2018-2028
Canadian Transit Infrastructure Needs

steer

2018-2028
Canadian Transit Infrastructure Needs

―――

Prepared by:

Steer
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada

+1 (647) 260 4860
www.steergroup.com

Prepared for:

Canadian Urban Transit Association
55 York Street #1401
Toronto, ON
M5J 1R7
www.cutaactu.ca

Our ref: 23296201

steer

Contents

Figures

steer

Disclaimer

Professional practices and procedures have been used in the development of these analyses and findings. The projections of transit infrastructure needs contained within this document represent Steer's estimates, and, in our view, a reasonable expectation for the future, based on credible information and resources available as of the date of this study.

Any forecast contained herein is an opinion based on reasonable investigation as to a future event and is inherently subject to uncertainties. Some assumptions used to develop the forecasts may or may not be realized, and unanticipated events and circumstances beyond the control of Steer may occur.

The views and estimates contained within this document are influenced by eternal external drivers and circumstances that can change quickly and can affect transit infrastructure needs in the next decades.

In particular, external factors such as economic and population trends that are seemingly beyond government control and change in policies and political agendas in response to those external factors and new political objectives. Therefore, the future context and parameters (population and ridership growth) may differ to that assumed as the basis of projections contained in this study. The outcome of any external changes, circumstances and responses that differ from current trends could result in differences between forecast and actual results.

No representation or warranty is given by Steer that any forecast contained herein will be achieved.

Our analysis is based, in part, on data collected by third parties (Statistics Canada, transit agencies, and CUTA). Steer does not guarantee the accuracy of these third-party data.

Reliance

This report and these forecasts are developed for the benefit and use of the Canadian Urban Transit Association (CUTA) in line with the terms and conditions established in our contract. No other person or entity may rely upon this without the prior written consent of Steer and CUTA which may be granted or withheld in their sole discretion.

Executive Summary

The 2018 – 2028 Canadian Transit Infrastructure Needs Report (herein the Infrastructure Needs Report) summarizes the results of the biennial survey of CUTA transit systems members. For this year's report, a predictive model was developed and used to forecast investment needs over a longer ten-year period as well as to supplement missing data.

The Infrastructure Needs Survey examines funded and unfunded projects representing the infrastructure investments of Canadian transit systems for expansion and maintenance of a state of good repair. The results also identify the type of infrastructure investment planned and required by member systems.

In addition to survey results and modelled forecasts, the model was used to forecast infrastructure funding that may be required to meet the modal share increase targets developed in bilateral agreements between the Federal government and the provinces under the Public Transit Stream of the *Investing in Canada Infrastructure Plan.*

Total Funding Requirements

Based on survey input and model results, infrastructure funding needs, shown in Figure E-1, amount to $74.9 billion through 2022, more than 25 percent of which, or $19.5 billion, is currently unfunded.

Through 2028, total funding needs, including the amount required to meet agreed modal share increase targets, is $75 billion, of which only about 25 percent is currently funded. Using current growth projections that do not account for the modal share increase targets, 2023-2028 investment needs total $58.4 billion, about one-third of which is currently funded.

Figure E-1: Funded vs. Unfunded Transit Infrastructure Investment, 2018–2022 and 2023-2028
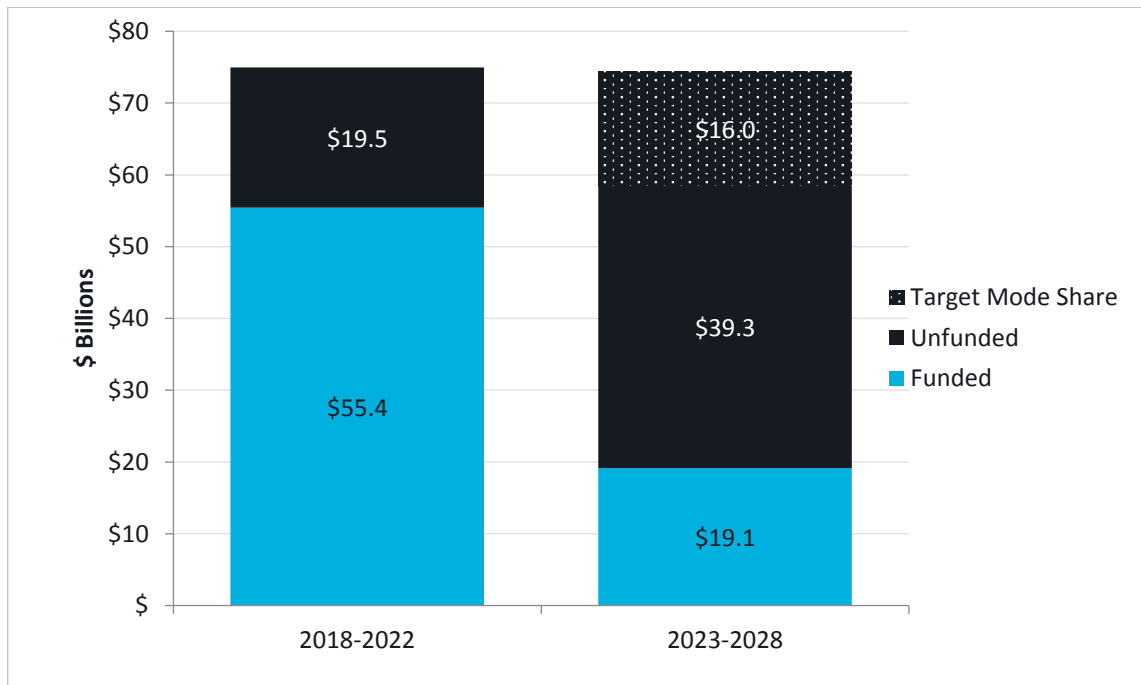
Expansion versus Rehabilitation and Replacement Needs

Figure E-2 shows the breakdown of expansion requirements versus rehabilitation and replacement needs for each of the two five-year periods, as well as the total (excluding the target modal share amount).

Overall, funded expansion projects represent about 38 percent of investment needs, with unfunded expansion projects at about 29 percent. Funded rehabilitation and replacement represent about 19 percent of future needs, with unfunded rehabilitation and replacement at about 14 percent.

In the first five years, expansion projects account for about 65 percent of the total, with replacement and rehabilitation projects the remaining one-third. In these projects, similar portions are funded and unfunded – about two-thirds of each category are funded versus about one-third unfunded.

In the second five years, the ratios are similar, with expansion projects at 70 percent of the total, and rehabilitation and replacement at about 30 percent. As noted, the value of unfunded projects increases over the longer term, as expected, with more than two-thirds of each category unfunded.

Figure E-2: Expansion vs. Rehabilitation and Replacement Needs

2018-2022
17% | 27% | 8% | 48%

2023-2028
9% | 24% | 46% | 21%

2018-2028
19% | 29% | 14% | 38%

- Funded : Rehabilitation and Replacement
- Funded : Expansion
- Unfunded : Rehabilitation and Replacement
- Unfunded : Expansion
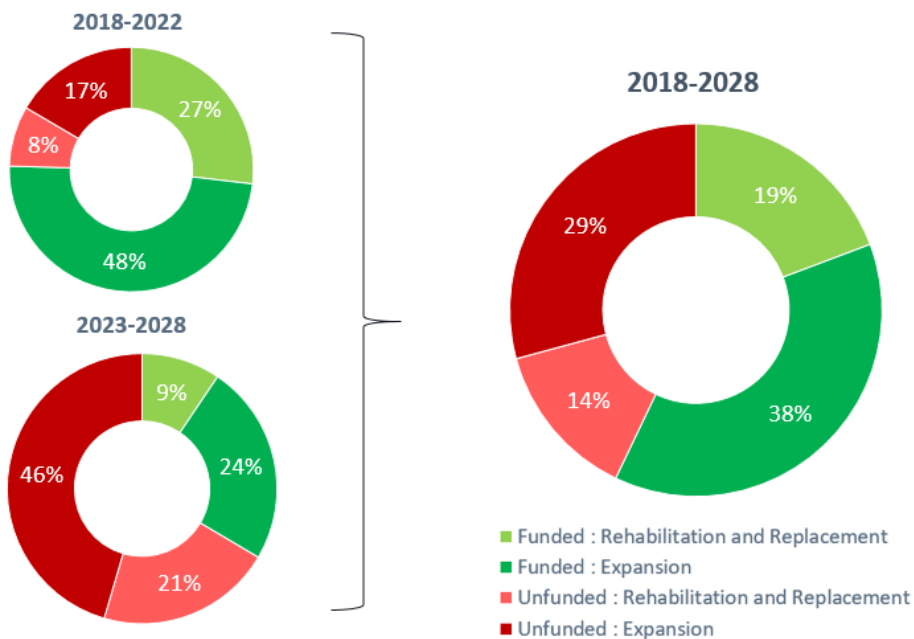
Annual Funding Requirements

