

**FORMALIZING A FEDERAL ROLE FOR CANADIAN TRANSPORTATION INVESTMENT:  
TOWARDS FISCAL POLICY THAT LINKS TRANSPORTATION, HEALTH AND THE ENVIRONMENT**

by

HOLLY J. FOXCROFT

B.A., The University of British Columbia, 2005

A PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS (PLANNING)

in

THE FACULTY OF GRADUATE STUDIES

School of Community and Regional Planning

We accept this project as conforming to the required standard

.....

.....

.....

THE UNIVERSITY OF BRITISH COLUMBIA

APRIL 2008

© Holly Foxcroft, 2008

## **DEDICATION**

For Janis, my steadying force.

## **ACKNOWLEDGEMENTS**

I would like to sincerely thank Dr. Lawrence Frank for his guidance and wisdom throughout the process of this project. A special thanks must be extended to Dr. Thomas Hutton whose heartfelt generosity has enriched my time at SCARP with humour, grace and a common love for the west coast.

Dr. Elvin Wyly, thank you for inspiring me to pursue an MA in planning and for sharing your passion for all things urban. Veronica McCaffrey thank you for your mentoring, inspiration, curiosity, and joie de vie!

I would like to thank my family and dear friends, who have listened, advised, made the occasional meal and coached me through this process. Thank you so much for your patience. Tyler, thank you for your love, humour, patience, support, and editing prowess.

## EXECUTIVE SUMMARY

Canada is the only country, amongst 29 other member countries, in the Organisation of Economic Co-operation and Development that does not have a permanent source of national funding and investment in transportation infrastructure projects. Canada is the only country in the G-7 (a group which comprises over 49% of the global financial market) that fails to invest in supportive transportation infrastructure over a long time horizon. If all of these countries have significantly invested in transportation infrastructure, why has Canada failed to do so?

The Federal government has not historically played a role in financing urban transportation systems. This responsibility is jurisdictionally allotted to the provinces. There has been a commensurate decline in provincial funding of municipal transportation infrastructure and as the necessary funding has dwindled transit fares have increased and transit service hours have decreased (McCormick Rankin Corporation 2002). But, in the last few years there has been a shift in federal policy that has resulted in municipalities (via the provinces) receiving much needed funding for urban transportation infrastructure.

Through a literature review, stakeholder, programmatic and case study analysis this report explores the challenges facing Canada's urban transportation systems. Transportation related externalities are threatening to undermine the environment and the overall health of Canadians through urban sprawl, congestion, the acute and disbursed environmental effects of emissions. Stakeholders in the transportation system have made their desires for a national policy/strategy on transportation funding well known. The current federal transportation funding programs are disparate, do not provide enough long term funding, and are limited in scope. A comparative analysis of the US, UK, and Germany provides valuable insight into successes and failures of urban transportation funding.

### Key findings

*Canada lacks comprehensive guiding principles to underpin transportation investments.*

Federally funded transportation programs either have very high level principles or very specific principles to guide investment. There is a lack of comprehensive guiding principles for sustainable transportation investment on the whole.

*Canada's political structure is a barrier in the creation of sustainable transportation systems.*

The separation of governmental powers complicates the implementation of standardized transportation goals and objectives. The Federal government cannot directly mandate that the provinces adopt certain approaches to transportation. This being said the Federal government has a stake in how the provinces interact and fund urban municipalities as many of the issues cross over into federal responsibility (immigration, housing, transportation). The Federal government can leverage change through bilateral agreements with the provinces.

*Greater inter and intra governmental partnerships need to be fostered to support holistic transportation planning objectives.*

Working with provincial and municipal governments to establish an urban transportation planning agenda will benefit all parties. Including the provincial and municipal governments is necessary to capture the local context. To create transportation systems that are efficient, environmentally sustainable, and health promoting the Federal government needs to incorporate a wider range of actors in transportation funding. Health Canada and Environment Canada need to be included in the transportation funding process to create a more holistic approach to planning.

*Adopting a holistic approach to transportation planning will incorporate the cost of transportation externalities.*

Externalities within Canada's transportation systems have worsened over time and will continue to do so unless there is governmental intervention. The case studies demonstrated the benefits of linking land use, GHG emissions, air pollution, health, and the promotion of sustainable forms of transportation into transportation planning.

*To foster national environmental change funding needs to be available to support sustainable transportation innovation and research.*

In comparison to the US, UK, and Germany Canada has failed to make a substantial financial commitment to reducing emissions generated from transportation through innovation and research. The Federal government does provide limited funding through the eco-MOBILITY and Urban Transportation Showcase Program for sustainable transportation research and innovation. These programs should be broadened if the Federal government wants to make a dedicated commitment to sustainable transportation innovation and research.

*Municipalities cannot afford to pay for the operating costs of transportation infrastructure.*

Federal transportation funding in Canada currently provides municipalities - via the provinces - with money for capital projects. Herein lies a problem for the long term vitality of the Canada's transportation system. If capital funds exist for new projects, there will be the ongoing burden of operating costs that the municipalities need to bear. Municipalities may forgo necessary transportation projects because they cannot afford the maintenance costs.

The key findings inform and shape the report recommendations. The recommendations are interconnected, expansive and in the main report are graphically depicted. For the sake of brevity a selection of recommendation highlights have been included here.

**Recommendation highlights:**

- Create an intermodal national transportation policy and funding model.
- Create mandatory, not voluntary GHG emission reductions.
- Establish national standards for GHG emission reduction for the transportation sector.
- Mandate that federal transportation funding should be linked to environmental and health criteria.
- Federal funding should specify that eligible transportation projects should be linked to land use.

- Create a transportation hierarchy to guide funding, linked to the most health beneficial forms of transportation (transit, walking and cycling).
- Prioritize the maximization of transportation system capacity before expanding it.
- Support the expansion and maintenance of transit systems.
- Create additional financial incentives to encourage a modal shift to public transit.
- Use financial incentives and disincentives to create an efficient, sustainable transportation system.

Canada is at its zenith. We are a prosperous, energy and resource rich nation that has the opportunity to lead the world in the arena of integrated, sustainability driven transportation systems. If the Federal government wants to achieve goals of sustainability, remain economically competitive, foster healthy cities, citizens and the environment then the Federal government needs to play a greater role in transportation investment. But, the question remains: Will the Federal government rise to the challenge and promote the health, environment, and equity of Canadians through a permanent role in federal transportation funding?

## TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>9</b>
1.1 BACKGROUND .....	9
1.2 PURPOSE AND OBJECTIVES OF THE STUDY .....	10
1.3 APPROACH.....	11
<b>2. URBAN TRANSPORTATION IN CANADA.....</b>	<b>13</b>
2.1 EXTERNALITIES WITHIN CANADA’S URBAN TRANSPORTATION SYSTEMS .....	13
2.2 HEALTH EXTERNALITIES.....	13
2.2.1 SENIORS HEALTH .....	15
2.3 LAND USE EXTERNALITIES .....	16
2.3.1 URBAN SPRAWL.....	16
2.3.2 CONGESTION.....	17
2.4 ENVIRONMENTAL EXTERNALITIES.....	18
2.4.1 AIR POLLUTION.....	18
2.4.2 CLIMATE CHANGE.....	19
2.5 EQUITY .....	20
2.6 FEDERAL-PROVINCIAL-MUNICIPAL SEPERATION OF POWERS .....	21
2.7 MUNICIPAL INFRASTRUCTURE SHORTFALL.....	22
<b>3. FEDERALLY ADMINISTERED TRANSPORTATION PROGRAMS .....</b>	<b>24</b>
3.1 GAS TAX FUND .....	24
3.2 PUBLIC TRANSIT FUND AND PUBLIC TRANSIT CAPITAL TRUST FUND.....	26
3.3 ecoTRANSPORT.....	27
3.4 URBAN TRANSPORTATION SHOWCASE PROGRAM.....	28
3.5 BUILDING CANADA .....	28
3.6 PROGRAMMATIC DISCUSSION .....	29
<b>4. STAKEHOLDER ANALYSIS .....</b>	<b>30</b>
4.1 FEDERATION OF CANADIAN MUNICIPALITIES .....	30
4.2 COUNCIL OF THE FEDERATION .....	31
4.3 CANADIAN URBAN TRANSIT ASSOCIATION.....	31
4.4 CANADIAN TRUCKING ALLIANCE .....	32
4.5 BC TRUCKING ASSOCIATION.....	32
4.6 STAKEHOLDER REVIEW .....	33
<b>5. CASE STUDY ANALYSIS .....</b>	<b>34</b>
5.1 UNITED STATES.....	34
5.2 UNITED KINGDOM .....	37
5.3 GERMANY.....	38
5.4 CASE STUDY CRITERIA AND MATRIX.....	39
5.5 CASE STUDY FINDINGS.....	40
<b>6. OPPORTUNITIES FOR A FEDERAL ROLE IN TRANSPORTATION INVESTMENT .....</b>	<b>44</b>
6.1 KEY FINDINGS .....	44
6.2 RECOMMENDATIONS.....	45
<b>7. CONCLUSION .....</b>	<b>48</b>
<b>8. BIBLIOGRAPHY .....</b>	<b>49</b>

## **LIST OF TABLES**

Table 1: Report Card on Canadians' Health Overweight and Smoking .....	15
Table 2: Ways in which transport influences health .....	20
Table 3: The Effect of ISTEAs on Transportation Planning .....	36
Table 4: Case Study and Base Case Analysis .....	40

## **LIST OF FIGURES**

Figure 1: Urbanization in Canada 1871-1996 .....	13
Figure 2: Taxes on Gasoline When Pump Price is One Dollar per Litre (Cents/Litre).....	25
Figure 3: Recommendations .....	46



# 1. INTRODUCTION

## 1.1 BACKGROUND

---

British Columbia's Lower Mainland is awash with proposed transportation infrastructure upgrades. The Asia-Pacific Gateway initiative, a joint federal-provincial venture, has been heralded as a necessary element to maintain Canada's trade competitiveness and economic growth. By expanding the Delta ports, creating north and south Fraser Perimeter roads, twinning the Port Mann Bridge, and widening the Trans-Canada highway, the Lower Mainland will move goods and people more efficiently. By increasing transportation infrastructure capacity the Gateway is projected to reduce congestion and doing so bolster the competitiveness of the region and the country over other Pacific coast ports.

But, the Gateway Program is at odds with Metro Vancouver's regional planning strategy. The Metro Vancouver region has been engaged in creating more vibrant, robust, compact communities, which are better integrated with transit systems, preserve green space, and are mixed use. Instead of building new roads the region has been focusing on how to maximize the current road capacity, supporting the modal-split from automobile to transit, cycling, and walking. By encouraging mixed-use compact development, leaders have supported the creation of walkable; and logically more health promoting communities. The Gateway threatens to undermine many of the community, transportation, and environmental benefits accrued by Metro Vancouver municipalities – ironically at a time when sustainability is becoming paramount.

The Metro Vancouver region has loudly voiced their concerns about the implementation of the Gateway. They have requested that the province forego its unilateral approach to, "regional transportation planning and urge the province to return to a regional transportation planning process that involves the collaboration of municipalities, the GVRD, the GVTA and the province." Many of the 21 municipalities within Metro Vancouver stand united against the twinning of the Port Mann Bridge and the widening of the Highway 1. These municipalities (primarily north of the Fraser River) have implored the province to consider transportation demand management alternatives instead of merely expanding capacity. There is even greater urgency for regional cooperation in transportation planning with the shuffling of publicly elected representatives from the regional transportation body, TransLink, and their replacement with provincial appointees.

In early 2008 both Health Canada and Environment Canada critiqued the Gateway environmental impact assessment (EIA). They deemed that the Gateway EIA insufficiently captured the true costs associated with widening Highway 1 and twinning the Port Mann Bridge. There has been an explicit determination by the provincial government to disregard the affects of induced demand and the effects of road widening on the region. Health Canada and Environment Canada also cited a lack of rigor in the assessment process. The provincial government is aware of the criticism directed at the EIA process, but are forging ahead regardless. The opinions of the Federal government departments hold little sway over the objectives of the province.

The Gateway program illuminates the complexities surrounding large scale transportation infrastructure initiatives. Highly politicized, the Gateway program demonstrates the jurisdictional separation of powers between federal, provincial, and municipal governments. It captures the

differences between transportation planning practices and priorities between the jurisdictions in the way that it seeks to manage congestion. The Metro Vancouver region needs transportation dollars but does not want funding for projects that it does not support. The objectives of the municipalities within Metro Vancouver have been sidelined by the imposition of the desires of the federal and provincial governments to strengthen the economic base of the region, and Canada. And the Metro Vancouver municipalities will be left with the costs associated with the increased road capacity such as, increased congestion, air pollution, greenhouse gas emissions, urban and sprawl. The increase in transportation induced costs in the region is a result of the tension and objectives between the different levels of government.

The tension between the prioritization of economic competitiveness over the environment and health of the region is palpable. The discrepancy in the interpretation of the Gateway EIA and the federal departments of Health and Environment highlights the need for greater regulatory compliance for infrastructure projects. However, this necessity is buttressed against the challenge of federalism. Canada lacks a singular federal policy with a set of standards to disburse transportation funding. The role of the Federal government has been blatantly called into question – should they be disbursing money without explicit requirements to mitigate environmental and health impacts of investments that are made? Moreover, to not require that investments that are made be consistent with federally adopted policies on climate change, air quality, and public health.

Canada is the only country, amongst 29 other member countries, in the Organisation of Economic Co-operation and Development that lacks a permanent source of national funding and investment in transportation infrastructure projects. Also, Canada is the only country in the G-7 (a group which comprises over 49% of the global financial market) that fails to invest in supportive transportation infrastructure over a long time horizon. If all of these countries have significantly invested in transportation infrastructure, why has Canada failed to do so?

Transportation infrastructure is costly and requires long timelines to complete. But, transportation infrastructure improvements are often essential to maintaining required capacity for moving people and goods, as well as creating functional cities. However, transportation investments dictate urban form and land use decisions and impact how people will travel and in turn health and environmental outcomes.

## **1.2 PURPOSE AND OBJECTIVES OF THE STUDY**

---

The purpose of this project is to explore the need for a greater and more specified federal role in transportation investment.

The Federal government has not historically played a role in financing urban transportation systems. This responsibility is jurisdictionally allotted to the provinces. There has been a commensurate decline in provincial funding of municipal transportation infrastructure and as the necessary funding has dwindled transit fares have increased and transit service hours have decreased (McCormick Rankin Corporation 2002). But, in the last few years there has been a shift in federal policy that has resulted in municipalities (via the provinces) receiving much needed funding for urban transportation infrastructure.

