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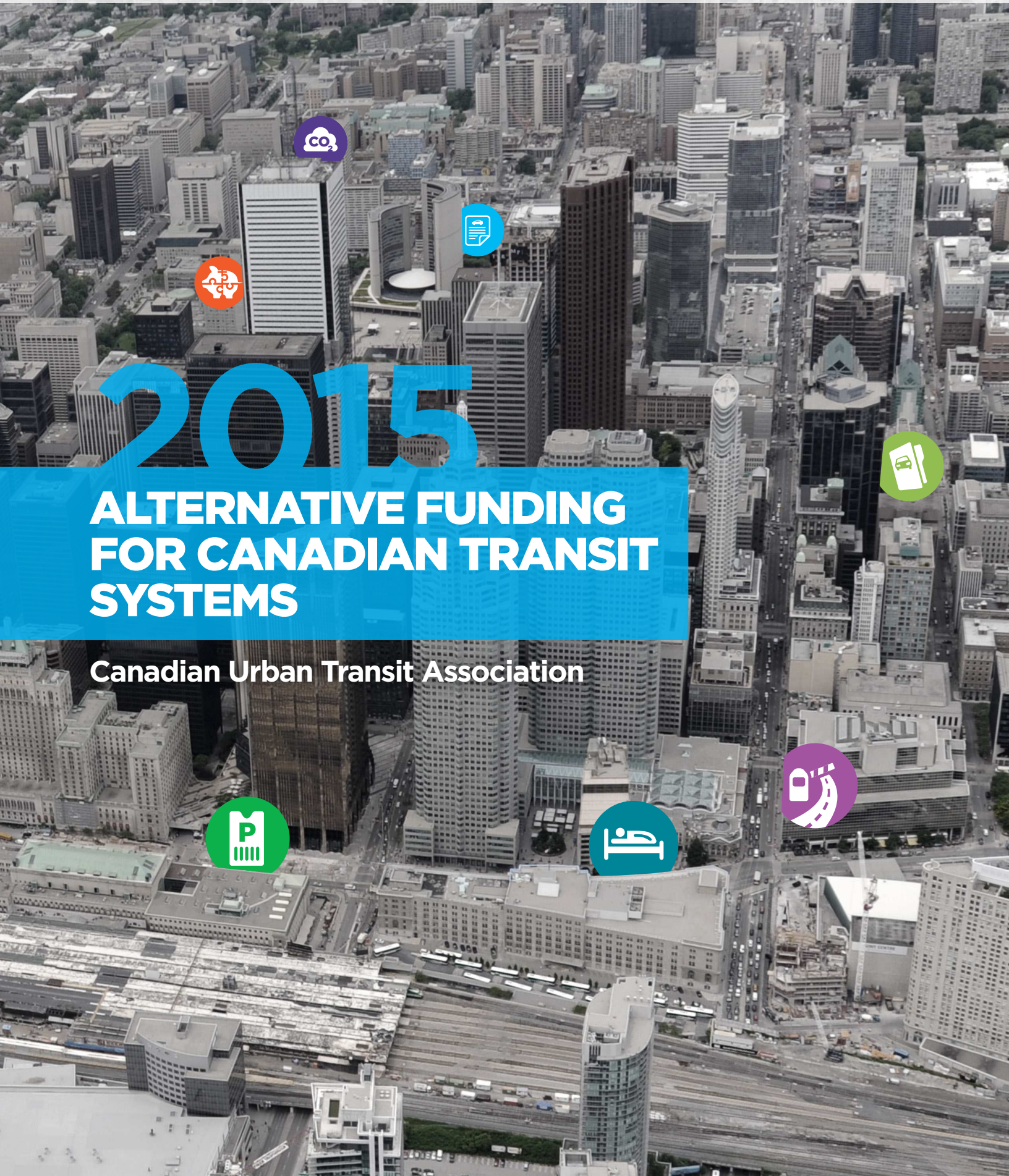

2015 ALTERNATIVE FUNDING FOR CANADIAN TRANSIT SYSTEMS

Canadian Urban Transit Association

This report has been prepared by HDR Corporation for the Canadian Urban Transit Association (CUTA).

About the Canadian Urban Transit Association (CUTA)

CUTA is the collective and influential voice of public transportation in Canada, dedicated to being at the centre of urban mobility issues with all orders of government, and delivering the highest value to its members and the communities they serve. CUTA is the national association representing public transit systems, manufacturers and suppliers to the industry, government agencies, individuals and related organizations in Canada.

The report is available at: www.cutaactu.ca

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1. Introduction

Reliable, efficient, and affordable public transit is the future of mobility in Canada and a foundation of sustainable growth in our urban areas. Transit ridership and the demand for improvements in service levels, fleet quality, and passenger comfort and security are increasing. Today transit agencies are faced with a challenge of "doing more for less" while offering low cost fares and meeting acceptable service levels.

Whereas passenger fares, miscellaneous revenues and municipal contributions cover operating costs, capital investment funding largely depends on provincial or federal grants. Today's reality is that municipalities and all other orders of government can no longer bear the sole responsibility of funding transit, particularly with the massive price tags that come with major infrastructure projects. The need to find new means of funding transit has resulted in a push to identify alternative mechanisms to supplement traditional revenue sources.

Municipalities and all other orders of governement can no longer bear the sole responsibility of funding transit.

The research into alternative transit funding mechanisms supports the CUTA Vision 2040 strategic direction of "**ensuring financial health** through enhanced transit infrastructure and operating investments by all orders of government, more progressive approaches to generating revenue, and new efficiencies in service delivery."

The Alternative Funding for Canadian Transit Systems report explores new sources of funding tools that have been used by transit agencies in North America, Europe and Japan; evaluates their reliability and potential for implementation; and develops funding guidelines. The reader is advised that the research in this report focuses on alternative *funding* sources rather than *financing* sources. To clarify the difference, funding means "who pays" and financing means "how the payment is made or structured."

For example, Public Private Partnerships (PPP or P3) are increasingly used to execute large transit projects but are not considered a transit funding mechanism. The Design, Build, Operate, Maintain and Finance forms of P3s may be appropriate means to manage large complex projects; price or transfer project risks; and bring funds into a project or spread the cost of a project over time; however, the P3 financing in itself does not create new funds; rather, it creates an opportunity to use funds now and pay over an extended timeframe. Accordingly, P3s are considered a financing rather than a funding mechanism.

The report is augmented by an on-line transit funding calculator and a bibliography of information sources.

The research component of this report is based on an extensive literature review. The research started with a review of a number of documents prepared on behalf of Metrolinx[1], City of Toronto[2] [3], Toronto Board of Trade[4], Government of Ontario[5], City of Calgary[6] and others, which provides a foundation to the research on transit funding mechanisms. It is supplemented by discussions with transit professionals, as well as presentations delivered at the 2014 International Practicum on Innovative Transit Funding and Financing in Montreal, Quebec.

The report is organized into six parts:

- The **Introduction** outlines the document and provides information about how the work was completed.
- **Funding Needs Overview** provides a high-level summary of transit funding needs in Canada.
- **Traditional Funding Sources** describes current revenue sources used by transit agencies.
- **Alternative Funding Sources** evaluates alternative funding mechanisms.
- **Selected Case Studies** explores 10 specific funding mechanism case studies reviewed as part of the research, and provides a high-level summary of each tool.
- **Alternative Funding Mechanisms Summary** is a quick reference of funding mechanisms available to organizations based on the evaluation criteria.

[1] Metrolinx investment strategy http://www.metrolinx.com/en/regionalplanning/funding/IS_Full_Report_EN.pdf
[2] City of Toronto Transportation Investment Survey http://www1.toronto.ca/City%20Of%20Toronto/Feeling%20Congested/PDFs/CITY-OF-TORONTO-TransportationInvestment-Summary-Report-1.pdf
[3] Civic Action Infrastructure Funding Report http://civicaction.ca/wp-content/uploads/2012/06/AllianceReliableFundingPaper.pdf
[4] Toronto Board of Trade Paying For Public Transportation Expansion http://www.bot.com/advocacy/Documents/Campaigns/DiscussionPaper_AGreenLight_March18_2013.pdf
[5] Transit Investment Strategy Advisory Panel http://www.mto.gov.on.ca/english/news/transit-reports/TISAP%20Report%20Dec10_Report%20Full%20x.pdf
[6] AECOM. Southeast Transitway Alternative Financing and Funding Workshop Summary Report. City of Calgary. (2013)

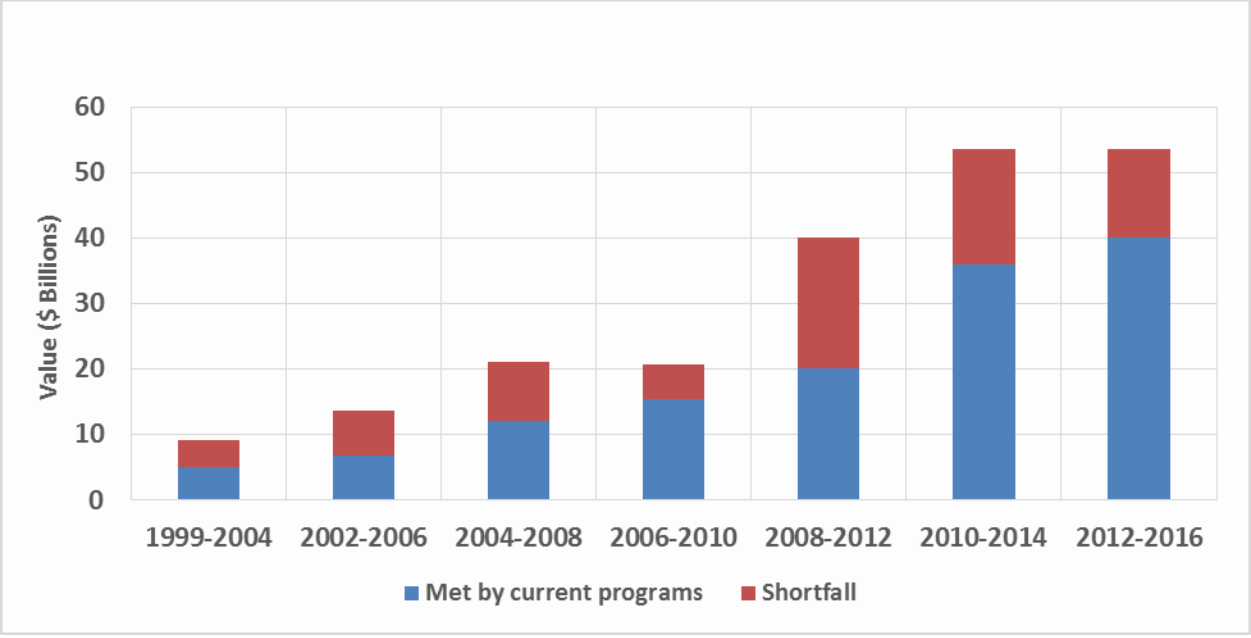
2. Funding Needs Overview

The Canadian transit industry includes over 100 transit systems serving 22.3 million people, or 63% of Canada's total population. Annually, these transit systems carry about 2 billion passengers, spend $8.3 billion in direct operating expenses, and have capital expenditures of $4.6 billion (CUTA Canadian Transit Fact Book 2013).

Federal, provincial and municipal planning documents across Canada consistently call for public transit to play a larger social, environmental and economic role in Canadian cities. To respond to the challenge, transit systems must provide greater route coverage, increase their hours and frequency of service, improve comfort and quality of their fleet, and offer competitive travel times. For Canadian transit services to evolve from a secondary to a primary travel mode, capable of competing with private vehicles, will require a significant level of sustainable, long term investment to fund both the capital and operating budgets.

From 1999 to 2014, CUTA produced a series of *Transit Infrastructure Needs* summaries which clearly indicate that the level of required transit investment is increasing. The CUTA *Transit Infrastructure Needs for the Period 2014-2018*[7], illustrated in **Figure 1**, estimated that the Canadian transit industry requires $53.5 billion in capital funding for the given period. Twenty-four percent of these funds are required to rehabilitate or renew existing infrastructure, and the remaining 76% is required to expand service capacity with new capital infrastructure. For the 2012-2016 funding needs, $40 billion will be met by existing funding programs, which leaves an unfunded requirement of $13.5 billion, or a $3.38 billion annual shortfall over a four year period.

Figure 1: Transit Infrastructure Needs - Investment Summary



[7] CUTA Transit Infrastructure Needs for the Period 2014-2018

Additional operating funds will also be required to operate new infrastructure and expand service to satisfy growing demand. Although the latent demand for service has not been tabulated across Canada, a reasonable estimate is that a 25% increase in service hours is required to meet the demand for new transit services. This would require approximately $2 billion annually in new operating funds.

The estimates for new operating and capital fund requirements will vary over time; however, by any measure the numbers are significant and growing. The challenge is to generate new stable revenues that will enable the required system expansion. The successful funding approach will involve a layered strategy to maximize existing fare revenues; increase and stabilize capital support from higher level government; and identify and implement revenue sources beyond government and riders.

The challenge is to generate new stable revenues that will enable the required system expansion.

It is important, however, that transit systems optimize their internal fare revenue before requesting government or non-transportation funding. The value of transit service must be priced appropriately compared with the costs of transportation alternatives, and fare discounts should not erode fare revenues and service levels. The transportation services that transit systems provide are often subsidized for specific social groups. These subsidies could be more efficiently provided directly to individuals in need of such support rather than generically across a broad category of users, many of whom may not require them.

Empirical studies of the relationship between fare increases and service expansion show that transit customers value the improvement of service more highly than discounts in its cost[8]. It may, therefore, be unwarranted to provide deep discounts for books of tickets and monthly passes or blanket seniors' pass discounts at the expense of providing the service required by the community. It is by providing service that transit systems meet the social, economic and environment objectives mandated by society.

Transit customers value the improvement of service more highly than discounts in its cost.

The provincial and federal governments have generally increased their support for public transit projects; however, a greater rate and consistency of capital contributions, particularly at the federal level, is required. **Figure 2** illustrates variations in funding sources for operating and capital budgets for five groups of transit systems, based on the size of their coverage areas[9]. Operating expenses are largely funded by fare-box revenues (47%). Additional

A greater rate and consistency of capital contributions, particularly at the federal level, is required.

[8] Transportation Elasticities, How Prices and other Factors Affect Travel Behavior, Todd Litman, Victoria Transport Policy Institute, 2008
[9] Summary of Canadian Transit Statistics, CUTA, 2012

funding support is provided through municipal taxes (28%), provincial sources (8%), and other contributions (10%). While provincial support for transit capital investment projects averages 67% (from 26% for the 150,000 to 400,000 population group to 71% for populations less than 50,000), federal support has averaged only 12% and has not been evident at all for systems serving 50,000 people or fewer.

The planning, building and operation of transit systems are long term investments that cannot be financed with short-term or sporadic funding commitments. The challenge is to find new funds to meet the operating and capital needs of Canada's transit systems.

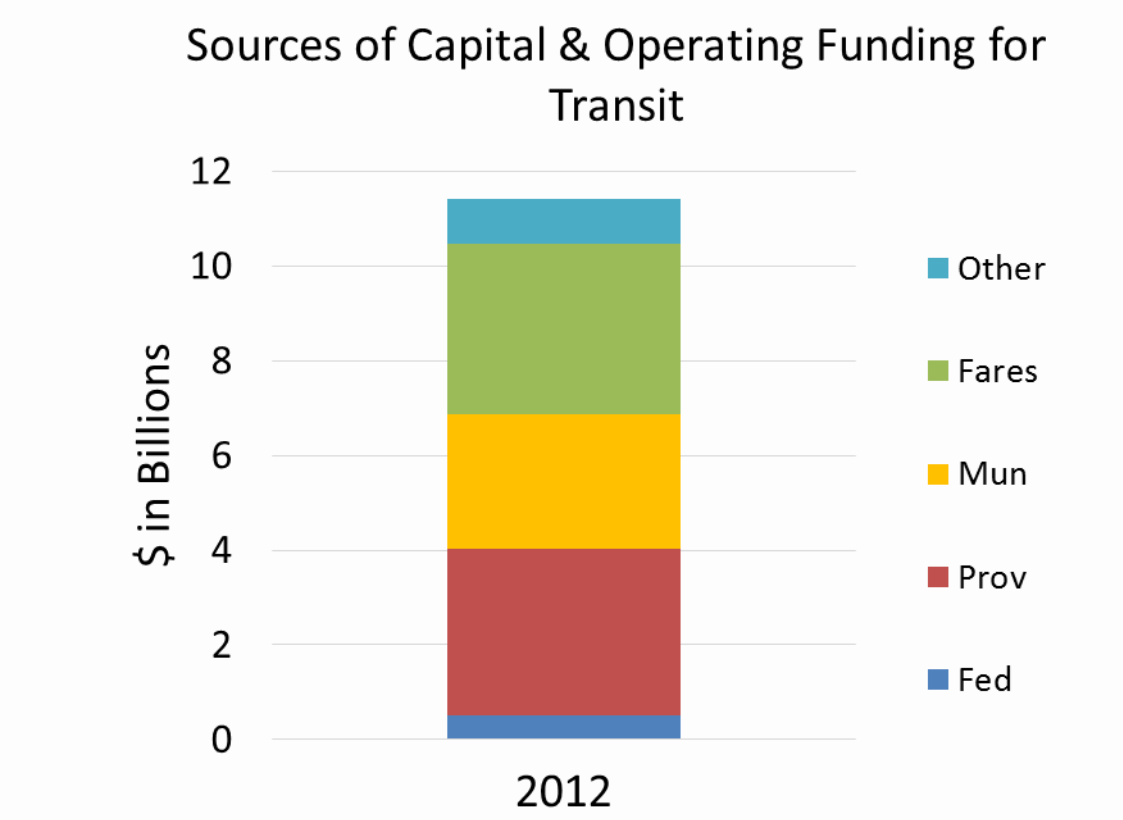
Figure 2: Summary of Existing Funding Sources

		Group 1	Group 2	Group 3	Group 4	Group 5
		> 2 million	400,000 - 2 Million	150,000 - 400,000	50,000 -150,000	< 50,000
	101 Systems	3 Systems	13 Systems	11 Systems	32 Systems	39 Systems
Operating Revenues and Other Funding Contributions						
Total Operating Expenses	**$ 7,746,467,429**	**$ 3,702,350,922**	**$ 2,187,052,029**	**$ 485,013,518**	**$ 343,941,006**	**$ 76,433,447**
Total Revenues	**$ 4,138,630,989**	**$ 2,131,650,677**	**$ 945,083,454**	**$ 193,031,517**	**$ 117,027,754**	**$ 24,301,767**
Passenger Revenues	$ 3,614,637,086	$ 2,010,089,871	$ 888,698,692	$ 180,773,770	$ 87,360,763	$ 15,762,170
Non-Passenger Revenues	$ 523,993,903	$ 121,560,806	$ 56,384,762	$ 12,257,747	$ 29,666,991	$ 8,539,597
Total Contributions	**$ 3,607,836,440**	**$ 1,570,700,245**	**$ 1,241,968,575**	**$ 291,982,000**	**$ 226,913,252**	**$ 52,131,681**
Federal Operating Contribution	$ -	$ -	$ -	$ -	$ -	$ -
Provincial Operating Contribution	$ 623,514,564	$ 230,369,581	$ 132,595,140	$ 65,878,858	$ 48,787,214	$ 18,150,314
Municipal Operating Contribution	$ 2,204,764,288	$ 650,876,095	$ 1,066,581,091	$ 223,536,947	$ 178,092,478	$ 33,942,677
Other Operating Contributions	$ 769,237,647	$ 689,454,569	$ 47,333,928	$ 4,969,617	$ 33,558	$ -
Capital Expenses and Funding Sources						
Total Capital Expenditures	**$ 4,761,862,835**	**$ 1,590,530,267**	**$ 970,443,792**	**$ 98,110,482**	**$ 43,560,845**	**$ 5,171,770**
Total Capital Funding	**$ 4,443,663,948**	**$ 1,327,355,882**	**$ 921,033,158**	**$ 93,118,529**	**$ 43,667,725**	**$ 4,979,853**
Federal Capital Contribution	$ 521,666,860	$ 305,647,351	$ 191,579,063	$ 15,856,363	$ 3,902,924	$ -
Provincial Capital Contribution	$ 2,986,517,126	$ 508,257,230	$ 477,246,019	$ 24,051,308	$ 14,763,391	$ 3,548,090
Municipal Capital Contribution	$ 771,909,484	$ 409,241,285	$ 220,699,576	$ 50,718,940	$ 22,835,658	$ 1,431,763
Other Capital Contribution	$ 163,570,478	$ 104,210,016	$ 31,508,500	$ 2,491,918	$ 2,165,752	$ -

CUTA Summary of Canadian Transit Statistics 2012

3. Traditional Funding Sources

Canadian transit systems have traditionally relied on passenger fares (47%) and municipal contributions (28%) to fund operating costs, and provincial grants (67%) to fund capital requirements. The balance of funding comes from non-passenger revenues (7%) and other contributions (10%) for operating costs, and federal (12%) or municipal (17%) sources for capital contributions.[10]



Additional passenger revenues are raised by increasing or restructuring transit fares for public transit users. An increase in fares can be easily implemented by public transit agencies, but it may decrease transit ridership and encourage auto use, depending on the price elasticity of demand. According to the Simpson-Curtin rule, for each 3% fare increase, public transit demand will decrease by 1%.[11] Restructuring transit fares to reflect differing values of a trip based on travel distance or peak/off-peak periods may limit lost ridership as passengers pay more for higher-value trips and vice versa.[12]

[10] CUTA Canadian Transit Fact Book - 2012
[11] Todd Litman, "Transit Price Elasticities and Cross-Elasticities," *Journal of Public Transportation* 7, no. 2, (2004): 6.
[12] AECOM Canada Ltd., "Southeast Transitway Alternative Financing and Funding Workshop Summary Report," (2013): 22.

Discounted bulk transit passes may be made available for certain demographic groups such as high school or university students. By making public transit more affordable, the funding initiative encourages transit ridership. However, these programs are often designed just to offset the operating expenses of providing the additional transit services; in other words, they are often revenue neutral[13].

Canadian transit systems have also relied on funds through non-passenger revenues, which include charter service, advertising, and concession revenues. Charter or contract/purchase-of-service revenues are collected by providing transit services to groups such as municipal governments, health and social agencies, and educational institutions, in addition to regular services.

Advertising revenues are derived by selling space on transportation facilities, vehicles, and related assets to place advertisements. They are a common source of revenue for transit agencies, but they generally only represent a modest 0.1% to 3% of total operating income.[14] Concession revenues are collected through the lease of spaces at larger transit and transfer stations to private-sector entities to use for gift shops, vending machines, or food stands. Such initiatives may convert existing transit passengers into potential retail customers.

Municipal, provincial and federal funding contributions may consist of revenues collected from property taxes, development charges, sales taxes, fuel taxes, or corporate and personal income taxes. Municipal governments may respond to transit funding needs by increasing property tax rates. This step will result in a higher cost of owning a property within the taxed region and risks political repercussions with the respective constituency. Property taxes are also a primary source of revenues for other municipal services such as water and waste water, transportation, policing or education, so the mechanism is always competing with other municipal services for resources.[15] Contributions may also come from sales tax revenues, a tax imposed on the purchase of goods and services. Sales taxes are a widely used source of funding with great revenue yields and stability. However, it is challenging to increase sales taxes to keep pace with funding needs given current HST rates.

Fuel taxes can also be considered as sales taxes. These are taxes imposed on the sale of transportation fuel. By increasing the costs of fuel, the mechanism may also encourage the use of fuel-efficient vehicles and help to reduce automobile travel.[16] TransLink (BC), Alberta and Ontario currently allocate a portion of provincial fuel taxes towards funding transportation and / or public transit services.[17]

Development cost charges, (DCC) differ from the other taxes listed in that the charges are levied on developers to fund on and off-site infrastructure for new subdivisions or other types of

[13] Todd Litman, "Local Funding Options for Public Transportation," *Victoria Transport Policy Institute*, (2014): 13.
[14] Bethesda MD et al., "TRCP Report 129: Local and Regional Funding Mechanisms for Public Transportation," *Transportation Research Board – Transit Cooperative Research Program*, (2009): 18.
[15] TransLink, "2010-2019 10 Year Transportation and Financial Plan," (2008).
[16] Ibid., 21.
[17] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," (2010): 9.

development. These charges represent a one-time fee applied to the developers to recover the cost for the associated infrastructure. Each province defines the scope and charge mechanism differently, but one common thread among all DCC mechanisms is their limited applicability to transit cost recovery, with the focus on cost recovery for road and road-related infrastructure. DCC levies in Alberta, BC and Saskatchewan exclude transit services altogether. Ontario is the only province which permits partial cost recovery of transit service investments that will not exceed a 10-year service average[18]. Ontario Regulation 197/07 of the Development Charges Act (1997) allows for full cost recovery for construction, servicing and land acquisition costs associated with the Toronto-York Subway Extension[19].

Corporate and personal income taxes provide the bulk of funds remitted by government authorities to transit systems. Corporate income tax revenues are collected from companies across Canada that file corporate income tax returns, while personal income taxes are applied to individuals who have income from employment, investments, and owning small businesses. Increasing these taxes has always been controversial and a major political risk to governing parties. The detrimental effects of higher taxation on the economy have by now become a cliché of politics with all efforts taken to increase the competitiveness of regional businesses by keeping taxes low[20].

In summary, the demands for increased transit service, and the cost of 'state of good repair' and new infrastructure, cannot be met by existing funding sources. It is important that Canadian transit systems not only optimize funding from traditional sources but search for new non-government and non-transportation sources of funding. Examples from around the world, as will be discussed in the ensuing chapters, provide many ideas for new sources of Canadian transit funds.

The demands for increased transit service, and the cost of 'state of good repair' and new infrastructure, cannot be met by existing funding sources.

[18] SGE Acres,"Infrastructure Charges Study", (2006).
[19] Ontario Development Charges Act, Regulation 197/07
[20] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," (2013).

4. Alternative Funding Sources

This section identifies and assesses a series of alternative transit funding mechanisms studied and/or implemented in Canada and worldwide. The research addresses the common characteristics of the mechanisms and uses seven distinct evaluation criteria to ascertain their strengths and weaknesses. The key findings of selected Case Studies are also presented in Chapter 5 to demonstrate further the success factors and implementation challenges of individual cases.

The review of funding strategies completed under the umbrella of this study identified several categories of funding mechanisms that have similar underlying funding principles. The key principle under consideration is "who bears the cost". There is also consideration of what should be paid for by society as a community benefit versus what should be paid for by the user as an individual benefit.

The key principle under consideration is "who bears the cost".

The six categories of funding mechanisms discussed in the following sections are:

1. User-Based Charges;
2. Vehicle Ownership Charges;
3. Land Value Capture;
4. Land-Based Charges;
5. Non-User-Based Charges; and,
6. Other Charges.

These funding categories align with many existing studies of funding sources.

4.1 Evaluation Framework

HDR has reviewed the available research and identified seven commonly-applied evaluation criteria[21,22,23,24] to form a framework for identifying relevant alternative funding mechanisms, as well as their success factors and implementation challenges. This framework also assists in determining which mechanisms are applicable in Canada. The seven criteria are described below.

[21] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," (2013).
[22] IBI Group, "Research on Funding for TransLink," (2011).
[23] AECOM Canada Ltd., "Southeast Transitway Alternative Financing and Funding Workshop Summary Report," (2013).
[24] Todd Litman, "Local Funding Options for Public Transportation," *Victoria Transport Policy Institute*, (2004): 13.

