

# ENVIRONMENTAL PROTECTION FEES, INTER-GOVERNMENTAL EQUALIZATION PAYMENTS AND OTHER OPTIONS FOR TRANSPORTATION FUNDING EXPLORED

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## **Abstract**

The policy issue most debated in Canada's largest city and commercial capital is how to fund transportation expansion and maintenance. Metrolinx, the transportation agency established by the provincial government of Ontario, released a plan that covers the Greater Toronto and Hamilton area (GTHA) for this purpose, the cost of which is estimated at \$50 million over 25 years. The Toronto Board of Trade proposed raising funds through a hike in the sales tax, a parking levy, a fuel tax and through tolls all of which were met by strong resistance from the Toronto public. In a survey conducted by pollsters, Torontonians showed some support for a congestion charge. This study uses logistical regression to analyze the results of this survey to find out what the Toronto public thinks of the current system, what improvements should be made to it and how best to fund them. It also provides recommendations on using methods of funding not considered previously such as environmental protection charges by tracking drivers' number of vehicle miles traveled and benefit charges/taxes. Finally, it calls for efficiency in inter-governmental fund transfers so more funds are available for local and regional projects.

**Keywords:** Transportation funding, urban infrastructure planning, environmental sustainability

## **1. INTRODUCTION**

Transportation planning is always accompanied by the quintessential question: how to fund it. Such is the dilemma facing policy-makers in Toronto, Canada's largest city and also the capital of Ontario, Canada's largest and most commercial province. Metrolinx, the provincial agency set up to manage regional transit expansion in Toronto and its surrounding area (known as the GTHA) developed a plan called The Big Move. It addressed deficiencies in the city's transportation system and how to keep it up to date with the transportation systems of other major cities in North America and the world. The Toronto Board of Trade estimates the cost of this plan at \$50 billion over a 25-year period. In order to cover these costs, the Board proposed raising funds through four revenue tools: a 1% regional sales tax, a \$1 per space per day parking space levy, a 10-cent/litre regional fuel tax and a 30-cent/kilometre toll for single drivers on high occupancy lanes (Toronto Region Board Of Trade 2013). Public opinion polls show that these funding methods are not supported by a large majority of the impacted population.

A recent report by the Toronto Dominion Bank provides a broad outline about how this issue can be broached. It suggests that the GTHA leverage behavioral change and demand management mechanisms within its transit systems. In doing so, it should charge fares based on distance travelled and time of travel. The report also suggests adopting a regional outlook for urban transportation (TD Economics 2013). Consolidating urban transportation regionally is advantageous because urban transportation networks bring people and jobs closer together in denser communities, discourage urban sprawl and bring more workers within commuting distance from employers. For projects involving urban road, rail and transit improvements, this raised benefit-cost ratios by an average of more than 20 per cent (The Conference Board of Canada 2011). As the next paragraph explains, there is ample need for doing this.

During the morning rush hour, approximately two million automobile trips are made in the GTHA. This poses a problem for local authorities as it increases the cost of the region's transportation activities and has a negative impact on the region's economy. Costs to the economy are a result of reduced output and accompanying job losses. Travel delays, unpredictable travel times, more frequent traffic accidents and re-timing of trips to avoid severe congestion also add to the problem. There are costs to individuals such as higher vehicle operating costs associated with higher traffic volumes and costs to society like local and global environmental costs of vehicle emissions (Residential and Civil Construction Alliance of Ontario 2013). Besides the need to alleviate congestion, Toronto's roadways are also in urgent need of repair. One of the city's main expressways, the Gardiner express, is in need of fixing after parts of it began to break off earlier this year.

The city manager unveiled a 10-year capital plan, which would cost the city \$505-million from 2013 to 2022. Some city councillors have suggested tearing down a portion of the Gardiner Expressway and allowing the private sector to build and manage a toll expressway in its place as a means of avoiding this huge capital outlay (Alcoba 2012).

This is certainly a complex issue facing the Toronto region. It not only has to find a way to upgrade existing infrastructure but also decide how to fund it. Should it risk falling out of favor with the public and raise taxes and impose tolls and fees? Or should it find alternative ways of funding its transportation plan? This paper explores urban infrastructure provision from a broad perspective, analyzes public opinion about transportation funding in the GTHA and provides a list of funding alternatives that might spice up this discussion.

