AECOM

Project Number:
60330387

DATE:
May 8, 2015

THE CITY OF CALGARY

Comprehensive Analysis of Shortlisted Funding Mechanisms

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May 8, 2015

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Dear Travis:

Project No: **60330387**

Regarding: Comprehensive Analysis of Short Listed Funding Mechanisms

AECOM is pleased to provide the attached final report for the Funding Mechanisms Analysis project. The report has been revised to take into account the 4¢/L fuel tax announced in the March 26, 2015 Budget of the Alberta Government.

If you have any questions, please contact the undersigned at 514-287-8500 x8271.

Sincerely,
AECOM Canada Ltd.

Mario Iacobacci, Ph.D.
Director, Economics
Mario.Iacobacci@aecom.com

cc:

RPT-2015-05-08-Calgarycomprehensiveanalysis_FINAL

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
	Mario Iacobacci	December 29, 2014	Issued
	Mario Iacobacci	January 7, 2015	Rev. #1
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	Mario Iacobacci	May 8, 2015	Rev. #4

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Executive Summary

The purpose of this report is to provide a comprehensive evaluation of a shortlist of Revenue Tools used in other jurisdictions to support the development of transportation infrastructure.

For each shortlisted Revenue Tool, the report provides a revenue forecast as well as a quantitative estimate of the travel behaviour impacts and the overall efficiency impacts of the Revenue Tool. The assumptions used in developing the revenue estimates were laid out for each Revenue Tool, using the best information available publicly, and were used for the sole purpose of creating an adequate basis to assess the revenue potential of the tools.

The starting point for this project were the funding tools identified by AECOM in 2013 and presented at the Special Meeting of Council on January 31, 2014 where tools were categorized as mobility user charges, traditional tax tools, land-based Revenue Tools and other tools. Council directed further evaluation of 27 potential funding or revenue sharing mechanisms to fund the future transition to the Green Line LRT, and the remainder of the unfunded capital projects in The City of Calgary's "*Investing in Mobility, 2015-2024 Transportation Infrastructure Investment Plan*".

AECOM was asked to undertake the analysis supporting Administration in this task and started with a preliminary analysis of 27 Revenue Tools. The analysis included revenue estimates and a qualitative evaluation of the revenue sustainability, implementation challenges, equity impacts and efficiency impacts. The following 28 Revenue Tools were evaluated.[1]

Mobility User Charges

- Cordon Charge
- Fuel Tax
- HOT Lanes
- Road Tolls
- Transit Fares
- Transit Fare Restructuring
- VKT Charge

Conventional Tax Tools

- Corporate Income Tax
- Payroll Tax
- Personal Income Tax
- Sales Tax

Land-Based Revenue Sources

- Development Charges
- Land Transfer Tax
- Land Value Capture
- Parking Space Levy
- Parking Sales Tax
- Property Tax
- Tax Increment Financing

Other Revenue Sources

[1] *One additional Revenue Tool – the Land Transfer Tax – was evaluated following input from City administration and interviews. Note: "Revenue Tools", "revenue sources" and "funding mechanisms" are used interchangeably throughout the document*

- Auto Insurance tax
- Car Rental Levy
- Carbon Tax
- Crowdfunding
- Drivers' License Tax
- Hotel and Accommodation Levy
- Monetization of City Assets
- New Vehicle Sales Tax
- Utility Levy
- Vehicle Registration Fee

Evaluation Framework

New Vs. Re-Allocated Revenue Sources

The purpose of this project is to develop a shortlist of revenue sources for funding the gap in the transportation program over the next ten years. There are three general methods to address the funding gap:

1. New revenue sources drawn directly from users or taxpayers: These consist of Revenue Tools not currently used as a source of funding for the City of Calgary and the Province of Alberta. These include mobility charges such as road tolls and conventional tax sources such as payroll or sales taxes.

2. Existing revenue sources drawn directly from users or taxpayers: These consist of Revenue Tools already used either by the City or the Province. In almost all these cases, the funds collected go into the consolidated revenue funds of the City or the Province and are used to fund the provision of services or responsibilities of the respective governments. These revenue sources include mobility charges such as the fuel tax; conventional tax tools such as corporate income taxes and personal income taxes; land-based tools such as development charges and property taxes and other Revenue Tools, such as the vehicle registration fee.

3. Federal or provincial contributions: In addition to the first two categories, the City may be able to access specific provincial or federal spending envelopes intended for specific uses, such as the Building Canada Fund at the federal level or the Municipal Sustainability Initiative at the provincial level. Funding for these specific programs and grants – which included an Alberta provincial grant for transit operating funding cancelled in 2010 – comes from the consolidated revenue fund of the provincial and federal governments. As such, these programs do not represent additional revenue sources as much as targeted areas of spending by higher-order levels of government.

This report examined the Revenue Tools in the first two categories on a comparable basis. That is, the examination addressed the impact of incremental increases in tax rates for each of the tools – whether new or existing. This enables a comparison of the results of these Revenue Tools on a like-for-like basis. However, in practice it is possible for the Province (or the City) to re-allocate existing revenue sources to the City transportation budget, if they so desire. This does away with any of the impacts of additional taxation, but it does require that decision-makers accept the impact of withdrawing the revenue from the alternative use.

The third category can also be explored by the City as a way to address the funding gap for transportation. This last category does not represent additional sources of funding, but rather spending programs target at specific uses, which can include transit operating funding, a use that tends to be ignored relative to capital grants.

Why Evaluate Revenue Tools?

The primary reason to evaluate Revenue Tools is to provide an indication of the revenue generation potential of each tool under alternative assumptions regarding charge rates and other design features. However, it is also important to recognize that additional revenue can be generated from many different Revenue Tools (and possibly from revenue-sharing with the provincial or federal governments on existing revenue sources). Hence, one of the fundamental reasons to favour one tool over another is that it can improve the economic welfare of Calgary residents and the performance of businesses in the city – by providing improvements in the performance of the travel network (or other travel-related benefits such as safety and environmental considerations), or by minimizing the economic distortions resulting from taxation.

Evaluation Framework and Criteria Explained

The evaluation framework applied to each shortlisted revenue tool is based on multiple criteria. These consist of:

1. Revenue potential, sustainability and impacts on other funding sources
2. Implementation challenges
3. Equity impacts, and
4. Efficiency impacts, which take account of the costs of economic distortions, travel behaviour impacts and transportation network performance and implementation costs, all of which are quantified, where possible.

Not all criteria are necessarily of equal importance. A qualitative scoring is provided of each revenue tool based on equal weighting of the criteria. This was designed to allow readers to formulate their own choices (e.g. based on attributing greater importance to some criteria over others).

As regards revenue potential, quantitative estimates are provided for 2014 and the forecast period (2015-24). Implementation costs (capital and operations) were estimated at a rough order-of-magnitude level, where relevant; and net revenue estimates are reported (after accounting for capital and operating costs and implementation timing, since some Revenue Tools would take several years to implement).

Shortlisted Revenue Tools

A shortlist of 16 Revenue Tools was retained based on the results of the evaluation and discussions with the project coordination committee. The following were the main considerations which determined the selection of the shortlisted revenue sources:

- Revenue generation potential
- Efficiency considerations
- Avoiding duplication of revenue sources

Based on these considerations, the following Revenue Tools were not shortlisted:

- Mobility User Charges not shortlisted:
    - Cordon charge (downtown only): in favor of a cordon charge around the city boundary, given the concern that non-residents should contribute their fair share of transportation and transit infrastructure costs. Moreover, there is arguably already an equivalent downtown cordon charge in place due to the tightly controlled supply of parking places and resulting parking prices in downtown Calgary which are among the highest in North America. (There is little through traffic in downtown Calgary).

  - Vehicle Kilometers Travelled (VKT) Charge: because it has not yet been implemented on a large commercial scale (although there are pilots underway, such as in Oregon) and because the road tolls and other tolling options are at least partial substitutes
  - Transit fare restructuring: because it is not a source of additional revenue as compared to transit fares, even though fare restructuring can mitigate some of the adverse impacts of fare increases on transit ridership
- Conventional tax tools not shortlisted:
  - Corporate Income Tax: because it would entail greater inefficiencies compared to the three other conventional tax tools (payroll, income and sales taxes)
  - Payroll Tax: because it would entail greater inefficiencies than sales taxes and it is not a revenue tool currently used by the Province.
- Land-based Revenue Tools not-shortlisted:
  - Tax Increment Financing (TIFs), known as a Community Revitalization Levy (CRL) in Alberta: because it does not generate new revenue but borrows instead from future property tax revenues. In this respect, it is more of a financing tool than a funding tool.
  - Land-Transfer Tax: because it performed more poorly than the property tax in efficiency terms
  - Parking Sales Tax: because it would apply only to priced parking in the downtown area, where parking prices are among the highest in North America,
  - Crowdfunding was not shortlisted, because it was not deemed have significant revenue potential
- Other Revenue Tools not shortlisted:
  - Auto Insurance Tax: because it was among the worst performers in efficiency terms relative to the 10 Revenue Tools considered under this category (including the Car Rental Levy).
  - Carbon Tax: for the same reasons the auto insurance tax.
  - Driver's License Tax: because it was deemed preferable to shortlist the Vehicle Registration Fee, which may discourage vehicle ownership (rather than discouraging potential drivers).
  - Hotel and Accommodation Levy: because the Province already has such a charge in place – a 4% ad valorem tax on temporary accommodation prices known as the Alberta Tourism Levy

The remaining shortlist of 16 Revenue Tools was subject to a comprehensive analysis, the results of which are presented in the Table below. The table shows the qualitative results in the upper panel as well as the quantitative results in the lower panel. For example, the qualitative results suggest that top-ranked tool in terms of efficiency considerations is the Fuel Tax, followed by HOT Lanes, with a group of other revenue sources in third place, including the Sales Tax, Parking Space Levy, Property Tax, Utility Levy and Vehicle Registration Fee. In terms of overall scores, where each of the four criteria are given an equal weighting, the Personal Income Tax was the top ranked (since it is a more sustainable revenue source), followed by a second group of sources including the Fuel Tax, Transit Fares, Utility Levy and Vehicle Registration Fee.

However, these qualitative results are only indicative in nature. The quantitative assessment – notably the revenue generation and the benefit-cost results in the lower panel, which represent a summary efficiency assessment – are a more reliable source for evaluating the Revenue Tools. In terms of benefit-cost considerations alone, the HOT Lanes, Road Tolls and the Fuel Tax are the top-ranked tools. They also represent the only tools which are likely to generate efficiency gains and thereby make Calgary a more competitive city and region. It is important to note that these results are specific to the Calgary context and to the tax rates evaluated. For example, a 20-cent per litre increase in the fuel tax would not have proportionate impacts to the 4-cent per litre increment evaluated.

Comprehensive Evaluation of Shortlisted Funding Mechanisms

CRITERIA	SHORTLISTED FUNDING MECHANISMS																
	Mobility User Charges							Conventional Tax Tools		Land-Based Taxes				Other Tools			
		Tolling Options															
	Fuel Tax	High Occupancy Tolls	Road Tolls	Border Toll	Facility-Specific (Airport Tunnel)	Facility-Specific (Bow Bridge)	Transit Fare Increases	Personal Income Tax	Sales Tax	Development Charges	Land Value Capture(LVC)	Parking Space Levy	Property Tax	Car Rental Levy	Monetization of City Assets	Utility Levy	Vehicle Registration Fee
1. Revenue Sustainability	2	5	5	4	3	3	5	5	5	2	2	4	5	4	1	5	4
2. Implementation Challenges	5	2	2	1	4	4	4	5	3	3	2	3	4	4	2	5	5
3. Equity Impacts	4	4	3	3	4	4	3	3	3	3	4	3	2	3	3	2	3
4. Efficiency Impacts												s					
Cost of Economic Distortions	3	5	4	2	3	3	3	1	4	3	4	3	3	2	4	3	3
Travel Behaviour and Transportation Network Performance	4	4	4	3	2	2	1	2	2	2	2	3	2	2	2	2	2
Implementation Costs	5	2	1	1	3	3	5	5	4	4	3	4	5	5	3	5	5
Efficiency Impacts (Average Score)	4.0	3.7	3.0	2.0	2.7	2.7	3.0	2.7	3.3	3.0	3.0	3.3	3.3	3.0	3.0	3.3	3.3
Overall Score	**3.8**	**3.7**	**3.3**	**2.5**	**3.4**	**3.4**	**3.8**	**3.9**	**3.6**	**2.8**	**2.8**	**3.3**	**3.6**	**3.5**	**2.3**	**3.8**	**3.8**
Yield for Unit Tax Rate	$24M	$0.2M	$30M	$53M	$5M	$32M	$1M	$348M - $377M	$232M - $252M	na	na	$98M - $125M	$36.5M	$1M - $3M	n/a	$6M	$11M
Rate for $100M Yield	4.1 - 4.2 cents/ltr	na	3.4 cents/k	$1.96/trip	na	$3.25 - $3.40/trip	na	0.26% - 0.28%	0.39% - 0.43%	na	na	$0.81 - $1.02/da	0.00028	n/a	n/a	$18.50/ month	$130/ year
Ranking by Efficiency Impacts	**1**	**2**	**4**	**6**	**5**	**5**	**4**	**5**	**3**	**4**	**4**	**3**	**3**	**4**	**4**	**3**	**3**
Ranking by Overall Score	**2**	**3**	**7**	**9**	**6**	**6**	**2**	**1**	**4**	**8**	**8**	**7**	**4**	**5**	**10**	**2**	**2**

Tax / Charge rate	4¢/L	20¢/km	3¢/km	2$/trip	2$/trip	$2/trip	$0.20/ trip	0.5% point tax	0.5% tax	Based on Ottawa rates	Southeast BRT stations	$1/space /day	0.033% (res) / 0.145% (non-res)	$4/day	ENMAX & Calgary Parking	$1/ month	$1/ month
Gross Revenue - 2015-2024 (2014 $M, Undiscounted)	1000	51	980	1400	120	630	230	2100	1400	725	50	1100	1700	90	650 - 2100	60	120
Time required to implement (years)	<1	3	5	5	3	3	<1	<1	3	2	2+	2	<1	<1	2	<1	<1
Net Revenue - after implementation (2014 $M)	1000	na	340	625	70	360	110	2100	1000	650	50	890	1700	90	less 1-5%	60	120
Efficiency benefit (cost) - per $ revenue	0.05	na	na	na	na	na	na	(0.32)	(0.13)	na	na	(0.13)	(0.19)	(0.25)	na	na	na
Efficiency benefit (cost) -2014 $M (Undiscounted)	50	na	na	na	na	na	na	(672.00)	(130.00)	na	na	(115.70)	(323.00)	(22.50)	na	na	na
Benefit-cost ratio	1.2	1.5	1.4+	<1?	na	na	<1	<1	<1	1	1	<1	<1	<1	<1 or >1	<1	<1

Note: 'na' indicates not applicable/not available

Recommendations and Categorization of Shortlisted Revenue Tools

In order to facilitate the screening and decision-making process for the 16 shortlisted tools, the study draws on the following principles in order to support the City in funding the Green Line LRT and other unfunded projects in *Investing in Mobility* as well ensuring that additional revenue generation is not at the expense of the city and region's competitiveness:

- Revenue generation potential
- Timing of new revenue streams
- Jurisdictional considerations and
- Efficiency considerations

These principles suggest the following categorization of the shortlisted Revenue Tools:

1. Funding Mechanisms within City Jurisdiction and Available for Implementation within a Year

- Property Taxes – this is already a major revenue source for the City
- Utility Levy – this is also a current revenue source for the City (i.e., 10% franchise fee on utility bills), although there may be legal and other challenges involved introducing an additional surcharge.

2. Funding Mechanisms Requiring Provincial Approval

- Development Charges – while these are a current revenue source for the City (and are currently under review), the use of DCs to recover capital costs for transportation and transit infrastructure may require amendments to the enabling legislation (i.e., the Municipal Government Act)
- Fuel Tax – this is already a revenue source which the Province of Alberta shares with Calgary and Edmonton. A modest increase in this tax could generate significant efficiency gains (5 cents per additional revenue dollar collected) and could be viewed as a user charge for fully funding the City roads budget (capital and operations). This type of mobility user charge is also an efficient way of addressing usage of Calgary transportation infrastructure by non-residents (to the extent that their fuel purchases are made at least partly within city boundaries). The latter consideration reinforces the need to implement the increase in fuel taxes at the Calgary Region level or province-wide in order to minimize distortions arising from changes in the location of fuel purchases.
- Parking Space Levy – a significant revenue source with some similarities to a property tax, except that it would incentivize parking lot owners to allocate some of their unused and under-valued parking spaces to other uses. Our understanding is that this revenue source would require new provincial legislation, because it is essentially a new tax on privately held property.
- Sales Tax – a potentially important revenue source with some of the lowest efficiency costs of all conventional tax tools
- Vehicle Registration Fees – a current revenue source for the Province which has a direct relationship to vehicle ownership (if not usage)

The City of Calgary is currently engaged in negotiations with the Province regarding the City Charter, which includes potential revisions to the fiscal framework for funding the delivery of City services and associated capital projects. Provincial approval and any associated provincial legislative requirements for the above Revenue Tools can be addressed though this vehicle.

3. Funding Mechanisms for Consideration in the Longer-Term

- Road Tolls can generate substantial efficiency gains even after factoring in capital and operating costs, provided the implementation is designed to enable mode-shifts and discourage low-value trips (rather than just creating trip diversions). However, current provincial legislation (i.e., the Alberta "Traffic Safety Act") does not allow for road pricing. Hence, this legislative obstacle would need to be addressed in any planning for this revenue tool in the long term.

4. Complementary Measures

These refer to funding mechanisms which are not necessarily important revenue generators, but which may be desirable for efficiency or other reasons. They include:

- HOT Lanes, which can provide important decongestion benefits, provided the provincial legislative obstacles can be addressed
- Facility-Specific Tolls, which can be a significant revenue source, but can only be applied in relatively unique situations, where the tolls do not create major trip diversions and disruptions
- Land Value Capture, which can provide an additional revenue source with little or no inefficiency costs, although the timing of the revenue would be uncertain

5. Revenue Tools not Recommended

These Revenue Tools are not recommended because they can lead to important efficiency losses for Calgary or because they do not represent a fundamentally new revenue source:

- Border Tolls – the introduction of road tolls for entering Calgary could create important efficiency losses by discouraging economic activity within the city boundaries without addressing road congestion in an effective manner. Concerns about ensuring that non-residents contribute their fair share to the upkeep of transit and transportation infrastructure are best addressed through other types of user charges, where total charges paid depend on the extent of infrastructure usage rather than on the location of users.
- Transit Fares – these are within City jurisdiction and can be implemented quickly. However, raising fares under the current fare structure has adverse efficiency impacts. Mitigating these impacts through a fare restructuring that better aligns fares with customer value delivered by transit services requires considerable time and effort to accomplish. Moreover, this revenue tool is already dedicated to funding transit service operations, including potential service improvements, the cost of which is not fully covered by fare box revenues.
- Personal Income Taxes – are already a major revenue source for the Province of Alberta. In addition, an increase in income taxes would entail higher inefficiency costs than a sales tax, the other conventional tax tool in the shortlist.
- Car Rental Levy – is likely to entail higher efficiency costs than broader-based consumer sales taxes, without generating any changes in travel behavior or any improvements in the performance of the road network.
- Monetization of City Assets – these assets are already a revenue source for the City and the sale represents a monetization of the future revenue stream associated with the assets

All of the above Revenue Tools which are already currently in use by the Province could also be tapped for revenue-sharing potential. However, such revenue sharing would come at the expense of funding other government services or transfers to individuals and/or communities.

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Appendices

1. Comprehensive Evaluation Framework for Shortlisted Revenue Tools

The purpose of this report is to provide a comprehensive evaluation of a shortlist of Revenue Tools used in other jurisdictions to support the development of transportation infrastructure.

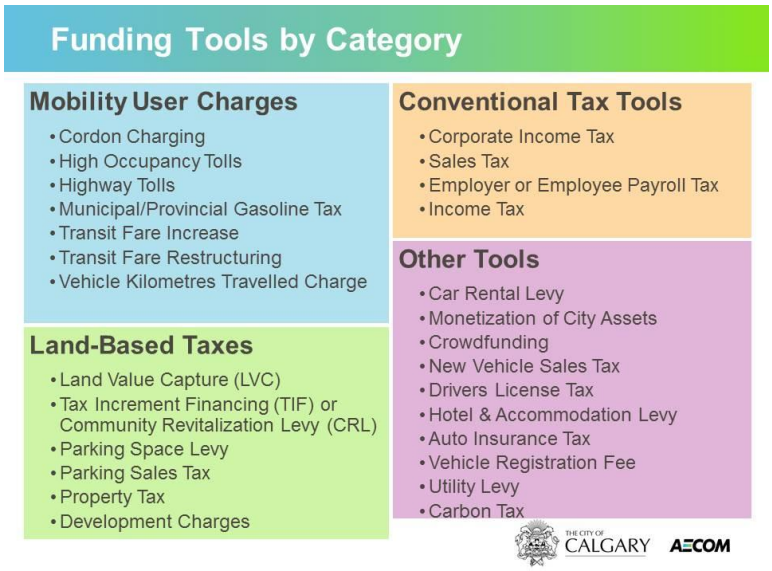
For each shortlisted Revenue Tool, the report provides a revenue forecast as well as a quantitative estimate of the travel behaviour impacts and the overall efficiency impacts of the Revenue Tool. The assumptions used in developing the revenue estimates apply the best information available publicly and were used for the sole purpose of creating an adequate basis to assess the revenue potential of the tools.

The remainder of this section explains the rationale for evaluating Revenue Tools; presents the evaluation framework, and discusses other relevant considerations, such as the issues considered in arriving at the shortlist of Revenue Tools considered in this report.

1.1 Council Direction

The starting point for this work was the funding tools identified by AECOM in 2013 and presented at the Special Meeting of Council on January 31, 2014, where tools were categorized as mobility user charges, traditional tax tools, land-based Revenue Tools and other tools (see Figure 1 below). Council directed further evaluation of 27 potential funding or revenue sharing mechanisms to fund the future transition to the Green Line LRT, and the remainder of the unfunded capital projects in The City of Calgary's "*Investing in Mobility, 2015-2024 Transportation Infrastructure Investment Plan*".

