Economic Benefits of TTC
Light Rail Vehicle Contract with Bombardier Transportation

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Submitted to:
Bombardier Transportation

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Table of Contents

Executive Summary

The following highlights the key elements of the contract recently awarded to Bombardier Transportation Canada Inc., by the Toronto Transit Commission (TTC) for the supply of new light rail vehicles (LRVs) that is the subject of this economic analysis. The contract provides for:

- design, development and production of 204 LRV's at the accepted bid price of $993 million (including GST and Ontario Retail Sales Tax) that includes 25% Canadian content;
- manufacture and supply of $13.3 million in spares parts; and,
- vehicles options that can be exercised by the TTC for up to an additional 400 vehicles based substantially on the base contract vehicle design but incorporating some additional and different features as well as higher Canadian content.

For the purpose of this analysis, the following assumptions have been made:

- the first vehicle option of 196 vehicles has been assumed to include 50% Canadian content and a per vehicle price of $5.5 million (excluding taxes) to allow for design changes, required extra features, changes in foreign currency exchange, the increased Canadian content requirement, etc. Based on this assumed price, the option's total value is $1,078 million (excluding taxes); and,
- design, development and production of the base contract, spare parts and first vehicle option are assumed to occur concurrently over ten years.

The key findings of the analysis are as follows:

- **5,700 direct jobs**[1] will be generated by the contract in Canada, of which 5,000 jobs are expected to be located in Ontario and 700 in Quebec. Within Ontario, 4,650 drect jobs are expected to be situated in the Thunder Bay area, where Bombardier's production facility is located, and 350 direct jobs in the Greater Toronto area.
- **Another 14,800 indirect jobs** will be generated by the contract in Canada, of which 10,300 jobs are expected to be located in Ontario and 4,500 in Quebec and Manitoba. Within Ontario, 6,195 indirect jobs are expected to be situated in the Thunder Bay area and 4,105 indirect jobs in the Greater Toronto area.

[1] Person-years or full-time equivalent (FTEs).

- **$1,165 million in wages, salaries and benefits** will be generated by the contract, of which $885 million are expected to paid to Ontario residents and $280 million to Quebecers and Manitobans. Within Ontario, $655 million are expected to be received by Northern Ontario residents and $230 million by residents in the Greater Toronto area.
- **$240 million in Ontario tax revenues** are expected to result from personal income taxes and the Ontario Retail Sales Tax that can offset any capital grant by the province to the City of Toronto.
- **$244 million in federal tax revenues** are expected to result from personal tax revenues that can offset any capital grant by the federal government to the City of Toronto.
- In addition, **$48 million in Quebec personal tax revenues** will be generated and **another $4 million in Manitoba personal tax revenues.**
- **Additional jobs, associated wages, salaries and benefits and tax revenues will result from induced employment** or expenditures by direct and indirect workers and their families that have not been included in the above.

1. INTRODUCTION

On April 26, 2009, the Toronto Transit Commission (TTC) voted unanimously to award a contract to the low bidder, Bombardier Transportation Canada Inc., for the supply of 204 new light rail vehicles (LRVs) to replace its existing aging fleet. The contract award is contingent upon the City of Toronto securing funding for this procurement from the federal and Ontario provincial governments. This decision followed an eight month competitive bidding process based on a Request for Proposals initially issued by the TTC in August 2008. As part of the commercial requirements of the contract, a minimum of 25% Canadian content in the contract value, excluding taxes, was stipulated.

The City of Toronto has approached both the Province of Ontario and the federal government with requests for funding of one-third each of the cost of the LRV contract. At the federal level, this includes an application for funds under the Infrastructure Stimulus Program. To assist in this application as well as to more fully demonstrate the economic benefits of the contract beyond its primary purpose of providing much needed accessibility and other improvements and replacement of Toronto’s aged streetcars, Bombardier Transportation was asked by the City of Toronto if they would commission an independent analysis of employment and economic benefits resulting from the LRV contract.