In 2002, a document was produced by the Federal government, *Canada's Urban Strategy: A Vision for the 21<sup>st</sup> Century*, which highlighted the importance of Canada's urban municipalities to the functioning of Canada. The document outlined the necessity of supporting urban regions because Canada is a highly urbanized country with 80 per cent of citizens dwelling in urban municipalities, a large portion of economic trade flowing through urban centres, and urban centres, the areas that are so critically important for the success of this country, are experiencing infrastructure decline.

If federal policy has shifted towards a greater supporting role in urban municipalities what is the purpose of producing this report? Steps are being taken to assist municipalities through regularized funding programs like the Gas Tax Fund or through major infrastructure projects like the Gateway Initiative (as outlined above), but there is a fundamental piece missing. Providing money for municipalities is only part of the answer, there needs to be a coordinated approach to transportation investment. The task force involved in compiling *Canada's Urban Strategy: A Vision for the 21<sup>st</sup> Century* recommended that Canada adopt a national urban transit investment program. To date this has failed to transpire. If the Federal government wants to achieve goals of sustainability, remain economically competitive, foster healthy cities, citizens and the environment then the Federal government needs to play a greater role in transportation investment.

#### **Objectives of Report:**

- ☐ To contribute to the growing body of literature on the topic of a national role for transportation investment; and
- ☐ To produce criteria to guide national transportation investments.

### **1.3 APPROACH**

---

The foundation of this report is comprised of a literature and programmatic review, as well as a stakeholder and case study analysis.

#### *Literature Review*

The literature review will provide background information on the externalities associated with transportation systems, such as: environmental effects, urban sprawl, congestion, and health. This information will be discussed in Section 2.2-2.7, as well as referenced throughout the report. It also provides the analytical framework for evaluating the case studies.

#### *Programmatic Review*

The Federal government has a number of ad hoc transportation funding programs. The programs differ in scope, criteria, funding levels, and time horizons. Conducting a review of these programs will help to assist in creating a context of the current system of national transportation funding within Canada.

### *Stakeholder Analysis*

A number of transportation stakeholder documents have been reviewed to provide greater insight into the functioning of Canada's transportation systems. The stakeholders fall roughly into two groups, urban transit and truck movement. These documents capture the opinions of individuals who are moving people and goods and their challenges and ideas for improvement.

### *Case Study Analysis*

The final methodological component in this report is a case study analysis. Canada is frequently compared to G-7 countries whose national governments have a more specified role in transportation investment. By conducting a review of some of the member countries (US, UK and Germany) there will be an opportunity for a greater understanding not only the funding structure but also the coordinated goals they have set and their ability to achieve them.

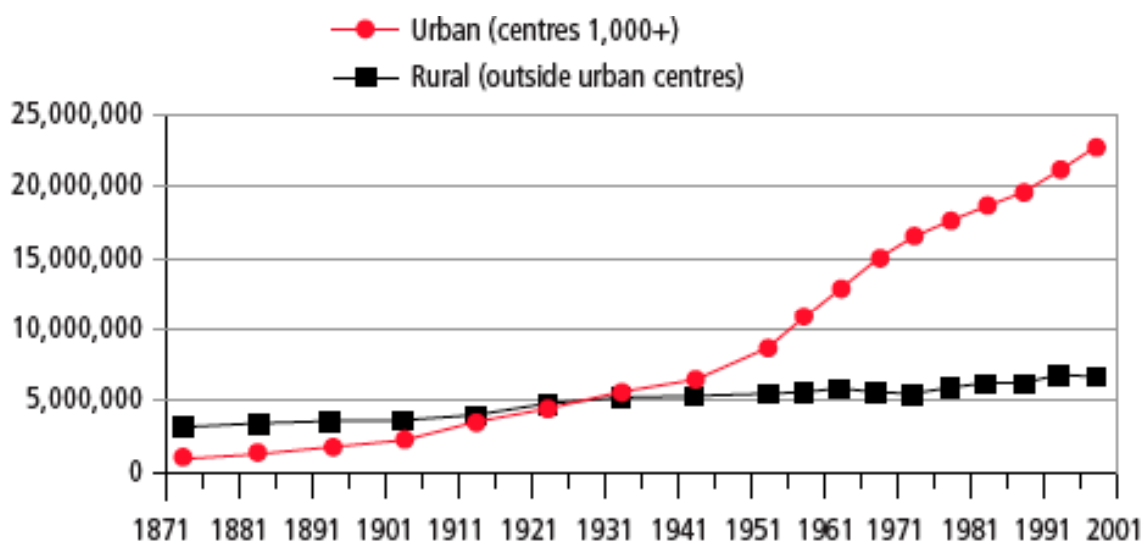
## 2. URBAN TRANSPORTATION IN CANADA

The purpose of this section is to contextualize Canada's transportation systems. The first sub-section will discuss the externalities of transportation systems in urban centres within Canada. The second sub-section will provide an overview of the division of powers ascribed to federal, provincial, and municipal governments as outlined in the constitution. The third sub-section will discuss the additional challenge of a municipal infrastructure deficit on transportation systems.

### 2.1 EXTERNALITIES WITHIN CANADA'S URBAN TRANSPORTATION SYSTEMS

Canada's municipalities are under pressure from transportation system externalities. The challenges of air pollution, urban sprawl, and congestion are affecting the health of urban residents, who make up 80 per cent of Canada's population (Statistics Canada 2006). Most often the externalities caused by urban transportation systems are not accounted for in transportation infrastructure cost calculations. And as we continue to become an even more urbanized nation, as the trend in Figure 1 demonstrates, these issues are particularly salient.

Figure 1: Urbanization in Canada 1871-1996



Source: Statistics Canada, Census of Population, 1871-1996

Source: (Prime Minister's Caucus Task Force on Urban Issues 2002)

Often the externalities caused by urban transit systems are not accounted for in transportation infrastructure cost calculations.

### 2.2 HEALTH EXTERNALITIES

The link between land use and transportation has been well established in transportation literature. In recent years there has been a growing body of research that has examined the link

between the built environment and health (Frank 2000; Frank and Engelke 2001; Ewing, Schmid et al. 2003; Litman 2003; Northridge, Sclar et al. 2003; Papas 2007). The built environment has been defined as, “the part of the physical environment made by people for people, including buildings, transportation systems, and open space” (Northridge, Sclar et al. 2003). Transportation investment shapes communities by the type of transportation infrastructure that is constructed. If transportation investments are being directed towards building new highways, there will be a decrease in the walkability of the community. But, if transportation investment is being used to build pedestrian end of trip facilities, there will be an increase in the walkability of the community.

Neighbourhood characteristics play a role in determining whether residents can engage in utilitarian physical activity. Utilitarian physical activity is the activity that we engage in when we are going from place to place either by walking or other forms of non-motorized transportation (cycling, skateboarding, etc). Research has found that neighbourhood characteristics, such as its walkability, promote greater levels of utilitarian activity than neighbourhoods that cater solely to automobile transportation.

Neighbourhood design and form influence how we interact with the environment. Stereotypically pre-WWII neighbourhoods have smaller blocks, are organized on a grid-like pattern (creating higher street connectivity), have denser populations, are located near transit, and are linked to a high/main street, and have mixed use land use. These neighbourhoods have been touted as promoting utilitarian physical activity because they reduce car dependence. The new urbanist movement (which utilizes design principles to create a sense of place by linking public and private spaces for people to live, work and play) and smart growth (which promotes compact, mixed uses, well-connected streets and sidewalks and a supportive pedestrian environment) movements have tried to recapture many of these characteristics in response to less favourable development patterns like suburbanization (Talen 1999; Frank, Kavage et al. 2006). Suburban development is typically single zoned land use, has large blocks, has urban design problems with low connectivity, is not located near a main/high street, has lower populations, and is highly car dependent.

Researchers have found a link between neighbourhoods that exhibited the same development characteristics as suburban areas and decreased physical inactivity (Frumkin, Frank et al. 2004). Physical inactivity has been tied to, “many chronic diseases and conditions, including obesity, hypertension, non-insulin-dependent diabetes, colon cancer, osteoarthritis, osteoporosis and coronary heart failure” (Ewing, Schmid et al. 2003).

Suburban development patterns provide limited access to food. Grocery stores are not easily accessible and require an automobile for transportation. The poor connectivity in suburban neighbourhoods provides a disincentive to walking, but the physical location of grocery stores (usually on the urban fringe) provides an even greater disincentive. Often fast food restaurants are the most easily accessible and plentiful source of food in suburban areas. Some researchers have found a correlation between suburban neighbourhood design, density of fast food restaurants and increased obesity rates (Nestle and Jacobson 2000; Papas 2007).

In 2004, the Heart & Stroke Foundation produced their annual report card entitled, “Fat is the new tobacco.” In the report they note that overweight and obese individuals have reached such large numbers that they are putting extreme pressures on the health care system. Table 1 captures the increase in rates of obesity from the 1970s to the early 2000s.

**Table 1: Report Card on Canadians' Health Overweight and Smoking**

<b>Rates among Canadian adults:</b>	<b>Early 1970s</b>	<b>2000/01</b>	<b>% Change</b>
Smoking (Aged 15+)	47%	22%	53% decrease
Overweight (BMI > 25; Aged 20-64)	40%	47%	18% decrease
Obese (BMI > 30; Aged 20-64)	10%	15%	50% increase

Source: (Heart & Stroke Foundation 2004)

The Heart & Stroke Foundation draw parallels between the epidemic of overweight and obese Canadians to the public health crisis thirty years ago when one half of the population smoked (2004). An earlier study conducted by the Heart and Stroke dispels the myth of the suburbs being healthier than urban areas. The report finds that urban residents, "who live in moderate-to-high density neighborhoods that have community and commercial services within walking distance of where they live, are 2.4 times more likely to meet this [recommended] daily 30-minute minimum (Heart & Stroke Foundation 2004). Suburban and rural residents, on the other hand, are trapped in an environment that prioritizes automobile access, and implicitly is a disincentive to utilitarian exercise (Heart & Stroke Foundation 2004).

The literature on this topic suggests that to counter the trend of overweight and obese individuals we need to change how we build our cities. By supporting urban development that is more walkable, less car dependent, yet does not sacrifice on the feel of being urban there will be greater incentives for people to engaged in utilitarian exercise (Frumkin, Frank et al. 2004).

### 2.2.1 SENIORS HEALTH

---

Canada's population is quickly approaching a transition period. Within the next fifteen years most baby boomers will become seniors (The Daily 2006). The sheer size of the baby boomer age cohort will inevitably put strains on an already over-taxed health care system. Thus it is imperative that the health of seniors is promoted. Recent literature supports the claim that physical activity (particularly walking) improves the health of all populations and perhaps even more so, for the aged. DiPietro found that moderate levels of physical activity and fitness have been associated with a lower incidence of morbidity and mortality from a number of major chronic diseases affecting older people, namely, coronary heart disease (2001). Walking with its physical and social benefits can help to counteract some of the negative aspects of the aging process, such as health problems. Arthritis and rheumatism, reduced muscle and bone mass, declining sensory perception such as vision and hearing, and slower reflexes often plagued older people. Mental faculties may also decline, and some elderly people are afflicted with dementia, Alzheimer's or other diseases (Fitzpatrick and LaGory 2000).

The link between the physical health of Canadians, the built form, and access to food has been illustrated by the increase in overweight and obese individuals. The car dependant nature of our communities is indiscriminately affecting young and old. Canada has reached a tipping point

where the option of “doing nothing” is no longer applicable, the stakes are high and we have a lot to lose: our health. As the Heart and Stroke Foundation have outlined the number of overweight and obese individuals is reaching epidemic levels. If steps are not taken to support the health of Canadians by playing a more active role in developing a more compact urban form then the collective health of Canadians will continue to decline.

## **2.3 LAND USE EXTERNALITIES**

### **2.3.1 URBAN SPRAWL**

Canadian cities are sprawling outwards. Some cities have purposely attempted to mitigate sprawl through urban growth boundaries such as Ottawa’s Green Belt or Metro Vancouver’s Agricultural Land Reserve. Metro Vancouver’s unique geographical constraint that situates it between the ocean, the mountains and the US border has created greater compliance to the urban growth boundary. Ottawa on the other hand has been experiencing substantial growth outside of its Green Belt (Davidson and Brown 2005). Cities like Calgary, Edmonton, Winnipeg, and Montreal do not have urban growth boundaries and have been experiencing, at different rates, urban sprawl. The fast growing economies of Calgary and Edmonton are rapidly sprawling outwards.

Gonzalez explains that urban sprawl is used as a driver for economic growth. Urban sprawl increases land values, consumption of automobiles, supports the oil industry and increases construction (Gonzalez 2005). As the urban centre expands, land outside of the urban core is either bought up in anticipation of its development or held on to by its owners hoping to capitalize on the rising costs of land. The anticipation of urban growth increases the premium placed on the land (Hushak 1975; Cavailhes and Wavresky 2003).

But, land outside of the Central Business District is generally less costly to buy or rent than land within it. The low relative cost of land on the urban periphery has continued to act as a draw for residents, office parks, and retail centres. The interaction between urban and suburban development is shaped by location theory. Alonso’s location theory suggests that tradeoffs are made by individuals or firms as they near the Central Business District (CBD). Rents and rates of density are higher in the CBD than in suburban areas (Alonso 1967).

For example, the price of commercially zoned land in the City of Vancouver has driven potential buyers and renters to surrounding municipalities. While the regional district, Metro Vancouver, has encouraged commercial enterprises to locate in town centres they have failed to create a large enough incentive. Commercial enterprises have flourished in office parks, located on cheap parcels of land but relatively inaccessible by public transportation. Surrounded by large tracts of undeveloped land office parks are commonly single-use facilities and do not reap the same benefits as offices located in mixed use areas. Office park employees are wholly dependent on their cars to commute to and from work and in some cases to get lunch (Ladner 2004).

The low-density development that is occurring across Canada is creating a land use pattern that is more difficult to service by public transit. Low-density areas result in higher variations of travel dispersion. This causes traffic flows to become more complex and thus harder to anticipate. Attempting to service these areas with public transport becomes inefficient. Both the travel time of riders increase and the cost of providing transit service to the areas increases (Cox 1995). If the



travel time cost for public transit users exceeds the cost of their perceived time cost then they are more likely to switch modes.

Urban sprawl will only increase dependence on the automobile with mounting cost to our health, the environment and the economy. Some regions in Canada have had the mixed blessing of constrained geography, such as the Metro Vancouver region. The region can no longer continue to sprawl outwards because of a lack of available land and has experienced density increases. Other metropolitan regions do not have the same geographical constraints as Metro Vancouver, but this does not diminish the necessity of densification. Continuing to build low density developments will foster financial vulnerability for residents as gas prices continue to increase because of peak oil, and lead to worsening congestion. Low density development also erodes farmland and the region's ability to feed itself, which in turn compromises food security. While the preference of Canadians may be to have a suburban home, the question is can we collectively afford it? The discussions surrounding congestion, which is spurred by low density development, illuminate some of the costs that are becoming evident.