Figure 1 - 27 Funding Tools Presented to City Council, January 2014



1.2 New Vs Re-Allocated Revenue Sources

The purpose of this project is to develop a short-list of revenue sources for funding the gap in the transportation program over the next ten years. There are three methods to address the funding gap:

1. New revenue sources drawn directly from users or taxpayers: These consist of Revenue Tools not currently used as a source of funding for the City of Calgary and the Province of Alberta. All of these revenue sources would represent a new revenue source for either the City and or the Province:
   - Mobility charges: Car rental levy, cordon charging, high occupancy tolls, highway tolls and other tolling options and a vehicle kilometre charge
   - Conventional tax tools: payroll taxes and sales taxes
   - Land-based taxes: Land transfer tax, land value capture and parking space levy
   - Other tools: auto insurance tax, carbon tax, crowdfunding, drivers' license tax, hotel and accommodation levy, monetization of city assets, new vehicle sales tax, utility levy and vehicle registration fee.

2. Existing revenue sources drawn directly from users or taxpayers: These consist of Revenue Tools already used either by the City or the Province. In almost all these cases, the funds collected go into the consolidated revenue funds of the City or the Province and are used to fund the provision of services or responsibilities of the respective governments. These revenue sources comprise:
   - Mobility charges: Fuel tax
   - Conventional tax tools: Corporate income tax and personal income tax
   - Land-based taxes: Development charges, property tax and tax increment financing (Community Revitalization Levy)

3. Federal or provincial contributions. In addition to the first two categories, the City may be able to access specific provincial or federal spending envelopes intended for specific uses, such as the Building Canada Fund at the federal level or the Municipal Sustainability Initiative at the provincial level. Funding for these specific programs and grants – which included an Alberta provincial grant for transit operating funding cancelled in 2010 – comes from the consolidated revenue fund of the provincial and federal governments. As such, these programs do not represent additional revenue sources as much as targeted areas of spending by higher-order levels of government.

The remainder of this report examines the Revenue Tools in the first two categories on a comparable basis. That is, the report analyzes the impact of incremental increases in tax rates for each of the tools – whether new or existing. This enables a comparison of the results of these Revenue Tools on a like-for-like basis. However, in practice it is possible for the Province (or the City) to re-allocate existing revenue sources to the City transportation budget, if they so desire. This does away with any of the impacts of additional taxation, but it does require that decision-makers accept the impact of withdrawing the revenue from the alternative use.

The third category can also be explored by the City as a way to address the funding gap for transportation. This last category does not represent additional sources of funding, but rather spending programs targeted at specific uses, which can include operating transit funding, a use that tends to be ignored relative to capital grants.

1.3 Why Evaluate Revenue Tools?

The primary reason for evaluating Revenue Tools is to provide an indication of the revenue generation potential of each tool under alternative assumptions regarding charge rates and other design features. However, it is also important to recognize that additional revenue can be generated from many different Revenue Tools (and possibly from revenue-sharing with the provincial or federal governments on existing revenue sources). Hence, one of the main reasons to favour one tool over another is that it can improve the economic welfare of Calgary residents and businesses – by providing improvements in the performance of the travel network (or other travel-related benefits such as safety and environmental considerations) or by minimizing the economic distortions resulting from taxation.

1.4 Evaluation Framework and Criteria Explained

The evaluation framework applied to each shortlisted revenue tool is based on multiple criteria. These consist of:

1. Revenue sustainability over the forecast period
2. Implementation challenges
3. Equity impacts, and
4. Efficiency impacts, which take account of the costs of economic distortions, travel behaviour and transportation network performance and implementation costs.

Not all criteria are necessarily of equal importance. A qualitative scoring is provided for each revenue tool based on equal weighting of the criteria. This is designed to allow readers to formulate their own choices (e.g. based on attributing greater importance to some criteria over others).

In addition, the report provides the transport economics and public finance view of the relative performance of the different tools by summarizing the efficiency impact of each revenue tool.

Each revenue tool profile will consist of the following.

1. Overview of Tool

An overview of the tool is provided, including how the tool works. The purpose of the section is to ensure the reader has a basic understanding of how the tool can be used to generate revenues for use in funding transportation initiatives.

1.1. How does the tool work and where is it being used?

This subsection explains how the revenue tool works (i.e., whether it is applied as a flat rate charge or as a percentage of the base price) and which other jurisdictions rely on it.

1.2. How is the tool used for evaluation?

This subsection how the revenue tool would work for the purposes of the evaluation conducted in this report.

2. Revenue Potential, Sustainability and Impacts on Other Funding Sources

This section provides quantitative estimates of revenue potential and assesses the sustainability of the revenue source and any impacts on other funding sources.

2.1. Revenue potential

For each tool, a revenue estimate for 2014 (one year) is calculated and adjusted to account for changes in demand and travel behaviour stemming from the implementation of the tool. For the purpose of this evaluation, a revenue forecast for the 2015-2024 period is also provided.

2.2. Revenue sustainability

This subsection comments on the sustainability of the revenue stream in the medium- to longer-term, including the factors which affect any trend.

2.3. Impacts on other funding sources

Impacts of the revenue tool on other funding sources are examined, where relevant.

3. Implementation costs

These consist of additional capital, operating, maintenance and compliance costs required to implement the tool and collect the revenues. Compliance costs refer to the time, effort and any out-of-pocket costs borne by those who pay the charges.

4. Net revenue estimates

Net revenue estimates are provided showing the gross revenue less a high-level estimate of any incremental capital and operating costs required to implement the revenue tool over the 2015-2024 ten-year time frame. The time required for implementation is also taken into account. Tools that require one year or more to be implemented will not be able to generate revenue until the year in which implementation is complete. Thus, the net revenue estimates over the forecast period are reduced to capture this reduction. Tools that require less than one year for implementation are assumed to have a full year of revenue in their first year (i.e., 2015).

5. Impacts on travel behavior and transportation network performance

Impacts on travel behaviour and network performance (mode shifts, time savings, changes in auto usage costs and environmental impacts) are conceived relative to a base case characterized by the absence of the proposed revenue tool.

6. Implementation challenges: Technical & Governance considerations

These identify how the tool can be implemented with a particular focus on the ease and time required for implementation, such as whether mechanisms that are currently in place can be leveraged for monitoring and collecting revenues. It is important to note that the scores assigned for time and ease of implementation do not take societal or social acceptance considerations into account.

7. Equity and distributional impacts

This section notes the likely impacts of the revenue tool on different income groups (vertical equity) and whether individuals targeted by the tools are also the beneficiaries of the uses of the funds (horizontal equity).

8. Overall efficiency impact

The overall efficiency impacts of a revenue tool comprise three parts: (i) travel behaviour and transportation network performance impacts, (ii) implementation costs and (iii) the costs of economic distortions. Each of these factors is quantified for each revenue tool, where feasible.

This section considers whether the City of Calgary would be better off with the revenue tool in place, taking account of the incremental costs, any costs associated with economic distortions and the impacts on travel behaviour and network performance. It does not take into account revenue recycling (i.e., alternative uses for the revenue proceeds). In economic terms, this is equivalent to assuming that all the revenue collected is returned to those who made the payments.

Within each of the above criteria, specific characteristics were identified for evaluation purposes and scored on a 5-point scale, where 5 is the best score and 1 is the worst. The table below displays the characteristics that were evaluated for each of the tools and provides a guide for how the scores were arrived at. The majority of scores were

assigned relative to other tools. In other words, if Tool X is assigned a score of 3 for one criterion, then to be judged as superior with respect to that criterion, Tool Y should be at least a 4 for the same criterion based on the analysis of the quantitative and qualitative characteristics of the two tools. In instances where there were no quantifiable measures that could be used for scoring, professional judgment combined with the relevant experience of other major North American cities was used to determine those scores.

Table 1 - Breakdown of Scoring for Each Criterion Evaluated

BREAKDOWN OF SCORING FOR EACH CRITERION EVALUATED					
	1	2	3	4	5
REVENUE SUSTAINABILITY	Revenues are not sustainable in the short- or long-term	Revenues are not sustainable in the long-term	Revenues could be sustainable depending on user perception of the tool	Revenues are likely sustainable in the long-term	Revenues will be sustainable in the short- and long-term
IMPLEMENTATION CHALLENGES					
(1) Ease of Implementation	Significant barriers to implementation (costs, approvals, etc.)	High levels of coordination between multiple entities required	New tool requiring consultation with affected parties	Tool is already in place, but requires additional consultation for transit portion	Tool can be implemented almost immediately
(2) Time to Implementation	Significant planning, testing and infrastructure is required prior to implementation	Significant infrastructure is required to be built prior to implementation	New infrastructure or systems are required to be put in place prior to implementation	Existing infrastructure or systems can be leveraged for implementation with some coordination between entities	Tool can be implemented almost immediately
EQUITY IMPACTS ***(Horizontal Equity)***	None of the groups targeted / affected by the tool receive a benefit commensurate with the charge paid	Few of the groups targeted / affected by the tool will receive the full benefit from the tool	Select groups targeted / affected by the tool will receive a benefit; however, other groups will benefit without being targeted directly	The majority of affected groups who bear the cost also benefit from the tool; some groups may benefit without being targeted directly	All affected groups who bear the cost burden also derive commensurate benefits from the tool
EQUITY IMPACTS ***(Vertical Equity)***	Tool places a higher burden (in terms of proportion of income) on low-income groups	Lower income groups do not pay lower charges under this tool. So tool may represent a higher burden or proportion of income for low-income groups	Lower income groups sometimes pay lower charges under this tool, due to the lower value or quantity of their purchases (not to a lower charge rate)	Lower income groups often pay lower charges under this tool, due to the lower value or quantity of their purchases (not to a lower charge rate)	Lower income groups always pay lower charges under this tool, due to the lower value or quantity of their purchases (not to a lower charge rate)
EQUITY IMPACTS ***(Availability of Alternatives, where relevant)***	There are no practical alternatives to avoid this tool for groups targeted / affected	Few alternatives exist for groups targeted / affected by the tool; undue burden will be put on users looking to avoid the tool	Alternatives are available for targeted groups looking to avoid the tool, but likely in some form of modal shift	Alternatives exist; however, they may not be as convenient as the desired option	Equally suitable alternatives are conveniently available for groups targeted / affected by the tool

BREAKDOWN OF SCORING FOR EACH CRITERION EVALUATED					
	1	2	3	4	5
COSTS OF ECONOMIC DISTORTIONS	Tool will generate very high costs, from economic distortions (representing a large majority and possibly exceeding the revenue collected)	Tool will generate substantial costs from economic distortions (representing a substantial portion and up to a majority of revenue collected)	Tool will generate moderate costs from economic distortions (i.e., representing a significant portion of revenues collected)	Tool will only generate small and potentially insignificant costs from economic distortions (i.e., representing a small or negligible portion of revenues collected)	Tool will not generate any costs associated with economic distortions and may well reduce any pre-existing distortions
IMPLEMENTATION COSTS	Very high costs associated with implementing the tool	High costs associated with implementing the tool	Moderate costs associated with implementing the tool	Small or insignificant costs associated with implementing the tool	No incremental costs associated with implementing the tool
TRAVEL BEHAVIOUR AND TRANSPORTATION NETWORK PERFORMANCE					
(1) Impact on Network Performance	Tool has a negative impact on the network	Tool has no impact on network performance	Tool may have minimal positive impact on network	Tool will improve network performance	Tool will significantly improve network performance
(2) Travel Time Savings	Tool will increase travel times	Tool has no effect on travel time	Tool may decrease travel times slightly	Tool will generate travel time savings	Tool will generate significant travel time savings
(3) Savings due to Decreased Auto Use / Fuel Savings	Tool will increase auto use and fuel consumption	Tool has no effect on auto use or fuel consumption	Tool may cause minimal decrease in auto use and fuel consumption	Tool will decrease auto use and fuel consumption	Tool will significantly decrease auto use and fuel consumption
(4) Reductions in Traffic Collisions	Tool will increase the number of traffic collisions	Tool has no effect on traffic collisions	Tool may slightly reduce the number of traffic collisions	Tool will reduce the number of traffic collisions	Tool will significantly reduce the number of traffic collisions
(5) Air Pollution and Emissions Savings	Tool will increase air pollution and emissions	Tool has no effect on air pollution or emissions	Tool will minimally decrease air pollution and emissions	Tool will reduce air pollution and generate emissions savings	Tool will significantly reduce air pollution and generate emissions savings

1.5 Summary of Shortlisted Revenue Tools

A project coordination committee meeting was held on Monday, November 10, 2014 to discuss the evaluation of the long list Revenue Tools and input arising from the stakeholder interviews (see Appendix A for the profiles of the Revenue Tools not retained in the short list).

Several themes were noted from the stakeholder interviews:

- Reluctance to "nickel and dime" citizens with multiple taxes and levies; there is only one taxpayer
- Desire to address issue of Calgary non-residents making use of transportation infrastructure without contributing to the funding sources
- Additional taxes, or tools perceived as taxes, are politically unpalatable
- Revenue Tools should directly connect funding with the requirements of economic growth
- Potential to increase fuel taxes
- Support for region-wide application of new tools

Other suggestions for tools from the interviews included:

- Revenue sharing with province
- Bicycle tax
- Land transfer tax – incorporated into long list of Revenue Tools evaluated
- Privatized parking facilities, which is addressed under the City asset monetization tool
- Levying a toll on road users from outside the city
- Obtaining the provincial education tax room, which is similar to revenue sharing
- Selling naming rights for assets (included with City asset monetization tool)
- Revenue bonds - which is a form of financing rather than a funding tool
- Building infrastructure while interest rates are relatively low – which is also primarily a financing issue

The project coordination committee suggested the following shortlist of Revenue Tools for comprehensive analysis:

- Mobility charges:
    - Fuel taxes,
    - High Occupancy tolls (HOT) Lanes,
    - Road Tolls and
    - Other tolling options (Border Tolls and Facility-Specific Charges)
    - Transit Fares

- Conventional tax tools:
    - Personal Income Taxes
    - Sales Taxes

- Land-based taxes:
    - Development charges,
    - Land Value Capture,
    - Parking Space Levy
    - Property Tax

- Other tools:
    - Car rental levy,
    - Monetization of City Assets,
    - Utility Levy
    - Vehicle Registration Fee.

The shortlist was derived based on the results of the evaluation and discussions with the project coordination committee. The following were the principal considerations which determined the selection of the shortlisted revenue sources:

- Revenue generation potential
- Efficiency considerations
- Avoiding duplication of revenue sources

Based on these considerations, the following Revenue Tools were not shortlisted:

- Mobility User Charges
    - Cordon charge (downtown only) – this was dropped in favour of a cordon charge around the city boundary, given the concern that non-residents should contribute their fair share of transportation and transit infrastructure costs. Moreover, there is arguably already an equivalent downtown cordon charge in place due to the tightly controlled supply of parking places and resulting parking prices in downtown Calgary which are among the highest in North America. (There is little through traffic in downtown Calgary).
    - Vehicle Kilometres Travelled (VKT) Charge – this revenue tool was not shortlisted because it has not yet been implemented on a large commercial scale (although there are pilots underway, such as in Oregon) and because the road tolls and other tolling options are at least partial substitutes

- Conventional tax tools
    - The corporate income tax was not shortlisted, because it would entail greater inefficiencies compared to the three other conventional tax tools (payroll, income and sales taxes).
    - The payroll tax was no retained, because it would entail greater inefficiencies than sales taxes and it is not a revenue tool currently used by the Province.

- Land-based Revenue Tools
    - Tax Increment Financing (TIFs), known as a Community Revitalization Levy (CRL) in Alberta, was not shortlisted, because it does not generate new revenue but borrows instead from future property tax revenues, In this respect, it is more of a financing tool than a funding tool.
    - The land-transfer tax was not shortlisted, because it performed more poorly than the property tax in efficiency terms.
    - The parking sales tax was not retained, because it would apply only to priced parking in the downtown area, where parking prices are among the highest in North America.
    - Crowdfunding was not shortlisted, because it was not deemed have significant revenue potential.

- Other Revenue Tools
    - The auto insurance and carbon tax were not shortlisted because these were the worst performers in efficiency terms relative to the 10 Revenue Tools considered under this category (including the car rental levy).
    - The driver's license tax was not shortlisted, because it was deemed preferable to shortlist the vehicle registration fee, which may discourage vehicle ownership (rather than discouraging potential drivers).
    - The hotel and accommodation levy was not retained, because Province already has such a charge in place – a 4% ad valorem tax on temporary accommodation prices known as the Alberta Tourism Levy.

2. Mobility User Charges

2.1 Fuel Tax

2.1.1 Overview of the tool

2.1.1.1 How does the tool work and where is it being used?

A fuel tax is an excise tax levied on the sale of transportation fuels. The tax typically takes the form of either a flat rate per litre of fuel purchased or an ad valorem tax (i.e., a percentage of the base price).

The province of Alberta already collects a province-wide fuel tax of 13 cents per litre for gasoline and diesel, 5 cents of which is transferred to the cities of Calgary and Edmonton under the Basic Municipal Transportation Grant (BMTG).[2] The province-wide fuel tax was recently increased from 9 cents per litre to 13 cents per litre in the March 26, 2015 Alberta Budget. In addition, regional gas taxes dedicated to transportation exist in other provinces. In Quebec, there is currently a 3 cent-per-litre tax in the Greater Montreal area which was implemented by the Province of Quebec across all the municipalities in the Greater Montreal region to fund public transit operations. The tax is collected by the Province and remitted to the public transit operators. Similarly, in the Metro Vancouver Area, there is currently a 17 cent-per-litre tax on fuel which is dedicated to TransLink for operating and capital investments.

Table 2 - Qualitative Evaluation of Fuel Tax

CRITERIA	SCORE
1. Revenue sustainability	2
2. Implementation challenges	5
3. Equity Impacts	4
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network performance	4
▪ Implementation costs	5
Efficiency Impacts Average Score	4.0
Overall Score *(simple average)*	3.8

2.1.1.2 How is the tool used for evaluation?

The tax is assumed to be collected by fuel retailers and remitted to the provincial government along with the existing fuel tax. Unless otherwise stated, the analysis assumes an additional flat rate per litre of fuel sold is imposed on the existing "tax base" of both gasoline and diesel fuel sales in Calgary for the purposes of funding transportation initiatives in the City.

2.1.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

2.1.2.1 Revenue potential

A fuel tax has the potential to generate significant revenues for the City. According to annual reports produced by the provincial government, the fuel tax generated approximately $918 million in calendar year 2013. The existing fuel tax agreement between the Government of Alberta and the cities of Calgary and Edmonton stipulates that approximately 24% of Alberta-wide fuel tax revenues are attributable to fuel purchases in Calgary.[3] On this basis, a 1 cent-per-litre increase in the current fuel tax collected from the City of Calgary would generate approximately $24 million in 2014.

[2] *The agreement between the Province of Alberta and the two cities dates back to 2001, when the grant was known as the City Transportation Fund. The City of Calgary signed a revised agreement in 2013 under the BMTG.*

[3] *An alternate approach to determining the share of provincial fuel tax revenues attributable to Calgary would be to rely on vehicle registration data and estimate the share of Alberta vehicle registrations in Calgary, which is approximately 28%. However, it is not possible to confirm that this approach would produce a more accurate estimate of the City's share of provincial fuel tax revenues than the 24% share used in the fuel tax agreement.*

It follows that a 4.1 to 4.2 cent-per-litre increase is required to yield $100 million in 2014. These revenue yields are broadly consistent with the revenue estimates from the 2015 Alberta Budget.[4]

Table 3 - Revenue Potential for an Increase in Fuel Taxes

Yield for 1 cent/litre (2014$)	$24M
Rate for $100M Yield	4.1 – 4.2 cents/litre

The ten-year revenue forecast takes into account projected gains in vehicle fuel efficiency. Due to uncertainty in how changes in vehicle fuel efficiency will impact the demand for fuel over time, two methods were used for the forecast. Both methods use the same underlying growth rate in fuel use in Calgary (before consideration of fuel efficiency), which is based on the lesser of the annual growth rates of the Calgary population forecast (for the year in question) and the historical growth rate in vehicle registrations.

Method 1 – Vehicle fuel efficiency based on CAFE standards:

The United States government establishes Corporate Average Fuel Economy (CAFE) standards, which dictate the average fuel economy that an automaker's vehicle fleet must achieve. These standards did not change through much of the 1990s and 2000s, but new standards were recently announced through to 2025. Due to the integration of the North American vehicle market, improvements in vehicle efficiency in the United States typically flow through to Canada.

Starting with the base year of 2013, the relative improvement in the CAFE standard (combined standard for passenger vehicles and light trucks) was calculated for each year through to 2024. With the assumption that 7.5% of the vehicle fleet in Calgary is replaced each year, the cumulative impact of fuel economy improvements on fuel use in Calgary was estimated for each year of the forecast.

Method 2 – Vehicle fuel efficiency based on historical trend:

Transport Canada's annual reports provide detailed historical data for vehicle kilometres travelled and fuel used by light vehicles in each province. This data indicates that fuel use per kilometre in Alberta decreased by approximately 0.7% per year from 2005 to 2009. This annual improvement in fuel efficiency was extrapolated through to the 2015-24 forecast period.

The forecast in the table below and shown in Figure 1 is reported for a 4 cent-per-litre tax for the two methods. It also takes into account the reduction in fuel demand resulting from the tax-induced increase in the fuel price. The table below shows that a 4-cent increase in the fuel tax would generate revenues of approximately $100 million per year through the forecast period. The two methods produce similar results during the first five years of the revenue forecast, but diverge in later years as the phase-in of the fuel efficiency gains from the CAFE standards outpace historical fuel efficiency gains.