## 2. CONCEPTUAL FRAMEWORK

Urban infrastructure draws high capital investment costs. Once funds are committed to it, they are essentially sunk, difficult, or impossible to retrieve. Direct returns from this are at their highest during the early stages of a city's development but taper off once its basic networks are complete and its stock of infrastructure has grown. Due to changing conditions and demands, there is always a need for urban infrastructure for the incremental expansion of existing networks.

This calls for a long-term approach to planning and investment, the effectiveness of which dictates the extent of developmental impact and the rate of return. Sustainability is a challenge due to fiscal constraints and climate uncertainty underscoring even more so the importance of strategic investment in infrastructure. In order to overcome these challenges, Wellman and Spiller (2012) recommend the coordination of economic and social infrastructure, "Of course, urban economic infrastructure is hardware and merely represents the most recent physical manifestation of humanity's culture and economy. But cities are about software, about people."

Another important element in urban infrastructure management is how to invest infrastructure funds. While laying down new infrastructure is essential in certain cities, the need of maintenance is more important in others. Some authorities focus on maintenance only during emergencies or on the most badly damaged parts of a system. Prudence suggests a more proactive approach of regular inspections would result in cost savings. Modern technology has allowed some cities to monitor infrastructure systems for condition and age, to draw up maintenance plans and to schedule upkeep of the system before it breaks down. Although the initial investment in such a system could be substantial, it prevents recurrent expenditures.

There is also the option for local authorities to contract out infrastructure management to the private sector while being chiefly responsible for the supply side (Organisation For Economic Cooperation and Development 2011). Von Hirschhausen (2004) notes how risk is factored into infrastructure investment. Construction risk arises due to the difficulty in estimating the costs of projects. The risk is in the project running over the estimated time and cost. Large infrastructure projects become difficult to abandon once begun. Revenue risk is the result of a project being unable to attract the expected number of users of infrastructure. Policy and planning risk occurs when there is a change in policy or the plan during the course of an infrastructure project. For example, a change in government or a conflict between two levels of a government could lead to a change or discontinuation in its implementation.

It is interesting to note how all this applies in a Canadian context. Basic urban infrastructure is a group of public capital assets such as roads, highways, bridges, public transportation system structures and equipment that are used to provide essential services to the local community.

In Canada, government investment in basic urban infrastructure on a per household basis steadily declined in three decades before the early 2000s. Local governments have been left with the responsibility for financing and managing a larger share of it over the years and have increasingly relied on development charges to do so. By law, many Canadian municipalities are permitted to levy specific charges on developers of new residential and non-residential building lots.

They are typically intended to fund urban infrastructure projects ranging from sewage treatment plants to sidewalks to arterial roads. Generally reluctant to increase property taxes, municipalities have relied more and more heavily on development charges and other levies on new development (Canadian Home Builders' Association 2012). This brings us back to funding alternatives for the GTHA's transportation plan. As stated earlier, Metrolinx recommended four funding methods for its 25-year plan. This next section analyzes public opinion about all four methods.

### 3. METHODS AND RESULTS

This study used a survey conducted by Vision Critical Inc. (October 2012) to examine the attitudes of Torontonians towards their transit system. The sample size included 1,001 respondents. Among the respondents, 43% were aged 18-34, 38% were 35-54 years old and 19% were 55 years or older. The respondents were almost equally divided in gender with 48% of them being male and 52% being female. When it came to education, 44% of the respondents' highest level of education was high school, 26% of respondents completed college or technical school and 30% of respondents had at least a university degree. Survey respondents belonged to various income categories: 28% earned less than \$50,000 annually, 31% earned \$50,000-\$99,000 while 21% earned \$100,000 or more. Almost half (47%) of respondents drove to work or school while 42% spent more than half an hour each way per day commuting to work or school. An overwhelming majority (65%) would consider switching to public transit if it reduced each one-way trip by 30 minutes, 59% would do so if it reduced each one-way trip by 20 minutes and 41% would consider it if it reduced each one-way trip by 10 minutes.