### 2.3.2 CONGESTION

---

Congestion has been touted as the cause of lost productivity, economic competitiveness, and an unnecessary contributor to climate change. It is undeniable that people sitting in idling cars is a waste of time and productivity and ruinous to the environment. While this may be a near universal understanding, there are different approaches to managing congestion. Expanding the capacity of the road network has historically been the approach adopted by transportation planners. And this approach is still being used, as in the case of the Gateway initiative widening of Hwy 1. An alternate approach to congestion – which has been adopted in the last 15 years – is managing the road network capacity. Recently, the US national government wrote this approach into policy, disbursing funds to municipalities to manage their current road capacity without expanding it.

There is a large reserve of road capacity that, if tapped into, would severely reduce the need to expand road capacity. Many of the cars idling on the roads are single occupant vehicles. Increasing the capacity of passengers within vehicles will create a reduction in the number of vehicles on the road. With this in mind more of an emphasis should be placed on moving people instead of moving vehicles.

The costs associated with congestion have become a large and under-researched problem in Canada. Worryingly, congestion is being viewed as a “problem” of the transportation system and not a “symptom.” Congestion is the symptom of our dependence on automobiles, which is the problem. While there has been extensive literature published on congestion in the United States and in Europe, the research on Canada's congestion is limited. In fact there has only been one comprehensive report published on congestion (Delcan 2006, 2007).

The Transport Canada commissioned report, *The Cost of Urban Congestion in Canada*, defines congestion as, ‘... the inconvenience that travelers impose on each other while using their vehicles and attempting to use the road network at the same time, because of the relations that exists between traffic density and speed (with due consideration of capacity). The report provides an estimate of the annual cost of congestion in Canada's major urban areas. The report suggests that recurrent congestion (peak period congestion) costs between \$2.3 billion to \$3.7 billion dollars a

year, and that 90 per cent of this cost is associated to the loss of productive time for drivers and passengers. The remainder of the cost can be attributed to the value of fuel consumed (7-8 per cent) and the GHGs emitted (2-3 per cent) (Delcan 2006, 2007).

For the past few years Canada has topped the G-8 countries for economic growth. And a large portion of the economic growth is attributed to high rates of productivity (Statistics Canada 2005). Given the volatility of world markets, as witnessed with the recent sub-prime market lending crash, ongoing quick economic growth is not indefinite and steps need to be taken within Canada to break down internal transportation barriers. If Canada wants to maintain its competitive advantage in a world marketplace that is changing, barriers to productivity need to be eliminated. Adopting demand and pricing strategies will increase Canada's road capacity and subsequently increase productivity.

In Europe and the US there has been an emphasis placed on expanding road capacity through management. Techniques such as road pricing, prioritization of transit, and transportation demand management strategies are working to increase economic competitiveness while reducing congestion. Many of these responsibilities have been devolved to states and local authorities and it is their responsibility to ensure compliance. For example, in the state of Florida all development must be in compliance with the plan created and regulated by the Land Planning Agency. The transportation department is required to make transportation investments that are in line with the objectives outlined within the plan (DeGrove 1984). Canada could greatly benefit from implementing similar strategies but it also needs to focus on reducing internal barriers to productivity. A common barrier is the politicization of transportation infrastructure projects. The focus on politically favourable infrastructure investments sometimes outweighs the regional priorities, such as the Gateway project. There is a need for the Federal government to play a larger role in transportation investments that will allow local governments and the provinces to select health promoting and environmentally beneficial strategies by making match funding available for these options.

## **2.4 ENVIRONMENTAL EXTERNALITIES**

### **2.4.1 AIR POLLUTION**

---

Anthropogenic activities are the main driver of air pollution. Derived from two stationary (e.g. factories) and mobile (e.g. automobiles), and areas sources (e.g. airports) air pollution has many adverse effects on human health and the environment. Pollutants from factories and automobiles have different compositions and vary between geographic regions (Crutzen 2004). For the purposes of this report the focus will be on air pollution derived from mobile sources.

Air pollution from automobiles and trucks has an effect on the health of local populations. The effects of air pollution on respiratory health have been widely written about over the last twenty years. Air pollution has led to a loss of optimal lung function, increases in asthma rates and severity, and mortality. The Heart and Stroke Foundation (2008) estimates that there are 6,000 deaths annually attributed to the short-term exposure to air pollution. And that of these deaths 69 per cent are either cardio or cerebrovascular disease (Heart & Stroke Foundation 2008). Air pollution indiscriminately affects both young and old.

A Dutch study tested the lung capacity of school aged children, with no pre-existing conditions, attending school and living near motorways (<1000m). The study measure nitrogen dioxide (NO<sub>2</sub>) and suspended particulate matter. The findings suggest that children who studied and lived within 1000 meters experienced a decline in lung function; those that lived within 300 metres experienced an even greater decline. Children that lived within a 1000 meters from a motorway that experienced a daily density of truck traffic of 10,000 experienced a 2.5 per cent decline in their forced expiratory volume (FEV) in 1 second (a measure of lung capacity and strength). Children living 300 meters away experienced a 4.1 per cent decline in FEV ability. The study compared six areas and found that the area (Dordrecht) with the greatest traffic volume correlated to the area with the largest loss in lung capacity (Brunekeef, Janssen et al. 1997).

Transportation induced green house gas emissions account for approximately 27 per cent of Canada's air pollution. Between 1990 and 2005 green house gas emissions in the transportation sector increased by 33 per cent (Environment Canada 2007). The concentration of Canada's population in urban centres makes it particularly vulnerable to air pollution. Urban Canadians are more exposed to the acute effects of air pollution than other countries where there may be greater population disbursement. Ironically, increasing the density of a city lead to a greater exposure to air pollution if there are not commensurate measures taken to increase public transit use, and decrease private automobile use.

## 2.4.2 CLIMATE CHANGE

---

There is a firmly established link between the effects of automobile pollution and global warming (Sipes and Medelsohn 2001). The release of carbon dioxide (CO<sub>2</sub>) from anthropogenic sources is the main driver of global warming. Global warming could be causing environmental damage that are creating more uncertainty, from the melting of the ice sheet in northern Canada to increasing the intensities of tropical storms (Treut, Somerville et al. 2007). As of January 1, 2008 countries that had signed and ratified the Kyoto protocol were to bring emissions to 1990 levels. The eleven year delay from the inception of the Kyoto Protocol to 2008 was a grace period for countries to amend their regulations to ensure the reduction of GHG emissions. While Canada has ratified the Kyoto Protocol it has failed to introduce measures to meet the agreed upon targets in any substantial way. As the graph below depicts Canada has experienced an increase, not a decrease, in GHG emissions since 1997.

Climate change, air pollution and transportation systems are intrinsically linked. Climate change is the diffuse effect of transportation systems, contributing to a greater global problem through the production of air pollution. Contributing to a reduction in the pollutants that are causing global warming is a global responsibility, one that Canada has been hesitant to address.

Canada does not have the opportunity to languish any longer. The Organization for Economic Co-operation and Development estimate that that if global governments do not adapt their climate change policies there will be significant increases in GHG emissions. They project that GHG emissions will grow 52 per cent by 2050 resulting in a global temperature increase between 1.7 degrees Celsius and 2.4 degrees Celsius (2008). This is double the temperature increase that occurred between 1899 and 2005.

The effects of global warming are becoming more acute within Canada and especially Canada's northern regions. Canada may be a country heavily reliant on trade and the movement of goods

through our transportation systems, but new opportunities need to be sought out to maximize our road space, while reducing emissions.

## 2.5 EQUITY

The functioning of urban transit systems is critical to the transit dependant members of society. There are a number of societal groups that have greater transit dependency because of social, physical, and economic inequalities that they experience within society.

Women and people of colour primarily make up the majority of transit users, followed by First Nations, immigrants, the elderly, low-wage workers, the poor, unemployed, people with disabilities, and students. As their primary means of transportation, the public transit system is their link to work, health services, daycare, social networks, education, recreation, arts, parks, and school. Transit systems that serve the needs of the disadvantaged members of society reap social benefits. The unemployed will be able to use transit to locate employment, the disabled will be able to access their social networks, and students will be able to attend classes (Bus Riders Union Planning Committee 2003). John Whitelegg's table (Table 2) captures the transect between the health promoting and health damaging aspects of transportation systems.

**Table 2: Ways in which transport influences health**

Type of effect	Results
Health promoting	Enables access to: employment, education, shops, recreation, social support networks, health services, countryside; provides recreation and exercise.
Health damaging	Accidents; pollution: carbon monoxide, nitrogen oxides, hydrocarbons, ozone, carbon dioxide, lead, benzene; noise and vibration; stress and anxiety; danger; loss of land and planning; blight; severance of communities by roads.

Source: (Whitelegg 1993)

Frumkin et al. suggest that transit dependent groups are disproportionately affected by air pollution and injury. The clustering of immigrants, minority groups and low-income individuals in inner-city neighbourhoods makes them vulnerable to exposure to air pollution and rates of injury (2004). Road density is higher in low income neighbourhoods because of the perception of lower land costs. In turn, higher road density increases the rate of air pollution and vulnerability of residents to traffic (Deka 2004).

Just as the transit dependent members of society are most reliant on public transit systems they are also disproportionately bear the cost of the transportation systems. The cost of transportation comprises a greater percentage of their budget than a middle-income earner. This is especially true in Canada because transit riders bear higher user fees than other countries within the EU and US (The Centre for Sustainable Transportation 2002).

These groups are disproportionately affected by the transportation and land use interaction which dictates that low low-density, typically suburban neighbourhoods, are more difficult to service by transit (Frank and Engelke 2001). Urban sprawl has increasingly propagated the dependence on automobiles for moving people. There has been an increase in the number of people that use cars as their primary mode of transit, whether in the driver's seat or as a passenger. Stats Canada reports that in 1992, 68 per cent of individuals (passenger or driver) drove to all of their destinations, in 1998 this rose to 70 per cent and in 2006 it rose further to 74 per cent (Turcotte 2008). The increase in car use for the majority trips has driven a wedge between supporting transportation infrastructure that supports car and transportation infrastructure that supports public transit. There are increasing pressures being put on municipalities to upgrade transportation infrastructure and the dominant, car dependent, portion of the population will be pitted against the transit dependent members of society to capture a larger share of the scarce infrastructure dollars. The political decision makers may be swayed to support the automobile dependent population as they comprise a greater portion of the electorate (Whitelegg 1993).

## **2.6 FEDERAL-PROVINCIAL-MUNICIPAL SEPERATION OF POWERS**

---

Section 91 and 92 of the Canadian Constitution establish the powers and responsibilities of the federal and provincial governments. Section 92 outlines the responsibilities and powers of provincial legislatures, enabling them to make laws. With respect to transportation the following powers have been allotted to the provinces regarding transportation, Section 92.10 states:

Local Works and Undertakings other than such as are of the following Classes: -  
(a) Lines of Steam or other Ships, Railways, Canals, Telegraphs, and other Works and Undertakings connecting the Province with any other or others of Provinces, or extending beyond the Limits of the Provinces (1867).

As a result of this distinction transportation falls primarily within provincial jurisdiction except in the case where it extends out of the province.

Provincial governments further devolve power to municipal governments. Municipalities are granted the following powers: regional growth management, regulatory control over land use, subdivision, planning, levying fees, public participation, non-conformity, variances, and site by site discretion (1996).

There is a key distinction that needs to be made about the separation of power between the three levels of government. The federal and provincial governments have the power to raise money, "by any Mode or System or Taxation" (1867). But, municipal governments do not share this power; they can raise money through the levying of fee, e.g. property tax levy, development permit levy, and parking sales tax levy (1996). This distinction is important, as we will see in the following section.

The separation of constitutional powers in Canada dictates the influence that the Federal government can have on municipalities. If the Federal government wishes to fund initiatives within municipalities it must work with the municipalities via the provincial governments. Constitutionally the Federal government cannot circumvent the province and thus must broker agreements with provinces to fund municipalities. Municipalities are creatures of the province.

The provincial governments have absolute control over the municipalities and can dissolve them at will.

Although the Federal government does not have direct constitutionally endowed powers or responsibilities towards municipalities it does have an obligation to tackle “urban issues.” Municipalities may lie under provincial jurisdiction, but many of the issues affecting urban municipalities involve some federal responsibility. Issues such as housing, transportation, and infrastructure occur in urban municipalities and may be labeled as “urban issues,” and as Berdahl suggests, “The federal government is prohibited from interfering with the structure and operation of municipal institutions, but it faces no constraint when it comes to urban issues...” (2006).

The Federal government has had a presence – even at an arm’s length – in urban areas in the services they provide or fail to provide. The *Building Canada Initiative* (which is discussed later) is a new program that invests directly in urban infrastructure projects, such as storm water drainage and sewer upgrades. The withdrawal of federal funding from the urban municipal realm in the 1990s devolved many federal issues, such as affordable housing to the municipalities who were ill equipped to handle new financial responsibilities (Berdahl 2006). But, there is a certain level of responsibility towards greater federal-municipal cooperation.

In 2005, the federal government aligned Transport Canada, Infrastructure Canada, the Canadian Transportation Agency, the Transportation Appeal Tribunal of Canada and 16 Crown Corporations into a single portfolio: Transport, Infrastructure and Communities. The purpose of this portfolio is to provide a coordinated approach to, “contribute to rural and urban infrastructure, and make sure that our roads bridges, railroads, ports and airports are well-placed, well-built, safe and secure” (Transport Canada 2007). This departmental amalgamation holds the potential for greater horizontal coordination, but it is primarily concerned with building infrastructure and transportation projects. It fails to consider the greater affects of transportation or infrastructure on the urban environment by negating the inclusion of Environment Canada and Health Canada. Which challenges the very core the portfolio’s mandate that seeks to, “... supports the economy, the environment, and the health of Canada’s communities” (Transport Canada 2007).

## **2.7 MUNICIPAL INFRASTRUCTURE SHORTFALL**

---

Municipalities across Canada have been experiencing significant stresses on their infrastructure. Municipalities lack the funding to repair and replace aging infrastructure as well as to upgrade transport systems to accommodate for population growth. The Federation of Canadian Municipalities surveyed water and wastewater, transportation, transit, and waste management infrastructure systems and concluded that Canadian municipalities are facing an infrastructure deficit of \$123 billion. The infrastructure deficit also encompasses infrastructure for recreational, cultural and social use (Big City Mayors' Caucus 2007; Mirza 2007; McManus 2008). The FCM’s estimate is significantly above previous estimates that calculated the value between \$12 billion in 1985 and \$60 billion In 2003 (Mirza 2007). The discrepancy between the previous estimates and the FCM estimate represent the rising cost associated with a deteriorating infrastructure.