[4] *The Alberta Budget estimated $410 million in incremental revenue for FY 2015-16 from the 4 cent per litre fuel tax implement on March 27 2015, excluding the impact of capping the Tax Exempt Fuel User (TEFU) and Alberta Farm Fuel Benefit (AFFB). Note that the $410 million is expressed in nominal dollars, while the revenue estimates in Table 4 are in 2014 dollars. The latter figures can be converted into nominal dollars using the implicit GDP deflator from the Alberta Budget (i.e. ratio of real to nominal GDP on p. 56), which result in $94-95 million in nominal terms for Calgary in calendar year 2016, depending on which of the two methods is used. By comparison, the Alberta Budget estimate of $410 million (FY 2015-16) would yield $97 million in nominal terms in 2016. However, the revenues from the 4 cent per litre increase in the 2015 Budget are not shared with the cities of Edmonton and Calgary.*

Table 4 - Revenue Forecast for an Increase in Fuel Taxes

Revenue Yield for 4 cents/litre (2014$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Method 1	$99M	$99M	$100M	$99M	$100M	$100M	$99M	$99M	$98M	$96M	$988M
Method 2	$98M	$98M	$99M	$100M	$101M	$102M	$103M	$104M	$105M	$105M	$1,014M

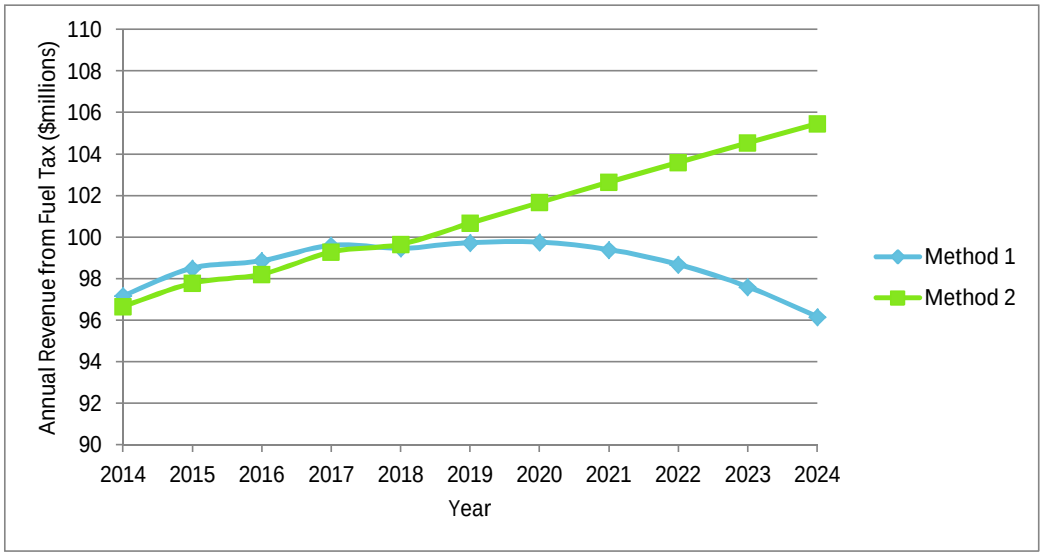
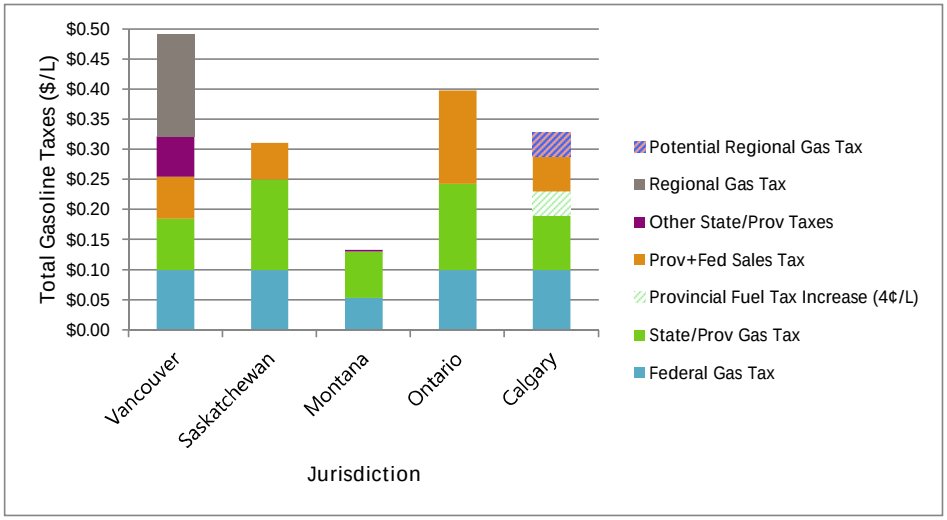


Figure 2 - Illustrated Revenue Forecast for Fuel Tax – 2015-2024

Figure 3 shows a comparison of fuel taxes in Calgary (after the introduction of the additional 4 cent-per-litre tax) as compared to current fuel taxes, including the March 2015 provincial fuel tax of 4 cents per litre, in force in selected neighbouring jurisdictions. With the exception of Montana, the sum of taxes per litre of fuel in Calgary would remain below most neighbouring jurisdictions even after the introduction of a 4 cent-per-litre tax. Calgary fuel taxes would be only 2 cents per litre higher than in Saskatchewan.



Sources: NRCAN web site, AECOM research

Figure 3 - Jurisdictional Comparison of Fuel Taxes, 2015

2.1.2.2 Revenue sustainability

Fuel tax revenues may not be sustainable in the medium- to longer-term as vehicles become more fuel efficient, in part through increased reliance on hybrid and electric vehicles. This trend is evident in the Method 1 revenue forecast, which is based on more aggressive CAFE standards.

2.1.2.3 Impacts on other funding sources

The implementation of a new fuel tax is expected to result in decreased fuel use compared to the level of fuel use without the tax, as noted above. As a result, the new fuel tax would adversely affect the revenue collected by the Province from the existing 13-cent gas tax. Over the 10-year revenue forecast period, the reduction in provincial gas tax revenues collected by the Province from the city of Calgary is in the order of $45 million to $50 million. As a result, the City's revenue allocation under the existing 5-cent per litre BMTG grant would be decline by an amount between $25 million and $28 million (or 5/9 of the $45-$50 million revenue reduction). This revenue reduction is not incorporated into the revenue forecast in section 2.1.2.1 above.

2.1.3 Implementation Costs

Incremental costs associated with implementing a fuel tax would be nil. The Province has already established an administrative structure for collecting the existing fuel tax. The new tax could easily be added to the current provincial fuel tax on a province-wide basis and the current fuel tax agreement between Calgary and the Province could be amended so that the additional revenue collected from the city geographic area is remitted to The City.

2.1.4 Net Revenue Estimates

The net revenue for The City from a four-cent gas tax from 2015 to 2024 is in the order of $1 billion. There are no incremental implementation costs from an additional fuel tax. Since the additional fuel tax can be implemented relatively quickly (i.e., within the year 2015) we have assumed that the total revenue generated by the fuel tax over the ten-year period would be available to The City.

2.1.5 Travel Behaviour and Transportation Network Performance Impacts

A higher fuel tax could have a positive effect on the overall performance of the transportation network in the long-term through reduced congestion on all major highways and arterial roads.

The extensive literature on the micro-economic adjustments in behaviour arising from fuel taxes indicates that drivers reduce their demand for fuel (in response to higher prices) by driving less and by switching to more fuel-efficient vehicles over time. In the short-term, both these effects are inelastic (e.g., the percentage reduction in vehicle kilometres driven resulting from the tax-induced fuel price increase is much smaller than the original percentage increase in fuel prices), because drivers have relatively limited discretion to alter their behaviour.[5] The ability to re-organize and postpone trips (including car-pooling), to switch to public transit or active modes of travel, to cancel their trips altogether and to purchase more fuel-efficient vehicles is very limited. Over the longer-term (typically 2-5 or more years), drivers have much more discretion to re-organize their travel commitments and they also have opportunities to change their vehicle purchases in order to manage their fuel consumption. As a result, the long-term response in demand for fuel and for vehicle kilometres driven is greater than in the short-term. The analysis is based on a price elasticity of demand of -0.3 for 2015; rising to -0.5 for 2016 and 2017; and rising further to -0.7 from 2018 to 2024.

Over the long-term, the reduction in vehicle kilometres travelled can account for between one-third of the total reduction in fuel consumption (e.g., Agras and Chapman 1999) up to 95% of the total reduction in fuel consumption (e.g., Bento et al. 2009), with the remainder accounted for by a shift to more fuel-efficient vehicles. This reduction in vehicle kilometres travelled can be due to:

- Changing travel modes, including shifting to public transit, if appropriate services are available
- Postponement and re-organization of trips;
- Suppression of trips; and or
- Changes in the location of residences, workplaces and amenities intended to reduce trip lengths

A rough estimate of the benefits arising from a 4 cent-per-gallon increase in the fuel tax can be derived. The reduction in fuel consumption from this tax is in the order of 1% under an elasticity of -0.3. Based on the full cost investigation analysis undertaken by Transport Canada, the average social costs associated with the use of light vehicles in Canada were estimated at $0.056 per km in 2006, which included the average accident, air pollution, GHG and congestion costs across Canada.[6]

Using the average fuel efficiency for light vehicles in Alberta in 2006 (12.3L per 100km), this suggests that average social costs amounted to about $0.46 per litre. If the reduction in fuel demand attributable to the reduction in driving is 40% of the total (with 60% due to increased fuel efficiency), which is consistent with Parry et al. 2007, this would suggest that the reduction in social costs (congestion, accident, air pollution and GHG costs) would be about $3 million in 2015. In addition, the fewer kilometres driven would represent savings of $7 million and the impact of improved vehicle fuel efficiency would mean savings of $11 million in lower fuel consumption.

Together, these incremental benefits ($21 million) would represent about 21% of the revenue generated from the 4 cent regional fuel tax in 2015. In other words, for every dollar of revenue collected, the fuel tax would generate 21 cents of additional social benefits. Moreover, these benefits would increase significantly as the elasticity of demand rises to -0.5 and -0.7 over the ten year period. As a result, over the ten year period, these benefits would represent between 30% and 40% of the gross revenue generated. However, these rough calculations may not capture all the

[5] This means that short-run elasticity values are between 0 and -1. For example, see Tae Hoon Oum, W.G. Waters II, and Jong-Say Yong (1992), "Concepts of Price Elasticities of Transport Demand and Recent Empirical Estimates" in *Journal of Transport Economics*, May, pp. *139-154; Victoria Transport Policy Institute "Transportation Elasticities: How Prices and Other Factors Affect Travel Behaviour" 21 July 2011.*

[6] *Bruno Jacques "Estimates of the Full Cost of Transportation in Canada: An Overview" Transport Canada, presented at the Mobility Pricing Conference, Feb. 3, 2011. Note that the estimates above are average rather than marginal costs. Marginal costs are likely to be higher than average costs for cost components such as congestion.*

costs associated with the behavioural changes resulting from the fuel tax increase (e.g., the incremental transit operating costs associated with trips that shift to transit).

2.1.6 Implementation challenges: Technical & Governance considerations

The tax would be collected by fuel retailers and remitted to the provincial government using the existing fuel tax collection system. The funds could then be transferred to the City for use in funding transportation initiatives.

The preferred area of implementation for the tax would be the Calgary Regional Partnership (CRP) municipalities or even the entire province of Alberta, with the revenues generated outside of Calgary going to the respective municipalities or to the Province. Having a single authority, like the Province, responsible for the collection of the revenues from this new tax is likely the best way to minimize implementation costs (and inefficiency costs, as discussed in section 2.1.8 below).

2.1.7 Equity and Distributional Impacts

Drivers would have to pay the fuel tax when purchasing fuel inside Calgary. If the tax leads to sustained fuel prices that are higher than in the surrounding areas outside Calgary, users may plan trips that incorporate opportunities to purchase fuel outside the city. This effect may not be material for a price differential of a few cents per litre, but it would be significant at a price differential of 10 cents per litre and higher.

With respect to distributional issues, fuel taxes may be borne disproportionately by households which are more reliant on personal vehicle travel, such as those in rural areas and suburban areas with fewer transit services.

2.1.8 Overall Efficiency Impact

A large fuel tax is likely to entail significant changes in travel and vehicle purchase behaviour over the long-term, notably reduced driving and a more fuel-efficient vehicle fleet. It may also entail some improvement in the performance of the transportation network. As discussed above, these benefits could amount to at least $0.30 per dollar of revenue collected.

In addition, the costs of economic distortions resulting from the additional fuel tax need to be estimated. These distortions are due to changes in behaviour in markets other than travel markets (i.e., labour, consumption, savings) resulting from the new tax. This is a relatively new area of the literature, but a recent study of the micro-economic effects of raising US gasoline taxes found that efficiency costs would be in the range of $0.15 to $0.25 cents per dollar of revenue raised, depending on whether the fuel tax increase is $0.10 per gallon or $0.75 per gallon respectively (or $0.026 per litre and $0.20 per litre respectively).[7]

Combining the two above considerations – travel market impacts and other economic distortions – would suggest that the overall efficiency impact of the fuel tax would be positive and generate between $0.05 to $0.15 cents per dollar of revenue raised. However, the net benefit from introducing the higher regional fuel tax is likely to lie at the low end of this range for at least two reasons.

First, the Bento et al 2009 study which yielded the result of distortionary costs between $0.15 to $0.25 cents per dollar of revenue raised was conducted for the US market, where the tax increase under consideration was the US federal gasoline tax, which applies equally across the entire country. A fuel tax imposed only within the city (or even the CRP or Alberta as a whole), would entail higher distortions, given the greater room for perverse or unintended changes in behaviour when the tax applies to a smaller jurisdiction.

Second, distortionary costs tend to be higher when a given tax increase is applied on top of a higher pre-existing tax rate. The Bento et al 2009 study was based on the US, where the federal fuel tax combined with the average state fuel tax was $0.41 per gallon in 2009 (or $0.108 per litre), which is significantly lower than the combined federal and provincial fuel taxes in Alberta (now at $0.23 per litre). This would also suggest that the distortionary costs of an

[7] *Bento et al. (2009) "Distributional and Efficiency Impacts of Increased US Gasoline Taxes" American Economic Review 99: 1-37.*

additional $0.04 the fuel tax is also expected to increase the cost of moving goods within Calgary. This could have a marginal negative impact on the competitive position of companies within Calgary and could also lead to a one-time price adjustment. However, transportation costs represent only a small share of retail or consumer prices for goods and services and as such, the impact on consumer prices may not be discernible even if all of the fuel price increase is passed onto final prices.

Hence, the overall efficiency impact of a fuel tax increase may well be positive, but it is unlikely to be much higher than $0.05 cents per dollar of revenue collected.

2.2 Tolling Options

2.2.1 Overview of the Options

2.2.1.1 How does the tool work and where is it being used?

This section considers four types of tolling options: High Occupancy Toll (HOT) lanes, road tolls, border toll and facility-specific toll.

Table 5 - Qualitative Evaluation of Tolling Options

Criteria	Scores by Tolling Option			
	HOT Lanes	Road Tolls	Border Toll	Fac-Sp Toll
1. Revenue Sustainability	5	5	4	3
2. Implementation Challenges	2	2	1	4
3. Equity Impacts	4	3	3	4
4. Efficiency Impacts				
▪ Costs of Economic Distortions	5	4	2	3
▪ Travel Behaviour and Transportation Network Performance	4	4	3	2
▪ Implementation Costs	2	1	1	3
Efficiency Impacts Average Score	3.7	3.0	2.0	2.7
Overall Score *(simple average of 1,2,3,4)*	3.7	3.3	2.5	3.4

HOT Lanes

Using high-occupancy toll lanes, single-occupant vehicles can pay a toll for the use of otherwise restricted high-occupancy lanes on limited-access highways. High-occupancy vehicles use the lanes paying no toll. The tool requires the existence, creation or designation of high-occupancy lanes, which can be used with no toll by vehicles with a minimum number of passengers (i.e., high-occupancy vehicles with two or more people (HOV2+)).

HOT lanes have been successfully implemented in a growing number of US states including Colorado, Florida, Utah, Georgia, Minneapolis, Washington State, California, Virginia and Texas.

Road Tolls

Road tolls are a common revenue tool used in a number of jurisdictions globally. Drivers pay a toll per kilometre travelled on a designated road (or section thereof) or on the overall road network in a given jurisdiction. Road tolls are typically applied to limited-access roadways since entry and exit from the road is more controlled. Toll rates can either be fixed throughout the day or vary based on the time of day to help reduce congestion.

Road tolls are used in many jurisdictions globally, including Toronto where Highway 407ETR is an electronically tolled highway operated by a private concessionaire. Several cities in the United States and Europe also use road

tolls as a key revenue source for funding construction of, maintenance of, or improvements to their transportation networks, including roads that are not tolled, as well as transit.

Border Toll

A border toll is a specific configuration of tolls which applies to the entry into and/or exit from a particular jurisdiction, be it a city, region or country. While there are many examples of tolled bridges or tunnels between Canada and the US, there are few examples of a jurisdiction with tolls designed to charge all incoming and/ or outgoing traffic.

Facility-Specific Toll

A facility-specific toll usually applies to a bridge, tunnel or any other specific road facility. There are many examples in BC, Ontario and elsewhere in Canada. These types of tolls are usually put in place primarily in order to fund the building and maintenance costs of the facility.

2.2.1.2 How the Tool is Being Considered for Evaluation

HOT Lanes

For the purposes of this analysis, HOT lanes are implemented on freeway segments that have at least three general-purpose lanes per direction for a contiguous distance without chokepoints. One of these general-purpose lanes would be converted to a HOT lane, leaving at least two general-purpose through lanes without a toll. The only applicable freeway segments would be Highway 2 (Deerfoot Trail) between Anderson Road and Highway 201 (Stoney Trail NW/NE), Crowchild Trail between Highway 201 and 24 Av NW, and Crowchild Trail between Bow Trail and Glenmore Trail. A toll would be charged on all single-occupant vehicles using the converted lanes. Vehicles with two or more occupants would be exempt from the toll. HOT lanes would be in force in the peak periods in the peak direction only, when congestion is highest.

Road Tolls

Road tolls would be charged on all provincial limited-access highways and major municipal expressways in Calgary. This would involve tolling more than 160 km of centreline highway in the area. The roads that would be tolled include Highway 2 (Deerfoot Trail) within the Highway 201 ring road, Crowchild Trail, Glenmore Trail west of Deerfoot Trail, and all of Highway 201 (the ring road), including the future section through southwest Calgary. For the purposes of this analysis, it is assumed that all targeted roads would be tolled using a fixed rate per kilometre at all times.

Border Toll

A border toll is assumed to be implemented on all roadways crossing the Calgary city limits. Since the city limits are outside of the Highway 201 ring road, traffic would not be able to use this highway to bypass the toll. For the purposes of this analysis, it has been assumed that the toll would be in place at all times and charged only for trips entering Calgary.

Facility-Specific Toll

Two Calgary examples of a facility-specific toll were considered in this report: the newly built Airport Tunnel and the existing Bow River Bridge on Crowchild Trail. The Airport Tunnel was chosen because it is a recent piece of infrastructure that is planned to become a more integral component of the road network. The Bow River Bridge was chosen because the expansion of the bridge was identified as a project in the “Investing in Mobility” plan.

2.2.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

2.2.2.1 Revenue Potential

HOT Lanes

This revenue tool generates only limited gross revenues, as shown in Tables 6 and 7.

Table 6 - Revenue Potential for HOT Lanes

Yield for $0.01/km (2014$)	$0.2M
Rate for $100M Yield	Not applicable

Table 7 - Revenue Forecast for HOT Lanes

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $0.20/km (2014$)	$4M	$4M	$4M	$5M	$5M	$5M	$6M	$6M	$6M	$7M	$51M

High-occupancy toll lanes have modest potential to generate revenues within Calgary, since the HOT lanes would be in force only for certain highway segments and would only be attractive to users during peak travel times.

The 10-year revenue forecast for HOT lanes is based on a projection of the average traffic growth rate from 2007 to 2012 using City of Calgary traffic data for a selection of potential HOT lane locations. This forecast is also assumes that the toll applies to single-occupant vehicles. As the remaining general-purpose lanes reach capacity for longer durations during the peak periods, more single-occupant vehicle drivers will choose to use the HOT lanes, increasing the revenue generated.

Road Tolls

Road tolls have the potential to generate substantial revenues for the City. A one cent-per-kilometre charge would likely yield approximately $30 million in 2014, based on existing traffic volumes. This takes account of expected behavioural changes. It would be feasible to generate $100 million in one year with a flat toll of a little more than three cents per kilometre.

Table 8 - Revenue Potential for Road Tolls

Yield for $0.01/km **(2014$)**	$30M
Rate for $100M Yield	$0.034/km

The 10-year revenue forecast for road tolls is based on the average traffic growth rate from 2007 to 2012 using City of Calgary traffic data for a selection of potential road toll locations.

Table 9 - Revenue Forecast for Road Tolls

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $0.03/km (2014$)	$91M	$92M	$94M	$96M	$97M	$99M	$101M	$102M	$104M	$106M	$983M

Border Toll

A border toll has the potential to generate a substantial amount of revenues for the City. A $2 toll, applied only to vehicles entering Calgary, is expected to yield over $100 million per year, based on existing traffic volumes.

The 10-year revenue forecast for the border toll applies the average traffic growth rate from 2004 to 2013 based on Alberta Transportation traffic data for major provincial highways entering Calgary. Since this annual growth rate is very high (nearly 6%), it was reduced to 5% in the later years of the forecast to reflect that the larger population base in the suburbs outside Calgary, plus the decreasing provincial population growth rate, would likely result in a slower rate of growth (as a year-over-year percentage) in the longer term.

Table 10 - Revenue Potential for a Border Toll

Yield for $1/trip (2014$)	$53M
Rate for $100M Yield	$1.96

Table 11 - Revenue Forecast for a Border Toll

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $2/trip (2014$)	$108M	$115M	$121M	$128M	$136M	$143M	$150M	$157M	$165M	$174M	$1397M

Facility-Specific Toll

An airport tunnel toll charge has modest potential to generate revenues for the City, since the toll would be applied at only one point and there is a high potential for traffic diversion. A $2 toll on the tunnel would only be expected to generate approximately $10 million in 2014, with substantial increases dependent on the eastward extension of Airport Trail toward Highway 201.

The traffic growth factor used in the 10-year revenue forecast is based on traffic information from selected sources.[8] The growth factor was adjusted downwards through to 2020 to reflect the lack of a connection east of 36 St NE. It is assumed that the extension to Métis Trail and Highway 201 will open by 2020, allowing more traffic to access the tunnel.

A toll charge on the Bow River Bridge on Crowchild Trail has a much greater potential to generate revenues for the City, as this bridge is one of the most heavily travelled bridges in the city. A $2 toll on the bridge was projected to generate slightly more than $60 million in 2014. A similar amount of revenue was projected each year in the 10-year revenue forecast. In recent years, there was little growth in traffic on the bridge, presumably because the bridge is near or at capacity during peak periods. Without expansion of the bridge, growth in traffic volume is limited. The analysis is based on having no bridge expansion within the forecast period.