While most respondents (54%) rated transportation in the GTA as good or very good, almost 40% rated it as poor or very poor. Majority of the respondents thought that transportation in the GTA has worsened or stayed the same in the past ten years. While 45% of respondents felt it has worsened, 20% felt that it has stayed the same. Only 28% felt it had improved but an overwhelming 65% agreed that it had some

good aspect to it. Noteworthy is the fact that only 32% of respondents thought that transportation in the GTA would improve over the next five years while 62% felt it would not. What stood out is that most respondents (63%) rated getting improved service as being more important to them than paying lower fares. Only 37% of respondents rated this (lower fares) as being more important to them of the two. When asked to pick two improvements they would like to see in the GTA's transportation system, respondents' top preference was more express bus and train service. Other options of lesser importance were free wi-fi on buses and trains, heated transit shelters, cleaner transit vehicles, more electronic fare payment options and better station facilities (including washrooms).

Respondents were roughly divided when it came to how infrastructure funding should be directed with 44% stating it should go towards roads and bridges and 56% feeling it should go towards public transit. Most respondents were of the opinion that the government should be chiefly responsible for building transportation infrastructure in the GTA with a majority of these (58%) looking at this as the responsibility of the provincial government. Corresponding with this, most respondents thought that funding for these should roughly be divided among all three levels of government. Approximately 26% of respondents felt that drivers and transit riders should be responsible for funding. Since sources of funding are the subject of this study, a detailed analysis of the responses in this regard follows.

A logistical regression analysis helped find out what respondents thought about implementing tolls on highways, enacting a gas tax of 10%, authorizing an increase of 1% to the sales tax and introducing a congestion charge to pay for building transportation infrastructure and operating public transit in the GTA. The outcome or available categories of responses is dichotomous, therefore, the use of binary logistic regression to analyze the survey results.

When comparing the model of interest to the null model without any predictors, the chi-square test was significant (.000) which means that the model with our set of predictors fit the data better than the null model. Next, we used the Hosmer and Lemeshow test for the overall fit of the logistic regression model. Our finding of non-significance ( $p\text{-value} > .05$ ) led us to conclude that the model adequately fits the data. The next part of the paper goes through elicited responses for each funding method.

### **3.1. Tolls**

Implementing tolls on highways: good idea or bad idea?

The table below tells us that overall, the effect of age, gender and education on whether respondents feel that implementing tolls on highways is a bad idea is significant but the level of income is insignificant.

TABLE 1 - VARIABLES IN THE EQUATION FOR TOLLS

	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
age			.001			
age(1)	.821	.323	.011	2.272	1.207	4.277
age(2)	-.163	.218	.454	.849	.554	1.303
gender(1)	.750	.174	.000	2.118	1.507	2.976
education			.002			
education(1)	-.904	.308	.003	.405	.221	.741
education(2)	-.847	.244	.001	.429	.266	.692
Step 1 <sup>a</sup>			.358			
income			.090			
income(1)	.498	.294	.090	1.646	.925	2.930
income(2)	.354	.280	.206	1.425	.823	2.468
income(3)	.431	.264	.103	1.538	.916	2.583
rating	.328	.190	.085	1.388	.956	2.016
drive	1.045	.189	.000	2.842	1.963	4.116
Constant	-1.576	.503	.002	.207		

Of the two dummy variables attributed to age, only age (1) is significant. This dummy variable compares 18-34 year old to 35-54 years old respondents. The coefficient is positive indicating that 18-34 year old respondents are more likely to think that implementing tolls on highways to fund public transportation is a bad idea than 35-54 year olds. Exp (B) = 2.272 suggests that 18-34 year old respondents are about twice more likely to think that this is the case compared to 35-54 years old.

Gender (1) compares male to female respondents. The coefficient is positive indicating that male respondents are more likely to think that implementing tolls on highways to fund public transportation is a bad idea than female respondents. Exp (B) = 2.118 suggests that male respondents are about twice more likely to think that this is the case compared to female respondents.

Of the two dummy variables attributed to education, both education (1) and education (2) are significant. Education (1) compares those respondents with a high school education or less to those who have graduated from college and technical school. Education (2) compares those respondents with a college and technical school diploma to those with at least a university degree.

The coefficient is negative in both cases indicating that the higher the level of education of the respondent, less likely it is that the respondent thinks that implementing tolls on highways to fund public transportation is a bad idea. The respondents are approximately 60% (1-Exp (B) \* 100) less likely to think so with each additional level of education.

