“Pay-ving” the Road Ahead: Financing Transportation Infrastructure in Calgary, Alberta

by

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B.A., University of Alberta, 2013

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Faculty of Arts and Social Sciences

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Abstract

This study explores ways to finance the City of Calgary’s transportation system. The city is currently experiencing difficulties in financing planned and approved transportation projects, resulting in a $1.9 billion shortfall. This funding gap is the result of unsustainable financing methods employed by the city. An examination of three jurisdictions is used to identify successful characteristics in financing an urban transportation system. Three policy options are born from these characteristics, and are evaluated on their ability to meet four criteria. Results indicate that a flexible transportation tax can help close the funding gap in Calgary’s transportation system, and improve the system as a whole for the foreseeable future. I recommend that Calgary implement a flexible transportation tax through its existing property tax structure to create a more sustainable and effective transportation system.

Keywords: Transportation Financing; Transportation Infrastructure; Calgary; Financial Sustainability
This work is dedicated to my family, and my life partner, Colleen.
Acknowledgements

First and foremost, I would like to thank everyone who have supported, encouraged and believed in me for the past two years. My family and friends have been instrumental in helping me through this process, something I will never forget. More specifically, I would like to recognize the selflessness and support demonstrated by my loving parents. These actions are irreplaceable and something that I cannot express enough gratitude for.

I would also like to thank my best friend and life partner, Colleen, for her never-ending support and patience with me. I would not have been able to accomplish what I have without our daily Skype calls and your unfettered love. I love you and I look forward to our future together.

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<th>Description</th>
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<td>CMA</td>
<td>Census Metropolitan Area</td>
</tr>
<tr>
<td>CTP</td>
<td>Calgary Transportation Plan</td>
</tr>
<tr>
<td>FTA</td>
<td>Federal Transportation Authority</td>
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<tr>
<td>GreenTrip</td>
<td>Green Incentives Program</td>
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<tr>
<td>MGA</td>
<td>Municipal Governance Act</td>
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<tr>
<td>MSI</td>
<td>Provincial Municipality Sustainability Initiative</td>
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<tr>
<td>PBOT</td>
<td>Portland Bureau of Transportation</td>
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<tr>
<td>P3s</td>
<td>Public Private Partnerships</td>
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<tr>
<td>TIF</td>
<td>Tax Increment Financing</td>
</tr>
<tr>
<td>TriMet</td>
<td>Transportation District of Oregon</td>
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<tr>
<td>RTD</td>
<td>Regional Transportation District</td>
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<td>VFM</td>
<td>Value For Money</td>
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Executive Summary

The issue of investing and financing transportation is evident in the City of Calgary. The booming population and economic growth that the city is experiencing have exacerbated the demands and needs for its public and private transportation network. The city’s large growth has contributed to the strain on the transportation network as more commuters are added. Calgary has identified the need for $5.6 billion in infrastructure investment between 2015 and 2024 to accommodate growth and adequately maintain the transportation system. The City’s Transportation department anticipates having up to $3.7 billion in funding over the next decade, leaving a gap of $1.9 billion (City of Calgary, 2014). As a result, securing new, consistent and flexible funding sources to accommodate this gap is a priority and, thus, an objective. This study is an in-depth examination of transportation financing policies to determine the best policy options available to Calgary. The goal of this research is to suggest policies that will ensure a stable, sustainable, equitable and flexible financing for transportation infrastructure.

In order to meet this goal, I use a case study analysis, where three cities are examined to identify practices that best support sustainable transportation financing: Portland, Denver and Vancouver. I examine the key features and techniques used to collect funding for transportation in each city. The analysis revealed that fixed and non-fixed transportation-dedicated taxes and levies are employed in all three cities. Additionally, the importance of regional transportation authorities in collecting funding is well supported.

The findings from the case study analysis motivate the following policy options:

1. Introduce a Flexible Transportation Tax

This policy option allows for Calgary to resolve its short-term objective of funding scarcity. A flexible transportation tax would be added as a part of the existing property tax structures. This reduces implementation complexity, since the tax structure and the proper payment and collection mechanisms already exist. In addition, it can provide a substantial amount of additional revenue towards transportation specific projects. A
percentage of the property tax is reserved for the flexible transportation tax, and is used only for transportation specific projects. Furthermore, the tax is flexible and increases or decreases based on current and future needs ensure sustainability.

2. Introduce a Fixed Transportation-Dedicated Utility Levy

This policy option introduces a transportation-dedicated utility levy to fund transportation projects. The fixed levy is added to the utility bill and applied to each private dwelling and business in the city. The revenues are expected to be sustainable as the number of people residing in a given region and paying utilities are likely to be maintained into the future. Similarly, shifts in the economic cycle have little effect on the revenues generated by this financing tool.

3. Establish a Regional Transportation Authority in the Calgary Region

Transportation funding is the product of its governing structure. This introduces an indirect financing policy that proposes the creation of a transportation authority to oversee all transportation-related infrastructure and services, and make decisions on those matters. This includes, long-term infrastructure planning, investment plans, transportation strategies, service changes, facilities and maintenance. It is governed by a mayor’s council, which includes all cities and jurisdictions in the Calgary area. The role of the mayor’s council is to act as a representative to each respective jurisdiction under the regional authority. The council also appoints a Chief Executive Officer (CEO) of the regional authority, who is responsible for the day-to-day management of the authority itself.

The evaluation of these three policy options helps determine the best recommendation to address the problem. The options are assessed on the following criteria: effectiveness, administration costs, implementation complexity and acceptability. Given my policy analysis, I recommend implementing a flexible transportation tax as an add-on to Calgary’s existing property tax. The policy is effective in achieving the short-term objective and is inexpensive to implement. I also suggest future consideration for developing a regional transportation authority in the Calgary region. My analysis concludes that a regional transportation authority is effective, but is costly and complex to implement. Overall, these recommendations will improve Calgary’s ability to finance
current and future transportation projects, therefore improve transportation systems as a whole. Moreover, they provide a foundation to build a system to better meet future demand and growth in the city.
1. Introduction

In recent years, the urban agenda has risen as a priority for all orders of the Canadian government. There is growing recognition of the importance of cities for national and regional economies and for the quality of individual lives. At the same time, there is a growing understanding that a gap exists between the needs and the ability to provide infrastructure and deliver services within cities. Combined, these factors have created pressure on all levels of government to address urban issues, close the infrastructure gap and ensure the viability and prosperity of Canada’s urban centres.

Canada has become one of the most urbanized countries in the world. The population is becoming increasingly urban, with much of the population, employment and economic activity located in the country’s largest cities. This has made Canada’s cities the economic engines of the country. Within cities, much of the need is in transportation and much of the investment should consequently be targeted at transportation infrastructure. Transportation is an enabling sector that is often overshadowed by issues deemed more critical. However, transportation affects Canadians’ lives everyday through access to work, education, health care facilities, and accessible goods. This is exemplified through a highly mobile population, with 13 million traveling to and from work each day, making six trillion trips each year and as many trips again for recreational purposes (Parsons, 2003). Fundamentally, transportation enables economic wealth and the tax base to pay for what is important to Canadians (Western Transportation Advisory Council, 2002).

The issue of investing and financing transportation is evident in the City of Calgary. The booming population and economic growth the city is experiencing has exacerbated the demands and needs placed on its transportation network (public and private). Like many large municipalities in Canada, Calgary struggles to balance citizen needs and budget constraints. The city’s massive growth has mainly contributed to the
strain on the transportation network as more commuters are added. Calgary has experienced the highest population growth rates recorded by a Census Metropolitan Area (CMA) since 1996/1997 (Statistics Canada, 2014). In response, the city’s Transportation 2012-2016 capital plan has planned an investment of $1.7 billion for major capital infrastructure projects, and to fund ongoing lifecycle maintenance of the transportation system (City of Calgary, 2014). However, the city has identified the need for $5.6 billion in infrastructure investment between 2015 and 2024 to accommodate growth and adequately maintain the transportation system. The city’s transportation department anticipates having up to $3.7 billion in funding over the next decade, hence, leaving a gap of $1.9 billion (City of Calgary, 2014). As a result, securing new, consistent and flexible funding sources to reduce this gap is a priority. The purpose of this capstone is to determine what the most efficient and feasible financing methods are that can apply to financing transportation infrastructure in Calgary. The goal is to determine policy options that ensure a stable, sustainable, equitable and flexible financing model for transportation infrastructure.

The City of Calgary’s current transportation funding model is unsustainable and insufficient to meet the needs of its citizens. The research question I examine in this study is, “what financing methods can be used to ensure the financial sustainability of Calgary’s transportation network?” In order to answer this question, I explore three case studies where comparable jurisdictions employed innovative financing techniques to alleviate their funding gaps in transportation. A number of factors are considered during the analysis of each jurisdiction to ensure a comprehensive case study. The results and experiences of the jurisdictions involved in the case studies inform a range of policy options.

The capstone is organized as follows: Chapter 2 provides an overview of the City of Calgary and its transportation governance. It also provides evidence of population growth and its effect on transportation demand. Chapter 3 highlights to complexity of transportation in urban centres and its relationship with the future of Calgary’s mobility. It also presents the difficulties Calgary faces with financing its transportation system in the present and future. Chapter 4 provides background information on urban transportation, focusing on how it is financed and several tools available to do so. Chapter 5 presents
the policy problem and stakeholders for this study. Chapter 6 explains the study’s analysis methodology, which is a case study analysis of three jurisdictions and how they finance their transportation systems. Chapter 7 presents the analysis the cases and the results informing the policy options. Chapter 8 depicts the policy objectives and established set of criteria in which the policy options are assessed by. Chapter 9 explains the policy options and their evaluation, ending with recommendations based on the policy evaluation itself. Lastly, Chapter 10 presents the conclusion to this study.
2. Calgary, Alberta

Calgary started as a fort built in September 1875 by the North West Mounted Police and was officially ordained as a city in 1894 with a population of 3,900 (City of Calgary, 2014). Since those humble beginnings, Calgary has grown into a truly globalized city. This has been exemplified by its hosting of the 1988 Winter Olympics; by being a major centre for Canadian corporate head offices; and by developing an international and cosmopolitan population (Smith and Stewart, 2006). This has meant that the costs of physical infrastructure have grown to support the expanding city. Today, transportation infrastructure is at the forefront of citizen concerns, as mobility remains the most important issue for Calgarians (City of Calgary, 2011). This chapter provides an overview of Calgary itself, how transportation is governed in the city, and describes the current challenges it faces.

2.1. City Overview

Calgary is one fastest growing cities in Canada with a population of approximately 1.4 million as of 2014 (Calgary Economic Development, 2014). It has experienced the highest population growth rates recorded by a CMA since 1996/1997 (Statistics Canada, 2014). In 2012/2013, Calgary experienced a growth rate of 4.26 per cent and is projected to grow at an average rate of 2 per cent per year for the next 10 years (See Figure 1). Calgary also experiences a strong economy with a GDP of approximately $47 billion CAD per year (Smith and Stewart, 2006). In 2014, Calgary’s GDP is growing by 3.4 per cent, compared to the national rate at 2 per cent. There are approximately 800,000 people employed, and the city has the third lowest unemployment rate in Canada with 4.4 per cent. The lowest rate is in Regina at 3.1 percent, followed by Saskatoon at 3.6 percent, and the national average is 6.6 per cent (Calgary Economic Development, 2014, Statistics Canada, 2014).
Calgary’s population growth is linked through its spatial extent. In 1951, Calgary’s population was 127,057 people; by 2012 the population had grown to 1,120,225, representing an increase of 782 per cent. Spatially, the area within Calgary’s boundaries grew from about 104km$^2$ in 1951 to over 848km$^2$ in 2007’s annexation of land, a gain of 715 per cent (City of Calgary, 2013). Calgary also has a fairly low population density with 2,289 people per square kilometre, compared to 5,249 people in Vancouver for example (Statistics Canada, 2012). This is also exemplified through Calgary’s significant increase in population and employment, with the city’s population increasing by 24 per cent since 2001, where 103 per cent of the growth was located in the city’s Greenfield areas (new suburban communities) as shown in Figure 2 (City of Calgary, 2013). Furthermore, growth in Calgary has not captured the whole growth of the region. A number of municipalities surrounding the city have experienced massive growth rates, among which, Cochrane, Airdrie, Chestermere, Okotoks, High River, the Municipal District of Rocky View and the Municipal District of Foothills (See Figure 3) (City of Calgary, 2013). The rapid population growth of the city of Calgary, in addition to regional growth, means that physical infrastructure and services need to grow as well. This requires providing
citizens with appropriate infrastructure for movements. A major aspect of this is transportation and how to finance it.

Figure 2. Map of Calgary’s Growth in New Communities (Greenfields) 2011 – 2012

2.2. Transportation Decision-making and Financing

The definition of transportation for the purposes of this study encompasses both private and public forms of transportation, such as private roads and public transit respectively. This is because the City of Calgary has identified that both private and
public transportation are essential to future growth through its various guiding documents mentioned below.