[8] *Existing traffic volumes from "By the numbers: Details about the Airport Tunnel", Calgary Herald, May 22, 2014. Future projections from Airport Trail Functional Planning Study presentation, MMM Group, 2012.*

Table 12 - Revenue Potential for Selected Facility-Specific Tolls

	Airport Tunnel	Bow River Bridge
Yield for $1/trip (2014$)	$5M	$32M
Rate for $100M Yield (2014$)	Not applicable	$3.25 to $3.40

Table 13 - Revenue Forecast for Selected Facility-Specific Tolls

Revenue Yield for $2/trip (2014$)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Airport Tunnel	$10M	$11M	$11M	$11M	$12M	$12M	$13M	$13M	$14M	$14M	$121M
Bow River Bridge	$62M	$62M	$62M	$63M	$63M	$63M	$63M	$63M	$63M	$63M	$628M

2.2.2.2 Revenue Sustainability

HOT Lanes

Revenues from HOT lanes depend closely on the level of highway congestion in the areas where HOT lanes are available as well as drivers' implicit value of time. The more congestion there is on the highway, the more willing users will be to pay for use of the HOT lanes.[9] In addition, the higher the drivers' value of time, the more willing they will be to pay for time savings and improved reliability under congested traffic conditions. Both of these factors suggest that HOT lane revenues should grow significantly over time, unless highway capacity grows more quickly than traffic levels.

Road Tolls

Road tolls would be a sustainable source of revenue over the long-term, because road usage is strongly correlated with economic growth.

Border Toll

Toll revenues from a border toll around Calgary would be less sustainable than in the case of highway tolls because there would be some incentive to locate jobs and other economic activity outside the city in the longer term.

Facility-Specific Toll

The sustainability of a facility-specific toll would depend on the available alternative routes bypassing the tolled facility in the medium to longer term.

In the case of the airport tunnel, the revenue source is likely to be sustainable because traffic in the area will continue to grow. In addition, the construction of parallel roads is constrained by the airport and development lands, so the number of alternative options is unlikely to increase over time. As parallel roads become congested over time, a tolled airport tunnel would become a more attractive option for road users.

[9] *An analysis of live traffic data for the 95 Express Lanes between Miami and Fort Lauderdale found a linear relationship between traffic density on HOT lanes and that on general purpose lanes, suggesting that the more the GP lanes become congested, the more drivers pay a toll and switch to the HOT lanes (L. Kong and M. Hallissey "Managed Lanes Traffic and Revenue Potential: 95 Express Case Study" Paper P12-5897 presented at the January 2012 TRB Annual Meeting.*

A toll on the Bow River Bridge is likely to be more sustainable because the bridge already carries a high volume of traffic and the few available alternatives are also heavily used. No additional river crossings near this bridge are planned apart from improvements to the Bow River Bridge, as identified in preliminary Crowchild Trail transportation planning studies.

2.2.2.3 Impacts on other funding sources

Tolling options, particularly the road and border tolls, may have a small negative impact on fuel tax revenues collected by the Province to the extent that tolls reduce vehicle kilometres travelled.

2.2.3 Implementation Costs

HOT Lanes

The incremental costs associated with the implementation of HOT lanes would be significant. From a capital cost perspective, HOT lane tolling can be less capital-intensive than full highway tolling due to smaller gantries and fewer required cameras and other electronics. Nonetheless, capital investment would be required for the initial construction of tolling infrastructure and gantries along all portions of highway in the region in which HOT lanes are available. Significant infrastructure expenditures would also be incurred for lane barriers, vehicle monitoring systems and transaction processing systems.

Road Tolls

The implementation costs associated with road tolls would be significant.

The initial construction of overhead gantries to record passing vehicles on tolled roads would require significant capital investment. It was assumed that a gantry would be installed at each entry or exit point to the toll road network, which includes all on- and off-road ramps with non-tolled roads and at the end points of the tolled segments. The cost of these gantries was estimated at about $225 million. Since the lifespan of these gantries is assumed to be 15 years, the capital cost was amortized over this period. As a result, a lower (amortized) capital cost of $147 million is used for the 10-year forecast period.

The operating cost was assumed to be 19% of revenues, which is based on the ratio of operating expenditures (and likely some capital maintenance expenditures) to revenues for the 407ETR.[10] Over the 10-year revenue forecast, operating costs are expected to total $186 million on an undiscounted basis.

Border Toll

As in the case of highway tolls, there would be substantial capital and operating costs for the implementation of this option. Each road crossing the city limits would either need a gantry installed or be closed. If the toll is charged only for inbound vehicles, limited-access, divided roadways may only need a gantry in the inbound direction. The cost of these gantries was estimated at approximately $45 million. Since the lifespan of these gantries is assumed to be 15 years, the capital cost was amortized over this period. As a result, a lower (amortized) capital cost of $29 million is used for the 10-year forecast period. The operating cost is assumed to be 19% of revenues, which is based on the ratio of operating expenditures (and likely some capital maintenance expenditures) to revenues for the 407ETR revenues.[11] Over the 10-year revenue forecast, operating costs are expected to total $264 million on an undiscounted basis.

The border toll is assumed to be charged in one direction only because implementation costs would be substantially lower than charging the toll in both directions, assuming that traffic volumes are similar in both directions. Capital costs would be slightly lower with a unidirectional toll than a bidirectional toll because a unidirectional toll would

[10] *Costs of Alternative Revenue Generation Systems, NCHRP 689, 2011.*
[11] *Costs of Alternative Revenue Generation Systems, NCHRP 689, 2011.*

avoid the need for a second gantry on limited-access, divided roadways. Operating costs would be substantially lower for a unidirectional toll because half as many transactions are required to collect the same amount of revenue. Many other jurisdictions charge tolls in only one direction. For example, in New York City, many of the tolled water crossings only have a toll in one direction.

Facility-Specific Toll

This tolling option should have relatively modest capital and operating costs, since there is likely to be only one point for each facility at which the toll is imposed on passing traffic. Nevertheless, the implementation costs for the airport tunnel toll amount to about $25 million over the ten-year period and the implementation costs for the Bow River Bridge toll amount to approximately $120 million over the ten-year period, both on an undiscounted basis. Almost all of these costs are attributable to operating costs, which may be on the high side.

2.2.4 Net Revenue Estimates

HOT Lanes

The net revenues from HOT lanes will be substantially less than the $51 million of gross revenue generated due to capital costs for gantries, electronic equipment and other civil infrastructure as well as operating costs associated with processing the transactions. For the purposes of this report, it was assumed that HOT lanes could be implemented in three years (i.e., by 2018). Therefore, the net revenue for the forecast period would be further reduced, and only generated within the remaining seven years of the forecast. Hence, it is possible that capital and operating costs could more than offset gross revenues for the forecast period.

Road Tolls

The net revenue for the City from a 3 -cent-per-kilometre road toll over the ten-year period is $650 million on an undiscounted basis. The capital and operating expenditures required to support road tolling is extensive, totalling more than $300 million. For the purposes of this report, it was assumed that road tolls could be implemented in five years (i.e., by 2020). Therefore, the net revenue during the remainder of the forecast period is approximately $340 million.

Border Toll

The net revenue from a $2-per-trip border toll is estimated at $1.1 billion on an undiscounted basis over the ten-year period. The capital and operating expenditures required to support road tolling is extensive, totalling nearly $300 million. For the purposes of this report, it was assumed that a border toll could be implemented in five years (i.e., by 2020). Therefore, the net revenue during the remainder of the forecast period is approximately $625 million.

Facility-Specific Toll

The net revenue for the City from a $2-per-trip toll at the airport tunnel over the ten-year period is about $100 million on an undiscounted basis. The net revenue from the same toll at the Bow River Bridge is estimated at slightly more than $500 million (undiscounted) over the ten-year period. For the purposes of this report, it was assumed that a facility-specific toll on either facility could be implemented in three years (i.e., by 2018). Therefore, the net revenue during the remainder of the forecast period is approximately $70 million for the airport tunnel and $360 million for the Bow River Bridge.

2.2.5 Travel Behaviour and Transportation Network Performance Impacts

HOT Lanes

The primary behavioural rationale for the introduction of HOT lanes is that they provide drivers in congested highway conditions with an option to save travel time and to reach their destination on time (i.e., trip time reliability) in those

instances (e.g., business trips, trips to airport or emergencies) when the value of trips exceeds the toll charge. Given that the value of time and reliability varies significantly across the population of drivers as well as across the trips taken by the same driver (depending on the purpose of their trip), HOT lanes can have substantial positive impacts on consumer welfare and productivity by facilitating the most valuable trips for personal emergencies as well as business purposes.

While this analysis does not quantify the transportation user benefits of implementing HOT lanes, these benefits should be studied as they could be significant. One unique feature of HOT lane projects is that the value of time savings for HOT lane users may be considerably higher than for the average highway user, because only users with relatively high time values, determined in part due to trip circumstances (e.g., late for an appointment), will self-select to use the HOT lanes. In fact, the travel time savings and the voluntary nature of this type of tool are the primary reasons it is now being implemented in many cities across the US (and why it is also being considered in Toronto and other Canadian cities).

Though this analysis is based on HOT lanes being introduced along segments of Deerfoot Trail and Crowchild Trail with three lanes per direction, much of the existing congestion on these highways is caused by two-lane bottlenecks just beyond the assumed HOT lane segments. In these areas, HOT lanes would operate as queue-jump lanes, allowing users to bypass some of the congestion in the general-purpose (GP) lanes and merge into the GP lanes just before the bottleneck. HOT lanes would also allow users exiting the highway upstream of the bottleneck to avoid much of the queuing caused by the bottleneck.

Road Tolls

Introducing tolls on all major roads could significantly improve the overall performance of the transportation network within the region by reducing congestion.

In the short term, changes in travel behaviour would lead to fewer vehicle kilometres travelled by encouraging a shift to other modes (if convenient transit services are available; or car-sharing), regrouping and rescheduling trips as well as suppressing certain trips which users may value less than the toll charge plus the auto usage costs associated with the trip. This would also result in associated savings in fuel and auto usage costs, fewer collisions, and less air pollution and carbon emissions. However, there would also be some diversion of shorter trips from the tolled highways to local and arterial roads.

In this case, a rough estimate of the value of the changes in travel behaviour and network performance can be developed based on the reduction in vehicle kilometres travelled arising from a $0.03 toll. This calculation is based on the average social costs associated with the use of light vehicles in Canada, which were estimated at $0.056 per km in 2006 and included average accident, air pollution, greenhouse gas emissions, and congestion costs; and the average driving cost $0.53 per km. The results suggest that the value of travel behaviour changes are approximately 47% of the gross revenue collected under this tool (i.e., for every dollar of revenue collected, this revenue tool generates $0.47 cents in travel and related safety and environmental benefits and auto operating cost savings). On the one hand, this is a conservative estimate, because the Transport Canada social cost estimate is dated (i.e. from 2006). On the other hand, the estimate does not take account of the cost of travel diversions, which would bring down the estimate somewhat.

Border Toll

The behavioural changes resulting from a border toll around Calgary would be a fraction of the benefits identified under the highway toll (i.e., likely half or less). This is because the tolling points would amount to a screenline that follows the city border rather than a tolling strategy based on where most of the traffic or the congestion is found (and where drivers have few alternative routes available). In other words, a border toll would amount to an arbitrary tolling strategy with limited benefits rather than a tolling strategy designed to maximize travel benefits (or revenue generation). All the trips within Calgary would not be subject to the toll. In addition, short auto trips crossing the city border would be subject to the toll and would necessarily pay the same toll as long trips into the city centre. As a

result, the border toll could be expected to have a disproportionate effect on traffic and congestion in the area near the city border, but it would have considerably less impact in addressing congestion in the city centre and adjacent communities.

The behavioural adjustments from a $2 toll suggest that auto trips crossing the city border would decline by about 6% (or 8.4 million trips per weekday), based on an elasticity of -0.3 and a driving cost of $0.53 per km in 2014.

Facility-Specific Toll

The behavioural adjustments from a facility-specific toll are generally of second-order importance, because the primary objective of such a toll is cost recovery and revenue generation rather than congestion reduction. In fact, these types of tolls should be designed to minimize the adverse impact on traffic using the facility, because a reduction in trips on these facilities usually means that there is diversion to other facilities, potentially resulting in underutilization of the tolled asset. Hence, the travel behaviour impacts for this version of toll pricing have not been estimated.

2.2.6 Implementation challenges; Technical & Governance Considerations

All Options

Planning and building infrastructure for vehicle monitoring and transaction processing will be costly and take several years. As such it is likely that any of the toll pricing options considered here (with the exception of the facility-specific toll) would require a phased implementation approach across Calgary in order to facilitate installation of the required tolling technology and public understanding of the charging system.

The implementation of any tolling option would require provincial legislative changes, because the provincial “Traffic Safety Act” prohibits the charging of a tax or fee for road use.

Note on HOT Lanes

HOT lanes will require additional/upgraded infrastructure along all stretches of highway. This would include tolling gantries to assist with vehicle monitoring and transactions processing as well as constructing lane barriers to isolate HOT lanes. It will take time to implement. An automated collection system could be integrated with other toll programs. Geometric changes may be required to provide adequate merging distances where HOT lanes would end in advance of a chokepoint.

Implementation of HOT lanes could also facilitate the effective development of a Bus Rapid Transit (“BRT”) network. Developing a broader HOT lane network could make a BRT service more attractive to current and potential transit users, particularly on sections of highway with high bus frequencies and congestion.

Note on Border Toll

A border toll will require the placement of gantries on all roads crossing the city boundary. This placement is complicated along many portions of the boundary because some segments of the boundary run along a road allowance (a boundary road). Gantries would need to be placed on intersecting roads on the Calgary side or the non-Calgary side of the boundary. If placed on the Calgary side, some Calgary businesses and residences accessed from the boundary road would lie outside the toll zone. If placed on the non-Calgary side, the gantries would be in another municipality and would need approval from the respective municipalities. These municipalities are not likely to support a border toll and would likely not approve gantry placement within their jurisdiction.

2.2.7 Equity and Distributional Impacts

HOT Lanes

With HOT lanes, all pre-existing alternatives would remain open for drivers to use, since use of the HOT lanes would be completely optional. Drivers could choose to drive in the regular free lanes, whose performance would likely be degraded since HOT lanes would be converted from existing general-purpose lanes, resulting in fewer free lanes compared to existing. Only users who choose to use the HOT lanes (and do not meet the minimum occupancy threshold) are required to pay for the HOT. Hence, no user is forced to pay if they do not want to.

In terms of vertical equity, HOT lanes have been criticized for providing benefits to higher income earners (known as the "Lexus Lanes" issue). However, surveys of HOT lane users indicate that HOT lanes are used by people from a broad range of economic strata for high-value trips, such as getting to daycare prior to closing. In horizontal terms, the tool scores very highly, because the users obtain the decongestion benefits associated with the use of the HOT lanes.

Road Tolls

The roads around Calgary are critical routes for trade, commuters and tourists. Few alternatives exist to drivers who are looking to travel long distances within or through the city.

The implementation of the tool is likely to have a broad impact among drivers in the province that would extend beyond Calgary residents. All users of major roads within the region will be charged for use regardless of vehicle type or number of occupants. The increased cost of using the roads may lead to some drivers choosing alternative routes to avoid paying the tolls. This would likely increase their travel times significantly, particularly if they are travelling long distances.

In terms of equity, all users of the road system will receive a benefit from the tool through reduced congestion on tolled roads and will share the cost burden. However, users of the non-tolled arterial network may be negatively impacted by the shift of drivers from tolled to non-tolled facilities. Commuters travelling long distances with few alternatives for public transit will likely bear a higher proportion of the funding burden, particularly those who rely on road travel as part of their daily commute to and from work. While the use of the road system is available to all car users, tolling certain facilities may preclude some low income users from using these facilities and diverting them to non-tolled arterial roads which may increase their commute times.

Border Toll

This tool ranks poorly in terms of both horizontal and vertical equity. On horizontal equity, it impacts only road users crossing the city boundary regardless of trip length or destination within Calgary. These road users are not necessarily the beneficiaries of the additional transportation services made possible by the border toll revenue. In terms of vertical equity, it would have a disproportionate effect on low-income households who travel across the city boundary by car.

Facility-Specific Toll

This tool ranks well in terms of horizontal equity in that it is usually instituted to recover the cost of building a specific facility from the users of that facility. Depending on the facility in question (and the alternatives available), this kind of toll may not rank as well in terms of vertical equity.

2.2.8 Overall Efficiency Impact

The efficiency impacts of different tolling options can vary greatly. The four tolling options presented in this section were designed as indicative options to illustrate the types of impacts of tolling. In practice, any one option would

need to be considered in far greater detail in order to arrive at the optimal design from an efficiency perspective (i.e., the design with the highest benefit-cost ratio).

HOT Lanes

HOT lanes may have a significant positive impact on the productivity and competitiveness of the Calgary region by facilitating high-value trips and without suppressing or diverting lower-value trips which use the same highway network. This means that while the travel time savings and reliability benefits will accrue primarily to those who are able to use the HOT lanes – either by paying for access or by qualifying as a high-occupancy vehicle – there are also likely to be some travel time savings for users of the adjacent general-purpose lanes as a result of the higher utilization of the HOT lanes and GP lanes combined.

The overall efficiency impacts of HOT lanes also depend on the costs of any economic distortions and on the magnitude of the capital costs. First, there are no additional economic distortions arising from HOT lane pricing, because drivers must opt-in to use the HOT lane and they would not do so if the costs (the toll) exceed the expected benefits. Incremental capital and operating costs can vary from project to project. However, one can look to several studies which have examined the societal costs and benefits of HOT lane pricing and found that the benefits exceed the costs by a substantial margin (e.g., Burris and Sullivan 2006).

Road Tolls

The introduction of road tolls within Calgary may have a positive impact on the productivity and competitiveness of the City by generating substantial positive changes in travel behaviour and by improving the performance of the road network in the region. The value of these changes in behaviour and road network performance may or may not exceed the additional capital, operating and compliance costs associated with the toll system, because congestion is costly. In the case of this $0.03 per km toll, the benefit-cost ratio is estimated to be 1.4. This is almost certainly conservative and it means that for every dollar spent on capital and operations for this road toll network, it would generate $1.40 in benefits.

The improved performance of the road network would improve the efficiency of the Calgary labour market (for both workers and employers) due to lower and more reliable commute times as well as that of the goods movement sector within the Calgary region.

Border Toll

The border toll would be clearly less attractive from an efficiency perspective. Since it would entail significant capital and operating expenditures, it is far from clear whether it could achieve the break-even 1.0 benefit-cost ratio. However, it is certainly clear that this tolling configuration would make Calgary a less attractive destination for the location of business investment (and employment) as well as for other economic activities which require travelling by road into the city.

Facility-Specific Toll

A facility-specific toll could well make sense for new bridges, tunnels or other road facilities. The efficiency impact of these would need to be considered on a case-by-case basis.

2.3 Transit Fare Increases / Restructuring

2.3.1 Overview of the Tool

Table 14 - Qualitative Evaluation of a Transit Fare Increase

CRITERIA (FARE INCREASE ONLY)	SCORE
1. Revenue Sustainability	4
2. Implementation Challenges	5
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	1
▪ Implementation Costs	5
Efficiency Impacts Average Score	3
Overall Score *(simple average of 1,2,3,4)*	3.8

2.3.1.1 How does the tool work and where is it being used?

Fares are a user charge for public transit exclusively collected at the local level. This revenue source is used primarily to fund the ongoing operations and maintenance of the transit system. Increases in fares typically dampen ridership growth. Higher fares can lead to more people driving and in turn can negatively impact the Calgary economy through increased congestion and auto use. However, restructuring transit fares (e.g., peak / off-peak fares, distance-based fares) can provide opportunities to raise fares while minimizing adverse impacts on ridership.

There are limited cases where a portion of fares are dedicated to capital expenses for new or renewed infrastructure. In Baltimore, Maryland an increase in public transit fares was proposed in early October 2011 as one of the ways to fund the growing backlog of transportation costs affecting bus, light rail, commuter rail, and metro service. BART in the San Francisco Bay area increased fares by 45% over a three-year period in the late 1980s and dedicated most of the increase to infrastructure. Metra, the commuter rail system in Chicago, recently proposed a 10-year program of fare increases with a portion of these increases dedicated to capital.

However, the use of fare increases for capital expenditures will mean that the resulting revenue would not be available for offsetting operating and maintenance costs on the Green Line LRT or other planned transit projects.

2.3.1.2 How is the tool used for evaluation?

For the purposes of this analysis, an increase in fares is implemented as a flat dollar increase on each trip fare.

2.3.2 Revenue Potential, Sustainability and Impacts on Other Funding sources

2.3.2.1 Revenue Potential

A fare increase has the potential to generate modest revenues. An increase in fares of 20 cents per trip, which would represent about a 13% increase in the average fare paid by Calgary Transit ridership, would generate $21M in 2014, after accounting for behavioural change (i.e., the reduction in ridership) using an elasticity of demand of -0.5. With this elasticity, it is not feasible to generate $100M in revenues, because if one considers a fare increase greater than $1.60 (i.e., more than doubling average fares), the behavioural response more than offsets the impact of the fare increase on revenues.

Table 15 - Revenue Potential from a Transit Fare Increase

Yield for 1cent/trip (2014$)	$1M
Rate for $100M Yield	n.a.

The 10-year revenue forecast is based on the projected growth in Calgary Transit ridership. Calgary Transit has estimated ridership through 2018 as part of their Action Plan 2015-18. The growth rate from the final year of the plan, 1.6%, was used as the growth rate for the remainder of the revenue forecast. This growth rate is likely conservative as it is the lowest growth rate of any years in the Action Plan, plus this rate is similar to the rate of population growth in the later years of the forecast.

Table 16 - Revenue Forecast from a Transit Fare Increase

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $0.20 / trip (2014$)	$21M	$22M	$22M	$23M	$23M	$23M	$24M	$24M	$24M	$25M	$231M

2.3.2.2 Revenue Sustainability

This revenue tool is sustainable in the long-run. Ridership numbers will decrease (relative to a situation with the fare hike in place), but there is likely to be continued underlying growth in transit ridership in Calgary.

2.3.2.3 Impacts on other funding sources

A transit fare increase is unlikely to have a direct impact on other municipal or provincial revenue sources. However, a substantial increase in fares (e.g., 20%+) under the current fare structure could drive users away from transit and to other modes of transportation (esp. automobiles). This would be a perverse change in behaviour, but it would entail a small increase in fuel tax revenues for the province.