'Rating' compares those respondents who rated the GTA's public transportation system as good versus those who rated it as poor. The coefficient is positive indicating that respondents who rated public transportation in the GTA as good are more likely to think that implementing tolls on highways to fund public transportation is a bad idea than those who rated it as poor. Exp (B) = 1.388 suggests that those respondents who rated it as good are about one and a half times more likely to think that this is the case compared to those who rated it as poor.

'Drive' compares those respondents who drive to work/school versus those who do not. The coefficient is positive indicating that respondents who drive to work/school are more likely to think that implementing tolls on highways to fund public transportation is a bad idea than those who do not drive to work/school. Exp (B) = 2.842 suggests that those respondents who drive to work/school are about thrice more likely to think that this is the case than those who do not drive to work/school.

### 3.2. Gas Tax

Enacting a gas tax of 10% - good idea or bad idea?

The table below tells us that overall, the effect of age and education on whether respondents feel that enacting a gas tax of 10% is a bad idea is significant but gender and the level of income is insignificant.

TABLE 2 - VARIABLES IN THE EQUATION FOR GAS TAX

	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
age			.008			
age(1)	.229	.381	.548	1.257	.596	2.653
age(2)	-.554	.268	.039	.575	.340	.972
gender(1)	-.091	.211	.667	.913	.604	1.380
education			.016			
education(1)	-1.011	.353	.004	.364	.182	.727
education(2)	-.632	.288	.028	.532	.302	.934
income			.482			
income(1)	.313	.359	.383	1.368	.677	2.767
income(2)	-.087	.338	.796	.916	.472	1.779
income(3)	.134	.321	.675	1.144	.610	2.146
rating	1.032	.208	.000	2.806	1.868	4.216
drive	.705	.211	.001	2.025	1.338	3.062
Constant	-.412	.573	.472	.663		

Of the two dummy variables attributed to age, only age (2) is significant. This dummy variable compares 35-54 year old respondents to those 55+.

The coefficient is negative indicating that 35-54 year old respondents are less likely to think that enacting a gas tax of 55% to fund public transportation is a bad idea than respondents who are 55+. Specifically, respondents are approximately 40% ( $1 - \text{Exp (B)} * 100$ ) less likely to think so than those in the higher age bracket.

As is the case with tolls, both education (1) and education (2) are significant in this case. The coefficient is negative in both cases indicating that the higher the level of education of the respondent, less likely it is that the respondent thinks that enacting a gas tax of 10% to fund public transportation is a bad idea. In the former case, the respondents are approximately 65% ( $1 - \text{Exp (B)} * 100$ ) less likely to think so while in the latter case they are 47% less likely to think so with each additional level of education.

'Rating' compares those respondents who rated the GTA's public transportation system as good versus those who rated it as poor.

The coefficient is positive indicating that respondents who rated public transportation in the GTA as good are more likely to think that enacting a gas tax of 10% to fund public transportation is a bad idea than those who rated it as poor.  $\text{Exp (B)} = 2.806$  suggests that those respondents who rated it as good are about thrice more likely to think that this is the case compared to those who rated it as poor.

'Drive' compares those respondents who drive to work/school versus those who do not. The coefficient is positive indicating that respondents who drive to work/school are more likely to think that enacting a gas tax of 10% to fund public transportation is a bad idea than those who do not drive to work/school.  $\text{Exp (B)} = 2.025$  suggests that those respondents who drive to work/school are about twice more likely to think that this is the case than those who do not drive to work/school.

### 3.3. Sales Tax

Authorizing an increase of 1% to the sales tax – Good idea or bad idea

The table below tells us that overall, the effect of age, gender and education on whether respondents feel that authorizing an increase of 1% to the sales tax is a bad idea is significant but the level of income is insignificant.