Figure E-3 reveals the trend of increasing capital expenditures over time, with similar proportions of funded and unfunded projects. The larger proportion of unfunded needs in the 2023-2028 period reflects the longer-term nature of this forecast.

steer

Beginning about 2008, investment requirements have increased substantially and at the same time, actual expenditures begin to lag behind overall requirements. From 2010, actual expenditures lag behind funded project levels.

Figure E-3 shows the annual pattern of funded versus unfunded requirements identified in the biennial surveys since 1999, along with the actual capital expenditure through 2016.

Figure E-3: Transit Infrastructure Investment, 1999-2028

Taken together these trends highlight the need for increased funding to allow project requirements to be met, as well as more effective funding programs and project delivery mechanisms to ensure that projects proceed according to plan.

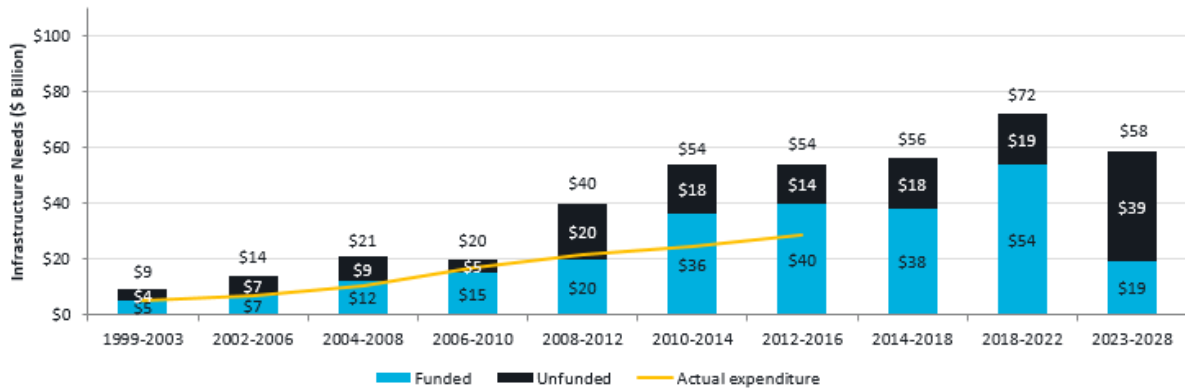It is important to note that the higher proportion of unfunded projects over the longer 10-year term is a function of the timeframe, and that the proportion of funded needs in the 2023-2028 period is expected to increase as more projects are approved. This current higher unfunded proportion reflects the absence of project funding agreements, rather than a lack of potential funding for projects through existing funds. As an example, federal funding for the Green Line expansion in Calgary was announced just prior to the publication of this report, and is still listed as an unfunded need in this research.

Efficient and sustainable public transit plays an important role in keeping Canadian communities among the best places in the world to live, while contributing to clean economic growth. To ensure that transit systems continue to meet their overall mobility objectives, as well as transit modal share and emissions targets, federal, provincial and municipal government as well as the private sector and citizens need to collaborate and find new innovative funding solutions to sustain extensive expansion of transit networks across the country while maintaining the state of good repair in current and future assets.

Additionally, this study does not include transit infrastructure projects that are developed by the private sector. For instance, the Réseau express métropolitain (REM) is excluded from the total transit infrastructure need for 2018-2022. Total cost is estimated at $6.3 billion.

1 Introduction

Over the past several years, all levels of government have embraced transit as a way to manage increasing congestion in Canadian cities, enhance mobility, ensure Canada's economic competitiveness and reduce carbon emissions. As the transit industry works to provide urban mobility solutions for Canadians, it is important to understand the types of investments that transit systems need and the level of investment they are receiving.

The Canadian Urban Transit Association (CUTA) has conducted biennial transit infrastructure needs surveys since 1999, with the most recent survey covering the needs of the industry from 2014-2018. These surveys review the infrastructure needs of CUTA's transit system members across the country in two dimensions: expenditures currently planned versus additional capital investment projects that cannot be met through existing funding; and expenditures for replacement or renewal versus expenditures to respond to population growth or attract new ridership.

Traditionally, these reviews have been completed every two years and cover the following five-year period. For this edition, the survey has been expanded to cover a ten-year period, from 2018 – 2022 and from 2023 – 2028. The survey for the initial five-year period expands on that of previous years. For the first time, survey responses will also be used to predict, as accurately as possible, the scope and demographics of infrastructure needs within Canadian transit systems over the following ten years. Other sources of information including socioeconomic trends, plans and policies were analyzed to develop a forecasting model and draw a complete infrastructure transit needs profile for the next ten years.

The expansion of the period in scope is in line with asset management and sound planning principles that prescribe that the industry looks at its needs over a longer time frame than it has in the past. In fact, new funding from all levels of government has created a need to understand the funded and unfunded needs of the industry over a ten-year window.

This ninth edition presents the latest result of the latest analysis of needs and covers the period 2018-2028.

2   Methodology

Survey Methodology

CUTA replicates the survey methodology to determine the infrastructure needs of the Canadian transit industry over a five-year to ten-year period, thus ensuring consistent reporting and comparison.

Surveys are sent to all CUTA transit systems members, who are asked to provide their budgeted capital infrastructure needs for the next ten years (2018-2028).

The needs are categorized by:

- rehabilitation and replacement;
- expansion in response to population growth;
- infrastructure needs that could be met through existing funding programs; and
- infrastructure needs that could only be met through additional funding.

The infrastructure needs were further categorized by type, including:

- bus purchase or refurbishment;
- other rolling stock — including heavy and light rail vehicles, and support vehicles;
- fixed guideways or rights-of-way;
- maintenance, garage and other facilities or land acquisitions;
- stations or terminals;
- parking facilities — for commuters at stations, terminals or interchanges;
- transit priority measures — infrastructure and technology designed to give transit vehicles priority over other traffic flow;
- customer amenities — including bus stop enhancements, shelters, signage;
- advanced technology — such as automatic vehicle location, advanced fare collection;
- information systems, intelligent transport systems, software and customer information systems; and
- any other infrastructure.

Responses were received from 40 systems representing 87 percent of total Canada-wide transit ridership based on CUTA's 2017 annual statistical report.

Predictive Model Methodology

To draw a complete profile of infrastructure investment in the country over the next decade, a forecasting model was developed to:

- predict infrastructure needs of transit agencies that did not complete the survey for 2018-2022 period; and

- predict infrastructure needs of transit agencies that did not complete the survey or provided partial information for the 2022-2028 period.

A predictive model was developed alongside the survey to estimate the capital investment needs and costs for a ten-year period and supplement missing information from transit systems that did not respond to the survey for the five- and ten-year periods. The model was developed to test various long-term ridership scenarios and their impact on the level of capital investment required at the national level.