From a broad perspective, Calgary is subjected to Alberta’s Municipal Governance Act (MGA), which “is the legislative framework in which all municipalities and municipal entities across the Province of Alberta operate,” (Municipal Governance Act, 2000). More specifically, the MGA lays the foundation for how municipalities operate, how municipal councils function, and how citizens can work with their municipalities. Through this legislation, Calgary controls its governance; planning and development; assessment and taxes; and roads.

Both private and public transportation decision-making is under the responsibility of the municipal government, in alignment with the MGA, because the transportation department is part of the municipality and not a separate agency. Like many municipalities, Calgary is responsible for local planning decisions, such as municipal transportation, development of transportation plans, and public transit (Hatzopoulou and Miller, 2008). Transportation decisions follow the Calgary Transportation Plan (CTP), a guiding document that provides policy direction on multiple aspects of the city’s transportation system (City of Calgary, 2014). A key objective of the CTP is to “align transportation planning and investment decisions with strategic corporate growth policies in order to increase municipal fiscal sustainability” (City of Calgary, 2012, p. 2-2). The policies of this objective primary refer to alignment with other municipal guiding documents, such as the Municipal Development Plan (MDP), and prioritization criteria for transportation projects.

Transportation in Calgary is currently funded from four sources: city funds, developer levies, provincial and federal transfers and grant (City of Calgary, 2013). City funds primarily consist of property and business taxes, while developer levies include a transportation levy and utility levy only paid by developers. In addition, the city relies on provincial programs such as the Provincial Municipal Sustainability Initiative (MSI), the

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2 For more information see Municipal Government Act, 2000.
3 For more details on transportation policies in Calgary, please refer to the Calgary Transportation Plan (2012).
Basic Municipal Transportation Grant and the Green Incentives Program (GreenTRIP). Federally, the city relies on general transfers and grants, such as the Building Canada Fund and Federal Gas Tax Fund. There is also a fuel tax, where Calgary receives five cents per litre from Alberta gas tax revenues for municipal transit/transportation purposes (Transportation Association of Canada, 2002). In regards to transportation financing, a city policy notes that: “New funding sources should be identified and pursued to fund both transportation capital and operating costs” (City of Calgary, 2012, p. 3-47). The recognition of the benefits associated with new funding sources suggests that current funding models are unsustainable.

2.3. Transportation Challenges

As shown above, Calgary’s transportation challenges can be resulting from the growing population as shown in Table 1. This has resulted in an increase in citywide, all day and all-purpose automobile use from 77 per cent in 2001, to 79 per cent in 2011 (City of Calgary, 2013). Furthermore, there has been a decrease in walk mode share from 14 per cent to 12 per cent, while the transit mode share has remained the same (City of Calgary, 2013). This implies that the distribution of population growth is occurring in areas where the city has fewer transportation options, such as limited bus routes and access to transit, resulting in people increasing their automobile use.

### Table 1. Changes in Travel Mode Share 2001 – 2011

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>2001 Share</th>
<th>2011 Share</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>77%</td>
<td>79%</td>
<td>+ 2%</td>
</tr>
<tr>
<td>Transit</td>
<td>9%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>Walk</td>
<td>14%</td>
<td>12%</td>
<td>- 2%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Trip rates in Calgary for all travel modes have also increased for both work and other purposes (City of Calgary, 2013). As shown in Table 2, the number of trips made for work purposes in Calgary has increased from 976,300 in 2001 to 1,095,700 in 2011 representing a 12 per cent increase. The number of trips made for purposes other than work or school has increased by 24 per cent from 2,304,300 in 2001 to 2,850,500 in 2011. The proportion of daily trips made for other purposes increased from 57.9 per cent
in 2001 to 61.2 percent in 2011 with minimal changes in travel modes. Auto driver mode has the highest proportion at 59.9 per cent of travel. This suggests that Calgarians are making more trips for other purposes relative to work and school trips and that their mode choice for these trips has not been heavily influenced over the last 10 years.

Table 2. Changes in Trip Rates for Work, School and other Purposes

<table>
<thead>
<tr>
<th>Trip Type</th>
<th>Trips 2001</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Change</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>976,300</td>
<td>29.1</td>
<td>1,095,700</td>
<td>27.7</td>
<td>119,400</td>
<td>-1.4</td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>434,200</td>
<td>13</td>
<td>438,000</td>
<td>11.1</td>
<td>3,800</td>
<td>-1.9%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1,939,000</td>
<td>57.9</td>
<td>2,423,000</td>
<td>61.2</td>
<td>484,000</td>
<td>+3.3%</td>
<td></td>
</tr>
<tr>
<td>Total Trips</td>
<td>3,349,500</td>
<td>100</td>
<td>3,959,000</td>
<td>100</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Calgary’s trip rates are also influenced by income and auto ownership. In regards to income, travel behaviour survey data concluded that households with an income greater than $100,000 make over 12 trips per household compared to 5.54 made by households with incomes under $30,000.\(^4\) There is also a correlation with income factor and car ownership, resulting in greater personal travel. Gilbert and Perl (2010) support this by finding that when GDP per capita is more than about $5,000 car ownership rises steeply. In Calgary, in 2012, GDP per capita is the highest in Canada at $97,607 (Calgary Economic Development, 2013). Finally, auto ownership had an expected increase on household trip rates. Household auto ownership rates are increasing in the city; in 2001 it was 1.72, and it has increased to 1.85 in 2011. Within the region, household ownership rates are growing at an even higher rate, reflected through a household ownership rate of 2.56 in 2011, up from 2.11 in 2001. These factors are supported and compounded by transportation literature, where car ownership is the linking factor between residential density and the amount of travel by a car. For example, Gilbert and Perl (2010) compared two cities, Hong Kong where there were 320 persons per hectare (pp/ha) in 1995, and Atlanta that had 6.4 pp/ha. The two cities’ rates of car ownership in that year were 46 and 746 per 1,000 residents, respectively. To compare, Calgary’s population density is at 12.64 pp/ha (City of Calgary, 2013).

\(^4\) All statistics from this sub-section are from City of Calgary (2013), unless otherwise indicated.
In summary the trends exhibited in Calgary by the population show an increase in demand for and use of the transportation network today and likely in the future. It has placed significant pressure on the city to finance new transportation infrastructure and maintain existing infrastructure as the next chapter examines.
3. Transportation’s Future in Calgary

This chapter highlights complexity of transportation in urban centres and its relationship with future mobility. This is approached through the city’s difficulties in financing its transportation projects and infrastructure to meet current and future demand.

3.1. Projections of Transportation

From a broad perspective, transportation networks are complex especially when they cover all modes of transportation. There is a large number of interactions: how traffic behaves at the intersection of two highways, the corridors around those highways, other modes of travel and the effects of transportation on other areas of concern (e.g., land use, the environment). In addition, the distribution of all those effects across locations and groups present and future must be considered.

How the transportation system in a city performs depends on public investment, public policy and, on millions of decisions made daily by consumers about whether, where, how and when to travel (National League of Cities, 2011). Understanding how people make travel choices is the key to understanding urban transportation problems and identifies potential solutions. These choices include how travelers aim for value, consider benefits, and consider costs. Value means that people want to enjoy the benefits of being in different places, engaging in different activities and having choices available to get the best value. In that sense, travel is a means to an end. Benefits imply that travelers consider safety, speed, reliability convenience and comfort. However, these characteristics are subjective to individuals and can be more important to some travelers than others. Finally, some costs affect travel directly, such as fuel, maintenance, parking, tolls and travel time.
Along with the complexity of transportation networks and individual behaviour, there are several factors that may challenge jurisdictions and their transportation networks. These include: diminishing returns to investment, funding scarcity and increased knowledge about the value placed on the impacts of transportation projects (National League of Cities, 2011). In this situation there are two likely results: the benefits per dollar of new capacity will decline; or the per unit real costs of adding that capacity will be higher. There are three reasons for this, (1) the construction costs are higher, (2) requirements for transportation projects are greater (e.g., more environmental protection, safety features, access for alternative modes) and (3) more construction is taking place in developed areas, where land, disruption and relocation costs are high. In terms of funding scarcity, people’s willingness to pay taxes and trust government to build and operate facilities has declined. Past federal, provincial/state and local government practices on both the revenue side and the expenditure side solve short-run budget dilemmas by pushing expensive maintenance problems into the future. This is compounded with increasing demand for new highway and transit system components. Overall, securing funds is more difficult, and the need for funding is as great as it ever was. Finally, greenhouse gas emissions and climate change are topics of global debate and action. As people’s understanding of direction and magnitude of these effects increases, so do the values they place on public policy choices. Those values are also influenced by economic circumstances, which may also change substantially.

Although a strong relationship between mobility and development generates growth, there is a multitude of externalities that have potential long-term consequences. The development model that generates urban sprawl, spatial specialization and the inevitable increase in travel time, results in additional costs and “diseconomies,” like congestion, pollution-related health problems, stress and major environmental impacts. These effects translate into a financial, social or human cost that somebody ends up paying: citizens, companies, employees or the local authority (CODATU, 2009, Vander Ploeg, 2003). For example, congestion means delay – lost time and productivity, wages foregone and extra fuel costs for individuals. This results in greater fuel consumption and additional emissions of air pollutants and greenhouse gases. Congestion also reduces the effectiveness of the national and local transportation system by constraining the movements of goods and passengers within and through major urban centers (Transport
Canada, 2003). It is in high growth emerging countries where such choices are going to have a significant impact and where investment needs will be highest. The failure to invest in urban transport today will have medium and long-term consequences on the creation of wealth in cities and could undermine social policies, such as reducing poverty. For example, the poorest of people have no alternative but public transport to access jobs, healthcare, education and culture. Mobility also plays an important role in social inclusion; a lack of transport can worsen social exclusion. It is evident that investing in transportation networks in Canada’s major cities, such as Calgary, are vital to both the economy and citizens alike. As a result, securing new, consistent and flexible funding sources to reduce this gap is a priority.

### 3.2. Difficulties in Financing Transportation

The City of Calgary experiences a combination of diminishing returns to investment and funding scarcity, which has affected its ability to finance the transportation network in the future. In terms of capital funding projections, $5.6 billion funding need is based on policies and infrastructure data in the CTP, RouteAhead and Corporate Growth Management Framework (City of Calgary, 2014). The city currently has 31 transportation projects and 28 transportation programs planned to maintain and improve the network within 2015 to 2024.\(^5\) Of these projects and programs, 18 are not funded completely, and make up the $1.9 billion shortfall in the budget.

The main source of funding for capital transportation projects is expected to decline as a number of provincial and federal funding programs are coming to an end or non-committed. For example, the Provincial Municipal Sustainability Initiative (MSI) ends in 2017, with no replacement grant program announced (City of Calgary, 2014). Furthermore, the funding from GreenTRIP, a provincial program that supports sustainable public transit initiatives in municipalities through capital funding, is dwindling and the next disbursement of funds is unknown. The unknown timing of the federal Building Canada Fund grants compounds this as well. In addition, the city’s

\(^5\) For more information on these projects and programs please see: Investing in Mobility (City of Calgary, 2014).
transportation department projects that fuel tax revenues from the province will begin to
decline later in the decade as new fuel efficiency standards exceed growth rates.

The city projects that at least $450 million in funding is required annually to
support transportation projects for the next ten years (City of Calgary, 2014). As shown
in Figure 3 it is projected in 2015 that about $400 million will come from provincial
grants, or 49 per cent of total funding. The province’s funding level is projected to
dramatically drop to about $110 million by 2017. This results in an average of only $300
million in funding from 2017 to 2024, and an average shortfall of about $150 million
annually. Other funding sources, such as from the federal government, developer levies
and city funds are projected to marginally decrease per year. Overall, without provincial
and federal grants funding in the future is projected to be unsustainable for
transportation needs.

**Figure 4. Transportation Capital Funding Projections 2015-2024**

4. Challenges in Transportation and its Financing

Cities play a vital role in a country’s economy; so, much of the need is in transportation and investment should consequently be targeted at transportation infrastructure. This section provides background information on the challenges of urban mobility, and what financial tools are available to address them.

4.1. Constraints and challenges for urban mobility

There are a number of factors affecting transportation in urban centres. The ones I examine are urban growth and income; types of transportation mode; and the costs of a transportation system.

4.1.1. Urban Growth and Income

The “Century of the City” has arrived. The United Nations (2014) announced that 3.9 billion of the world’s population was residing in cities in 2014. The attractiveness of cities, which serve as economic centers, transportation hubs and places of specialized services, means that challenges are growing in magnitude (Wagner, 2008). This has generated a multitude of policy problems such as, air pollution, affordable housing, traffic congestion, unemployment and many others (Wagner, 2008). The issues brought by rapid urban growth have led to questions concerning mobility for residents and how to best serve these demands.