TABLE 3 - VARIABLES IN THE EQUATION FOR SALES TAX

	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
age			.008			
age(1)	.504	.329	.126	1.655	.869	3.152
age(2)	-.296	.227	.191	.743	.477	1.159
gender(1)	.360	.180	.046	1.433	1.007	2.038
education			.006			
education(1)	-.913	.316	.004	.401	.216	.745
education(2)	-.739	.248	.003	.478	.294	.776
income			.355			
income(1)	.468	.303	.123	1.596	.882	2.891
income(2)	.473	.288	.100	1.605	.913	2.823
income(3)	.453	.269	.092	1.573	.928	2.666
rating	.714	.187	.000	2.042	1.417	2.944
drive	.766	.186	.000	2.150	1.493	3.097
Constant	-1.263	.512	.014	.283		

Of the two dummy variables attributed to age, both age (1) and age (2) are insignificant.

Gender (1) which compares male to female respondents has a positive coefficient indicating that male respondents are more likely to think that authorizing an increase of 1% to the sales tax to fund public transportation is a bad idea than female respondents. Exp (B) = 1.433 suggests that male respondents are about one and half times more likely to think that this is the case compared to female respondents.

Of the two dummy variables attributed to education, both education (1) and education (2) are significant. The coefficient is negative in both cases indicating that the higher the level of education of the respondent, less likely it is that the respondent thinks that authorizing an increase of 1% to the sales tax to fund public transportation is a bad idea. The respondents are approximately 50-60% (1-Exp (B) \* 100) less likely to think so with each additional level of education.

'Rating' compares those respondents who rated the GTA's public transportation system as good versus those who rated it as poor. The coefficient is positive indicating that respondents who rated public transportation in the GTA as good are more likely to think that authorizing an increase of 1% to the sales tax to fund public transportation is a bad idea than those who rated it as poor. Exp (B) = 2.042 suggests that those respondents who rated it as good are about twice more likely to think that this is the case compared to those who rated it as poor.

'Drive' compares those respondents who drive to work/school versus those who do not. The coefficient is positive indicating that respondents who drive to work/school are more likely to think that authorizing

an increase of 1% to the sales tax to fund public transportation is a bad idea than those who do not drive to work/school. Exp (B) = 2.150 suggests that those respondents who drive to work/school are about twice more likely to think that this is the case than those who do not drive to work/school.

### 3.4. Congestion Charge

As you may know, the City of London, England, has charged a congestion charge since February 2003. The congestion charge is a fee charged to drivers who wish to travel at certain times. Support or oppose.

The table below tells us that overall, the effect of gender and education on whether respondents support a congestion charge to fund public transportation is significant but age and the level of income is insignificant.

TABLE 4 - VARIABLES IN THE EQUATION FOR CONGESTION CHARGE

	B	S.E.	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
age			.549			
age(1)	.143	.316	.651	1.154	.621	2.145
age(2)	-.123	.191	.522	.885	.608	1.287
gender(1)	.323	.165	.049	1.381	1.000	1.907
education			.009			
education(1)	.328	.263	.213	1.388	.828	2.325
education(2)	-.276	.198	.163	.759	.515	1.118
Step 1 <sup>a</sup>						
income			.665			
income(1)	.202	.277	.465	1.224	.711	2.108
income(2)	.008	.265	.975	1.008	.600	1.695
income(3)	-.026	.253	.919	.975	.593	1.601
rating	-.765	.195	.000	.465	.318	.681
drive	.967	.191	.000	2.630	1.810	3.822
Constant	-.675	.457	.140	.509		

The coefficient for gender (1) is positive indicating that male respondents are more likely to support a congestion charge to fund public transportation than female respondents. Exp (B) = 1.381 suggests that male respondents are about one and a half times more likely to think that this is the case compared to female respondents.

Of the two dummy variables attributed to education, both education (1) and education (2) are insignificant.

The coefficient for 'rating' is negative indicating that respondents who rated public transportation in the GTA as good are more likely to oppose a congestion charge to fund public transportation than those who rated it as poor. The respondents are approximately 55% ( $1 - \text{Exp}(B) * 100$ ) more likely to oppose this charge with a higher rating.

The coefficient for 'drive' is positive indicating that respondents who drive to work/school are more likely to support a congestion charge to fund public transportation than those who do not drive to work/school.  $\text{Exp}(B) = 2.630$  suggests that those respondents who drive to work/school are about two and a half times more likely to think that this is the case than those who do not drive to work/school.