This section provides a brief overview of the model development and forecasting processes. Full documentation of this process is included in the separate Model Guide.

The model development process looked to:

- identify a model objective collaboratively with CUTA;
- collect socio-demographic and transit system data for CUTA member systems;
- estimate and calibrate a regression model;
- estimate future parameters;
- forecast capital investment needs;
- develop alternative investment scenarios based on national ridership growth objectives;
- integrate feedback from the steering committee to ensure alignment with CUTA's objectives; and
- integrate feedback from the steering committee to ensure that the model is in line with CUTA's objectives.

The model was developed from the base data received in the survey responses. Data were reviewed, and incomplete responses completed in collaboration with the respondent or based on reasonable assumptions.

Figure 2.1: Forecasting Approach
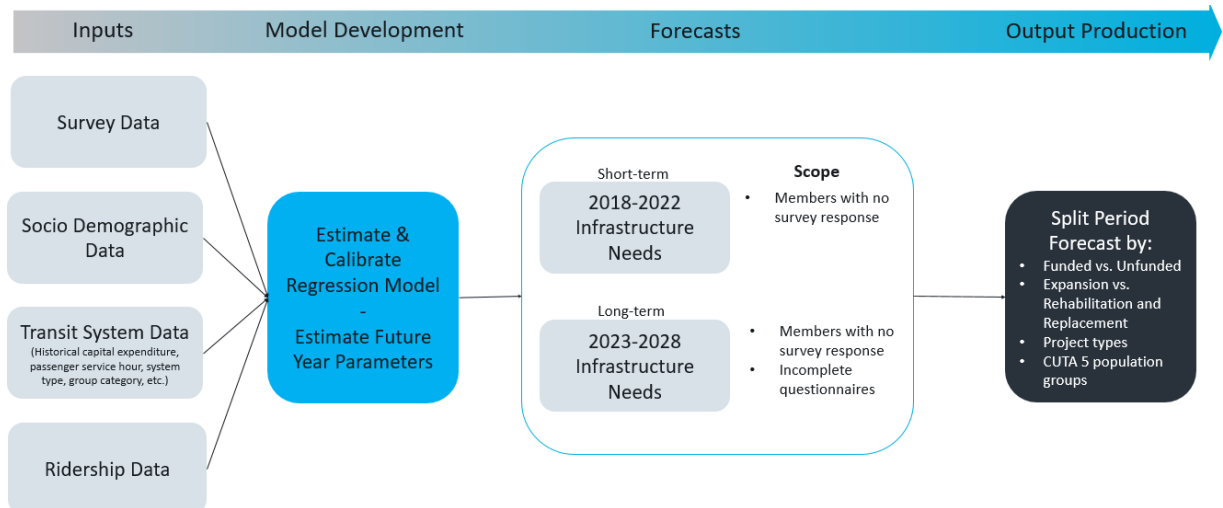
A variety of system data and socio-demographic data was used as independent variables to predict investment requirements, including characteristics such as population, location, system type, historical expenditure data and others.

These independent variables were tested in numerous combinations in a regression analysis process to identify the most suitable variables and associated coefficients. Data from Exo and Metrolinx were excluded from this process, since they represented considerable outliers in the data and would have unduly influenced the regression analysis. In the results, forecasts are developed, then the Exo and Metrolinx data are added to each of the two five-year periods (full ten-year data was available for both agencies' projects).

In this analysis, current population combined with current ridership proved to be the most effective at explaining variation in the observed data. This model equation can be adapted to forecast other five-year periods by estimated future year population and ridership parameters. This makes the model a powerful and simple analytical tool to evaluate future transit infrastructure needs in Canada.

$$\text{Total Infrastructure investment (2018-2022)} = coef_1 * \text{population in 2016} + coef_2 * \text{ridership in 2016} + \text{intercept}$$

This equation was used to test a future scenario where ridership would increase to levels required to meet the modal share increase targets mandated in the federal-provincial agreements for the Public Transit Stream of the *Investing in Canada Infrastructure Plan*.

3   2018-2028 Transit Infrastructure Needs

Status

Funded vs. Unfunded

Canadian transit systems need $133.3 billion in capital investment for the period 2018-2028, $74.9 billion of which is for the 2018-2022 period (Figure 3-1).

The $133.3 billion includes both infrastructure projects for which funding has already been allocated or committed and those that are currently unfunded and can only be completed if additional funding sources were made available. Funded projects makeup $74.5 billion, or 56 percent of the infrastructure needs for the 2018-2028 period. The share of funded project decreases from 74 percent to 33 percent for the 2023-2028 period due to uncertainty regarding the approval of future funding so far into the future. Capital expenditure budgets of most transit agencies, especially smaller ones, cover two to five years ahead.

> Canadian transit systems need more than $133 billion to pursue their unprecended investment in public transit.

Figure 3-1: Estimated Canadian Infrastructure Investment by Period
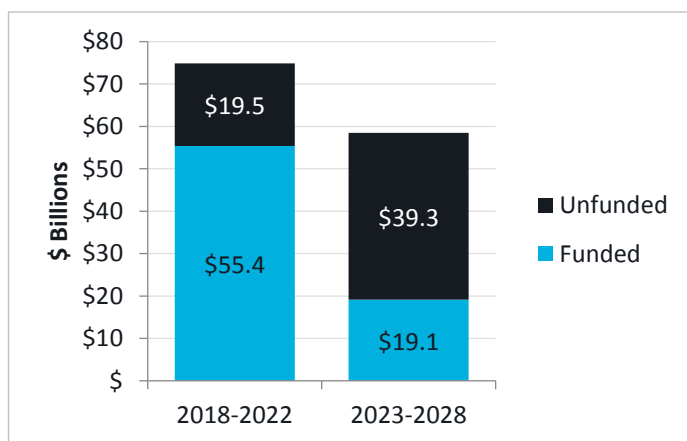
Figure 3-1 shows the breakdown of total Canadian infrastructure investment for the short- and long-term period.

The majority of the transit infrastructure investment remains funded for the 2018-2022 period despite the increase in overall infrastructure investment compared to previous surveys. Transit agencies reported a total need of $56.6 billion in the previous 2014-2018 survey. The share of currently funded infrastructure needs decreases drastically in the long-term. This is reflective of current asset management and planning procedures. Most agencies across the country plan their needs and secure funding within a one- to five-year window.

Infrastructure investments are estimated to be lower in the long-term (2023-2028) for two reasons. First, forecasts of transit infrastructure needs and cost estimates are not always completed for periods beyond five-years. This is particularly true for small systems or systems that are planning transformational projects in the short-term that will fundamentally change services provided in a region. Needs are usually reassessed once those projects are completed. Second, more than $8 billion (around 11 percent of infrastructure needs for 2018-2022) is allocated to GO expansion in the Greater Toronto Hamilton Area. Such transformational projects are currently not forecast to continue at the same rate in the longer term.

It is important to note that the higher proportion of unfunded projects in the longer 10-year term is a function of the timeframe, and that the proportion of funded needs in the 2023-2028 period is expected to increase as more projects are approved. This current higher unfunded proportion reflects the absence of project funding agreements, rather than a lack of potential funding for projects through existing funds. As an example, federal funding for the Green Line expansion in Calgary was announced just prior to publication of this report and is still listed as an unfunded need in this research.

Reasons to Invest in Transit

Both funded and unfunded infrastructure needs include projects for rehabilitation and replacement as well as for network and infrastructure expansion in response to population growth and other factors (Figure 3-2). The primary reason to invest in transit infrastructure is to expand existing networks. More than 65 percent of projects planned in the next decades aim at improving the quality and quantity of transit services in Canada. Share of capital expansion project increases in the long-term (2023-2018) and ratio of fully funded projects decreases:

> In the next decade, efforts are required to identify new funding sources to finance the expansion of existing transit systems in Canada.