4.1.2. Types of Transportation Mode

In the majority of cities in the world there has been a constant rise in the use of private cars (Gilbert and Perl, 2010). This is also the case in cities with relatively well-developed transport system, which continue to invest in improvements. This global phenomenon is caused by a number of factors: the fall in vehicle prices, trade
deregulation, a rise in earnings and people’s aspiration to have their own car in order to avoid uncomfortable collective modes of transport. The types of transportation mode affects transport policy choices, forcing a decision between the development of road networks to respond to the growth in road traffic, the need to reduce dysfunctions, the cost to the local community and the development of economic activity through sustainable public transportation (CODATU, 2009). With the development of road networks to respond to growth in road traffic, the demands of new car users means attempts to remedy growing congestion, culminates in an increase in congestion and pollution. The occasionally contradictory aims of responding to growth in road traffic, while promoting sustainable public transportation mean that the authorities have to consider a transportation system that combines all modes of transport and all uses of public areas: private modes of transport, public modes of transport, pedestrians and cyclists.

4.1.3. **Transportation System Costs**

The cost of transportation often depends on the modes of transport chosen (CODATU, 2009). However, regardless of choices made, the key is to establish long-term funding conditions both for investments (infrastructure and rolling stock) and the operating of the various modes of transport (operating, maintenance and replacement). Therefore, all of these costs in the long term have to be considered in choosing the type of transportation to focus on.

4.2. **Sources of Funding for Transportation Infrastructure**

There are multiple sources of funding often utilized in financing transportation infrastructure. Some are public funding, others, user funding, and there are also more specific and innovative sources, ranging from land-value capture to public-private partnerships.⁶

⁶ The content in this section is from CODATU (2009), unless otherwise referenced.
4.2.1. Public Funding

Today, public authorities of many jurisdictions are the main contributors to the funding of urban modes of transport in terms of investment and, often, operations. Since providing modes of transportation is a public service obligation, public funding is perfectly justified and sensible. Nevertheless, the players and the forms of funding have changed significantly with the emergence of decentralization policies which have given rise to new players at a regional and a local level. Up until the 1980s, the state, including countries with a federal system, was often the main and sometimes even the only public body to fund urban modes of transport (CODATU, 2009). In many countries, the power to organize and fund urban modes of transport has been gradually transferred to local authorities. However, this does not always go hand in hand with financial resources, which meant that the cities and metropolitan areas concerned had to introduce new means and partnerships to fulfill the role. It is worth distinguishing between the funding of investments and the funding of routine operations as these involve different mechanisms.

4.2.2. User Funding

Users are generally the primary source of funding for the transportation network on an operational level (CODATU, 2009). Depending on the modes of transport and the manner in which these modes of transport are organized, user fees may or may not cover all the operating costs like operating and amortization for the replacement of equipment. However, it does not cover new investment spending which is generally borne by the municipality. Private vehicle owners, who are also users of public urban roadways – often at no charge – pay for using shared urban areas through taxes and may under certain conditions also contribute to the funding of public transport.

4.2.3. Road Infrastructure Charges

Road infrastructure charges are levied primarily to generate funds for extending and improving transportation networks (CODATU, 2009). Only users who are prepared to pay for a gain in time and/or convenience are charged. In other instances, the user has no choice other than to pay the toll, such as in San Francisco, where all seven
bridges allowing passengers to travel within the Bay Area are subject to tolls (Bay Area Toll Authority, 2013). Once loan repayments have been met and operating and maintenance costs of the infrastructure have been covered, any surplus net revenues are generally invested into public transportation (CODATU, 2009).

An example of road infrastructure charges is a fee designed to reduce congestion, for example, the number of vehicles travelling in urban zones. As a result, users must pay some amount to enter a designated zone. It is used to reduce congestion in city centers by encouraging a modal shift towards public transport and by discouraging motorists from using their vehicles at certain times, or from taking certain routes (CODATU, 2009). Cities such as London and Stockholm have chosen to implement entrance charges to certain zones primarily to control the number of drivers entering city centers and to free up roads for public transportation and professional use (Eliasson, 2008, Givoni, 2012). Generally, there are two conditions for implementing congestion charges: an effective public transport network and social acceptance. The public transport system must be capable of absorbing the higher volume of new users, and of a high enough quality for the modal shift not to be perceived as an act of discrimination (CODATU, 2009). The concept of social acceptance is only gained by explaining to users that congestion carries both social and environmental costs, such as by describing it as a “pay-to-pollute” licence (CODATU, 2009). As in London’s case, the scheme is often better accepted once it is up and running and the residents have had time to appreciate the positive impact it has had on their quality of life (Givoni, 2012). If it is presented in a careless manner, it can provoke a strong public backlash.

4.2.4. Employer and Business Taxes

An urban public transport system plays a key role in encouraging business development by providing employees with daily access to their workplace, giving clients access to sales outlets, and facilitating the delivery of goods. So it is natural that companies and business activities should contribute to funding public transport.

Businesses contribute to financing public transport through general taxes, although in some countries a direct tax is imposed on companies since the authorities
consider them to be indirect beneficiaries of the public transport system (CODATU, 2009). These mandatory taxes are applied in two ways: a tax is charged on a company’s total payroll costs and directly attributed to the public transport sector; or subsidies are granted to salaried employees who use public transport.

4.2.5. Land Value Capture

The term “value capture” is a public finance mechanism that raises funds in proportion to the increase in land value associated with new or improved public infrastructure (Levinson and Istrate, 2011). The development of transport infrastructure generally gives rise to an increase in the value of the land and buildings served. According to various case studies, the value is estimated between 5 per cent to 10 per cent for residential properties, and 10 per cent and 30 per cent for commercial properties (CODATU, 2009). For example, when a subway line was built in Helsinki, the price increase of apartments was inversely proportional to the distance from the metro station within a radius of 750 meters, with a particularly high level between 250 and 500 meters. The increase in value of the 81,000 buildings less than a kilometer away was estimated at between US$550 and US$670 million (Laakso, 1992). Conversely, areas not served by public transport can have a negative impact: pollution, noise, increases in traffic, loss of prestige in local areas, or drop in value. Again in Helsinki’s case, areas that are not served by public transport have dropped in value. This loss in value has been estimated at between US$90 to US$150 million for the whole of the metropolitan area (Laakso, 1992). However, the benefits can outweigh the costs like in Helsinki. The proximity to a public transport corridor generally participates in increasing business for local shops and services and increasing productivity whilst reducing costs for consumers, business activities and public administrations. Moreover, land near the transport corridors is put to better use, with increased land value giving rise to new urban developments or new ways to use the land.

4.2.6. Public-Private Partnerships (P3s)

The aim of P3s is to involve the private sector in the initial investment and operation of a project by transferring a share of the risk to the private partners, while
guaranteeing a sufficiently profitable setup (by means of public sector subsidies if needed) to attract investors (Martin, et al., 2013). P3s are not, strictly speaking, a source of funding but rather a mechanism to raise funds for a project, in the same way as a loan, but which commits the lender (the private sector) and makes him/her responsible for the proper implementation of the project. In the long run, the real financing comes from the users and/or the public sector via ticket sales and the remuneration of the private partner responsible for repaying the loans.7

To summarize, this chapter outlines the factors affecting modern transportation systems and their cost. It is important to understand the impact of growth on transportation and how it affects its cost in society. Furthermore, achieving a balance in transportation mode makes financing transportation more difficult. The demand through urban growth and a need for balanced transportation systems, therefore affects how it is financed and the available tools to do so. The general knowledge of transportation financing is fundamental in understanding the policy problem and consequent analysis.

7 For more detailed information, please refer to Martin, et al. (2013).
5. **Policy Problem and Stakeholders**

The policy problem I examine is: the lack of adequate financing for transportation infrastructure can have a wide range of negative impacts for Calgary in the future. The increasing population growth in the city has led to an increase in demand for more transportation infrastructure to support this growth. The current model of financing is inadequate in addressing the future needs and demands of Calgarians as exhibited through the projected budget shortfall of $1.9 billion in the next decade. In addition, the availability of alternative financing sources that are not used by Calgary means that there is an opportunity to adopt such approaches to improve its transportation system.

The stakeholders with a vested interest are the municipal government, the provincial government, the federal government, interest groups and citizens. There are two major stakeholders, the municipal government and the citizens. The municipal government is directly involved with how transportation infrastructure is financed and governed. More broadly, the city administers planning, roads, transit and land use policies; all of which are related to the transportation network. It is therefore one of the most involved stakeholder for this policy problem. On the other hand, citizens are those who utilize the transportation network and are equally as involved as the municipal government. In other words, the citizens are the customers of the transportation network, while the city is the provider. Other stakeholders impacted are the federal and provincial governments, given their current importance and role in providing a significant portion of funding for transportation infrastructure through grants and programs. Finally, there are interest groups who may take interest in this issue given their position on the problem or potential solution. An example could involve taxpayer groups, taxi companies and neighbourhood associations who may be impacted by an inadequately financed transportation network or the solutions to compensate for this inadequacy.
Overall, each of these stakeholders has an interest in how transportation infrastructure is financed today and in the future to ensure an adequate transportation network for Calgary’s growing needs. As a result, they have some degree of influence over how effective any policy will be, and their perspectives aid in predicating the success of each policy option. The next chapter explores the policies that successfully finance transportation infrastructure in three jurisdictions. These findings assist in determining the policy options for Calgary.
6. Case Study Methodology

This chapter describes the methodology used for this study and the rationale behind the choice of cases. There are two methods used: a case study analysis and an evaluation of successful characteristics from the cases themselves.

In the case study, I examine qualitative information on the three selected cases; the information is gathered from literature in the field of transportation studies from academic articles, consulting reports, government documents and NGO reports. I begin by examining specific jurisdictions, which have been recognized for efforts in using alternative financing tools to fund transportation infrastructure, followed by the results of implementing their financing model on revenue and travel behaviour. I also examine the various characteristics of each jurisdiction’s transportation funding model, aside from financing tools. With a secondary methodology, I examine the prevailing characteristics of the case studies and analyze the usefulness of them. This includes the challenges faced through implementation, and the level of equity and economic efficiency of each characteristic employed. The secondary methodology is explained in greater detail in section 7.5.

6.1. Choice of Cases

The chosen three cases are: Portland, Oregon; Denver, Colorado; and Vancouver, British Columbia. These jurisdictions have demonstrated success in funding transportation infrastructure through various financing methods. They are often cited as prime examples of using alternative financing techniques in successful transportation networks. This is exemplified through Portland’s extensive streetcar network; Denver’s commitment to expanding their public transportation through light rail transit; and Vancouver’s extensive rapid transit system. Furthermore, the cities are similar to Calgary in terms of growth challenges due to sustained population growth rates, and large
existing metropolitan areas. As a result, they have likely faced the need to find effective ways to finance their transportation networks. The selective characteristics of the cases are compared to Calgary as shown in Table 3. Although the characteristics shown are not similar to Calgary, these jurisdictions are still effective case studies to use by examining the differences. For example, the area of each jurisdiction is considerably smaller than that of Calgary’s, ranging from approximately 350km\(^2\) to 600km\(^2\) larger. By identifying the challenges and accomplishments of a jurisdiction in a smaller area, this experience can be applied and adapted to a larger one. The populations of the case studies are not similar either as they nearly double that of Calgary’s by approximately 1 to 2.5 million. The significantly larger metropolitan populations that utilize the cities’ transportation network are to similar issues Calgary may face, especially with the rapid growth in its own metropolitan area. As a result, each jurisdiction’s transportation infrastructure is built to service a much larger population than within its own boundaries. Furthermore, Portland and Denver have very similar population densities to Calgary, even though its land area and population are different. Finally, the population growth rate of the case studies are not as high as Calgary’s, lagging at about 3 percent, but is still growing at a positive rate in the immediate future. Calgary is currently experiencing a very high population growth rate, however this is unlikely to be sustained in the long-term. In summary, while the case studies have differences compared to Calgary, these differences reflect similar challenges with financing their transportation infrastructure and meeting demand. Arguably, the jurisdictions chosen have valuable experience and may have already experienced a similar situation that Calgary is currently in. Therefore, the case studies are well suited to provide potential information about how to solve the policy problem.
Table 3. Summary of Case Studies Compared to Calgary

<table>
<thead>
<tr>
<th></th>
<th>Portland</th>
<th>Denver</th>
<th>Vancouver</th>
<th>Calgary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (km²)</td>
<td>345.58</td>
<td>396.27</td>
<td>115</td>
<td>726.50</td>
</tr>
<tr>
<td>Population</td>
<td>609,456</td>
<td>649,481</td>
<td>603,502</td>
<td>1,096,833</td>
</tr>
<tr>
<td>Population Density (km²)</td>
<td>1,764</td>
<td>1,639</td>
<td>5,248</td>
<td>1,510</td>
</tr>
<tr>
<td>Population (Metropolitan Area)</td>
<td>2,314,554</td>
<td>2,897,298</td>
<td>2,313,328</td>
<td>1,214,839</td>
</tr>
<tr>
<td>Annual Population Growth Rate (10 year projections)</td>
<td>1.8%</td>
<td>1.6%</td>
<td>1.4%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

The case study evaluation framework is an outline of the information that is extracted for each case study. It outlines relevant information gathered to understand how each jurisdiction operates in terms of financing and governing transportation. A summary of this framework is shown in Table 4. The construction of the evaluation framework is based on a number of consultation reports of transportation financing employed by engineering firms and governments.

