortcomings - The shortcomings in infrastructure that will be mentioned will be limited to: Urban and Public Transit; Aging Highway; and NAFTA Super-Corridors. First, regarding urban and public transit, the Minister of Transport in his *Transportation Blueprint* indicated "Our urban road network cannot keep up to this growing demand, and our public transit systems are struggling to provide an alternative to move people."[12] This finding was voiced earlier in the CTAR Panel's statement that it "... sees urban areas as a source of major transportation problems and urban transit as a key component of

a comprehensive multi-modal transport policy."[13] Since, the nucleus of Canadian activity is now in Canadian cities, the shift in rural population to urban areas is expected to make the problems worse. Therefore, greater investment in urban road network and mass transit is a priority. Second, our old transportation network was not built for the new 'city-centred' reality of Canada.[14] Nor was it built for the present volume of trade. Further, it was built in the 1960s. It has been aging and a fair amount of work is needed for its care, as was recently made apparent by two major disasters one in Laval, Quebec with the collapse of an overpass killing five and the other in Minnesota with the collapse of the I-35 highway bridge killing thirteen. Third, the NAFTA Super-Corridor projects are not progressing adequately. The US and Canadian governments have not shown too much of an interest in them. There are state and private interests that are involved but there does not appear to be any single body to co-ordinate the project overall. It is not even certain whether it is part of the Security and Prosperity Partnership (SPP) agreement.

3. Other shortcomings - Our comments on other shortcomings will be confined to: a) Policy, b) Regulatory Barriers and c) Resources Management. a) Policy appears to be fragmented, part of this problem has arisen because responsibility for transportation is divided between the federal, provincial and municipal governments. At the more specific level, there are a number of policies that need to be implemented or changed. One would be the road pricing policies to take account of social costs or externalities and related to it is an incentive policy to achieve it. Two would be the need to be address the government's financially self-sustaining policy for ports for national significant projects. b) Regulatory barriers appears to be like a hydra, no sooner has one barrier been eliminated another appears to have arisen. The regulatory barriers now seems to be international rather than domestic. Three that have been brought to the limelight recently are: cabotage with respect to international containers; border processing; and cabotage with respect to foreign workers, empty trailers and tank trailers. c) Resources management or lack of it, especially labour, is expected to lead to problems. The forecasted traffic growth and large transportation projects underway will make the shortage of skilled workers even worse. This has been pointed out by several writers and organizations.[15] This shortage is not just truck drivers but also supply chain workers, ship workers and highly skilled workers. One source indicated that engineering, procurement and construction industry is facing such a worldwide shortage of skilled labour at all levels that companies are in a 'war for talent.' The shortage estimated by the Ontario Trucking Association is 224,000 by the end of 2008.

B. What should be done?

The solutions we will discuss are related to the shortcomings noted: 1. Sustainable transportation; 2. Infrastructure; and 3. Other.

1. Sustainable transportation - With regard to the first failure - to reduce GHG, there should be a firm commitment and failure to meet it would result in penalties. Since highway transportation, especially freight transportation, is responsible for most of the GHG emissions and the increase in emissions, emphasis should be on this sector. First, with regard to freight transportation, technology exits to eliminate emissions by freight carriers on the highway. David Bradley, CEO of CTA recently said "The technology to eliminate emissions that cause smog from the trucking industry and to reduce GHG's through improved fuel efficiency is here ...the key is to get this equipment out into the marketplace on an accelerated basis." Other devices such as auxiliary power units, speed limiters and wide-base tires which reduce emissions can also be used. He offers the following solution "The federal government can assist by helping to defray some of the costs and by identifying qualifying equipment much like they have with the Energy Star program for household appliances ...."[16] Besides this solution, all new trucks manufactured should be required to have the equipment.

With regard to the second failure - to develop or use cleaner technologies, the preference of Canadians for the purchase of passenger automobiles that are not so green should be changed. In 2006, the purchase of trucks, minivans, SUVs and pickups increased to 48.2% from 35% in 1992. This means that the government policy of offering rebates for purchase of smaller cars is not as successful as it should have been. One solution proposed is removing the federal exemption granted to pick-up trucks. Other solutions could range from persuasion to penalties. Governments at all levels should go on a blitz campaign informing Canadians of the serious consequences of not using environmentally friendly vehicles.[17] This could be accompanied by levying a small tax at all gasoline pumps serving vehicles that are not green as there is general agreement by economists that the full social costs should be paid by consumers in the case of pollution. The proceeds of the tax could go back to the industry to encourage developing environmentally friendlier vehicles and subsidizing use of such vehicles. For example, the government could encourage research into the production of greener technologies i.e., solar/hydrogen cars, etc. Regarding developing and encouraging use of better fuels, it has been shown that most vehicles in Canada can operate safely on ethanol blended gasoline. Gasoline when blended with ethanol at low concentrations can reduce GHG. The government should pursue its proposals in its publication *StraightAhead i.e.*, 35% of all gasoline produced should contain 10% ethanol and 500 million litres of biodiesel should be produced by 2010.[18]