- 2018-2022: 64 percent of projects for expansion (47% funded).
- 2023-2028: 67 percent of project for expansion (23% funded).

Figure 3-2 illustrates an increasing need for additional funding for network expansion initiatives which address increasing mobility needs in Canadian communities.

Figure 3-2: Expansion vs. Rehabilitation and Replacement Needs

2018-2022

2023-2028

2018-2028

- ■ Funded : Rehabilitation and Replacement
- ■ Funded : Expansion
- ■ Unfunded : Rehabilitation and Replacement
- ■ Unfunded : Expansion
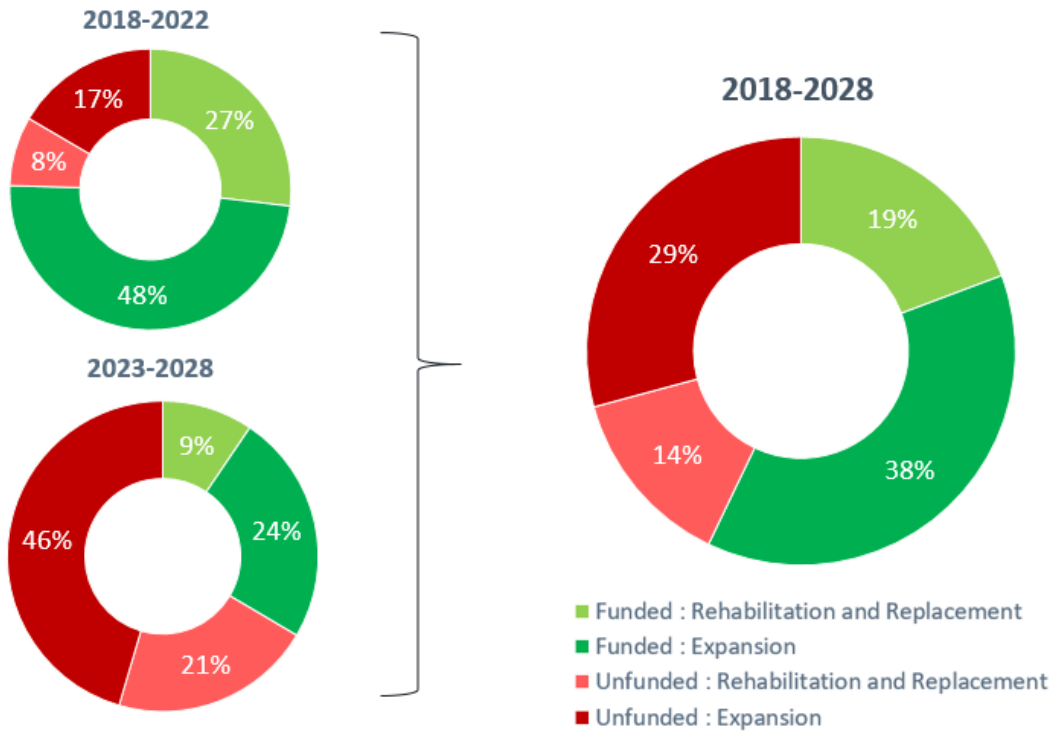
Types of Infrastructure Needs

Overview

Figure 3-3 outlines the breakdown of projects into type of infrastructure.

Figure 3-3: Type of Infrastructure Needs (2018-2028)

Type of Infrastructure Investment	$ in Million
Other infrastructures	1,097
Advanced technology	3,269
Customer amenities	1,006
Transit priority measures	1,159
Parking facilities	505
Stations or terminals	19,447
Maintenance, garage and other facilities	8,165
Fixed guideways or rights-of-way	70,312
Other rolling stock	11,055
Buses purchases or refurbishment	14,671

Fixed guideways represent the highest value component at 54 percent of projected needs. In line with the extension of transit networks, construction of stations or terminals is a priority with 15 percent of the future transit needs being allocated in this category. Note that in most cases cost estimates for fixed guideways include station or terminal construction, rolling stocks purchase customer amenities, implementation of new technological systems and to a certain extent park-and-ride facilities. Bus purchases, replacement or rehabilitation and transit priority measures continue to remain critical priorities for most smaller systems.

Figure 3-4 summarizes type of infrastructures by rehabilitation and replacement projects (total $45.5 billion, or 35%), and expansion projects (total $85.2 billion, or 65%)[1].

- Of the reported $85.2 billion needed for expansion, $39.2 billion, or 46 percent, is part of funded projects. An additional $46 billion, or 54 percent, remains unfunded and additional funding will be necessary for transit systems to complete these projects to accommodate increased transit ridership demands and meet national emission reduction targets.
- Of the reported $45.5 billion needed for rehabilitation and replacement of existing equipment and facilities, $26.2 billion, or 57 percent, is part of funded projects. An addition of $20.4 billion, or 43 percent, remains unfunded. Additional funding will be necessary to maintain the physical condition and quality of existing transit assets in the country.

---

[1] Note that cost estimates of major transit network extensions often aggregate capital expenditures into one program that includes multiple subcategories of expenditures such as customer's amenities, land expropriation, station and park-and-ride facilities, etc. Details of those programs were not provided.

steer

Figure 3-4: Type of Transit Infrastructure investment 2018-2028 (in millions)

	Project type	Funded		Unfunded		Total	
		2018-2022	2022-2028	2018-2022	2022-2028	2018-2022	2022-2028
Expansion	Buses purchases or refurbishment	$404	$1,971	$712	$339	$1,096	$2,205
	Other rolling stock	$416	$97	$2,102	$1,475	$2,507	$1,577
	Fixed guideways or rights-of-way	$5,219	$20,379	$24,851	$8,543	$30,030	$28,547
	Maintenance, garage and other facilities	$560	$636	$2,149	$343	$2,693	$917
	Stations or terminals	$4,447	$3,597	$2,232	$1,060	$6,690	$4,365
	Parking facilities	$36	$20	$218	$222	$254	$242
	Transit priority measures	$450	$251	$190	$125	$642	$372
	Customer amenities	$315	$223	$202	$24	$518	$236
	Advanced technology	$101	$89	$1,083	$585	$1,179	$680
	Other infrastructures	$16	$24	$383	$26	$398	$50
	Total	**$11,965**	**$27,286**	**$34,122**	**$12,742**	**$46,006**	**$39,192**
Rehabilitation and Replacement	Buses purchases or refurbishment	$910	$3,984	$4,076	$2,603	$4,879	$6,491
	Other rolling stock	$2,063	$665	$3,804	$492	$5,811	$1,159
	Fixed guideways or rights-of-way	$364	$4,085	$6,605	$1,218	$6,748	$4,986
	Maintenance, garage and other facilities	$577	$1,389	$2,295	$436	$2,783	$1,772
	Stations or terminals	$1,619	$4,026	$2,649	$275	$4,332	$4,061
	Parking facilities	$1	$2	$5	$1	$6	$3
	Transit priority measures	$38	$60	$28	$14	$75	$70
	Customer amenities	$20	$65	$135	$38	$157	$94
	Advanced technology	$203	$123	$888	$219	$1,063	$346
	Other infrastructures	$89	$148	$274	$142	$359	$290
	Total	**$5,885**	**$14,546**	**$20,760**	**$5,439**	**$26,215**	**$19,273**
	GRAND TOTAL	$17,849	$41,832	$54,882	$18,181	$72,221	$58,465

Figure 3-5 illustrates share of expansion and rehabilitation/replacement needs by project sub-category. Needs are greater in some infrastructure sub-categories than others. New fixed-guideway construction account for the largest share of infrastructure needs for expansion (69%). Conversely, fixed-guideway enhancement only accounts for 26 percent of the rehabilitation needs, a similar proportion (25%) is allocated for the replacement of existing bus fleets across the country. Replacement and rehabilitation of other rolling stocks is also relatively important, but in a lesser proportion (15%).

