

Importance of Public Transit in Canada and Calgary, and Who Should Pay



SUMMARY:

Public Transit serves people. In Canada people generally live in large cities and most of the economic activity in Canada happens when Canadians provide services for each other. This is facilitated with Public Transit.

Public Transit in Canada traditionally serves three niche markets:

- Low cost mobility option for low income people
- Daily commuters (to work, school or social events), and
- To facilitate growth of higher density areas like downtown city cores

Most Canadians use Public Transit when going to school or during their first years in the job market. Some Canadians continue to rely on the service for many more years too. Indeed, the possibility of mass transit has enabled the growth and densification of Canadian cities while keeping infrastructure costs significantly reduced. Finally, everyone benefits from faster transportation times when public transit is available.

Corporate Economics estimated the ratio of benefits to costs of Public Transit in Calgary using a standardized methodology used to estimate such ratios throughout the United States and applying price, wage, population and ridership data from Calgary in 2012 (the most recent year with full data). For all Calgaryans of all ages whether riders or not, we estimated the total benefits of Calgary Transit in Calgary at about \$570 million. This results in a benefit to cost ratio as high as 1.8 : 1. Interestingly, about 2/3 of the total benefits to all Calgaryans from Calgary Transit comes from reduced road congestion alone.

Calgary Transit Benefit To Cost Ratio:

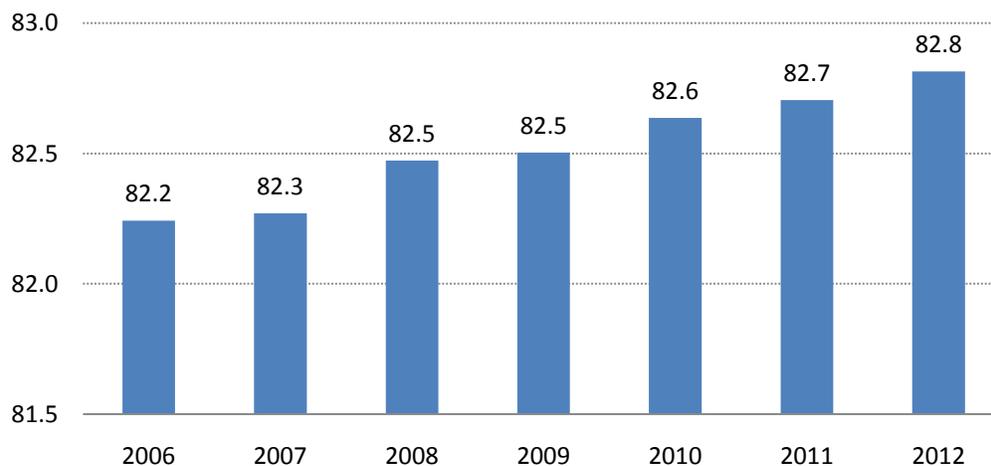
At least 1.68 To 1 and possibly as high as 1.8 To 1

IMPORTANCE OF PUBLIC TRANSIT IN CANADA

Public transit is an important part of the Canadian economy and the lives of average Canadians, especially those residing in cities.¹ Urban areas² are the home of the vast majority of residents and economic activity in Canada.

- In the past 20 years, 84% of all economic growth in Canada came from urban areas.
- 65% of all economic growth in Canada is created in Canada's six biggest cities; Toronto, Vancouver, Montreal, Calgary, Edmonton and Ottawa.

CMA* Share of Canada's Population Per cent



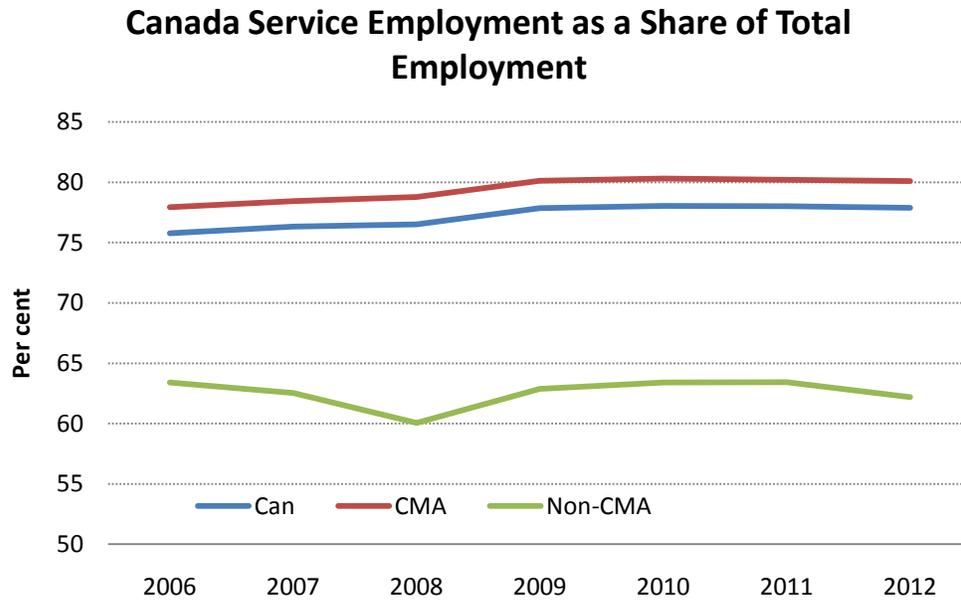
* CMA = Census Metropolitan Area, Statistics Canada's definition of the geographic areas of urban areas in Canada.