It should also be noted that even a modest fare increase would lead to an adverse impact on transit ridership. This reduction in ridership also reduces the base transit fare revenue (as opposed to the revenue associated with the fare increase). Over the 10-year revenue forecast period, it is estimated that a total of $123 million in fare revenue will be foregone by Calgary Transit.

2.3.3 Implementation Costs

Transit fares are the revenue tool of choice for aligning user payments with user benefits. However, an increase in fares is based on the assumption that the current fare structure remains in place.

The fare increase can be implemented as a fixed amount per trip or as a percentage of the base fare. A fixed fare increase, across all fare types, may slightly alter the pricing relationship between different fare classes, such as adult fares versus student concession fares. If a large fare increase is considered, it would be preferable to implement a percentage price change across the fare structure rather than a flat dollar increase per trip.

There is no capital cost associated with a fare increase, although there may be small marketing costs associated with announcing the new fares.

On the other hand, developing a new fare structure to align fares with the services where riders perceive value (e.g., peak time trips when alternative modes are congested and transit is competitive) would take some time and resources to develop and would likely encounter resistance in certain parts of the community.

2.3.4 Net Revenue Estimates

The net revenue for the City from a 20-cent fare increase from 2015 to 2024 is $107 million. The capital and operating expenditures for a transit fare increase are minimal and would have negligible impact on the revenues collected by the tax. However, more than half of the $231 million generated by the fare increase is lost through a reduction in regular fare revenue due to the reduction in transit trips that would occur. This portion of the additional fare revenue collected will need to be retained by Calgary Transit to keep their operating budget intact, reducing the available revenue for new transportation projects. For the purposes of this report, we have assumed that a transit fare increase can be implemented in less than one year. Therefore, the net revenue during the forecast period is $107 million.

2.3.5 Travel Behaviour and Transportation Network Performance Impacts

Instituting a fare increase could have a significant negative effect on the overall performance of the transportation network through increased auto usage for individuals with access to a car, and could consequently increase congestion. It is possible that the cost of this increased congestion could outweigh the incremental revenue generated by the fare increase.

The 20-cent per trip fare increase considered here would lead to a reduction in trips in the order of 6.5%, assuming a price elasticity of demand of -0.5 (to be confirmed with Calgary Transit). This amounts to just over 7 million trips in 2014, a portion of which would switch to private auto travel, particularly for off-peak travel and for travel to destinations other than the city centre.

The adverse impact on travel behaviour, network performance (and fare box revenues) could be mitigated by increasing fares only for certain segments of current or potential transit riders that place a high value on their transit trips (e.g., peak-period transit trips, when auto travel is less competitive). This approach would require a restructuring of transit fares.

2.3.6 Implementation Challenges: Technical & Governance Considerations

The fare increase can be implemented shortly after being approved, with minimal administration necessary. Restructuring transit fares would be more of a challenge, but the new automated fare collection system should provide considerable flexibility in introducing different types of transit pricing.

2.3.7 Equity and Distributional Impacts

Fare increases are equitable in terms of horizontal equity (i.e., those who pay also benefit from the additional services) but are more inequitable across income groups, because lower-income groups tend to bear a disproportionate share of the fare burden.

2.3.8 Overall Efficiency Impact

Transit fares are the first and most effective user pricing mechanism for recovering the cost of building and operating transit services in Calgary. However, fare increases can have a negative impact on the productivity and competitiveness of Calgary to the extent that these discourage transit ridership, increase road congestion and thereby hinder mobility across Calgary and the Calgary region. Hence, fare increases could well lead to adverse overall efficiency impacts.

However, it is important to recognize that this view of fare increases is taken in the context of the current fare structure, which does not allow for such smart fare attributes such as peak/off-peak pricing, or distance-based fares.

A review of the legacy fare structure and the introduction of smart pricing features such as those noted above would provide considerably more room to increase fares while mitigating the undesirable side effects such as shifting trips from transit to roads. For example, an increase in peak time fares alone, while leaving off-peak fares unchanged, would mitigate the perverse mode shift behaviour noted earlier, because the fare increase coincides with times of day when highways and roads are also at their most congested, thereby mitigating the tendency to shift to auto usage. It may also help shift some transit users to off-peak times, when the transit network is less congested.

3. Conventional Tax Revenues

3.1 Personal Income Tax

Table 17 - Qualitative Evaluation of Personal Income Task

CRITERIA	SCORE
1. Revenue Sustainability	5
2. Implementation Challenges	5
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	1
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	5
Efficiency Impacts Average Score	2.7
Overall Score *(simple average of 1,2,3,4)*	3.9

3.1.1 Overview of the Tool

3.1.1.1 How does the tool work and where is it being used?

An income tax used to fund transportation initiatives would apply as a percentage of the personal income tax base used by the province of Alberta. Current income tax rates depend on the individual's taxable income level and tax bracket. Current federal marginal personal income tax rates range from 15% to 29% and the current Alberta personal income tax rate is 10%.

3.1.1.2 How is the tool used for evaluation?

For the purpose of this analysis, it is assumed that the personal income tax would be implemented as a percentage of taxable income and applied uniformly across Calgary. The tax would be applied to the same tax base as the current Alberta provincial income tax.

3.1.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

3.1.2.1 Revenue Potential

An additional income tax has the potential to generate substantial revenues for the City. Revenue estimates for this tool are based on the share of projected personal income tax revenues collected in Alberta in 2014 (as per the provincial budget) that is attributable to Calgary. Indeed, based on the Alberta budget, personal income tax revenues in Alberta are about $10.9 billion in 2014 ($3.6 billion to $4.0 billion is attributable to Calgary). A tax increase of 1% point has the potential to generate between $348 and $377 million for the City by 2014. To yield $100M by 2014, the personal income tax dedicated to transportation should be increased by 0.26-0.28 percentage point.

Table 18 - Revenue Potential from an Increase in Personal Income Taxes

Yield for 1% tax rate **(2014$)**	$348M - $377M
Rate for $100M Yield	0.26% - 0.28%

The 10-year revenue forecast is based on the projected growth rates for real GDP in Alberta from the Conference Board of Canada. The growth rates through 2017 are slightly lower and more conservative than the real GDP growth

rates projected in the Government of Alberta Economic Outlook, which only projects out to 2017. The Economic Outlook projects cumulative personal income within Alberta to grow faster than GDP, so the use of GDP growth rates is conservative.

Table 19 - Revenue Forecast for an Increase in Personal Income Taxes

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for 0.50% tax (2014$)	$189M	$194M	$199M	$203M	$208M	$214M	$220M	$225M	$231M	$237M	$2,121M

3.1.2.2 Revenue Sustainability

The implementation of this tax would impact all Calgary residents with taxable income. The revenue potential for this tool is higher than a payroll tax due to the inclusion of capital income and investments. Income taxes would be a sustainable source of revenue over the long-term because economic growth drives income tax revenues. The revenue would however, vary with the business cycle, especially capital income that increases/decreases with economic growth/contraction.

3.1.2.3 Impacts on other funding sources

A small increase in personal income taxes is unlikely to have any direct impact on other municipal funding sources or on any provincial revenue sources. However, if the increase in income tax is significant in magnitude and implemented only in Calgary, it could lead to the dislocation of some economic activity to outside the city and possibly the province, with adverse impacts on other provincial revenue sources.

3.1.3 Implementation Costs

Incremental costs associated with the income tax would be minimal as the current taxation infrastructure should be able to accommodate the rate increase. The additional tax can be combined with the current provincial taxes that are already collected annually through the federal income tax collection process.

3.1.4 Net Revenue Estimates

The net revenue for the City from a 0.50% increase in the personal income tax would be $2.12 billion over the 10-year revenue forecast period. There are no incremental capital or operating costs for this tax, so all the revenue generated can be retained. For the purposes of this report, it was assumed that a personal income tax could be implemented within the year. Therefore, the net revenue during the forecast period is approximately $2.12 billion.

3.1.5 Travel Behaviour and Transportation Network Performance Impacts

Any increase in income tax will have no direct impact on travel behaviour or the performance of the transportation network.

3.1.6 Implementation Challenges: Technical & Governance Considerations

An income tax collection scheme is already in place as employers already withhold income taxes from the gross pay of employees and individuals already pay capital gains taxes and other income taxes annually. As such, implementation of the new tax can be achieved with minimal administrative adjustment necessary after the tax legislation is passed by the Province. Currently, provincial income taxes are collected by the Canada Revenue

Agency ("CRA") and remitted to each of the provinces (except Quebec, where provincial income taxes are collected directly by Quebec).

3.1.7 Equity and Distributional Impacts

The implementation of the tax could have considerable distributional impacts on Calgary (e.g., the tax could influence the location decision for small businesses). Investment in the province may be impacted as well. Investors can easily decide to invest in other provinces to achieve their desired portfolio mix.

In terms of horizontal equity, this tool does not perform very well since anyone paying taxes will be targeted by the tool, regardless of their use of the transportation network.

In terms of vertical equity, the current income tax system scores highly, because it is progressive. However, a percentage point (or fraction thereof) increase in the income tax rate dedicated to transportation would apply equally to all income levels and hence, would represent a larger increase for lower-income households.

The tax has the potential to reduce the competitiveness of businesses in Calgary with potential costs associated with reduced work effort or the relocation of businesses outside Calgary. It may also reduce the attractiveness of Calgary for potential new businesses and capital investment.

Province-wide implementation would help to mitigate some of these distributional impacts.

3.1.8 Overall Efficiency Impact

An increase in personal income taxes would entail no impact on travel behaviour and no incremental capital or operating costs. It would only entail additional inefficiency costs, which are discussed below.

A modest increase in income taxes would entail efficiency costs in terms of reduced labour supply and work effort as well as reduced economic activity in Calgary due to less attractive employment opportunities and increased costs of capital. Employment and capital investment in Calgary will become inherently less attractive than in surrounding areas (as measured by net of tax earnings and returns to employees and investors). The increased costs could lead to the relocation of some economic activity/capital out of Calgary. The resulting reduction in economic activity (associated with capital flight or employment relocation) could be a significant cost to the city economy.

A 2004 report by the federal Department of Finance (Baylor and Beauséjour 2004) conducted a simulation of the efficiency costs of taxation using a computable general equilibrium model. It showed that an increase in personal income taxes equivalent to 1% of GDP in revenue terms would entail a 1.29% drop in steady state GDP for Canada as a whole.12 When applied to Calgary or even to Alberta, this would imply an even larger negative impact on GDP, because the jurisdiction is smaller and hence, there is more room for individual business owners and entrepreneurs to reduce their income tax exposure by changing the location of economic activity.

The 2004 federal report also estimated the marginal efficiency costs from an increase in income taxes. These were estimated at $0.32 per dollar of additional income tax revenue generated (Baylor and Beauséjour 2004, 16). In other words, the Calgary region economy would be worse off by almost 1/3 of a dollar for every dollar in additional income tax revenue generated.

Therefore, even a small increase in income tax rates applied to Calgary would entail significant negative overall efficiency impacts, and a reduction in output for the region.

[12] Baylor and Beauséjour "*Taxation and Economic Efficiency: Results from a Canadian CGE Model*" Department of Finance Working Paper 2004-10, November 2004, p. 16.

3.2 Sales Tax

3.2.1 Overview of the Tool

Table 20 - Qualitative Evaluation of Sales Tax

CRITERIA	SCORE
1. Revenue Sustainability	5
2. Implementation Challenges	3
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	4
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	4
Efficiency Impacts Average Score	3.3
Overall Score *(simple average of 1,2,3,4)*	3.6

3.2.1.1 How does the tool work and where is it being used?

A sales tax is a percentage of the sale price of all taxable goods and services sold in a region. A sales tax has the advantage of a broad tax base, which generally produces high revenue yields.

Many American cities use retail sales taxes as a way of funding transit infrastructure. Sales taxes in the U.S. are typically applied to goods only and not services and they are not value-added taxes, as they typically are in Canada. Local sales taxes in the U.S. are generally approved by voters only when dedicated to funding specific transportation projects. For instance, over the last 25 years, residents of 20 counties in California have voted to raise retail sales taxes to pay for transportation projects. They raised roughly $2.5 billion per year and this has been the fastest-growing source of revenue for transportation funding in California. Other cities in the U.S. using this method include New York, Chicago, Atlanta, Miami, Dallas, Cleveland, Los Angeles, San Francisco, Minneapolis, and Houston. Retail sales taxes are the most common source of dedicated non-federal funding for public transportation in the U.S.

In Canada, the Mayors' Council for Metro Vancouver recently proposed a referendum asking residents to approve 0.5 per cent sales tax to fund selected public transit in the region. The additional sales tax would apply to the same tax base as the current B.C. Provincial Sales Tax, but it would only apply to the Metro Vancouver region.

3.2.1.2 How is the tool used for evaluation?

For the purpose of this analysis, the sales tax is assumed to apply uniformly to all goods and services sold in Calgary. The provincial government is assumed to collect the sales tax revenues on behalf of the City.

3.2.2 Revenue Potential, Sustainability and Impacts on Other funding Sources

3.2.2.1 Revenue Potential

The sales tax tool has the potential to be a major revenue source for the City. For the purposes of this report, the revenue estimate from the implementation of a sales tax within Calgary is based on a one percentage point increase to the current federal GST rate (5%).

Revenue estimates for this tool are based on the Calgary share (based on population share) of retail sales in the Calgary CMA in 2014. Retail sales in the Calgary CMA were $27.1 billion in 2014. Between $23.7 and $25.7 billion is attributable to retail sales in Calgary, which means that a 1% sales tax increment could generate between $232

million and $252 million in 2014. If the objective is to yield $100 million in 2014, the additional sales tax should be about 0.39%-0.43%.

Table 21 - Revenue Potential for a Sales Tax

Yield for 1% tax rate 2014$	$232M - $252M
Rate for $100M Yield	0.39% - 0.43%

The 10-year revenue forecast is based on the projected growth rates for real GDP in Alberta from the Conference Board of Canada. The growth rates through to 2017 are slightly lower and more conservative than the real GDP growth rates projected in the Government of Alberta Economic Outlook, which only projects out to 2017. The Economic Outlook projects retail sales within Alberta to grow faster than GDP, so the use of GDP growth rates is conservative.

Table 22 - Revenue Forecast for a Sales Tax

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for 0.50% (2014$)	$126M	$129M	$132M	$135M	$139M	$143M	$146M	$150M	$154M	$157M	$1,411M

3.2.2.2 Revenue Sustainability

The implementation of this tax would impact all individuals purchasing goods and services within Calgary. Revenues will be sustainable in the future as they are related to the sale of goods and services, though some variability may be experienced year-to-year depending on the state of the economy.

3.2.2.3 Impacts on other funding sources

A small increase in sales taxes is unlikely to have any direct impact on other municipal funding sources or on any provincial revenue sources. However, if the increase in sales taxes is significant in magnitude and implemented only in Calgary, it could lead to the dislocation of some economic activity to outside the City and possibly the province, with adverse impacts on provincial income tax revenues.

3.2.3 Implementation Costs

Since Alberta does not have a provincial sales tax, the transportation-related portion of the tax would be a challenge to implement. Payment and collection mechanisms already exist at the federal level. However, there would be some incremental administrative costs associated with processing the collection of the new tax at the provincial level and remitting to the City. Negligible capital costs are anticipated.

3.2.4 Net Revenue Estimates

The net revenue expected over the next 10 years from a 0.50% sales tax is projected to total $1.411 billion ($1,411 million). The actual amount of revenue retained may be somewhat lower due to the administrative costs that need to be implemented because Alberta currently does not collect a sales tax. It is anticipated that a sales tax could be implemented in three years. Therefore, the net revenue during the remainder of the forecast period is approximately $1 billion.

3.2.5 Travel Behaviour and Transportation Network Performance Impacts

An incremental sales tax will have no impact on travel behaviour or the performance of the transportation network.

3.2.6 Implementation Challenges: Technical & Governance Considerations

Since there is no provincial sales tax in Alberta, the implementation of a sales tax within Calgary will be difficult because there is no administrative system with Alberta to collect a non-federal sales tax. In practice, this revenue tool is only feasible if and when the Province should decide to undertake a tax reform and introduce a provincial sales tax (potentially harmonized with the federal sales tax).

3.2.7 Equity and Distributional Impacts

This scheme does not provide a horizontally equitable solution as everyone purchasing goods and services within the region will pay the incremental tax, regardless of their use of the transportation network, and will share the cost burden associated with funding transportation in the region. For lower income groups, the proportion of the funding burden measured as a share of their income is likely to be higher when compared to other groups.

As for vertical equity individuals who consume more will be paying more sales taxes (typically higher income earners will consume more). However, the sales taxes paid are likely to represent a higher share of the budget of low income households compared to other households.

3.2.8 Overall Efficiency Impact

An increase in sales taxes would entail no impact on travel behaviour and no incremental capital or operating costs. It would only entail additional inefficiency costs, which are discussed below.

Implementing a modest sales tax is expected to have some small negative impacts on the productivity and competitiveness of Calgary and Alberta. It is likely that there will be a marginal reduction in consumption as the additional tax will increase the cost of purchasing goods or services within the region.

In a simulation using a computable general equilibrium model, an increase in sales taxes equivalent to 1% of GDP in revenue terms would entail a 0.19% drop in steady state GDP for Canada as a whole.[13] When applied to Calgary or even to Alberta, this would imply a larger negative impact on GDP, because the jurisdiction is smaller and hence, there is more room for distortions to consumption and the location of economic activity.

The 2004 federal report also estimated the marginal efficiency costs from an increase in sales taxes. These were estimated at $0.13 per dollar of additional sales tax revenue generated (Baylor and Beauséjour 2004, 16). In other words, the Calgary region economy would be worse off by about $0.13 for every dollar in additional sales tax revenue generated. These inefficiency costs are among the lowest for any traditional tax tool. The reason for this lies in the very large tax base for tool, which would make it difficult to avoid, particularly if implemented at the Calgary region (i.e., CRP) or the provincial level. They presume the implementation of a value-added tax system similar to the federal GST.

Hence, a low sales tax rate suggests a small overall negative impact on efficiency for Calgary.

[13] Baylor and Beausejour “Taxation and Economic Efficiency: Results from a Canadian CGE Model” Department of Finance Working Paper 2004-10, November 2004, p. 16.

4. Land Based Revenues

4.1 Development Charges

4.1.1 Overview of the Tool

Table 23 - Qualitative Evaluation of Development charges

CRITERIA	SCORE
1. Revenue Sustainability	2
2. Implementation Challenges	3
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	4
Efficiency Impacts Average Score	3
Overall Score *(simple average of 1,2,3,4)*	2.8

4.1.1.1 How does the tool work and where is it being used?

Development charges are used to pay for infrastructure associated with new developments and are one-time mandatory charges levied on new developments and eligible redevelopments. The City currently has a two-tier system, with a development charge regime for the city-centre area based on site frontage, and a separate regime applied to green-field developments applied on a per hectare basis. The City is moving towards changing their development charges regime by 2016. These charges are defined under the City's Master Development Agreements. The City is exploring changes to their development charges regime in the future. These changes present some potential for transportation funding needs to be taken into account.

4.1.1.2 How is the tool used for evaluation?

The current system of development charges in Calgary provides very limited revenue for transportation needs. Many cities have moved towards a more comprehensive city-wide system of development charges, based on a per unit or development floor space-based calculation. This has the potential to provide significant additional revenue for infrastructure which may also include funding of transit projects. Currently several other jurisdictions have identified specific development charges to support transit investment. The following table provides a summary of the rates charged in the cities of Toronto, Ottawa, and San Francisco.

Table 24 - Development Charges in Toronto, Ottawa and San Francisco

	Singles & Semi-Detached	Apartment (2+ BR)	Apartment (1 BR)	Non-Residential
Toronto	$9,471	$7,875	$5,186	$69.18 per sq m of non-residential floor area
Ottawa	$6,409	$3,775	$2,780	$29.82 psm (non-industrial use); $72.44 psm (industrial use)
San Francisco	N/A	N/A	N/A	Retail/Entertainment: $1 psf; Office: $12.64 psf; Industrial: $6.80 psf

As the City considers revamping its existing fee regime, there exists perhaps some potential to implement a system that calculates development charges on a per new unit or saleable area basis with a portion of the new charge being applied to funding transit capital and operating expenses.

4.1.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

4.1.2.1 Revenue Potential

For the purposes of the projection below, the city of Ottawa is used as a baseline to assess the revenue impacts of a targeted transit-focused development charge. Ottawa has similar characteristics to Calgary, in terms of its jurisdictional boundary, size and overall population.

Ten-year estimates are based on unit demand projections derived from population projections for the City over a 10-year period to 2025.

Table 25 - Revenue Potential of a Hypothetical Set of Development Charges

	Per Year (millions of 2014$)
Collected Fees for Apartment Units	$12
Collected Fees for Ground Oriented Units	$41
Collected Fees for Industrial	$5
Collected Fees for Retail/Commercial Space	$15
Total DCC Revenues	$73

The ten-year revenue forecasts are presented in the table below. Any differences between revenue estimates for individual years and the undiscounted sum over the ten-year period is due to rounding errors.

Table 26 - Revenue Forecast for a Hypothetical Set of Development Charges

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield (millions of 2014$)	$73	$73	$73	$73	$73	$73	$73	$73	$73	$73	$725

4.1.2.2 Revenue Sustainability

While development charges can be calibrated to align with total cost of infrastructure capital cost requirements over the long-term, including transportation, the rate of new development is dependent on market conditions and so may vary year-over-year. Nevertheless, development charges are one-time charges imposed on new or eligible redevelopments. As such, this is not a sustainable revenue source because it depends on new developments or redevelopments.

4.1.2.3 Impacts on other funding sources

A small change in development charges should not have a material impact on the property tax assessment base. However, a substantial increase in the charges can reduce residual land value, which in turn may be reflected in the market price of land and hence in the property tax assessment base.

4.1.3 Implementation Costs

If the City moves towards the introduction of a new regime for development charges, the introduction of an incremental increase in that charge should not entail additional capital, operating or administrative costs.

4.1.4 Net Revenue Estimates

There are no significant overhead and or administration costs associated with this tool over the long term. Hence, the net revenue estimates are similar to the gross revenues reported above. For the purposes of this report, we have

assumed that the new development charges would be implemented by 2016, when the revisions to development charges regime are expected to be completed. Therefore, the net revenue during the remainder of the forecast period is approximately $650 million.