Revenue

Revenue is commonly defined as the income generated from sale of goods or services. As an evaluation criterion, we focus on how much income any funding mechanism could generate; its applicability to either capital and/or operational expenditures; and its long-term stability, sustainability and robustness in light of economic downturns and unplanned events.

We focus on how much income any funding mechanism could generate.

Social Equity

Social equity is assessed from two angles – how does the funding mechanism affect different income groups (also referred to as "vertical equity") and how does the mechanism affect the same income group (referred to as "horizontal equity").[25]

A funding mechanism is **vertically equitable**, or progressive, if it imposes lower costs and provides greater relative benefits for those who are economically disadvantaged. In reverse, a funding mechanism will be considered regressive if it puts a greater burden on disadvantaged groups.

Horizontal equity is based on the concept that those who use and benefit from the service pay for the cost to provide and maintain it. Horizontal equity reflects the degree, under the given funding mechanism, to which the people who contribute to funding the service are also those who benefit from the reduction of adverse effects that it mitigates, such as congestion, collisions, infrastructure wear and tear, and air pollution.

***Vertical Equity** – the degree to which greater benefits are provided to the economically disadvantaged.*
***Horizontal Equity** – the degree to which those that benefit pay for the service.*

Travel Behaviour Impact

This evaluation criterion refers to the ability of a funding mechanism to encourage changes in human behavior to affect modal shifts away from automobiles and to support transit use, and subsequently to affect external costs. For instance, an initiative that sets prices to discourage automobile travel would contribute to the reduction of traffic congestion, collisions, travel time, and greenhouse gas (GHG) emissions, as well as increasing transit use.

Economic Efficiency

Economic efficiency refers to how a funding mechanism affects a region's productivity and competitiveness through its influence on economic activities. Economic distortions arising from

[25] Todd Litman, "Local Funding Options for Public Transportation," 8..

payment avoidance behaviours may have adverse effects on economic efficiency, potentially resulting in the reduction of productivity and competitiveness of a region.

Development Impact

This evaluation criterion considers a funding mechanism's impact on the type and location of development in the region. Specifically, it looks at whether the mechanism encourages more compact, accessible development or "sprawl" development (low density land use away from the core metropolitan area). This is closely tied to travel impact as the type of development influences the degree of reliance on automobiles for transportation. A funding mechanism that encourages compact development and discourages sprawl is typically desirable as a sprawl development strategy increases automobile reliance through less public transit access and greater travelling distances. [26]

Implementation

The implementation criterion refers to the challenges and costs to fully implement a funding mechanism. It includes the costs of initial implementation such as time commitment for planning and testing as well as the costs to establish administration and collection systems upon full implementation. Implementation also depends on the legal ability for a transit authority to implement the tool independently. The legal status of the tool ultimately determines the level at which implementation decisions are made. For example, if a funding mechanism requires provincial legislation, then the decision on whether to apply the mechanism rests at the provincial level.

Public Perception

This final criterion considers the degree of public or political acceptability of the funding source. It is not only influenced by the underlying funding principles but also by how the tools are designed and implemented. Hence, public or political preference may vary significantly even for similar tools.

Public or political preference may vary significantly.

Table 1 below maps the seven criteria of the evaluation framework to a list of key questions to ask when assessing alternative funding mechanisms.

[26] Robert Burchell et al., "TRCP Report 39: The Costs of Sprawl - Revisited," *Transportation Research Board – Transit Cooperative Research Program*, (1998).

Table 1: Evaluation Framework

Evaluating Framework	Key Questions
Revenue	• How much revenue can be generated? • How stable and predictable is the revenue over time? • Can the revenue to be sustained in the long-run?
Social Equity	• Is there a mismatch between those who carry the costs and those who benefit and/or impose external costs? • Is the tool progressive or regressive for different income groups?
Travel Impact	• Does the tool encourage efficient travel choices? • What are the impacts of the tool on external costs such as congestion, collisions, travel time, and air pollution?
Economic Efficiency	• What is the impact of the tool on regional productivity and competitiveness? • Are there any economic distortions? To what extent do they hinder economic development?
Development Impact	• Does the tool encourage more compact development and discourage sprawl development?
Implementation	• How much cost is associated with implementation? • What are the challenges to implementation? • Can the tool be implemented quickly? • What legal support does the implementation require?
Public Perception	• What are the common perceptions of the tool by the public? • What is the degree of public acceptability for the tool? • What is the level of potential political support?

The seven criteria of the evaluation framework discussed in this section provide a broad yet comprehensive evaluation framework for assessing a variety of alternative transit funding mechanisms that are available to transit decision makers.

4.2 Alternative Funding Mechanisms

Alternative funding mechanisms are grouped into six categories based on their target groups:

1. User-Based Charges
2. Vehicle Ownership Charges
3. Land Value Capture
4. Land-Based Charges
5. Non-User-Based Charges
6. Other Charges

User-based charges are levied on those who directly use and benefit from services and resources. “Services and resources” may imply having access to transportation and transit

services and infrastructure, as well as consuming fuel (and producing GHG emissions). Traditional funding sources that fall into this category are fuel taxes and transit fares.

Vehicle ownership charges refer to funding tools that target groups who own vehicles and thereby likely cause external impacts through vehicle use.

Land value capture initiatives focus on the beneficiaries of the public transit projects. They attempt to capture a portion of the financial benefits gained through land value appreciations as a result of proximity to specific public transit development projects. Development cost charges are one such traditional funding initiative that falls into this category.

Unlike LVC, **land-based revenues** impose costs on properties irrespective of their distance from transit services. A traditional funding tool in this category is property taxes.

Non-user-based levies are charged with no apparent connection to polluters and beneficiaries. It becomes irrelevant under this category whether or not, and to what extent the targeted groups use services and resources or inflict costs on the community. Examples of this category from traditional sources are sales taxes and income taxes.

Other charges include other potential funding sources that do not directly fall into any of the five categories described above. Each of these funding mechanisms follows a different funding principle in the consideration of their targets.

The following is a summary of these categories and their alternative funding tools.

4.2.1 User-Based Charges

While these funding mechanisms may vary in design, there are common attributes that can be observed in many of them. These charges have a significant impact on users' travel decisions and, as a result, the level to which a service or facility is used. Many of these tools, by placing the cost burden on the user (who directly benefits from the service), display horizontal social equity.

Most user-based charges encourage regional productivity and competitiveness by making high-value trips easier, but they also tend to incur high implementation costs and require provincial legislation and support.

As many other funding attributes depend on the design and implementation method, they differ by mechanism. For instance, revenue potential may vary due to differences in tax bases, and public acceptability may vary based on how the tools are implemented.

Table 2 presents the alternative mechanisms that belong to the user-based charges category.

Table 2: User-Based Charges

User-Based Charges	Definitions
• Carbon Tax	A tax levied per unit of carbon dioxide emitted from fuel used for transportation and other purposes
• Car Rental Levy	A fee charged daily on vehicle rentals
• Cordon Charge	A toll charged to drivers entering or exiting a zone or crossing a cordon during a specific time period of a day
• High Occupancy Toll	A toll for the use of a designated highway lane used jointly with high occupancy vehicles, with the expectation of reduced commute time
• Highway Toll	A toll per kilometre travelled on a designated road or for the use of a particular facility such as a bridge or tunnel
• Vehicle Kilometre Travelled Fee	A charge to drivers for every kilometre travelled within a designated area or in all areas

A carbon tax is currently implemented in British Columbia (BC) as a revenue-neutral mechanism, where all the funds generated are returned to the public through reductions in other taxes. Therefore, the particular mechanism does not specifically fund transportation projects.[27]

A car rental levy is applied in Allegheny County, Pennsylvania. Unlike most car rental levies in the U.S., which are generally used to fund the construction of sports and cultural facilities, the

[27] Province of British Columbia, Ministry of Finance, "Tax Bulletin: Tax Rates on Fuels," (2014), British Columbia.

particular mechanism in Allegheny County provides funding for the local transit agency's operations.[28]

Cordon charges are applied in London, UK and Stockholm, Sweden.[29] The cordon charge in Central London was introduced in 2003 with the primary objective of reducing congestion. In 2007, Stockholm adopted a similar scheme in the central area of the city to reduce congestion and increase accessibility of the cordoned zone. Case Study 1 summarizes how the mechanism was implemented in Stockholm.

High occupancy tolls (HOT) are commonly used in the US. The State Route 91 in Orange County, California and the HOT lane corridors in Harris County, Houston, Texas and San Diego County, California are examples of this toll system.[30,31] Case Study 2 illustrates Orange County's implementation of HOT lanes.

Toronto, Ontario has implemented a toll on the Highway 407 Express Toll Route (ETR); however, the revenue collected from the 407 ETR is not used in support of transit infrastructure. The mechanism charges each trip on the highway route depending on the trip length and time of day.[32] Germany also charges a toll for all trucks with a gross weight of 12 tonnes or more using German highways.[33] The particular mechanism implemented in Germany also has characteristics of vehicle kilometre travelled fees (VKT). The charges are on a kilometre basis and the implementation requires the use of GPS computerized on-board units installed in trucks. The Netherlands has also introduced VKT fees to replace other road-related taxes.[34]

Revenue

Revenue potential largely depends on the size of the tax base which a charge is targeting; in this case, it is referring to the number of users and their degree of usage. Carbon taxes, highway tolls, and vehicle kilometre travelled fees (VKT) are expected to target wide segments of the population and consequently have significant revenue potential. The BC carbon taxes are applied to all those who consume fossil fuels in the province by putting a price on each tonne of GHG emitted.[35] VKT applies to any automobile trips; and highway tolls account for all access to certain highways or facilities.

Cordon charges, HOTs, and car rental levies, however, have narrow tax bases. Cordon charges have limited revenue potential due to their nature as a traffic management tool. The purpose of the tool is to maintain the efficiency of a traffic system by discouraging the crossing of a defined cordon within a specific time period, thereby also limiting the amount of revenues to be gained.

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[28] AECOM, "Detailed Case Studies of Selected Revenue Tools," (2012): 60.
[29] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 14.
[30] Ibid., 21.
[31] Ray Tomality. "Innovative Infrastructure Financing Mechanisms for Smart Growth," Smart Growth BC, (2007): 22.
[32] 407 ETR, http://www.407etr.com/index.html.
[33] AECOM, "Detailed Case Studies of Selected Revenue Tools," 36.
[34] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 12.
[35] Province of British Columbia, Ministry of Finance, "June Budget Update 2013/14 to 2015/16: Carbon Tax Review," (2014), British Columbia.

HOT charges are limited to high-value trips, and, car rental levies target the limited pool of rental vehicle users.

Some mechanisms also provide more stable revenues than others. While all mechanisms are expected to impact travel choices, which in turn affect revenues over time, some revenues are less susceptible to travel decisions than others. Since the level of vehicle use hinges on economic growth, tools that heavily depend on such factors are expected to generate fairly sustainable revenues. Car rental taxes, highway tolls, and VKT fees are such tools. Carbon taxes and cordon charges, however, may experience declining revenues over time as travellers are expected to take higher GHG emission and transportation costs into account when making long-term decisions. Revenues generated from HOTs may also be cyclical as users are more likely to opt to avoid the charge during economic recessions.[36]

To facilitate public transit agencies in gauging the effects of each funding initiative, HDR estimated the potential revenues generated from implementing each tool. Assumptions underlying each calculation are formed based on existing implementations and documented studies.

The carbon tax rate is assumed to be $30 CAD per tonne of GHG emitted based on the implementation of BC carbon taxes.[37] Following Metrolinx's approach,[38] the GHG emissions for a region with a population size of 400,000 is estimated to be 7.6 million tonnes in year 2015. Annual GHG emissions are derived based on the theoretical region's percentage of Canada's population and the assumption of 699 million tonnes of GHG emissions in Canada in year 2012. The calculation also applies a linear decline rate to reach 65% below the 2006 levels by year 2050.[39]

The car rental taxation rate is assumed to be $2.18 CAD[40] per day in accordance with the current implementation of the rental vehicle tax in Allegheny County.[41] In 2011, Allegheny County is shown to have collected $5.481 USD million in tax revenue, which represents approximately 2.7 million car rental days.[42] By adjusting for the difference in population size, HDR assumed that a theoretical city with a size of 400,000 would likely exhibit 913,500 car rental days. Following Metrolinx's approach,[43] the number of rental days is set to increase at a rate of 2.25%.

[36] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," (2013).
[37] Province of British Columbia,Ministry of Finance, "Carbon Tax Review".
[38] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 29.
[39] National Round Table on the Environment and the Economy, "Achieving 2050: A Carbon Pricing Policy for Canada," (2009).
[40] The daily car rental taxation rate is estimated based on $2.00 USD daily charge implemented in Allegheny County and a 2014 average exchange rate of $1.09 CAD/USD (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)
[41] Allegheny County, Office of the Treasurer, "Allegheny County Rental Vehicle Tax Rules and Regulations," Allegheny County, Pennsylvania.
[42] AECOM, "Detailed Case Studies of Selected Revenue Tools," 59.
[43] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 20.

HDR assumed an average cordon charge per trip of $1.70 CAD based on the average revenue collected from Stockholm's congestion charges.[44] Stockholm reports approximately 115,100 trip charges based on an average day in May 2006. With significant associated implementation costs, HDR considered cordon charges to be more suitable for larger service regions, and therefore assumed a sample service region population of 2 million. Adjusting for differences in population between the theoretical city and Stockholm implies an assumption of roughly 296,000 daily charged trips. Over 250 annual working days, 74.1 million trips would then be charged. The annual revenue yields are set to remain constant over a 25 year study period to be consistent with the stable congestion charge revenues found in Central Stockholm between 2008 and 2012.

Following Irwin and Bevan's approach,[45] HDR assumed a maximum HOT charge of $0.20 CAD per km for single-occupant vehicles. Based on Metrolinx's study predicting a demand of 2.3 million vehicles annually per kilometre of HOT lanes for the Greater Toronto and Hamilton Area (GTHA),[46] HDR reached an estimate of roughly 707,000 charged vehicles per km for a service region with a population of 2 million. For the purpose of generating revenue estimates, HDR further assumed a 20 km HOT lane. According to Metrolinx's study on the potential revenue yields of highway tolls,[47] the GTHA is estimated to be able to generate maximum annual revenues of between $950 million and $1.5 billion CAD if all 400-series highways are tolled. HDR estimated consistent annual average revenues based on the assumption that the theoretical service region has a population size of 2 million and that all highways within the region are tolled.

The 2009 Canadian Vehicle Survey indicates 333.2 billion vehicle kilometres were travelled in 2009.[48] By adjusting the VKT to a smaller regional population size (2 million) and applying a 1.5% growth rate, HDR estimated the regional VKT to be 2.8 billion in 2015. Revenue estimates are generated by assuming a VKT charge of $0.05 CAD per kilometre travelled.

Table 3 summarizes the revenue estimates generated based on the above assumptions.

Table 3: Revenue Estimates for User-Based-Charges

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Carbon Tax	400,000	233 million	4.6 billion
Car Rental Levy	400,000	2.2 million	73 million
Cordon Charge	2,000,000	127 million	3.2 billion
High Occupancy Toll	2,000,000	2.5 million	61 million
Highway Toll	2,000,000	223 million	5.6 billion

[44] AECOM, "Detailed Case Studies of Selected Revenue Tools," 13.
[45] Neal Irwin, Andrew Bevan, "Time to Get Serious: Reliable Funding for GTHA Transit/Transportation Infrastructure," IBI Group, Sustainable Prosperity, (2010): figure 3.
[46] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 102.
[47] Ibid., 114.
[48] Statistics Canada, "Canadian Vehicle Survey: Annual – 2009," (2009): table 4-1.

Vehicle Kilometre Travelled Fee	2,000,000	991 million	30 billion

Social Equity

User-based charges are largely consistent with the user-pay principle. The groups targeted are generally those who cause costs to the community such as traffic congestion, collisions, and air pollution. However, concerns may be raised concerning carbon taxes, car rental levies, and VKT. Their targets may not necessarily benefit equally from public transit projects. For example, targeted groups without easy access to public transit are required to pay carbon taxes irrespective of whether they can benefit from transit services. According to the British Columbia Carbon Tax Review,[49] rural and remote BC communities perceived that they were being unfairly burdened and protested against the carbon tax. To address their concern, the Province of BC introduced a Northern and Rural Homeowner benefit of up to $200 for residents outside of major metropolitan centres. Similarly, car rental levies and VKT place disproportionate burdens on vehicle users with a lack of access to public transit systems, the same groups that cannot benefit from public transit projects.[50]

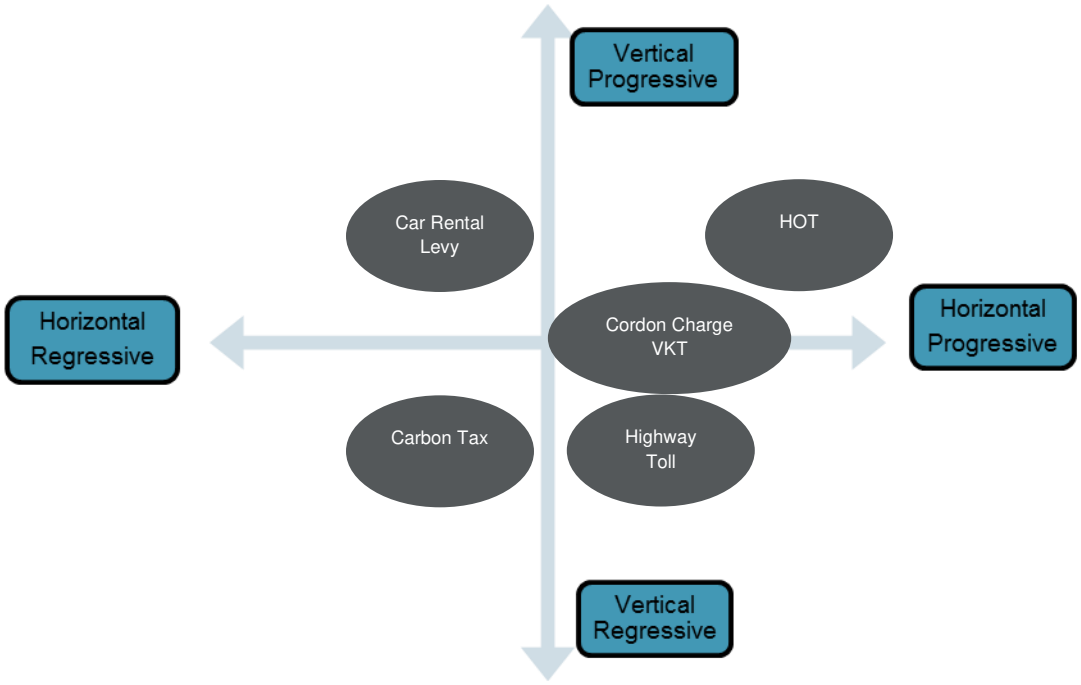
From the vertical equity perspective, a car rental levy is progressive as it imposes a lower burden on low-income groups who are less likely to rent vehicles. HOTs are also considered to be progressive. Such tolls in effect create “luxury lanes” that economically disadvantaged groups tend to avoid.[51] In addition, Eliasson and Mattsson’s study on the equity effect of Stockholm’s cordon pricing suggests that cordon charges are also progressive with regard to vertical equity.[52] High-income groups are more affected by the tool than low-income groups, as high-income groups tend to make a greater share of their journeys by car. The study finds that the richest third of the residents pay more than four times as much each in congestion charges than the poorest third.

Other tools including carbon taxes and highway tolls are considered regressive, because they place a greater burden on low-income motorists. According to Sustainable Prosperity’s British Columbia Carbon Tax Review, tax payers with lower incomes tend to spend a greater proportion of their income on carbon-intensive goods and have less ability to switch. The Province has mitigated the adverse impact through the introduction of the Low-Income Climate Action Tax Credit.[53]

Figure 3 illustrates the social equity standing of user-based charges. The upper right quadrant of the chart represents the most desirable equity ranking.

[49] Sustainable Prosperity, “British Columbia Carbon Tax Review,” (2012): 4.
[50] AECOM,KPMG, “Big Move Implementation Economics: Revenue Tool Profiles.”
[51] Ray Tomality. “Innovative Infrastructure Financing Mechanisms for Smart Growth,” 7.
[52] Jonas Eliasson, Lars-Goran Mattsson, “Equity effect of congestion pricing: Quantitative methodology and a case study for Stockholm,” *Transportation Research Part A: Policy and Practice* 40, 602-620.
[53] Sustainable Prosperity, “British Columbia Carbon Tax Review,” 5.

Figure 3: Equity Ranking of User-Based Charges



Source: Chart produced based on the scoring system of Metrolinx's Big Move Implementation Economics: Revenue Tool Profiles (2013) and HDR's professional judgement.

Travel Behaviour Impact

Most user-based charges encourage efficient travel choices. Carbon taxes, for example, encourage shifts to lower emission alternatives such as fuel-efficient vehicles or public transit.[54] Cordon charges, highway tolls, and VKT fees have similar effects; they reduce automobile travel through shifts to other modes of transit as well as trip rescheduling or suppression. Such impacts help to reduce traffic congestion, collisions, travel time, and air pollution.

The implementation of cordon charges in London, UK, has decreased traffic volume entering the central zone by 21%. Similarly, Oslo, Norway, experienced a drop in traffic between 6 and 10%.[55] Germany's highway tolls (or VKT charges) on trucks contributed to an increase in loaded runs of 2.1% in 2010.[56] Car rental levies also have a marginal impact on the level of vehicle use. By taking advantage of extra space on high occupancy vehicle lanes for those who are willing to pay to use them, HOTs directly improve traffic conditions within the targeted area. The Houston HOT lanes, for example, caused a decline in average travel time from 25 minutes in 2008 to 8 minutes in 2010. Travel speeds increased from 18 mph to 55 mph during the afternoon peak period and from 20 mph to 64 mph during the morning peak period.[57]

Some mechanisms may have unintended adverse impacts on network performance. Cordon charges and highway tolls may potentially lead to increased traffic elsewhere as travellers seek

[54] IBI Group, "Research on Funding for TransLink," 16.
[55] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 14.
[56] AECOM, "Detailed Case Studies of Selected Revenue Tools," 39.
[57] Ibid., 46.

alternative routes. Moreover, HOTs may potentially encourage single occupant vehicles by making more road capacity available to them.

Economic Efficiency

Most of the listed mechanisms are expected to have desirable effects on regional productivity and competitiveness. Cordon charges, HOTs, highway tolls, and VKT encourage regional economic development by facilitating high-value trips for personal and business purposes and encouraging effective distribution of goods and services.

Carbon taxes and car rental levies, however, may lead to economic distortions that compromise economic efficiency within a region. Car rental levies may have adverse effects on the regional car rental industry and the tourism industry due to the potential decrease and/or shift in vehicle rental demand, though such effects are expected to be marginal considering the narrow tax base.[58] Carbon taxes encourage the migration of businesses to other jurisdictions and the reduction in carbon-intensive goods production to avoid the charges. The 2013 Carbon Tax Review conducted by the Province of BC indicates that the provincial carbon tax has had and will continue to have a small negative impact on the region's gross domestic product (GDP).[59]

Development Impact

The development impact of a funding tool heavily depends on the scope over which the tool is implemented. In the long run, people tend to opt to be closer to work and/or public transit facilities. Therefore, if the tools are applied broadly rather than in central areas, they may encourage compact, accessible development. If the charges are applied to limited areas, however, they may encourage sprawl as people relocate outside the affected area to avoid paying extra costs such as cordon charges. Funding tools such as HOTs can also adversely impact development strategies by increasing access to low-density areas.[60]

Implementation

Other than car rental levies, all listed mechanisms require significant infrastructure implementation costs. Tools linked to automobile travel such as cordon charges, HOTs, highway tolls, and VKT require initial investments in vehicle monitoring infrastructure systems such as GPS, prior to deployment. Stockholm, for example, spent approximately $162 million CAD for tolling system investments to implement congestion charges. The HOT lane in Florida, on I-95, required a capital investment of $152 million CAD in 2010.[61] Carbon taxes similarly require infrastructure to monitor emissions.

In addition to infrastructure requirements, administration systems are needed to collect and remit payments to transit authorities. While car rental levies do not require material capital costs for implementation, significant administrative costs are incurred, as in the case with Allegheny County.[62] Given the large initial investment necessary to implement some of the user-based

[58] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 24.
[59] Province of British Columbia, "Carbon Tax Review," 64.
[60] Senate Transportation and Housing Committee, "High-Occupancy Vehicle (HOV) Lanes II: The Next Generation," (2009), Los Angeles, California.
[61] AECOM, "Detailed Case Studies of Selected Revenue Tools," 45.
[62] Ibid., 60.

charges, a detailed planning and design process, requiring a significant time-commitment, is often emphasized prior to full implementation. A highway toll strategy implemented in Germany, known as the Heavy Goods Vehicle Toll, took approximately 5 years to plan and implement.[63] With high capital costs, the initiatives are more suitable for larger service regions with more resources to support the implementation.

All the listed user-based charge mechanisms may require provincial legislation and support to be implemented in Canada. High occupancy lane tolls, highway tolls, and VKT fees may require additional support at the municipal or federal level if they are operated on municipally-owned highways or federal assets. Implementation decisions for user-based charges, therefore, lie at the provincial and federal level, making it challenging for transit agencies to develop independent implementation strategies.

Public Perception

The public opinion on user-based charges is mixed and largely dependent on the individual implementation method and purpose of the mechanisms. Sustainable Prosperity's British Columbia Carbon Tax Review (2012) indicates that the perception of the social equity of carbon taxes has a significant influence on the public acceptance of the tool. With policies in place to lessen equity concerns, many British Columbians have supported the continuation and expansion of carbon taxes.[64] The study conducted by Sustainable Prosperity also finds that public acceptance for this tool is more likely if the fund contributes to solving climate change problems.

Gaining public support would also be easier if the majority of the residents are not subject to the charge, as is the case with car rental levies.[65]

The Transportation Research Board's Compilation of Public Opinion Data on Tolls and Road Pricing has studied public opinion on cordon charges, HOTs, and highway tolls based on cases in the U.S. and worldwide.[66] The study indicates that in aggregate, cordon charges are less supported by the public than HOT and highway tolls, partially because the advantages, and hence the value, of cordon charges cannot be easily understood by users. The initial public opposition to Stockholm's congestion charge further supports this claim. HOT charges, however, can clearly demonstrate their advantages as users interpret their benefits as time savings, as is the case with SR-91 express lanes in Orange County. On the other hand, it has been observed that highway infrastructure in Canada has historically been funded through tax revenues; therefore, Canadian motorists are likely to resist paying for what they perceive as having already been paid for through their tax dollars. [67]

[63] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 123.
[64] Province of British Columbia, "Carbon Tax Review," 63.
[65] Bethesda MD et al., "TRCP Report 129," 44.
[66] Johanna Zmud et al., "NCHRP Synthesis 377: Compilation of Public Opnion Data on Tolls and Road Pricing," *Transportation Research Board – Transit Cooperative Research Program*, (2008): 43.
[67] Ray Tomality. "Innovative Infrastructure Financing Mechanisms for Smart Growth," 23.