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8 See Appendix 1 for the complete case study evaluation framework.
| Table 4. Summary of Case Study Evaluation Framework |
|----------------------------------|----------------|---------------------------------|
| **Funding Sources** | **Characteristic** | **Measure** |
| Transportation Dedicated Public Funding | Property Tax Allocation | These characteristics are financing tools funded by the general public. |
| | Regional Sales Tax | |
| | Employer Payroll Tax | |
| | Tax Increment Financing | |
| | Public-Private Partnerships (P3s) | |
| Transportation Dedicated Private Funding (User Funding) | Utility Bill Levy | These characteristics are financing tools funded by users of transportation system. |
| | Vehicle Registration Tax | |
| | Gasoline Tax | |
| | Parking Fees & Taxes | |
| | Highway Tolling | |
| Use of Public & Private Funding | Public Funding Only | These characteristics determine what kinds of funding mechanisms the jurisdiction uses. |
| | Private Funding Only | |
| | Combined Funding | |
| Spending Focus | Private (Roads) | These characteristics examine how funding is primarily allocated in the transportation system |
| | Public (Transit) | |
| | Both – Private & Public | |
| Intergovernmental Transfers/Grants | Federal Infrastructure Funding | These characteristics examine what kind funding support the jurisdiction receives from other levels of government. |
| | Provincial/State Infrastructure Funding | |
| Organizational Structure | Local Authority | These characteristics examine how the jurisdiction governs and makes decisions for its transportation system. |
| | Regional Authority | |
| | Governed both Regional and Local Authorities | |
There are six principles that are considered in the evaluation framework: transportation dedicated public and private funding methods employed; use of public and private funding; spending focus; intergovernmental transfers and grants; and the organizational structures of each jurisdiction. Each of these principles and their characteristics are briefly explained below.

With regards to funding, the transportation dedicated public and private funding characteristics examines what kind of funding mechanisms is used for transportation system in each case. They are separated into public and private types of funding mechanisms, and some are already covered in section 4.2. Those funding mechanisms, as well as those not described before are considered here. It is important to note that although P3s are considered a public funding mechanism in the literature, it differs from the other mechanisms mentioned, as it does not collect revenue, rather it is a procurement formula.

For transportation dedicated public funding, some of the jurisdictions use a property tax allocation or a regional sales tax. The property tax allocation is a determined percentage of the property tax collected as a transportation tax and reserved for transportation-related spending. Similarly, a regional sales tax is where a determined percentage of the sales tax is collected through the sale of goods and services, and reserved for transportation-related spending.

For transportation dedicated private funding, the jurisdictions use a utility bill levy; vehicle registration tax; gasoline tax; parking fees and taxes; and highway tolling. A utility bill levy is where a levy is applied to an individual’s private dwelling, which is used for transportation-related spending. A gasoline tax is either a flat tax on per liter of gasoline purchase, or tax centered on a percentage of the base price. The revenue from the gasoline tax is dedicated to transportation-related spending. Parking fees and taxes is the price paid to access parking rights on designated public space. The revenue generated is used towards transportation-related spending. Finally, highway tolling is where drivers pay a toll per kilometer travelled on a designated road or section of road or for the use of a particular asset such as a bridge crossing or tunnel. Toll rates can either
be fixed throughout the day or vary based on the time of day to help reduce congestion. Once again, the revenue gathered by tolls is used for transportation-related spending.

The third principle is the use of public or private funding. The evaluation considers if the jurisdiction employs just user or public funding, or a combination of both. This is determined from the previous principles and characteristics of public and private funding.

The fourth principle is spending focus, which shows if the jurisdiction decides to spend funding on either public or private transportation within its system. Transportation directives, such as goals and mandates, determine this. Furthermore, the allocation of funds towards private or public transportation projects is taken into account. For example, public transportation funding focus is justified through higher investments into public transportation projects compared to private transportation.

The fifth principle of intergovernmental transfers and grants from state/provincial and federal levels are evaluated. These transfers and grants from either level of government are dedicated towards transportation-related projects in municipalities.

Finally, the organizational structure principle examines how the jurisdiction makes transportation decisions. This is distinguished by the use of a local or regional authority. A local authority is where a jurisdiction consolidates decision-making process within its own governing structure, such as a department within the municipal government. A regional authority is not part of the local government. Rather, it is a separate entity that purely focuses on transportation decisions for the jurisdiction. These authorities are usually arms-length organizations that work together with local governments and set directives for transportation decisions. Regional authorities may also possess powers to issue certain taxes or other mechanisms to collect revenue.
7. Analysis

This chapter presents the analysis of transportation financing tools used in the chosen three jurisdictions. After identifying the attributes of each case, I compare the strengths and weaknesses, and determine what can be learned and applied to Calgary.

7.1. Portland, Oregon

The City of Portland is located in Oregon State in northwestern United States. It is not the capital of the state, but it is Oregon’s largest city with a population of 609,256, along with a metropolitan population of about 2.3 million. Portland has taken a unique position by supporting a transportation system that makes it more convenient for people to walk, bicycle, use transit, and drive less to meet their daily needs (City of Portland, 2007). This includes an extensive light rail network and bicycle lanes in the city. This distinction is important as it guides the city’s alternative financing methods for transportation.

7.1.1. Transportation Dedicated Public Funding

Portland’s transportation dedicated public funding includes an employer payroll tax, a utility levy and P3s. The payroll tax is levied directly on employers for transit services performed within Portland or the Lane Transit Districts (Oregon Department of Revenue, 2014). In 2003, the Oregon Legislature decided to allow the Transportation District of Oregon (TriMet) to increase the payroll rate over ten years annually by 1/100 per cent (TriMet, 2012). On January 1, 2012, the payroll tax was increased to 0.7018 per cent ($7.018 per $1,000) within the TriMet area. In 2012, the payroll tax accounted for the majority of TriMet’s operating revenue, where $232.3 of the $472 million came from the tax (TriMet, 2012b). The city also employs a utility levy in twelve metro Portland communities to augment shrinking roadway maintenance revenues from gas taxes and
other sources (AECOM/KPMG, 2013). There are also P3s to finance transportation infrastructure. This has been evident in projects primarily involving public transportation in the city. For example, the 2001 “Airport MAX Red Line,” which connects city’s airport with the city center, funding came from the government (54%); Bechtel/CascadeStation Development Company LLC (23%); and the Port of Portland (23%); no federal dollars or new local taxes were needed (TriMet, 2012).

7.1.2. Transportation Dedicated Private Funding

For transportation dedicated private funding, Portland collects revenue from its General Transportation Revenues (GTR), which consists of the state gasoline tax, vehicle registration taxes and local parking fees and taxes (PBOT, 2007). GTR is a flexible funding source that may be applied to a wide range of capital improvement projects, maintenance activities, and operating expenses. However, Portland has identified a problem with GTR funding, as the state gasoline tax has not increased since 1993, while vehicle–miles traveled in the metropolitan area have increased by 40 per cent since 1980. This is partly due to improved vehicle fuel efficiency; motorists now pay about half as much gas tax per mile as they did in 1972. Without periodic gas tax rate increases, tax revenues have not been able to keep up with inflation over time. Over the past five years, gasoline tax revenue has dropped by 7 per cent. However, for the 2014/2015 PBOT budget, GTR will account for $71.9 million of the $309.4 million operating budget (PBOT, 2014).

7.1.3. Use of Public and Private Funding

Portland uses different public and private funding mechanisms for its transportation system as discussed above. Therefore, the city uses both transportation dedicated public and private funding.

7.1.4. Spending Focus

Portland’s transportation spending focus lies within a balanced transportation system of both public and private modes. The city’s transportation plan helps implement
the region’s 2040 Growth Concept by supporting a more balanced transportation system that makes it more convenient for people to walk, bicycle, use transit, and drive less to meet their daily needs (PBOT, 2007). This is also exemplified through the robust role TriMet plays in determining transportation choices in the Metro Portland area, through its public transit projects.

7.1.5. **Intergovernmental Transfers and Grants**

Portland receives a variety of both state and federal transfers and grants dedicated to funding transportation. Federally, the Highway Trust Fund revenues apply to road-related projects through the Federal Highway Administration, to the Oregon Department of Transportation and then to Metro Portland (PBOT, 2007). The Highway Trust Fund is the primary source of federal transportation revenues to local jurisdictions. The Federal Government also provides the Highway Trust Fund revenues for transit-related projects through the Federal Transit Administration (FTA), to Tri-Met and to Metro Portland.

The Federal Trust Fund comprises various programs for specific purposes. Surface Transportation Program funds are very flexible and may be applied toward nearly any transportation project or program (PBOT, 2007). For example, the Congestion Management/Air Quality funds support alternative mode projects and demand management programs. On the other hand, Enhancement Funds are limited to various activities that reduce reliance on the single occupant vehicle, right-of-way preservation, historic preservation, and environmental mitigation for transportation projects. Furthermore, the FTA provides Transit Formula Funds for transit capital purchases such as buses and maintenance facilities. Transit Discretionary Funds are for major new transit capital projects. In the Portland region, Transit Discretionary Funds have been used primarily to provide the federal portion of capital cost construction of the regional light rail system.

On the state level, the Oregon Transportation Commission distributes state revenues for transportation projects from the State Highway Trust Fund (PBOT, 2007). The fund derives its revenues from the statewide gas tax, vehicle registration fees, and
the truck weight/mile tax. The use of trust fund is limited to road and bridge construction and maintenance, and preservation of the existing transportation system.

The Oregon Transportation Investment Act of 2001 provides additional revenue for modernization and preservation projects statewide (PBOT, 2007). Approximately half of the program, or $200 million, is provided statewide for pavement preservation projects and bridge replacement/rehabilitation projects. Another $200 million is allocated to modernization projects statewide. The Portland metropolitan area is expected to receive about $70 million. The criteria for these projects emphasize capacity improvements that demonstrate that project designs and environmental processes are complete or not expected to cause delays.

7.1.6. Organizational Structure

The organizational structure of Portland’s transportation system consists of two agencies: The Portland Transportation Bureau (PBOT) and the Tri-County Metropolitan Transportation District of Oregon (TriMet). The former is responsible for road infrastructure and the general maintenance of the transportation network, while the latter primarily oversees public transit and its infrastructure in the Portland area.

PBOT is the agency tasked with the planning, building, managing and maintaining an effective and safe transportation system that provides Portland access and mobility (PBOT, 2014). It maintains the $8.4 billion investments in infrastructure facilities from streets and structures to traffic signals and streetlights. The mayor of Portland appoints the commissioner of PBOT, and is considered a municipal agency.

TriMet is a municipal corporation and public body of the State of Oregon. It has broad powers to provide mass transportation on behalf of the district (TriMet, 2012b). It can issue and sell general obligation and revenue bonds, levy an employer payroll tax and levy a tax measured by net earnings from self-employment. A seven-member board of directors governs TriMet. They are appointed by the Governor to represent, and must live in, certain geographical districts. The term of office is four years, but board members serve at the pleasure of the Governor. The board sets agency policy, enacts legislation (taxing and ordinances relating to police ordinances) and reviews certain contracts.
7.2. Denver, Colorado

Denver is located at the eastern base of the Rocky Mountains in the north-central part of Colorado (City of Denver, 2013). The city is the capital of the state, and it is also the cultural, distribution, entertainment, financial, service and transportation hub of the Rocky Mountain region. In 2013, Denver had an estimated population of 649,481 for the core city and county. It is estimated that 2.9 million people reside in the Denver metro area, which includes the suburban counties of Adams, Arapahoe, Boulder, Broomfield, Douglas and Jefferson. Denver is known for its commitment to public transportation in the late 1990s, which has completely changed the landscape of the city today. This is evident through its extensive four-line light rail system that spans the city.

7.2.1. Transportation Dedicated Public Funding

In terms of transportation dedicated public funding, Denver utilizes tax increment financing (TIF) and a regional sales tax. An example of a TIF that supported transit infrastructure is the city of Denver’s 30-year TIF district comprising the entire Union Station rail hub and 20 acres of developable land to support transit expansions and the rehabilitation of the station (Metropolitan Area Planning Council, 2013). The property taxes generated in the TIF district will go toward the debt services on two federal loans: a $145.6 million Transportation Infrastructure Finance and Innovation Act loan and a $155 million Railroad Rehabilitation and Improvement Financing Loan.