With regard to the third failure - to encourage alternative means of transportation, we offer the proposal made by the CTAR Panel: that transit operating agencies and their funders seek the most cost-effective ways of improving their services; that experimentation with innovative forms of service (smaller vehicles, shared

taxis) be encouraged; that urban transit be permitted to qualify for funding from user charges; and that payments to transit authorities be made on the basis of their actual performance in inducing shifts from private automobile use to transit.

With regard to the fourth failure - to develop more efficient use of transportation, the use of GPS in cars and trucks would enable road users to choose the most efficient and less congested route and this could lead to sizable reduction in emissions. Drivers should be trained to use such devices when they start their vehicles. It has been shown that the choice of the most efficient or shortest flight path in air transportation has resulted in the use of less fuel and reduced cost. In a speech to the Arab World on October 27, 2007, the CEO for IATA indicated "In 2006 IATA's fuel programme saved a lot of CO_2: 6 million tonnes by shortening 350 air routes; 8 million tonnes by our GO Teams working with airlines on best practices; and 1 million tonnes through better operational procedures." Similarly, it has been shown that by carrying unnecessary weight or through the use of lighter metals in the construction of vehicles, energy can be used more efficiently resulting in less emissions. Similarly, utilizing new paving technologies and use of alternative materials; overhead signs on road status; other uses of ITS to clear trucks through weight inspection stations and border points through transmittal of custom documents, etc. could all increase efficiency and ultimately lead to less emissions.

2. Infrastructure - Regarding public transit, in case of smaller cities or some urban cities we recommend improvement in bus transit, light rail projects and bicycle paths. Regarding aging infrastructure, in the case of the Quebec overpass collapse, the Johnson Report urged the government to make bridge and overpass inspections a priority, and to set up stable long-term financing for road infrastructure that could include user fees, tolls or partnerships with the private sector where "there is investment capital" for long-term projects. This should be adopted with regard to all bridges in Canada. With regard to NAFTA Super-Corridors, we propose that the scope of the SPP be broadened to include the North America's SuperCorridor Coalition (NASCO).

3. Other - Regarding policy, the CTARP indicated "It is certainly possible to articulate a vision for national transportation policy, but it cannot be realized by federal policies alone. Federal legislation and policy apply only to portions of the transportation system ... the majority, is road based transportation under provincial and municipal responsibility. If their policy directions and legislation are not consistent with a national vision, it will be difficult to achieve an efficient and harmonized system."[19] We propose a National Transportation Strategy with the provinces be formed. Regarding regulatory barriers, to deal with inefficiency resulting from cabotage of international containers it is proposed that the US regime be adopted and greater co-ordination and agreements in their use among carriers should be encouraged. To ensure that Canada can serve as a

gateway to the US, a Conference Board study proposed that the disparity in port costs between Canada and US should be removed and the administrative burden imposed on traders should be reduced. To deal with cabotage for workers and trailers attempts should be made to harmonize rules between the two countries. Regarding resources management, a recent study released by the Conference Board indicates that "Canada needs a human resource strategy" to deal with the issue of labour shortage.

VI. Conclusion

In the last twenty-five years, Canada has witnessed tremendous economic growth and with it changes in the Canadian transportation system. Much has been done and is being done in response to the social and economic transformation that is being accelerated by deregulation, liberalization and globalization. In this regard, the federal government has taken the initiative by rising to the challenge for the increased demand for infrastructure. The changes that were made were based on sound theoretical underpinnings.

The continued economic growth has brought with it new problems - climate change and degradation of the environment - unfortunately. This requires a further shake up in transportation, before the damage becomes irreversible. If the claim of the Canadian Trucking Alliance that we have technology to eliminate emissions is correct, then the shake up required would not be too large for highway freight transportation. Emissions by passenger automobiles can be reduced through a combination of schemes from persuasion to penalties. In 2008, the National Round Table on the Environment recommended a carbon tax, a cap and trade system, or both. The government has rejected the first but promises new rules this year.