VKT charges can be expected to face negative public opinion due to privacy concerns with installing GPS devices on individual vehicles to track travelling distances.[68] The Victoria Transport Policy Institute's study, however, indicates moderate support for this tool.[69]

Conclusions

User-based charges are generally consistent with the user-pay principle in that the people targeted by the charges are also those responsible for causing adverse impacts to the community such as congestion, collisions, and air pollution. By reducing these impacts and encouraging efficient travel choices, the tools also have positive effects on regional competitiveness and productivity. However, most of the tools have high implementation costs due to the significant infrastructure requirements and time commitments for planning and testing.

User-based charges generally produce sustainable revenues over time, so they can be used to fund operating expenditures of public transit projects. Carbon taxes, highway tolls, and VKT fees also have significant revenue potential, which make them appropriate for capital expenditure funding. The revenue potential of these three mechanisms largely depends on the targeted tax base. Hence, a service region with a large population may benefit greatly from them.

User-based charges generally produce sustainable revenues over time.

With desirable effects on traffic conditions and the environment, the charges are more suitable for service regions with heavy automobile use and have the ability to improve traffic, accessibility, and environmental conditions. They are also appropriate for regions with less than ideal economic conditions, as they facilitate the region's economic development. However, it is important to note that by placing a greater burden on low-income groups, user-based charges are less suitable for regions with a high proportion of below-average income populations.

In **Table 4**, the list of user-based charges is summarized based on the seven evaluation criteria.

Table 4: User-Based Charges Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Carbon Tax	Substantial	Low	Low	Marginally Positive	Marginally Negative	No Impact	Difficult	Positive
Car Rental Levy	Limited	Low	High	Marginally Positive	Marginally Negative	No Impact	Easy	Positive
Cordon Charge	Substantial	High	Moderate	Positive	Positive	Mixed Impact	Difficult	Negative
High Occupancy Toll	Limited	Very High	High	Positive	Positive	Sprawl	Difficult	Positive
Highway Toll	Substantial	High	Low	Positive	Positive	Mixed Impact	Difficult	Positive
Vehicle Kilometre Travelled Fee	Substantial	High	Moderate	Positive	Positive	Compact	Difficult	Negative

[68] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 12.
[69] Todd Litman, "Local Funding Options for Public Transportation," 21.

4.2.2 Vehicle Ownership Charges

Unlike user-based charges, which directly target service and resource users, vehicle ownership charges are directed at groups who own vehicles, and are hence likely to cause external impacts through automobile use. A fundamental difference between the two categories is that vehicle ownership charges have a minimal impact on sustainable travel choices and development strategies. The effects of ownership charges are more discernible in the form of economic distortions.

These charges generally require minimal implementation costs, and produce sustainable, although moderate, revenues. The charges exhibit a similar degree of horizontal equity as they are indiscriminately applied to all vehicle owners, but they are inequitable in the sense that, while vehicle owners may benefit from transit projects, the charges do not reflect the extent of individual use of services or contributions to congestion or emissions.

Table 5 presents the funding mechanisms in the vehicle ownership charges category.

Table 5: Vehicle Ownership Charges

Vehicle Ownership Charges	Definitions
• Auto Insurance Tax	A fee paid by vehicle owners through auto insurance payments
• New Vehicle Sales Tax	A fee paid by owners of vehicles at the time of first registration of such vehicle
• Vehicle Registration Fee	A fee paid by owners of vehicles upon registering a new vehicle and renewing that registration annually

Examples of these charges include the auto insurance tax implemented in Virginia partly to fund transportation; the 6.5% new motor vehicle sales tax applied in Minnesota and used entirely to fund transportation projects[70]; and the annual $50.75 USD ($55.32 CAD) vehicle registration fee enforced in Texas,[71] which is dedicated exclusively to transportation. A proposed annual vehicle registration fee of $30 USD ($32.70 CAD) in Washington County (Oregon), with potential revenues to be used for county road maintenance and operation purposes, is contingent on the outcome of the November 4, 2014 election.[72] In Canada, Toronto, Montreal, Quebec City, Gatineau, Trois-Rivières, Saguenay, Sherbrooke, and Saint-Jerome also apply vehicle registration fees.[73] Case Study 3 discusses the City of Toronto's implementation of this funding mechanism.

Revenue

Vehicle ownership charges have limited revenue potential as they represent marginal additions to already existing taxes or fees. Auto insurance taxes and vehicle registration fees may have

[70] Research Department of the Minnesota House of Represenatatives, "Motor Vehicle Sales Tax," (2014), Minnesota: 2.
[71] Mobility Investment Priorities. "State Vehicle Registration Fees."
[72] Washington County, Oregon, http://www.co.washington.or.us/LUT/TransportationFunding/vehicle-registration-fee.cfm.

[73] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 22.

greater revenue potential than new vehicle sales taxes. While new vehicle sales taxes are one-time charges to vehicle owners at the time of the purchase, auto insurance taxes and vehicle registration fees are collected annually.

Revenues raised by these tools are fairly sustainable over the long run since it is unlikely for the number of vehicle owners to decline over time and vehicles require valid insurance and registration.[74] According to Minnesota Management and Budget,[75] the state motor vehicle registration tax generated consistent revenues of between $462 million USD ($504 million CAD) and $506 million USD ($552 million CAD) for the period 2001-2007.

New vehicle sales tax revenues tend to be more sensitive to economic conditions than the other tools, as new vehicle sales are partially dependent on business cycles.[76] The new vehicle sales tax revenues collected by Minnesota, for instance, has an annual average growth rate of 6.8% from 1990 to 2000, a period of strong economic growth. However, a subsequent decline was experienced at an annual average rate of 2.6% following the recession of 2001.[77]

For demonstration purposes, HDR made the following assumptions to generate revenue yield estimates.

Following the Metrolinx approach,[78] HDR assumed an annual $60 auto insurance tax. The 2009 Canadian Vehicle Survey estimated there to be a total of 20.5 million vehicles in Canada.[79] By adjusting the number of vehicles for a service region of 400,000 in population and a growth rate of 1.5%, HDR assumed a total of roughly 270,000 vehicles in the hypothetical region.

HDR also assumed a 6.5% new vehicle sales tax following Minnesota's implementation. Approximately 21,000 new vehicles are assumed to be purchased within a taxed region of 400,000 in population in 2015; this is based on Ontario's 656,684 new motor vehicle sales in 2013 and a 4% sales growth rate between 2012 and 2013.[80] The average cost of a new passenger vehicle is estimated to be $25,259 by Statistics Canada.[81]

Vehicle registration fee revenue estimates are generated by assuming a vehicle registration fee of $55.32 (the same as in Texas). As with the auto insurance tax estimations, HDR assumed a population of 400,000, growth rate of 1.5, and 270,000 registered vehicles in the theoretical service region. **Table 6** summarizes the revenue estimates generated based on the above assumptions.

[74] Todd Litman, "Local Funding Options for Public Transportation," 17.
[75] Minnesota Department of Transportation, "Minnesota Statewide Transportation Plan 2009-2028 – Draft," (2009), Minnesota: 5-10.
[76] Bethesda MD et al., "TRCP Report 129," table 4.2.
[77] Minnesota Department of Transportation, "Minnesota Statewide Transportation Plan 2009-2028 – Draft," 5-11.
[78] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 10.
[79] Statistics Canada, "Canadian Vehicle Survey: Annual – 2009," (2009): table 3-1.
[80] Statistics Canada, "New Motor Vehicle Sales, by Province." CANSIM 079-0003.
[81] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 153.

Table 6: Revenue Estimates for Vehicle-Ownership Charges

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Auto Insurance Tax	400,000	15 million	424 million
New Vehicle Sales Tax	400,000	7 million	278 million
Vehicle Registration Fee	400,000	14 million	392 million

Social Equity

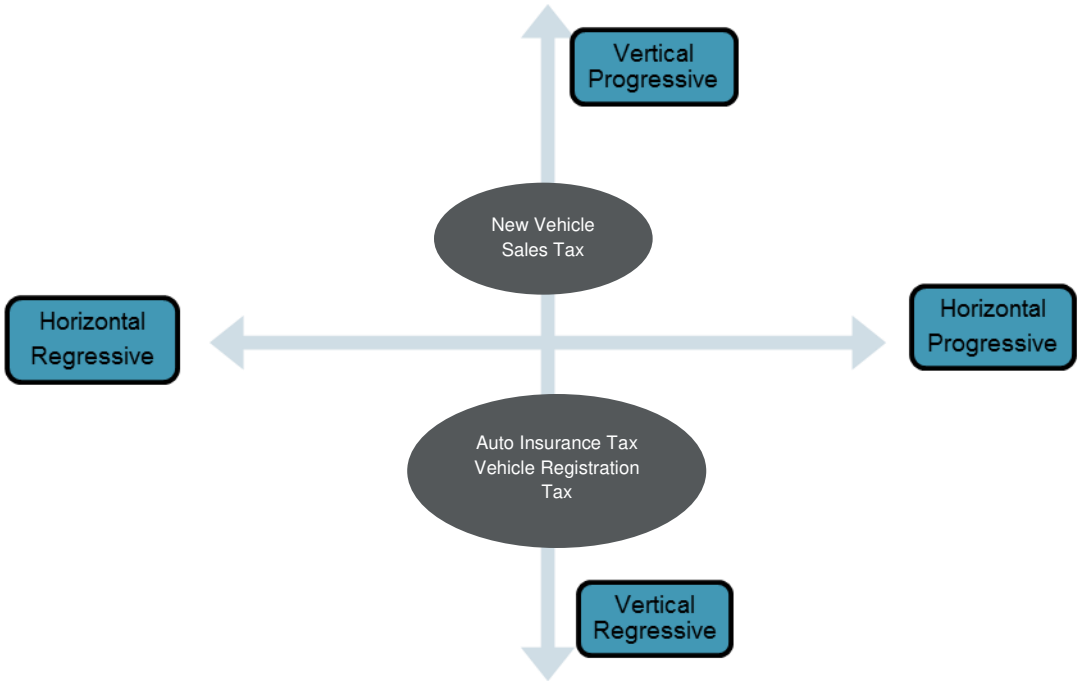
The funding strategies are, at best, partially consistent with the horizontal equity concept. They are applied to vehicle owners within the region, who may benefit from public transit improvement projects through reduced traffic congestion and collisions, consistent with the user-pay principle. However, since they do not account for differences in how much vehicles are used, they lack the ability to reflect external costs imposed on the community[82].

While similar with respect to horizontal equity, the funding mechanisms vary in vertical equity considerations. Auto insurance taxes and vehicle registration fees, applied indiscriminately to all vehicle owners, implicitly place a greater burden on low-income groups. Public consultation conducted in 2010 for TransLink revealed concerns about the distribution of vehicle registration costs.[83] New vehicle sales taxes, however, are progressive, because they impose greater costs on buyers of higher-value vehicles, who tend to belong to high-income groups[57].

Figure 4 illustrates the social equity standing of ownership-based charges. In the figure, new vehicle sales tax is shown to be more vertically equitable than auto insurance and vehicle registration taxes.

[82] Todd Litman, “Local Funding Options for Public Transportation,” 17.
[83] IBI Group, “Research on Funding for TransLink,” 16.

Figure 4: Social Equity Ranking for Ownership-Based Charges



Travel Behaviour Impact

The funding mechanisms in this category have minimal influences on travel behaviour. How they affect travel choices depends on tool design. For instance, auto insurance taxes that vary based on the amount of insurance (and thus the owners' driving records) may act as an incentive to curb undesirable driving behaviour and thus help to reduce collisions. Similarly, new vehicle sales taxes and vehicle registration fees charged based on the fuel efficiency of vehicles encourage the purchase of sustainable vehicles.[84] For example, TransLink of Vancouver has been planning the implementation of a vehicle registration fee as a short-term funding option. The fee is projected to vary based on vehicle emissions or engine size to encourage the purchase of low-polluting, efficient vehicles.[85]

However, both tools also experience the drawback that once the charges are paid, there would be no incentive for vehicle owners to use their vehicles less. Such a drawback may implicitly encourage automobile travel and the greater external costs including congestion, collisions, and air pollution.

Economic Efficiency

All of the listed mechanisms are expected to have negative impacts on regional productivity and competitiveness. These tools encourage consumers to avoid taxes by buying fewer vehicles or shift the demand for purchasing new vehicles outside the region.[86] Both mechanisms could means losses for regional vehicle dealers.

[84] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 157.
[85] TransLink. "Backgrounder #10: Transportation Funding."
[86] IBI Group, "Research on Funding for TransLink," 16.

Development Impact
These mechanisms have no material impact on development strategies.

Implementation
All of these initiatives represent additions to existing taxes in Canada, so they typically require provincial legislation to restructure the existing tax system.[87] Auto insurance taxes would likely require additional data protection legislation amendments if the tax rates are based on individual driving records. New vehicle sales taxes may only need municipality approval if they are implemented in the form of registration fees rather than additional taxes.[88]

Implementation costs should be minimal, as payment and collection mechanisms for auto insurance and vehicle registration are already in place. Investments in monitoring infrastructure are also unnecessary for these charges, as in the case of Minnesota's vehicle sales tax.[89] However, their negative influence on regional economic efficiency poses implementation challenges for authorities, as it requires careful consideration in setting pricing structures to balance revenue potential against economic distortions.

Public Perception
The Victoria Transport Policy Institute's study on funding mechanisms[90] suggests that vehicle registration fees have less public support than other transportation-related mechanisms, a conclusion supported by the Transportation Research Board study[91]. Through public consultation in 2010, TransLink further found mixed opinion on willingness to pay these types of fees.[82]

Conclusions
Most of the listed vehicle-ownership charges require provincial legislation to be implemented in Canada. While the tools have minimal implementation costs, they also have limited potential to generate revenues and limited impact on sustainable travel choices. In addition to their inability to distribute external costs of auto travel equitably, they also have distorting effects on the regional vehicle sales industry. The modest and sustainable nature of their revenues makes the charges suitable for operation funding. However, regions aiming to improve traffic conditions would not find these mechanisms useful. Moreover, regions that are highly dependent on vehicle selling businesses would not find vehicle ownership charges appropriate.

Table 7 summarizes vehicle-ownership charges based on the evaluation framework.

[87] Bethesda MD et al., "TRCP Report 129," table 4.2.
[88] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 155.
[89] AECOM, "Detailed Case Studies of Selected Revenue Tools," 58.
[90] Todd Litman, "Local Funding Options for Public Transportation," 17.
[91] Bethesda MD et al., "TRCP Report 129," table 4.3.

Table 7: Vehicle-Ownership Charges Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Auto Insurance Tax	Limited	Moderate	Low	Marginally Positive	Negative	No Impact	Easy	Uncertain
New Vehicle Sales Tax	Limited	Moderate	High	Marginally Positive	Negative	No Impact	Easy	Uncertain
Vehicle Registration Fee	Limited	Moderate	Low	Marginally Positive	Negative	No Impact	Easy	Negative

4.2.3 Land Value Capture (LVC)

In contrast to the initiatives discussed previously, which focus on vehicle drivers and owners who impose external costs on the community, Land Value Capture (LVC) focuses more on those who benefit from public transit improvement projects. Specifically, LVC mechanisms target properties and developments in the vicinity of existing or potential public transit facilities in attempt to capture a portion of the benefits realized.

Land Value Capture (LVC) focuses more on those who benefit from public transit improvement projects.

LVC charges are consistent with the user-pay principle in that users of potential or improved public transit facilities carry the costs of funding. The vertical equity aspect of the tools, however, tends to be moderately regressive.

Most LVC tools contribute to economic development within the region, while carrying significant implementation costs and challenges.

Table 8 presents the alternative mechanisms that belong to the land value capture category.

Table 8: Land Value Capture

Land Value Capture	Definitions
• Land Value Taxation	A tax on the land value in the vicinity of a public transit facility to more generally capture the value created by the provision of public goods and services
• Negotiated Exaction	A payment, in the form of in-kind contributions for local public goods and services, in return for development approval
• Special Assessment District	A self-imposed property tax within a defined district that benefits from public transit improvements
• Station Air Rights	The sale or lease of the rights to develop above or below transit facilities
• Tax Increment Financing	A public finance technique to fund projects within an area by leveraging future tax revenue increases to finance current infrastructure projects
• Transportation Utility Fee	A fee that treats transportation improvements a utility and applies to all properties within a defined district

Land value taxation (LVT) has had limited use in North America; the City of Harrisburg (Pennsylvania) is one of the few municipalities that have employed the revenue tool.[92] Harrisburg introduced a split-rate property tax akin to LVT, where the value of land is taxed at a higher rate than the value of buildings and improvements. Similar tools are also used in British Columbia, Saskatchewan, and Manitoba.

Negotiated exaction was used in London, UK to fund the extension of the London Underground Jubilee line to Canary Wharf.[93]

The special assessment district (SAD) mechanism is widely used in the U.S. Examples include the South Lake Union streetcar project and the Bus Tunnel project in Seattle, the New York Avenue Station project in Washington, and the Red Line subway project in Los Angeles.[94] The LVC tool has also been implemented by the Halifax Regional Municipality since 2009. Case Study 4 discusses Halifax's Area Rate Taxation in detail.

Washington Metropolitan Area Transit Authority (WMATA) began the implementation of station air rights in the 1970s to fund the development of transit-oriented projects. By leasing WMATA-owned/controlled properties to commercial and residential private developers, WMATA is generating, on average, $1.8 million USD ($2 million CAD) annually.[95] Metropolitan Rapid Transit Authority (MARTA) in Atlanta, Georgia has also used the mechanism to generate funds for transit projects.

Tax Increment Financing (TIF) is currently being implemented in London, UK to fund the development of the Crossrail project. The region applies a business rate supplement (BRS), a property tax of 2% levied on existing commercial buildings, to finance for the project-specific debts. Detailed discussions on the mechanism used in London can be found in Case Study 5. TIF is also implemented in Dallas, Texas to fund Dallas Area Rapid Transit infrastructure improvements.[96]Calgary is also using TIF to fund an urban area renewal project.

Municipalities in Oregon, Colorado, and Texas have successfully implemented transportation utility fees to fund the operations and maintenance of their transportation systems. Oregon City's Pavement Maintenance Utility Fee, for example, was adopted in May 2008. The fees are collected monthly from residences and businesses within the region through the City's regular utility bills. The fees are based on the number of trips a particular land use generates.[97]

[92] Ray Tomality. "Innovative Infrastructure Financing Mechanisms for Smart Growth," 27.
[93] George Hazel Consultancy Ltd., "Land Value Capture Discussion Paper," (2013): 34.
[94] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit: Lessons From Project-Specific Analyses," Mineta Transportation Institute, (2012): table 1.
[95] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance: Technical Research Report," (2009): II-209.
[96] Greenleaf Strategies LLC, Parsons Brinckerhoff, "Value Capture: Mechanisms, Practices & Prospects for Stimulating Economic Development and Funding Commuter Rail," (2011): 37.
[97] Oregon City, http://www.orcity.org/publicworks/transporation-utility-fee.

Revenue

The revenue potential for LVC mechanisms is influenced by several factors including the amount of developable land in proximity to the public transit service, the size and type of existing developments around the facilities, and the real estate market. LVT, SAD, and TIF rely on land and properties in the vicinity of public transit to generate revenues;[98] therefore, their revenue potentials are limited by the size and value of the region's development and land. Negotiated exactions and station air rights depend on the revenues raised from development rights, hence are limited by the amount and demand for new developments.[99]

The degree of revenue sustainability differs across mechanisms depending on whether they are one-time or ongoing levies. Negotiated exaction and station air rights are one-time funding tools, while others are ongoing tools. Their ability to generate revenues in the long-run, therefore, largely depend on the region's ability to issue development rights in the future.

Revenues also vary in stability. Transportation utilities fees are expected to be fairly stable as they are linked to the demand for transportation, which is not highly susceptible to economic variations. On the other hand, tools that depend on the real estate market, namely LVT, SAD, and TIF, are much more sensitive to economic conditions.[100]

For demonstration purposes, HDR made the following assumptions to generate revenue yield estimates for LVC mechanisms applied to a theoretical region.

Due to the difficulties in separating land from property values for LVT estimations, any practical measure of land value has to make an assumption for the land-to-building ratio.[101] According to Cord's study, the land component of the total property values is approximately 41.6%.[102] Following Gihring's estimation approach, HDR assumed a total property value of roughly $214.5 million CAD for 458 taxable parcels within a half mile radius targeted zone.[103] It is further assumed that the tax on land is 21.20 mills and tax on buildings is 9.62 mills, consistent with Harrisburg's LVT.

Due to the challenges in obtaining estimated value for negotiated exactions and the tool's similarities to development impact fees, HDR assumed similar values for negotiated exactions as impact fees. The estimated value for a multifamily unit building permit is $800 USD ($872

[98] Chicago Metropolitan Agency for Planning, S.B. Friedman & Company. "Transit Value Capture Analysis for the Chicago Region," (2010): 3.
[99] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," (2009): 9-10.
[100] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit," 45.
[101] Ashok Rao, http://www.slate.com/blogs/moneybox/2013/10/17/land_value_tax_revenue_how_much_can_we_raise_by_taking_unimproved_land.html.
[102] Steven Cord, "How Much Revenue Would a Full Land Value Tax Yield, " *American Journal of Economics and Sociology* 44, No.3, (1985).
[103] Thomas Gihring, "The Value Capture Approach To Stimulating Transit Oriented Development and Financing Transit Station Area Improvements," *Victoria Transport Policy Institute,* (2009): 5.

CAD)[104], and the value for a single family permit is $1,200 USD ($1,308 CAD).[105] The City of Minneapolis, with population close to 400,000, is found to have issued, on average, 1001 multifamily and 190 single family permits. HDR assumed that the theoretical region has a similar population size as Minneapolis and a consistent ability to issue building rights over the next 25 years.

The South Lake Union Streetcar project in Seattle raised a total of $25.7 million USD ($28 million CAD) through a SAD mechanism that was paid over an 18 year period.[106] Similarly, WMATA has collected roughly $25 million USD ($27.3 million CAD) in SAD revenues for the development of New York Avenue Metro Station. The revenues were collected over a 30-year period.[107] Following the two implementations, HDR estimated SAD revenues to be approximately $28 million CAD, paid over a 25 year period.

WMATA was able to generate approximately $2 million CAD per year on station air rights within the Washington Metropolitan Area. For a theoretical service region of smaller population size, HDR adjusted the annual revenues downwards for potentially smaller municipality-owned properties available for air rights sale/lease.[108] HDR further assumed the annual revenues will be consistently generated over the next 25 years.

Following a similar approach of estimating LVT, HDR assumed a total property value of roughly $214.5 million CAD for 458 taxable parcels within the half mile radius targeted zone. The tax rate is set to 2%, following London's BRS. HDR also used a revenue growth rate of 10% to reflect the growth potential of TIF, as was the case for Chicago's implementation of Wilson Yard TIF.

To estimate the revenue potential for transportation utility fees, HDR assumed that a service region with approximately 400,000 populations would generate a similar number of trips to Minneapolis. Following the study conducted by University of Minnesota,[109] HDR assumed roughly 94,000 single-family units and 74,000 multi-family units. The fees are charged at $5.54 CAD per month ($66.45 CAD per annum) for single families and $3.64 CAD per month ($43.69 CAD per annum) for multi-family units.

Table 9 summarizes the revenue estimates generated based on the above assumptions.

[104] Negotiated exaction price estimates based on 2009 average exchange rate of $1.14 CAD/USD (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)
[105] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance," II-184.
[106] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit," 50.
[107] Ibid., 57.
[108] Annual revenue estimates based on Washington Metropolitan Area population of 3.14 million in 1970 and hypothetical population of 2 million for the theoretical region. (http://www.city-data.com/forum/city-vs-city/1197522-population-metropolitan-area-msa-populations-1970-a.html)
[109] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance," table 8.4.

Table 9: Revenue Estimates for LVC

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Land Value Taxation	n/a	3.9 million	97 million
Negotiated Exaction	400,000	1.2 million	29 million
Special Assessment District	n/a	0.8 million	21 million
Station Air Rights	2,000,000	0.8 million	20 million
Tax Increment Financing	n/a	5.4 million	566 million
Transportation Utility Fee	400,000	20 million	569 million

Social Equity

LVC mechanisms are generally consistent with horizontal social equity. LVT, negotiated exaction, station air rights, and transportation utility fees represent costs, either directly or passed on through developers, to the owners of the neighbouring land and properties who benefit from the transit services.[110] SAD and TIF initiatives are also consistent with the user-pay principle as the beneficiaries of land and property value appreciations are asked to share a portion of such gain to facilitate the service that causes the appreciation. One concern raised over negotiated exaction is that the share of costs is allocated based not on the benefits new developments may receive but on the political power of stakeholders during negotiations.[111] TIF may also raise some issues related to geographic equity. The capture of property-tax increments by TIF often results in lower tax revenues for overlapping jurisdictions such as school districts.[112] TIF may, therefore, negatively impact other services.

LVT may be partially consistent with vertical equity. By taxing properties at lower rates than land, the burden shifts from lower-income homeowners and small business owners towards industrial property and vacant properties with low building-to-land ratios.[113] As of 2002, the City of Harrisburg further split the two-tiered tax system to a 1 (building) to 6 (land) ratio to benefit low-income groups and keep rents lower.[114]

Negotiated exaction and station air rights are slightly progressive as low-income groups are likely to avoid the new, higher-cost developments.[115] However, other mechanisms tend to increase the costs of land for property buyers and owners either by levying higher taxes or by

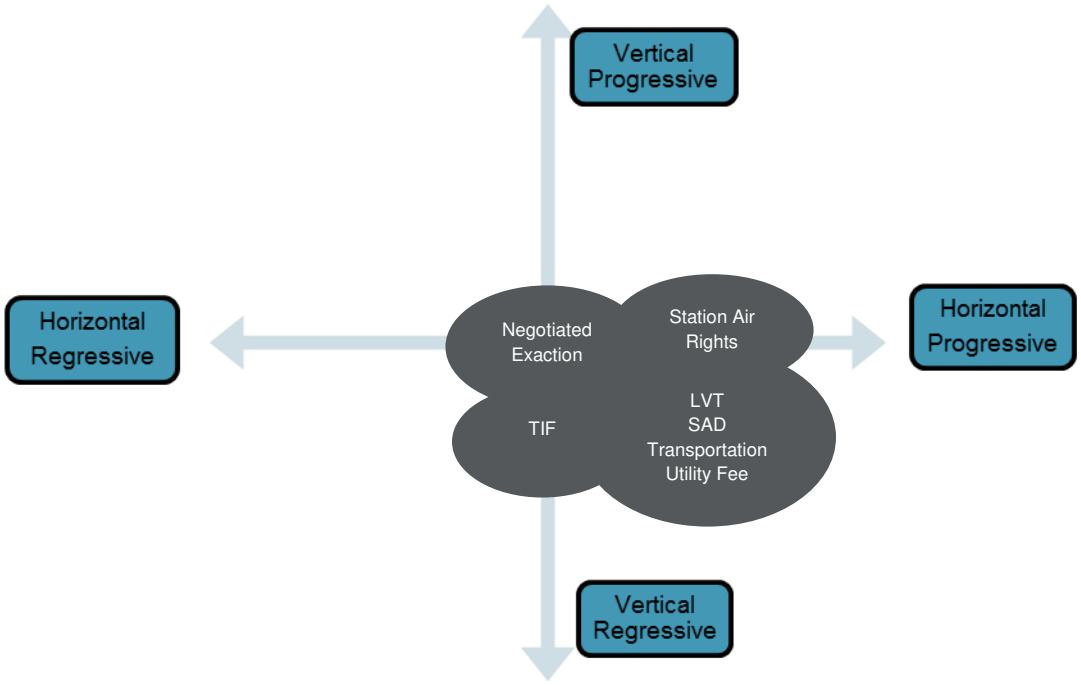
[110] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," 11.
[111] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance," II-179.
[112] Greenleaf Strategies LLC, Parsons Brinckerhoff, "Value Capture: Mechanisms, Practices & Prospects for Stimulating Economic Development and Funding Commuter Rail," 22.
[113] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," 5.
[114] City of Harrisburg, Office of the Mayor, "2002 Approved Budget", (2001), Harrisburg, Pennsylvania.
[115] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," 7.

passing the higher costs of development to them. Such increases in costs place a greater financial burden on lower-income property owners.[116]

To address vertical equity concerns, regions sometimes allow exemptions or deferment of payments for certain qualified property owners. For example, the Seattle Streetcar SAD implementation allowed indefinite deferment for qualified senior citizens and deferment up to five years for economically disadvantaged individuals.[117] Similarly, some states in the U.S. allocated a portion of the TIF funds to affordable housing.[118]

Figure 5 illustrates the social equity standing of LVC charges. The figure indicates that LVC mechanisms are mainly regressive in vertical equity ranking.