Denver’s Region Transportation District (RTD) collects a regional sales tax of 1.0 per cent, levied within the service area and is fixed (RTD, 2012a). The Base System is supported by 0.6 per cent sales and use tax and an additional 0.4% is dedicated to the FasTracks Program, a multi-billion dollar comprehensive transit expansion plan to build 122 miles of new commuter rail and light rail, 18 miles of bus rapid transit, 21,000 new parking spaces at light rail and bus stations. The sales and use tax revenue has fluctuated dramatically in the last few years, as shown in the next two figures. In 2008, the sales tax declined 1.5 per cent and further decreased in 2009 by 9.4 per cent, due to the economic recession. As the economy rebounded in 2010, sales tax revenue
increased by 6.4 per cent. From 2008 to 2009, use tax revenue decreased by 16.5 per cent and increased by 14.2 per cent from 2009 to 2010 (RTD, 2012a).

Denver also utilizes P3s on a number of transportation projects, such as the FasTracks Program, where a number of projects are in construction or completed (RTD, 2012b). These include: the Eagle P3-Program which includes the East Corridor to Denver International Airport, the Golden Line Corridor to the West, the segment of the Northwest Rail Corridor between Pecos and st/Lowell, and the commuter rail maintenance facility for the rail line. Furthermore, the P3 funding model is utilized on a multimodal transit hub, which integrates light rail, commuter rail, and intercity rail (Amtrak) on the site of Denver’s Union Station.

7.2.2. Transportation Dedicated Private Funding

The only form of transportation dedicated private funding in Denver is parking fees and taxes. This primarily comes from RTD owned property and also city-owned parking areas (RTD, 2012a). The parking tax is applied only to designated paid parking areas in the public space.

7.2.3. Use of Public and Private Funding

Denver uses different public and private funding mechanisms for its transportation system as discussed above. Therefore, the city uses both transportation dedicated public and private funding.

7.2.4. Spending Focus

Denver’s spending focus towards public transportation is exhibited through its prevalent and robust regional transportation authority, the Regional Transportation District. Furthermore, Denver has committed to the FasTracks program, a voter approved transit expansion program that creates more transit options for the Denver Metro area. The program further expands the light rail system to provide more accessibility and service to citizens.
7.2.5. **Intergovernmental Transfers and Grants**

Denver receives both federal and state transfers and grants. Federally, The RTD receives grants through the FTA, and the Department of Homeland Security (RTD, 2014a). On a state level, grants are also awarded to RTD by state of Colorado through the Colorado Department of Transportation. The federal and state government issues grants to RTD for operations, acquisition of property and equipment. The amount recorded as capital grants was $159,783 and $193,991 in 2013 and 2012, respectively. Other contribution revenue from local governments was $171,026 and $186,612 in 2013 and 2012, respectively.

7.2.6. **Organizational Structure**

The organizational structure of Portland’s transportation system consists of the: Regional Transportation District (RTD) and the Denver Public Works Department. The former is responsible for public transportation in Denver and it surrounding metropolitan area, while the latter oversees road infrastructure and the general maintenance of Denver’s transportation network.

Denver’s organizational structure of their transportation system includes a regional authority and a local authority. In 1969, the Colorado General Assembly created the Regional Transportation District (RTD). The RTD serves portions of 8 counties and 40 municipalities (RTD, 2014b). The governing structure of RTD consists of a 15-member Board of Directors elected to a four-year term by the district (RTD, 2014c). As of 2011, RTD served approximately 2.7 million people and 2,348 square miles. RTD operates 148 bus routes including 5 express bus routes to the airport, 5 light rails, a free downtown shuttle service, demand response services, and 74 Park-n-Rides, along with seasonal services to sporting events or winter sport facilities (RTD, 2014d).

Denver’s municipal Public Works Department maintains the city’s road infrastructure (City of Denver, 2014). The focus of the department is not limited to transportation as its responsibilities include year-round road maintenance and repair, weekly household trash collection service, design and construction management of streets, bridges, and public buildings, transportation services through our parking
management, transportation planning, engineering and operations offices, and protection of our urban environment.

7.3. Vancouver, British Columbia

Vancouver is a coastal city on the southwestern mainland of British Columbia. It is not the capital of the province, but the city and its metropolitan area contains the majority of the province’s population. It has a population of 603,502 and a population of 2.4 million in its metropolitan area, making it the third largest metropolitan area in Canada. Vancouver is home to an extensive public transportation network with several rapid transit lines and bus service.

7.3.1. Transportation Dedicated Public Funding

Vancouver utilizes a number of transportation-dedicated public funding tools through Translink, including a utility levy and a property tax allocation. The collection of the utility levy (Hydro) is at a statutory rate of $1.90 per month per residential account with no increase. However, revenue increases with general population growth, as there are more residential accounts (Translink, 2013). Translink is also permitted to allocate a portion of the property tax to transportation-related projects. The property tax revenue will increase by 3 per cent per year, the maximum annual increase permitted under legislation for a base plan. Tax rates for all property classes necessary to generate the targeted revenue increase will be calculated to generate no more than the amount permitted by law and will be rebalanced for growth in the region and assessed values of homes.

7.3.2. Transportation Dedicated Private Funding

For transportation dedicated private funding, Vancouver uses parking fees and taxes, a gasoline tax and highway tolling.

The parking fees and taxes, also known as the parking site tax, implemented by TransLink, came into effect in January 2006 (Translink, 2013). The tax is applied to all
non-residential parking areas in all 21 municipalities in Metro Vancouver, charging them an annual rate of $0.87 per square metre. In total, over 40,000 properties comprising about 25,500,000 square metres of parking space are subject to parking fees and taxes. Gross revenues from the tax are approximately $20 million per year, or about 4 per cent of TransLink’s annual budget. Combined with TransLink’s other revenues, parking fees and taxes has helped to finance transit, cycling infrastructure, and major roads throughout the region. For the gasoline tax, under the South Coast British Columbia Transportation Authority Act (SCBCTA), TransLink is allowed to collect a gasoline tax of $0.17/L in the Metro Vancouver region. The forecast revenues over the Plan and Outlook periods are expected to grow slightly in 2014 to $337.8 million and then begin to decline to $334.7 million in 2016 and $328.5 million in 2023. Finally, TransLink tolls transportation infrastructure through one bridge at this time, the Golden Ears Bridge.

7.3.3. Spending Focus

Vancouver maintains a balanced spending focus on both public and private transportation in the city. This is exemplified through Translink’s Base Plan headline targets, where the design of the community and transportation system makes it possible “… to make half of all trips by walking, cycling and transit; and makes it possible to reduce the distances people drive by one-third” (Translink, 2013, p.6). At the same time, Translink has made major investments into road infrastructure, most notably through the Golden Ears Bridge and Massey Tunnel replacement. These projects are intended to improve service through reduced congestion for vehicle commuters.

7.3.4. Intergovernmental Transfers and Grants

The Federal and Provincial governments both contribute to TransLink’s capital projects through intergovernmental transfers and grants. This is done through the Federal Gas Tax Fund, Building Canada Fund and the Provincial Transit Plan (Translink, 2013). In regards to federal funding, the 2013 federal budget, Economic Action Plan 2013, introduced over $53 billion in infrastructure investments; including over $47 billion in the new 10-year Building Canada Plan that renews and expands existing programs starting in 2014–2015. This new program includes a Community Improvement Fund
(Gas Tax Fund and incremental GST rebate for municipalities), a new Building Canada Fund and the P3 Canada Fund as well as providing for funding through the end of current agreements. The implementation of the Building Canada Plan and its subsequent regional allocations through agreements such as a Strategic Priorities Fund require new agreements between all partners.

7.3.5. Organizational Structure

The organizational structure of transportation decision-making in Vancouver is through a regional authority. The Greater Vancouver Transportation Authority, also called TransLink, was created by an agreement between the Greater Vancouver Regional District and the Province of British Columbia, dated February 26, 1998 (Transportation Association of Canada, 2002). The purpose of Translink is to plan, coordinate and administer the multi-modal transportation system in Vancouver in the context of the Region’s growth management strategies. Its role includes transit, major roads, transportation demand management and a vehicle emission-testing program.

7.4. Summary of Findings

Table 5 shows, a summary of the results. As it can be seen, there are several characteristics shared by a majority of jurisdictions (at least 2 out of 3). The characteristics shared by all three cases are: all jurisdictions utilized both public and private forms of transportation dedicated funding; P3s; parking fees and taxes; and received federal and provincial/state infrastructure funding. The characteristics that two out of the three cases share are: tax increment financing; a gasoline tax; a utility levy; and spending focus is on both public and private transportation. In terms of the organizational structure of transportation, both a local and regional authorities govern Portland and Denver, where public and private transportation are separated. On the other hand, Vancouver’s transportation decisions are combined and governed by a single regional authority. It is important to note that Calgary already employs P3s, parking fees and taxes; tax increment financing; and a gasoline tax.
Table 5. Summary of Case Study Analysis

<table>
<thead>
<tr>
<th>Funding Sources</th>
<th>Characteristic</th>
<th>Portland</th>
<th>Denver</th>
<th>Vancouver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Property Tax Allocation</td>
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<td></td>
<td>Increasing tax rate with a maximum of 3% annually</td>
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<tr>
<td>Dedicated Public Funding</td>
<td>Regional Sales Tax</td>
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<td>Fixed tax rate of 1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employer Payroll Tax</td>
<td>Increasing tax rate of 1/100% annually</td>
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<td></td>
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<tr>
<td></td>
<td>Tax Increment Financing</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Public-Private Partnerships (P3s)</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Transportation</td>
<td>Utility Bill Levy</td>
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<td></td>
<td>✔</td>
</tr>
<tr>
<td>Dedicated Private Funding (User Funding)</td>
<td>Vehicle Registration Tax</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Gasoline Tax</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Parking Fees &amp; Taxes</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Highway Tolling</td>
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<td></td>
<td>✔</td>
</tr>
<tr>
<td>Use of Public &amp; Private Funding</td>
<td>Public Funding Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private Funding Only</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Combined Funding</td>
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<td>✔</td>
<td>✔</td>
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<td>Governance</td>
<td>Private (Roads)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public (Transit)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both – Private &amp; Public</td>
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<td></td>
<td>✔</td>
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<tr>
<td>Intergovernmental Transfers/Grants</td>
<td>Federal Infrastructure Funding</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Provincial/State Infrastructure Funding</td>
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<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Organizational Structure</td>
<td>Local Authority</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regional Authority</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Governed both Regional and Local Authorities</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>
7.5. Evaluation of Successful Characteristics

The secondary methodology of this study is used to validate the usefulness of the common characteristics by the case study analysis; an evaluation of the characteristics, which are met by either two or all three cases, is conducted. The purpose of the evaluation is to confirm the effectiveness of the tool, not necessarily the feasibility and viability of it. Rather, this will be done in Chapter 8. The secondary methodology is adapted from an evaluation framework used by AECOM and KPMG (2013) to assess revenue tools, which can be seen in Appendix B. The framework by AECOM and KPMG explains each characteristic and how it is measured and ranks it with respect to their established criteria. Within each of these criteria specific characteristics have been identified for evaluation purposes and scored on a 5-point scale, where 5 is the best score and 1 is the worst. The characteristics evaluated are those that are shared by two or all three cases. Although Calgary uses some of the characteristics mentioned, it is important to understand their effectiveness for its transportation needs and goals. The evaluation focuses on the revenue potential, governance considerations, and equity and distributional impacts of the select tools.

When it comes to evaluating public-private partnerships, regional transportation authorities and a balanced transportation spending focus, the framework is not suited to evaluate these options; rather a brief overview of the literature will be used to evaluate these characteristics. Finally, all three jurisdictions utilize intergovernmental transfers and grants and are highly reliant on them, given the substantial contribution it has on transportation budgets. This characteristic is not evaluated given that this practice is standard and essential to transportation financing. A summary of the financing tool evaluation is shown in Table 6.

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9 For more detailed information on the criteria used, please refer to AECOM and KPMG (2013).
10 The criteria of implementation is not considered, given the differences in jurisdictions and their legislation, which may or may not affect the viability of the revenue tool. Incremental costs are not considered as well, given that costs may vary for each jurisdiction.
Table 6. Evaluations of Successful Financing Tools

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Parking Fees &amp; Taxes</th>
<th>Gasoline Tax</th>
<th>Tax Increment Financing</th>
<th>Utility Levy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Potential</td>
<td>Revenue Potential</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sustainability</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Cyclical Variability</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Governance Considerations</td>
<td>Transparency of Scheme</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Equity and Distributional Impacts</td>
<td>Horizontal Equity</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Vertical Equity</td>
<td>4</td>
<td>3</td>
<td>N/A</td>
<td>2</td>
</tr>
</tbody>
</table>

7.5.1. Parking Fees and Taxes

Parking fees and taxes on paid parking transactions is a commonly used tool to generate revenue. While the tax is typically included in the price of parking, a parking sales tax can be imposed in addition to these taxes with the proceeds being dedicated to transportation funding.

Revenue Potential

A parking sales tax has the potential to generate modest revenues within the region. However, revenues are limited because this tool only captures revenues from non-residential, off-street charged parking and the majority of parking in the region is non-charged.