- 83 per cent of Canada's population lived in metropolitan areas in 2012.
- 80 per cent of new jobs are located in metropolitan areas. Metropolitan areas experience above average rates of growth because jobs attract people.

1 Fan, W., et.al, Importance of Cities: with emphasis on Canadian urban areas (2008), Corporate Economics, The City of Calgary.

2 Ibid.

Service Economy: Jobs are in Cities



The Canadian economy has been referred to as a “service economy³”. In Canada, more people are employed in providing services than are employed in producing and providing goods. About 77% of all jobs in Canada are in service industries. Transportation, accounting, professional and technical services, hairdressing and medical testing are but a few of the many services offered in Canada. Jobs where goods are produced include manufacturing, which is concentrated in automotive, aerospace, agriculture, telecommunications and wood product industries. About 80% of jobs in CMAs are in service industries.

³ A Service is provided when one person does something for and with the co-operation of a customer. (e.g. teeth cleaning requires a customer go to an office (dentist or hygienist) and not talk on a cell phone.)

Majority of GDP and income tax produced in cities

Canada's six largest cities; Vancouver, Edmonton, Toronto, Calgary, Ottawa and Montreal, by themselves, account for 38% of Canada's total population, jobs and GDP⁴. The people in Canada's six largest cities paid \$78.6 billion in income tax to provincial and federal coffers in 2009. This amounts to 51.1% of all personal income taxes paid in Canada.⁵

Individuals in Calgary, with a regional population of 1.3 million, paid \$9.64 billion in federal and provincial income taxes in 2009⁶. The Census Metropolitan Area of Calgary represents about 3.7% of the total Canadian population yet the people in this region paid 6.25% of all personal income taxes collected in Canada in 2009. On average, Calgarians pay almost 70% more income taxes than Canadians in other parts of the country.

Data on corporate income taxes is not available on a CMA basis. Given the tendency for large corporation head offices to locate in large municipalities it seems reasonable to presume that there is even greater concentration of corporate income taxes collected in Canadian cities than personal income taxes.

TRANSIT IS A KEY COMPONENT THAT MAKES CITIES WORK.

Public transit as a part of the transportation solution:

Public transit traditionally competes with auto use in three niche areas

- 1) A *low cost mobility* option for people who are unable or chose not to drive.
- 2) In urban areas with congestion problems, rapid transit (such as the LRT in Calgary) serves as a *congestion management* tool.
- 3) Public transit *facilitates pedestrian friendly centres* such as downtown cores, commercial centers, urban neighbourhoods, retirement communities, and large college campuses.

4 Source: Statistics Canada, Conference Board of Canada

5 Source: Canada Revenue Agency (T1 Final Statistics 2011 (2009 tax year) Table 1)

6 Source: Canada Revenue Agency

In large metropolitan areas, millions of daily commuters use rapid transit to bypass congested freeways and avoid downtown parking costs⁷. Over 17% of all work commuting in Calgary⁸ is done via Calgary Transit. Additionally, surveys from the City of Calgary Transportation Forecasting Division show 50% of downtown workers use transit to travel to and from work. The vast majority of Calgary commuters are car owners. Imagine if 130,000 more drivers tried to use the roads of Calgary during rush hour today. If they did, Calgary would need 14 more lanes into and out of the downtown core. The fact that these drivers choose transit helps to reduce the demand for road and parking infrastructure.

Calgarians send more to Provincial and Federal Governments than they receive.

The City of Calgary conducted a comparison of the revenues and expenditures of different levels of government in Calgary. In 2010 the Fiscal Imbalance report⁹ was compiled using data from 1988 to 2007.