Figure 5: Social Equity Ranking for Land Value Capture



Travel Behaviour Impact

Although LVC tools do not directly impact travel behaviour, they may implicitly affect travel decisions by making public transportation more readily available to neighbouring properties, allowing increases in transit ridership and reductions in automobile travel within the region. The New York Avenue Metro Station partly funded by SAD, for example, has experienced a dramatic increase in transit ridership since its opening in 2004, more than doubling by 2009.[119]

[116] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit," 45.
[117] Ibid., 51.
[118] Ibid., 67.
[119] Ibid., 58.

However, if the charges act to dampen compact development, transit ridership may be reduced and vehicle use increase.[120]

Economic Efficiency

LVC tools benefit economic efficiency as they result in third-party benefits from a new development that may not otherwise be gained,[121] and can consequently be considered an efficient way to allocate resources.[122] Proximity to transit services can also increase overall productivity by reducing total transportation costs for goods and people.[123] By increasing the cost of land near public transit facilities, LVT discourages land speculation and frees up more capital for productive investments. Harrisburg, for example, has successfully ended land speculation and experienced over $1.2 billion USD ($1.7 billion CAD) in new investments since the implementation of LVT.[124]

In the cases of station air rights and negotiated exaction, the voluntary nature of the transaction between public transit authorities and private developers ensures that transactions would only take place if the expected benefits for developers exceed their costs, hence promoting efficient economic activities within the region.[125]

TIF is argued by many to increase property value growth. Mann and Rosentraub indicate that housing values in TIF-adopting regions are significantly greater than in those without TIF.[126] Investments in TIF also help to create jobs in the region through new business opportunities, and construction and improvement of infrastructure.[127] Therefore, TIF is often used as a tool to stimulate economic growth.

Development Impact

LVC mechanisms have mixed impacts on development strategies. Since the tools are designed to share a portion of the financial gains with developers or land owners, they should not alter development incentives. Tools such as LVT also make underutilized lands too costly, thereby encouraging development of infill sites and conversion of designed areas into compact central areas. Harrisburg, for example, has experienced a decline of underused lots by approximately 85% since the implementation of LVT.[128]

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[120] Todd Litman, “Local Funding Options for Public Transportation,” 25-26.
[121] AECOM,KPMG, “Big Move Implementation Economics: Revenue Tool Profiles,” 149.
[122] University of Minnesota’s Center for Transportation Studies, “Value Capture for Transportation Finance,” I-29.
[123] Jeffery Smith, Thomas Gihring, “Financing Transit System Through Value Capture,” *Victoria Transport Policy Institute*, (2014): 4.
[124] Alanna Hartzok, “Pennsylvania’s Success with Local Property Tax Reform: The Split Rate Tax.” *The American Journal of Economics and Sociology,* (1997).
[125] University of Minnesota’s Center for Transportation Studies, “Value Capture for Transportation Finance,” II-213.
[126] Joyce Mann, Mark Rosentraub, “Tax increment financing: Municipal adoption and effects on property value growth, “ *Public Finance Review* 26, No. 6, (1998).
[127] University of Minnesota’s Center for Transportation Studies, “Value Capture for Transportation Finance,” II-102.
[128] Ray Tomality. “Innovative Infrastructure Financing Mechanisms for Smart Growth,” 27.

However, if priced too high, some tools may unintentionally reduce development within the region and/or cause development to "leapfrog" out of the region to avoid the charges. Negotiated exaction may be such a mechanism.[129]

Implementation

Most LVC tools present significant challenges to implement fully. Negotiated exaction is the exception, as it can be included as a part of an existing development permitting process, for which the payment and collection systems are already in place. However, the success of the tool as a revenue generator is uncertain, as it hinges on the power of political stakeholders during negotiations.[130] To optimize their negotiating power, local governments may need to conduct traffic impact studies to better establish the relationship between the impact of new developments and the requirement for developer contributions.[131]

While administratively simple to implement due to their similarities with conventional property tax,[132] LVT requires a determination of land value separate from the value of improvements on the land.[133] Similarly, SADs are challenging due to difficulties in estimating the expected individual property value increases that can be attributed solely to benefits from public transit projects. Furthermore, TIF carries the significant risk of falling apart if sufficient gains in property values do not occur. It is, therefore, essential that local governments conduct extensive analysis on the stability and growth of property values within the targeted zone.[134]

Transportation utility fees require that the charges are more closely related to transportation consumption than property, thus requiring the time to formulate appropriate policies to proxy for transportation demand. This mechanism is also difficult to enforce as it is challenging to deny transit services to landowners who refuse to pay the fees. Another challenge for transportation utility fees is related to charging non-owner-occupied properties. Up-to-date tenant information is required in such cases to better associate the costs with trip generation.[135]

Station air rights require specialized skills related to real estate management to achieve appropriate revenues.[136] They also require close coordination between public transit authorities and private developers, which may be challenging due to diverging interests.[137]

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[129] Greenleaf Strategies LLC, Parsons Brinckerhoff, "Value Capture: Mechanisms, Practices & Prospects for Stimulating Economic Development and Funding Commuter Rail," 20.
[130] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance: Technical Research Report," II-172.
[131] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," 9.
[132] Ibid., 11.
[133] Ray Tomality. "Innovative Infrastructure Financing Mechanisms for Smart Growth," 10.
[134] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit," 67.
[135] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance: Technical Research Report," II-193.
[136] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment," 10.
[137] Zhirong Zhao, et al., "Joint development as a value capture strategy for public transit finance, " *The Journal of Transport and Land Use* 5, No. 1, (2012).

Due to differences in designs, LVC mechanisms differ in the legal requirements for their implementation. Station air rights do not need additional provincial legislation as municipal or transit authorities have the legal right to sell air rights depending on the governance structure of regional public transit agencies. Similarly, municipalities typically have the legal ability to collect negotiated exaction revenues in development permitting processes and to issue debts to raise TIF revenues. SAD and transportation utility fees, however, represent additional taxes or charges to be levied within an area, so they may require provincial legislation and support to be implemented.

Public Perception

A key consideration to assess the public opinion for this category of funding sources is a charge's visibility to taxpayers.[138] A mechanism that is less visible to taxpayers could expect to be more politically feasible. TIF and station air rights are such mechanisms. TIF, for instance, does not alter the costs to taxpayers; instead, the costs are used to back the issuance of a bond. Similarly, station air rights are transactions between transit agencies and developers, not visible to taxpayers. However, air rights sales/leases may pose political challenges as the high cost of air rights development may force developers to target wealthy consumers in order to generate significant amounts of revenue.[139]

Transportation utility fees and negotiated exactions may be more appealing to existing residents. Transportation utility fees tend to shift the cost burdens to businesses from residences to reflect transportation use more appropriately. Since negotiated exactions apply to the narrow tax base of new developments, existing residents will not be subjected to them.[140] LVT and SAD, however, are visibly higher costs to taxpayers, so they are expected to receive more opposition than other LVC mechanisms. A study conducted by the Mineta Transportation Institute further indicates that unlike negotiated exactions, SADs also target existing developments, making the tool unpopular with current residents.[141]

Conclusions

LVC mechanisms can be implemented in Canada; some may be applied at a municipal level, while others require provincial legislation. The tools are largely consistent with horizontal equity as they target potential beneficiaries of new/improved public transit facilities. By increasing public transit access within the region, they also implicitly encourage efficient travel behaviour and contribute to economies resulting from increased density (agglomeration). However, most LVC tools present significant implementation challenges as specialized skills and detailed analyses are required to apply them successfully.

Negotiated exaction, station air rights, and TIF provide the means to generate a large amount of funds upfront, so they are appropriate for capital expenditure funding. LVT and transportation

[138] University of Minnesota's Center for Transportation Studies, "Harnessing Value for Transportation Investment."
[139] University of Minnesota's Center for Transportation Studies, "Value Capture for Transportation Finance: Technical Research Report," II-214.
[140] Ibid., I-31.
[141] Shishir Mathur, Adam Smith, "A Decision-Support Framework For Using Value Capture to Fund Public Transit," 44.

utility fees generate on-going revenues, and are suitable tools to fund operations. Although SADs also generate revenue over a long period of time, they are generally used to support capital costs, as is the case with the Seattle Streetcar project.[142] Since LVC mechanisms rely on narrow tax bases, they require a substantial quantity of developable land and existing properties to be effective.

The tools provide potentially desirable effects on traffic and economic conditions, so regions with high population densities and a high level of automobile travel can expect to benefit greatly from better public transit access and agglomerated economies. However, since the same tools are generally regressive, care must be taken before regions with high proportions of below-average income groups implement them.

Table 10 summarizes land value capture charges based on the evaluation framework.

Table 10: Land Value Capture Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Land Value Taxation	Limited	High	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Negative
Negotiated Exaction	Limited	Moderate	Moderate	Mixed Impact	Positive	Mixed Impact	Easy	Positive
Special Assessment District	Limited	High	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Negative
Station Air Rights	Limited	High	Moderate	Mixed Impact	Positive	Mixed Impact	Difficult	Positive
Tax Increment Financing	Substantial	Moderate	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Positive
Transportation Utility Fee	Substantial	High	Low	Mixed Impact	Positive	Mixed Impact	Moderate	Positive

[142] Thomas Gihring, “The Value Capture Approach To Stimulating Transit Oriented Development and Financing Transit Station Area Improvements,” 7.

4.2.4 Land-Based Charges

Unlike land value capture (LVC) mechanisms, land-based charges impose costs on properties irrespective of their proximity to transit services. By implicitly focusing on those who incur external costs (pollution), land-based charges are considered to be fairly consistent with horizontal equity. However, such merits may be potentially offset by their adverse impact on economic efficiency. This category of funding tools also has minimal impact on travel choices.

Table 11 presents the alternative mechanisms that belong to the land-based charges category.

Table 11: Land-Based Charges

Land-Based Charges	Definitions
• Land Transfer Tax	A tax on homebuyers for the purchase of property within a designated area
• Parking Sales Levy	A tax levied on paid parking transactions as additional sales tax
• Parking Site Levy	A per-day charge to owners of all non-residential, off-street parking spaces within a designed area

Land transfer taxes are widely used. The Ontario and BC governments levy a provincial land transfer tax on all purchases of properties within their respective provinces. The City of Toronto charges an additional Municipal Land Transfer Tax within the municipality.[143] The North Virginia Transportation Authority and Hampton Roads Transportation Authority of Virginia have been authorized to impose a 0.4% tax on land transfer transactions.[144]

Parking site levies are commonly used in Australia to fund transportation projects and encourage use of alternative transportation modes. Sydney, Perth, and Melbourne apply levies on non-residential urban parking spaces.[145] Sydney and Perth were able to raise annual revenues of AU$40 million ($40.2 million CAD)[146] and AU$9 million ($9.05 million CAD) respectively.

The Toronto Commercial Concentration Tax, introduced in early 1990s, had the characteristics of a parking site levy. It was repealed, however, after three years due to severe criticism from Toronto businesses.[147] Similarly, TransLink of Vancouver implemented a parking site tax in 2006, but it was highly criticized by suburban businesses, and in 2007 was replaced with a parking sales levy. Case Study 6 discusses the resulting parking sales levy in detail. Parking

[143] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 139.
[144] National Conference of State Legislatures, http://www.ncsl.org/research/fiscal-policy/real-estate-transfer-taxes.aspx/.
[145] Todd Litman, "Parking Taxes Evaluating Options and Impacts," *Victoria Transport Policy Institute,* (2013): 5.
[146] Canadian dollar estimates based on 2014 average exchange rate of 1.01 CAD/AU (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)
[147] Todd Litman, "Parking Taxes Evaluating Options and Impacts," 7.

sales levies are also widely used in the U.S. with San Francisco, Pittsburgh, Miami, Los Angeles, Chicago, and New York City all imposing taxes on commercial parking transactions.[148]

Revenue

By charging all parking space owners irrespective of whether they are priced spaces or not, parking site levies target a wide tax base. They can, therefore, generate a significant amount of revenue. Land transfer taxes and parking sales levies, on the other hand, are applied much more narrowly to those who acquire land or pay for parking.Land transfer taxes have the potential to generate significant revenues from each target taxpayer,[149] while the same cannot be said for parking sales taxes as they represent marginal charges on limited priced parking activities.

The revenues raised by land-based charges tend to be sustainable, but may experience slight declines over time. Land transfer taxes may dampen the volume and price of property sales. Dachis et al.'s analysis indicates that the tool has caused a 16% reduction in the number of single-family homes sold and 1.5% decline in house values during the period 2006-2008.[150] Similarly, higher costs carried by parking space owners may encourage them to convert the spaces to other uses, potentially reducing parking site levy revenues in the long-run.[151] According to IBI Group's study,[152] Toronto's suburban area municipal lots, and transit park and ride lots abolished their parking fees to avoid the Toronto Commercial Concentration Tax.

Parking site levies and parking sales levies tend to raise predictable revenues. Parking sales levies may lead to modest shifts in transportation mode choice and/or location decisions over time to avoid such charges, but the resulting revenue reductions are expected to be marginal. On the other hand, while revenues raised through land transfer taxes may be sustainable, they are susceptible to the swings of housing market conditions, making the tool highly unpredictable.[153]

HDR generated revenue yield estimates for land-based charges based on the following assumptions, to help transit agencies gauge the potential of each funding mechanism.

Based on Metrolinx's projected annual land transfer tax revenue of $570 million CAD for GTHA,[154] HDR estimated roughly 250,000 land transfers in the region per year and an average value of $227,500 CAD per property. For a hypothetical region, HDR further assumed a 1% tax rate on properties transferred and a 3.5% growth rate on revenue.

[148] Todd Litman, "Parking Taxes Evaluating Options and Impacts," 3-4.
[149] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 140.
[150] Benjamin Dachis, "Sand in the Gears: Evaluating the Effects of Toronto's Land Transfer Tax," C.D. Howe Institute, (2008).
[151] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 170.
[152] IBI Group, "Transit-Supportive Parking Policies: North American Experience and Model Policies for Municipalities, " (2000).
[153] Bethesda MD et al., "TRCP Report 129," table 4.2.
[154] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 140.

To estimate revenue potentials for parking site levies, the daily tax rate was set to $0.25 CAD per space following Metrolinx's approach.[155] HDR estimated approximately 250,000 targeted off-street parking spaces for a service region of 400,000 people based on Metrolinx's assumption of roughly 4.1 million spaces in the GTHA. HDR further optimistically assumed that annual revenue will be sustainable and that any decline in the long-run is negligible.

Following Litman's study, HDR assumed that 10% of the 250,000 non-residential off-street parking spaces are paid parking.[156] The parking sales tax is set to a maximum of $40 CAD per month in accordance to Chicago's implementation of the tool. Revenue is, again, assumed to have negligible decline over time.

Table 12 summarizes the revenue estimates generated based on the above assumptions.

Table 12: Revenue Estimates for Land-Based Charges

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Land Transfer Tax	400,000	56 million	2.2 billion
Parking Sales Levy	400,000	9 million	225 million
Parking Sites Levy	400,000	23 million	569 million

Social Equity

Land-based charges are generally considered to be horizontally equitable. Land transfer tax represents an approach to make new property owners pay a share of the transportation costs they will eventually impose on the community.[157] Parking site and parking sales levies are also equitable in the sense that they are targeting motorists (either directly or by passing on costs from property owners), who are currently imposing external costs and may benefit from public transit projects.[158] Some concerns may be raised for parking site levies as they impose a greater burden on vehicle users in rural areas with few transportation alternatives. Parking sales levies may also be perceived as unfair because free parking is not affected.[159]

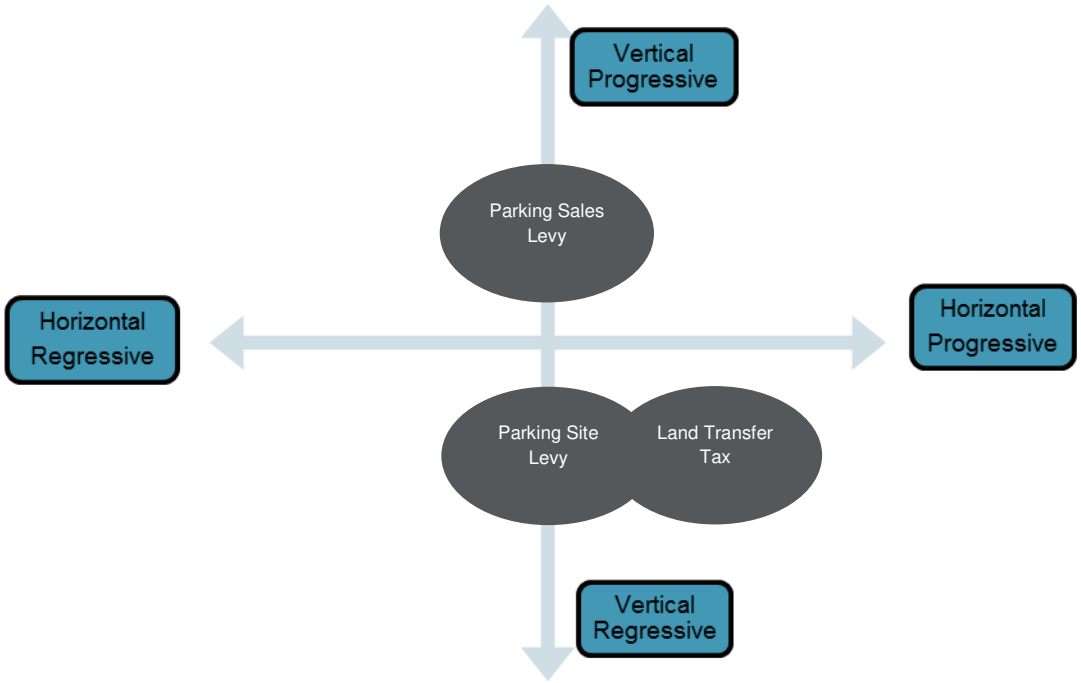
Some mechanisms raise vertical equity concerns. By discouraging relocations and hence reducing mobility, especially for those who are economically disadvantaged, land transfer taxes implicitly place a greater burden on low-income groups.[160] Toronto's implementation of the tool, for example, has been related to a larger reduction in transactions concerning houses below average value, and a smaller reduction for higher-priced housing.[161] Parking site levies are also regressive if the costs are passed on to parking space users as higher parking costs represent a greater financial burden for low-income groups. Parking sales levies are more appropriate in this

[155] Ibid., 170.
[156] Todd Litman, "Local Funding Options for Public Transportation," 22.
[157] Bethesda MD et al., "TRCP Report 129," table 4.2.
[158] Todd Litman, "Parking Taxes Evaluating Options and Impacts," table 4.
[159] Translink, "2010-2019 10 Year Transportation and Financial Plan."
[160] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles," 142.
[161] Benjamin Dachis, "Sand in the Gears: Evaluating the Effects of Toronto's Land Transfer Tax," 1

sense, as the voluntary nature of the transaction allow those who value parking activities and have the ability to pay to carry the costs.[162]

Table 13 illustrates the social equity standing of land-based charges.

Table 13: Equity Ranking of Land-Based Charges



Travel Behaviour Impact

By reducing parking supply and encouraging priced parking spaces, parking site levies tend to reduce vehicle use. As well, for households that have a car at their disposal, the availability and cost of parking is the single most important factor influencing transportation mode choice. There is evidence indicating that Perth has experienced a decline in parking supply since the introduction of the parking site levy.[163] Similarly, parking sales levies are expected to reduce automobile travel; however, the impact is typically modest. The City of Los Angeles, for example, found a negligible impact on driving habits. The Miami Downtown Development Authority also found no increase in parking space vacancies in the City of Miami due to the tax.[164]

Land transfer taxes have a marginal adverse impact on travel decisions, by discouraging relocations to reduce the distance from home to work. The tax may, therefore, encourage more and longer automobile trips. A study conducted by Dachis et al. supports the claim by estimating that at least 3,500 families within the City of Toronto have experienced a reduction in household mobility during the first year of operation for the land transfer tax.[165]

[162] Todd Litman, “Local Funding Options for Public Transportation,” 22.
[163] Todd Litman, “Parking Taxes Evaluating Options and Impacts,” 6.
[164] Ibid., 4.
[165] Benjamin Dachis, “Sand in the Gears: Evaluating the Effects of Toronto’s Land Transfer Tax.”

Economic Efficiency

One drawback common to all listed land-based charges is the economic distortions they create. Land transfer taxes do so by dampening property sales and reducing household mobility within the region. Toronto's land transfer tax has resulted in an average reduction in selling price of about $6,400 per house, and costs about $1 CAD for every $13 of revenue that the tax raised for the City.[166] Parking sales and site levies tend to induce shifts in purchasing locations to avoid priced parking. They also represent higher operating costs to businesses and parking operators. Parking site levies have the additional distorting effect of encouraging shifts in business locations and their related economic activities to outside of the region.[167]

Development Impact

Land-based charges have different effects on development strategies. While parking site levies may encourage compact development by reducing parking supply, parking sales levies and land transfer taxes tend to cause sprawl. Toronto's add-on land transfer tax, for example, may force home buyers to move farther out of the city.[168] Similarly, the priced parking spaces subjected to parking sales levies are primarily located in major commercial centres.

Implementation

Land transfer taxes and parking sales levies are relatively straight forward to implement, because they can use the existing administrative systems for tracking housing transactions and collecting parking payments. However, parking site levies may have significant implementation costs since property records are required to store an inventory of existing parking spaces.[169] Since all charges represent additional taxes, they require provincial legislation and support to be implemented.

Public Perception

Litman's study suggests that parking site levies have high support from the general public, while parking sales levies tend to experience opposition.[170] Such findings may be caused by the cost visibility to taxpayers. While the public can perceive the additional costs to parking sales levies, they may not be able to discern the costs to parking owners, nor the additional costs passed to them from the owners. However, opposition of parking site levies may come from the property owners. For example, Vancouver's and Toronto's parking taxes have received criticism from regional businesses.[171]

It can also be expected that land transfer taxes will be opposed by the public due to high visibility. Toronto's implementation of a land transfer tax was opposed by many Torontonians, due to its impact on housing affordability and its contribution to urban sprawl.[172] In 2013, the Toronto Real Estate Board released the results of a new public opinion research that showed 69% support for a phase-out of the Municipal Land Transfer Tax.

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[166] Benjamin Dachis, "Sand in the Gears: Evaluating the Effects of Toronto's Land Transfer Tax."
[167] AECOM,KPMG, "Big Move Implementation Economics: Revenue Tool Profiles."
[168] Toronto Real Estate Board, http://www.torontorealestateboard.com/market_news/release_market_updates/news2006/nr042606.htm.
[169] Todd Litman, "Parking Taxes Evaluating Options and Impacts," table 4.
[170] Todd Litman, "Local Funding Options for Public Transportation," 22-23.
[171] Todd Litman, "Parking Taxes Evaluating Options and Impacts," 7.
[172] BILD, http://www.bildgta.ca/media_releases_2007_detail.asp?id=460.

Conclusions

All land-based charges can be implemented in Canada, given approval and support from provincial governments. Land-based charges may be slightly regressive, making them less suitable for regions with a high proportion of low-income residents.

With the ability to provide sustainable revenues over time while exhibiting minimal implementation costs, land-based charges are suitable resources for transit operations. They are not appropriate stand-alone mechanisms, however, due to the cyclicality of their revenue sources. The tools have a modest impact on travel choices, so regions with the goal of improving traffic conditions would find them less helpful. Moreover, with adverse impact on regional economic efficiency, these tools are not appropriate in less-than-ideal economic conditions.

Table 14 summarizes land-based charges based on the evaluation framework.

Table 14: Land-Based Charge Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Land Transfer Tax	Substantial	High	Low	Negative	Negative	Negative	Easy	Negative
Parking Sales Levy	Limited	Moderate	High	Mixed Impact	Negative	Negative	Easy	Negative
Parking Sites Levy	Substantial	Moderate	Low	Positive	Negative	Positive	Difficult	Positive

4.2.5 Non-User-Based Charges

Non-user-based charges target most households or individuals in a region, with no direct connections to polluters and beneficiaries. As these charges do not depend on how stakeholders use services and resources or incur costs on the community, they generally have wide tax bases and are largely inconsistent with horizontal equity. They are also regressive with respect to vertical equity. Moreover, these tools tend to cause economic distortions while having minimal impact on travel behaviour.

Non-user-based charges, however, do share the common merits of providing sustainable revenues and requiring minimal implementation costs.

Table 15 presents the mechanisms that belong to the non-user-based charges category.

Table 15: Non-User-Based Charges

Non-User-Based Charges	Definitions
• Employer Payroll Tax	A tax withheld by employers and remitted to the government
• Utility Levy	A monthly fee that can be collected from all utility accounts within the region

An employer payroll tax is applied in Paris, France. The tax, referred to as Versement de Transport (Transport Tax), is payable by all companies with at least 10 employees, and it is levied on employers based on their employees' wages.[173] The mechanism is currently one of the major funding resources for public transportation projects in French municipalities. Portland and Hood River of Oregon also implement the tax to fund transit systems within the Tri-Met (Portland) and Lane Transit District (Eugene) areas.[174] Case Study 7 provides discussions on the implementation of the Versement de Transport.

TransLink has a utility levy. A monthly fee is applied to residences and businesses within the region to fund transportation projects. Calgary also collects utility levies to pay for urban development, including transportation infrastructure upgrades. [175]

Revenue

Payroll taxes have significant revenue potential.

By targeting employers of the region, payroll taxes have significant revenue potential.[176] They are also expected to be sustainable over time, as long as employment and income are consistent. The Transport Tax implemented in France represents a sustainable 30% to 40% of the income for public transit.[177] While sustainable, the tool's dependency on employment conditions makes it susceptible to economic cycles. Capital

[173] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 18.
[174] Oregon, Department of Revenue, http://www.oregon.gov/DOR/bus/Pages/payroll_basics.aspx.
[175] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 23.
[176] AECOM and KPMG, "Big Move Implementation Economics," 73.
[177] Caprice, http://www.caprice-project.info/spip.php?article30.

Regions Integrating Collective Transport for Increased Energy Efficiency indicates that, in France, the transport tax collected is highly correlated with the wage per capita.