What has caused this significant infrastructure deficit? Municipalities receive only 8% of the total tax receipts to the federal and provincial government (Mirza 2007). The federal and provincial shares in municipal infrastructure costs have been declining from 1961 to the present. In 2002,

the Federal government funded and owned only 6.8 per cent of municipal infrastructure down from 23.98 per cent in the 1960s. From the 1960s to the present the municipalities share of infrastructure ownership and maintenance grew from 30.9 per cent to 52.4 per cent of all infrastructure (Mirza 2007; McManus 2008). Provincial governments contributed only 15 per cent of transit capital costs and 5 per cent of operating costs. The remainder of the funding costs fall on municipalities (CUTA 2005).

The Canadian Urban Transit Association (CUTA) estimates that municipalities are facing a \$20.7 billion urban transportation deficit. 44 per cent of this amount is required to rehabilitate or renew existing infrastructure and the remaining 56 per cent is required to expand service capacity for ridership growth. Between 1996 to 2006, the transportation deficit increased from \$8.5 billion to \$20.7 billion (Canadian Urban Transit Association 2006; CUTA 2006). The increase transportation deficit increased because, similar to other municipal infrastructure, it is deteriorating and the municipalities do not have the means to pay the increased maintenance costs.

A recent CUTA report estimated that in the next five years municipalities require \$40.1 billion to fund their transit systems (Canadian Urban Transit Association 2007). CUTA compiled survey responses representing 72 transit systems that represent approximately 92 per cent of the transit operations across Canada. Survey respondents revealed that the most pressing issue was their dependence on external sources of funding to cope with increasing ridership and to expand the transportation system's capacity.

The report also concluded that 75 per cent of the transit infrastructure deficit is from three Census Metropolitan Areas (CMAs) Vancouver, Toronto and Montreal. The populations of Vancouver, Toronto, and Montreal have continued to grow at rates faster than elsewhere in the country and demand for transit has grown commensurately (Federation of Canadian Municipalities 2008). In contrast other CMAs make up 24 per cent of the total need and small cities and towns comprise the final 1 per cent (CUTA 2006).

## 3. FEDERALLY ADMINISTERED TRANSPORTATION PROGRAMS

In this section I will be reviewing the current federal transportation programs that support urban transportation and goods movement.

### 3.1 GAS TAX FUND

In 2005 the Federal government announced that they would remit a portion of the federally collected gas tax to municipalities on a per capita basis until 2009. (Department of Finance 2005). Canada's mayors called on the Federal government to extend the commitment period in order to create a national transportation strategy that will formalize the remittance of federal dollars into a dependable, non-politicized arrangement (The Council of the Federation 2005). Ottawa responded by formalizing of the Gas Tax Fund. In Budget 2008, the Federal government announced that it would disburse \$2 Billion per year to municipalities via the Gas Tax Fund until 2014. The Federal government also announced that the Gas Tax Fund would become a permanent transfer to the provinces earmarked for municipal infrastructure needs (Department of Finance 2008).

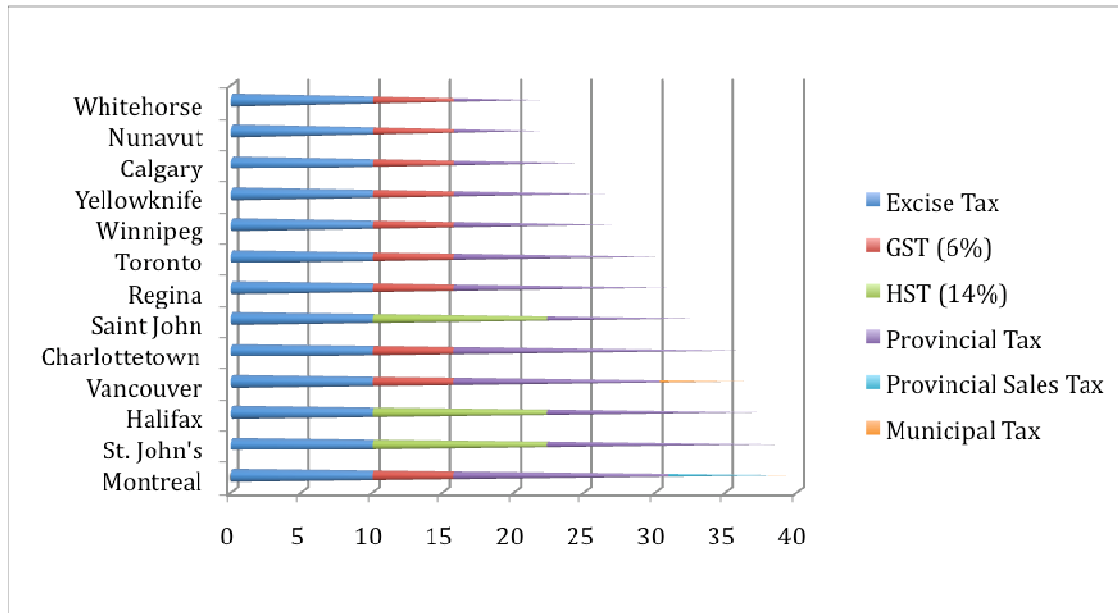
The federally implemented excise tax on gasoline and GST are the same across Canada, but the amount of tax that consumers pay across regions and municipalities varies. Provincial tax on gasoline can range from 6.2 cents per litre in the Yukon to 20.4 cents per litre in Prince Edward Island (Natural Resources Canada 2007). Some municipalities impose an additional tax on gasoline, such as Montreal (1.5 cents per liter), Victoria (2.5 cents per litre) and Vancouver (6.0 cents per litre). These municipally oriented taxes are used to support transit systems within the municipalities. Figure 2 illustrates the taxes that consumers pay at the pump across Canada.

#### *Opportunity for Regulatory Conformity*

The Gas Tax Fund is the first large scale program that has remitted federal money for sustainable transportation innovation. There is a potential to link this funding to Kyoto Protocol targets and health criteria. If the Federal government renegotiated the Gas Tax Fund through bilateral agreements there would be an opportunity to implement programmatic approaches to monitoring the effectiveness of funding spent relative to desired outcomes. Also, there could be a greater focus placed on outcome focused performance based monitoring. Canada needs to develop programs that tie funding to desired outcomes. We need to encourage municipalities (through incentives) to match funds and develop programs that accomplish the objectives that are inherent in federal programs.



**Figure 2: Taxes on Gasoline When Pump Price is One Dollar per Litre (Cents/Litre)**



Adapted from: (Natural Resources Canada 2008)

The excise tax is a federally administered tax on refined fossil fuels used for transportation. The Federal government began taxing gasoline in 1995 and diesel fuel in 1987. Currently, the Federal government applies a 10 cents per litre tax on gasoline and 4 cents per litre tax on diesel (Natural Resources Canada 2007). The Federal government raises approximately \$5 billion annually from these excise taxes (Department of Finance 2007).

The Federal government has only recently remitted excise tax revenues to municipalities. The policy was implemented in 2002 by the Martin government under its “New Deal for Cities and Communities” plan. Budget 2005 expanded on the commitment earmarking \$5 billion for municipalities over a five year period. The Gas Tax Fund is distributed to cities and communities on a per capita basis. Funding is allocated to, “support environmentally sustainable infrastructure projects such as public transit” (Department of Finance 2005).

In 2005, the Federal government signed bilateral agreements with the provinces to establish the terms and conditions of the transfer of the gas tax funding. For infrastructure projects to receive federal funding, they must fall under one of nine categories for eligibility. Out of the nine categories, two pertain to transportation. Below is a list of the eligible transportation related capital infrastructure projects.

1. Roadways and Bridges that enhance sustainability outcomes for municipalities. These include:

- Reconstruction and rehabilitation of roadways;
- Reconstruction and rehabilitation of road structures;
- Construction, reconstruction and rehabilitation of railway other grade separations;

- Construction, reconstruction and rehabilitation of bridges;
- Other ancillary works such as sidewalks, commuter bikeways, lighting, traffic control signals, pedestrian signals, storm drainage and utility relocations;
- Construction or implementation of major transportation systems management projects such as major intersection improvements and major traffic signal coordination and;
- Construction of noise attenuation devices as a part of an eligible project, and rehabilitation of existing noise attenuation devices on an eligible roadway or transitway, consistent with the municipality's approved noise attenuation policy.

## 2. Public Transit

- Construction and major rehabilitation of Light Rail Transit (L.R.T.) lines, station structures, park and ride facilities, and L.R.T. Maintenance facilities. L.R.T. lines must be designated by the municipality's transportation system bylaw;
- Construction, reconstruction and rehabilitation of L.R.T. grade separations;
- Construction and rehabilitation of major public transit terminals and transit garages;
- Purchase of L.R.T. vehicles, "low-floor" standard 40-foot buses, "low-floor" articulated buses, and accessible community public transit vehicles as well as specialized transit vehicles for seniors and/or persons with disabilities;
- Major rehabilitation of public transit vehicles;
- Major comprehensive transit-stop retrofit programs to achieve a "barrier free path of travel" to accessible transit services;
- System-wide capital improvement or upgrading projects;
- Purchase, development, and rehabilitation of major capital security devices, communication equipment, and other public safety enhancements;
- Implementation of Municipal Infrastructure Management Systems including software and the collection of Core Infrastructure data to the limits outlined in the program guidelines and;
- Significant enhancements or improvements for the safety of users of the transportation system (Infrastructure Canada 2005).

In the past three budgets the Federal government has continued its commitment to transferring the Gas Tax Fund to municipalities. In Budget 2008 the deadline of the Gas Tax Fund was extended four years to 2013-2014 at the rate of \$2 Billion per year (Department of Finance 2008).

## 3.2 PUBLIC TRANSIT FUND AND PUBLIC TRANSIT CAPITAL TRUST FUND

The Public Transit Fund (PTF) was a one-time transfer of \$800 million to municipalities on a per capita basis over two fiscal years between 2005 and 2006. The funds were available for urban transit projects that reduced GHG emissions and energy use. The Federal government signed agreements with each of the ten provinces and three territories that outlined the PTF's guiding principles. One important characteristic of this program is the relative freedom that municipalities have to reach the GHG emissions and energy reduction objectives.

In Budget 2006, the Conservative government reconfigured the Public Transit Fund into the Public Transit Capital Trust. Reneging on the commitment in the PTF to disburse \$400 million over two years, the new government disbursed \$500 million over a three year period. Another difference between the Public Transit Capital Trust and the Gas Tax Fund is that it disburses funds based on

per capita and ridership levels. Municipalities with established transit systems will capture more of the funding, but smaller municipalities with fledgling transit systems will not be excluded from this revenue source. Although, larger municipalities will have greater transit ridership and will be able to draw from the fund through this mechanism, smaller municipalities will still receive funding via the per capita disbursement of funds (Infrastructure Canada 2006).

### **3.3 ecoTRANSPORT**

---

ecoTRANSPORT is part of a larger federal government initiative, ecoACTION, that targets the reduction of local and GHG emissions, and supports the health of Canadians and the environment. There are six programmatic components to ecoTRANSPORT: ecoMOBILITY, ecoAUTO REBATE PROGRAM, ecoENERGY for Fleets, ecoFREIGHT, ecoTECHNOLOGY for vehicles and ecoENERGY for personal vehicles. The Federal government has allocated \$100 million to be divided among the 6 initiatives.

#### ***ecoMOBILITY***

The ecoMOBILITY program aims to reduce GHG emissions by reducing urban passenger transportation emissions. The program has \$10 million in available funding; however, this funding is split between two components of the program: financial support to implement transportation demand management projects and developing research and information capacity to assess transportation demand management solutions.

Municipalities and regional transportation authorities are eligible to apply for \$4 million in available funding from the ecoMOBILITY program. However, the maximum contribution per project is \$800,000 over a three-year period, covering up to 50 per cent of eligible costs. Eligible projects must either fall within two categories: a) education, promotion and outreach and b) travel incentives and disincentives.

#### ***ecoAUTO Rebate Program***

This program is targeted at Canadian consumers. From March 2007 onward, the Federal government offers a rebate of \$1000 to \$2000 for the purchase or long-term lease of a fuel-efficient vehicle. The program defines fuel-efficient vehicles as, “new cars getting 6.5 L/100km or better and new light trucks getting 8.3L/100km or better” (Transport Canada 2008). The ecoAUTO Rebate Program website lists vehicles eligible for a rebate (Infrastructure Canada 2008).

#### ***ecoENERGY for Fleets***

Freight movement is major contributor to GHG emissions. This program seeks to limit freight emissions by providing transportation firms with “free advice” concerning fuel efficiency, as well as suggesting business practices to increase productivity and competitiveness.

#### ***ecoFREIGHT***

The focus of this program is to reduce the impact that freight has on the environment through environmental innovation.

### *ecoTECHNOLOGY for Vehicles*

This is a demonstration program in which the Federal government purchases and tests advanced transportation technologies and showcases them at events across Canada (Infrastructure Canada 2008).

## **3.4 URBAN TRANSPORTATION SHOWCASE PROGRAM**

---

Initiated in 2000 as part of the Government of Canada's Action Plan 2000 on Climate Change, the Urban Transportation Showcase Program (UTSP) supports the development of sustainable transportation. Chief among the objectives of the UTSP is to showcase case studies that "demonstrate and evaluate integrated approaches to GHG emissions" (Transport Canada 2007). The UTSP is a repository of information about sustainable transportation projects (showcases) that are occurring within Canada and internationally. These showcases either highlight: transportation demand management measures, public transit measures, innovative land use and economic measures, community outreach measures, advanced transportation technologies, low-cost infrastructure measures and vehicle use measures (Transport Canada 2007).

The UTSP primarily functions as an information sharing and gathering entity. But, the UTSP jointly draws on the funds available under the eco-MOBILITY program for the co-development of transportation projects with municipalities. The UTSP also provides funding for community driven transportation demand management projects (Transport Canada 2007).

## **3.5 BUILDING CANADA**

---

Between 2007 and 2014, the Building Canada initiative will provide funding for infrastructure improvements across Canada. The Building Canada initiative is largest investment in municipal infrastructure by the Federal government (\$33 billion) in recent Canadian history. The program is largely a response to Canada's infrastructure deficit and the need to maintain a competitive edge in today's global marketplace. The Building Canada initiative supports infrastructure upgrades and expansion of: highways, border crossing, airports, short line rail and short sea shipping. It will also invest in improving wastewater, public transit, green energy, solid waste management, disaster mitigation, and brownfield development (Transport 2007).

### *Asia Pacific Gateway Initiative*

The Asia Pacific Gateway Initiative, colloquially referred to as the Gateway Program, is one of the components within the Building Canada initiative. It is a joint funding project between the Federal government and the province of British Columbia.