Taking the 2007 data only; the Federal government collected \$13.97 billion from Calgarians and spent a mere \$5.2 billion in Calgary. On net, the federal government withdrew \$8.89 Billion dollars from the Calgary economy in 2007, roughly \$8,716 per Calgarian in 2007.

In the same year the Provincial government collected \$12.53 billion from Calgarians while spending \$10.92 billion in Calgary with a net impact of withdrawing \$2.58 Billion from the local economy. This is roughly equal to an additional withdraw of \$2,530 per Calgarian.

Effectively, in 2007 the Provincial and Federal governments collected \$11,245 from every man, woman and child in Calgary. In comparison, the civic government collected \$3.98 billion, and spent \$2.9 billion on operating expenses and another \$1.3 billion on past, present and future capital investments. On net, the City spent \$200 million more in the city than it collected from citizens. The municipality put approximately \$200 more into the pockets of every Calgarian than it collected.

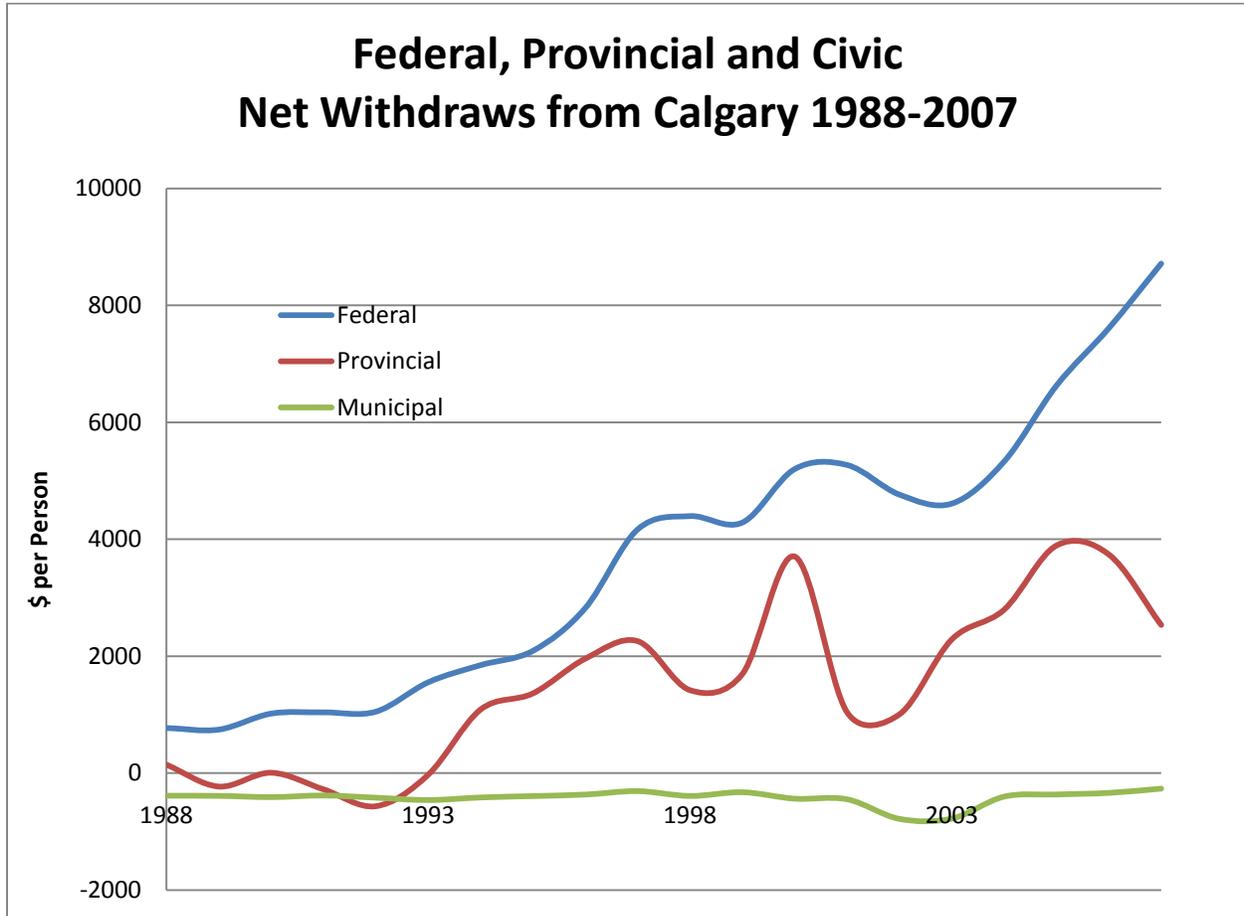
This left each Calgarian with a net local benefit of all levels of government at minus \$11,050 for 2007 alone. The following graph shows this is not a recent phenomenon. The local government has financially benefitted Calgarians consistently whereas the federal government has

⁷ In 1990, transit's share of journeys to work in the New York metropolitan area was 53.4 percent, Boston (31.5 percent), Chicago (29.7 percent), San Francisco (33.5 percent), Washington, D.C. (36.6 percent) and Philadelphia (28.7 percent).