There is a common pattern in the survey responses for three of the four proposed funding methods: tolls, gas tax and sales tax. These seem to find favor among those who are, perhaps, more financially settled – the 35-54 year old age group. It is probably for this very reason that those with lower incomes and lower levels of education are generally against these methods of transportation funding. Generally, males disagree with them probably because they are the main breadwinners at home or they are the ones paying the bills. Also, those respondents who rated the current transportation system as good were generally not in favor of tolls and taxes to fund transportation. They were, perhaps, against paying more for something they were already satisfied with. The same was the case for those who drive to work/school as these funding methods would surely take a hit on their wallets. However, these patterns do not seem to hold when it comes to imposing a congestion charge showing some support for reducing gridlock and protecting the environment. The next section discusses how this can be used to shape public policy.

#### 4. RECOMMENDATIONS

Besides taxes and fees, there are other mechanisms for funding transportation. Historically, governments have relied on debt financing but modern methods include public-private partnerships. The Los Angeles County Metropolitan Transportation Authority (MTA) is the transportation authority in Los Angeles whose funding methods include fares, senior government grants, two general sales taxes, each half a percent, approved by voters in 1980 and 1990. Additional funding was needed to fund a new 30-year transportation plan aimed at reducing gridlock, improving air quality and stimulating the local economy. Majority of Los Angeles residents approved another half-cent sales tax to fund this investment. A part of the revenue from all three taxes is used to service borrowing for transportation investments. Efforts to fund this transportation strategy have also involved exploring innovative

financing solutions with the private sector and foreign sovereign wealth funds (Institute On Municipal Finance And Governance 2012).

According to a report by the Institute For Municipal Finance and Governance at the University of Toronto federal funding towards transportation in Canada does not compare to that in other parts of the world. This forces cities to seek alternatives. For example, Vancouver employs a range of transportation funding tools, such as a gas tax, property tax, hydro levy and bridge tolls. The recipient of dedicated funds from these sources is Translink, the transportation authority in the city. Besides these, it used public-private partnerships (PPPs) to construct the Canada Line, a 19-kilometre connection between the airport and downtown. Canada Line Rapid Transit Inc. (CLI) went about this by holding an international competition which was won by SNC Lavalin. SNC made a \$720 million investment in the project and also received milestone payments during construction and will continue to receive performance-based payments for operating the service. TransLink retains ownership of the assets and the ability to set fares. The report advises, "Rigour and discipline are needed to structure a financing model that aligns with private incentives, can be taken to market quickly, and will inspire public confidence in the process and the partners."(Institute On Municipal Finance And Governance 2012). In the context of the GTHA, this paper recommends that the following funding methods be explored.

#### ***Environmental Protection Charges***

In many ways, the provision of infrastructure services is meant to protect citizens' health and the quality of the environment. Services such as sewage and solid waste disposal are intended to reduce public health risks. Electricity and gas supplies were introduced to reduce pollution from coal and wood fires. While environmental damage and health problems will never be completely eliminated, they are now a priority as more resources are now being poured into reducing the environmental impact of infrastructure. Urban transportation produces immense air pollution causing lead poisoning and respiratory problems through the release of harmful gases like carbon dioxide. The amount of pollution varies with the extent that transportation is used. Newer funding mechanisms in the form of user charges that discourage certain behaviors such as single-occupant vehicles are aimed at alleviating these negative externalities (Neutze 1997, 4-6).

In response to the public's consciousness of environmental issues and as a means of raising much-needed funding for transportation, a number of methods could be adopted to achieve these outcomes. While gas or fuel taxes would result in reduced emissions, experts believe that the time has come to replace them. Options include mileage-based user fees which includes congestion pricing and emissions-based pricing. Mileage fees are already in place in a number of jurisdictions in Europe and

have been approved for passenger and freight trains in the Netherlands. It is also being tested in a number of states across the U.S. with Oregon declaring its pilot project a success. It found that paying these fees at the pump works while protecting privacy and placing minimal burden on business. Additionally, mileage fees could be phased in, integrated with current systems and could offer various pricing options. A Council of State Governments report explains that under such a system, vehicles could be fitted with equipment capable of tracking the number of vehicle miles traveled (VMT) in a given area. The state government could collect fees based on the number of miles and revenues could then be distributed among local jurisdictions (Slone 2010). However, the complexity of this method suggests that it will be more costly and burdensome than fuel taxation. Yet, it has other advantages.