Figure 3-5: Expansion and Rehabilitation/Replacement Needs by Sub-Categories (2018-2028)
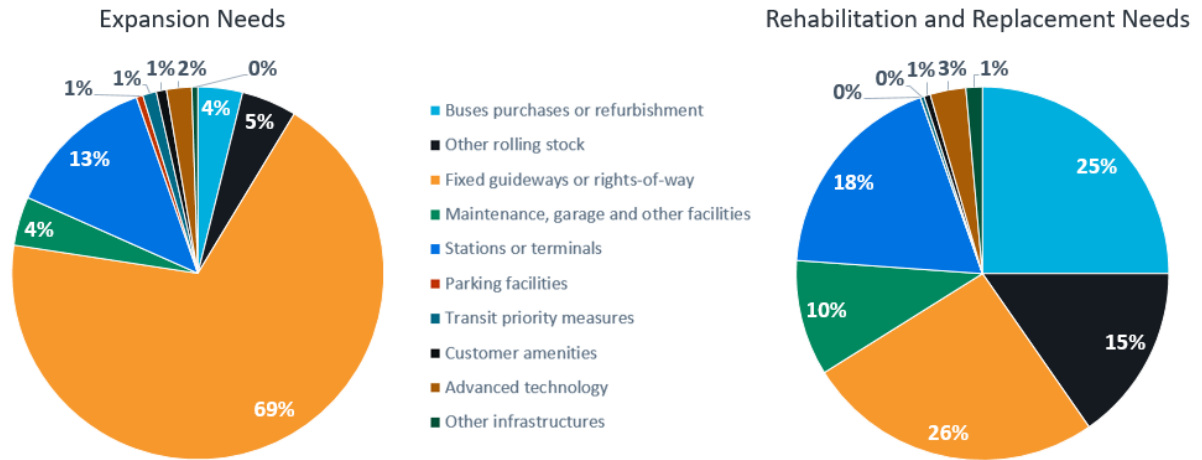
A further breakdown of funded projects shows that fixed-guideway construction or enhancement account for the largest share of currently funded projects at $41.2 billion, or 31 percent, of both funded rehabilitation/replacement and expansion projects. Figure 3-6 presents these shares of funded and unfunded needs by project sub-categories in greater detail for the next decades.

Figure 3-6: Funded and Unfunded Needs by Sub-Categories (2018-2028)

Service Area Population Size and Infrastructure Needs

Canada's three largest metropolitan centres (Toronto, Montréal and Vancouver) report the greatest infrastructure investment needs in Canada, totaling more than $51.6 billion, or 62

percent, of total Canadian investment needs over the next decade (excluding Exo and Metrolinx from the analysis[2].)

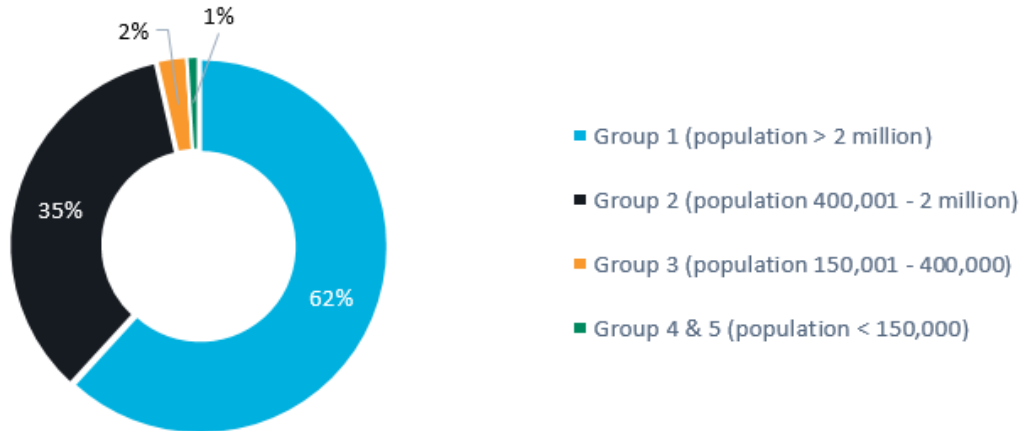Figure 3-7: Transit Infrastructure Needs by Population Group (2018-2028)

Figure 3-8 shows infrastructure investment needs by CUTA's population groups over time using previous survey results. A cyclic pattern of transit infrastructure needs is notable for the two largest population groups. This suggests that transit agencies in larger communities go through a cycle of expansion followed by a period where existing transit infrastructure is maintained (and new projects planned) until expansion of the network becomes necessary again to accommodate for increased demand and new policy targets.

Figure 3-8: Percentage of Infrastructure Needs by Population Group

Population Group	2010-2014	2014-2018	2018-2022	2023-2028	2018-2028
Group 1 (population > 2 million)	77%	56%	70%	52%	62%
Group 2 (population 400,001 – 2 million)	20%	40%	27%	45%	35%
Group 3 (population 150,001 - 400,000)	3%	2%	3%	2%	3%
Group 4 & 5 (population <150,000)	2.0%	1.7%	1.8%	1.1%	1%

The data in Figure 3-8 also illustrate the correlation between population sizes and the value of infrastructure needs. This is in line with the forecasting model developed. When looking at the infrastructure needs by population groups on a per capita basis, the relationship between greater population sizes and transit infrastructure needs continues in the next decades (Figure 3-9.). Transit systems in Population Group 1 will require, on average, almost 140 percent more per resident annually than those in Population Group 2. This discrepancy increases when comparing Population Groups 2 and 3. Figure 3-9 also shows that average annual spending is expected to increase significantly in the next decades compared to what was reported five years ago.

---

[2] Value numbers reported from TransLink, Toronto Transit Commission (TTC) and Société de transport de Montréal (STL). Exo and Metrolinx projected infrastructure spending is not accounted for in this section.

Figure 3-9: Infrastructure Investment Needs per Capita per Year

Population Group	2014-2018	2018-2028
Group 1 (population > 2 million)	$278	$706
Group 2 (population 400,001 - 2 million)	$200	$293
Group 3 (population 150,001 - 400,000)	$9	$75
Group 4 & 5 (population <150,000)	$4.5	$19

Note: 2016 population data were used to calculate 2018-2028 annual average spending per capita.

On average, the infrastructure needs of all transit systems serving communities with fewer than two million residents focus on the expansion of their current operations. The municipalities comprising Toronto, Montréal and Vancouver (members of Group 1) focus primarily on maintaining the quality of existing infrastructure, while regional agencies (Metrolinx, Exo/RTM) focus on expanding and integrating transit network and services in the GTHA and Greater Montréal area respectively. This explains the focus of Toronto and Montréal projects and funding needs on maintaining their existing assets rather than expansion.