4.1.5 Travel Behaviour and Transportation Network Performance Impacts

Increasing development charges within the city will have no direct impact on the performance of the transportation network.

4.1.6 Implementation Challenges: Technical & Governance Considerations

Under Alberta's Municipal Government Act (MGA), municipalities are allowed to charge fees on new developments to fund basic infrastructure, including transportation related costs. If the City undergoes a redesign of its existing development charges regime, there should not be any additional technical or governance challenges to calibrate the new fee schedule to fund a portion of the forecasted transportation related costs. However, the use of DCs to recover capital costs for transportation and transit infrastructure may require amendments to the enabling legislation (i.e., the MGA).

Currently, the city collects minimal development charges for inner city projects on a linear (per meters of frontage) scale. For 2013, the city centre redevelopment levies amounted to $4,288,119. The City also collects green-field development charges on a per hectare basis, which amounted to $88,024,203 in 2013. The majority of these fees fund infrastructure needs directly related to the development and as such do not raise adequate revenue to support citywide transportation infrastructure needs. A new DCC regime can be calibrated to raise revenues beyond the infrastructure requirements of each development site, in order to contribute to the citywide transportation infrastructure projects.

4.1.7 Equity and Distributional Impacts

Any developer looking to build within Calgary proper will be subject to the development charges. The costs incurred by the developer cannot be directly passed to the consumer, except in tight housing supply markets. Increased development charges will impact land values for new development sites.

4.1.8 Overall Efficiency Impact

Increasing development charges will have no effect on travel behaviour, nor do they improve the performance of the transportation network. Furthermore, these additional development charges would not entail any incremental capital, operating or compliance costs.

The only efficiency impacts arising from additional development charges are the costs of economic distortions to the extent that the level of development charges overestimate (or underestimate) the true cost of the infrastructure provided to the users (or to the extent that the charges levied across different municipalities of the Calgary region distort the pattern of demand for commercial or residential ownership). However, there is no reason to believe that these economic distortions would be large. Hence, the efficiency impacts of this revenue tool are likely to be only modestly negative, provided that the revenues raised through this tool are done on the basis of cost recovery of local transportation-related infrastructure costs. However, should there be a large increase in development charges, this could lead to reduced real estate development in the city and diminished land values, particularly if this opens up significant differentials with respect to development charges in neighboring municipalities. Similarly, a substantial increase in development charges for in-fill developments could make the latter less attractive than green-field development, thereby adversely affecting transit use and densification policies.

4.2 Land Value Capture

4.2.1 Overview of the Tool

Table 27 - Qualitative Evaluation of LVC

CRITERIA	SCORE
1. Revenue Sustainability	2
2. Implementation Challenges	2
3. Equity Impacts	4
4. Efficiency Impacts	
▪ Costs of Economic Distortions	4
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	3
Efficiency Impacts Average Score	3
Overall Score *(simple average of 1,2,3,4)*	2.8

4.2.1.1 How does the tool work and where is it being used?

Land value capture (LVC) is designed to capture a one-time gain in property values associated with transit investments and related land use changes. Developments around transit stations benefit from greater accessibility and often lead to increased property values which can lead to additional land value that may be captured from developers and landowners to support the development of infrastructure that directly benefits their development.

4.2.1.2 How is the tool used for evaluation?

Land value capture presents an opportunity to capture revenues as a result of joint ventures with land owners and developers looking to create high-value developments. The revenue generation potential from land value capture can vary considerably depending on the type of transit investment and the size, location and type of developments located in the vicinity (e.g., offices, residential, mixed retail/residential). It is assumed that this mechanism would be developed to extract through negotiation a portion of the land value uplift generated by the infrastructure investment and related land use changes. This would be undertaken as a condition of development or rezoning and paid in cash or in-kind contribution. This approach would require project-by-project negotiation to determine the exact land lift for each site based on land sale price, current market dynamics, and future land use.

4.2.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

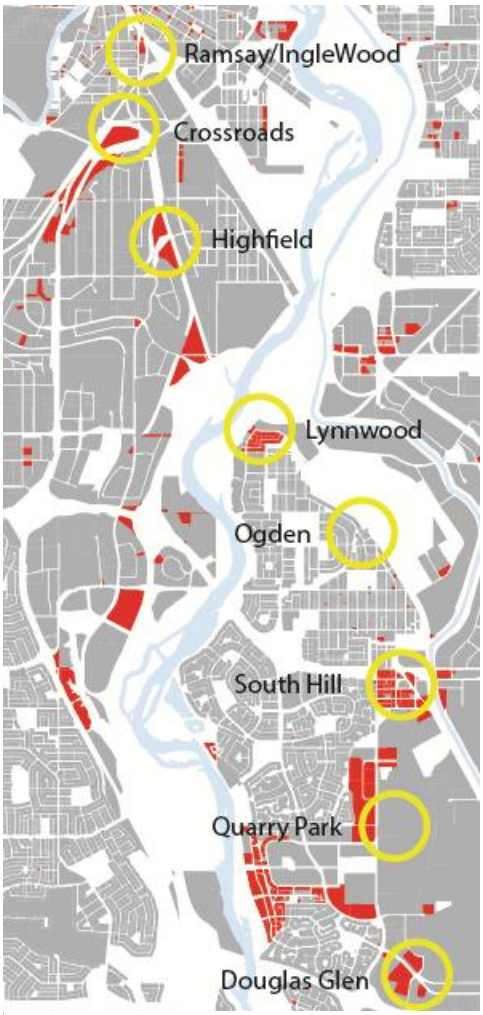
Land value capture is very specific to the current land use, market dynamics, and plan entitlements for a given location. Therefore a global estimate of land value potential is difficult to assess in the aggregate. A simplified, indicative calculation of the residual land value impacts of changes in land use and transit investment along the proposed Southeast LRT line has been provided here for an order-of-magnitude estimate of future revenue potential. Given the relatively short 10-year timeframe for analysis (in development terms), that development will occur first at those sites within the 400m catchment areas of proposed stations that are easiest and least complicated to develop. Given competing sites and the challenges associated with land assembly, it is assumed that within the next 10-years, development along the first phase of the Southeast LRT alignment will occur primarily within 96 identified vacant or under-utilized sites totalling approximately 120 acres of land.

4.2.2.1 Revenue Potential

The uplift value is derived primarily from changes in the allowable land use and density for a given parcel. However, based on past research with similar BRT projects it is assumed that development within these areas would see an average of 4% revenue premium generated by the improved marketability of the final development given its proximity to a major transit line. In this analysis, estimated land value under the current zoning (and assuming no transit investment) is compared to the potential land value under a future development scenario assuming a highest and best use outcome for the site. The 4% additional transit-related revenue premium is also added to the site value calculation to arrive at total uplift value. The chart below provides a summary of projected land uplift potential for the sites examined along with an expected share of that uplift that could be captured to fund new transit infrastructure.

**Table 28 -
Revenue Forecast for Selected Land Value Capture Opportunities – 2015-2024**

Proposed Stations	Potential Uplift From Development in Underutilized Parcels (Millions of 2014 $)
Ramsay/IngleWood	5
Crossroads	35
Highfield	7
Lynnwood	N/A
Ogden	N/A
South Hill	30
Quarry Park	15
Douglas Glen	7
Total Uplift in Development Along Stations (10 Year Time Frame)	99
Municipal LVC Revenue (50% Capture Rate of Uplift)	49.5



Vacant and under-utilized lands along the first phase of the Southeast LRT line (Source: Developed Areas Growth 2014)

**Figure 4 -
Vacant and Under-utilized Lands
(Southeast LRT Phase 1)**

In this scenario, if Calgary targets 50% of the potential uplift in the station area, it could potentially generate approximately $49.5 million in revenue over the ten-year time frame.

4.2.2.2 Revenue Sustainability

The revenue generation potential of this tool largely depends on the development potential within the catchment area of the infrastructure. As revenue is captured at the time of development or redevelopment, actual value captured and year-over-year revenue generation can vary significantly due to: the pace of development along a given alignment; site conditions which may limit future development potential; current land uses which may prove

uneconomic to redevelop or generate lower marginal land uplift; current market conditions which may not favour development or redevelopment at a given time or within a given location; and or the actual amount paid by the developer for a given piece of land.

4.2.2.3 Impacts on other funding sources

To the extent that land value capture has a significant impact on residual land value, this revenue tool could have some adverse impacts on land prices in the affected areas and hence on the assessed property tax base in those areas.

4.2.3 Implementation Costs

Incremental costs associated with implementing the land value capture tool could be significant in administrative terms. This is because any implementation must be specific to a designated property, requiring legal and planning expertise and a potentially lengthy negotiation process.

4.2.4 Net Revenue Estimates

Net revenue estimates for land value capture are likely to be less than the gross revenue estimates reported above, due to the administrative costs which are likely to be incurred in negotiating and extracting any value uplift. These administrative costs are difficult to predict and could vary significantly depending on the complexity of each development. For the purposes of this report, it was assumed that land value capture could be implemented within two years. However, since revenue generation from land value capture is dependent on development in the station areas, the timing of revenue generation within the 10-year forecast period is uncertain.

4.2.5 Travel Behaviour and Transportation Network Performance Impacts

The implementation of the land value capture tool is not expected to have any impact on the overall performance of the transportation network. The implementation of an LVC regime could incentivise the local municipality to focus development near transit assets to maximize land uplift potential. This could lead to positive impacts on network performance as more people and businesses are provided with opportunities to locate closer to the transit system. However, it is the transportation infrastructure improvement and the corresponding increase in development density that is directly responsible for the increased development.

4.2.6 Implementation Challenges: Technical & Governance Considerations

This tool requires development of expertise within the city to negotiate on a site-by-site basis with developers, their contribution to a particular piece of infrastructure. There could be push back from developers, land owners and residents and make development processes lengthy and unpredictable.

While a portion of the revenues can be captured at the time of development approval process, the majority of the revenues generated would be captured closer to the completion of proposed station area developments. Therefore delays in completion of development projects could result in delayed revenues, impacting the overall revenue stream.

4.2.7 Equity and Distributional Impacts

If LVC targets are properly calibrated and incentivised (e.g., through additional density bonuses, etc.) the tool should not adversely impact development in a given area as they represent value created by infrastructure improvement and land use changes. However, the relative impact of LVCs will depend on the cost of the land paid by the developer.

4.2.8 Overall Efficiency Impact

The overall efficiency impact of LVC is positive if it is used where justified – such as on developments which benefit from windfall gains due to their proximity to new transit facilities. The rationale is that the LVC is designed to capture a positive externality (i.e., the windfall gain) and use it to fund the infrastructure project that is creating that externality. Failure to capture this gain could, in principle, lead to the under provision on such transit investments. In practice, attempts to extract the value uplift can lead to some distortions if the incremental value is not correctly identified and isolated from other market influences on property value. However, there can be some incremental costs to implementing LVC, because this is by its nature a bespoke exercise which must be carried out on each parcel of land which is subject to the infrastructure-induced windfall gains.

The success of this tool largely relies on the effectiveness of the municipality in putting in place appropriate policies that communicate clearly to the market the requirements of the LVC regime. Ideally these policies should be put in place prior to any transit investment announcements. This way, speculative land purchases along the line would account for the LVC policy and not create conditions where the potential land lift is absorbed by land owners prior to their purchase by developers.

4.3 Parking Space Levy

4.3.1 Overview of the Tool

Table 29 - Qualitative Evaluation of Parking Space Levy

CRITERIA	SCORE
1. Revenue Sustainability	4
2. Implementation Challenges	3
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	3
▪ Implementation Costs	4
Efficiency Impacts Average Score	3.3
Overall Score *(simple average of 1,2,3,4)*	3.3

4.3.1.1 How does the tool work and where is it being used?

A parking space levy is a per-day charge on all non-residential, off-street parking spaces. Pricing is typically implemented on an area basis rather than a per stall basis in order to mitigate tax avoidance. Owners of the parking spaces are charged directly and this cost is may be passed onto users in the form of increased parking prices.

Per-space parking levies are used in Sydney and Melbourne, Australia.

4.3.1.2 How is the tool used for evaluation?

For the purpose of this analysis, it was assumed that a daily levy would be charged on all non-residential off-street parking spaces within Calgary. The charge would be collected directly from the parking space owners. The levy would be similar to a property tax, but it would be a flat charge per space rather than set as a percentage of assessed property value.

4.3.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

4.3.2.1 Revenue Potential

Assuming approximately 49,000 non-residential off-street charged parking spaces and between 245,000 to 325,000 free parking spaces in Calgary (as described below), a $1 per space daily fee could generate between $98 million and $125 million in 2014. Therefore, in order to yield $100 million in 2014, the fee per space daily should be set between $0.81 and $1.02 (i.e., $296 to $372 per space yearly).

Estimating the number of uncharged parking spaces in Calgary is challenging as there is no inventory of such spaces. Estimates were computed using the ratio of uncharged/charged parking spaces in Toronto, ON and accounting for the difference in the size of the respective geographic areas..

Table 30 - Revenue Potential for Parking Space Levy

Yield for 1$/day	$98M - $125M
Rate for $100M Yield	$0.81 - $1.02 / day

For the revenue forecast, a conservative assumption has been made that there would be no increase in the number of non-residential parking spaces in Calgary. New greenfield non-residential development within Calgary would of course include new parking spaces subject to the levy. But it is likely that new development would be built with less parking than similar developments in the past. In addition, based on experiences in other cities, it is likely that there would be a reduction in existing parking spaces.

Table 31 - Revenue Forecast for Parking Space Levy

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $1/day (2014$)	$111M	$111M	$111M	$111M	$111M	$111M	$111M	$111M	$111M	$111M	$1,113M

4.3.2.2 Revenue Sustainability

A parking space levy is a relatively sustainable source of revenue over the long term. However, over time, some parking space owners may convert some parking spaces to other uses to reduce their tax exposure.

4.3.2.3 Impacts on other funding sources

It is not clear whether or not the implementation of a parking space levy would have a material impact on other revenue sources for the City or the Province. For example, it is possible that large parking lots which provide free parking may lose some of their property value, which in turn would be reflected in a lower property tax assessment and eventually in lower property tax revenues (assuming the mill rate is unchanged). However, this effect could be partially or fully offset by improved demand conditions (after a reduction in available free parking spaces due to the levy – a 10% reduction in the inventory of free non-residential off-street parking is assumed). Moreover, it is also possible that other uses for the reduced parking spaces may command higher market values on an area basis.

There may also be some impacts on fuel tax revenues, but these are not likely to be significant given that any travel demand impacts are likely to be modest.

4.3.3 Implementation Costs

Implementation costs associated with a parking space levy would be relatively low since no new infrastructure is required. An inventory of all non-residential, off-street parking would be needed at the outset and maintained annually to ensure an accurate count of parking spaces in the region. There would be some additional administrative costs required for collection.

4.3.4 Net Revenue Estimates

The net revenue estimated from a $1 daily parking space levy on all non-residential parking spaces is estimated to generate $1.11 billion over the full 10-year forecast period. This amount would be slightly lower due to the administrative costs required for the revenue collection and the costs of undertaking an inventory of private parking supply, which in turn would need to be updated regularly. For the purposes of this report, we have assumed that a parking space levy could be implemented in two years. Therefore, the net revenue during the remainder of the forecast period is approximately $890 million.

4.3.5 Travel Behaviour and Transportation Network Performance Impacts

Instituting a parking space levy could have some effect on the overall performance of the transportation network depending on several factors that are difficult to assess in quantitative terms, given the limited experience with parking levies to date:

1. Some free parking spaces may be eliminated (i.e., converted to other uses in order to avoid the parking levy). Private owners of parking spaces (other than retailers and shopping centres, for whom it can be a competitive advantage) are likely to reduce their spaces. This is likely to reduce the supply of free parking in suburban areas, although it is unclear by how much. A 10% reduction in the inventory of free parking spaces in the City was assumed in the analysis.
2. Some free parking spaces may be converted to charged parking. This may occur in areas where there is already a strong local demand for priced parking. Users of parking spaces that are converted from free to priced parking would face increased driving costs and may be incented to change travel modes, reducing the number of auto trips. This conversion to priced parking is likely to be very limited in Calgary, because tight parking supply conditions only prevail in the city centre, where parking spaces are already priced (and at rates among the highest in North America).
3. For priced parking stalls, some or the entire levy may be passed on from the property owners to the end users. The extent of the pass-through will depend on the strength of local demand for charged parking. If the levy is passed through, the increased price of parking may encourage some users to change travel modes, reducing the number of auto trips. In practice, this change in travel behaviour may be of limited importance in Calgary because the parking rates are already among the highest in North America. Our estimated behavioural adjustment for a $1 parking levy per day amounts to a 1.5% reduction in parking demand.

4.3.6 Implementation Challenges: Technical & Governance Considerations

The City will need to establish an inventory of non-residential off-street parking in Calgary, which may take some time and effort. There is potential for land owners to self-report the number of parking spaces they have to help implement the tool more quickly. However, an audit of the reported numbers would still be required to ensure accuracy and compliance. It is very likely that large retailers will push back on the implementation of this tool as there is likely going to be an impact on their business operations.

It is understood that the City is not currently permitted to implement a parking space levy. Provincial legislative approval is required to implement a parking levy.

4.3.7 Equity and Distributional Impacts

The cost burden is borne directly by the parking space owners, but may be passed on to the consumers in the form of higher parking fees or a higher cost of consumer goods.

For parking space users, there are alternatives available in the form of other modes of transportation, notably public transit. However, these alternatives may not be viable for travelling to some areas of the region that are not well-connected with the public transit system.

Outside of the downtown area (the only area in the city which supports priced parking), the burden of this charge would be borne primarily by parking lot owners and operators, which would make it a poor performer in horizontal equity terms. It is unlikely that the levy would impact low-income households disproportionately. As such, it may be neutral to positive in terms of vertical equity.

4.3.8 Overall Efficiency Impact

Parking space levies may have an overall positive impact on the productivity and competitiveness of Calgary due to the changes in travel behaviour and network performance resulting from the charge, although these benefits may be more than offset by the costs of the economic distortions arising from the levy on free-of-charge parking space owners and the incremental costs of implementation.

The changes in travel behaviour – a shift from auto to transit trips – and the resulting benefits of reduced congestion and improvements in network performance are likely to be modest because (i) parking rates are already high in the city centre and (ii) it is difficult to anticipate the changes in travel behaviour resulting from the expected contraction in non-residential, off-street parking supply. A significant shift of parking spaces to charged parking was not assumed, given the considerable uncertainty about parking market conditions outside of the city centre.

The estimated one-time and ongoing implementation costs associated with this revenue tool have not been quantified. In essence, it is assumed that any positive behavioural impacts are fully offset by the incremental implementation costs.

The economic distortions resulting from the parking levy include changes in the behaviour of parking lot owners, who may choose some alternative land uses for some of their parking lots and or may choose to sell these in light of the increased charges to holding and managing this property. These adverse efficiency impacts are estimated at approximately $0.16 per dollar of parking levy revenue collected. This estimate is based on the estimated of inefficiency costs associated with property taxes ($0.186 per dollar of property tax revenue collected) applied to the share of parking levy revenue attributable to the levy on parking spaces which are not subject to pricing (i.e., approximately 84% of all parking spaces in the city).

4.4 Property Tax

4.4.1 Overview of the Tool

Table 32 -Qualitative Evaluation of Property Tax

CRITERIA	SCORE
1. Revenue Sustainability	5
2. Implementation Challenges	4
3. Equity Impacts	2
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	5
Efficiency Impacts Average Score	3.3
Overall Score *(simple average of 1,2,3,4)*	3.6

4.4.1.1 How does the tool work and where is it being used?

Property taxes are typically a percentage-based tax levied on the assessed value of real property owned by individuals and organizations in a given region. Property taxes are a common revenue tool for municipal governments and they are used to pay for a variety of local programs and services.

4.4.1.2 How is the tool used for evaluation?

This revenue tool is being analyzed as an increase in the overall residential and non-residential property tax rate via a separate targeted mill rate to support transit authority capital and operating costs. This funding model is utilized in relatively few other jurisdictions in Canada. The most applicable is in Metro Vancouver where a separate property tax designation is applied to residential and non-residential property to support TransLink, the regional transportation authority. For the analysis in this section, the additional mill rate used for this revenue projection was set equal to the TransLink rate used in Metro Vancouver.

Table 33 - Transit Property Tax Rates in Metro Vancouver

METRO VANCOUVER TRANSIT PROPERTY TAX RATE	TAX RATE
Residential Property	0.0003315
Non-Residential Property	0.0014508

Revenue estimates were developed based on the current municipal tax rate in Calgary and total property tax revenues (based on 2014 estimates).

4.4.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

4.4.2.1 Revenue Potential

Property taxes already generate significant revenue for the city. Using the projected property tax revenues for the City of $1.37 billion for 2014 and a municipal tax rate of 0.00375, an increase of the municipal tax rate by 0.0001 could generate $36.5 million in additional revenue. In order to raise $100 million additional revenue, the City would have to raise its property tax rate by approximately 0.000277, which is equivalent to an average tax increase of $118 for an average residential unit.

Table 34 - Revenue Potential for Property Tax – 2014

Yield for 0.01% tax rate	$36.5M
Rate for $100M Yield	0.03%

For the ten-year forecast, the 2014 municipal assessment projected by the City and 2014 mill rates for residential and non-residential property types was used as a baseline. The total municipal tax base was increased annually based on the projected value and volume of new residential and non-residential development.

The following table presents the projected tax revenues in 2015 based on an increase in the residential and non-residential tax rates equal to the TransLink property tax rates and reported in millions of 2014$.

Table 35 - Revenue Potential based on TransLink Property Tax Rates

Year	2015
Revenue Yield – Incremental 0.000332 Increase to the Residential Property Tax Rate	$63
Revenue Yield – Incremental 0.001451Increase to the Non-Residential Property Tax Rate	$99
Total Revenue Yield	**$162**

The following table presents the overall projected revenue stream over the ten year period.

Table 36 - Revenue Forecast based on TransLink Property Tax Rates

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield (2014$ millions)	$162	$165	$166	$167	$169	$170	$172	$173	$175	$176	**$1,695**

4.4.2.2 Revenue Sustainability

Property taxes are a relatively stable source of revenue but they do depend on the overall assessment of property values in the region and can fluctuate based on real estate market conditions and other economic factors.