This report presents the findings from the analysis of employment and economic benefits of the LRV contract to the Greater Toronto area, Province of Ontario as a whole and federally. While Bombardier Transportation has provided basic input data and information needed for this analysis, the data is derived directly from their contract bid, which has been independently reviewed and verified through the bid review process by TTC staff and its consultant, Booz, Allen, Hamilton. Other data, including input-output multipliers, have been derived from Statistics Canada and Revenue Canada. The assumptions, analysis and findings of the report have been independently developed and are those of the authors of this report.

2. METHODOLOGY

The employment and economic benefits examined in this report include:

- direct employment at Bombardier resulting from the LRV design, development and production;
- wages and salaries associated with both direct and indirect employment generated by the LRV design, development and manufacture;
- taxes resulting from wages and salaries paid as well as taxes applied to the contract; and,
- All figures are rounded.

Direct employment and associated wages, salaries and benefits are derived from Bombardier's bid. Indirect employment and associated wages, salaries and benefits are calculated using the most recent economic multipliers developed by Statistics Canada[2] for rolling stock manufacturing within Ontario from their 2005 Input-Output Model (I-O). As these multipliers reflect an industry average and the LRV contracts incorporate higher than average Canadian content, adjustments based on known direct effects were applied to the multipliers to retain the proportional relationship between direct and indirect effects. These adjustments were made in consultation with Statistics Canada's I-O analysis division.

Personal income taxes resulting from wages, salaries and taxable benefits earned as a result of the TTC contract are estimated based on Ontario, Quebec, Manitoba and federal 2009 personal tax rates (See Table 1-1 below).

While TTC is refunded GST payable on the contract, it is subject to Ontario Retail Sales Tax (ORST) that would be charged on this contract and remitted by Bombardier to the province. While other tax benefits will also flow from the contract, such as corporate taxes and municipal taxes, these contributions have not been calculated. In the former case, this is due to complexity and lack of data that would allow separation of the contract's contribution from other business transactions and the corporate financial structure. In the latter case, this is because they form part of the basic cost of doing business and will be the same with or without the contract as long as the plant and its suppliers stay in business.

[2] Statistics Canada, *Provincial Input-Output Multipliers*, 2005; Ontario Railroad Rolling Stock Manufacturing.

TABLE 1-1: FEDERAL AND PROVINCIAL 2009 PERSONAL TAX RATES

Federal		Ontario (1)		Quebec		Manitoba (2)	
Tax Bracket	Tax Rate	Tax Bracket	Tax Rate	Tax Bracket	Tax Rate	Tax Bracket	Tax Rate
Up to $38,832	15%	Up to $$36,848	6.05%	Up to $38,385	16%	Up to $31,000	10.8%
Up to $77,664	22%	Up to $73,698	9.15%	Up to $76,770	20%	Up to $67,000	12.75%
Up to $126,624	26%	$73,698 +	11.16%	$76,771 +	24%	$67,000 +	17.4%
$126,624 +	29%	-	-	-	-	-	-

(1) Ontario's 2009 budget proposes to reduce the lowest tax bracket rate to 5.05% in 2010.
(2) Manitoba proposes to increase the threshold for the lowest tax bracket to $32,000 in 2010 and to $35,000 in 211 and decrease the tax rate to 10.7% and 10.5% respectively. It also proposes to increase the middle bracket income
(3) Threshold to $67,000 in 2010 and $68,000 in 2011.

Source: Canada Revenue Agency, 2009. *http://www.cra-arc.gc.ca/tax/individuals/faq/taxrates*

The study also does not quantify induced economic benefits, or jobs and associated wages, salaries, taxable benefits and tax revenues that will accrue from the expenditure of wages and salaries by direct and indirect workers and their families. The reason for this is that while Statistics Canada data is available on average household expenditures in Ontario, information at the provincial or local level for the Greater Toronto Area for example, on the domestic content of this spending is unavailable and detailed surveys necessary to develop local supply coefficients are beyond the scope of this study. As a result, calculation of what proportion of every dollar spent stays in Ontario and how much leaks out in the form of imports and taxes is impossible.