Figure 3-10: Type of Infrastructure Needs by Population Group (2018-2028)[3]
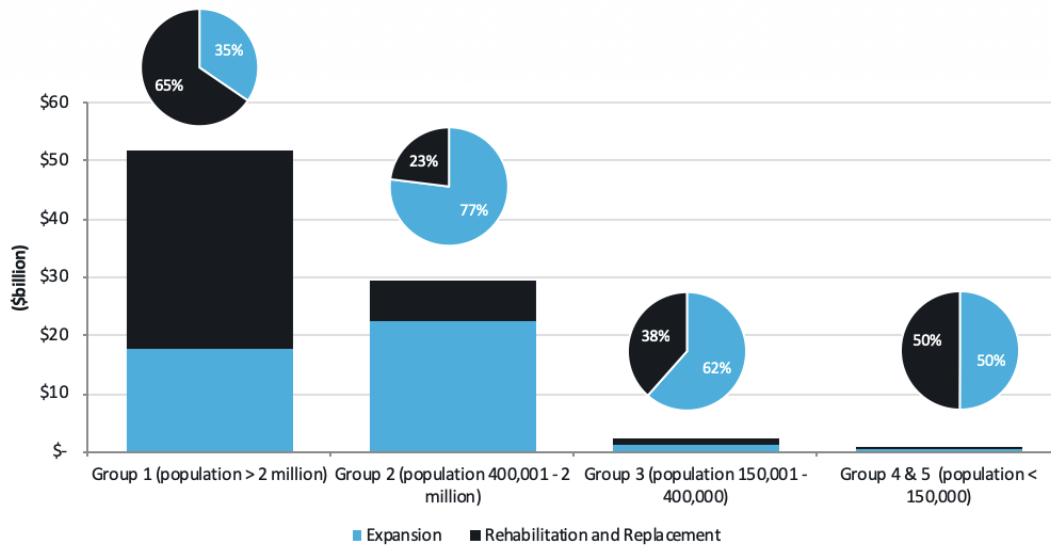
Infrastructure Needs by Province

The following section describes infrastructure needs by province based on assumptions and information readily available. In order, Ontario, Québec and British Columbia are the provinces with the biggest needs for the next decade. Nearly 45 percent of the national transit infrastructure needs are in Ontario, 27 percent in Québec and 14 percent in British Columbia. Together, the Prairies account for more than 13 percent of all needs. The remaining, about one percent, is for

---

[3] Exo/ARTM and Metrolinx projected infrastructure spending is not accounted for in this section as they are serving more than 1 municipality and account for an entire region.

the Maritimes and the Territories. Figure 3-11 presents infrastructure needs for 2018-2028 for each CUTA region and the level of funding estimated to be available according to the member and our analysis. In this data, the Prairies and Territories region reflects the lowest proportion of funded projects[4,5].

Figure 3-11: Infrastructure Investment by CUTA Regions (2018-2028)
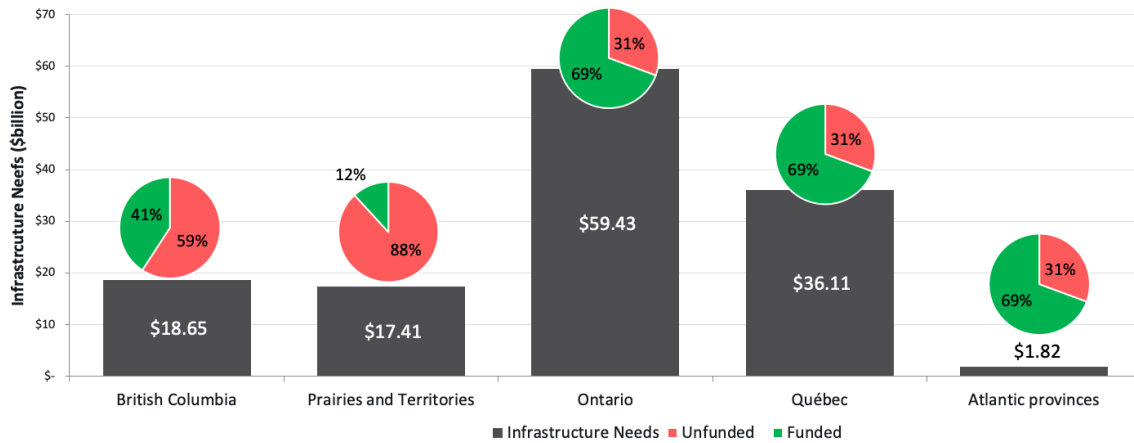
National Trends

*Transit Infrastructure Investment Over Time*

Transit capital investment requirements in Canada have developed over the past decades as federal, provincial and municipal governments increased their investments in public transit, ensuring that people move freely in a highly competitive economic environment while reducing emissions. Figure 3-12 presents the total infrastructure investment needs in five-year increments from 1999 to 2028. Canada's transit infrastructure investment continues to increase from the 1999-2003 baseline, to the current estimate of $72.2 billion for the period 2018-2022. This is reflective of a national effort to expand transit networks across the country particularly in larger centres. While lower in the current forecasts, long-term expected needs are expected to be about the same as the short-term period once closer to 2023.

Figure 3-12 also reflects that actual spending has fallen behind projected needs (even funded needs) as the level of projects has increased. This is examined in more detail in the next section.

---

[4] Funding shares depend on how the transit agencies reported data. Some are more reluctant to report that they will have enough funding as they do not plan more than one or three years ahead. Larger agencies such as Metrolinx plan their capital budget on a longer period.

[5] Recent announcements of federal funding commitments for the Green Line expansion in Calgary will also alter these proportions, as the Green Line project is included as unfunded in this report.

Figure 3-12: Transit Infrastructure Investment (1999-2028)
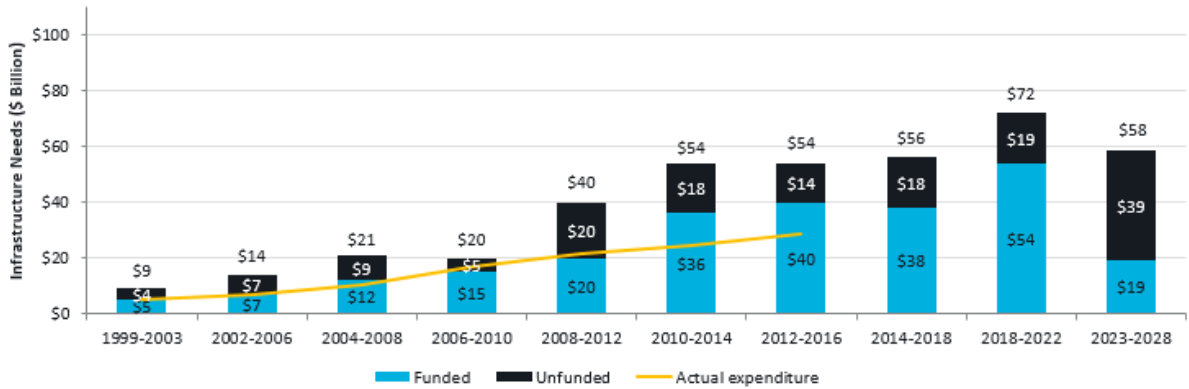
Source: Previous infrastructure Needs Survey and CUTA Fact Book.

The figure also illustrates the proportion of infrastructure needs funded by existing funding programs and those which were unfunded at the time of the surveys and required additional funding. Since 2010, the level of projected infrastructure needs that are not met by existing funding programs has been stable around $18 billion[6].

Government Capital Funding
Government funding of capital transit projects has continued to grow over the past decades, reaching a high averaging about $5.7 billion per year between 2012 and 2016 (with a total of nearly $29 billion for that period). Figure 3-13 shows the historical pattern of government funding, including disbursements from the federal, provincial and municipal levels.