Governance Considerations

The introduction of the parking sales tax will require government approvals before implementation can begin. The approvals may take time, as it may be difficult to draw a link between parking and transit projects. The tool is not transparent if the tax is lumped in with the other sales taxes currently charged on parking. It will be difficult to track the portion of the tax dedicated for transport funding and from the users’ perspective, there may not necessarily be an obvious link between parking and transit.
initiatives. Transparency may be improved if the tax is itemized separately and if public education campaigns are carried out.

**Equity and Distributional Impacts**

The impacts of this tax are limited to short-term paid parking stalls. This tool cannot be viewed as being very equitable in horizontal terms since it only affects users who are already paying a fee for parking; non-charged spaces will not be affected by a parking sales tax. Additionally, there is not necessarily a direct link between paid parking and transit initiatives.

In terms of vertical equity, a parking sales tax is likely to affect primarily individuals with moderate to high levels of disposable income, since these individuals tend to be the drivers where most of the short-term paid parking stalls are located. If the implementation of the tool reduces the number of vehicles on the road, it benefits all road users (including the users who are not affected by the parking sales tax).

**7.5.2. Gasoline Tax**

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 liter of fuel purchased or a percentage of the base price.

**Revenue Potential**

The implementation of this tax would impact all drivers travelling within the region and is a reasonable way to directly charge users of the road network, while having high revenue potential. The sustainability of this tool is heavily dependent on the availability and price of oil. This could lead to decreasing revenues as oil becomes scarcer. There may also be some variation in fuel demand as prices fluctuate and efficiency of vehicles increases, which will directly affect the demand for fuel and the sustainability of fuel tax revenues, as indicated in the table above. The variability of fuel tax revenues over the business cycle is expected to be relatively limited, because most auto usage is not discretionary in the short-term.
Governance Considerations

If a fuel tax is implemented, there should be an authority that is responsible for the collection and allocation of the funds. Legislative approval will be required to introduce a new tax on fuel that is collected by a transit authority. This arrangement, however, has the potential to reduce the transparency of the scheme for users.

Equity and Distributional Impacts

Drivers must pay the fuel tax when purchasing fuel inside a given region. It will affect regular users as well as passing trade. If the tax leads to sustained fuel prices that are higher than in the surrounding areas outside the region, users may plan trips that incorporate opportunities to purchase fuel outside the region. This effect may not be significant at a 5 cent per litre price differential, but it would likely be significant at 10 cents / litre and higher. The tax will affect all petrol and diesel drivers. It could add a significant cost to the transportation of goods within the region, having an impact on the region’s business competitiveness and cost of goods, thus carrying the potential impact to a broader consumer base than just drivers. With respect to distributional issues, fuel taxes may be borne disproportionately by households that are more reliant on personal vehicle travel, such as those in rural areas and suburban areas with fewer transit services.

7.5.3. Tax-Increment Financing

Tax increment financing (TIF) is a public finance technique used by local government jurisdictions to fund infrastructure initiatives and stimulate economic development in designated geographic areas. Tax increment financing works by leveraging future tax revenue increases to finance current infrastructure projects. The mechanism effectively dedicates the incremental tax revenue between the assessed value of designated areas prior to the development and its assessed value over time. By doing this, future tax gains are leveraged to finance the present costs of eligible improvements in designated areas.
Revenue Potential

The revenue generation potential from tax increment financing can vary substantially as it is largely dependent on the real estate market and the size of the TIF zone that is established. During early implementation revenues are likely to be small to modest after which they can be expected to ramp up. Each transport/infrastructure initiative should be evaluated to determine if they are eligible for funding through tax increment financing. It is not a funding mechanism that can be used without a specific project in mind and requires forecasts of real estate growth in the identified areas over the long-term.

Governance Considerations

The scheme is relatively transparent because there is a clear connection between increased property values and the proximity to new transportation initiatives. Residents within the TIF area should also be educated to ensure full transparency of the scheme.

Equity and Distributional Impacts

Landowners within a TIF area do not have a choice on whether they participate or not. It is generally seen however that these landowners will benefit from a more rapid increase in their land value due to the transport initiative that has defined the TIF area. Residents within the TIF area are not charged a higher property tax rate, but rather experience higher property tax payments due to the increased value of their properties. The latter suggests that TIF area are characterized by some measure of horizontal equity. The tool has not been given a vertical equity score as it does not impact (positively or negatively) the tax rate paid by a property owner, but rather generates revenues from the increase in assessed value. However, by redirecting investment to transportation in blighted areas, TIF can indirectly improve vertical equity.

7.5.4. Utility Levy

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 city’s regular utility bill.

Revenue Potential

A utility levy implemented within a large city has the potential to generate a moderate amount of revenue. The levy is usually fixed and applied to each private dwelling in a jurisdiction. The revenues are expected to be sustainable as the number of people residing in a given region and paying utilities are likely to be maintained into the future. Similarly, shifts in the economic cycle have little effect on the revenues generated by this financing tool. If the utility levy were to be extended to businesses within a region, there is the potential to generate higher revenues.

Governance Considerations

The introduction of a utility levy requires regulatory approvals before implementation. As a result, utility providers will be obliged to collect the levy on behalf of the municipality or province. The utility companies generally remit taxes to the province and the utility levy can be included with these remittances. As it will be a flat rate, tracking the revenues collected from the levy and where the money is going should be relatively straightforward. However, an important detail that should be determined is which utility bill the levy should be attached to (e.g., electricity, gas or hydro). Legislation may also be required to define who is ultimately liable for the levy in the case of landlord and tenant. Other items for consideration would be homes not yet connected to all utilities such as gas mains and how the levy should be charged to these residences.

Equity and Distributional Impacts

All owners/occupants of a private residence within the affected jurisdiction must pay the fee. The charge is unlikely to displace economic activity or result in people moving outside of the affected jurisdiction to avoid paying the levy. A flat charge on all households may be perceived to be inequitable and lead to public backlash, especially in areas that may be poorly supported by the transportation system. While the rate can be applied equally across the region, a flat monthly fee is likely to place a disproportionate funding burden on lower income groups when compared to other groups, measured as a
share of income. The use of a variable pricing scheme that is dependent on household size, energy efficiency, proximity to transit or other factors may be a more vertically equitable solution.

7.5.5. Public-Private Partnerships

P3s do not generate new sources of revenue in and of themselves, since they require an underlying revenue stream such as tolls, fuel taxes, or other revenues that could be available to the public sector as well as the private sector. P3s do, however, generate upfront cash that may allow projects to be accelerated and that preserves public borrowing capacity.

In order to justify P3s to the public, governments will often produce what are known as “value for money” (VFM) reports, or assessments, which show how the costs of the P3 compare to the costs of a publicly procured alternative. However, some note that VFM reports are usually released after P3s have ‘passed the point of no return’ when contracts have been signed (Murray, 2006). This late release prevents public scrutiny before P3 contracts are signed, and diminishes the transparency of the process.

7.5.6. Regional Transportation Authorities

The case study analysis revealed that all the studied jurisdictions were governed by either a sole regional authority, or had part of its transportation network governed by a regional authority. This suggests that a regional transportation authority is essential in creating and implementing alternative financing tools. In general, regional governance can help metropolitan areas achieve the economic, environmental, and equity goals that motivates the original interest in regional government (Alpert et al., 2006). More specifically, by examining Translink in Metro Vancouver, a unique strength of a regional transportation authority is observed. This is evident in the consolidation of planning, dedicated, user based funding, multi-modal coordination and implementation under a single management authority operating within a broader regional policy framework for growth management, air quality, economic development and public finance (Transportation Association of Canada, 2002).
7.5.7. Balanced Transportation Spending Focus

Two out of three jurisdictions examined in the case study analysis exhibited a funding focus towards public transportation. This is compounded by the fact that Denver and Portland have dedicated public transportation authorities. However, it is important to note that the cases are focusing on public transportation in order to create a more balanced, multi-modal transportation system.

With suitable governance and funding mechanisms in place, cities would be well positioned to invest in infrastructure that supports sustainable transportation. This will inevitably involve investment in both transit and private vehicle-based infrastructure. As a result, if the essence of sustainable transportation is to reduce auto dependence without compromising urban mobility and accessibility, it is imperative for these systems to include an extensive and well-integrated public transit system capable of providing adequate capacity and competitive levels of service that can accommodate and attract a large proportion of urban travellers (Kennedy et al., 2005).

7.6. Considerations of Successful Characteristics

The evaluation of successful characteristics, specifically financing tools, yields substantive results. Other than the gasoline tax and P3s, which Calgary already utilizes, both tax increment financing and parking fees are evaluated as ineffective tools. This demonstrates that current practices are not effective, and that alternative tools are needed. Furthermore, Calgary is committed to investing in a balanced transportation system as stated through their transportation plans and current projects. As a result, these tools are not considered as potential policy options. On the other hand, the case study analysis found a common theme among all three cases, where the existence of a non-fixed transportation tax is utilized. Moreover, a transportation authority does not currently exist in Calgary, and the application of a utility levy is not present. Therefore, these options are examined in the following policy analysis.
8. Policy Objectives and Criteria

This chapter develops policy options to address Calgary’s difficulties in financing its transportation system and infrastructure. This includes the short-term and long-term policy objectives, as well as the criteria and measures used to evaluate the policy options. Following that is an assessment of the strengths and weaknesses of each policy, resulting in the policy recommendations.

8.1. Objectives

There are both short and long term objectives for these policy options. In the short term, Calgary recoups the $1.9 billion shortfall within 2015-2024, and finance planned transportation infrastructure and projects. This addresses immediate needs and places the city in a better position to adopt better approaches to financing transportation. Therefore, the policy options of this study address the short-term objectives.

For the long-term objective, Calgary is in an environment where transportation financing is sustainable for the future transportation needs of the city. This is vital to ensure that budget shortfalls do not happen again and that transportation projects can be financed for future demand.

8.2. Criteria and Measures for Analysis

The criteria are the standards set to evaluate the policy options and thus determine the best policy alternative for Calgary in the short term. I have selected the following criteria: effectiveness, administrative cost, implementation complexity and acceptability. It should be noted that equity is not assessed, given that the transportation system is meant to be accessible to all. Each criterion has a measure, or a number of
measures, to determine how it meets the above objective. Each measure has a benchmark against which measures are ranked; this benchmark sets a scale for comparison. Measures are ranked “low” (1), “medium” (2) or “high” (3). For criteria with several measures, the average of the rankings is used to ensure identical weight of criteria. Then the average of all criteria determines the ranking of the options. In this analysis, all criteria are equally important and are given the same weight to ensure the neutrality of recommendations. Table 7 summarizes the criteria and measures used to assess the policy options. A policy can receive a maximum total score of 12.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create an effective transportation system with high levels of accessibility and service to meet the demands of the city</td>
<td>How much will the policy improve the transportation system in the short term?</td>
<td>Substantial level of revenue generated annually (&gt; $190 million)</td>
<td>(3) High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate level of revenue generated annually ($150 million - $190 million)</td>
<td>(2) Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low level or no revenue generated annually (&lt; $150 million)</td>
<td>(1) Low</td>
</tr>
<tr>
<td><strong>Administration Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budgetary impact</td>
<td>A quantitative measure that evaluates the annual cost of implementing each policy option</td>
<td>No change or less than $35 million per year (&lt; 10% of reference level)</td>
<td>(3) High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$35 to 65 million per year (10-20% of reference level)</td>
<td>(2) Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than $65 million per year (&gt; 20% of reference level)</td>
<td>(1) Low</td>
</tr>
<tr>
<td><strong>Implementation Complexity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation complexity</td>
<td>Legislative and program changes needed to implement policy</td>
<td>Legislative changes required</td>
<td>(3) High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legislative changes required, with administrative changes</td>
<td>(2) Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legislative changes required, with restructuring</td>
<td>(1) Low</td>
</tr>
<tr>
<td><strong>Acceptability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government acceptance</td>
<td>Levels of government involved (municipal, provincial or federal).</td>
<td>1 level (Municipal only)</td>
<td>(3) High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 levels (Municipality and Provincial Government)</td>
<td>(2) Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 levels (Municipality, Provincial Government, and Federal Government)</td>
<td>(1) Low</td>
</tr>
</tbody>
</table>
**Effectiveness**

The criterion of effectiveness is defined in a fairly broad manner, given the varied range of policy options present. Since the options are not comparable in nature, effectiveness is defined as the ultimate short-term goal of providing the most ideal transportation system for the City of Calgary. This is measured through the annual revenue generated from the policy in reference to the goal of recouping $1.9 billion in transportation funding in ten years. As a result, a policy that generates $190 million or more per year is ranked as high with 3; a policy that generates in between $150 million and $190 million or more per year is ranked as medium with 2; and policy that that generates less than $150 million or more per year is ranked as low with 1.