Gas or fuel charges are not a reliable source of transportation funding due to fuel-efficient vehicles and alternative fuel options. A report by policy think-tank, Rand, states that vehicle miles travelled has doubled while fuel consumption has increased by only 50 percent since 1980 and will continue to outpace it. This proves that it is a steady source of funding compared to gas/fuel taxes. This method also provides a semblance of fairness to the system where the level of fees owed are proportional to the benefits derived (or costs imposed) from using the system. It can be adjusted to achieve other policy goals such as reducing harmful pollutant emissions or traffic congestion. This is done by varying the per-mile charge based on relevant vehicle characteristic such as emissions class (emission based pricing) or the time and location of travel (congestion pricing) (RAND 2009).

### ***Inter-Governmental Payments***

The flow of funds to local governments in Canada can be improved by adopting a more proportional inter-governmental financial model. Equalization payments are cash payments made by the federal government to the provinces for the purpose of offsetting the cost of providing services. A recent report from Winnipeg's Frontier Centre for Public Policy found Canada's system of federal-provincial transfers over-equalizing. This resulted in lower income-generating provinces being able to deliver enhanced levels of public services than higher income-generating ones (as evidenced in data such as higher teacher-student ratios and more physicians and nurses per capita) (Courchene 2010). Another study estimated the difference between what Ontarians contributed to federal revenues and what, in turn, is received from the federal government at \$11 billion. According to the study by the University of Toronto's Mowat Centre, "there are few regional inequities in federal taxation. Almost all of the \$11 billion gap is due to inequities in federal spending (Zon 2013)." A different funding formula would enable some of these funds to reach cities in need of infrastructure upgrades. A more proportional funding formula would see bigger cities with bigger infrastructure needs receiving their fair share of funding.

A revised funding formula is not the only solution to infrastructure (under-)funding. A more vigilant system of guardianship would increase the availability of funds for local projects. A recent report by Canada's Auditor General called for the federal government to improve evaluation of program funds after it could not account for \$3.1 billion in anti-terrorism funding. It suggested better tracking on spending and on results achieved for money spent (Fitzpatrick 2013). In the Canadian federal government, all departments are required to manage their programs against set targets, monitor program performance against these targets and assess results by evaluating outcomes. A cabinet committee known as the Treasury Board leads a review of each department's spending which is conducted every four years (McCormick 2007). Perhaps, spending reviews should take place at the same time as annual budget deliberations take place. This would help the government make adjustments to programs that are not performing up to expectations right away instead of waiting for four years before doing so. The end result would be savings that could be passed on to municipalities.

#### ***Benefit Taxes Or Charges***

Also known as Local Benefit Levy, these are levied on individuals or owners of property who benefit from the provision of this infrastructure (Neutze 1997, 156). They can be imposed as annual payments (property taxes or access charges) or capital payments (developer charges that are absorbed by property prices). They are imposed on an additional beneficiary who although does not play a direct part in contributing to transportation financing, gains a disproportionate share of the economic benefits arising from building and operating rail and bus lines. Wetzel (2006) argues that by only raising transportation funding by taxing wages, trade, or goods and services, governments are choosing to give an 'unearned bonus' to property owners. If governments do not build and maintain transportation infrastructure due to inadequate budget revenues and are, at the same time, reluctant to increase taxes, "they are denying property owners the opportunity to share in rising values that will arise if the improvements are at least partly financed from the increase in property values. (Wetzel 2006)" Benefit taxes or charges would involve first assessing the value of property for its rental income based on its optimum permitted use. A tax rate is then applied to this land value as a means of collecting transportation funds. These funds would increase as the land value rises. This system is not only inexpensive to administer and collect but difficult to avoid (land is not mobile nor can it be concealed like other assets) (Wetzel 2006).