Figure 3-13: Capital Expenditure and Source of Capital Investment (1999-2016)
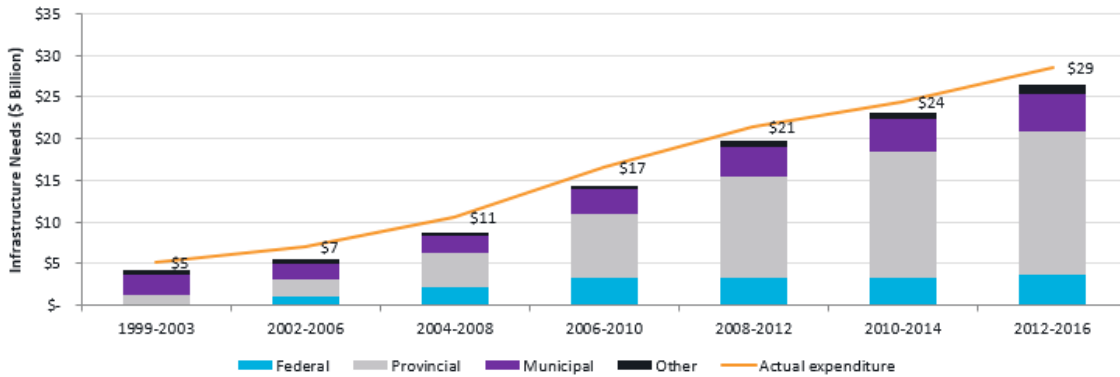
The largest proportion of funding has traditionally come from provincial governments, funding from other alternative sources is also increasing. If the transit capital investment trend continues

---

[6] Except for the 20123-2028 period. This period is too far ahead to be compared to the other one.

to growth at the same rate[7], transit infrastructure needs identified for the next decade will still lack funding.

Increasing Backlog of Transit Infrastructure Project

Reported funded needs in past surveys did not necessarily translate into actual expenditures in the same period (Figure 3-14). Since 2010, major transit agencies across the country appear to have accumulated a backlog of infrastructure projects. Delay in construction projects is a common phenomenon and often a costly problem. The following are among the most significant factors delaying procurement and construction in the public sector:

> The backlog of transit Infrastructure projects is increasing across the country

- delay in preparing technical specification, scope of work or terms of reference;
- failure to start the procurement process on time;
- longer bids process than initially planned;
- delay in contract negotiation;
- delays in release of funds from funding partners;
- poor cashflow management; and
- unexpected construction issues.

Insufficient funding combined with inadequate asset management practices can contribute to increasing the number of transit assets nationwide that are not in a state of good repair. To remedy this situation, efforts must be made to improve long-term infrastructure management while balancing priorities between expansion and rehabilitation needs.

Figure 3-14: Reported Funded Projects vs. Actual Capital Expenditure by Period
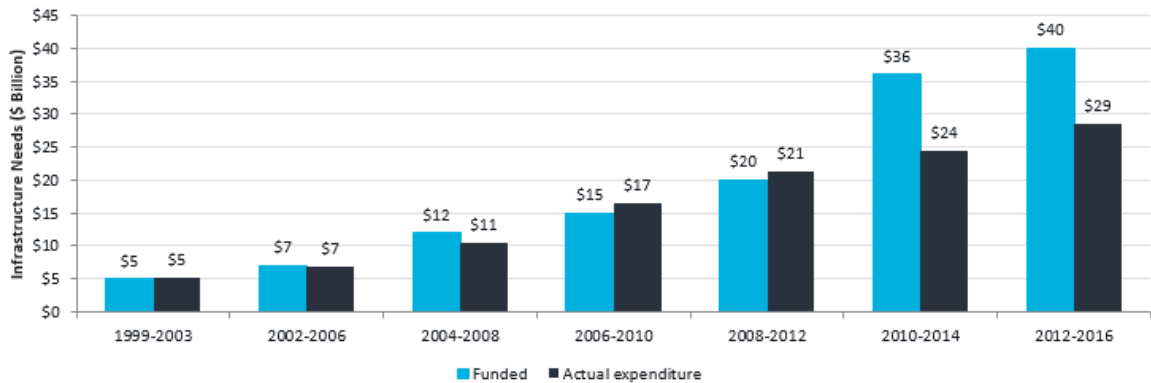
Source: CUTA Fact Book and previous survey.

---

[7] Unprecedented provincial and federal funds have been announced in the recent years. However, level of needs reported is also unprecedented.

Other Needs and Investments

The state of transit infrastructure needs presented here reflects the needs projected by public sector transit agencies as CUTA members. Infrastructure needs from transit agencies that are not members of the organization are not accounted for in the scope of this study (for example, Sherbrooke, Québec).

Additionally, this study does not include transit infrastructure projects that are developed by the private sector. For instance, the Réseau express métropolitain (REM) is excluded from the total transit infrastructure need for 2018-2022. REM is a 67-km light rail rapid transit system under construction in the Greater Montréal area that will link several suburbs with downtown Montréal and the airport. Caisse de dépôt et placement du Québec is responsible for financing the project. Total cost is estimated at $6.3 billion span over five years of construction. New funding arrangements such as CDPQ are likely to become more common if this investment is successful and could represent a new way to finance transit infrastructure.

4   Target Modal Share Scenario

Overview

Results presented in Chapter 3 represent the outcomes if current capital investment, population and ridership trends remain unchanged during the next ten years[8]. This chapter presents an alternative scenario defined to represent the level of transit infrastructure investment required to meet an enhanced future based on achieving ridership performance targets across the country.

Scenario Description and Methodology

Context

The new phase of the *Investing in Canada Infrastructure Plan* will allocate $20.1 billion towards improving the capacity, quality, safety of, and access to public transit infrastructure through the Public Transit Stream. Bilateral agreements have been signed with each province to define the allocation of funding and associated performance measures.

With regards to reporting requirements and targets, the Public Transit Stream is much more comprehensive than any previous transit infrastructure program of the federal government. Targets are set for each province prescribing the increase in transit modal share and active transportation, increasing system coverage and contributing to a national 10 mega-tonne GHG emission reduction.

The target modal share scenario tries to answer this question:

> What is the level of transit infrastructure investment required to meet the modal share targets set in the bilateral agreements?

Results

Overview

This section presents high level infrastructure needs from the target modal share scenario. As described in the methodology, this scenario does not change expected needs for the 2018-2022 period. However, long-term needs are revised to consider ridership required to meet the bilateral targets. Exo and Metrolinx spending is assumed to stay the same as in the baseline since the model cannot forecast needs for these two agencies.

---

[8] This type of scenario based on existing trends are classified as deductive scenario.

Figure 4-1: Content of the Results presented in the Target Modal Share Scenario

Period	Content
Short-term: 2018-2022	Survey responses + EXO + Metrolinx + short-term forecasts from base scenario (central case)
Long-term: 2023-2028	Exo + Metrolinx + long-term forecast from the aspirational scenario

Transit Infrastructure Investment – Target Modal Share Scenario

More than $74 billion in transit infrastructure investment will be required for the 2023-2028 period to meet provincial modal share increase targets. This represents $16 billion more than what is estimated in the baseline scenario. Note that the baseline scenario is a continuation of past infrastructure investment trends.

Figure 4-2: Funded vs. Unfunded Transit Infrastructure investment
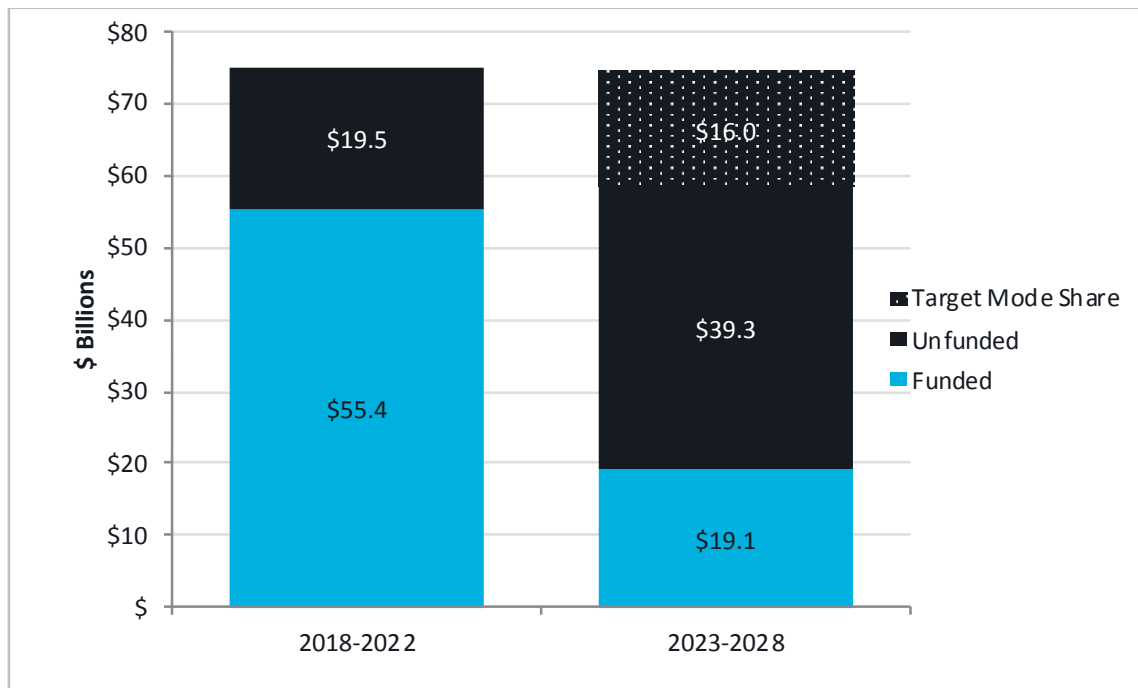
If the reported survey trend stays the same, one could expect that capital expansion projects will remain the most important type of unfunded projects.