**Administrative Costs**

This criterion measures annual government expenditure under each option. Since policy options are to be permanent, the interest is in ongoing expenses incurred, not the start-up (one-time) cost of implementation. Hence, administrative costs consider how a policy option impacts the government’s operating expenses, or its budgetary impact. The reference point is the City of Calgary’s (2014) annual transportation operating budget of approximately $325 million. Given that the City of Calgary (2014) notes that it is a strategic action to reduce costs and focus on value-for-money in its council priorities, the most cost-effective policy option is marked as high, while a larger increase in the current transportation budget is ranked lower. A 10 per cent or less increase to the budget is ranked as high with 3, a 10 to 20 per cent increase is ranked as medium with 2, and a more than 20 per cent increase in the budget is ranked as low with 1.

**Implementation Complexity**

Implementation complexity is the third criterion. The measure for this estimates the extent of legislative changes and other changes within the government required. Since all the policy options require legislative change, a policy that requires legislative changes with administrative changes or restructuring is more difficult to execute than a
policy requiring only legislative change. In regards to administrative changes, this refers changes to the civil service and whether new hiring or the creation of new units is required to support the new policy. A legislative change with restructuring refers to changes in the decision-making process, such as in the delegation of power and responsibilities to new or existing governmental entities. A policy only requiring legislative changes is ranked as high with 3, a policy that requires legislative changes and administrative changes is ranked as medium with 2, and a policy requiring legislative changes and restructuring is ranked as low with 1.

**Acceptability**

The primary stakeholders in implementing potential policy options are the citizens of Calgary who are directly affected by these policies. This is because the primary users and beneficiaries of the transportation system in Calgary are its citizens. Therefore, their acceptability is inherently tied to the effectiveness criterion as the effectiveness of the transportation system affects the benefits gained from it. Hence, their acceptability of a given policy is already taken into account. As a result, the primary stakeholder under evaluation is the government, which administers the potential policy options. I evaluate this criterion based on how many levels of government are involved. In Canada, provinces are given substantial responsibilities and there are few examples of coordinated federal-provincial policy making. The same is true from a provincial-municipal level. As a result, a policy becomes more complicated with more levels of government involved. Thus, an option that can be implemented by one level of government is ranked as high with 3; an option that requires coordination between the provincial government and the municipal government is ranked as medium with 2; and an option that requires all three levels of government is ranked as low with 1.

The next chapter presents the description of three policy options to improve financing of Calgary’s transportation system, public and private and their analysis based on those criteria.
9. Analysis of Policy Options

This section evaluates the proposed policy options based on the criteria and measures outlined earlier. The evaluation of policy options against the four criteria is based on past studies and results of the current estimation. Table 8 provides a summary of the policy evaluation results. I do not consider the status quo as one of the potential policy options because, at the time of writing, the City of Calgary is unable to fully finance current and future transportation projects.\textsuperscript{11}

In this section, I identify three policy options that are intended to create a more effective and stable transportation system in the City of Calgary. The options are analyzed independently to determine which ones are optimal. Although policies are analyzed independently, they are not mutually exclusive.

\textsuperscript{11} For more information on current and future transportation projects, please refer to City of Calgary, Investing in Mobility (2014)
Table 8. Summary of Policy Analysis

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
<th>Flexible Transportation Tax</th>
<th>Fixed Utility Levy</th>
<th>Transportation Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>How much will the policy improve the transportation system in the long term?</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Administration Costs</td>
<td>A quantitative measure that evaluates the annual cost of implementing each policy option</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Implementation Complexity</td>
<td>Legislative and program changes needed to implement policy</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Acceptability</td>
<td>Levels of government involved (municipal, provincial or federal).</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

9.1. Policy Option 1: Introduce a Flexible Transportation Tax

This policy option allows for Calgary to resolve its short-term objective. Portland and Vancouver do possess a form of taxation dedicated to transportation and is non-fixed. More specifically, it is fairly identical to the taxation method employed by Translink in Metro Vancouver. A Flexible Transportation Tax provides a substantial amount of additional revenue towards transportation specific projects. The tax would be added as a
part of the existing property tax structures in Calgary. This would reduce implementation complexity, since the tax structure and the proper payment and collection mechanisms already exist. In Alberta, there are four classes of property: residential, non-residential, farmland and machinery and equipment, where the tax is applied correspondingly (Government of Alberta, 2010). The percentage of the transportation tax is determined from the property tax, and would be used only for transportation specific projects. Furthermore, the tax must be flexible and change based on current and future needs to ensure sustainability.

**Effectiveness:** A flexible transportation tax as an addition to Calgary’s property tax has the ability to increase revenue substantially. In turn, this additional revenue can help fund the city’s transportation needs presently and into the future. For example, in 2013, Translink (2013) collected $298 million through their property tax allocation. This is up from $289 million in the previous year due to the non-fixed nature of its transportation tax. As a result, the sustainability of this funding mechanism is high due to the non-fixed nature of the tax as it can be increased periodically. Regardless, this policy has the ability to collect $190 million or more annually. This sustainable and substantial form of revenue can meet the short term transportation needs of Calgary, by funding planned projects intended to improve the transportation system’s effectiveness. For these reasons, the effectiveness of a flexible transportation tax is ranked as high.

**Administration Costs:** The allocation of a portion of the property tax towards transportation-dedicated funding does not have a high budgetary impact to the municipal government. Since the tax structure is in place already, there are only new costs placed on the government for new hires to administer the tax. Therefore, the administration cost is the annual salary of the number of new employees needed to administer the non-fixed transportation tax. The reference used is the number of employees in a property tax department. In this case, Prince Edward Island’s (PEI) provincial government, which administers the municipal property taxes, provided the information. PEI’s tax compliance department has 3 employees and 1 supervisor that administer the property tax a population of about 146,000 (PEI, 2014). Therefore, there is a need for about 28 new employees, since Calgary’s population is nine times larger than PEI’s. The employees’ salaries are determined from the budget of Calgary’s Department of Corporate
Administration, where approximately 78 per cent of its expenditures are salaries (City of Calgary, 2014). Within this department is the tax and treasury services branch, responsible for tax administration, which had expenditures of $14.4 million in 2014. This means that $11.23 million is dedicated to the 139 full-time staff salaries in the tax and treasury services branch, with an average salary of $80,805. So, 28 new employees mean that administering this new tax costs approximately $2.26 million annually. As a result, this policy option ranks as high for administration costs.

*Implementation Complexity:* The implementation complexity of this policy is affected by legislative and administrative changes. Any change in the allocation of the property tax requires legislative amendments the province of Alberta’s Municipal Government Act (MGA). The MGA governs and regulates all activities that are associated with property assessment and taxation. As a result, this will require administrative changes to Calgary’s municipal government and their administering of the property tax. This is because the city is responsible for calculating the taxes payable, or the tax rate, and what percentage of the property tax is to be allocated to transportation-related projects. The city is also responsible for collecting the taxes. A restructuring of the government is not required since the tax structure is already in place. Since this policy requires both legislative and administrative changes, the policy is ranked as medium (2) for the implementation criterion.

*Acceptability:* The acceptability of a flexible transportation tax for the government is dependent on how many levels of government involved to implement the policy. Since changes to the property tax requires legislative amendments from the province and administrative changes from Calgary’s municipal government, the policy requires two levels of government, and is ranked as medium (2) in terms of acceptability.

9.2. **Policy Option 2: Introduce a Transportation-Dedicated Fixed Utility Levy**

This policy option introduces a transportation-dedicated utility levy, which uses a fixed utility levy to fund transportation projects. The fixed levy is added to the utility bill and applied to each private dwelling in the city. The revenues are expected to be
sustainable as the number of people residing in a given region and paying utilities are likely to be maintained into the future. Similarly, shifts in the economic cycle have little effect on the revenues generated by this financing tool. The utility levy is also extended to businesses within the city.

**Effectiveness**: A transportation utility levy’s effectiveness is dependent on the additional revenue it can generate to fund transportation projects and reduce travel time. Since the levy is fixed, the revenue generated is marginal. In the jurisdictions that employed a transportation-dedicated utility levy, the additional revenue is dependent on the levy rate and the number of households in the affected region. For example, the utility levy of $1.90 per month generated about $22 million in 2013 from about 870,000 households (Translink, 2013). In comparison, Calgary has 464,000 households (Statistics Canada, 2011). This policy therefore, does not have the ability to generate enough revenue to meet the short-term objective, and is ranked as low for effectiveness.

**Administration Costs**: The addition of a fixed transportation-dedicated utility levy towards transportation-dedicated funding does not have a high budgetary impact to the municipal government. Since the administration of utility bills in Calgary is already in place, the only costs placed on the government are the new hires needed to administer the policy. Therefore, the administration cost is the annual salary of the number of new employees needed to administer the transportation-dedicated utility levy. The reference used is the number of employees in a user fee department. The reference used is the number of employees in a property tax department. In this case, Prince Edward Island’s (PEI) provincial government, which administers the municipal property taxes, provided the information. PEI’s tax compliance department has 3 employees and 1 supervisor that administer the property tax a population of about 146,000 (PEI, 2014). For Calgary’s population, this means that there is a need for about 27 new employees and 1 supervisor. The employees’ salaries are determined from the budget of Calgary’s Department of Corporate Administration, where approximately 78 per cent of its expenditures are salaries (City of Calgary, 2014). Within this department is the tax and treasury services branch, which had expenditures of $14.4 million in 2014. This means that $11.23 million is dedicated to the 139 full-time staff salaries in the tax and treasury services branch, with an average salary of $80,805. So, 28 new employees mean that
administrating this new levy cost approximately $2.26 million annually. As a result, this policy option ranks as high for administration costs.

*Implementation Complexity*: The introduction of a utility levy requires legislative and administrative changes. Legislative changes are required for Alberta’s MGA, since it affects tax structures and collection. Legislation may also be required to define who is ultimately liable for the levy in the case of landlord and tenant (i.e., home owners or home occupants). Administratively, the City of Calgary also needs to direct utility providers to collect the levy on behalf of the municipality. Furthermore, the city needs to determine which utility bill the levy should be attached to (e.g., electricity, gas or hydro). Other items for consideration would be homes not yet connected to all utilities such as gas mains and how the levy should be charged to these residences. From these considerations, this policy option ranks as medium (2) for implementation complexity.

*Acceptability*: The acceptability of a transportation-dedicated fixed utility levy for the government is dependent on how many levels of government involved implementing the policy. Since there are changes to levies and fees collection, this requires legislative changes to the province’s MGA. It also requires administrative changes to tax administration from Calgary’s municipal government. As a result, the policy requires two levels of government, and is ranked as medium (2) in terms of acceptability.

### 9.3. Policy Option 3: Establish a Transportation Authority in the Calgary Region

This policy draws on all three case studies with the existence of a transportation authority in each jurisdiction. This is an indirect financing policy that enables the creation of a transportation authority to oversee and finance all transportation-related infrastructure and services, and make decisions on those matters. This includes, long-term infrastructure planning, investment plans, transportation strategies, service changes, facilities and maintenance. It is governed by a mayor’s council, which includes all cities and jurisdictions in the Calgary area. The role of the mayor’s council is to act as a representative to each respective jurisdiction under the regional authority. The council
also appoints a Chief Executive Officer of the regional authority, who is responsible for the day-to-day management of the authority itself.

**Effectiveness:** Through the case study analysis, it is certain that a transportation authority is beneficial to an effective transportation system by having the ability to secure higher levels of funding and provide a higher level of service. In turn, additional funding decreases travel time by seeing through current and planned transportation projects. This is evident through the creation of the Regional Transportation Authority (RTA) in South Florida. Since its inception in 2003, the RTA induced a transportation dedicated funding program from the state level, called Mobility 2000 (Alpert et al., 2006). It was also responsible for securing $12 million in transit funds for South Florida from Congress in 2005. Denver’s RTD led a campaign to introduce a 0.4 per cent increase in the regional sales tax to support its transportation projects, which was approved in 2004 (Jonas et al., 2014). As of 2014, the RTD is collecting about $274 million per year from the sales tax (RTD, 2014). These examples reflect the ability of transportation authorities to obtain new and effective sources of funding. Furthermore, an authority is able to focus only on transportation decisions, allowing a higher level of autonomy not present when transportation decision-making is incorporated in the wider municipal government. This can make financing more effective as existing institutions can be harnessed in new ways, and that people can regulate themselves through horizontally linked organizations (Savitch and Vogel, 2000). As a result, a transportation authority is ranked as high for effectiveness, given the level of success in other jurisdictions and its ability in acquiring funding.

**Administration Costs:** In order to calculate the budgetary impact of a transportation authority, I use current operating costs of the transportation authorities in the three case studies, and used the average of the three. The operating costs ranged from approximately $60 million to $80 million annually, resulting in an average of about $70 million per year to operate a transportation authority (Translink, 2013; TriMet, 2013 RTD, 2012a). This cost excludes capital spending on transportation projects; it is only administrative costs. The cost is over a 20 per cent increase in Calgary’s current transportation budget, and the policy option is ranked as low (1) for administration costs.
Implementation Complexity: The establishment of a transportation authority requires legislative changes and restructuring. Since a regional transportation authority affects municipal governance for a number of jurisdictions, legislative changes are needed for the MGA, which regulates municipal governance in Alberta. A transportation authority has a degree of autonomy and power for transportation-related decision-making, and legislation must be changed to reflect this. Municipal governments in the Calgary area must also change or amend local bylaws and policies to reflect the decision-making power of a transportation authority to set out directives, budgets, policies, and other responsibilities mentioned before. The restructuring aspect comes from the fact that there is a transfer of powers from the municipalities to the transportation authority, and the likely creation of a government arm to oversee and manage the transportation authority. As a result, this policy option is ranked as low (1) for implementation complexity.