⁸ Statistics Canada, 2011 Federal Census

⁹ Zhang, Ivy, A Case of Fiscal Imbalance; The Calgary Experience, Nov. 2010, City of Calgary.

consistently received greater and greater sums from the average Calgarian. Occasionally the Provincial government has been a net contributor but over the most recent 15 years the Province has consistently withdrawn significant money from the average Calgarian.



Note: The net financial contributions of the City of Calgary to citizens were financed by deferring maintenance expenditures. The result has been a generally declining quality of municipal infrastructure and an increasing backlog of required maintenance.

COSTS TO BENEFITS RATIO FOR CALGARY TRANSIT

Local taxpayers benefit from transit service provided in their communities even if they do not or seldom use it themselves. Because of their proximity to transit access points they can rely on transit one day if their vehicles are not available. When they drive to work, they benefit from less

road congestion because other commuters are using transit. The benefits to local taxpayers include their travel time saved. The higher residents' income, the more valuable their time is to them. In addition, local taxpayers benefit indirectly by having reduced air and noise pollution, whether or not they access public transit.

There are inter-jurisdictional benefits from the provision of public transit as well. Because of the dampening effect of transit on automobile ownership and use, the public can collectively enjoy economic and environmental benefits such as; a less polluted environment, reduced health issues, lower health care costs, less urban sprawl and larger budget savings from not having to add more highway capacity in congested urban travel corridors.

Several studies have attempted to estimate the ratio of benefits to costs for public transit. One study in particular provides estimates ranging from 0.29 : 1 to 2.44 : 1 for 80 major US cities, with the average cost to benefit ratio estimated at 1.34 : 1¹⁰. In a Tel Aviv study¹¹ the benefit to cost ratio was estimated at 1.15 : 1 and many other studies have touted the benefits of public transit in general¹².

In general, though there is wide variation in what the benefit to cost ratio of public transportation is, there is universal consensus that increased ridership increases the benefit to cost ratio. Anything that increases ridership has multiplicative positive system wide impacts. Increased capacity, creature comforts, and information systems telling riders how long until the next bus are all examples of enhancements with positive system wide impacts.

10 Harford, Jon; Congestion, Pollution and Benefit-to-Cost Ratios of U.S. Public Transit Systems, Cleveland State University, Cleveland OH. 2006

http://www.ce.cmu.edu/~gdrg/readings/2007/07/12/Harford_CongestionPollutionAndBCRatiosOfUSPublicTransitSystems.pdf

¹¹ Shefer, Daniel; Aviram, Haim, Incorporating Agglomeration Economies in Transport Cost-Benefit Analysis: The Case of the Proposed Light Rail Transit in the Tel-Aviv Metropolitan Area, Papers in Regional Science, 84(3), August 2005.

¹² Topalovic, P; et.al; Light Rail Transit in Hamilton: Health, Environmental and Economic Impact Analysis, Social Indicators Research, 108(2), September 2012.

Results:

Benefits from reduced road congestion, which accrued to all¹³ Calgarians in 2012 were \$6.90 per trip taken on Calgary Transit. Additional benefits which accrued to riders of Calgary Transit in 2012 were \$2.36 per trip taken. Total benefits as a result of Calgary Transit providing service in Calgary were thus \$9.26 per trip, or \$529 million to Calgarians in 2012. Costs to provide public transit in Calgary were \$3.30 per ride, or approximately \$320 million in 2012. Benefits exceed the costs yielding a benefit-to-cost ratio of 1.65 : 1, very favorable compared to the average U.S. rate of 1.34 : 1. However:

- A) If we include the environmental benefits of reduced gaseous emissions then the Calgary Transit estimated benefit to cost ratio rises to 1.68 : 1.
- B) This analysis only estimates the benefits which accrue to adult riders. Seniors, youth and post secondary students also benefit as a result of the provision of public transportation in Calgary. We don't have enough data to provide a good estimate of the benefits which accrue to them but if they receive only half the per ride benefits which accrue to adult riders then the benefit to cost ratio would rise to around 1.8 : 1.

Summary:

In terms of “bang for the buck”, public transit in Calgary provides exceptional value to all citizens. With such a high benefit to cost ratio, increased expenditures - particularly those which result in more people using existing transit service – should be encouraged.