Figure 4-3: Expansion vs. Rehabilitation and Replacement Needs (2023-2028) – Target Modal Share Scenario

- Funded : Rehabilitation and Replacement
- Funded : Expansion
- Unfunded : Rehabilitation and Replacement
- Unfunded : Expansion
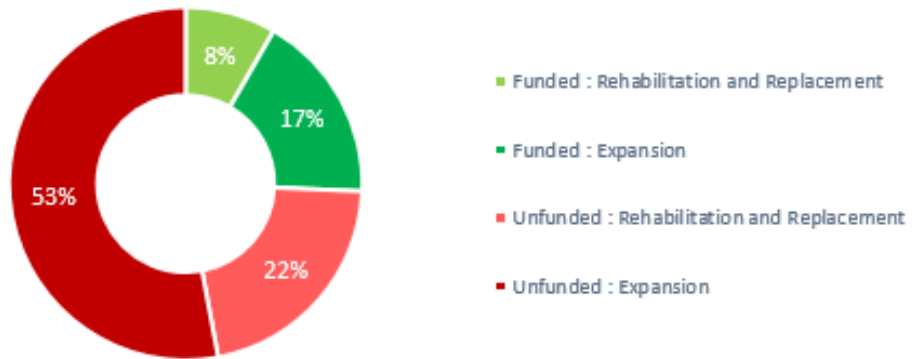
5   Conclusion

Funding Needs

Efficient and sustainable public transit plays an important role in keeping Canadian communities among the best places in the world to live, while contributing to clean economic growth. To ensure that transit systems continue to meet their overall mobility objectives, as well as transit modal share and emissions targets, federal, provincial and municipal government as well as the private sector and citizens need to collaborate and find new innovative funding solutions to sustain extensive expansion of transit networks across the country while maintaining the state of good repair in current and future assets.

This means members working closely with their local decision-makers to develop a strong foundation of understanding of the importance of infrastructure development (and therefore funding), to local mobility, environmental and economic objectives.

It also means member systems working together, in conjunction with CUTA and regional partnerships, to educate federal, provincial-territorial and municipal governments on the importance of infrastructure development and the need for broad investment support to make those projects a reality.

Model Development

In developing forecasts of future infrastructure and investment needs in Canada, the model developed in this process appears to be an effective tool. As with any model, its results depend on the quality of the input data, and CUTA could work with its transit system member agencies to develop more robust ridership forecasting methodologies appropriate to the size of the transit system.

Given the relatively small number of transit agencies in Canada and within each province, it is unlikely that the tool can be developed to give more detailed breakdowns of investment requirements. However, in its current form the key inputs – population growth and ridership growth – could be the subject of more detailed review to develop higher levels of confidence in future forecasts.

Glossary

Term	Definition
Funding Terms	
Capital investment project	Refers to a transit system's acquisition of capital or fixed assets (infrastructure project) such as garages, rail infrastructure, offices, vehicles, etc. that is expected to be used to deliver services over many years.
Project fully funded	Any capital investment project for which sufficient funds have been allocated as per current plans and budgets. The municipality is confident in being able to make all the anticipated payments and cover all costs.
Project contingent on external funding	Any capital investment project for which insufficient funds are allocated for the total estimated cost / Any capital investment project for which no funds have yet been allocated. Completion of the project is contingent to new funding. Project is approved or endorsed.
Potential capital investment project	Reasonably foreseeable projects that your transit system might consider between 2018 and 2028. These projects do not need to be approved or endorsed internally. Some may still be in early development stage. Other projects might simply be long-term projected infrastructure rehabilitation or replacement needs (e.g. new buses to replace old fleet beyond 2025) that you foresee but have not been planned yet. To identify those projects, you can refer to your transportation masterplan or projects identified by mayors or premiers as being a need within your community over the next ten years.
Public Transit share of Integrated Bilateral Agreements	Refers to the public transit share of the Integrated Bilateral Agreements between the provinces and territories and the Federal Government. This fund includes an allocation of $33 billion, of which $20 billion is allocated to transit. Other funding streams include: green infrastructure, community infrastructure and funding for rural and northern communities.
PTIF Phase 2	Public Transit Infrastructure Funds - second phase of funding commencing 2018. Short-term funding from the Federal to help accelerate municipal investments to support the rehabilitation of transit systems, new capital projects, and planning and studies for future transit expansion to foster long-term transit plans.
Infrastructure Types	

steer

Term	Definition
Rehabilitation & Replacement	Rehabilitation and replacement of existing infrastructure
Expansion	Network/infrastructure expansion in response to population growth and or other factors
Project Types	
Bus purchases or refurbishment	Acquisition of new buses or refurbishment of existing buses, for replacement only, including projects to convert existing fleets to alternate fuels.
Other rolling stock – including heavy or light rail vehicles	Acquisition of other vehicles for replacement, such as light rail or heavy rail.
Fixed guideways or rights-of-way	New, upgrading or replacement of existing rail or dedicated bus rights-of-way.
Maintenance facilities	New, upgrading or replacement of garage and equipment maintenance facilities.
Stations or terminals	Construction of new or upgrading existing stations or terminals
Parking facilities – for commuters at stations, terminals or interchanges	Construction of new or upgrade/expansion of existing commuter parking facilities at stations, terminals or interchanges.
Transit priority measures – infrastructure designed to give transit vehicles priority over other traffic flow	Implementation of transit priority measures or improvement of existing ones (e.g. queue jumpers, traffic signal priority, transit-only lanes on existing streets)
Customer amenities – including bus enhancements, shelters, signages, etc.	Acquisition, upgrading or replacement of existing customer amenities.
Advanced technology – such as automatic vehicle location, advanced fare collection and customer information systems	Implementation of advanced technology systems upgrades, such as automatic vehicle location, advanced fare collection and customer information systems.
Other infrastructure	Other infrastructure not include above
Other Terms	
Target Modal Share Scenario	Future forecast scenario where ridership increases are calculated to meet provincial modal share increase targets, based on the agreements signed under the Integrated Bilateral Agreements

steer

Control Information

Prepared by

Steer
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada
+1 (647) 260 4860
www.steergroup.com

Prepared for

Canadian Urban Transit Association
55 York Street #1401
Toronto, ON
M5J 1R7
www.cutaactu.ca

Steer project/proposal number

23296201

Client contract/project number

Author/originator

Myriam Langlois

Reviewer/approver

Dennis Fletcher

Other contributors

Dennis Fletcher

Distribution

Client: Steer:

Version control/issue number V2

Date November 7, 2018

steer