Despite also having a wide tax base by targeting all households with utility accounts, utility levies have limited revenue potential due to the marginal amount they can charge to each account. TransLink utility levies are expected to generate revenue in the long-run as populations currently paying for utilities are likely to continue to do so in the future. Such revenue should be stable as utility consumption is relatively insensitive to economic cycles. TransLink's hydro levy, for example, has been generating $18-$19 million CAD consistently during the period 2009-2012, with minimal fluctuations.[178,179]

To estimate employer payroll tax revenues, HDR assumed a tax rate of $250 CAD per full-time employee, following the Toronto Board of Trade's approach.[180] Statistics Canada reports a 2014 year-to-date average full-time employment of 14.4 million, out of 29 million Canadian residents over 15 years of age.[181] By adjusting for differences in population size, HDR estimated that a comparable service region of 400,000 residents would have roughly 199,000 employees. The 2012 employment growth rate of 1.2% for Canada is also used to project the growth for tax revenue.[182]

Following the Toronto Board of Trade's approach, HDR assumed a utility levy of $40 CAD per household. According to Statistics Canada, Canada had roughly 13 million private households and 33 million people in 2011.[183,184] The revenues are estimated based on a relatively smaller number of households for the theoretical region and the assumption that the number of households would grow at an annual rate of 2.5%.[185]

Table 16 summarizes HDR's estimated revenue potentials for non-user-based charges.

Table 16: Revenue Estimates for Non-User-Based Charges

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Employer Payroll Tax	400,000	41 million	1.2 billion
Utility Levy	400,000	6.2 million	212 million

[178] TransLink, "2010 Annual Report," (2011).
[179] TransLink, "2012 Business Plan, Operating and Capital Budget Summary."
[180] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 18.
[181] Statistics Canada, "Labour force survey estimates(LFS), by sex and age group, seasonally adjusted," CANSIM 282-0087.
[182] The Conference Board of Canada, http://www.conferenceboard.ca/hcp/details/economy/employment-growth.aspx.
[183] Statistics Canada, "Canadian households in 2011: Type and growth," (2011).
[184] Statistics Canada, "The Canadian Population in 2011: Population Counts and Growth, " (2011).
[185] AECOM and KPMG, "Big Move Implementation Economics," 205.

Social Equity

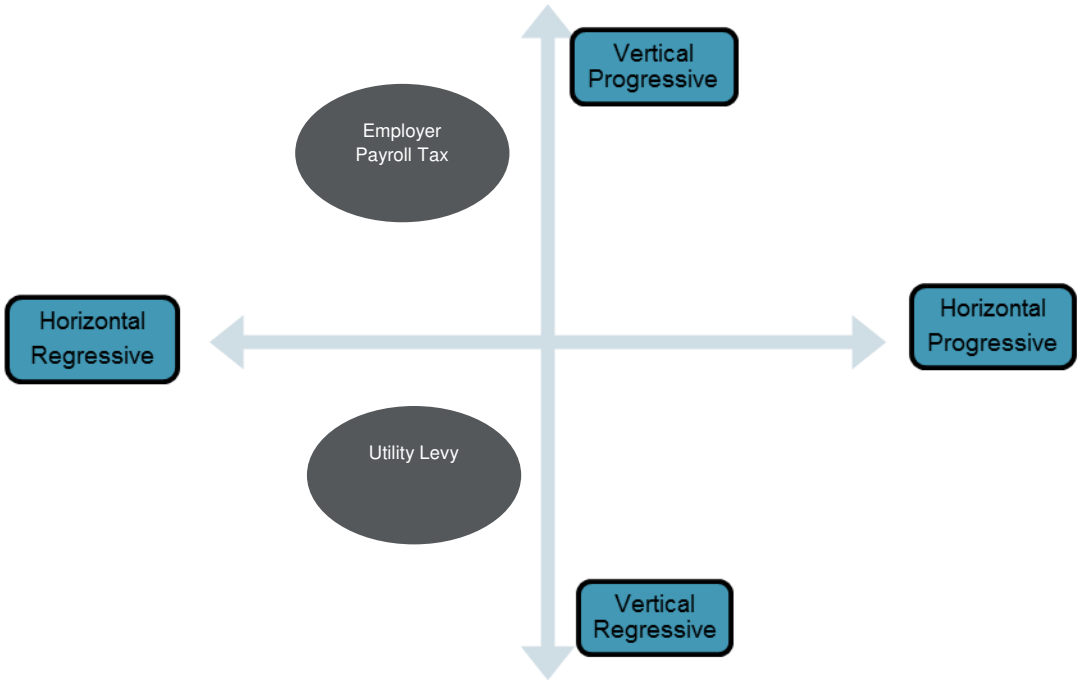
Neither charge is consistent with the user-pay principle. Employer payroll taxes are not tied to the funded transit projects, so some of the targeted taxpayers do not benefit from the projects.[186] Similarly, utility levies are not dependent on rate of consumption, so they reflect the use of resources poorly. To address the horizontal equity issue, France has designed the employer payroll tax in such a way that areas where people are more likely to use public transport pay a higher tax.[187]

Depending on the implementation of employer payroll taxes, the charge can be both regressive and progressive with respect to vertical equity. The tool causes higher costs for employers to maintain staff, so it implicitly places a burden on the employees. If applied as a flat rate per employee, the tool would impose a greater burden on low-income groups. A tax rate on wages is a more appropriate implementation in this sense.[188] The Transport Tax in France is an example of a wage-based tax.

Utility fees are regressive in the sense that they impose a greater burden on low-income groups through the application of flat fees on all targeted payers.

Figure 6 illustrates the social equity standing of non-user-based charges. The revenue tools tend to rate low in horizontal equity.

Figure 6: Equity Ranking of Non-User-Based Charges



[186] Toronto Board of Trade, "The Move Ahead: Funding 'The Big Move'," 18.
[187] AECOM, "Detailed Case Studies of Slected Revenue Tools," 30.
[188] AECOM and KPMG, "Big Move Implementation Economics," 77.

Travel Impact
Non-user-based charges have no direct impact on travel decisions.

Economic Efficiency
Non-user-based charges adversely affect economic efficiency. Since employer payroll taxes represent higher labour costs for employers, this tool may inspire businesses to move or reduce staff, resulting in higher regional unemployment and possibly eventual lower labour force participation, both harming economic development. Baylor and Beausejour's research indicates that the cost to economic efficiency for each $1 in additional tax revenue ranges between $0.15 and $0.25 CAD.[189] Utility levies impose costs to a lesser extent by increasing the cost of living within a region, and in consequence, making the region a marginally less attractive place to live.[190]

Development Impact
The burden of employer payroll taxes is shared between employers and employees. This is especially true for businesses in high-density areas. As such, employers and employees may have the incentive to relocate and avoid the charge. Hence, this funding source discourages compact development and encourages sprawl. France may face such an issue as the payroll tax rates are designed to increase with distance from commercial centres.[191]

Utility levies have no discernible impact on development strategies.[192]

Implementation
Minimal implementation costs are expected for employer payroll taxes and utility levies as their payment and collection systems should already be in place. However, they may experience some implementation challenges. For example, it is necessary to monitor and enforce employer payroll taxes on firms with multiple operating locations, as such firms can potentially shift payroll transactions to locations outside of the funding scope.[193] Furthermore, both mechanisms require provincial legislation and support as they represent additional taxes and fees for the general public.

Public Perception
Litman's study suggests that utility levies tend to have significant public opposition.[194] The public perception of employer payroll taxes is uncertain; on the one hand, the tax is paid by employers, so it may be not be visible to the general public, but on the other hand, affected local businesses may oppose it.

[189] Maximilian Baylor, Louis Beausejour, "Taxation and Economic Efficiency: Results from a Canadian CGE Model," *Department of Finance*, *Working Paper*, (2004).
[190] AECOM and KPMG, "Big Move Implementation Economics," 208.
[191] AECOM, "Detailed Case Studies of Selected Revenue Tools," 30.
[192] Todd Litman, "Local Funding Options for Public Transportation," 18.
[193] AECOM and KPMG, "Big Move Implementation Economics," 75.
[194] Todd Litman, "Local Funding Options for Public Transportation," 18.

Conclusions

Non-user-based charges in Canada require provincial approval prior to implementation. Unlike other categories of funding initiatives, these charges do not consider if the targeted groups benefit from the funded services. Higher costs for local residents and businesses create economic distortions, which make the charges inappropriate for regions experiencing adverse economic conditions. Regions looking to curb sprawl should also bear in mind that it may be encouraged by the economic distortion from employer payroll taxes. Moreover, non-user-based tools have no significant impact on travel choices, so they cannot help regions directly with improving traffic and environmental conditions.

On the other hand, non-user-based charges do provide excellent resources for funding due to their wide tax bases, and provide a source of sustainable, ongoing revenue to regions with large populations that can use to fund transit operations. An employer payroll tax also generates significant revenue, making it a suitable tool for capital expenditure funding as well.

Table 17 summarizes non-user-based charges based on the evaluation framework.

Table 17: Non-User-Based Charge Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Employer Payroll Tax	Substantial	Low	High	No Impact	Negative	Mixed Impact	Moderate	Uncertain
Utility Levy	Limited	Low	Low	No Impact	Negative	No Impact	Easy	Negative

4.2.6 Other Charges

This category describes potential funding sources that do not fall into any of the previously-discussed groups. Similarities in their characteristics are therefore coincidental, as they all vary in their targets and structures.

Table 18 describes these funding mechanisms.

Table 18: Other Funding Sources

Others	Definitions
• Crowdfunding	Funds raised through the collection of small contributions from the general public
• Hotel and Accommodation Levy	A hotel tax charged along with accommodation fees
• Monetization of City Assets	Selling of City-owned assets that are not considered as core to the City's operations and responsibilities
• Driver's Licence Tax	A charge to drivers upon the issuing or renewal of their driver's licence

A reward-based crowdfunding initiative, the most common type in Canada, is currently being launched by a group of Toronto commuters.[195] The Line Six Transit campaign asks backers to donate money for a bus that runs between Union Station and Liberty Village in Toronto in exchange for guaranteed seats on the bus. Another model of crowdfunding donations is found in Orlando, Florida, Grand Rapids, Michigan, and Lubbock, Texas.[196]

Hotel and accommodation levies are applied in Allegheny County, Pennsylvania. Revenues are used to promote tourism-related facilities, including transportation requirements to support local tourism.[197] Similar hotel taxes are also currently levied in British Columbia, Alberta, Quebec, Nova Scotia, and Newfoundland.

The City of Chicago has monetized assets by selling parking concessions to a private entity, eliminating operating responsibilities and generating financial benefits.[198]

Driver's licence taxes are used in many states in the U.S. Pennsylvania is one such state where, as of April 2014, driver's licence fees were doubled from $13.50 to $27.50 to fund transportation infrastructure and public transit improvements. The charges are expected to increase by $1 annually from 2015 to 2019, after which they will begin to keep pace with inflation.[199]

Revenue

Crowdfunding, hotel and accommodation levies, and driver's licence taxes tend to be modest in revenue potentials. Crowdfunding represents small contributions from backers.[200] Hotel and accommodation levies are limited by the relatively low number of people who use hotels.[201] While a driver's licence tax targets a wide number of people, the amount collected over time is low.

Monetization of assets can provide significant revenue depending on the value of assets. The City of Chicago, for example, has generated a total of $3.6 billion USD ($3.9 billion CAD) through the lease of downtown parking garages and the citywide metered parking system assets.[202]

Hotel and accommodation levies and driver's licence taxes tend to generate sustainable revenues over time. The sustainable global tourism market is a key factor in hotel and accommodation levy revenues, allowing the tax revenue to be sustainable as well. For example, hotel occupancy tax revenue in Allegheny County increased steadily during the period 2001-

[195] Crowdfund Insider, http://www.crowdfundinsider.com/2014/09/50051-brief-toronto-commuters-launch-crowdfunding-platform-raise-funds-new-transit-route/.
[196] Bethesda MD et al., "TRCP Report 129," table 3.2.
[197] AECOM, "Detailed Case Studies of Selected Revenue Tools," 60.
[198] Governing, http://www.governing.com/blogs/bfc/More-on-Chicago-Parking.html.
[199] Philly.com, http://articles.philly.com/2014-03-28/business/48634143_1_gas-tax-gallon-four-cents.
[200] Tim Cestnick, "Crowdfunding can be a great way to raise money – but watch out for the taxman," Calgary Herald, (2014).
[201] AECOM, KPMG, "Big Move Implementation Economics," 125.
[202] The City of Chicago, http://www.cityofchicago.org/city/en/depts/fin/supp_info/public_private_partnerships.html.

2008.[203]However, the tool's dependency on the tourism leads to short-term revenue fluctuations based on economic volatility. Driver's licence taxes are expected to be sustainable as long as the number of licensed drivers remains similar over time. Crowdfunding revenues, on the other hand, are less sustainable over the long-run due to their voluntary nature.

To estimate revenue potentials of hotel and accommodation levies, HDR followed Metrolinx's approach and assumed a conservative rate of $2.00 CAD per night.[204] National statistics reported roughly 457,000 hotel rooms and occupancy rates of 61% in Canada for the 2011. Scaling the estimates downwards for a region of 400,000, HDR estimated 122,000 annual person-hotel nights. While Metrolinx's approach projected an annual decline in the number of hotel nights, Allegheny County reported a growth in revenue. To accommodate the contradicting claims, HDR assumed stable annual revenues over the next 25 years.

The driver's licence tax rate is set to $50 CAD per licence renewal every 5 years. HDR estimated 256,000 licensed drivers in a service region of population size 400,000 based on Metrolinx's assumption of 4.2 million drivers in the GTHA.[205] The revenue is assumed to grow by 1.35% annually.

Crowdfunding revenues vary from project to project. They can be as modest as $2,500 CAD for Line Six Transit (the goal at the pilot stage) or as significant as $10.27 million USD ($11.19 million CAD) for Pebble Smartwatch. HDR assumed total revenue of $2,500 CAD for a transit project at the pilot stage.

Similar to crowdfunding, revenue potential from monetization of assets hinges on the value of individual assets. The City of Chicago made$1.83 billion USD ($ 1.99 billion CAD) from a 99-year lease of the Skyway toll road, equivalent to $20 million CAD per year. Similarly, the City has earned $563 million USD ($614 million CAD) for a 99-year lease of parking garages (or $6.2 million CAD per year) and $1.15 billion USD ($1.25 billion CAD) for a 75-year lease of parking meters (or $16.7 million CAD per year).[206] HDR summarized the total annual-equivalent revenues from Chicago's implementation of the tool.

Table 19 below summarizes the revenue potentials of these funding mechanisms.

Table 19: Revenue Estimates of Other Charges

Potential Revenue Generated			
	Hypothetical Population	**Revenue - 1 year ($ CAD)**	**Revenue - 25 years ($ CAD)**
Crowdfunding	n/a	25,000	n/a
Hotel and Accommodation Levy	400,000	2.3 million	58 million
Monetization of City Assets	n/a	45 million	1.1 billion
Driver's Licence Tax	400,000	2.8 million	82 million

[203] AECOM, "Detailed Case Studies of Selected Revenue Tools," 60.
[204] AECOM, KPMG, "Big Move Implementation Economics," 125.
[205] Ibid., 65.
[206] The Economist, http://www.economist.com/node/17043320.

Social Equity

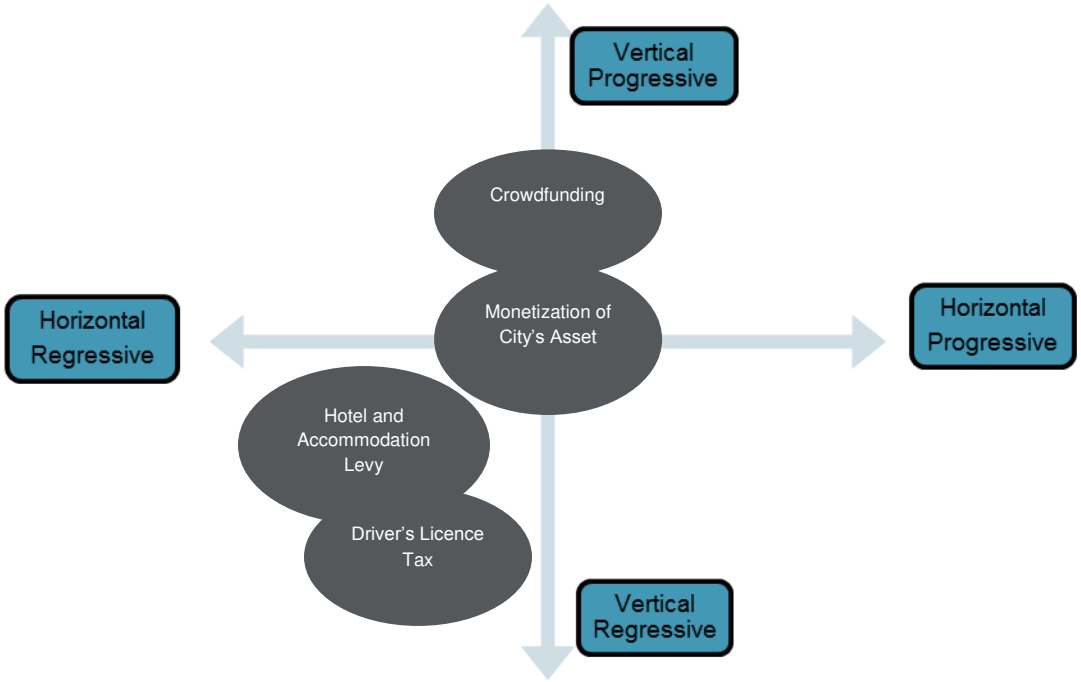
Hotel and accommodation levies, and driver's licence taxes may raise social equity concerns. Hotel and accommodation levies target visitors, who may not benefit from improved public transit services beyond their actual stay. Moreover, a flat accommodation fee does not appropriately reflect the ability to pay, thereby potentially placing a greater burden on low-income groups.[207] Driver's licence taxes do not account for vehicle use, so they are levied on licence holders irrespective of whether they drive or not. The funding tool also imposes greater burden on low-income groups of payers.[208]

Due to its voluntary nature, crowdfunding is progressive in the sense that it reflects the ability to pay. The lending, equity-based, and reward-based models are consistent with horizontal equity, as backers can potentially benefit through loan interest, ownership of company equity, or rewards.[209] The Line Six Transit campaign, for example, promises backers bus seats in return for their contribution to the transit project.

Unlike other crowdfunding models, donations burden those who are willing to pay, not those who should pay (i.e. beneficiaries and polluters) for public transit projects.

Figure 7 illustrates the social equity ranking of the listed charges. They appear to have moderate to low standing on horizontal equity.

Figure 7: Equity Ranking of Other Charges



[207] AECOM, KPMG, "Big Move Implementation Economics," 127-128.
[208] TransLink, "2010-2019 10 Year Transportation and Financial Plan."
[209] Tim Cestnick, "Crowdfunding can be a great way to raise money – but watch out for the taxman."

Travel Behaviour Impact

Most of the listed mechanisms have no direct impact on travel behaviour. Driver's licence taxes have modest influences on efficient travel decisions by slightly reducing the number of licensed drivers in the region. However, such an impact is expected to have minimal effects on external cost reductions. The number of licensed drivers per capita in Pennsylvania remained approximately 0.85 despite the increase in driver's licence tax in 2012.[210,211,212,213]

Economic Efficiency

Both hotel and accommodation levies and driver's licence taxes have marginal negative effects on economic development within the region. The two mechanisms lessen the productivity and competitiveness of the region by making the region marginally less attractive for leisure travel as well as residence.[214]

Development Impact

There is no apparent impact on development strategies.

Implementation

Both hotel and accommodation levies and driver's licence taxes are straightforward to administer as payment and collection systems, as hotel fees and driver's licensing fees are already in place.[215,216]. Monetization of assets may require planning and asset valuation before implementation to optimize revenue yields without hampering the city's operations. Since crowdfunding is a relatively new concept, the taxation policy for the different funding models is not well established, so efforts are required to ensure compliance with existing policy.[217]

From a legislative perspective, monetization of assets is an appropriate tool, because a municipality has the legal ability to sell their operations. Crowdfunding requires no governmental actions for donation, reward-based, and equity-based models. Lending-based crowdfunding, however, is not legal in Canada.[218,219] Both hotel and accommodation levies and driver's licence taxes require provincial legislation, as they represent additional taxes.

Public Perception

Hotel and accommodation levies are politically attractive, because they represent costs to visitors rather than residents of the region.[220] Studies conducted by the Transit Cooperative Research Program also indicate high political popularity and public acceptance for hotel levies and donations.[221]

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[210] U.S. Department of Transportation, Federal Highway Administration, "Highway Statistics 2009."
[211] U.S. Department of Transportation, Federal Highway Administration, "Highway Statistics 2010."
[212] U.S. Department of Transportation, Federal Highway Administration, "Highway Statistics 2011."
[213] U.S. Department of Transportation, Federal Highway Administration, "Highway Statistics 2012."
[214] AECOM, KPMG, "Big Move Implementation Economics: Revenue Tool Profiles."
[215] Ibid.
[216] TransLink, "2010-2019 10 Year Transportation and Financial Plan."
[217] Tim Cestnick, "Crowdfunding can be a great way to raise money – but watch out for the taxman.".
[218] Ibid.
[219] AECOM, "Southeast Transitway," 26.
[220] Bethesda MD et al., "TRCP Report 129," table 4.2.
[221] Ibid., table 4.3.

The public's perception of monetization of assets heavily depends on the subsequent effects on taxpayers. For instance, while the Skyway and garage deals were successful, leasing parking meters in Chicago resulted in public discontent due to higher parking rates.[222]

Conclusions

Charges belonging to this category can be implemented in Canada with legislative approval. Most initiatives can generate limited to moderate revenue yields and require minimal implementation costs. Since hotel and accommodation levies, monetization of assets, and driver's licence taxes have sustainable revenue sources, they are suitable for operations funding. Crowdfunding, however, does not have a predictable revenue pattern; it is, therefore, more appropriate for capital expenditure funding. Regions with large populations may benefit financially from driver's licence taxes due to wide tax bases. The mechanisms have marginal effects on travel behaviour and economic efficiency, so they are not the appropriate tools to choose if traffic and economic conditions are the main considerations for a service region.

Table 20 below summarizes the other charge criteria.

Table 20: Other Charge Criteria

	Revenue	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Crowdfunding	Limited	Moderate	High	No Impact	No Impact	No Impact	Moderate	Positive
Hotel and Accommodation Levy	Limited	Moderate	Low	No Impact	Marginally Negative	No Impact	Easy	Positive
Monetization of City Assets	Substantial	Very Low	Moderate	No Impact	No Impact	No Impact	Difficult	Uncertain
Driver's Licence Tax	Limited	Low	Very Low	Marginally Positive	Marginally Negative	No Impact	Easy	Uncertain

[222] Chicago Reader, http://www.chicagoreader.com/chicago/features-cover-april-9-2009/Content?oid=1098561.

5. Case Studies

Case Study 1: User-Based Charge – Cordon Charge

Project: Stockholm Congestion Tax

Location: Stockholm, Sweden

The Stockholm Congestion Tax was adopted and introduced by the Stockholm City Council to levy a charge on vehicles entering and exiting its city centre, with the primary objectives of enhancing mobility, improving the environment, and providing funding for road construction in Stockholm. After a successful seven-month trial and referendum decision in 2006, the tool was implemented on a permanent basis in August 2007.[223] The congestion taxes are levied on all vehicle users at 18 entrance points to the city, with exemptions for vehicles such as environmentally sustainable vehicles, buses, and emergency vehicles.[224] The charges currently vary between SEK 10 ($1.65 CAD) [225] and SEK 20 ($3.30 CAD) per trip across the cordon area based on the time of the day. By 2016, the charges are projected to increase to between SEK 11 ($1.81 CAD) and SEK 35 ($5.77 CAD) in order to further reduce traffic going into central Stockholm.[226]

Revenue

Cordon charges have the ability to generate significant, sustained revenues over time.

Between 2008 and 2010, annual revenues were estimated to be consistently around SEK 850 million ($131 million CAD), while the annual operating expenses to collect payment and maintain traffic monitoring systems declined from SEK 393 ($61 million CAD) to SEK 250 ($39 million CAD) during the same period.[227] The observations indicate the significant revenue potential that the tool has and the sustainability of the revenue over time. The empirical findings also suggest that in addition to covering the operating costs, the funding mechanism has the ability to provide resources for road construction projects in Stockholm.

Social Equity

The Stockholm Congestion Tax is largely consistent with the user-pay principle. The targeted tax payers are users of the cordon zone, and hence beneficiaries of the reduced congestion and better air quality. Eliasson and Mattsson's study on the equity effects further suggests that high-income groups are more affected by the charges than low-income groups, because high-income

[223] http://www.roadtraffic-technology.com/projects/stockholm-congestion/
[224] http://thisbigcity.net/the-success-of-stockholms-congestion-pricing-solution/
[225] Canadian dollar estimates based on 2014 average exchange rate of 6.07 CAD/SEK (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)0
[226] Gunnar Soderholm, "Congestion tax in Stockholm," *International Practicum on Innovative Transit Funding & Financing*, (2014).
[227] AECOM, "Detailed Case Studies of Selected Revenue Tools," 14.

groups tend to make a greater share of journeys by car than low-income groups.[228] The study finds that the richest third of the residents each pays more than four times as much in congestion charges as each of the poorest third. As a result, travel costs increase by 24% for high-income groups, while such costs only increase by 12% for low-income groups. The tool is vertically equitable.

Travel Behaviour Impact

Congestion tax encourages efficient travel behaviour.

The congestion tax encourages efficient travel behaviour. Since the introduction of the Stockholm congestion tax, the number of trips across the cordon has remained in the 347,000 to 366,000 range (compared to between 447,000 and 485,000 trips before the charge took effect) while population has increased steadily from 795,000 to 914,000 during the same period.[229] A comparison between 2005 (pre-charge period) and 2006 (post-charge period) finds a 22% average decline in the number of vehicles passing through the cordon area during the time of the day while the charge was applied.[230] The total vehicle kilometres travelled within the charged zone similarly declined by approximately 14% between 2005 and 2006. A study conducted by Borjesson et al further showed that from 2006 to 2011, central Stockholm experienced between 18% and 21% reduction in traffic volume compared with 2005, while public transit demand increased significantly.[231] Borjesson et al.'s analysis of orbital roads outside the cordon zone indicates no correlation between the orbital road traffic volume and the introduction (January – July 2006), suspension (August 2006 – July 2007), and reintroduction of the congestion tax mechanism (August 2007) suggesting that the tool has minimal adverse impacts on the congestion level of alternative routes surrounding the cordon zone.

This charge encourages travellers to seek environmental friendly alternatives to avoid tax payments.

As of 2011, the ownership of tax-exempt environmentally sustainable vehicles has almost tripled, indicating that the tax encourages travellers to seek environmental friendly alternatives to avoid tax payments.[232] As a result of efficient travel behaviour, travel delays to enter central Stockholm during peak times have decreased 50% by 2011. Similarly, GHG emissions from vehicle usage in the cordon area declined by 14% to 18% during the trial, and were further reduced by 4% upon full implementation.[233]

[228] Jonas Eliasson, Lars-Goran Mattsson, "Equity effect of congestion pricing," 610.
[229] Gunnar Soderholm, "Congestion tax in Stockholm."
[230] Stockholm Stad, "Facts and results form the Stockholm Trials," (2006): 4.
[231] Maria Borjesson, et al., "The Stockholm congestion charges – 5 years on. Effects, acceptability and lessons learnt," *Transport Policy* 20, (2012): 5.
[232] http://thisbigcity.net/the-success-of-stockholms-congestion-pricing-solution/
[233] AECOM, "Detailed Case Studies of Selected Revenue Tools," 15.