The Gateway Program is touted as the Lower Mainland, British Columbia and Canada's bridge to future economic success. Much of this success hinges on supporting the movement of goods from Lower Mainland "gateways" – ports, airports and intermodal facilities – to the interior of Canada (Gateway, 2005). While the Gateway Program attempts to reduce commuter congestion levels in the Lower Mainland, Gateway is primarily about supporting goods movement. The Provincial government believes that supporting goods movement through infrastructure improvements is crucial for growing British Columbia's economy by capitalizing on the emerging markets of Asia, and remaining competitive with other port cities along the west coast of North America.

One Gateway document, “Canada’s Asia-Pacific Gateway and Corridor Initiative,” makes a correlation between investments in trade-related infrastructure and foreign direct investment. Investing in transportation infrastructure to move goods has had positive effects on Canada’s economy in the past. The report states, “Over the last 20 years, market oriented policies in the Canadian transportation sector have contributed to productivity increases that far outstripped those in the economy” (Government of Canada 2006). But, Canada no longer enjoys this productivity boost as technology has aged and new technology is required to maintain competitiveness.

The influx of federal dollars into municipalities is important in rectifying the municipal infrastructure deficit. But, the local municipalities and regional districts need to be consulted and a part of the decision making process to ensure that transportation projects are in line with their goals and objectives. The implementation of the Asia Pacific Gateway program clearly illustrates the danger of not collaborating on a transportation project with the regional district.

### **3.6 PROGRAMMATIC DISCUSSION**

---

Both the Gas Tax Fund and the Public Transit Capital Trust cite the reduction of GHG emissions as one of objectives that eligible projects need to accomplish. But, ensuring that projects should seek to reduce GHG emissions is a very broad statement which could have adverse impacts. Canada lacks sufficient transportation based emissions regulations, to provide a context for emissions reductions. Because there are no supporting regulations to reduce GHG emissions in Canada, municipalities must piecemeal their approaches to emissions reductions without support or guidance which is an onerous and time consuming task that diverts resources. These plans imply that shifting modes from cars to buses will reduce GHG emissions they do not replace the foundational understanding that regulations could provide.

Also, current Federal transportation programs fund capital project costs but do not fund operating costs. This problem afflicts almost all transportation related funding regimes. Funding is available for ribbon cutting ceremonies on new infrastructure projects, but not upkeep of the infrastructure. It is the responsibility of municipalities to fund operating costs. Some of the transportation stakeholders believe that the Federal government should take on increased responsibility for urban transportation infrastructure maintenance. Others disagree and think that operating costs fall under the responsibility of the Province. While there is disagreement among the stakeholders over which higher level of government should pay for operating costs there is a demonstrated need for financial assistance to municipalities for operating costs.

## 4. STAKEHOLDER ANALYSIS

---

The need to create a federal transportation plan, policy or strategy has been growing louder in recent years. A number of stakeholder organizations with municipal and provincial memberships have been lobbying the federal government to create a national transportation plan. The purpose of this section is to review documents which have been produced by stakeholder organizations which discuss a federal role in transportation planning and policy.

In general the stakeholder reports cover similar topics, they contextualized of the current municipal infrastructure crisis and the subsequent policy challenges facing the Canada's transportation systems. They also cite many of the challenges that transportation externalities place on municipalities. However, many of the points that they raise have been covered in Sections 2.1 – 2.7. The stakeholder documents, which have been summarized herein, bring new information to the discussion about a greater role for federal transportation funding.

### 4.1 FEDERATION OF CANADIAN MUNICIPALITIES

---

The Federation of Canadian Municipalities (FCM) represents municipal policy and program interests to the federal government. Their membership of 1600 is composed of municipal representatives from both large and small cities.

#### *National Transit Strategy (2007)*

The National Transit Strategy outlines the need for a greater federal role in transportation planning. The report makes proscriptive recommendations for direct federal involvement. An annual investment of \$2 billion should be allocated for transit system capital expenses. This investment would ensure that the systems are in good repair and can expand to meet growing demand. Cities with transportation plans that prioritize transit systems over cars should have priority in receiving federal funds. The Federal government should continue to provide financial incentives for transit use through tax breaks for transit users. To foster better transportation systems more innovative research needs to be occurring. Finally, they call on all levels of government to increase accountability through transportation funding (Big City Mayors' Caucus 2007).

#### *Funding Transit Wisely (2002)*

This report outlines the funding challenges that Canadian municipalities face with transit systems. It presents an overview of the status of transportation funding in Canada and offers a comparative analysis of transportation funding in the US. The report applauds the American federal government for investing in transit, but cautions against the lack of performance indicators to receive funding. Canada should learn from the US and support transit through regular, systematized funding that has locally devised performance criteria to ensure accountability. Finally, it concludes with a discussion on how the Federal government could provide funds for municipalities that ensures accountability (Gilbert 2002).

## 4.2 COUNCIL OF THE FEDERATION

---

The Council of the Federation (CotF) facilitates collaborative intergovernmental relations through, “interprovincial-territorial cooperation and close ties between members of the Council, to ultimately strengthen Canada (CotF 2005).” The CotF is composed of Canada’s provincial and territorial Premiers.

*Looking to the Future: A Plan for Investing in Canada’s Transportation System (2005)*

This document argues that the Federal government must take a more proactive role in funding transportation to ensure the economic prosperity of Canada. The transportation corridors that move goods are deteriorating, congested, and do not adequately link urban and rural areas. Over 80 per cent of the population of Canada lives in urban areas and yet urban areas are not receiving the infrastructure funding that they need.

Urban residents are experiencing a decline in their quality of life from time spent in congestion and increases in pollution levels. Goods movement suffers to a point where it is economically disruptive. The document states, “[o]ur competitiveness in the global market and our ability to build strong national, provincial and territorial economies are significantly affected by those policies and regulations that influence transportation infrastructure utilization and investment” (CotF 2005).

To counter these problems, the report suggests, that a multi-modal national transportation network (road, rail, ports, ferries, airports) should be established. A national transportation network needs to incorporate national, provincial and territorial perspectives, while respecting each jurisdiction’s priorities. A strategic transportation network on the national level should link rural, remote, and northern communities and industries to the network.

The report suggests that there is a need to remit a greater portion of the gas tax back to municipalities. In 2005, the U.S. remitted 90 per cent of federally collected gas taxes to transportation projects in states and municipalities. During the same time the Canadian Federal government invested only 9 per cent of its fuel revenues to projects. Canadian provincial governments, on the other hand, invested \$ 6.2 billion into transportation projects, or the equivalent of 92 per cent of the fuel taxes they collect. Investing in transportation infrastructure is critically important to, “encourage economic growth and diversification, enhance productivity and international competitiveness, strengthen community self-reliance and better integrate provinces and territories for a prosperous future” (CotF 2005). To achieve these goals there must be a long term partnership between the federal government and the provinces that provides stable transportation funding (CotF 2005).

## 4.3 CANADIAN URBAN TRANSIT ASSOCIATION

---

The Canadian Urban Transit Association has a diverse membership with representatives from 120 transit systems, 15 government agencies (federal, provincial and municipal), 250 business members (including consultants), and 50 affiliates.

*Transit Infrastructure Needs for the Period 2006-2010 Summary Report (2006)*

Similar to the report previously mentioned in Section 2.7, this report outlines the transit infrastructure need of CUTA's membership. Members completed a survey about their funding needs which was divided into four categories:

1. Currently planned rehabilitation/replacement
2. Rehabilitation/replacement contingent on external funding
3. Currently planned expansion ridership growth
4. Expansion/ridership growth contingent on external funding.

The results of the survey revealed that of the \$20.7 billion for infrastructure requirements, 44 per cent is needed to rehabilitate or renew existing infrastructure and the remaining 56 per cent is needed to expand capacity to encourage and support greater transit ridership.

The report concludes that if Canada wants to increase transit ridership it needs greater investment from the federal and provincial governments (CUTA 2006).

#### *Provincial and Territorial Funding of Urban Transit in Canada (2005)*

This report is the third in a series of reports that CUTA has published on transportation funding levels. The report details the 33 census metropolitan areas within Canada and notes federal and provincial funding that they have received. There is a further breakdown between what types of funding the municipalities receive, capital or operational. Much like other CUTA reports this report focuses on the numerical breakdown of finances (CUTA 2005).

## **4.4 CANADIAN TRUCKING ALLIANCE**

---

The membership of the Canadian Trucking Alliance is comprised of seven Canadian provincial trucking associations.

In a 2005 press release the Canadian Trucking Alliance called on the Federal government to create a national highway plan. They launched a campaign called "Fix Our Highways" that held, as one of its main tenements, that the Federal government create a long-term strategy for transportation investment. Creating a long-term national highway strategy would allow for coordinated development, and buck the current ad hoc development trend (Canadian Trucking Alliance 2005).

## **4.5 BC TRUCKING ASSOCIATION**

---

As a non-profit motor carrier lobbying organization the BC Trucking Association represents the interests of approximately 13,000 vehicles. Its membership is composed of truck, bus and courier companies that range from family owned to some of the largest of their kind in the country.

The BC Trucking Association recognizes that Canadian provinces have more generous weight restrictions than many American states. Moving goods cheaply is Canada's competitive advantage over other US port cities and states. However, this competitive advantage does not come without a price. Having more vehicles on the road creates more wear and tear on road infrastructure. The BC Trucking Association website ascribes the decline in road infrastructure to the thaw and freeze cycle of Canadian winters and a lack of maintenance funding by all levels of government. They further note, "Canada is the only major industrial state without a national highway policy" (BC



Trucking Association 2006) They urge the Federal government to adopt a national transportation strategy (BC Trucking Association 2006).

## **4.6 STAKEHOLDER REVIEW**

---

The stakeholder reports contribute a necessary industry perspective to the discussion about a more defined federal role in transportation. Overall, the reports cite the importance and necessity of greater federal involvement in Canada's transportation systems. The following key themes have been identified by the stakeholder reports:

- The Federal government should create and support a multimodal transportation system that links transit, goods movement, non-motorized transportation, rail, and automobile.
- The Federal government should preferentially distribute funds to cities that prioritize transit over automobiles in their transportation plans.
- Funding from the Federal government should be tied to performance mechanisms to ensure that it is being used for its intended purpose and used effectively.
- A larger portion of the Gas Tax should be remitted to municipalities to support innovative transportation solutions.
- There should be greater financial incentives provided by the Federal government for transit users.

The stakeholder reports add an additional level of breadth to this study. Drawing on the 'lived experience' of their membership the stakeholders contribute to the discussion of a greater federal role in transportation.

## 5. CASE STUDY ANALYSIS

---

This section reviews transportation policies from 3 countries: the United States, the United Kingdom and Germany. I chose these cases because the stakeholder reports outlined in the previous section made reference to these three jurisdictions. Moreover, these three countries share characteristics as Canada: they are industrialized, have similar settlement patterns, urban form, and in the case of the UK and US similar auto dependency. The purpose of this section is to conduct a comparative analysis of transportation policies in each of these three countries to find best practices with respect to national transportation plans promoting emissions reductions and improving public health.

### 5.1 UNITED STATES

---

The United States Federal government has played an active role in transportation development since the implementation of the Federal Highway Aid Act of 1956. The expansion of the highway network in the U.S. cemented the role of the automobile as the dominant transportation modal preference. But, automobile dependence provided economic, social and environmental challenges to municipalities. The Federal Highway Aid Act provided federal funding for the costs associated with expanding the transportation system, but did not provide funding for maintenance. The Interstate highway system began to fall into disrepair in the 1980s because municipalities lacked the economic capacity for road maintenance (Skinner 1991).

In the 1990s, there was a significant policy shift within transportation planning in the US because of the introduction of two federal Acts. Both passed in 1991, the Clean Air Act Amendments (CAAA) and the Intermodal Surface Area Transportation Act of (ISTEA) signaled this shift. The CAAA built upon the original mandate of the US Clean Air Act of 1971 to take steps to improve the public health of Americans by reducing exposure to harmful pollutants (Clean Air Trust 2002). The CAAA created a national standard of acceptable standards of air pollution and smog. States are required to comply with this standard and must adopt strategies to reduce air pollution and smog. The CAAA – through the Environmental Protection Agency – requires the Federal government to establish limits on acceptable levels of pollutants from tailpipes of new automobiles (Environmental Protection Agency 1990).

Some commentators heralded the adoption of the ISTEA as the most significant piece of transportation legislation since the Federal-highway Act of 1956 (Gertz 2003). Perhaps what is most profound about ISTEA is that it is an outgrowth of the federal government's role in the national highway system, but was a very dramatic policy shift. ISTEA placed an emphasis on linking different modes, from automobile to transit and to walking and cycling. Moreover, for the first time in the history of U.S. transportation policy, ISTEA was endowed with a policy mechanism that gave it “teeth” (Horan, Dittmar et al. 1999). ISTEA granted local authorities to play a more active role in formulating transportation planning objectives and the power to regulate potential transportation project funding (Gertz 2003).

Horan et al. note in 1999 that the practice of embedding broad social, economic, and environmental goals within transportation policies appeared in federal transportation legislation in 1962 (Federal Aid Highway Act). But, what set ISTEA apart from previous legislation was that it

was endowed with enabling powers to regulate. Funding was contingent upon a set of agreed criteria, if projects failed to meet the criteria then funding would be removed. Some of these powers are derived from the CAAA, which allow regional planning authorities to, “integrate clean air planning and transportation planning at the regional level” (Hanson 2004). The CAAA built upon the conclusions made in the Clean Air Act that automobiles are a major contributors to air pollution by moving a step further to identify goals for cleaner vehicles, cleaner fuels, and for transportation programs to adhere to and meet air quality standards (Hanson 2004). The CAAA and ISTEA work in tandem to establish air quality standards and tie them to transportation projects (Horan, Dittmar et al. 1999). Funding for transportation projects under ISTEA, and its successors, is contingent upon the projects upholding the transportation activities that are consistent with the air quality goals outlined in the CAAA (Jensen 2003).

The ISTEA empowers municipalities to implement transportation projects through devolving the power and responsibility of transportation planning to the local level. The Metropolitan Planning Organizations (MPO) are support bodies that were created under ISTEA for urban populations exceeding 50,000 (Horan, Dittmar et al. 1999). MPOs are responsible for creating transportation implementation plans (TIP) in conjunction with state authorities and transit operators. A core objective of the ISTEA is to promote intermodalism and emphasize other transportation modes that had previously been ignored such as walking and cycling. Locally devised TIPs are mandated to acknowledge and plan for intermodal connectivity, as well as land use, and methods to enhance transit services (Skinner 1991). MPOs were delegated a cadre of options by ISTEA to best reduce transportation related air pollution in their local area. MPOs had the opportunity to select development projects, “among highway, transit, and other transportation alternatives that would enable them to select the best mix of projects to address air quality” (Jensen 2003) .