4.4.2.3 Impacts on other funding sources

Marginal increases in property taxes should have little or no effect on other land-based sources of revenues for the City or the Province. However, a substantial increase in property tax rates could reduce the residual land value for owners and developers. This could adversely affect other land-based revenue sources, such as land value capture and land transfer taxes.

4.4.3 Implementation Costs

There are no incremental implementation costs associated with raising revenue through this tool, as payment and collection mechanisms already exist for property taxes.

4.4.4 Net Revenue Estimates

There are no significant overhead and implementation costs associated with the long term application of this tool. Therefore, the revenues generated from this tax should mostly translate to new transit dollars that can be utilized to fund infrastructure projects. Fluctuations in the assessment values could alter the future revenue stream, but this can

be mitigated through adjustments to the overall tax rate. Overall net revenues generated through property taxes can provide a consistent and stable revenue stream over time. For the purposes of this report, it was assumed that a property tax could be implemented within the year. Therefore, the net revenue during the forecast period is approximately $1.7 billion.

4.4.5 Travel Behaviour and Transportation Network Performance Impacts

The implementation of an additional property tax would not have any direct impact on the overall performance of the transportation network. A large increase in property taxes could lead to reduced real estate development in Calgary by shifting development to lower-tax jurisdictions, such as the nearby municipalities in the region.

4.4.6 Implementation Challenges: Technical & Governance Considerations

Since the city covers most of the Calgary metropolitan area, raising property taxes across the city is not technically challenging, and it can be implemented relatively easily. However, a significant increase in property taxes would be best implemented at the regional level (i.e., including CRP municipalities) in order to avoid perverse behavioural responses, such as changes in the location of businesses or residents.

4.4.7 Equity and Distributional Impacts

All property owners within the city would be impacted in a proportionally similar manner. The cost burden would be borne by property owners who pay directly, although the tax burden may also be partly or fully passed on to renters and businesses depending on market conditions. This revenue tool does not perform well in terms of horizontal equity, because there is no direct link between this revenue source and the use of transit and transportation infrastructure in Calgary.

4.4.8 Overall Efficiency Impact

Implementing a property tax increase is expected to have some negative impacts on the competitiveness of the city as a location for residential and business investment relative to other jurisdictions in the region. However, these impacts are expected to be mitigated due to the dominant economic role and broad geographic coverage of the city within the region. Further, the property tax rates levied by the City for residential development are currently significantly lower than those of surrounding counties, cities and towns. That said, non-residential property tax rates in Calgary are currently quite higher than those of competing jurisdictions within the region. Therefore, any incremental increase in the non-residential mill rates to support transit will exacerbate this difference and may impact businesses that are more cost sensitive and flexible in their location.

A well-known study on the efficiency costs of local property tax rates (Jorgensen and Yun 1996) found that the marginal efficiency costs associated with a small change in property tax rates is 18.6% of the property tax revenues collected. No incremental capital or operating costs should be incurred, given that a property tax collection regime is already in place. Further, there are no impacts on transportation network performance. Hence, the net benefit-cost impact (measured in terms of economic welfare) of additional property taxes imposed to address an infrastructure funding gap is the loss of 18.6 cents per dollar of property tax revenue collected.

5. Other Revenue Sources

5.1 Car Rental Levy

5.1.1 Overview of the Tool

5.1.1.1 How does the tool work and where is it being used?

Table 37 - Qualitative Evaluation of Car Rental Levy

CRITERIA	SCORE
1. Revenue Sustainability	4
2. Implementation Challenges	4
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	2
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	5
Efficiency Impacts Average Score	3
Overall Score *(simple average of 1,2,3,4)*	3.5

A car rental levy is a daily charge levied on the price of renting a vehicle that is dedicated to transportation funding within a specified region. The charge can be a fixed charge per day or can take the form of a percentage of the net cost of renting the vehicle. The levy is paid by individuals renting a vehicle within the region and is collected by the rental car company on behalf of the transportation authority.

Such a rental vehicle levy is currently in place in Pittsburgh, Pennsylvania and Triangle Transit Authority in Raleigh/Durham/Chapel Hill, North Carolina.

5.1.1.2 How is the tool used for evaluation?

For the purposes of this analysis, it has been assumed that a fixed daily levy per vehicle would be added to the cost of renting a vehicle. The levy would be added to the cost of renting a vehicle at all car rental locations within The City of Calgary. For hourly car rental services such as Car2Go, the daily levy will only apply to full-day rentals.

5.1.2 Revenue Potential and Sustainability and Impacts on Other Funding Sources

5.1.2.1 Revenue Potential

The revenue potential for this tool is relatively limited. The first table below notes that the yield for a unit charge of $1 per car rental per day for 2014 would be in the range of $1 million to $3 million. The range is due primarily to different assumptions about the proportion of Alberta tourism visits allocated to the Calgary Census Metropolitan Area (CMA). It is assumed that all car rentals in the CMA are based within the city.

Table 38 - Revenue Potential for Car Rental Levy - 2014

Yield for $1 (2014$)	$1M – $3M
Rate for $100M Yield	Not applicable

The next table shows the 10-year revenue forecast for a $4 per day levy. This forecast is based on the projected growth rates for real gross domestic product (GDP) in Alberta from the Conference Board of Canada. The growth

rates through to 2017 are slightly lower and more conservative than the real GDP growth rates projected in the Government of Alberta 2014 Economic Outlook. Other assumptions include the proportion of Alberta tourism visits allocated to the Calgary CMA, which converts provincial data to a Calgary estimate, and the estimated average daily rental levy, which affects the demand response caused by the levy.

Table 39 - Revenue Forecast for Car Rental Levy

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $4/day (2014$)	$8M	$8M	$9M	$9M	$9M	$9M	$10M	$10M	$10M	$10M	$92M

5.1.2.2 Revenue Sustainability

The implementation of this levy would impact all people renting automobiles within The City of Calgary. While this is not a large segment of the population, this tool is considered to be a fairly sustainable form of revenue, because demand for rentals rises with economic growth. However, there is potential for car rental revenues to vary somewhat over the business cycle, because tourist and business demand for car rentals varies with economic activity.

5.1.2.3 Impacts on other funding sources

The implementation of a car rental levy will not have any material impact on provincial or municipal revenue sources. Any adverse impact from a car rental levy would be on revenue from the GST on car rental sales and possibly on revenue from the GST and fuel taxes if less driving occurs. These effects are unlikely to be material given the small size of the rental car industry relative to the GDP in Calgary.

5.1.3 Implementation Costs

Implementation costs associated with a car rental levy would be minimal as tax payment and collection mechanisms already exist in the car rental industry. These fees would simply be an additional levy added to the daily rate charged to consumers. There may be incremental administrative costs (e.g., auditing collection of the tax) associated with processing the collection of the new tax and remitting to The City. However, these costs are not expected to be significant.

5.1.4 Net Revenue Estimates

The net revenue estimated generated by a $4 per day car rental levy is $92 million (undiscounted) over the 10-year forecast period. This amount may be somewhat lower due to any administrative or audit costs associated with the collection of the levy. For the purposes of this report, it was assumed that a car rental levy could be implemented in less than one year. Therefore, the net revenue during the forecast period is approximately $92 million.

5.1.5 Travel Behaviour and Transportation Network Performance Impacts

The implementation of a car rental levy is not likely to have an impact on the overall performance of the transportation network. While there may be a marginal reduction in the number of rental vehicles in Calgary due to the increased cost of car rentals, the reduction is unlikely to have a discernible impact on network performance.

5.1.6 Implementation Challenges: Technical & Governance Considerations

The new levy can be implemented relatively soon after the necessary approvals. Administrative costs should be modest as collection will be through rental vehicle invoices, which are already used to collect other types of third-party charges.

5.1.7 Equity and Distributional Impacts

There are alternatives available to users in the form of other modes of transportation, including taxis or purchasing a vehicle rather than renting. However, not all of these alternatives may be viable for visitors to Calgary who are travelling to areas that are not well-connected to the public transit system.

The implementation of this tool would have the biggest impact on frequent rental car users within the city and on tourists. In terms of horizontal equity, this tool performs poorly because it targets a specific group, while the beneficiaries of transportation services are a much larger group. From a vertical equity standpoint, it is likely that low-income earners are under-represented among residents and tourists renting vehicles and therefore, the funding burden of this tool is likely to be borne by middle- and higher-income groups.

5.1.8 Overall Efficiency Impact

The overall efficiency impacts of this revenue tool comprise three parts: (i) travel behaviour and transportation network performance impacts, (ii) implementation costs, and (iii) the costs of economic distortions. Since the travel behaviour and transportation network performance impacts are expected to be negligible (or nil) and the other two components are negative, the overall efficiency impacts for this revenue tool are negative.

The implementation costs for a car rental levy are likely to be small or modest at most, since car rental companies already collect fees or taxes for third parties or governments.

The costs of economic distortions are likely to be higher than for broad-based and country- or province-wide consumer sales or excise taxes, because they are applied to a narrow consumption base (i.e., to very small parts of overall consumer spending) and to a restricted geographic area (i.e., The City of Calgary). Hence, consumers are likely to be fairly sensitive to changing their consumption patterns in response to these excise taxes, including the value and types of goods and services purchased as well as the locations where they are purchased. However, these distortions can be reduced in part by expanding the base of taxable services to other possible substitutes (e.g., car-sharing services) and by expanding the area of application to the Calgary region (i.e., the municipalities in the Calgary Regional Partnership) or province-wide if possible — with revenues collected outside Calgary going to their respective jurisdictions (or to the Province). For example, a region-wide application could avoid a scenario in which some car rental companies locate just outside city limits (e.g., to serve the Airport via a shuttle) in order to avoid the charge. The third factor affecting the costs of economic distortions is the charge rate. In essence, inefficiency costs rise more than proportionately with the charge rate. Hence, if the rate is set low (e.g., up to $2 to $3), the inefficiency costs may be modest (e.g., $0.15 to $0.25 per dollar of revenue). This is the case even if the charge is applied within the city alone. However, if the rate is, for example. $5 or higher, the costs of distortion are likely to be significantly higher (e.g., $0.25 to $0.40 per dollar of revenue), especially if the levy is applied within the City alone.

There may also be some distortions associated with the flat-rate nature of the dollar-per-rental-per-day charge. This is because the charge will represent a higher percentage increase in prices for discount rental car companies (i.e., those who compete through discounted (lower) prices). This type of charge would narrow the relative difference between rental car companies (though the absolute difference would remain constant) and might put discount companies at a competitive disadvantage.

In conclusion, car rental fees are expected to have a modest adverse effect on the productivity and competitiveness of The City of Calgary in that higher-cost car rentals can make the region marginally less attractive as a destination for tourism and investment. This includes a negative effect on car rental companies within The City of Calgary

through a reduction in demand for car rentals due to the increased price. This conclusion is predicated on a charge of $2 to $3 per day. A higher levy would entail significantly higher inefficiency costs.

5.2 Monetization of City Assets

5.2.1 Overview of the Tool

Table 40 - Qualitative Evaluation of Monetization of City Assets

CRITERIA	SCORE
1. Revenue Sustainability	1
2. Implementation Challenges	2
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	4
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	3
Efficiency Impacts Average Score	3
Overall Score *(simple average of 1,2,3,4)*	2.3

5.2.1.1 How does the tool work and where is it being used?

Asset monetization involves the transfer of a public sector asset and its associated activities to the private sector through a sale, concession, or some other form of transaction. In return, the public sector typically receives an upfront one-time payment that it can use for various purposes. In some types of transactions, such as in a concession, payments may be received by the public sector over the term of the concession. This tool profile addresses only the sale of public assets.

The sale of public assets to invest in infrastructure, reduce debt, or boost economic efficiency is a common revenue tool used across the globe. In the U.S., the city that has pursued asset sales most aggressively is the City of Chicago. It has completed the sale of the future revenue stream from a toll road, four downtown parking garages, and a system of parking meters; the ownership of these assets was retained by the City. In Australia, New South Wales sold two ports in 2012 for $5 billion dollars. The government planned to re-invest this money into large transportation infrastructure projects. In Britain, the government sold its postal service company, Royal Mail, in 2013 to reduce its public debt-to-GDP ratio.

In Canada, examples of the sale of public assets include the sale of local electricity distribution companies by many Ontario municipalities. These sales followed the restructuring of the provincial electricity sector in 1999.

5.2.1.2 How is the tool used for evaluation?

City assets include public infrastructure such as land and buildings required to deliver public services as well as business entities or operations that have commercial value.

As of 2013, the City owned $3.6 billion worth of land holdings. The City also has a building portfolio of $3.7 billion. To the extent there is excess land and buildings, those could be sold off.

City-owned operations which generate significant revenues could also be sold to private investors. For example, the Calgary Parking Authority (CPA) manages public parking across Calgary. The CPA owns seven parking structures, 32 surface lots, and over 700 pay machines for public parking. Following what Chicago did in 2008, the City could sell these assets and privatize parking across the City.

Another type of assets that could be sold is public utilities. Utilities that provide citizens with essential services, such as electricity and water/wastewater, can provide investors with a stable revenue base and an associated earnings stream. ENMAX Corporation, an electricity distribution utility wholly owned by the City, is an asset that could potentially be sold to provide a large source of funds for transportation infrastructure.

From the perspective of revenue potential, the sale of public utility assets is likely to generate the most significant funding and accordingly is profiled.

5.2.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

5.2.2.1 Revenue Potential

Table 41 - Revenue Potential for Monetization of City Assets

Yield for 1% (2014$)	Not applicable
Rate for $100M Yield	Not applicable

Revenue potential depends on the public asset being sold and how the asset is valued by the market. A large utility with a stable revenue base and earnings potential will likely be attractive to investors such as pension funds. The valuation of assets by the market will depend on many factors such as the size and scale of the asset, revenues, earnings, cash flow, short-term and long-term outlook, underlying risks of the business/asset, market condition at the time, and many other factors.

Rough estimates of the ranges of potential revenues that could be received by the City if it were to sell either (or both) of the two entities referred to above were generated on the basis of the recent financial performance of the two entities and benchmarks from other comparable transactions in the marketplace. Assuming that existing debt is transferred to the new owner, the estimate for ENMAX is that the City could generate in the order of $500 million to $1.7 billion while the estimate for the Calgary Parking Authority is $150 million to $400 million. As mentioned, these values are highly dependent on the circumstances at the time of the transaction and a whole host of specific parameters, and the estimates are based on very crude methodologies. The City should conduct further analysis if it wants to generate values that can be used as the basis for decision making.

5.2.2.2 Revenue Sustainability

Asset monetization encompasses a one-time sale of a public asset and results in a substantial, one-time injection of funds for transportation infrastructure. Thus, revenue is not sustained unless there are multiple assets and transactions.

5.2.2.3 Impacts on other funding sources

The sale of a publicly-owned entity such as ENMAX or the Calgary Parking Authority may entail some impact on property tax revenues for the City and the Province, if there is a change in the property assessment or the property tax treatment of the entity.

5.2.3 Implementation Costs

Implementation costs to the City will depend on the nature and size of the asset being sold. Implementation costs could include:

- Transaction costs for the valuation, due diligence, and deal organization and development related to the sale.
- Legal, financial, technical and consultation costs to create and run a well-designed and transparent bidding process.

- Regulation costs to ensure that the new private sector owner of the asset provides an appropriate level of service and to prevent abuse of monopoly powers. Cost for regulation may be ongoing, while the transaction costs noted above are likely to be one-time in nature.

Generally, implementation costs can range from 1% to 5% of the sale price of an asset. As was the case with the estimated range of revenues above, these values are highly dependent on the circumstances and a range of factors related to the transaction. The City should conduct further analysis if it wants to generate values that can be used as the basis for decision making.

5.2.4 Net Revenue Estimates

The net revenue to the City from the sale of ENMAX would lie between $500 million to $1.7 billion less transaction costs, less transaction costs which can vary between 1% and 5% of the sale price. In the case of the Calgary Parking Authority, the net revenue would be in the range of $150 million to $400 million, less transaction costs in the range of 1% and 5% of the sale price. For the purposes of this report, it was assumed that monetization of City assets would require at least two years. Therefore, the net revenue from the transaction would likely be unchanged, but it would be generated approximately two years into the forecast period.

5.2.5 Travel Behaviour and Transportation Network Performance Impacts

This revenue tool would not have a direct impact on travel behavior or network performance. However, the sale of some assets, such as Calgary Parking, could result in indirect impacts on travel behaviour if the sale resulted in changes in parking pricing and or changes in the supply of parking spaces.

5.2.6 Implementation Challenges: Technical & Governance Considerations

Implementation challenges will depend on the asset being sold. Challenges are likely greatest with the sale of large utilities that affect most residents.

Since utilities provide citizens with essential services, the sale of the assets would require that a framework be in place to ensure that the new private sector owner of the asset provides an appropriate level of service and does not abuse its monopoly powers. In this context, it is noted that:

- The electricity distribution activities of ENMAX are already regulated by the Alberta Utilities Commission. Thus a regulatory framework already exists.
- ENMAX carries out a number of unregulated activities, including electricity retailing, unregulated customer billing and metering services, and EPC contracting. These unregulated activities are carried out in separate corporate entities that are affiliates of the electricity distribution company. Since these activities are generally subject to competitive market forces, they do not a require regulation by an independent third-party.

5.2.7 Equity and Distributional Impacts

The following considerations will determine the equity and distributional impacts of a sale transaction:

- The distribution of taxes among Calgary residents may differ from the distribution of utility costs. If a sale transaction results in a shift in costs from taxpayers to utility consumers — for example, as a result of increases in the required revenues of the utility — this may result in a shift in costs among ratepayers/consumers.
- City employees may be affected by changes in staffing levels or compensation arrangements as a result of the shift in asset ownership.

- Increases in efficiency as a result of a sale transaction can result in positive impacts for consumers and ratepayers, to the extent that such efficiency improvement ultimately flows through to users under an appropriate regulatory framework.
- Private owners may be less likely to serve high-cost or unprofitable customers, unless they are mandated to do so under an appropriate regulatory framework. Thus, a sale transaction could potentially have a negative impact on certain consumer groups.

5.2.8 Overall Efficiency Impact

The overall efficiency impact is considered from the perspective of the City and the perspective of consumers.

5.2.9 Perspective of the City

- The sale of an asset results is a loss of an income stream to the City. The impact on the City of this loss of income will need to be compared to the impact associated with alternative mechanisms for raising the funding. Alternative mechanisms for raising funding may include borrowing the funds or increasing other tax revenues.
- With a well-designed bidding procedure and sufficient competition between private investors, privatization effectively serves as a mechanism for market pricing
- With the appropriate regulations in place, the private sector will be driven to generate efficiencies in service delivery, while maintaining fair user fees and quality of service.
- It is important to note that increases in efficiency do not necessarily make all stakeholders better off
- Through the sale of a public asset, the City could lose the ability to control local service quality and prices charged to consumers.
- There is also a risk that private companies may provide inferior quality products or services and/or charge higher fees to users in order to maximize profits. This could leave users (and synonymously, taxpayers) worse off.

5.2.10 Perspective of Consumers

- Consumers may favour privatization due to improved quality of service
- Consumers would also benefit if the private operators passed on the savings resulting from improved efficiencies
- Consumers may oppose privatization if private operators charge higher user fees and/or provide inferior quality of service in order to maximize profits.

In terms of operations of the assets being monetized, it can be expected that there will be a stronger focus on efficiency and profitability. Using the parking authority as an example, there can be a stronger motivation for optimization of pricing strategies, use of technology to lower cost, improve service levels and increase the degree of utilization of the parking spaces, and lower operating costs through better capital-operating trade-offs.

Overall, the decision by the City whether to sell particular assets, such as ENMAX and/or the Calgary Parking Authority, requires considerations of the benefits and costs associated with each transaction. In this case, the primary benefits would be revenue from the sale of the asset. The primary costs would be the implementation costs of the transaction, as mentioned in section 13.3.

5.3 Utility Levy

5.3.1 Overview of the Tool

Table 42 - Qualitative Evaluation Utility Levy

CRITERIA	SCORE
1. Revenue Sustainability	5
2. Implementation Challenges	5
3. Equity Impacts	2
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	5
Efficiency Impacts Average Score	3.3
Overall Score *(simple average of 1,2,3,4)*	3.8

5.3.1.1 How does the tool work and where is it being used?

A transportation utility levy is a monthly fee that can be collected from residences and businesses within a region to help fund transportation initiatives. The fee can be implemented as a fixed dollar amount that is collected through the regular utility bill.

To date, 12 Oregon communities have adopted transportation utility programs to augment shrinking roadway maintenance revenues from gas taxes and other sources. Port Orange, Florida has also used the tool successfully. In Vancouver, TransLink has implemented a $1.90/month hydro levy, which generates just over $18M annually.

5.3.1.2 How is the tool used for evaluation?

For the purpose of this analysis, a utility levy is being considered as a monthly charge on all dwelling units (including owned and rented) within the city. The fee is set up as a fixed dollar amount and is collected through monthly utility bills (hydro). This charge would be in addition to the charges already incurred for household utilities. The evaluation excludes levying the charge on businesses.

5.3.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

5.3.2.1 Revenue Potential

A utility levy implemented in Calgary has the potential to generate a moderate amount of revenue. For the purposes of developing a revenue estimate for the tool, a fixed monthly levy per private dwelling has been assumed.

With approximately 423,400 private dwelling units in Calgary, a $1 per month levy has the potential to generate around $6 million annually. In order to yield $100 million by 2014, the levy would need to be set at around $18.50 per month.

Table 43 - Revenue Potential for Utility Levy - 2014

Yield for 1$/month (2014$)	$6M
Rate for $100M Yield	$18.50/month

The 10-year revenue forecast assumes that the growth of dwelling units is equal to projected population growth in Calgary. This growth rate declines gradually from 1.9% in 2014-15 to 1.6% in 2023-24. Revenue estimates are rounded to the nearest million, which explains why there appears to be little year-on-year growth in revenues.

Table 44 - Revenue Forecast for Utility Levy

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $1/month (2014$)	$6M	$6M	$6M	$6M	$6M	$6M	$6M	$6M	$6M	$7M	$61M

5.3.2.2 Revenue Sustainability

The implementation of this levy would impact all private dwelling owners and renters in the city. With a modest levy of a few dollars per month, revenues are expected to be sustainable as the number of people residing in the region and paying utilities will likely be maintained into the future. Similarly, shifts in the economic cycle will have little effect on the revenues being generated by the tool.