Economic Efficiency

The congestion tax has positive effects on the Stockholm's economic efficiency. The cordon charges facilitate high-value trips by reducing travel time across the cordon during peak periods for those who are willing to pay. According to the cost-benefit analysis conducted by Eliasson and AB, if the charge is to be implemented for a 20 year period, the socioeconomic benefits, allowing for operating costs, is projected to be over four times greater than the capital costs associated with the charge.[234] While there may be concerns that cordon charges encourage travellers to take less efficient alternative routes, the lack of correlation between orbital road and cordon zone traffic volumes suggests otherwise. Furthermore, contrary to beliefs, the tool has shown to have minimal negative impact on the retail businesses located within the cordon zone, according to a study completed by Daunfeldt et al.[235]

Development Impact

There is currently no evidence suggesting any impact of Stockholm's congestion taxes on development strategies. The congestion charge may have an adverse impact on development strategies. By increasing the travel costs to the city centre, the mechanism may encourage sprawl. In contrast, it may also be that it encourages compact development within the cordon zone to avoid the charges.

Implementation

During the full implementation of the Stockholm Congestion Tax, Optical Character Recognition (OCR) cameras were installed at 18 entrance points to central Stockholm to capture vehicle crossings. Stockholm was able to avoid significant operating costs by limiting the number of cameras installed throughout the city's centre. It was only made possible because the cordon zone is, in effect, an island with limited possible points of entry.[236] As expected for cordon charge implementation, a significant amount of commitment and investment to design and test the system were required prior to deployment. The entire initial cost for the mechanism was approximately SEK 1.9 billion ($298 million CAD), of which SEK 1.05 billion ($162 million CAD) was incurred prior to implementation for extensive testing.[237]

The government agency, Swedish Road Administration, was initially responsible for the administration of the charge and operation of the project. In January 2009, the responsibility was transferred to the Swedish Transport Agency.

[234] Jonas Eliasson, Transek AB, "Cost-benefit analysis of the Stockholm congestion charging system."
[235] Sven-Olov Daunfeldt, et al., "Congestion charges and retail revenues: Results from the Stockholm road pricing trial," *Transportation Research Part A* 43, (2009)..
[236] http://thisbigcity.net/the-success-of-stockholms-congestion-pricing-solution/
[237] AECOM, "Detailed Case Studies of Selected Revenue Tools," 13.

Public Perception

Prior to the seven-month trial, the mechanism was opposed by more than 75% of the public.[238] Upon the successful implementation of the trial, a referendum on the continued operation of the mechanism was held and received an initial 51.3% support from voters of all 461 boroughs in the City of Stockholm.[239] Public support has increased steadily over the subsequent years. Such shift in the public mood may be the result of increased familiarity with the system. The general public may have discovered greater benefits to the cordon charges than anticipated or have found the travel costs to be less than initially thought.

Applicability in Canada

The cordon charge tool may be applied within Canada, given authorization from provincial legislation. However, depending on the specific cordon zone, the operating costs are expected to be greater than those for the City of Stockholm, as it would be challenging to limit the number of OCR cameras or other traffic monitoring systems within the zone like Stockholm did. Implementation of such a tool would also require significant time and monetary commitment to conduct extensive tests prior to operation.

[238] Gunnar Soderholm, “Congestion tax in Stockholm.”
[239] Stockholmsforsoket, http://www.stockholmsforsoket.se/templates/page.aspx?id=10215.

Case Study 2: User-Based Charge – HOT

Project: State Route 91 Express Lanes

Location: Orange County, California

The State Route 91 (SR-91) Express Lanes are ten-mile-long high occupancy toll (HOT) lanes located between the SR-91/SR-55 junction in Anaheim and Orange/Riverside County. The lanes were implemented in 1995 to reduce traffic congestion on what had been one of the most heavily congested corridors of California, as well as to finance the operation and maintenance of lanes in the corridor.[240] By law, the revenues collected from the express lanes must be reinvested into SR-91.[241] The tolls are structured to vary by hour, day, and direction across 20 different toll levels to control road demand. In 2004, the toll rates ranged between $1.05 and $6.25 per trip, with the peak toll charged during heavily congested Thursday and Friday afternoons.[242] Exemptions are made for vehicles with three or more occupants (HOV3+). Such vehicles can access the HOT lanes for free except for Monday through Friday from 4 to 6 p.m., when they receive a 50% discount.[243]

Up until early 2003, the express lanes were operating under a private toll road franchise agreement between the Orange County Transportation Authority (OCTA) and the California Private Transportation Company (CPTC). The tolls lanes were then purchased, and thereafter administered, by OCTA.[244]

OCTA also introduced the Eastern Toll Road (ETR) in late 1998, a fixed-toll highway that competes with the SR-91 Express Lanes for traffic to Irvine or its vicinity and requires merging into the SR-91 General Purpose Lanes (GPLs) in order to cross the Orange/Riverside County Line. The opening of this highway has greatly compromised the benefits SR-91 Express Lanes could provide.

Revenue

During the first four years of operation, SR-91 Express Lanes generated annual revenues ranging from $7.1 million USD ($9.7 million CAD) to $20.1 million USD ($29.8 million CAD), while the annual operating expenses fluctuated between $6.3 million USD ($8.6 million CAD) and $9.1 million USD ($13.5 million CAD).[245] The revenue yields, though modest, have the ability to cover the operating expenses. By the period of 2010 to 2013, revenues had grown considerably to between $37.7 million USD ($37.7 million CAD) and $43.0 million USD ($42.5

[240] OCTA, “91 Express Lanes Toll Policy,” (2003).
[241] Riverside County Transportation Commission, http://www.sr91project.info/news-and-faqs.
[242] Edward Sullivan, et al., “Benefit-Cost Analysis of Variable Pricing Projects: SR-91 Express Lanes,” *Journal of Transportation Engineering,* (2006): 192.
[243] Edward Sullivan, “Continuation study to evaluate the impacts of the SR 91 value-priced express lanes,” (2000): 20.
[244] RBF Consulting, et al., “2011 State Route 91 Implementation Plan,” (2011): 1.
[245] Edward Sullivan, “Continuation study to evaluate the impacts of the SR 91 value-priced express lanes,”6..

million CAD) per annum. Similarly, annual operating expenses have increased along with revenues to range from $16.5 million USD ($16.5 million CAD) to $22.4 million USD ($23.1 million CAD).[246,247,248] Within this period, the operating expenses represented, on average, 56% of the gross revenues collected from the express lanes. The express lanes are therefore shown to generate sustainable revenues over time, partially due to the sustainable and growing number of vehicle trips on the SR-91 corridor.

Express lanes are shown to generate sustainable revenues over time.

Social Equity

HOT lanes such as the SR-91 Express Lanes are horizontally equitable as they target the groups that use and benefit from the less congested lanes. There is concern, however, that since reductions in congestion are experienced by users of both the HOT lanes and the free GPLs, all drivers benefit from the lane operations, irrespective of whether they have paid or not.

SR-91 Express Lanes may be considered as progressive or vertically equitable. Analysis conducted by Sullivan finds that within the period of study (1996 – 1999), the proportions of the lane users increased with income.[249] Such observations are consistent with the "luxury lanes" claim, that HOT lanes place a greater burden on high-income groups.

Travel Behaviour Impact

The SR-91 Express Lanes are effective traffic management tools that attempt to improve travel conditions during peak periods. By increasing road capacity through the addition of lanes, the mechanism was able to reduce peak period congestion in the corridor until the opening of ETR. The peak period travel delays on GPLs fell from 20-40 minutes to less than 10 minutes before late 1998.[250] The average number of daily trips in the corridor has consequently increased significantly during the period. Immediately prior to the start of ETR operations, the daily traffic had increased by approximately 36,000 trips, and over 85% of the growth was carried by the express lanes. During the same period, HOV3+ traffic also increased materially in both GPLs and HOT lanes. These observations suggest that there was an increased number of carpools to take advantage of free/lower cost HOT lanes. However, the findings also raise some concerns about encouraging single occupant vehicle usage in the corridor due to increased road capacity.

Upon the introduction of ETR in October 1998, travel delays on GPLs returned to pre-express lane conditions. The worsening traffic conditions, along with increased toll lane rates, have

[246] Orange County Transportation Authority, "91 Express Lanes Fiscal Year 2009-2010 Annual Report," Orange County, California.
[247] Orange County Transportation Authority, "91 Express Lanes Fiscal Year 2010-2011 Annual Report," Orange County, California.
[248] Orange County Transportation Authority, "91 Express Lanes Fiscal Year 2011-2012 Annual Report," Orange County, California.
[249] Edward Sullivan, "Continuation study to evaluate the impacts of the SR 91 value-priced express lanes," 80.
[250] Edward Sullivan, et al., "Benefit-Cost Analysis of Variable Pricing Projects," 191.

resulted in a decline of express lane traffic by 3,900 trips per day and GPLs by 7,400 trips per day.[251]

During the initial 5 years of SR-91 Express Lanes operations, which include both pre- and post-ETR periods, the traffic volumes remained stable for neighbouring highway corridors, indicating that the HOT lanes did not lead to payment avoidance behaviours in the form of inefficient travel route shifts.[246]

Economic Efficiency

The SR-91 Express Lanes benefit economic efficiency. The toll lanes facilitate high-value trips by reducing the travel time within the corridor, for those who are willing to pay. The underlying assumption is that consumers of such toll lanes are rational and they are willing to carry such access costs only if their time savings are worth at least that much in tolls. Sullivan estimates that the implied value of time per HOT lane user during the peak hour ranges between $6 USD ($6.53 CAD) and $14 USD ($15.26 CAD).[252] The funding tool also delivers positive efficiency through GPLs, as vehicle users on GPLs also experience time savings. His cost-benefit analysis further indicates that within the first 10 years of operations, SR-91 has provided time savings benefits with the present value of $171 million USD ($187 million CAD). [253]

There is minimal cost of economic distortions associated with SR-91. The express lanes are found to have no unintended effects of inducing inefficient travel route shifts.

Development Impact

SR-91 Express Lanes may have an adverse impact on development strategies. The increased road capacity created by the two new toll lanes may lead to sprawl development as corridor users have increased access to the suburbs of Riverside County.

Implementation

The SR-91 Express Lanes required considerable investment to implement. According to Sullivan's study (2000), the project had an initial cost of $134 million to construct the toll lanes and establish a well-enforced traffic management system. Due to a lack of public funds, the project became a private-public partnership in the form of wholly owned private franchising, as authorized by the California Legislature under AB 680 legislation.[254] The toll lanes were therefore built and operated by CPTC under the supervision of the California Department of Transportation (Caltrans). The franchise agreement with CPTC posed significant challenges not only to the operations of SR-91 Express Lanes but also to other improvement projects. The agreement contains a non-compete provision that prevents Caltrans from making freeway improvements that may potentially undermine CPTC's profitability, unless they are for

[251] Edward Sullivan, "Continuation study to evaluate the impacts of the SR 91 value-priced express lanes," 18.
[252] Ibid., 19.
[253] Edward Sullivan, et al., "Benefit-Cost Analysis of Variable Pricing Projects," 194.
[254] Marlon Boarnet, Joseph Dimento, "The Private Sector's Role in Highway Finance: Lessons From SR 91," *Access*, (2004).

addressing highway safety concerns. Such provision has led to many heated debates between CPTC and the public sector on potential freeway improvement projects. The debates were finally resolved when OCTA purchased the express lanes from CPTC in early 2003 and subsequently received the rights to operate them.

As an example of private-public partnerships, the conflicts between OCTA and Caltrans exemplify the adverse impacts of strict franchise provisions and demonstrate the paramount importance of obtaining operational control of the project and balancing the interests of the public and private sectors.

Public Perception

The public opinion during early implementation of SR-91 Express Lanes was favourable as the project was viewed as a source of traffic condition improvement.[255] That opinion changed during the period of controversy between CPTR and Caltrans on safety justifications of the potential freeway. During the period, the project was viewed by many as contributing to congestion and collisions.[249]

Applicability in Canada

The HOT lanes funding mechanism requires legislative approval to be applied in Canada. A study conducted by Dachis indicates that the Greater Toronto and Hamilton Area (GTHA) incurs an annual cost of $2.5 billion CAD due to traffic congestion. [256] Similarly, Montreal and Vancouver face annual congestion costs of $1.4 billion CAD and $927 million CAD respectively. Implementing the mechanism in these regions would help to reduce such costs. The same study has also estimated a potential gain of $926 million CAD in gross revenue per annum from HOT lanes in the GTHA. As shown by the SR-91 example, if a private-public partnership is to be established, a key element to consider would be the balance between public and private interests and control over the project.

[255] Toll Road News, http://tollroadsnews.com/news/profits-loom-91-express-goin.
[256] Benjamin Dachis, “Congestive Traffic Failure: The Case for High-Occupancy and Express Toll Lanes in Canadian Cities,” C.D. Howe Institute, (2011).

Case Study 3: Vehicle-Ownership Charge – Vehicle Registration Tax

Project: Personal Vehicle Tax

Location: Toronto, Ontario

The Personal Vehicle Tax (PVT) was introduced by the City of Toronto in 2008 to improve the city's fiscal capacity and reduce its reliance on property tax. The fund was not used exclusively to support transit and transportation projects but rather to diversify the city's income.[257] The PVT was applied to personal vehicles at an annual rate of $60 CAD for cars and $30 CAD for motorcycles; commercial vehicles, historic vehicles, and other vehicles that were not charged the Provincial vehicle registration permit fees were exempt from PVT.[258] The revenue tool existed for three years before it was terminated on January 1, 2011, after the City Council voted 39 to 6 to repeal it.[259]

Revenue

During the three years of its implementation, PVT represented less than 2% of the City's tax-supported operating budget.[260] It collected approximately $64 million per year.[261] The revenue yields appeared modest in comparison to the annual average property tax revenue of $3.5 billion CAD that the City of Toronto collected during the same period.

Social Equity

PVT may be considered as inequitable. While only personal vehicles are taxed, exempt vehicles may also have benefit from the funded projects in Toronto. The flat PVT fees on all cars and motorcycles also imply a greater burden on low-income groups.

Travel Behaviour Impact

There is no evidence suggesting any impact of PVT on sustainable travelling behaviour. A review of annual statistical reports provided by the Toronto Police Service reveals a similar number of annual traffic collision incidents pre- and post-implementation, indicating that PVT had minimal effect on the reduction of traffic collisions.[262,263,264]

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[257] Toronto Star, http://www.thestar.com/news/gta/2008/08/27/60_city_car_tax_starts_monday.html.
[258] The City of Toronto, http://wx.toronto.ca/inter/it/newsrel.nsf/0/170a89b271e68d4f852574b8004f498d?OpenDocument.
[259] CBC News, http://www.cbc.ca/news/canada/toronto/toronto-councillors-kill-car-tax-cut-budgets-1.883783.
[260] City of Toronto, "Budget Summary 2009," Toronto, Ontario.
[261] City of Toronto, "2010 Financial Report," Toronto, Ontario: 68.
[262] Toronto Police Service, "2007 Annual Statistical Report," Toronto, Ontario: 4.
[263] Toronto Police Service, "2009 Annual Statistical Report," Toronto, Ontario: 4.
[264] Toronto Police Service, "2011 Annual Statistical Report," Toronto, Ontario: 4.

Economic Efficiency

PVT had minimal distorting effects on regional economic efficiency. Since the tax was levied on plate renewal not vehicle purchase, it was unlikely to affect demand for new vehicle purchases. Furthermore, the tax was applied based on vehicle owners' addresses, so consumer demand was not expected to shift away from Toronto.[265]

Development Impact

There is no evidence suggesting any impact of PVT on development strategies in Toronto.

Implementation

PVT was collected by the Province of Ontario on behalf of the City.[266] Vehicle registrants with a Toronto address were required to pay the tax at the time of licence plate renewal by using internet, kiosks, mail, or at any Driver and Vehicle Licence Issuing Office within Ontario. Details about the PVT charges were also included in the Vehicle Licence Renewal Application form.[267] The funding tool represents a case of adding additional charges to existing fees, so PVT was able to use the existing payment and collection mechanisms already in place within the Province.

Public Perception

Councillor Glenn De Baeremaeker claimed PVT to be the "the most unpopular tax [Torontonians] have ever seen."[268] It was detested by Toronto car owners during its implementation, and its repeal became one of former Toronto Mayor Rob Ford's major campaign promises during the 2010 election.[269]

Applicability in Canada

The implementation of municipality-wide PVT in Canada requires the municipality to secure an appropriate collection and enforcement agreement with the Province.[270] As shown by Toronto's example, if a PVT is to be implemented as a long-term funding mechanism, a key element to consider would be the public's opinion on the tool.

A key element to consider would be the public's opinion on the tool.

[265] Toronto Star, http://www.thestar.com/news/gta/2008/08/27/60_city_car_tax_starts_monday.html.
[266] http://www.carpages.ca/blog/2011/01/03/city-of-toronto-kicks-off-new-year-by-officially-abolishing-personal-vehicle-tax/
[267] City of Toronto, http://wx.toronto.ca/inter/it/newsrel.nsf/0/170a89b271e68d4f852574b8004f498d?OpenDocument.
[268] CBC News, http://www.cbc.ca/news/canada/toronto/toronto-councillors-kill-car-tax-cut-budgets-1.883783.
[269] Digital Journal, http://www.digitaljournal.com/article/301497#ixzz3DUnmKXz9.
[270] John Mascarin, Cameron Paulikot, "Toronto's New Taxes," *D.M.P.L.* 2d, (2007).

Case Study 4: Land Value Capture – Special Assessment District

Project: Local Transit Tax

Location: Halifax, Nova Scotia

The Local Transit Tax was introduced by the Halifax Regional Municipality (HRM) in 2009 to separate the costs of transit services from the general residential tax.[271] The Local Transit Tax is applied to all residential and resource properties within a 1-km walk of a transit stop to fund Metro Transit's conventional services, including the addition of new routes and improving service schedules. In 2009, a rate of $0.088 CAD per $100 was applied to all targeted properties based on their full assessed values; the rate has since increased to $0.105 CAD. The new tax was not meant to raise more funds for HRM as the residential general tax rates were reduced at the time same time the separate transit taxes were introduced.

Revenue

Since its implementation, Local Transit Tax has raised, on average, $21.7 million CAD per year. The lowest annual revenue earned was $16.9 million CAD during the period 2009-2010, but it subsequently experienced a steady increase along with property assessment growth and new service areas. For the period 2013-2014, the annual revenue is budgeted to be $25 million CAD. [272,273,274] Such a stable and predictable source of funding greatly increased the future planning and budgeting capabilities of Metro Transit. The Local Transit Tax covered roughly 30% of the annual conventional transit service expenses.

Social Equity

Link the taxes to transit services provided and benefits received.

One of the main purposes for the Local Transit Tax was to link the taxes more closely to transit services provided and benefits received. By implementing the tax, HRM anticipated that 2.5% of the property owners in the urban tax zone would experience a tax rate decline because they are outside the one-km distance measurement from transit. On the other hand, 4.5% of owners in the suburban or rural tax zone were expected to incur greater tax expenses because they are within the one-km targeted area.[275] Since the tax reallocates the share of transit service costs among residents to better reflect their access to the transit service, the tool may be considered horizontally equitable.

[271] Halifax Regional Municipality, http://www.halifax.ca/taxes/TaxBill/Definitions.php#Other.
[272] Halifax Regional Municipality, "2011/2012 Business Plans and Budget (Approved)."
[273] Halifax Regional Municipality, "2013/2014 Business Plans and Budget (Approved)."
[274] Metro Transit, "Area Rate Taxation," *2013 Cuta Fall Conference*, (2013).
[275] Halifax Regional Municipality, http://www.halifax.ca/taxes/TaxBill/Questions.php.

The tool may be slightly regressive with respect to the ability-to-pay, as it represents a greater share of income dedicated to taxation for economically disadvantaged groups.

Travel Behaviour Impact

The funding mechanism does not have a significant impact on travel behaviour. Metro Transit's annual ridership remained within a 19 million to 19.3 million range for the period 2009-2013 (excluding the 2011/2012 fiscal year with a work stoppage).[276]

Economic Efficiency

The Local Transit Tax is expected to have minimal economic distortion. In aggregate, the tax does not represent additional cost to residents, so the costs of living in the taxed region would not be significantly altered. According to HRM, about 89% of all property owners would see minimal differences in their overall tax rates.[277] Therefore, the tax is not expected to trigger payment avoidance behaviours.

Development Impact

The tool is applied to properties in both the urban tax zone and the suburban or rural tax zone,[278] so it is unlikely to encourage sprawl.

Implementation

HRM claimed that the implementation of the Local Transit Tax does not require any additional administration costs.[279] The transit tax is collected along with other municipal residential taxes such as the urban general tax and supplementary education tax, so payment and collection mechanisms already exist. By separating itself from other business units, the transit tax provides transparency to residents with regard to the implied costs of transit services. HRM assumed that some time commitment would be required to update the Local Transit Area Rate boundaries, but expected to need minimal time considering HRM's expertise in mapping.

The transit tax provides transparency to residents with regard to the implied costs of transit services.

Since the Local Transit Tax is a component of Halifax's municipal tax system, its implementation required the approval from Regional Council, the main legislative and governing body for Halifax.[280]

Public Perception

[276] Halifax Regional Municipality, "A Systems-Level Performance Review of Metro Transit's Service Delivery," (2013): exhibit 4.
[277] Halifax Regional Municipality, http://www.halifax.ca/taxes/TaxBill/Questions.php.
[278] Ibid.
[279] Ibid.
[280] Halifax Regional Municipality, http://halifax.ca/mediaroom/pressrelease/pr2008/081216NewTransitStructure.php.

There is no evidence indicating favourable or unfavourable public opinion towards the tool.

Applicability in Canada

The implementation of a municipality-wide Local Transit Tax in Canada requires the approval of the local government. Based on Halifax's example, implementing the tax requires constant updating of taxed area boundaries and property value assessments, so the cost of maintaining such information would need to be considered.

Case Study 5: Land Value Capture – Tax Incremental Financing

Project: Crossrail Business Rate Supplement

Location: London, UK

The Crossrail Business Rate Supplement (BRS) in the Greater London Area was introduced in 2010 to finance the Crossrail project. BRS is a property tax of 2% levied on all existing commercial buildings that rent for more than £55,000 ($100,000 CAD)[281] per annum within all 32 London Boroughs and the Common Council of the City of London.[282] BRS is used to finance and repay the loans received and bonds issued by the Greater London Authority (GLA) for Crossrail project funding; and the revenue is expected to grow due to the appreciation in values of land in proximity to the public transit project. This mechanism is expected to last for between 24 and 30 years, to pay for the initial financing.

Revenue

Significant revenue is expected from the wide tax base. The GLA anticipates the BRS will generate roughly £8.1 billion ($14.7 billion CAD) in revenue over its lifetime, £4.1 billion ($7.5 billion CAD) of which would finance the Crossrail project by either repaying the principal borrowed by GLA or directly contributing to Transport for London for project construction. The remaining £4.0 billion ($7.3 billion CAD) would be interest payable for the GLA's borrowing.[283,284] In essence, the BRS mechanism would provide £4.1 billion ($7.5 billion CAD) or 26% of the expected £15.9 billion ($29 million CAD) project construction costs.

As of 2011, the gross revenue raised by BRS is £226.6 million ($412 million CAD) greater than anticipated.[285] This provides some support for the viability of the mechanism. However, future revenues heavily depend on the growth of the targeted land values, so BRS inherits significant risks from real estate market and the cyclical nature of the economy.

Social Equity

BRS is horizontally equitable in the sense that it is chiefly levied on existing buildings that benefit from the Crossrail project. It may raise some equity concern; however, as a flat tax rate is applied to all London Boroughs irrespective of which areas gain the most from the project.[286]

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[281] Canadian dollar estimates based on 2014 average exchange rate of 0.55 GBP/CAD (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)
[282] Greater London Authority, "Intention to levy a business rate supplement to finance the Greater London Authority's contribution to the Crossrail project, " (2010).
[283] Ibid.
[284] A.Roukouni, F. Medda, "Evaluation of Value Capture mechanisms as a funding source for urban transport: the case of London's Crossrail," *Transport Research Arena*, (2012): 2396.
[285] Ibid., 2397.
[286] A.Roukouni, F. Medda, "Evaluation of Value Capture mechanisms as a funding source for urban transport," 2397.

The mechanism can be considered as slightly progressive. The established threshold for BRS is a rent value of £55,000 ($100,000 CAD) per annum as opposed to the minimum level of £50,000 ($90,909 CAD). It relieves small and medium sized businesses from the funding liabilities, reducing their burden in comparison to larger businesses. The GLA indicates that about 4,000 properties are exempt under the policy.[287]

Travel Behaviour Impact

The funding mechanism does not have a discernible impact on travel behaviour.

Economic Efficiency

BRS contributes to the region's economic development. Studies found that property values within 2 km of a commuter rail station grew by 9.3% more than elsewhere in London.[288] Furthermore, BRS is levied on commercial buildings consistently across different densities, with exemptions for qualified types of empty properties.[289] It may encourage more efficient and intensive use of land and contribute to economies of agglomeration within Greater London.

Property values within 2 km of a commuter rail station grew by 9.3%.

The tool has minimal economic distortions. Small and medium businesses are exempt from BRS, and are not affected. Larger businesses would remain profitable despite the costs they carry. Property values are expected to appreciate by 10% to 15% as a result of the Crossrail project, while BRS is intended to capture only 2%.[290]

Development Impact

BRS likely encourages compact development. While both non-domestic and residential properties increase in value, only non-domestic properties are targeted.[291] As such, it may encourage residential development in the vicinity of the Crossrail project to capture the benefits while avoiding the BRS costs. BRS may also positively influence compact development by making underutilized lands too costly to keep vacant.

Implementation

No additional legal support or ballots were needed, as the ability to introduce BRS was granted to the GLA under the Business Rate Supplements Act 2009.[292] The BRS is collected by the 32 London Boroughs and the City of London Corporation on behalf of the GLA, and the taxes are

[287] Greater London Authority, "Crossrail Business Rates Supplement Q&A," 5.
[288] Deborah Salon, "Location Value Capture Opportunities for Urban Public Transport Finance," Regional Plan Association, (2014): 3.
[289] Greater London Authority, "Crossrail Business Rates Supplement Q&A," 7.
[290] Deborah Salon, "Location Value Capture Opportunities for Urban Public Transport Finance," 8.
[291] Greater London Authority, "Crossrail Business Rates Supplement Q&A," 4.
[292] Greater London Authority, "Intention to levy a business rate supplement to finance the Greater London Authority's contribution to the Crossrail project, " 7.

included on the same bill as normal national business rates. Hence, the administrative system for the mechanism is easily established.

Implementing the BRS requires careful revaluation of property values every five years to generate detailed projections for the exempt properties.[293] Establishing the minimum rent value also requires careful consideration of the impact on small and medium businesses.

Public Perception

The BRS has received little opposition from the public, partially due to the high visibility of the overall profit that businesses can gain from the Crossrail project, and partially due to the long history of the project.[294] The Crossrail project has been under consideration for approximately 20 years; the general public has a good understanding of the intentions and impacts of the project.