Since its inception in 1991, the ISTEA has altered the way transportation is planned in the US. Table 3 describes the planning changes initiated by the ISTEA, as well as the problems associated with it.

**Table 3: The Effect of ISTEA on Transportation Planning**

<b>Positive Changes Initiated Through ISTEA</b>	<b>Challenges Associated with ISTEA</b>
Land use: <ul style="list-style-type: none"><li>• ISTEA recognized the connection between transportation and land use.</li></ul>	Land use: <ul style="list-style-type: none"><li>• Some experts suggest that linking land use and transportation planning was beyond the jurisdiction of MPOs, which limited their effectiveness.</li></ul>
Funding alternative transportation modes: <ul style="list-style-type: none"><li>• Large scale funding was available for transit.</li><li>• Funding for bicycle facilities dramatically increased.</li></ul>	Institutional difficulties: <ul style="list-style-type: none"><li>• ISTEA required a reconfiguration of institutional processes. In many instances the institutions resisted or were slow in adopting the changes.</li></ul>
Emphasis on repair: <ul style="list-style-type: none"><li>• The share of federal funds being allocated to building new roads has begun to decline.</li></ul>	Change was not mandated <ul style="list-style-type: none"><li>• PMOs varied in the effectiveness and how active they were in instituting ISTEA.</li></ul>
Flexibility: <ul style="list-style-type: none"><li>• The flexibility of funds has been one of the greatest accomplishments of ISTEA, funds have been able to be used for both highway and transit investments. Freeing up the funding regulations has created an increase in transit projects being funded from highway funding.</li></ul>	

Adapted from: (Horan, Dittmar et al. 1999; Schweppe 2001; Gertz 2003)

Since the expiration of ISTEA in 1998 there have been two successive acts that have been signed into law, the Transportation Equity Act 21st Century (TEA-21) and Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Current funding for transportation planning and projects is committed under SAFETEA-LU until 2011.

These Acts broaden the original mandate of ISTEA. Below is a list of the significant changes made by these two acts.

- Funding continued under the model established by ISTEA and was expanded, in real dollars, as well as the share of the gas tax remitted to states and MPOs;
- A national transportation research centre was created to support MPOs and states with transportation planning;
- Powers were devolved to the states allowing them to undertake congestion charging which created another stream of revenue for the state coffers and the MPOs to draw on;
- Environmental regulations at the local level were strengthened;
- There has been a shift away from building new roads, to maintaining roads and managing road capacity and;

- Finally, public private partnerships are permitted in constructing and maintaining transportation infrastructure (United States Department of Transportation 1998; United States Department of Transportation 2005).

While the United States remains the most car dependent country in the world, public consciousness and all three levels of government have moved toward a more sustainable transportation system.

## 5.2 UNITED KINGDOM

The UK has a similar built form as the United States with low-density developments making it heavily car dependent (Docherty 2003). After WWII, England<sup>1</sup> embarked on a significant road building program as a mechanism to regenerate its shattered economy. The rise of the automobile as a sign of personal freedom as well as its ability to distribute wealth over a larger area -as witnessed in North America- was quickly adopted by Britain. The culture of universal car ownership proved too heavily influence land use patterns in Britain. Docherty notes that,

Britain's towns and cities have followed American trends toward low density suburban sprawl and the rapid growth of satellite dormitory settlement around major cities, encouraged by a laissez-fair attitude to wide spread car use (2003).

The UK continued to preferentially plan for cars by expanding road capacity until the economic downturn of the 1990s. The economic recession resulted in funding cutbacks that stymied road expansion, as well as the privatization of the public transportation sector (Knowles 2004).

The ascribed model of “predict and provide” which resulted in expanding roadways and low-density land use was temporarily suspended because of a lack of funding for transportation infrastructure during the recession of the early 1990s. This dominant transportation planning ethos was challenged by the stresses associated with the “predict and provide model” during the recession and is signaled as the impetus for systemic change in transportation planning in the UK. (Docherty 2003; Knowles 2004).

Around the same time, the Bruntland Report of 1987 broadly articulated the concept of sustainability. The report specifically discussed the impact of transportation on the environment, two concepts which had previously been disparate. However, Docherty explains that the term “sustainable transportation” quickly became mutated (2003).

The recommendations made in the Bruntland Report laid dormant until the Labour Government's *A New Deal for Transport: Better for Everyone* was revealed in 1998. This report shifted government priorities towards a more integrated multi-modal transportation system, that linked transportation planning with the environment and land use (Grayling 2004). The plan prioritized sustainability within the transportation sector and the decrease of car dependence. Through demand management programs, and financial incentives, car use would decline and people would turn to other modes of transportation such as transit, biking and walking. As a further testament to Labour's commitment to linking transportation and the environment they melded the environment and transport departments into a single bureaucracy, the new Department of the Environment, Transport and the Regions (Docherty 2003).

---

<sup>1</sup> For the purpose of simplicity this section will focus on transportation policy within England.

Many of the policy recommendations of the Department of the Environment, Transport and the Regions were laid out in the Transport Act of 2000. There were also new powers granted to the municipalities to enact road pricing, the powers to levy charges on congestion. Local authorities were mandated to create five year transportation plans to outline future transportation needs for the area (Smyth 2003). While the plan was ambitious it failed to provide any new funding for transport, and provided less funding than previous governments (Grayling 2004).

But, the ambitious agenda outlined in *A New Deal for Transport* did not last. Sustainable transportation initiatives were toned down in the next transportation plan (*Transport 2010: The 10 Year Plan for Transport*) to avoid political repercussions. It turned out that Labour's voter stronghold was also the group who was most vocal about expanding, not contracting road networks. This conflict resulted in Labour backing away from the sustainability focused agenda and emphasizing problems with congestion and environmental degradation at the local level. Critics noted that the Labour government merely devolved responsibilities and powers to the local level, in an attempt to offload responsibility of long-term objectives such as Kyoto emissions reductions (Begg and Gray 2004).

The British government's recalcitrant attitude toward sustainable transportation systems has continued. Under increasing scrutiny and political pressure in 2000 Labour bowed to the call from protesters to reduce government fuel taxes. Instead of reducing car dependency the government has supported it and lost a valuable source of revenue to fund public transport (Grayling 2004). After 10 years of Labour rule the cost of owning a car fell by 10 per cent and the cost of bus travel increased by 13 per cent and train travel increased 6 per cent. During the same time period GHG emissions have risen five out of the past ten years (Russell 2007). Moreover, car dependence has continued to grow and is expected to grow by another third over the next 20 years (Urban Policy Directorate 1999). The devolution of powers to local levels of government has created mixed results and echo findings from the US, that local authorities approach are sometime ineffective in embracing their new powers. A more recent study conducted by the Urban Task Force suggests that the local transportation plans should adhere to national standards to ensure compliance and consistency (Urban Policy Directorate 1999).

The UK case study clearly demonstrates the costs of inaction in failing to manage the transportation sector. Relying on municipal governments to address important transportation challenges such as reducing emissions is shortsighted and ineffective. Failing to increase transportation choice through bus and train transport will not induce a modal shift to these more sustainable forms of transportation. The impetus for systemic change needs to originate from the national government, and have financial and programmatic support to put sustainable transport back on the agenda.

### **5.3 GERMANY**

---

I have included Germany in this case study analysis to look at the effects of the supra-national transportation policy from the European Union on Germany's internal transportation planning.

The German government has been actively involved in the planning and development of the transportation infrastructure since the reconstruction of Germany. A strong centralized government coupled with economic stimulus provided by the Marshall Plan helped to revive the

transportation sector in Germany after WW II. Since that time the central German government has actively directed development within this sector. For the majority of the 20th century urban transportation was the responsibility of municipalities and states (Federal Ministry of Transport 2003; Brandt 2006).

Transportation in Germany continues to be shaped by Germany's reunification that took place thirteen years ago. The adage that guides transportation investment is "upgrading in Western Germany and development of Eastern Germany" (Federal Ministry of Transport 2003). Transportation planning has been heavily influenced by the Federal government, but has also had significant state and regional involvement. The federal government agency, Ministry of Transport, Building and Urban Affairs, conducts transportation planning nested within the greater scope of planning Germany's urban areas (Federal Ministry of Transport 2003).

Germany, like Canada, experienced erosion in its urban transportation infrastructure. A remedial solution that Germany employed was the introduction of Public Private Partnerships (Eisenkopf and Knorr). This shift away from government subsidized, operated, and maintained urban transit systems was in tandem with a 1993 European Union policy which mandated the liberalization and re-regulation of urban public transportation (Brandt 2006). This policy sought to increase productivity, reduce government costs, and broaden the transportation sector. Today Germany continues to utilize the private sector to deliver public transportation (European Commission 2001).

The German constitution mandates the Federal government to financially support local public transport. Through the Local Public Transport (Regionalization) Act and the Act on Federal Government Financial Aid to Improve Transport at the Local Authority Level the federal government provides approximately € 15 billion per year for public transit throughout Germany. Public transit is publicly funded but privately operated. The federal government encourages transportation "alliances" by joint ventures and mergers of private transport providers (Federal Ministry of Transport 2000). In 2003, the Federal Cabinet passed the Federal Transport Infrastructure Plan. This plan committed € 150 billion over the course of fifteen years for Germany's intermodal transportation system. Approximately 55 per cent of this amount is earmarked to support existing intermodal transportation systems (Ministry of Transport, Building and Urban Affairs).

The Germany case study demonstrates that uneven areas of transportation infrastructure development are not an impediment to fostering sustainable transportation. In fact, under developed transportation infrastructure may support the integration of sustainable transportation. Instead of having a sprawling pattern that is dictated by cars underdeveloped areas may be more compact and easier to service by transit.

## **5.4 CASE STUDY CRITERIA AND MATRIX**

The case study analysis of the US, UK and Germany illuminates the configuration of transportation funding in these countries. The case study countries shared certain levels of policy commonality but also dissimilarity. To capture the similarities and differences between the countries case study criteria and a matrix have been developed. A number of criteria have been selected to assist in the process of comparatively reviewing the case studies with an element of rigor. The criteria have been informed from five broad sources: the challenges that Canada's transportation systems

are currently facing, the stakeholder reports, current federal transportation policies, the case studies themselves, and select transportation literature.

**Financial Incentives:** This criterion is intended to capture financial incentive mechanisms that the national governments may use to promote more sustainable forms of transportation, e.g. building busways instead of freeways.

**Fund Matching:** This criterion captures the level of involvement in transportation projects from multiple levels of government. Fund matching is typically standardized, for example the federal government will contribute X per cent of funding and the state will contribute the remaining X per cent.

**Transportation funding linked to air pollution legislation:** Similar to the financial incentives, this criteria is intended to be used as a measure to create environmental accountability. Are there emissions criteria that are supra organizational that transportation developments must adhere to?

**Transportation linked to land use:** The purpose of this criterion is to capture if transportation and land use planning are being simultaneously planned. Or rather, that the alteration of land use by transportation projects is being actively considered in transportation planning.

**Table 4: Case Study and Base Case Analysis**

Criteria	Canada	United States	Germany	UK
Financial incentives	Yes	Yes	Yes	Partial
Fund matching program	No	Yes	No	No
Transportation funding linked to air pollution/climate change legislation	No	Yes	Yes	Yes
Transportation linked to land use	No	Yes	Yes	Yes

## 5.5 CASE STUDY FINDINGS

### Financial Incentives

Germany implements a cadre of financial incentives to support sustainable transportation. By supporting mass transport systems (bus and rail) and non-motorized transportation (walking and cycling) Germany has made these modes as appealing as car travel (Federal Ministry of Transport 2003).



Britain and the US have similar institutional configurations to stimulate sustainable transportation projects. The Metropolitan Planning Agency (UK) and Metropolitan Planning Organization (US) are both required to create short-medium term (approximately 5 year) transportation plans that prioritize the maximization of system capacity before expansion. They are also both required to implement measures to increase public transit (Gertz 2003; Department for Transport 2006).

### **Fund Matching**

The US government provides the most generous fund match split, 90 per cent of the funding accessed through SAFETEA-LU is provided by the national government. The state or municipal government, depending on the project, funds the remaining 10 per cent (United States Department of Transportation 2005).

The UK government does not have a direct fund matching program. Instead the national government allocates dedicated funding on an annual basis for eligible transportation projects through Regional Development Agencies. These agencies advise the national government of regional funding priorities (Regional Development Agencies 2008). The national government provides funding to through the Transportation Innovation Fund for innovative and sustainable transportation projects that seek to reduce congestion or increase productivity. This fund disburses money based on “the quality of the schemes” under consideration (Department for Transport 2008).

The UK is able to tap into funding provided through the EU’s Structural Funds. There are four streams of Structural Funds, but for our purposes the European Regional Development Fund (ERDF) is the most relevant. Among its eligible uses, this fund is available for transportation projects and innovative transportation demonstration projects (Europa 2005). All member countries receive a portion of this fund. To access ERDF funding applicants – who may be part of the private sector, government bodies, environmental bodies, voluntary and private sectors, and members of the business community – apply for funding through Regional Development Agencies (RDA). There are nine RDAs in Britain, funding is allocated by a monitoring committee to ensure that the proposed project offers substantial benefits to the community. This committee is composed of government officials, local authorities, higher and further education institutions, environment bodies, voluntary and private sectors, and members of the business community (UK Government).

Germany does not have a fund matching program for states and municipalities but has a pool of funds that it makes available for local and regional passenger rail services. Approximately two thirds of the funds available are used to order local transport services. The remaining one third of funds are used to improve public transport (Federal Ministry of Transport 2003).

As a member of the EU and a recipient of funding through the Operational Programme for Transport Germany was provided funding to promote economic and structural adjustment because in 2000 it was economically lagging behind other member countries (Faber, ECOTEC et al. 2000). Germany was eligible to receive this funding because its GDP per capita was less than 75 per cent of the EU community over the previous three years. The Operational Programme for Transport (OPT) transferred funds to Germany for transportation infrastructure projects. The OPT has a funding match component that requires that national funds match Structural Fund

contributions, but can match up to 75 per cent of project costs under certain circumstances (Faber, ECOTEC et al. 2000).

### **Transportation Linked to Air Pollution Legislation**

All three countries have linked their transportation planning objectives and funding to air pollution legislation. In the US, SAFETEA-LU and its predecessors are linked to the Clean Air Act which mandates that transportation projects work to reduce GHG emissions. Under SAFETEA-LU the US federal government has granted greater powers and responsibilities to the MPOs to enact and enforce environmental regulations. Germany and Britain have both made commitments towards meeting Kyoto Protocol targets by guiding their transportation planning and investments to more sustainable transportation options. As members of the EU both Germany and the UK are expected to implement common transportation policies that seek to reduce air pollution by prioritizing sustainable forms of transportation. Britain has recently granted enforcement powers to municipalities to ensure that transportation emissions are being reduced at the local level (Department for Transport 2002).