5.3.2.3 Impacts on other funding sources

The implementation of a modest utility levy is not expected to have any discernable impact on other funding sources used by the City or the Province.

5.3.3 Implementation Costs

Implementing the levy under the current utilities billing regime should not incur any incremental capital or operating costs. Any additional administrative expenses associated with the collection and remitting of the revenues to the City from multiple utility providers / hydro companies should be minimal. The introduction of a flat fee (or a pro-rated ad valorem tax) will not require additional metering infrastructure.

5.3.4 Net Revenue Estimates

The net revenue for the City from a $1 per month utility levy from 2015 to 2024 is $61 million. This amount may be slightly lower due to any additional administrative expenses. For the purposes of this report, we have assumed that a utility levy could be implemented in less than one year. Therefore, the net revenue during the forecast period is approximately $61 million.

5.3.5 Travel Behaviour and Transportation Network Performance Impacts

A utility levy will have no impact on travel behaviour or the performance of the transportation network.

5.3.6 Implementation Challenges: Technical & Governance Considerations

Implementation of an additional levy should be straight forward, with the new charge being easily added to monthly utility bills. The costs of implementation should be minimal, since collection of monthly fees can be processed through the billing mechanisms are already in place. The City is currently permitted to institute a utility levy; no provincial legislative changes are required to implement this levy.

5.3.7 Equity and Distributional Impacts

All owner/occupants of a private residence within the city must pay the fee. A modest charge is unlikely to displace economic activity or result in people moving outside of the city to avoid paying the levy.

The equity impacts of this revenue tool are relatively adverse both because there is no relationship between fees paid and usage of the transportation network (horizontal equity) and because the charge would represent a greater share of budgets for low-income households.

5.3.8 Overall Efficiency Impact

The overall efficiency impact of a modest flat-rate utility levy should be only marginally negative as there is little scope for avoiding the charge. There may be some costs arising from economic distortions. However, these are likely to be small with a modest charge of a few dollars per month. While it is not a feasible option for most households to disconnect their residence from the public electrical grid and to use alternative energy sources instead, it is possible that the utility charge contributes to the cost of accommodation in the city and thereby makes the city a marginally less attractive for current and potential residents. This suggests the overall efficiency impacts of a nominal utility charge would likely be very small.

5.4 Vehicle Registration Fee

5.4.1 Overview of the Tool

Table 45 - Qualitative Evaluation of Vehicle Registration Fee

CRITERIA	SCORE
1. Revenue Sustainability	4
2. Implementation Challenges	5
3. Equity Impacts	3
4. Efficiency Impacts	
▪ Costs of Economic Distortions	3
▪ Travel Behaviour and Transportation Network Performance	2
▪ Implementation Costs	5
Efficiency Impacts Average Score	3.3
Overall Score *(simple average of 1,2,3,4)*	3.8

5.4.1.1 How does the tool work and where is it being used?

A vehicle registration fee is a fee paid by vehicle owners upon registering a new vehicle and renewing that registration annually. This tool is based on vehicle ownership as opposed to vehicle usage. As a result, the cost of ownership becomes slightly more expensive while operating costs are not impacted.

Vehicle registration fees are used in New York City and the province of Quebec and were used in Toronto until removed in January 2011. In the state of Maryland, vehicle registration fees are revenues to the multimodal state Transportation Trust Fund, which supports road and transit operations and capital funding.

5.4.1.2 How is the tool used for evaluation?

Vehicle registration charges are currently collected on an annual basis and it is assumed that those fees would increase to include a dedicated transportation funding portion of the fee. It is assumed that the current collection mechanism can continue to be employed through Service Alberta with the portion of the fee dedicated to transportation funding being remitted to the City. The fee can be a flat rate per vehicle or could be tiered according to vehicle class, engine size/CO2 emissions or vehicle value. This evaluation is based on the assumption of a flat fee per vehicle registration.

5.4.2 Revenue Potential, Sustainability and Impacts on Other Funding Sources

5.4.2.1 Revenue Potential

A vehicle registration fee has the potential to generate a significant amount of revenues depending on the tax rate. With about 930,500 vehicles registered in Calgary in 2012 (based on Alberta Transportation publication), a $12 fee/year (equivalent to a $60 charge per renewal) has the potential to generate $11 million in revenues in 2014. An annual fee of $130 would be required to generate $100 million.

Table 46 - Revenue Potential for Vehicle Registration Fee - 2014

Yield for 1$/month (2014$)	$11M
Rate for $100M Yield	$130 / year

The 10-year revenue forecast assumes a low growth rate in the number of registered vehicles in Calgary. The growth rate is based on the lower of either the recent growth rate in vehicle registrations in Calgary (1.94% between 2012 and 2014) or the projected population growth rate in Calgary. The rationale for this conservative approach is that the overall rate of vehicle ownership in Calgary is already is already relatively high and unlikely to increase substantially.

Table 47 - Revenue Forecast for Vehicle Registration Fee

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024 Undiscounted
Revenue Yield for $1/month (2014$)	$11M	$11M	$12M	$12M	$12M	$12M	$12M	$13M	$13M	$13M	$121M

5.4.2.2 Revenue Sustainability

This revenue tool would impact all owners of vehicles registered in Calgary. On its own, revenues from a vehicle registration fee would be expected to remain relatively flat and perhaps increase slightly with increased vehicle ownership. However, if implemented with other tools that increase the cost to drivers, this could reduce the number of drivers in the city, thus potentially reducing revenues over time.

5.4.2.3 Impacts on other funding sources

It is unlikely that a modest vehicle registration fee will lead to any measurable impacts to other funding sources for the City or the Province.

5.4.3 Implementation Costs

Implementation costs associated with a vehicle registration fee are expected to be minimal as payment and collection mechanisms already exist for vehicle registration fees. This revenue tool could leverage existing systems and vehicle registration procedures.

5.4.4 Net Revenue Estimates

The net revenue for the City from a $1/month vehicle registration fee from 2015 to 2024 is $121 million. This amount may be slightly lower due to any administrative expenses associated with the introduction of this fee. For the purposes of this report, it was assumed that a vehicle registration fee could be implemented in less than one year. Therefore, the net revenue during the forecast period is approximately $121 million.

5.4.5 Travel Behaviour and Transportation Network Performance Impacts

A modest vehicle registration fee will not be expected to have any material impact on the performance of the transportation network.

5.4.6 Implementation Challenges: Technical & Governance Considerations

It is expected that this tool would be implemented in the city by adding an additional fee to the vehicle registration fee already paid by drivers upon registration (and registration renewal). The fee could continue to be collected by the Province using their existing payment and collection mechanisms and subsequently transferred to the City.

5.4.7 Equity and Distributional Impacts

The availability of alternatives to this tool is limited. Calgary residents who own their vehicle will not be able to avoid the fee. The alternatives include renting or leasing a car or considering other transportation modes. The fee is unlikely to lead to modal shifts for the majority of road users, although it could possibly lead to fewer vehicles in multi-vehicle households if the fee is set high enough.

If the tool is structured as a flat rate, all owners will pay the same fee across the city and will generally share the funding burden, regardless of how much they use roads or public transit within the city. However, lower income groups will be paying a higher share of their income when compared to other groups. The use of a variable pricing scheme that is dependent on vehicle type, energy efficiency or other factors may be a more vertically equitable solution.

5.4.8 Overall Efficiency Impact

Overall efficiency impacts with a modest vehicle registration fee would be negative but small in magnitude. This is because there may be some costs associated with economic distortions. These distortions include all changes in behaviour designed to avoid or mitigate the impact of the tax, including:

- Not purchasing a vehicle or delaying the purchase of a vehicle (e.g., relevant for young adults in a multi-vehicle households)
- Increased sharing of vehicles (not car-pooling) in place of purchasing an additional vehicle
- Changing the location of vehicle registrations. For example, people with a second home outside Calgary could potentially succeed in registering their vehicle at this second location. The same goes for students or other workers with an alternative residences outside the taxed jurisdiction

The overall efficiency impacts of this revenue tool will tend to be negative and entirely attributable to the costs of economic distortions. However, these costs are likely to be relatively small in magnitude. Moreover, these economic distortions can be partly mitigated by applying the tax at a province-wide or region-wide level.

6. Summary and Concluding Remarks

6.1 Introduction

Calgary City Council passed a motion in January 2014 directing "Administration to evaluate the full range of 27 potential funding or revenue sharing mechanisms, or other methods, using best practice evaluation criteria, to identify which mechanisms are best suited to fund the future transition to the Green Line LRT, and the remainder of the unfunded list in Investing in Mobility".

AECOM was asked to undertake the analysis supporting Administration in this task and started with a preliminary analysis of 28 Revenue Tools (see Appendix A for profiles of Revenue Tools not retained in the shortlist). The analysis included revenue estimates and a qualitative evaluation of the revenue sustainability, implementation challenges, equity impacts and efficiency impacts. The following 28 Revenue Tools were evaluated:

Mobility User Charges

- Cordon Charge
- Fuel Tax
- HOT Lanes
- Road Tolls
- Transit Fares
- Transit Fare Restructuring
- VKT Charge

Conventional Tax Tools

- Corporate Income Tax
- Payroll Tax
- Personal Income Tax
- Sales Tax

Land-Based Revenue Sources

- Development Charges
- Land Transfer Tax
- Land Value Capture
- Parking Space Levy
- Parking Sales Tax
- Property Tax
- Tax Increment Financing

Other Revenue Sources

- Auto insurance tax
- Car Rental Levy
- Carbon Tax
- Crowdfunding
- Drivers' License Tax
- Hotel and Accommodation Levy
- Monetization of City Assets
- New Vehicle Sales Tax
- Utility Levy
- Vehicle Registration Fee

6.2 Preliminary Evaluation and Shortlist

A shortlist was retained based on the results of the evaluation and discussions with the project coordination committee. The following were the principal considerations which determined the selection of the shortlisted revenue sources:

- Revenue generation potential
- Efficiency considerations
- Avoiding duplication of revenue sources

Based on these considerations, the following Revenue Tools were not shortlisted:

- Mobility User Charges
  - Cordon Charge (downtown only) – this was dropped in favour of a cordon charge around the city boundary, given the concern that non-residents should contribute their fair share of transportation and transit infrastructure costs. Moreover, there is arguably already an equivalent downtown cordon charge in place due to the tightly controlled supply of parking places and resulting parking prices in downtown Calgary which are among the highest in North America. (There is little through traffic in downtown Calgary).
  - Vehicle Kilometres Travelled (VKT) Charge – this revenue tool was not retained because it has not yet been implemented on a commercial scale (although some pilots will soon be underway, such as in Oregon as of July 2015) and because the road tolls and other tolling options are at least partial substitutes.
  - Transit fare restructuring: because it is not a source of additional revenue as compared to transit fares, even though fare restructuring can mitigate some of the adverse impacts of fare increases on transit ridership
- Conventional tax tools
  - The Corporate Income Tax was not on the shortlist, because it would entail greater inefficiencies compared to the three other conventional tax tools (payroll, income and sales taxes).
  - The Payroll Tax was no retained, because it would entail greater inefficiencies than sales taxes and it is not a revenue tool currently used by the Province.
- Land-based Revenue Tools
  - Tax Increment Financing (TIFs), known as a Community Revitalization Levy (CRL) in Alberta, was not on the shortlist, because it does not generate new revenue but borrows instead from future property tax revenues, In this respect, it is more of a financing tool than a funding tool.
  - The Land-Transfer Tax was not shortlisted, because it performed more poorly than the property tax in efficiency terms
  - The Parking Sales Tax was not retained, because it would apply only to priced parking in the downtown area, where parking prices are among the highest in North America,
  - Crowdfunding was not on the shortlist, because it was not deemed to have significant revenue potential
- Other Revenue Tools not shortlisted:
  - The Auto Insurance and Carbon Tax: because these were the worst performers in efficiency terms relative to the 10 Revenue Tools considered under this category (including the car rental levy).
  - The Driver's License Tax: because it was deemed preferable to shortlist the vehicle registration fee, which may discourage vehicle ownership (rather than discouraging potential drivers).
  - The Hotel and Accommodation Levy: because the Province already has such a levy in place – a 4% ad valorem tax on temporary accommodation prices known as the Alberta Tourism Levy

The remaining shortlist of 16 Revenue Tools was subject to a comprehensive analysis, the results of which are presented in the Table 48. The table shows the qualitative results in the upper panel as well as the quantitative results in the lower panel. For example, the qualitative results suggest that top-ranked tool in terms of efficiency considerations is the fuel tax, followed by HOT Lanes, with a group of other revenue sources in third place, including the sales tax, parking space levy, property tax, utility levy and vehicle registration fee. In terms of overall scores, where each of the four criteria are given an equal weighting, the personal income tax was the top ranked (since it is a more sustainable revenue source), followed by a second group of sources including the fuel tax, transit fares, utility levy and vehicle registration fee.

These qualitative results are only indicative in nature, however. The quantitative assessment – notably the revenue generation and the benefit-cost results in the lower panel, which represent a summary efficiency assessment – are a more reliable source for evaluating the Revenue Tools. In terms of benefit-cost considerations alone, the HOT Lanes, Road Tolls and the Fuel Tax are the top-ranked tools. They also represent the only tools which are likely to generate efficiency gains and thereby make Calgary a more competitive city and region. It is important to note that these results are specific to the Calgary context and to the tax rates evaluated. For example, an 8-cent per litre increase in the fuel tax would not necessarily have double the impacts of the 4-cent per litre increment evaluated.

Table 48 - Comprehensive Evaluation of Shortlisted Funding Mechanisms

CRITERIA	SHORTLISTED FUNDING MECHANISMS																
	Mobility User Charges							Conventional Tax Tools		Land-Based Taxes				Other Tools			
		Tolling Options															
	Fuel Tax	High Occupancy Tolls	Road Tolls	Border Toll	Facility-Specific (Airport Tunnel)	Facility-Specific (Bow Bridge)	Transit Fare Increases	Personal Income Tax	Sales Tax	Development Charges	Land Value Capture(LVC)	Parking Space Levy	Property Tax	Car Rental Levy	Monetization of City Assets	Utility Levy	Vehicle Registration Fee
1. Revenue Sustainability	2	5	5	4	3	3	5	5	5	2	2	4	5	4	1	5	4
2. Implementation Challenges	5	2	2	1	4	4	4	5	3	3	2	3	4	4	2	5	5
3. Equity Impacts	4	4	3	3	4	4	3	3	3	3	4	3	2	3	3	2	3
4. Efficiency Impacts												s					
Cost of Economic Distortions	3	5	4	2	3	3	3	1	4	3	4	3	3	2	4	3	3
Travel Behaviour and Transportation Network Performance	4	4	4	3	2	2	1	2	2	2	2	3	2	2	2	2	2
Implementation Costs	5	2	1	1	3	3	5	5	4	4	3	4	5	5	3	5	5
Efficiency Impacts (Average Score)	4.0	3.7	3.0	2.0	2.7	2.7	3.0	2.7	3.3	3.0	3.0	3.3	3.3	3.0	3.0	3.3	3.3
Overall Score	**3.8**	**3.7**	**3.3**	**2.5**	**3.4**	**3.4**	**3.8**	**3.9**	**3.6**	**2.8**	**2.8**	**3.3**	**3.6**	**3.5**	**2.3**	**3.8**	**3.8**
Yield for Unit Tax Rate	$24M	$0.2M	$30M	$53M	$5M	$32M	$1M	$348M - $377M	$232M - $252M	na	na	$98M - $125M	$36.5M	$1M - $3M	n/a	$6M	$11M
Rate for $100M Yield	4.1 - 4.2 cents/ltr	na	3.4 cents/k	$1.96/trip	na	$3.25 - $3.40/tri	na	0.26% - 0.28%	0.39% - 0.43%	na	na	$0.81 - $1.02/da	0.00028	n/a	n/a	$18.50/ month	$130/ year
Ranking by Efficiency Impacts	**1**	**2**	**4**	**6**	**5**	**5**	**4**	**5**	**3**	**4**	**4**	**3**	**3**	**4**	**4**	**3**	**3**
Ranking by Overall Score	**2**	**3**	**7**	**9**	**6**	**6**	**2**	**1**	**4**	**8**	**8**	**7**	**4**	**5**	**10**	**2**	**2**

Tax / Charge rate	4¢/L	20¢/km	3¢/km	2$/trip	2$/trip	$2/trip	$0.20/ trip	0.5% point tax	0.5% tax	Based on Ottawa rates	Southeast BRT stations	$1/space /day	0.033% (res) / 0.145% (non-res)	$4/day	ENMAX & Calgary Parking	$1/ month	$1/ month
Gross Revenue - 2015-2024 (2014 $M, Undiscounted)	1000	51	980	1400	120	630	230	2100	1400	725	50	1100	1700	90	650 - 2100	60	120
Time required to implement (years)	<1	3	5	5	3	3	<1	<1	3	2	2+	2	<1	<1	2	<1	<1
Net Revenue - after implementation (2014 $M)	1000	na	340	625	70	360	110	2100	1000	650	50	890	1700	90	less 1-5%	60	120
Efficiency benefit (cost) - per $ revenue	0.05	na	na	na	na	na	na	(0.32)	(0.13)	na	na	(0.13)	(0.19)	(0.25)	na	na	na
Efficiency benefit (cost) -2014 $M (Undiscounted)	50	na	na	na	na	na	na	(672.00)	(130.00)	na	na	(115.70)	(323.00)	(22.50)	na	na	na
Benefit-cost ratio	1.2	1.5	1.4+	<1?	na	na	<1	<1	<1	1	1	<1	<1	<1	<1 or >1	<1	<1

Note: 'na' indicates not applicable/not available

6.3 Recommendations and Categorization of Shortlisted Revenue Tools

In order to facilitate the screening and decision-making process for the 16 shortlisted tools, the study draws on the following principles in order to support the City in funding the Green Line LRT and other unfunded projects in *Investing in Mobility* as well ensuring that additional revenue generation is not at the expense of the city and region's competitiveness:

- Revenue generation potential
- Timing of new revenue streams
- Jurisdictional considerations and
- Efficiency considerations

These principles suggest the following categorization of the short-listed Revenue Tools:

1. Funding Mechanisms within City Jurisdiction and Available for Implementation within a Year

- Property Taxes – this is already a major revenue source for the City
- Utility Levy – this is also a current revenue source for the City (i.e., 10% franchise fee on utility bills), although there may be legal and other challenges involved introducing an additional surcharge.

2. Funding Mechanisms Requiring Provincial Approval

- Development Charges – while these are a current revenue source for the City (and are currently under review), the use of DCs to recover capital costs for transportation and transit infrastructure may require amendments to the enabling legislation (i.e., the Municipal Government Act)
- Fuel Tax – this is already a revenue source which the Province of Alberta shares with Calgary and Edmonton. A modest increase in this tax could generate significant efficiency gains (5 cents per additional revenue dollar collected) and could be viewed as a user charge for fully funding the City roads budget (capital and operations). This type of mobility user charge is also an efficient way of addressing usage of Calgary transportation infrastructure by non-residents (to the extent that their fuel purchases are made at least partly within city boundaries). The latter consideration reinforces the need to implement the increase in fuel taxes at the Calgary Region level or province-wide in order to minimize distortions arising from changes in the location of fuel purchases.
- Parking Space Levy – a significant revenue source with some similarities to a property tax, except that it would incentivize parking lot owners to allocate some of their unused and under-valued parking spaces to other uses. This revenue source would require new provincial legislation, because it is essentially a new tax on privately held property.
- Sales Tax – a potentially important revenue source with some of the lowest efficiency costs of all conventional tax tools.
- Vehicle Registration Fees – a current revenue source for the Province which has a direct relationship to vehicle ownership (if not usage).

The City of Calgary is currently engaged in negotiations with the Province regarding the City Charter, which includes potential revisions to the fiscal framework for funding the delivery of City services and associated capital projects. Provincial approval and any associated provincial legislative requirements for the above revenue tools can be addressed though this vehicle.

3. Funding Mechanisms for Consideration in the Longer-Term

- Road Tolls can generate substantial efficiency gains even net of capital and operating costs, provided the implementation is designed to enable mode-shifts and to discourage low-value trips (rather than just creating

trip diversions). Current provincial legislation (i.e., the Alberta "Traffic Safety Act") does not allow for road pricing. This legislative obstacle would need to be addressed in any planning for this revenue tool in the long term.

4. Complementary Measures

These refer to funding mechanisms which are not necessarily important revenue generators, but which may be desirable for efficiency or other reasons. They include:

- HOT Lanes, which can provide important congestion-reduction benefits, provided the provincial legislative obstacles can be addressed
- Facility-Specific Tolls, which can be a significant revenue source, but can only be applied in relatively unique situations, where the tolls do not create major trip diversions and disruptions
- Land Value Capture, which can provide an additional revenue source with little or no inefficiency costs, although the timing of the revenue would be uncertain

5. Revenue Tools not Recommended

These Revenue Tools are not recommended because they can lead to important efficiency losses for Calgary or because they do not represent a fundamentally new revenue source:

- Border Tolls – the introduction of road tolls for entering Calgary could create important efficiency losses by discouraging economic activity within the city boundaries without addressing road congestion in an effective manner. Concerns about ensuring that non-residents contribute their fair share to the upkeep of transit and transportation infrastructure are best addressed through other types of user charges, where total charges paid depend on the extent of infrastructure usage rather than on the location of users.
- Transit Fares – these are within City jurisdiction and can be implemented quickly. However, raising fares under the current fare structure has adverse efficiency impacts. Mitigating these impacts through a fare restructuring that better aligns fares with customer value delivered by transit services requires considerable time and effort to accomplish. Moreover, this revenue tool is already dedicated to funding transit service operations, including potential service improvements, the cost of which is not fully covered by fare box revenues.
- Personal Income Taxes – are already a major revenue source for the Province of Alberta. In addition, an increase in income taxes would entail higher inefficiency costs than a sales tax, the other conventional tax tool in the shortlist.
- Car Rental Levy – is likely to entail higher efficiency costs than broader-based consumer sales taxes, without generating any changes in travel behaviour or any improvements in the performance of the road network.
- Monetization of City Assets – these assets are already a revenue source for the City and the sale represents a monetization of the future revenue stream associated with the assets

All of the above Revenue Tools which are already used by the Province could also be tapped for revenue-sharing potential. However, such revenue sharing would come at the expense of funding other government services or transfers to individuals and/or communities.