Our results make it quite clear that the GTHA should look beyond traditional methods of transportation funding such as debt financing. This would be an ill-advised move for a province that reportedly has a higher debt-level than California's and the city will have to find new ways to finance its debt. It is always

a risk for public entities to partner with the private sector due to the lack of transparency in the latter which has led to a number of crises of late. Proposed methods such as tolls, parking levies, fuel charges and sales tax increases won't sit well with an already heavily-taxed public. But more modern methods, with a purpose that benefits the public such as environmental protection, provide a better rationale for charges that contribute to transportation funding. Anecdotal evidence suggests that no system is perfect. For example, in London, congestion charges have reduced gridlock but drives times have minimally been impacted, perhaps, due to the time it takes to pay the charge. Emissions-based pricing such as carbon taxes are cumbersome to implement but will pay off by gaining public support, cleaning up the environment and providing much-needed revenue for transportation. In Canada, specifically, a more streamlined system of getting funds through from the federal to local governments would also help support local projects. A more equitable system of equalization payments, tracking each and every dollar spent and more robust financial planning will help achieve this. Local jurisdictions should look beyond development charges and property taxes for funding and explore benefit charges on those who gain from infrastructure improvements such as transportation expansion. A combination of these methods should provide a strong funding base for transportation and reduce the burden placed on the general public.

## REFERENCES

- Toronto Region Board Of Trade (2013). Toronto Region Board of Trade Advances Four Dedicated Revenue Tools to Fund The Big Move, *News Release*, March 18, 2013.
- TD Economics (2013). Staying on Track: Sustaining Toronto's Momentum After the Global Recession, *Special Report*, April 11, 2013.
- The Conference Board of Canada (2011). Better Urban Transportation Services Will Drive Productivity In The Greater Toronto And Hamilton Area, *News Release*, August 15, 2011.
- Residential and Civil Construction Alliance of Ontario (2013). Financing Roads and Public Transit In The Greater Toronto and Hamilton Area, *An Independent Study*, January 2013.
- Alcoba, N. (2012). Calls mount to demolish aging Gardiner Expressway as repair bill tops \$505-million, *The National Post*, December 5, 2012.
- Wellman, K. and Spiller, M. (2012). *Urban Infrastructure: Finance and Management*. Wiley-Blackwell: Introduction.
- Organisation For Economic Cooperation and Development (2011). Strategic Transport Infrastructure Needs To 2030, *International Futures Programme*, March 2012.
- Vickerman, R. (2004). "Private Financing of Transport Infrastructure: Some U.K. Experience." In C. Von Hirschhausen, T. Beckers and K. Mitusch (Eds.) *Trends in Infrastructure Regulation and Financing* (pp. 177-198). Northampton, MA: Edward Edgar Publishing Limited.

- Canadian Home Builders' Association (2012). Basic Urban Infrastructure for Canada: Evidence and Issues, *A synthesis of five reports prepared for CHBA by Altus Group Economic Consulting between 2008 and 2012*, May 2012.
- Vision Critical (2011). Torontonians Open to Congestion Charge to Fund Transportation System, *Toronto Public Opinion Poll*, Nov. 6, 2011.
- Ontario Institute For Studies In Education (2013). Introduction to SPSS Part V, Education Commons Workshop.
- Institute On Municipal Finance And Governance (2012). Moving Our Region: Funding Transportation for our Future, *IMFG Forum*, February-April, 2012.
- Slone, S. (2010). Vehicle Miles Traveled Fees. *The Council of State Governments: A Trends In America Special Report*, March 2010.
- Sorensen, P., Ecola, L. and Wachs, M. (2009). Implementable Strategies for Shifting to Direct Usage-Based Charges for Transportation Funding, RAND Corporation, June 2009.
- Courchene, T. (2010). Intergovernmental Transfers and Canadian Values: Retrospect and Prospect, *Options Politiques*, May 2010.
- Zon, N. (2013). *Filling the Gap: Measuring Ontario's Balance with the Federal Government*, Mowat Centre For Policy Innovation, [On-line]. Available at <http://mowatcentre.ca/pdfs/mowatResearch/79.pdf>. March 28, 2013. [Retrieved June 18, 2013].
- Fitzpatrick, M. (2013). Canada can't account for \$3.1B in anti-terror funding, AG finds, *Canadian Broadcasting Corporation News*, April 30, 2013.
- McCormack, L. (2007). "Performance Budgeting in Canada." *OECD Journal of Budgeting*, 7 (4):1-18.
- Wetzel, D. (2006). "Innovative Methods of Financing Public Transportation." *Global Urban Development Magazine*, 2 (1), March 2006.
- Neutze, M. (1997). Funding Urban Services: Options for Physical Infrastructure, Allen & Unwin, Oct. 1, 1997.