Applicability in Canada

The applicability of such a mechanism in Canada largely depends on the legal framework in each province. Currently in Canada, only Alberta and Manitoba have authorized the use of TIF.

[293] Ibid., 91.
[294] Deborah Salon, “Location Value Capture Opportunities for Urban Public Transport Finance,” 8.

Case Study 6: Land-Based Charge – Parking Sales Levy

Project: TransLink Parking Sales Tax

Location: Vancouver, British Columbia

The Parking Sales Tax in Metro Vancouver was introduced in 2007 as one of the replacement revenue sources for the Parking Site Tax established in 2006.[295] It was implemented to generate revenue to fund transit and road infrastructure maintenance/improvement projects within the Metro Vancouver area. The tax is applied to all 21 municipalities, Electoral Area A, and the Tsawwassen First Nation within TransLink's transportation coverage. Parking activities are considered taxable if they are a paid transaction to park (not store) motor vehicles. The tax was initially set to 7% of parking cost but increased to the legislative maximum of 21% on January 1, 2010.[296]

Revenue

On average, the Parking Sales Tax represents a modest 4% of TransLink's annual revenues. In 2009, the funding mechanism generated $15.6 million CAD in revenue.[297] This figure more than tripled in 2010 due to the increase in the tax rate. Between 2010 and 2013, the annual revenues ranged from $52.43 million CAD to $58.4 million CAD, indicating the sustainability of such revenues over time despite possible shifts in transportation mode and/or location choices to avoid such charges.[298,299,300,301]

Social Equity

The Parking Sales Tax is considered to be partially consistent with the horizontal equity concept. The tool targets some of the motorists who are using the road network and may benefit from public transit projects. It is also progressive with respect to vertical equity, because paid parking facilities are primarily used by high-income groups; therefore low-income motorists usually avoid the costs.

Travel Behaviour Impact

The sustainable tax revenues show no indication of a change in travel behaviour. However, as Litman's study on the elasticity of parking demand suggests,[302] if the entire 13% increase in parking sales tax is passed onto consumers as parking prices, it may result in the reduction of

[295] AECOM, "Detailed Case Studies of Selected Revenue Tools," 90.
[296] TransLink, "TransLink Tax Bulletin Motor Vehicle Parking."
[297] TransLink, "2009 Annual Report," (2010).
[298] TransLink, "2010 Annual Report," (2011).
[299] TransLink, "2011 Annual Report," (2012).
[300] TransLink, "2012 Annual Report," (2013).
[301] TransLink, "2013 Annual Report," (2014).
[302] Todd Litman, "Transit Price Elasticities and Cross-Elasticities," 6.

parking demand by 2% to 5%. Such a reduction may result from travel mode shifts, trip suppression, or changes in the destination or parking location.

Economic Efficiency

A study conducted for Metrolinx finds that the average monthly downtown parking price dramatically increased since the introduction of 7% parking sales tax occurred, and even further when the tax rate was set to 21%.[303] Such a significant increase in parking prices represents higher costs to local business operators, their employees, and their customers. The funding initiative could consequently encourage some businesses to move, in order to avoid the impacts of the tax on their operating costs and/or sales conditions.

Development Impact

There is no evidence of the impact of the Parking Sales Tax on Vancouver's development strategies, but it is expected that as it is primarily applied to downtown Vancouver, sprawl elsewhere would be indirectly encouraged.

Implementation

Prior to July 1, 2010, the tax revenues collected by parking vendors were remitted to the Ministry of Finance, Province of British Columbia, as a part of the Provincial Sales Tax.[304] With the elimination of Provincial Sales Tax on July 1, 2010, TransLink inherited the legislative rights from the Province to administer, enforce, and collect the tax revenues. As such, all tax revenues received by parking operators must be remitted to TransLink, and the transit agency has the responsibility to establish an administrative system for parking vendor registrations, audits, assessments, and collections.

Public Perception

The introduction of a 21% Parking Sales Tax in 2010 received considerable opposition from businesses. Over 30 businesses in Vancouver formed the "Drive Out the Tax" coalition to voice their opposition to the increase in tax rate.[305]

Applicability in Canada

The Parking Sales Tax funding mechanism can be applied to other regions within Canada. Provincial legislation is needed for implementation, as such a tool represents an additional tax on the general public. The revenues can be collected by the province and remitted to the local transit agency or directly administered by the transit agency as is currently done by TransLink.

[303] AECOM, "Detailed Case Studies of Selected Revenue Tools," 92.
[304] TransLink, http://www.translink.ca/en/About-Us/Taxes/Parking-Tax/About-the-Parking-Tax.aspx.
[305] CBC News, http://www.cbc.ca/news/canada/british-columbia/group-opposes-metro-vancouver-parking-tax-increase-1.893714.

Case Study 7: Non-User-Based Charge – Employer Payroll Tax

Project: Versement de Transport (Transport Tax)

Location: Ile-de-France

The Transport Tax was created by French Law in 1971 to finance public transportation in the French municipalities. The tax was first instituted in the full Paris region in 1991.[306] Initially applied to finance new investment projects, the tool is now used to support both capital and operating expenditures of public transportation. The tax is payable by all companies of at least 10 employees residing within a Transport Authority, and based on the number of local employees. The tax rate currently ranges from 1.4% to 2.6% of employees' salaries, depending on the location of the business. Non-profit entities are exempt from the collection; the tax is also reimbursed to employers who provide lodging and/or transport services to their employees or are located within newly created cities.[307]

Revenue

Tax revenues are highly dependent on economic activity.

The Transport Tax has generated € 2.97 billion ($4.30 billion CAD) and € 2.98 billion ($4.32 billion CAD) in 2008 and 2009 respectively.[308] Caprice's study on the tool indicates its sustainability. The annual revenues have consistently supported approximately 30% to 40% of the ever growing public transport costs during the period 2000-2009. An examination of quarterly revenues, however, shows that tax revenues are highly dependent on economic activity (as represented by wage per capita).

Social Equity

The tool is considered as equitable. By charging different rates based on the location within the Paris region, the mechanism is better able to reflect access to public transportation and the associate investment requirements. Paris and the neighbouring Hautes-de-Seine are charged the highest rate (2.6%), while the outer suburbs are charged the lowest (1.4%).[309] As such, the tool is consistent with the user-pay principle. The wage-based design of the payroll tax also takes into account varying employment income levels.

Travel Behaviour Impact

The Transport Tax does not have direct impact on travel behaviour.

[306] The Transport Politic, http://www.thetransportpolitic.com/2009/03/04/how-to-fix-transit-financing/.
[307] Louis Berger, "Review of French Experience with respect to Public Sector Financing of Urban Transport," *World Bank Urban Transport Strategy Review* (2000): 17.
[308] Caprice, http://www.caprice-project.info/spip.php?article30.
[309] Ibid.

Economic Efficiency

A study conducted by AECOM for Metrolinx indicates that the cost of economic distortion should, in principle, be relatively low as the tax is applied widely within the country. However, different rates across different parts of the country may lead to shifts in economic activity and locations of jobs.[310]

Development Impact

With a lower rate charged to poorer suburbs, the Transport Tax attempts to encourage investments in less-well off areas.[311] New towns are also, in effect, exempt from the tax. However, the tool likely encourages sprawl in the sense that investments are diverted from commercial centres to suburban areas.

Implementation

The regional transport authority, Syndicat des transports d'Île-de-France (STIF), has the right to impose the local Transport Tax within the limits set by the French Law to fund public transport projects. The tax is levied through the social security system on employers and is collected and remitted to STIF by the Unions de Recouvrement des Cotisations de Securite Sociale et d'Allocations Familiales (URSSAF), the public bodies that recover social security contributions.[312] URSSAF retains 1% of the tax revenues for administrative costs.

In addition to the administrative costs, costs of compliance may also be imposed on employers as they need to account for any changes in employee office locations for firms with multiple offices or plants.

Public Perception

The tax has strong political support and was accepted by employers, though with reluctance.[313] Nonetheless, there have been cases of opposition from employers for projects that trigger increases in the tax rates. Projects in Brest and Reims, for example, have been abandoned due to determined opposition from the stakeholders.[314]

Applicability in Canada

Provincial legislative approval is needed for the Transport Tax to be implemented in Canada. The implementation requires minimal administrative costs, but employers of multiple offices and plants across different regions may need to bear significant compliance costs.

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[310] AECOM, "Detailed Case Studies of Selected Revenue Tools," 31.
[311] Ibid., 30.
[312] Ibid.
[313] Ibid.
[314] Louis Berger, "Review of French Experience with respect to Public Sector Financing of Urban Transport,"17.

Case Study 8: Other – Reward-Based Crowdfunding

Project: Line Six Transit

Location: Toronto, Canada

Line Six Transit is a crowdfunding initiative for transit expansion in Toronto. The new transit service is founded by Chang and Scollon, a couple of Toronto commuters, to target the large transit demand in Liberty Village. The Liberty Village Express will follow a route from Liberty Village to Union Station in the mornings between October 6th and October 10th, 2014 at the pilot stage.[315] A minimum donation of $25 is required per backer in return for a guaranteed seat on the bus for the entire week.

Revenue

To test the market, the crowdfunding goal is set to $2,500 CAD for the pilot buses. The initiative has collected $1,500 CAD (60% funded) from 60 backers to date. [316]

Social Equity

By providing bus seats to backers who contribute to the operation of the new transit service, the tool aligns with the user-pay principle. The initiative is also progressive, in that it targets those who have the ability to pay.

Travel Behaviour Impact

The tool should not have a direct impact on the travel behaviour of Torontonians. However, if successful, the tool will be able to expand transit services in Toronto and accept those struggling to board the overcrowded King streetcar.[317] The initiative will likely compete with the Toronto Transit Commission for that portion of the demand. New ridership from Liberty Village may also be induced. Reliance on automobile travel, therefore, may be reduced.

Economic Efficiency and Development Impact

The tool should, in principle, not have a significant impact on the economic efficiency and development strategies of Toronto.

Implementation

While administratively straightforward, the implementation garners certain risks. The Express will not have any dedicated lanes or signal priority to help it move any faster than surrounding

[315] Line Six, http://www.ridelinesix.com/.
[316] Metro News, http://metronews.ca/news/toronto/1159685/toronto-startup-aims-to-crowdfund-new-bus-route-in-liberty-village/.
[317] Ibid.

traffic.[318] Hence, the pilot may not be successful. Moreover, since the Toronto Transit Commission has a legal monopoly in Toronto according to the City of Toronto Act, the Express may risk breaching the Act if it is not classified as one of the exempted "vehicles exclusively chartered to transport a group of persons for a specific trip … for a group fee."[319]

Public Perception

The funding mechanism has raised $1,500 CAD in less than a month, indicating its popularity with Torontonians.

Applicability in Canada

Reward-based crowdfunding such as Line Six is becoming more common in Canada. It does not require additional government action. However, as exemplifed in the Line Six example, the underlying project's compliance with municipal legislation is the key element to consider prior to the implementation of the tool.

Reward-based crowdfunding is becoming more common in Canada.

[318] Toronto Star, http://www.thestar.com/opinion/editorials/2014/09/21/crowdfunded_bus_service_sends_signal_to_ttc_editorial.html.
[319] Metro News, http://metronews.ca/news/toronto/1159685/toronto-startup-aims-to-crowdfund-new-bus-route-in-liberty-village/.

Case Study 9: Traditional Funding – Concession Revenue

Project: East Japan Railway Life-Style Businesses

Location: Greater Tokyo Area, Japan

Generate non-transportation revenues as another core business.

After the privatization of the Japanese National Railways into seven Japan Railway companies in 1987, the East Japan Railway Company (JR East) introduced Life-Style Business Strategies to generate non-transportation revenue as another core business.[320] The life-style business strategy consists largely of three components: station space utilization by providing in-station retail and restaurant services, known as EKINAKA; JR East-owned property leases to retailers, tenants in shopping centres, and offices; and other non-transportation services such as advertising and regional revitalization.[321] This study focuses on the first two components and their impacts as a traditional funding source.

Revenue

With approximately 17 million daily passengers, JR East stations offer great opportunities to develop the life-style businesses. By developing EKINAKA and leasing spaces to shopping centres, the stations improve customer convenience and enhance profitability to help offset any decline in transportation revenues associated with population decline. [322] Between 2003 and 2008, non-transportation revenue's share in total JR East operating revenue has increased from a little less than 30% to over 32%.[323] Revenues from station space utilization and leasing of shopping centres and office buildings also increased from 21% to 24% of total revenues. Revenues generated from these two components grew throughout the period from ¥539 billion ($5.7 billion CAD)[324] to ¥643 billion ($ 6.8 billion CAD).These findings indicate significant revenue potential that the business strategy provides and its sustainability over time.

Social Equity

The business strategy can be considered as horizontally equitable as it provides customer convenience and improves customer experience for those who shop and make purchases in EKINAKA. By expanding spaces within stations and providing more comfortable and fashionable designs, commuters are able to benefit from the strategy irrespective of their income status and their propensity to shop in EKINAKA.

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[320] Emiko Sayama, "JR East: Life-Style Business", International Practicum on Innovative Transit Funding & Financing," (2014).
[321] East Japan Railway Company, "Review of Operations – At a Glance," (2013).
[322] The Japan Times, http://www.japantimes.co.jp/news/2010/12/30/business/jr-easts-in-station-stores-a-success-story/.
[323] East Japan Railway Company, "Financial Highlights," (2013).
[324] Canadian dollar estimated based on 2014 average exchange rate of 94.02 Yen/CAD (http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates)

Travel Behaviour Impact

By enhancing customer experience through EKINAKA and improving public transportation accessibility through the lease of shopping centres and office properties in the vicinity of the stations, the strategy may attract more passengers, thereby encouraging commuters to travel by public transit.

The strategy may attract more passengers.

On the other hand, a drawback associated with this strategy would be the traffic congestion and air pollution it may indirectly induce. A study conducted by Muramatsu et al. suggests that trucks are used to carry goods to shops within the railway stations, and loading activities for stations with EKINAKA are greater than those without by a factor of 1.73 to 2.54.[325] Such increase in loading activities and trucking for EKINAKA may have a negative impact on regional transportation around the stations, causing congestion and air pollution.

Economic Efficiency

The Life-Style Business Strategy facilitates economic efficiency in the sense that EKINAKA increases the value of the stations and that shopping centres and office buildings adjacent to stations are more accessible, hence more attractive. Both effects contribute to regional productivity and competitiveness.

Development Impact

By enhancing the convenience of living, working, and shopping close to railway stations, which are located in the city centres, JR East's Life-Style Business encourages compact development.

JR East's Life-Style Business encourages compact development.

Implementation

The key element of the EKINAKA concept is to transform stations from places that commuters pass through to places where potential customers can enjoy quality shopping.[326] Large investment is required to follow the EKINAKA concept for public transit stations. JR East has committed itself in expanding its stations to add new spaces for EKINAKA. Shopping spaces are being redesigned to increase their visibility and improve their appeal to potential customers.[327] The railway company also periodically renews their stations' line up to keep the stores fresh and interesting for customers.[328]

[325] Kengo Muramatsu,et al., "A study of Loading Activities around the Railway Station for "EKINAKA" – In case of "ecute-Shinagawa," *Eastern Asia Society from Transportation Studies* 9, (2013).
[326] Tempo, http://www.tempo.com.ph/2014/02/ekinaka-shopping-malls-in-japan/.
[327] East Japan Railway Company, "Review of Operations – Non-Transportation," (2013).
[328] The Japan Times, http://www.japantimes.co.jp/news/2010/12/30/business/jr-easts-in-station-stores-a-success-story/.

Public Perception

There is no evidence associated with public opinion on JR East's Life-Style Business, but since the strategy can visibly improve the convenience and experience of commuters, it is expected to have public support.

Applicability in Canada

The EKINAKA concept can be applied within Canada but under crucial preconditions – with a governance structure and large passenger volumes moving through the station. Since the number of potential EKINAKA customers is heavily dependent on commuter volume, the station needs to have large existing passenger volumes to succeed with building in-station shopping zones. Similarly, the leasing of shopping centres and office spaces require the station to be located in high-density areas. A few transit authorities in Canada are independent bodies, while others are under the governance of municipalities. Lacking the decision making authority can be a challenge to implementing such a tool.

Case Study 10: Traditional Funding – Sales Tax

Project: Measure R Sales Tax

Location: Los Angeles County, California

Measure R was a ballot measure proposed during the November 2008 elections to raise a half-percent sales tax in Los Angeles County, California for funding new transportation projects.[329] Measure R was approved by 67.8% of Los Angeles County voters, and the 30-year tax took effect in July 2009 to increase the county sales tax from 8.25% to 8.75%.[330] According to the Expenditure Plan of Measure R, the largest portion of the revenues (64%) were to be devoted to new public transit projects and existing transit operations; the second largest portion (20%) devoted to highway improvement and maintenance projects. Including non-transit projects in the Expenditure Plan facilitated the passage of Measure R by getting support from voters located in suburban and rural parts of the county who may not benefit from public transit projects.[331]

Revenue

Measure R was implemented with the goal of generating $40 billion USD ($43.6 billion CAD) over its life time. However, due to an economic recession, the projection declined to $36 billion USD ($39 billion CAD). The mechanism is expected to raise sustainable revenues over the 30-year period.[332]

Social Equity

The tool can be considered as partially horizontally equitable. The revenues collected are used to fund both public transit projects and highway projects, which potentially benefit those who use public transit as well as those who travel by alternative means. The tool may raise some equity concern, however, because while the sales taxes target only Los Angeles County, the economic benefits the tool brings are shared among the neighbouring counties including Orange, San Bernardino, Riverside, and Ventura.[333]

Measure R may also be regressive as taxpayers must carry the same costs irrespective of their income status, thereby putting a greater burden on low-income groups and potentially distorting their consumption behaviour.

Travel Behaviour Impact

[329] MoveLa, “Transforming LA County,” International Practicum on Innovative Transit Funding & Financing,” (2014).
[330] Los Angeles Times, http://articles.latimes.com/2008/oct/30/local/me-roadsage30.
[331] About.com, http://publictransport.about.com/od/Transit_Funding/a/Los-Angeles-Countys-Measure-R.htm.
[332] Ibid.
[333] Los Angeles County Economic Development Corporation, “The Construction Impact of Metro’s Measure R Transportation Projects 2009-2038,” (2010).

The funding tool does not have significant impact on travel behaviour within the county.

Economic Efficiency

Measure R is desirable for regional economic development. The funding tool is, in effect, an economic stimulus package that counters economic recession. The economic impact study conducted by the Los Angeles County Economic Development Corporation (LAEDC) estimates that transportation projects made possible by Measure R funds could potentially add 507,500 jobs and inject $68.8 billion into the community over the 30-year period.[334] Such economic benefits are shared among 5 counties due to the interconnected nature of the regional economy.

Development Impact

A sales tax such as Measure R may lead to development outside of the Los Angeles County jurisdiction, through such impact is likely to be minimal as increases in sales taxes are small.

Implementation

Clearly define the funded transportation projects.

The key to the passage of Measure R was the support it received from voters located in suburban and rural parts of Los Angeles County, who may not benefit from public transit projects. By having an Expenditure Plan that clearly defined the funded transportation projects and the share of the funds to be devoted to them, the ballot measure conveyed to the public that the sales taxes would be used to fund both public transit and highway projects.

The State of California Board of Equalization has contracted out all administration, collections, and operations of the Measure R sales taxes to the Los Angeles County Metropolitan Transportation Authority (Metro), the regional transportation agency. [335]

Public Perception

The key takeaway of this case study is the high public support (67.8%) Measure R received during the November 2008 elections. Such positive public opinion on a sales tax may potentially be because of the wide range of projects it funds. Taxpayers located in suburban and rural parts of the county may perceive the highway projects as beneficial. Moreover, Measure R may be perceived as an economic stimulus package that counters the economic recession that occurred in previous years. It is a mechanism viewed by many as a source of job creation and business revenues.

Applicability in Canada

Sales taxes may be applied within Canada. The key success factor for this tool is public support.

[334] Ibid., 1.
[335] Los Angeles County, “Traffic Relief and Rail Expansion Ordinance.”

6. Alternative Funding Mechanisms Summary

The research conducted as part of the Alternative Funding for Canadian Transit Systems project defined twenty-four alternative funding mechanisms that could be used by Canadian transit systems to supplement traditional transit funding sources.

The funding mechanisms were organized within the six categories noted below:

1. User-based Charges
2. Vehicle Ownership Charges
3. Land Value Capture
4. Land-Based Charges
5. Non-User Based Charges
6. Other Charges

Each of the funding mechanisms were screened using the seven standard criteria and key questions within the Evaluation Framework illustrated in **Table 21.**

Table 21: Evaluation Framework

Evaluating Framework	Key Questions
Revenue	• How much revenue can be generated? • How stable and predictable is the revenue over time? • Can the revenue to be sustained in the long-run?
Social Equity	• Is there a mismatch between those who carry the costs and those who benefit and/or impose external costs? • Is the tool progressive or regressive for different income groups?
Travel Impact	• Does the tool encourage efficient travel choices? • What are the impacts of the tool on external costs such as congestion, collisions, travel time, and air pollution?
Economic Efficiency	• What is the impact of the tool on regional productivity and competitiveness? • Are there any economic distortions? To what extent do they hinder economic development?
Development Impact	• Does the tool encourage more compact development and discourage sprawl development?
Implementation	• How much cost is associated with implementation? • What are the challenges to implementation? • Can the tool be implemented quickly? • What legal support does the implementation require?
Public Perception	• What are the common perceptions of the tool by the public? • What is the degree of public acceptability for the tool? • What is the level of potential political support?

The twenty-four alternative funding mechanisms are summarized in **Table 22**. Each funding mechanism isdescribed by revenue potential and evaluation criteria.

Table 22: Summary of Alternative Funding Mechanisms

User-Based Charges - Levied on those who use the services and resources										
Alternative Funding Source	**Definition**	**Revenue ($) 1 year**	**Revenue ($) 25 years**	**Horizontal Equity**	**Vertical Equity**	**Travel Behaviour Impact**	**Economic Efficiency**	**Development Impact**	**Implementation**	**Public Perception**
Carbon Tax	Tax levied on carbon dioxide emissions from fuel usage for transportation and other purposes	230 million (400,000)	4.5 billion (400,000)	Low	Low	Marginally Positive	Marginally Negative	No Impact	Difficult	Positive
Car Rental Levy	Fee charged daily for vehicle rentals	2.2 million (400,000)	72 million (400,000)	Low	High	Marginally Positive	Marginally Negative	No Impact	Easy	Positive
Cordon Charge	Toll on drivers entering or exiting a zone or crossing a cordon during specific time period of a day	126 million (2 million)	3.1 billion (2 million)	High	Moderate	Positive	Positive	Mixed Impact	Difficult	Negative
High Occupancy Toll	Toll for the use of a designated highway lane used jointly with high occupancy vehicles	2.8 million (2 million)	71 million (2 million)	Very High	High	Positive	Positive	Sprawl	Difficult	Positive
Highway Toll	Toll for the use of a particular road infrastructure such as a bridge crossing or tunnel	373 million (2 million)	9.3 billion (2 million)	High	Low	Positive	Positive	Mixed Impact	Difficult	Positive

User-Based Charges - Levied on those who use the services and resources

Alternative Funding Source	Definition	Revenue ($) 1 year	Revenue ($) 25 years	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Vehicle Kilometer Travelled Fee	Charge to drivers for every kilometre travelled within a designated area or in all areas	991 million (2 million)	30 billion (2 million)	High	Moderate	Positive	Positive	Compact	Difficult	Negative

Vehicle Ownership Charges - Levied on owners of motor vehicles

Alternative Funding Source	Definition	Revenue ($) 1 year	Revenue ($) 25 years	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Auto Insurance Tax	Fee paid by vehicle owners through auto insurance payments	15 million (400,000)	424 million (400,000)	Moderate	Low	Marginally Positive	Negative	No Impact	Easy	Uncertain
New Vehicle Sales Tax	Fee paid by vehicle owners at the time of first registration of such vehicle	7 million (400,000)	278 million (400,000)	Moderate	High	Marginally Positive	Negative	No Impact	Easy	Uncertain
Vehicle Registration Fee	Fee paid by vehicle owners upon registering a new vehicle and renewing that registration annually	14 million (400,000)	392 million (400,000)	Moderate	Low	Marginally Positive	Negative	No Impact	Easy	Negative

Land Value Capture - Levied on properties and developments in the vicinity of public transit facilities										
Alternative Funding Source	**Definition**	**Revenue ($) 1 year**	**Revenue ($) 25 years**	**Horizontal Equity**	**Vertical Equity**	**Travel Behaviour Impact**	**Economic Efficiency**	**Development Impact**	**Implementation**	**Public Perception**
Land Value Taxation	Tax on the land value to more generally capture the values created by the provision of public goods and services	3.9 million (n/a)	97 million (n/a)	High	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Negative
Negotiated Exaction	In-kind contributions for local public goods and services in return of development approval	1.2 million (400,000)	29 million (400,000)	Moderate	Moderate	Mixed Impact	Positive	Mixed Impact	Easy	Positive
Special Assessment District	Self-imposed property tax within a defined district that benefits from public transit improvements	0.8 million (n/a)	21 million (n/a)	High	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Negative
Station Air Rights	Sale or lease of the rights to develop above or below transit facilities	0.8 million (2 million)	20 million (2 million)	High	Moderate	Mixed Impact	Positive	Mixed Impact	Difficult	Positive
Tax Increment Financing	Leverage future tax revenue increases to finance current infrastructure projects within an area	5.4 million (n/a)	566 million (n/a)	Moderate	Low	Mixed Impact	Positive	Mixed Impact	Difficult	Positive
Transportation Utility Fee	Fee that treats transportation improvements as utilities and is applied to all properties within a district	20 million (400,000)	569 million (400,000)	High	Low	Mixed Impact	Positive	Mixed Impact	Moderate	Positive

Land-Based Charges - Levied on properties irrespective of their proximity to transit facilities										
Alternative Funding Source	**Definition**	**Revenue ($) 1 year**	**Revenue ($) 25 years**	**Horizontal Equity**	**Vertical Equity**	**Travel Behaviour Impact**	**Economic Efficiency**	**Development Impact**	**Implementation**	**Public Perception**
Land Transfer Tax	Tax on homebuyers for the purchases of property within a designated area	56 million (400,000)	2.2 billion (400,000)	High	Low	Negative	Negative	Negative	Easy	Negative
Parking Sales Levy	Tax levied on paid parking transactions in addition to sales tax	9.0 million (400,000)	225 million (400,000)	Moderate	High	Mixed Impact	Negative	Negative	Easy	Negative
Parking Sites Levy	Daily charge to owners of all non-residential, off-street parking spaces within a designed area	23 million (400,000)	569 million (400,000)	Moderate	Low	Positive	Negative	Positive	Difficult	Positive

Non-User-Based Charges - Levied on households and individuals in the region

Alternative Funding Source	Definition	Revenue ($) 1 year	Revenue ($) 25 years	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Employer Payroll Tax	Tax withheld by employers and remitted to the government	41 million (400,000)	1.2 billion (400,000)	Low	High	No Impact	Negative	Mixed Impact	Moderate	Uncertain
Utility Levy	Monthly fee collected from all utility accounts within the region	6.2 million (400,000)	212 million (400,000)	Low	Low	No Impact	Negative	No Impact	Easy	Negative