Although Germany and the UK have ratified the Kyoto Protocol, they have not taken steps to aggressively reduce transportation emissions to align them with other GHG reduction policies. A recent report issued by the European Environment Agency has found that counter to the commitment made under the Kyoto Protocol to introduce, "Measures to limit and/or reduce emissions of green house gases not controlled by the Montreal Protocol in the transport sector..." (1997) the transportation sector has not gone far enough. The report suggests that the poor rate of GHG emission reduction is because, "Previous and current EU policies have mainly focused on improving vehicle technology and fuel quality to reduce pressures on the environment" (European Environment Agency 2008). A rebound effect has occurred, the introduction of greater fuel efficient cars has reduced the cost of operating the cars and has increased demand for road way capacity. This policy failure suggests that pursuing an emissions reduction strategy within Canada that relies on technological advances in the automobile industry is short sighted.

### **Transportation Linked to Land Use**

The transportation funding policies of the US, UK and Germany prioritize transportation projects that create compact, mixed use land use scenarios. However, these countries may have made a conscious effort to link transportation and land use but their efforts have not been entirely effective.

In the US, linking land use planning to transportation planning has continued to be a struggle because of the diverse pressures being placed on the transportation system. Gertz notes that some of the municipalities have been slow to implement transportation and land use planning because they were unsure of their powers and responsibilities under ISTEA and successive transportation acts (2003). In the UK, the Department for Transport established clear linkages between transportation planning and land use. However, due to political pressure the UK has backed down from the wide scale promotion of mixed-use, compact, development and has continued to build low-density developments that favour the automobile (Russell 2007). Germany appears to be having the greatest success in co-planning for land use and transportation. For example, in Hannover the 21 local authorities for the region have engaged in planning

transportation and residential development that has created dense corridors that favour transportation movement and other forms of non-motorized transportation (Husken 2004).

## 6. OPPORTUNITIES FOR A FEDERAL ROLE IN TRANSPORTATION INVESTMENT

This section outlines the key finding of the report and concludes with recommendations.

### 6.1 KEY FINDINGS

#### 1. *Canada lacks comprehensive guiding principles to underpin transportation investments.*

Within the Gas Tax Fund and the Building Canada initiative there are criteria that guide transportation investment, but they are ineffective. The Gas Tax Fund provides very specific criteria that projects must adhere to in order to tap into the \$2 billion in annual available funding. These criteria are mainly premised on what type of infrastructure project the funding can be used towards, e.g. Light Rail Transit. The Building Canada initiative provides very high level objectives to guide transportation investment. However, there is a lack of guiding principles that speak to guiding sustainable transportation investment on the whole.

#### 2. *Canada's political structure is a barrier in the creation of sustainable transportation systems.*

The separation of powers amongst the federal, provincial, and municipal governments complicates the implementation of standardized transportation goals and objectives. The federal government cannot directly mandate that the provinces adopt certain approaches to transportation. This being said the federal government has a stake in how the provinces interact and fund urban municipalities as many of the issues cross over into federal responsibility (immigration, housing, transportation). The federal government can leverage change through bilateral agreements with the provinces. The Gas Tax Fund established precedence of federally remitted funds to municipalities for transportation projects via the provinces.

Canada is at a pivotal moment; steps need to be taken to address many of the externalities associated with transportation systems. A question needs to be posed: at what point does the health of Canadians and the promotion of the natural environment break down the political barriers of federalism? Canada needs to reevaluate its priorities as a nation and work towards greater cooperation to foster positive change.

#### 3. *Greater inter and intra governmental partnerships need to be fostered to support holistic transportation planning objectives.*

Working with provincial and municipal governments to establish an urban transportation planning agenda will benefit all parties. Including the provincial and municipal governments is necessary to capture the local context. To create transportation systems that are efficient, environmentally sustainable and health promoting the federal government needs to incorporate a wider range of actors in transportation funding. Health Canada and Environment Canada need to be included in the transportation funding process to create a more holistic approach to planning.

4. *Adopting a holistic approach to transportation planning will incorporate the cost of transportation externalities.*

The externalities within Canada's transportation systems have worsened over time and will continue to do so unless there is governmental intervention. The case studies demonstrate the benefits of linking land use, GHG emissions, air pollution, health, and the promotion of sustainable forms of transportation into transportation planning.

5. *To foster national environmental change funding needs to be available to support sustainable transportation innovation and research.*

In comparison to EU countries and the US, Canada has failed to make a substantial financial commitment to reducing emissions generated from transportation through innovation and research. Provincial and municipal governments are primarily responsible for this task. British Columbia stands out amongst the provinces for taking a pro-active role in climate change abatement with the introduction of carbon taxes. Montreal, Victoria, and Vancouver have implemented a gas tax to fund urban transit and reduce transport related externalities.

The federal government does provide limited funding through the eco-MOBILITY and Urban Transportation Showcase Program for sustainable transportation research and innovation. These programs should be broadened if the federal government wants to make a dedicated commitment to sustainable transportation innovation and research. A greater federal role in this area will promote information sharing and innovation in sustainable transportation.

6. *Municipalities cannot afford to pay for the operating costs of transportation infrastructure.*

Federal transportation funding in Canada currently provides municipalities - via the provinces - with money for capital projects. Herein lays a problem for the long term vitality of the Canada's transportation system. If capital funds exist for new projects, there will be the ongoing burden of operating costs that the municipalities need to bear. Municipalities may forgo necessary transportation projects because they cannot afford the maintenance costs. For example, a large transit infrastructure project may be in the best interest of a metro region, but long-term forecasting models demonstrate the operating costs will be to challenging for the metro region to manage alone. The Canada Transportation Act Review panel in 2001 suggested that municipalities should be given the power to raise funds from road pricing. The revenue generated from road pricing should be reinvested in municipal transportation infrastructure to assist with operating costs (2001). This opportunity should be explored to allow municipalities to be able raise funds to support themselves.

## 6.2 RECOMMENDATIONS

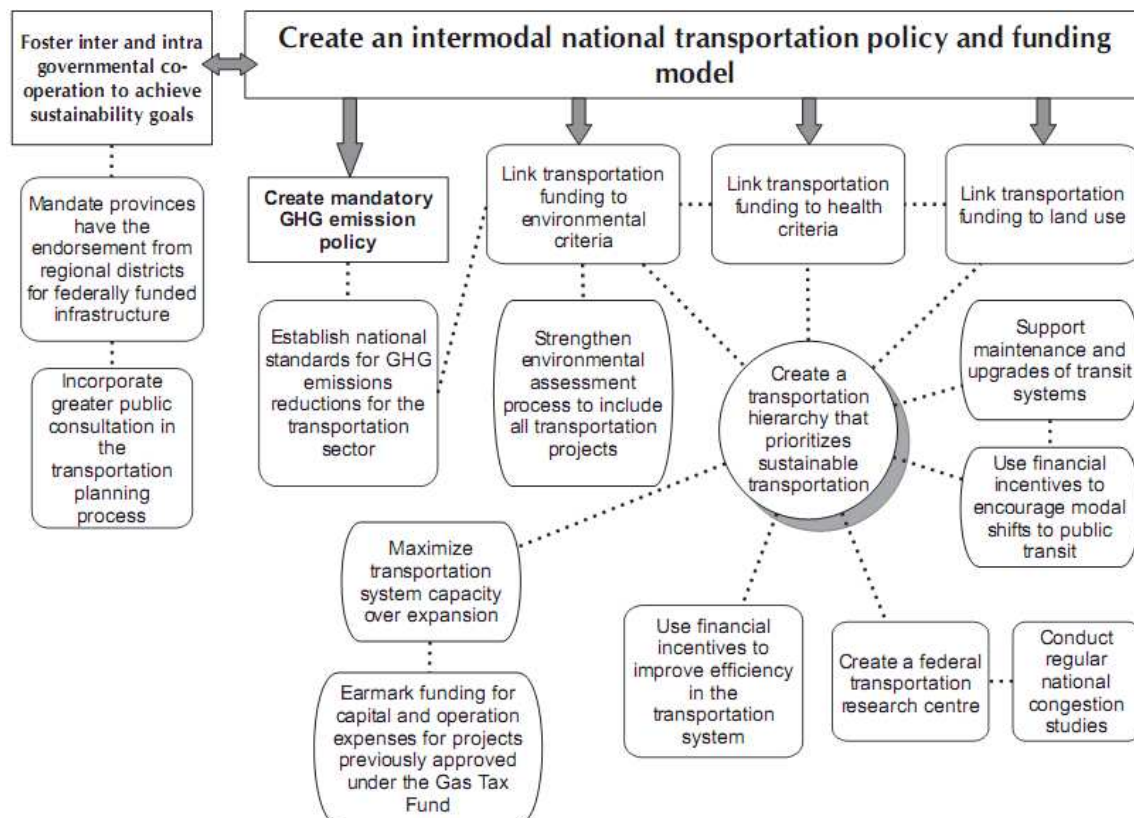
---

The recommendations outlined within this section are a product of research and analysis of the challenges facing Canada's transportation system, stakeholder analysis, current funding transportation programs, and the case study analysis. With the recent announcement that the Gas Tax Fund will be a permanent funding mechanism for municipalities to draw on there is an

excellent opportunity to provide recommendations on how the funding should be guided. This section also acts as a base from which Canada could reconfigure its transportation funding disbursement system.

To capture the relationship between the recommendations that are interdependent and partially hierarchical I have graphically depicted in Figure 3.

**Figure 3: Recommendations**



Creating a federal role for transportation investment will increase government accountability at all levels. Long-term, stable and predictable funding will de-politicize the nature of transportation investment. Creating a transparent program that has stable, long term funding will allow for coordinated planning to take place at the municipal, provincial and federal governments. Transparency is critical to ensure that the taxpayers' dollars are being spent wisely as well as the development that is taking place supports the health and wellbeing of Canadians.

Canada is at a very pivotal moment in its transportation funding history. The creation of a permanent funding transfer for transportation projects (through the Gas Tax Fund) has opened the door for holistic transportation planning. The Federal government has the opportunity to implement programmatic approaches to monitoring the effectiveness of funding spent relative to desired outcomes. Also, there could be a greater focus placed on outcome focused performance based monitoring. Canada needs to develop programs that tie funding to desired outcomes. We

need to encourage municipalities (through incentives) to match funds and develop programs that accomplish the objectives that are inherent in federal programs.

Furthermore, the federal government has the opportunity to work in partnership with the provinces and municipalities to determine a set of criteria that captures the health, environmental and economic impacts of transportation projects. New levels of rigor can be achieved in transportation projects by requiring that potential projects adhere to these funding criteria. Further, national requirements can be drafted that compel regions to contrast different growth scenarios (compact versus sprawling) and analyze how transportation projects affect mobility, equity, health, environmental outcomes. To achieve innovative sustainable transportation planning there should be a focus on developing tools, collecting data and using evidence (from other projects) to establish a more objective comparison of performance across multiple objectives.

## 7. CONCLUSION

In this report I have explored a multitude of challenges impacting Canada's transportation systems. The externalities from air pollution, urban sprawl, congestion, physical inactivity, climate change, and municipal infrastructure shortfall can no longer be ignored. Current federal government policy is falling short of managing the complexities of urban transportation systems. The promotion of goods movements can no longer occur at the expense of the health of urban residents. The calls from stakeholder organizations that represent transportation industry members are loud and clear: we can no longer afford the status quo approach to managing transportation planning and investment. The case study analysis provided a necessary comparative analysis, and glimpse of hope, of approaches that other countries are taking to transportation financing.

If the Federal government fails to formalize a federal role in transportation it will be at a great loss to Canadian citizens. Collectively urban residents will experience an increase in air pollution, endangering the lives of young and old through increased rates of asthma. Innovation in sustainable transportation will be disparate and limited. The transit dependent will continue to experience high transit costs and diminishing services. Low-density land use, with poor transit connectivity will support an automobile driven transportation system that inhibits utilitarian exercise. Finally, a greater reliance on automobiles is shortsighted in a time when gas prices have begun to rise and will continue to do so with the impending peak oil crisis.

Canada is at its zenith. We are a prosperous, energy and resource rich nation that has the opportunity to lead the world in the arena of integrated, sustainability driven transportation systems. But, the question remains: Will the Federal government rise to the challenge and promote the health, environment, and equity of Canadians through a permanent role in federal transportation funding?

In this report I have discussed the necessity for a greater and more permanent role for federal transportation funding. However, further research is still required in this field of study. Specifically, more in depth research needs to be conducted into countries that have had greater federal involvement in transportation funding. Canada has the opportunity to learn about the successes and pitfalls that these countries have experienced by examining their sustainable transportation policies, intergovernmental responsibility for transportation planning and inter and intra governmental cooperation.