Besides, climate change and environmental issues, some infrastructure issues such as public transit, aging infrastructure and super highway corridors have to be dealt with. Finally, other issues exist such as federal-provincial policy co-ordination and transborder convergence which one author describes as 'soft'. We believe that the Canadian Transportation System has changed and the shaking up needed is minimal.

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Footnotes

1. Freedom to Move in Canada's new transportation environment, Minister of Supply an d Services Canada 1988, p. 4.
2. In 1980, the major companies were: Pacific Steamships Limited and Dart Containerline (Canada) N.V.
3. These are contained in subsections 16(1) and 16(3), 16(6), 16(8) and section 14 of the *Aeronautics Act*; Part VI and Schedule XIV of the *Air Carriers Regulations* (i.e., ACR), Part II of the ACR and sections 112-114 of the ACR and sections 23 and 27 of the *National Transportation Act* and section 22.1 of the ACR.
4. The *Railway Act*, the *Transport Act*, the *National Transportation Act 1967*, the *Railway Relocation and Crossing Act*, the *Canadian National Railway Act*, the *Western Grain Transportation Act*, the *Government Railways Act*, the *Maritime Freight Rates Act*, and the *National Energy Board Act*.
5. These are: 1) monitoring of passenger services; 2) branch line abandonment applications; 3) approval of new track construction; 4) examination of applications for the consolidation of local stations; and 5) dealing with complaints from various groups.
6. These are: 1) auditing the accounts of Canadian railways under federal jurisdiction; 2) analysis and development of railway costing methodologies; 3) the determination of subsidy payments; and 4) matters related to rates and traffic. See for example: s. 275 of the *Railway Act* (i.e., RA) - publication of freight rates and filing of prospective rate increases; s. 256 - consideration of abandonment, etc.; ss. 262 and 265-266 - reviews of adequacy of service and suitability of traffic accommodation; ss. 276 and 277 - establishment of rate minima/compensatory rates; s. 278 - establishment of rate maxima (captive shipper); s. 264 - protection for small shipper; s. 284 - filing of agreed and joint tariffs on traffic; s. 279 - allowance for collaboration of railways on rates and costs with exemption from the *Combines Investigation Act*; s. 101 determination of infrastructure, location and construction; s. 23 of the *National Transportation Act 1967* (i.e., NTA) - appeal of freight rates which may be prejudicial to the public interest; s. 27 of the NTA - relating to acquisition of another transportation enterprise; ss. 32-35 of the *Transport Act* - relating to agreed charges to meet intermodal competition and protection against unjust discrimination; and *Maritime Freight Rate Act* and *Atlantic Region Freight Assistance Act* - relating to the grant of subsidy payments.
7. The basic laws applicable to domestic waters ((Pacific waters, Atlantic waters, inland domestic waters (i.e., the Great Lakes and the St. Lawrence River), Mackenzie river and Arctic waters)) before the era of deregulation were the *National Transportation Act*, *Canada Shipping Act* (Part XV), *Transport Act* (except part V), the *Inland Water Freight Rates Act*, the *St. Lawrence Seaway Authority Act* and the *Pilotage Act*.
8. The tariff provisions are designed to encourage competition in several ways. First, the railway' right to discuss and set rates collectively have been abolished. Second, shippers can negotiate confidential contracts, an agreement, which provides shippers flexibility to negotiate rates and conditions of services. These contracts must be filed with the Agency. Third, a streamlined approach has been adopted for tariffs and agreed charges. Electronic filing will be permitted and filing of tariffs is required when rates affect subsidy payment. Further, all tariffs must be published and it is no longer necessary for all railways serving competing points to consent to agreed charges between these points before they are established.
9. *Director of Investigation and Research, Competition Act*, Annual Report, march 31, 1987, p. 11.
10. *Transportation in Canada*, Annual Report 2006, p. 39.
11. Now or never to save Earth, UN warns, *The Ottawa Citizen*, October 26, 2007, p. 1.
12. *Creating a Transportation Blueprint for the next decade and beyond: defining the challenges*, Transport Canada, TP 13786, p. 9.
13. See *Vision and Balance*, Canada Transportation Act Review, June 2001, p. 215.
14. See *Opening the Arteries for Growth*, WESTAC, November 23, p. 12.
15. *Canada's Asia-Pacific Gateway and Corridor Initiative*, Canada, TP 14605, 2006, p. 16; Canada Needs to Close Transportation Gaps to Seize Historic Opportunity, October 2007; The Journal of Commerce 18th Annual Breakbulk Conference Project shipping facing labor shortage, www.joc.com
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