Other Charges

Alternative Funding Source	Definition	Revenue ($) 1 year	Revenue ($) 25 years	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Crowdfunding	Fund raised through the collection of small contributions from the general public	25,000 (n/a)	n/a (n/a)	Moderate	High	No Impact	No Impact	No Impact	Moderate	Positive
Hotel and Accommodation Levy	Hotel tax charged along with accommodation fees	2.3 million (400,000)	58 million (400,000)	Moderate	Low	No Impact	Marginally Negative	No Impact	Easy	Positive

Other Charges

Alternative Funding Source	Definition	Revenue ($) 1 year	Revenue ($) 25 years	Horizontal Equity	Vertical Equity	Travel Behaviour Impact	Economic Efficiency	Development Impact	Implementation	Public Perception
Monetization of City Assets	Selling of City-owned assets that are not considered core to the City's operations and responsibilities	45 million (n/a)	1.1 billion (n/a)	Very Low	Moderate	No Impact	No Impact	No Impact	Difficult	Uncertain
Driver's License Tax	Tax levied on drivers upon the issuing or renewal of their driver's license	2.8 million (400,000)	82 million (400,000)	Low	Very Low	Marginally Positive	Marginally Negative	No Impact	Easy	Uncertain

Values in brackets represent hypothetical service area population used to estimate revenue yields

Bibliography

1. 407 Express Toll Route. http://www.407etr.com/index.html
2. AECOM. Detailed Case Studies of Selected Revenue Tools. Metrolinx. (2012) http://www.metrolinx.com/en/regionalplanning/funding/Detailed_Case_Studies_of_Selected_Revenue_Tools_EN.pdf
3. AECOM. Southeast Transitway Alternative Financing and Funding Workshop Summary Report. City of Calgary. (2013)
4. AECOM, KPMG. Big Move Implementation Economics: Revenue Tool Profiles. Metrolinx. (2013) http://www.metrolinx.com/en/regionalplanning/funding/is_appendix_a_en.pdf
5. Allegheny County, Office of the Treasurer. Allegheny Country Rental Vehicle Tax Rules and Regulations. http://www.county.allegheny.pa.us/treasurer/RentVehTaxRegs.pdf
6. Baylor M., Beausejour L. Taxation and Economic Efficiency: Results from a Canadian CGE Model. (2004) http://www.ecn.ulaval.ca/~sgor/cit/baylor_FinanceCanadaWP_2004/F21-8-2004-10E.pdf
7. Berger L. Review of French Experience with respect to Public Sector Financing of Urban Transport. World Bank Urban Transport Strategy Review. (2000)
8. Bethesda MD et al. TRCP Report 129: Local and Regional Funding Mechanisms for Public Transportation. Transportation Research Board of the National Academies. (2009) http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_129.pdf
9. BILD. Toronto City Council Facing Land Transfer Tax Revolt. (2007) http://www.bildgta.ca/media_releases_2007_detail.asp?id=460
10. Boarnet M., Dimento J. The Private Sector's Role in Highway Finance: Lessons from SR 91. Access. (2004) http://www.uctc.net/access/25/Access%2025%20-%2005%20-%20Lessons%20From%20SR%2091.pdf
11. Borjesson M., et al. The Stockholm congestion charges – 5 years on. Effects, acceptability and lessons learnt. Transport Policy Vol. 20. (2012) http://www.sciencedirect.com/science/article/pii/S0967070X11001284
12. Burchell R. et al. TRCP Report 39: The Costs of Sprawl – Revisited. Transportation Research Board National Research Council. (1998) http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_39-a.pdf
13. Canadian Forex. http://www.canadianforex.ca/forex-tools/historical-rate-tools/yearly-average-rates
14. Caprice. The example of the French tax "Versement Transport": a key resource of public transport funding in Ile de-France. http://www.caprice-project.info/spip.php?article30
15. CBC News. Group opposes Metro Vancouver parking tax increase. (2010) http://www.cbc.ca/news/canada/british-columbia/group-opposes-metro-vancouver-parking-tax-increase-1.893714
16. CBC News. Toronto councillors kill car tax, cut budgets. (2010) http://www.cbc.ca/news/canada/toronto/toronto-councillors-kill-car-tax-cut-budgets-1.883783

17. Center for Transportation Studies, University of Minnesota. Harnessing Value for Transportation Investment. (2009) http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=1798
Center for Transportation Studies, University of Minnesota. Value Capture for Transportation Finance: Technical Research Report. (2009) http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=1802
18. Cestnick T. Crowdfunding can be a great way to raise money – but watch out for the taxman. Calgary Herald. (2014)
19. Chicago Metropolitan Agency for Planning, S.B. Friedman & Company. Transit Value Capture Analysis for the Chicago Region. (2010) http://www.cmap.illinois.gov/documents/10180/198740/CMAP+Value+Capture+Exec+Summary.pdf/ff4d3982-f64a-46c8-b5ed-8681c47c331c
20. City of Harrisburg, Pennsylvania. 2002 Approved Budget. (2001) http://harrisburgcitycontroller.com/wp-content/uploads/2010/01/2002-Approved-Budget.pdf
21. City of Toronto. 2009 Budget Summary. http://www.toronto.ca/budget2009/2009_budget_summary.htm
22. City of Toronto. 2010 Financial Report. http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=4ee62650a9ff1410VgnVCM10000071d60f89RCRD
23. City of Toronto. Personal Vehicle Tax in effect September 1. (2008) http://wx.toronto.ca/inter/it/newsrel.nsf/0/170a89b271e68d4f852574b8004f498d?OpenDocument
24. Cooper D. 'Crowdfunded' bus service sends signal to TTC: Editorial. Toronto Star. (2014) http://www.thestar.com/opinion/editorials/2014/09/21/crowdfunded_bus_service_sends_signal_to_ttc_editorial.html
25. Cord S. How Much Revenue Would a Full Land Value Tax Yield. American Journal of Economics and Sociology Vol. 44 No. 3. (1985) http://onlinelibrary.wiley.com/doi/10.1111/j.1536-7150.1985.tb02344.x/abstract
26. Dachis B. Congestive Traffic Failure: The Case for High-Occupancy and Express Toll lanes in Canadian Cities. C.D. Howe Institute. (2011) http://www.cdhowe.org/pdf/ebrief_122.pdf
27. Dachis B. Sand in the Gears: Evaluating the Effects of Toronto's Land Transfer Tax. C.D. Howe Institute. (2008) http://www.cdhowe.org/pdf/commentary_277.pdf
28. Daunfeldt SO., et al. Congestion charges and retail revenues: Results from the Stockholm road pricing trial. Transportation Research Part A Vol. 43. (2009) http://www.sciencedirect.com/science/article/pii/S0965856408001584
29. East Japan Railway Company. Financial Highlights. (2013) http://www.jreast.co.jp/e/investor/ar/2013/pdf/ar_2013_02.pdf
30. East Japan Railway Company. Review of Operations – At A Glance. (2013) http://www.jreast.co.jp/e/investor/ar/2013/pdf/ar_2013_08.pdf
31. East Japan Railway Company. Review of Operations - Non-Transportation. (2013) http://www.jreast.co.jp/e/investor/ar/2013/pdf/ar_2013_10.pdf

32. Eliasson J., Transek AB. Cost-benefit analysis of the Stockholm congestion charging system. http://siteresources.worldbank.org/INTTRANSPORT/Resources/StockholmcongestionCBAEliassonn.pdf
33. Eliasson J., Mattsson L. Equity effects of congestion pricing: Quantitative methodology and a case study for Stockholm. Transportation Research Part A: Policy and Practice Vol.40. (2006) http://www.sciencedirect.com/science/article/pii/S0965856405001618
34. Ernst & Young. Land value capture as a funding source for urban investment. (2011) http://www.ey.com/Publication/vwLUAssets/LVC_as_a_funding_source_for_urban_investment/$FILE/LVC_as_a_funding_source_for_urban_investment.pdf
35. Freemark Y. How to Fix Transit Financing. The Transport Politic. (2009) http://www.thetransportpolitic.com/2009/03/04/how-to-fix-transit-financing/
36. Futurewise. Compact Urban Development Requirements & Safe Harbors, Buildable Lands Reports, & Reasonable Measures. (2005) http://futurewise.org/resources/publications/Compact%20Urban%20Development%20Safe%20Harbor.pdf
37. George Hazel Consultancy Ltd. Land Value Capture Discussion Paper. Metrolinx. (2013) http://www.metrolinx.com/en/regionalplanning/funding/Land_Value_Capture_Discussion_Paper_EN.pdf
38. Gihring T. The Value Capture Approach To Stimulating Transit Oriented Development And Financing Transit Station Area Improvements. Victoria Transport Policy Institute. (2009) http://www.vtpi.org/gihing_tod.pdf
39. Goldsmith S. More on Chicago Parking Meters. Governing. (2010) http://www.governing.com/blogs/bfc/More-on-Chicago-Parking.html
40. Greater London Authority. Crossrail Business Rates Supplement Q&A. (2010) http://www.london.gov.uk/sites/default/files/questions-and-answers-jan10.pdf
41. Greater London Authority. Intention to levy a business rate supplement to finance the Greater London Authority's contribution to the Crossrail project, Final Prospectus. (2010) https://www.london.gov.uk/sites/default/files/finalprospectus.pdf
42. Greenleaf Strategies LLC, Parsons Brinckerhoff. Value Capture: Mechanisms, Practices & Prospects for Stimulating Economic Development and Funding Commuter Rail. The Charlotte North Corridor Red Line Project. (2011) http://redlineregionalrail.org/documents/Research%20Reports%20and%20Memos/RedLine_ValueCapture_FINAL.pdf
43. Halifax Regional Municipality. 2011/2012 Business Plans and Budget (Approved). http://www.halifax.ca/council/agendasc/documents/110322ca1041.pdf
44. Halifax Regional Municipality. 2013/2014 Business Plans and Budget (Approved). http://www.halifax.ca/council/agendasc/documents/120626ca1113.pdf
45. Halifax Regional Municipality. A Systems-Level Performance Review of Metro Transit's Service Delivery. (2013) http://www.halifax.ca/AuditorGeneral/documents/FinalSept1013.pdf
46. Halifax Regional Municipality. Media Room. New Release. http://halifax.ca/mediaroom/pressrelease/pr2008/081216NewTransitStructure.php

47. Halifax Regional Municipality. Taxes. Definition. http://www.halifax.ca/taxes/TaxBill/Definitions.php#Other
48. Halifax Regional Municipality. Taxes. Transit Tax Q & A's August 2009. (2009) http://www.halifax.ca/taxes/TaxBill/Questions.php
49. Hartzok A. Pennsylvania's Success with Local Property Tax Reform: The Split Rate Tax. The American Journal of Economics and Sociology. (1997) http://www.earthrights.net/docs/success.html
50. HR&A Advisors, Inc. Value Capture: An Overview. (2012) http://www.railvolution.org/rv2012_pdfs/20121510_10a_ValueCap_Rothman.pdf
51. Hurst S. Brief: Toronto Commuters Launch Crowdfunding Site to Raise Funds for New Transit Route. Crowdfund Insider. (2014) http://www.crowdfundinsider.com/2014/09/50051-brief-toronto-commuters-launch-crowdfunding-platform-raise-funds-new-transit-route/
52. Hymon S. A closer look at half-cent sales tax hike, Measure R. Los Angeles Times. (2008) http://articles.latimes.com/2008/oct/30/local/me-roadsage30
53. IBI Group. Research on Funding for TransLink. TransLink. (2011)
54. IBI Group. Transit-Supportive Parking Policies: North American Experience and Model Policies for Municipalities. (2000)
55. Irwin N., Bevan A. Time to Get Serious: Reliable Funding for GTHA Transit/ Transportation Infrastructure. Toronto City Summit Alliance. (2010) http://www.civicaction.ca/sites/default/files/AllianceReliableFundingPaper.pdf
56. Joravsky B., Dumke M. FAIL, Part One: Chicago's Parking Meter Lease Deal. Chicago Reader. (2009) http://www.chicagoreader.com/chicago/features-cover-april-9-2009/Content?oid=1098561
57. Line Six Transit. (2014) http://www.ridelinesix.com/
58. Litman T. Local Funding Options for Public Transportation. Victoria Transport Policy Institute. (2014) http://www.vtpi.org/tranfund.pdf
59. Litman T. Transit Price Elasticities and Cross-Elasticities. Journal of Public Transportation Vol. 7 No. 2. (2004) http://www.vtpi.org/tranelas.pdf
60. Los Angeles County. Ordinance #08-01, Traffic Relief and Rail Expansion Ordinance. http://media.metro.net/measureR/images/ordinance.pdf
61. Los Angeles County Economic Development Corporation. The Construction Impact of Metro's Measure R Transportation Projects 2009-2038. (2010) http://media.metro.net/measureR/images/Economic_Impact_of_MeasureR_Projects.pdf
62. MacKechnie C. Los Angeles County's Measure R. About.com. http://publictransport.about.com/od/Transit_Funding/a/Los-Angeles-Countys-Measure-R.htm
63. Mann J., Rosentraub M. Tax increment financing: Municipal adoption and effects on property value growth. Public Finance Review Vol. 26 No. 6. (1998) http://pfr.sagepub.com/content/26/6/523.abstract
64. Mascarin J., Paulikot C. Toronto's New Taxes. D.M.P.L. (2007)

http://www.airdberlis.com/templates/Articles/articleFiles/428/John%20Mascarin%20and%20Cameron%20Paulikot%20-%20Toronto's%20New%20Taxes.pdf
65. Mathur S., Smith A. A Decision-Support Framework for Using Value Capture to Fund Public Transit: Lessons from Project-Specific Analyses. Mineta Transportation Institute. (2012) http://transweb.sjsu.edu/PDFs/research/1004-decision-support-framework-value-capture-public-transit-funding.pdf
66. Metro News. Toronto startup aims to crowdfund new bus route in Liberty Village. (2014) http://metronews.ca/news/toronto/1159685/toronto-startup-aims-to-crowdfund-new-bus-route-in-liberty-village/
67. Metro Transit. Area Rate Taxation. 2013 CUTA Fall Conference. (2013)
68. Metrolinx. 2010-2011 Metrolinx Annual Report. (2011)
http://www.metrolinx.com/en/aboutus/publications/FinancialStatements20102011_Final-EN.pdf
69. Metrolinx. Metrolinx Submission to the Development Charges Act, 1997 Consultation Process. (2014) http://www.metrolinx.com/en/regionalplanning/funding/Metrolinx_Review_of_Development_Charges_EN.pdf
70. Minnesota Department of Transportation. Minnesota Statewide Transportation Plan 2009-2028 – Draft. (2009) http://www.dot.state.mn.us/planning/stateplan/pdfs/TitlePageTOC.pdf
71. Mobility Investment Priorities. State Vehicle Registration Fees. Texas A&M Transportation Institute. http://mobility.tamu.edu/mip/strategies-pdfs/funding/technical-summary/Vehicle-Registration-Fees-Statewide-2-Pg.pdf
72. MoveLa. Transforming LA County. International Practicum on Innovative Transit Funding & Financing. (2014)
73. Muramatsu K., et al. A study on Loading Activities around the Railway Station for “EKINAKA” – In case of “ecute-Shinagawa”. Eastern Asia Society for Transportation Studies Vol. 9. (2013) http://easts.info/on-line/proceedings/vol9/PDF/P183.pdf
74. Nakata H. JR East’s in-station stores a success story. The Japan Times (2010) http://www.japantimes.co.jp/news/2010/12/30/business/jr-easts-in-station-stores-a-success-story/
75. National Conference of State Legislatures. Real Estate Transfer Taxes. http://www.ncsl.org/research/fiscal-policy/real-estate-transfer-taxes.aspx/
76. National Round Table on the Environment and the Economy. Achieving 2050: A Carbon Pricing Policy for Canada. (2009) http://neia.org/wp-content/uploads/2013/04/carbon-pricing-advisory-note-eng.pdf
77. Nussbaum P. Pa. raising fees on motorists to fund transportation. Philly.com (2014) http://articles.philly.com/2014-03-28/business/48634143_1_gas-tax-gallon-four-cents
78. Orange County Transportation Authority. 91 Express Lanes Fiscal Year 2009-2010 Annual Report. http://www.octa.net/uploadedFiles/MainSite/Content/Express_Lanes/91elannual10.pdf
79. Orange County Transportation Authority. 91 Express Lanes Fiscal Year 2010-2011 Annual Report.

http://www.octafiles.net/91annual.pdf
80. Orange County Transportation Authority. 91 Express Lanes Fiscal Year 2011-2012 Annual Report. http://www.octa.net/pdf/4778_OC_91_EXP_Annual_Report_LR_spds.pdf
81. Orange County Transportation Authority. 91 Express Lanes Fiscal Year 2012-2013 Annual Report. http://www.octa.net/About/2013-91-Express-Lanes-Annual-Report/
82. Orange County Transportation Authority. 91 Express Lanes Toll Policy. (2003) http://www.octa.net/uploadedFiles/MainSite/Content/Express_Lanes/RevFinalTollPolicy7-30-03_v7.pdf
83. Oregon City. Transportation Utility Fee. http://www.orcity.org/publicworks/transporation-utility-fee
84. Oregon Department of Revenue. Business Taxes: Payroll tax basics for employers. http://www.oregon.gov/DOR/bus/Pages/payroll_basics.aspx
85. Palmer I. City of Toronto kicks off New Year by officially abolishing personal vehicle tax. Carpages.ca (2011) http://www.carpages.ca/blog/2011/01/03/city-of-toronto-kicks-off-new-year-by-officially-abolishing-personal-vehicle-tax/
86. Price C. Toronto City Council repeals much-hated personal vehicle tax. Digital Journal. (2010) http://www.digitaljournal.com/article/301497#ixzz3DUnmKXz9
87. Province of British Columbia, Ministry of Finance. Carbon Tax. http://www.fin.gov.bc.ca/tbs/tp/climate/carbon_tax.htm
88. Province of British Columbia, Ministry of Finance. June Budget Update 2013/14 to 2015/16: Carbon Tax Review. (2014) http://www.fin.gov.bc.ca/tbs/tp/climate/Carbon_Tax_Review_Topic_Box.pdf
89. Province of British Columbia, Ministry of Finance. Tax Bulletin: Tax Rates on Fuels. (2014) http://www.sbr.gov.bc.ca/documents_library/bulletins/mft-ct_005.pdf
90. Rao A. How Much Money Could a Land Value Tax Raise? Moneybox. (2013) http://www.slate.com/blogs/moneybox/2013/10/17/land_value_tax_revenue_how_much_can_we_raise_by_taking_unimproved_land.html
91. RBF Consulting, et al. 2011 State Route 91 Implementation Plan. Orange County Transportation Authority. (2011)
92. Research Department of the Minnesota House of Representatives. Motor Vehicle Sales Tax. (2014) http://www.house.leg.state.mn.us/hrd/pubs/ss/ssmvst.pdf
93. Riverside County Transportation Commission. News & Faqs. http://www.sr91project.info/news-and-faqs
94. Road Traffic Technology. Stockholm Congestion Charge, Sweden. http://www.roadtraffic-technology.com/projects/stockholm-congestion/
95. Roukouni A., Medda F. Evaluation of Value Capture mechanisms as a funding source for urban transport: the case of London's Crossrail. Transport Research Arena. (2012) http://www.sciencedirect.com/science/article/pii/S1877042812029539

96. Salon D. Location Value Capture Opportunities for Urban Public Transit Finance. Regional Plan Association. (2014) http://library.rpa.org/pdf/TLS-2014-Research-Paper-Value-Capture.pdf
97. Samuel P. Profits Loom 91 – Express goin' Ok. Toll Roads News. (1997) http://tollroadsnews.com/news/profits-loom-91-express-goin
98. Sayama E. JR East: Life-Style Business. International Practicum on Innovative Transit Funding & Financing. (2014)
99. Senate Transportation and Housing Committee. High-Occupancy Vehicle (HOV) Lanes II: The Next Generation. (2009) http://stran.senate.ca.gov/sites/stran.senate.ca.gov/files/12-01-09HOVLanesIIBackground.doc&rct=j&frm=1&q=&esrc=s&sa=U&ei=9B7pU7G7Hubl8AHd8YHICQ&ved=0CBQQFjAA&sig2=NeEziVkSsnpFeA-aAx3QyQ&usg=AFQjCNEOUp2tqcXB0aKLEElWxlEj7s68Bg
100. Smith J., Gihring T. Financing Transit System through Value Capture. Victoria Transport Policy Institute. (2014) http://www.vtpi.org/smith.pdf
101. Soderholm G. Congestion tax in Stockholm. International Practicum on Transit Funding and Financing. (2014)
102. Spears J. $60 city car tax starts Monday. Toronto Star. (2008) http://www.thestar.com/news/gta/2008/08/27/60_city_car_tax_starts_monday.html
103. Statistics Canada. Canadian households in 2011: Type and growth. (2011) http://www12.statcan.ca/census-recensement/2011/as-sa/98-312-x/98-312-x2011003_2-eng.cfm
104. Statistics Canada. Canadian Vehicle Survey: Annual – 2009. (2009) http://www.statcan.gc.ca/pub/53-223-x/53-223-x2009000-eng.htm
105. Statistics Canada. Labour force survey estimates (LFS), by sex and age group, seasonally adjusted. CANSIM 282-0087. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2820087&pattern=282-0069..282-0095&tabMode=dataTable&srchLan=-1&p1=-1&p2=31
106. Statistics Canada. New Motor Vehicle Sales, by Province. CANSIM 079-0003. http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0790003&paSer=&pattern=&stByVal=1&p1=1&p2=37&tabMode=dataTable&csid=
107. Statistics Canada. The Canadian Population in 2011: Population Counts and Growth. (2011) http://www12.statcan.ca/census-recensement/2011/as-sa/98-310-x/98-310-x2011001-eng.cfm
108. Stockholm Stad. Facts and results from the Stockholm Trials. (2006) http://www.stockholmsforsoket.se/upload/The%20Stockholm%20Trial,%20facts%20and%20results_Expert%20Group%20Summary%20June%202006.pdf
109. Stockholmsförsöket. The Stockholm trials 22 August 2005 – 31 July 2006. http://www.stockholmsforsoket.se/templates/page.aspx?id=183
110. Sullivan E. Continuation study to evaluate the impacts of the SR 91 value-priced express lanes. (2000)

http://www.ops.fhwa.dot.gov/congestionpricing/value_pricing/pubs_reports/projectreports/sr91_expresslanes.htm

111. Sullivan E., et al. Benefit-Cost Analysis of Variable Pricing Projects: SR-91 Express Lanes. Journal of Transportation Engineering. (2006) http://ascelibrary.org/doi/abs/10.1061/%28ASCE%290733-947X%282006%29132%3A3%28191%29?journalCode=jtpedi
112. Sustainable Prosperity. British Columbia Carbon Tax Review. (2012) http://www.sustainableprosperity.ca/dl891&display
113. Tempo. “Ekinaka”, shopping malls in Japan. (2014) http://www.tempo.com.ph/2014/02/ekinaka-shopping-malls-in-japan//
114. The City of Chicago. Public Private Partnership. http://www.cityofchicago.org/city/en/depts/fin/supp_info/public_private_partnerships.html
115. The Conference Board of Canada. Employment Growth. http://www.conferenceboard.ca/hcp/details/economy/employment-growth.aspx
116. The Economist. The big sell. (2010) http://www.economist.com/node/17043320
117. This Big City. The Success of Stockholm’s Congestion Pricing Solution. (2011) http://thisbigcity.net/the-success-of-stockholms-congestion-pricing-solution/
118. Tomalty R. Innovative Infrastructure Financing Mechanisms for Smart Growth. Smart Growth BC. (2007) http://www.smartgrowth.bc.ca/Portals/0/Downloads/sgbc-infrastructure-report-web.pdf
119. Toronto Board of Trade. The Move Ahead: Funding “The Big Move”. (2010) http://www.bot.com/advocacy/Documents/VoteToronto2010/The_Move_Ahead.pdf
120. Toronto Police Service. 2007 Annual Statistical Report. http://www.torontopolice.on.ca/publications/files/reports/2007statsreport.pdf
121. Toronto Police Service. 2009 Annual Statistical Report. http://www.torontopolice.on.ca/publications/files/reports/2009statsreport.pdf
122. Toronto Police Service. 2009 Annual Statistical Report. http://www.torontopolice.on.ca/publications/files/reports/2011statsreport.pdf
123. Toronto Real Estate Board. Realtors to Tell Province “Home-buying Tax” will Worsen Urban Sprawl, Hurt Economy. (2006) http://www.torontorealestateboard.com/market_news/release_market_updates/news2006/nr042606.htm
124. TransLink. 2010-2019 10 Year Transportation and Financial Plan. (2010)
125. TransLink. 2012 Business Plan, Operating and Capital Budget Summary. http://www.translink.ca/~/media/documents/about_translink/governance_and_board/board_minutes_and_reports/2012/february/2012%20business%20plan%20operating%20and%20capital%20budget%20summary.ashx
126. TransLink. About the Parking Tax. http://www.translink.ca/en/About-Us/Taxes/Parking-Tax/About-the-Parking-Tax.aspx
127. TransLink. Backgrounder #10: Transportation Funding. http://www.translink.ca/~/media/Documents/plans_and_projects/regional_transportation_strategy/Backgrounders/Transportation_Funding_Backgrounder.ashx
128. TransLink. Bulletin 105 Motor Vehicle Parking.

http://www.translink.ca/~/media/documents/about_translink/parking_tax/105_motor_vehicle_parking.ashx
129. TransLink. TransLink 2009 Annual Report. (2010) http://www.translink.ca/~/media/Documents/about_translink/corporate_overview/annual_reports/2009.ashx
130. TransLink. TransLink 2010 Annual Report. (2011) http://www.translink.ca/~/media/Documents/about_translink/corporate_overview/annual_reports/2010.ashx
131. TransLink. TransLink 2011 Annual Report. (2012) http://www.translink.ca/~/media/Documents/about_translink/corporate_overview/annual_reports/2011.ashx
132. TransLink. TransLink 2012 Annual Report. (2013) http://www.translink.ca/~/media/documents/about_translink/corporate_overview/annual_reports/2012/translink_2012_annual_report.ashx
133. TransLink. TransLink 2013 Annual Report. (2014) http://www.translink.ca/~/media/Documents/about_translink/corporate_overview/annual_reports/annual_report_2013.ashx
134. U.S. Department of Transportation, Federal Highway Administration. Highway Statistics 2009. https://www.fhwa.dot.gov/policyinformation/statistics/2009/
135. U.S. Department of Transportation, Federal Highway Administration. Highway Statistics 2010. https://www.fhwa.dot.gov/policyinformation/statistics/2010/
136. U.S. Department of Transportation, Federal Highway Administration. Highway Statistics 2011. https://www.fhwa.dot.gov/policyinformation/statistics/2011/
137. U.S. Department of Transportation, Federal Highway Administration. Highway Statistics 2012. https://www.fhwa.dot.gov/policyinformation/statistics/2012/
138. Washington County, Oregon. Ballot Measure 34-221: Proposed Countywide Vehicle Registration Fee for Road Maintenance. http://www.co.washington.or.us/LUT/TransportationFunding/vehicle-registration-fee.cfm
139. Zhao Z, et al. Joint Development as a Value Capture Strategy in Transportation Finance. The Journal of Transport and Land Use Vol. 5 No. 1. (2012) https://www.jtlu.org/index.php/jtlu/article/view/142
140. Zmud J., Arce C. Compilation of Public Opinion Data on Tolls and Road Pricing. Transportation Research Board of the National Academies. (2008) http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_377.pdf