¹³ Calgary roads are so interconnected and congested that a major incident in any major corridor has spill over effects on all other corridors. Thus, reduced congestion on roads going downtown lowers travel times for people who typically don't drive anywhere near the city core.

Appendix A: Methodology:

Utilizing the Harford study we estimated the benefit to cost ratio for Calgary Transit using 2012 data. There is one significant difference in the methodologies between our study and the Harford study. Harford measured benefits in terms of dollars per passenger mile of local public transit. We have more data at our disposal so we have measured benefits in terms of dollars per average Calgary Transit ride.

Congestion cost savings were estimated utilizing half the average wages for the average Calgarian, as is the standard methodology in such studies. Using comparable cities to Calgary, by Transit Fare revenues in 2004 (Miami, Atlanta, San Diego), adjusting for inflation and exchange rates¹⁴ and applying Calgary average wages¹⁵ yields a congestion savings from transit rides in 2012 in Calgary at \$6.90 per transit trip. This is how much both transit riders and non-riders benefit from reduced congestion when someone uses Calgary Transit.

In this study we estimated how much the average Calgary Transit rider values the service. To do this we use the Harford methodology and estimate the total benefit to riders of riding using the area under their demand curve less the amount they paid to ride. Using 2012 data this becomes $\frac{1}{2} * (a + f) * M$.

Where: f = the average fare paid by adult riders (\$2.00 in 2012)

a = the intercept of the demand curve we estimated using the elasticity (n) of our demand model (-0.36)

$$a = f * (-1 - n) = 2 * (1.36)$$

Which yields an estimated average benefit per ride to Calgary Transit riders of \$2.36 (average per adult ride in 2012). Summing over the number of adult rides yields total benefit to Calgary Transit Adult riders of \$146 million per year. To this we add the congestion savings of \$6.20 per transit trip (which accrues to all citizens of Calgary) to yield a total benefit of \$383 million plus \$146 million = \$529 million per year, or \$5.2 per trip taken.

In 2012 Calgary Transit incurred \$320 million in operating costs. Calgary Transit providing 101.9 million rides (5.1 million more than budgeted) the average cost per ride in 2012 was \$3.306 (budget).

¹⁴ Adjusting for inflation first then exchange rates yields \$6.90. Adjusting for exchange rates first then inflation yields \$9.50; because in 2004 the Canadian dollar was worth 2/3 as much as the US dollar. In our view inflation matters but exchange rates shouldn't significantly impact how Calgarians value their time in Calgary, though the reverse would hold during vacation.

¹⁵ Statistics Canada; Average Weekly Earnings, Industrial Aggregate, including overtime All Alberta averaged over 37.5 hour workweek, 2012 average: \$27.15/hr

WHO WE ARE

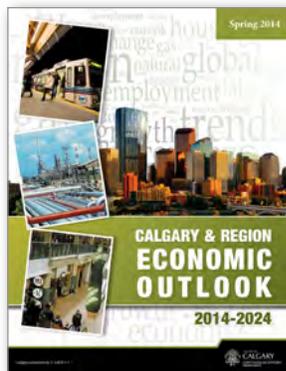
Corporate Economics provides services in four areas: forecasting, information provision, policy analysis and consulting. We also monitor the current economic trends which allows us to develop unique insights on how external events are impacting the local economy and the Municipal government. We are experienced at researching different economic topics and developed reliable methods of forecasting and analysis.

For more information, please contact:

Clyde Pawluk
403.268.2643 or clyde.pawluk@calgary.ca

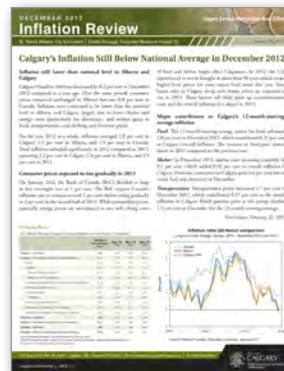
Many of our publications are available on the internet at www.calgary.ca/economy.

Forecasting



- ▶ Calgary & Region Economic Outlook
- ▶ Energy Reports on Natural Gas and Crude Oil

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- ▶ Labour Market Review
- ▶ Inflation Review
- ▶ Current Economic Analysis
- ▶ Construction Inflation

Policy Analysis



- ▶ A Case of Fiscal Imbalance: The Calgary Experience
- ▶ Diesel Fuel Price Pass-Through in Calgary
- ▶ Calgary Residential and Commercial Real Estate Markets

Corporate Research Analyst: Estella Scruggs

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