Acceptability: The establishment of a transportation authority has the ability to improve a transportation system by accessing additional forms of funding and providing higher levels of service, through greater autonomy. This requires changes to legislation, specifically the MGA, on the provincial level to establish the transportation authority’s decision-making powers and responsibilities. It also requires cooperation from all municipalities in the affected region to transfer governance powers to the authority. Therefore, government acceptability is ranked as medium (2) due to the need for two levels of government to implement this policy.

9.4. Policy Recommendations

Based on the analysis of the proposed policy options, introducing a flexible transportation tax has the most favourable results. This option provides a stable and sustainable funding source that creates an effective transportation system for Calgary in the short term. The effectiveness of this policy ranks high, given its potential to collect a substantial amount of revenue to fund current and planned transportation projects in Calgary. The administration costs are low, given that this tax is part of the local property tax and is allocated as such. However, there is no dominant policy when it comes to implementation complexity. All the policy options require legislative changes and involve
both the municipal and provincial government. This comes from the fact that municipalities in Alberta are heavily regulated and mandated by the MGA. Any change to how municipalities are governed, including the collection of taxes and division of powers, requires amendments to the MGA.

The fixed transportation-dedicated utility levy option ranks second in the analysis. It is ranked the same as the flexible transportation tax in all criteria, except for the effectiveness criterion, where it was the only option to score low on effectiveness. The main factor is that the potential revenue the policy brought is marginal and would not have been able to fund current and planned transportation projects. In turn, a reduction in travel time is low or would not be affected.

The establishment of a regional transportation authority in the Calgary region ranks the lowest in the analysis. It is hindered by administration costs and implementation complexity. The annual operating costs for a transportation authority is a considerable investment compared to the other options. Furthermore, its low score for implementation complexity is credited to the fact that it is a completely new undertaking for Calgary and its metropolitan area. However, given that a regional transportation authority ranks high in effectiveness, it is recommended that the City of Calgary give some consideration to its notion in the future. This can take form in preliminary engagements with regional partners and meetings with the provincial government to discuss the viability and appetite of this option.

From the analysis, I recommend that Calgary implement immediately a flexible transportation tax to address the short-term objective of recouping the $1.9 billion shortfall for current and planned transportation projects. Following this, the city, its surrounding municipalities and the provincial government should explore the viability of establishing a regional transportation authority in the future.

Calgary’s transportation system is in great need of a stable and sustainable funding source and a flexible transportation tax is a viable solution. The over reliance on intergovernmental grants and transfers to finance transportation in a growing city calls for more diverse forms of funding. The timing of this policy problem comes at a time where growth and demand is outpacing the means to support it. Therefore,
implementing new financing tools, such as a flexible transportation tax, for the transportation system is especially appropriate.
10. Conclusion

Calgary is facing challenges in financing its transportation projects due to growing population and demand. These challenges are expected to increase because of an over reliance on intergovernmental transfers and grants. Moreover, alternative financing options are not present. The city must therefore diversify its sources of financing to ensure that citizen demands for transportation systems are met and financial sustainability is achieved.

In this study, I explored ways to relieve a $1.9 billion financial shortfall Calgary is facing in its transportation system by examining financing policies in three other cities. Through a case study analysis, I discovered several main instruments commonly used to successfully finance transportation systems. The cities examined place value in dedicated forms of financing for their transportation systems through taxation and levies; a variety of financing tools; and in transportation-specific governance.

I consider the city’s own evaluation and goals to establish long and short-term objectives that inform the policy options. Three policy options are derived from my case study findings: a flexible transportation tax; the establishment of a regional transportation authority in the Calgary region; and a fixed transportation-dedicated utility levy. These options are assessed using four criteria to determine which options to adopt in Calgary. Using an established set of criteria, I analyzed these policies and determined that the flexible transportation tax ranks the highest, and should be implemented immediately. Furthermore, consideration and consultation towards the establishment of a regional transportation authority in the future is recommended.

The case study analysis revealed a couple of shortcomings that may have slightly affected my results. The analysis may have been better served if the cases were more similar to Calgary’s characteristics. This is because transportation needs and demands are dependent on characteristics, such as area size and population. As a
result, a jurisdiction's response may be based on such circumstances. Another issue is the fixed transportation-dedicated utility levy that was produced from the case study analysis. It is somewhat limited given its fixed nature compared to the flexibility transportation tax. A solution would be to make the options more comparable, such as suggesting a non-fixed utility levy instead.

For future research, it may be beneficial to examine the relationship between financing transportation and role of incentives in determining the value of certain projects. For example, a utility levy may have an effect on peoples' behaviour in regards to energy use. These incentives may affect how people travel and consequently, what jurisdictions spend on transportation. Finally, the cases analyzed did not evaluate Calgary's current financing tools. It may be beneficial to examine cases that share the city's existing strategy, as it may reveal potential improvements to these methods.

Calgary's predicament with financing transportation is not unique; rather it is part of the larger discussion of the infrastructure debt in all Canadian cities. Future research should examine the additional issues related to transportation financing in Canadian cities, specifically governance issues. This includes, but is not limited to, the overreliance on the provincial and federal government for infrastructure funding, and the lack of municipal powers to pursue innovations and initiatives. In addition, research is required to examine current practices and their effectiveness, such as the fixed gasoline tax in Alberta. Ensuring sustainable financing for urban transportation systems requires sufficient policies to guarantee that mobility and demand are effective.
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## Appendix A. Case Study Evaluation Framework

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Dedicated Public Funding</td>
<td><strong>Property Tax Allocation</strong>&lt;br&gt;A portion of the property tax collected is dedicated to transportation funding.</td>
</tr>
<tr>
<td></td>
<td><strong>Regional Sales Tax</strong>&lt;br&gt;This would involve the introduction of a municipal or a provincial sales tax modeled as a value-added tax like the GST.</td>
</tr>
<tr>
<td></td>
<td><strong>Employer Payroll Tax</strong>&lt;br&gt;Employee payroll taxes are a tax remitted by employers and/or employees based on the size of the payroll. Exemptions can be made for smaller firms and deductions can be capped much like CPP and EI premiums.</td>
</tr>
<tr>
<td></td>
<td><strong>Value Capture Levy (Tax Increment Financing)</strong>&lt;br&gt;Capture revenues from the indirect and proximity benefits generated by transport infrastructure (e.g., increased real estate value) to help fund transport projects. Examples of land value capture tools include tax increment financing (TIF) districts, development charges, development rights and joint development. To date, these tools have been applied mainly to roads, metros, and rail.</td>
</tr>
<tr>
<td></td>
<td><strong>Public-Private Partnerships (P3s)</strong>&lt;br&gt;A procurement method that allow for private sector participation and risk sharing. To be effective, they must offer sufficient “value for money” compared to traditional public procurement. The right institutional capacities and processes must also be in place. Experience to date suggests that PPPs are particularly suited for BRTs, highly used and specific rail links, and shared-use vehicle and bicycle systems.</td>
</tr>
<tr>
<td>Transportation Dedicated User Funding</td>
<td><strong>Utility Bill Levy</strong>&lt;br&gt;Revenues from the additional levy added to the utility bill are dedicated to transit/transportation.</td>
</tr>
<tr>
<td></td>
<td><strong>Vehicle Registration Tax</strong>&lt;br&gt;An additional fee dedicated to transit would be applied to vehicle owners upon registering a new vehicle and renewing that registration. General administration would leverage existing systems currently in place for standard vehicle registration procedures.</td>
</tr>
<tr>
<td></td>
<td><strong>Gasoline Tax</strong>&lt;br&gt;A tax levied on the sale of transportation fuels. This tax can be a flat rate of a predetermined dollar value per litre, or taxed at a percentage of the total purchase price. It can be applied either within city boundaries or across the entire province in order to limit changes in travel patterns designed to avoid the tax.</td>
</tr>
<tr>
<td></td>
<td><strong>Parking Rights Tax</strong>&lt;br&gt;A tax paid on the sale of a parking right. The tax is calculated by transportation authorities and includes parking rights sold by the hour, month, year or any other basis.</td>
</tr>
<tr>
<td></td>
<td><strong>Highway Tolling</strong>&lt;br&gt;Highway tolls are paid either per kilometer travelled or for access to designated roads, bridges or sections of road that require the planning and building of infrastructure for vehicle monitoring and transaction processing on a large scale.</td>
</tr>
<tr>
<td>Use of Public &amp; User Funding</td>
<td><strong>Public Funding Only</strong>&lt;br&gt;Jurisdiction only uses public funding mechanisms</td>
</tr>
<tr>
<td></td>
<td><strong>User Funding Only</strong>&lt;br&gt;Jurisdiction only uses private funding mechanisms</td>
</tr>
<tr>
<td></td>
<td><strong>Combined Funding</strong>&lt;br&gt;Jurisdiction only uses both public and private funding mechanisms</td>
</tr>
<tr>
<td>Intergovernmental Transfers/Grants</td>
<td><strong>Federal Infrastructure Funding</strong>&lt;br&gt;Transportation infrastructure funded through federal transfers.</td>
</tr>
<tr>
<td></td>
<td><strong>Provincial/State Infrastructure Funding</strong>&lt;br&gt;Transportation infrastructure funded through federal transfers provincial/state transfers.</td>
</tr>
<tr>
<td>Governance</td>
<td><strong>Local Authority</strong>&lt;br&gt;Transportation decisions are made within the local/municipal government.</td>
</tr>
<tr>
<td></td>
<td><strong>Regional Authority</strong>&lt;br&gt;Transportation decisions are made through a regional or dedicated transportation body.</td>
</tr>
<tr>
<td>Funding Focus</td>
<td><strong>Private (Roads)</strong>&lt;br&gt;Funding towards transportation infrastructure is focused on roads.</td>
</tr>
<tr>
<td></td>
<td><strong>Public (Transit)</strong>&lt;br&gt;Funding towards transportation infrastructure is focused on public transit.</td>
</tr>
<tr>
<td></td>
<td><strong>Both – Private &amp; Public</strong>&lt;br&gt;Funding towards transportation infrastructure is focused on both roads and public transit.</td>
</tr>
</tbody>
</table>

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12 All sources of this table are in the analysis section of the study.
Appendix B. Evaluation Framework for Revenue Tools ¹³

<table>
<thead>
<tr>
<th>Revenue Potential</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Potential</td>
<td>Tool has limited revenue potential</td>
<td>Tool has below average revenue potential</td>
<td>Tool has moderate revenue potential</td>
<td>Tool has above average revenue potential</td>
<td>Tool has the potential to generate significant revenues</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Revenues are not sustainable in the short- or long-term</td>
<td>Revenues are not sustainable in the long-term</td>
<td>Revenues could be sustainable depending on user perception of the tool</td>
<td>Revenues are likely sustainable in the long-term</td>
<td>Revenues are likely sustainable in the long-term</td>
</tr>
<tr>
<td>Cyclical Variability</td>
<td>Revenues will vary significantly with changing economic growth over the business cycle</td>
<td>Revenues will vary with changing economic growth over the business cycle</td>
<td>Potential for revenues to vary with changing economic growth over the business cycle</td>
<td>Revenues are for the most part sheltered from changing economic growth over the business cycle</td>
<td>Revenues are essentially unaffected by changing economic growth over the business cycle</td>
</tr>
<tr>
<td>Governance Considerations</td>
<td>Transparency of Scheme</td>
<td>There are several entities involved in the collection and allocation of funds; difficult process for administering funds for transit</td>
<td>Lines of accountability between authorities is vague; revenues are pooled or lumped in with other revenue streams</td>
<td>An authority will be responsible for collection but will require assistance allocating the revenues to transit</td>
<td>Lines of accountability between authorities are clear; revenues collected are dedicated to transportation</td>
</tr>
<tr>
<td>Equity and Distributional Impacts</td>
<td>Horizontal Equity</td>
<td>None of the groups targeted/affected by the tool receive a benefit commensurate with the charge paid</td>
<td>Few if the groups targeted/affected by the tool will receive the full benefit from the tool</td>
<td>Select groups targeted/affected by the tool will receive a benefit; however, other groups will benefit without being targeted directly</td>
<td>The majority of affected groups who bear the cost also benefit from the tool; some groups may benefit without being targeted directly</td>
</tr>
<tr>
<td></td>
<td>Vertical Equity</td>
<td>Tool places a higher burden (in terms of proportion of income) on low-income groups</td>
<td>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</td>
<td>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)</td>
<td>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)</td>
</tr>
</tbody>
</table>

¹³ All sources of this table are in the analysis section of the study.