## 8. BIBLIOGRAPHY

---

- (1867). The Constitution Act, Department of Justice.
- (1996). Local Government Act Queen's Printer.
- (1997). Kyoto Protocol to the United Nations Framework on Climate Change. United Nations.
- Alonso, W. (1967). "A Reformulation of Classical Location Theory and Its Relation to Rent Theory." Papers in Regional Science 19(1): 22-44.
- BC Trucking Association. (2006). "Infrastructure." Retrieved March 9, 2008, from <http://www.bctrucking.com/relations/infrastructure.php>.
- Begg, D. and D. Gray (2004). "Transport policy and vehicle emission objectives in the UK: is the marriage between transport and environment policy over?" Environmental Science & Policy 7(3): 155-163.
- Berdahl, L. (2006). The Federal Urban Role and Federal-Municipal Relations. Canada: The State of the Federation 2004 - Municipal - Federal - Provincial Relations in Canada R. Young and C. Leuprecht. Montreal, Institute of Governmental Relations.
- Big City Mayors' Caucus (2007). National Transit Strategy. B. C. M. Caucus. Ottawa, Federation of Canadian Municipalities.
- Brandt, T. (2006). Liberalisation, privatisation and regulation in the German local public transport sector. Country reports on liberalisation and privatisation process and forms of regulation. C. U. o. Leuven. Düsseldorf, Wirtschafts-und Sozialwissenschaftliches Institut
- Brunekeef, B., N. A. H. Janssen, et al. (1997). "Air Pollution from Truck Traffic and Lung Function in Children Living near Motorways." Epidemiology 8(3): 298-303.
- Bus Riders Union Planning Committee (2003). Billions for Buses Draft position of the Us Riders Union on the proposed Richmond/Airport/Vancouver Skytrain expansion. Vancouver, Bus Riders Union.
- Canada Transportation Act Review Panel (2001). Canada Transportation Act Review. P. o. Canada.
- Canadian Urban Transit Association (2006). Transit Infrastructure Needs for the Period 2006-2010 Summary Report. C. U. T. Association. Toronto, Canadian Urban Transit Association
- Cavailles, J. and P. Wavresky (2003). "Urban influences on periurban farmland prices." European Review of Agricultural Economics 30(3): 333-357.
- Clean Air Trust. (2002). "What is the Clean Air Act?" Retrieved 01 March, 2008, from <http://www.cleanairtrust.org/cleanairact.html>.
- CotF (2005). Looking to the Future A Plan for Investing in Canada's Transportation System, The Council of the Federation.
- Cox, W. a. J. L. (1995). How the Competitive Market Can Make Canadian Transit Efficient and Effective. Essays in Canadian Surface Transportation. F. Palda. Vancouver, The Fraser Institute: 141-178.
- Crutzen, P. J. P. J. (2004). "New Directions: The growing urban heat and pollution "island" effect - impact on chemistry and climate." Atmospheric Environment 38(21): 3539-3540.
- CUTA (2005). Provincial and Territorial Funding of Urban Transit in Canada. Toronto, Canadian Urban Transportation Association
- CUTA (2005). Transit in Canada: An Industry on the Move. Toronto, Canadian Urban Transit Association.
- CUTA (2006). Transit Infrastructure Needs for the Period 2006-2010 Summary Report. Toronto, Canadian Urban Transit Association

- Davidson, G. and B. Brown (2005). Building Consensus: Ottawa Ward Boundary Review - Recommendations Report. Ottawa, Beate Howron Etcetera Inc.
- The Davidson Group Inc.
- DeGrove, J. M. (1984). Land Growth & Politics Washington, Planners Press - American Planning Association.
- Deka, D. (2004). Social and Environmental Justice Issues in Urban Transportation. The Geography of Urban Transportation. S. Hanson and G. Giuliano. New York, The Guilford Press: 356-381.
- Delcan (2006, 2007). The Cost of Urban Congestion in Canada, Transport Canada.
- Department for Transport. (2002). "Enforcement of Vehicle Emissions Regulations by Local Authorities." Retrieved January 31, 2008, from <http://www.dft.gov.uk/pgr/roads/environment/research/enforcementofvehicleemission3839?page=2#a1001>.
- Department for Transport (2006). Final report of the Working Group on Delivering Success for Criteria for Transport. D. f. Transport.
- Department for Transport. (2008, 2008). "Transportation Innovation Fund." Retrieved 1 April, 2008, from <http://www.dft.gov.uk/pgr/regional/tif/transportinnovationfund?page=2#a1002>.
- Department of Finance (2005). Budget 2005 A New Deal for Canada's Communities. D. o. Finance.
- Department of Finance (2007). Backgrounder Oil and Gas Prices, Taxes and Consumers (Tax Bulletin). D. f. Transport. **2007**.
- Department of Finance (2008). Budget 2008 - Responsible Leadership. D. o. Finance.
- Dipietro, L. (2001). "Physical activity, adiposity, and body weight: an epidemiologic perspective." Exercise and Sports Science Review **25**: 275-303.
- Docherty, I. (2003). Policy, Politics and Sustainable Transport: The Nature of Labour's Dilemma. A New Deal for Transport? I. Docherty and J. Shaw. Oxford, Blackwell Publishing: 1-29.
- Eisenkopf, A. and A. Knorr Engaging the Private Sector in Transportation Infrastructure - The Role of Public-Private Partnerships.
- Environment Canada. (2007, 01 June 2007). "Canada's 2005 Greenhouse Gas Inventory - A Summary of Trends." Retrieved 10 February, 2008, from [http://www.ec.gc.ca/pdb/ghg/inventory\\_report/2005/2005summary\\_e.cfm](http://www.ec.gc.ca/pdb/ghg/inventory_report/2005/2005summary_e.cfm).
- Environmental Protection Agency (1990). Clean Air Act. E. P. Agency.
- Europa. (2005, 14 June 2005). "EDRF: European Regional Development Fund." Retrieved 10 April, 2008, from <http://europa.eu/scadplus/leg/en/lvb/l60015.htm>.
- European Commission (2001). White Paper: European transport policy for 2010: time to decide, European Commission.
- European Environment Agency (2008). Climate for a transport change: TERM 2007: indicators tracking transport and environment in the European Union, European Environment Agency.
- Ewing, R., T. Schmid, et al. (2003). "Relationships Between Urban Sprawl and Physical Activity, Obesity, and Morbidity " American Journal of Health Promotion **18**(1).
- Faber, O., ECOTEC, et al. (2000). Thematic Evaluation of the Impact of Structural Funds on Transport Infrastructures European Commission Directorate-General Regional Policy.
- Federal Ministry of Transport, B. a. H. (2003). Laying the foundations for the future of mobility in Germany Federal Transport Infrastructure Plan 2003. Berlin.
- Federal Ministry of Transport, B. a. U. A. (2000, 2008). "Benchmarks for efficient and attractive local public transport." Retrieved March 1, 2008, from <http://www.bmvbs.de/-1896.963517/Benchmarks-for-efficient-and-a.htm#1>.

- Fitzpatrick, K. and M. LaGory (2000). Unhealthy Places: The Ecology of Risk in the Urban Landscape. New York, Routledge.
- Frank, L., S. Kavage, et al. (2006). Promoting public health through Smart Growth: Building healthier communities through transportation and land use policies and practices. Vancouver, Smart Growth BC.
- Frank, L. D. (2000). "Land Use and Transportation Interaction." Journal of Planning Education and Research **20**(1): 6-22.
- Frank, L. D. and P. O. Engelke (2001). "The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health." Journal of Planning Literature **16**(2): 202-218.
- Frumkin, H., L. Frank, et al. (2004). Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities. Washington, Island Press.
- Gertz, C. (2003). "Lessons from a landmark US policy for transportation, land use and air quality, and implications for policy changes in other countries." International Social Science Journal **55**(176): 307-317.
- Gilbert, R. (2002). Funding Urban Transit Wisely, Federation of Canadian Municipalities.
- Gonzalez, G. A. (2005). "Urban Spread, Global Warming and the Limits of Ecological Modernisation." Environmental Politics **14**(3): 344-262.
- Government of Canada (2006). Canada's Asia-Pacific Gateway and Corridor Initiative. G. o. Canada.
- Grayling, T. (2004). "Whatever Happened to Integrated Transport?" Political Quarterly **75**(1): 26-33.
- Hanson, S. (2004). The Context of Urban Travel: Concepts and Recent Trends. The Geography of Urban Transportation S. Hanson and G. Giuliano. New York, The Guilford Press: 3-29.
- Heart & Stroke Foundation. (2004, 2008). "Report Card - Heart and Stroke Foundation Warns Fat is the New Tobacco." Retrieved March 1, 2008, from <http://ww2.heartandstroke.ca/Page.asp?PageID=33&ArticleID=2916&Src=news&From=SubCategory>.
- Heart & Stroke Foundation. (2008, January 28, 2008). "2008 Report Card - Air Pollution." Retrieved March 1, 2008, from [http://www.heartandstroke.com/site/c.iklQLcMWJtE/b.3848067/k.EC3B/2008\\_Report\\_Card\\_Air\\_Pollution.htm](http://www.heartandstroke.com/site/c.iklQLcMWJtE/b.3848067/k.EC3B/2008_Report_Card_Air_Pollution.htm).
- Horan, T. A., H. Dittmar, et al. (1999). ISTE and the Era in Transportation Policy: Sustainable Communities from a Federal Initiative. Toward Sustainable Communities Transition and Transformations in Environmental Policy. D. A. Mazmanian and M. E. Kraft. Cambridge, Massachusetts, The MIT Press: 217-246.
- Hushak, L. J. (1975). "The Urban Demand for Urban-Rural Fringe Land." Land Economics **51**(2): 112.
- Husken, B. (2004). Integrated Mobility: Integrated Residential and Transport Development in the Region Hannover. Intergovernmental Relations and Sustainable Urban Transportation. Ottawa.
- Infrastructure Canada (2006). Public Transit Fund. I. Canada.
- Infrastructure Canada. (2008, February 26, 2008). "ecoACTION - ecoTRANSPORT." Retrieved March 1, 2008.
- Jensen, G. (2003). Air Quality and Transportation, United States Department of Transportation - Federal Highway Administration. **2008**.

- Knowles, R. D. (2004). "Impacts of privatising Britain's rail passenger services - franchising, refranchising, and Ten Year Transport Plan targets." Environment & Planning A **36**(11): 2065-2087.
- Ladner, P. (2004). Free ride for business-park users is about to end. Business in Vancouver. Vancouver: 1.
- Litman, T. (2003). "Integrating Public Health Objectives in Transportation Decision-Making." American Journal of Health Promotion **18**(1).
- McCormick Rankin Corporation (2002). Urban Transit in Canada Taking Stock, Transport Canada.
- McManus, T. (2008). Politicians told Canada faces 'looming crisis'; Municipal infrastructures have reached the breaking point. The Record. New Westminster.
- Mirza, S. (2007). Danger Ahead: The Coming Collapse of Canada's Municipal Infrastructure, Federation of Canadian Municipalities.
- Natural Resources Canada. (2007). "Fact Sheet: Taxes on Fuels." Retrieved January 30, 2007, from [http://www.fuelfocus.nrcan.gc.ca/fact\\_sheets/fedtaxes\\_e.cfm](http://www.fuelfocus.nrcan.gc.ca/fact_sheets/fedtaxes_e.cfm).
- Natural Resources Canada. (2008). "Fact Sheet: Taxes on Fuels." Retrieved January 30, 2007, from [http://www.fuelfocus.nrcan.gc.ca/fact\\_sheets/fedtaxes\\_e.cfm](http://www.fuelfocus.nrcan.gc.ca/fact_sheets/fedtaxes_e.cfm).
- Nestle, M. and M. F. Jacobson (2000). "Halting the Obesity Epidemic: A Public Health Policy Approach." Public Health Reports **115**: 12-24.
- Northridge, M., E. Sclar, et al. (2003). "Sorting out the connections between the built environment and health: A conceptual framework for navigating pathways and planning healthy cities." Journal of Urban Health **80**(4): 556-568.
- Organization for Economic Co-Operation and Development (2008). Policy Brief Climate Change: Meeting the Challenge to 2050. O. Observer, Organization for Economic Co-Operation and Development.
- Papas, M. A., Anthony J. Alberg, Reid Ewing<sup>5</sup>, Kathy J. Helzlouer, Tiffany L. Gary and Ann C. Klassen (2007). "The Built Environment and Obesity." Oxford Journals: Epidemiologic Reviews.
- Prime Minister's Caucus Task Force on Urban Issues (2002). Canada's Urban Strategy: A Vision for the 21st Century. Ottawa, Prime Minister's Caucus Task Force on Urban Issues.
- Regional Development Agencies. (2008, 2008). "What we do." Retrieved 1 April, 2008, from [http://www.englandsrdas.com/what\\_we\\_do/national/](http://www.englandsrdas.com/what_we_do/national/).
- Russell, B. (2007). "Derailed: Government's green promises on transport policy." Retrieved March 20, 2008, from <http://www.independent.co.uk/news/uk/home-news/derailed-governments-green-promises-on-transport-policy-457704.html>.
- Schweppe, E. (2001). "Legacy of a Landmark: ISTEA After 10 Years." Public Roads **65**(3): 2.
- Sipes, K. N. and R. Medelsohn (2001). "The effectiveness of gasoline taxation to manage air pollution." Ecological Economics **36**: 299-309.
- Skinner, S. (1991). Intermodal Surface Transportation Efficiency Act of 1991 - Summary. D. o. Transportation.
- Smyth, A. (2003). Devolution and Sustainable Transport. A New Deal for Transport? I. Docherty and J. Shaw. Oxford, Blackwell Publishing 30-50.
- Statistics Canada. (2005, 21 June). "The Daily: Study: How Canada compares in the G8." Retrieved March 1, 2008, from <http://www.statcan.ca/Daily/English/050621/d050621c.htm>.
- Talen, E. (1999). "Sense of Community and Neighbourhood Form: An Assessment of the Social Doctrine." Urban Studies **36**(8): 1361.
- The Centre for Sustainable Transportation (2002) "Financial Costs of Transport." Sustainable Transportation Monitor **Volume**, DOI:

- The Council of the Federation (2005). Looking to the Future A Plan for Investing in Canada's Transportation System, The Council of the Federation.
- The Daily. (2006). "Age Pyramid Population of Canada." Retrieved February 1, 2008, from <http://www.statcan.ca/Daily/English/061026/d061026b.htm>.
- Transport Canada. (2007). "About the Transport, Infrastructure, and Communities portfolio." Retrieved March 12, 2008, from <http://www.tc.gc.ca/aboutus/Abouttic.htm>.
- Transport Canada. (2007). "Urban Transportation Showcase Program " Retrieved 05 January, 2008, from <http://www.tc.gc.ca/programs/environment/UTSP/menu.htm>.
- Transport Canada. (2008, 14 January 2008). "Eligible Vehicles: What Vehicles get Rebates?" Retrieved 05 January, 2008, from <http://www.tc.gc.ca/programs/environment/ecotransport/eligiblevehicles.htm>.
- Transport, I. a. C. (2007). Building Canada Modern Infrastructure for a Strong Canada.
- Treut, H. L., R. Somerville, et al. (2007). Historical Overview of Climate Change Science. Climate Change 2007: The Physical Science Basis. Contributing of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. A. Baede. Cambridge, Cambridge University Press.
- Turcotte, M. (2008). "Dependence on cars in urban neighbourhoods." Retrieved March 15, 2008, from <http://www.statcan.ca/english/freepub/11-008-XIE/2008001/article/10503-en.htm#2>.
- UK Government. "The UK government's EDRF site for England - How do I apply?" Retrieved 10 April, 2008, from <http://www.ERDF.communities.gov.uk/WhatIsERDF/HowdoIapply>.
- United States Department of Transportation. (1998). "An Overview - TEA-21 - Transportation Equity Act for the 21st Century." Retrieved March 10, 2008, from <http://www.fhwa.dot.gov/Tea21/sumover.htm>.
- United States Department of Transportation. (2005). "A Summary of Highway Provisions in SAFETEA-LU." Retrieved March 2, 2008, from <http://www.fhwa.dot.gov/safetealu/summary.htm>.
- Urban Policy Directorate (1999). Towards an urban renaissance: final report of the Urban Task Force, Office of the Deputy Prime Minister.
- Whitelegg, J. (1993). Transport for a Sustainable Future: The Case for Europe. London and New York, Belhaven Press and Halsted Press.