3. THE LRV CONTRACT

Bombardier's base bid price for the LRV replacement contract is $993 million or $4.9 million per car, including GST and Ontario Retail and Sales Tax (ORST). The contract also includes provision for another $293 million for a new maintenance facility, spare parts, cost escalation and unforeseen changes. Spares account for approximately $13.3 million and have been included in this analysis. Compliance to the 25% Canadian content requirement was documented by Bombardier in its bid and independently reviewed and verified by TTC staff and its consultant, Booz, Allen, Hamilton, during the bid review process.

In addition, the contract includes options that can be exercised by the TTC to purchase up to 400 additional vehicles for the new Etobicoke-Finch West, Sheppard East, Eglinton Cross Town, Jane, Waterfront West, Mississauga Transit, Don Mills and Scarborough Malvern lines. While these additional vehicles will be based substantially on the 204 replacement car design, they require some different features that will add cost, including dual cabs and doors on both sides of the vehicles, and the TTC's design requirements have not yet been finalized. In addition, the contract requires an increased level of Canadian content on the option vehicles. Although no value is stated in the contract, discussions have clearly indicated a desire to increase Canadian content to 50%.

Funding approval for the first vehicle option of 196 vehicles (Etobicoke-Finch West, Sheppard East, and Eglinton Cross Town) is in place, although the exact specifications and hence price for these vehicles has yet to be finalized. For the purpose of this analysis, we have assumed 50% Canadian content and a per vehicle price of $5.5 million per car (excluding taxes) to allow for design changes, required extra features, changes in foreign currency exchange, increased Canadian content requirement, etc. Based on this assumed price, the option's total value is $1,078 million (excluding taxes).

Design, development and production of the base order of 204 vehicles are expected to extend over ten years. While some customer services activities will occur in the three years following vehicle delivery, the number of jobs and associated wages, salaries and benefits are minimal and have been lumped into year 10 as an upfront cost. Given that infrastructure and vehicle funding and scheduled completion of the new lines are in place, this report is predicated on simultaneous production of the first vehicle option on a parallel production line to the base contract order and spares parts. Thus, it is expected to occur over the same ten year period.

4. Economic Benefits from the LRV Replacement Order

4.1 Direct Employment

Direct employment reflects Bombardier's contractual commitment in their bid and the assumed value of the first vehicle option. Over the ten years of vehicle design, development and production, a total of 5,700 person years or full time equivalent (FTEs) jobs will result from the LRV contract. Of this total, approximately 1,700 jobs are associated with the base contract and spare parts order and a further 4,000 jobs from the first vehicle option. However, the actual number of direct jobs and individuals that will benefit from this employment will be more as the actual jobs will include part-time and full-time positions and involve different people at different stages of the manufacturing cycle.

5,000 jobs (FTEs) or 88% of all direct jobs and workers, who fill these positions, will be in Ontario. Approximately 4,650 jobs will be located in Thunder Bay, where the vehicle production facility is located. The remaining 350 jobs will be in the Greater Toronto area, where field testing, customer service, warranty support and some contract management and adminstrative services will occur. In addition to Ontario, another 700 jobs will be supported in Quebec, specifically St Bruno, just outside Montreal, where Bombardier Transportation Canada Inc's head office and engineering and design centre is located along with other procurement, contract management and administrative functions.

The following table illustrates direct employment by contract components and geographic distribution.

Table 4-1: Direct Employment (FTEs)

	GTA (Inc. in Ontario Total)	Ontario	PQ	Total
Base Contract	160	1,400	300	1,700
1st Car Option	190	3,600	400	4,000
Total	**350**	**5,000**	**700**	**5,700**

4.2 Indirect Employment

Indirect employment includes jobs that the contract will generate with Bombardier's suppliers and service companies as well as goods and services suppliers to these industries. Over the course of the contract, a total of 14,800 indirect jobs are estimated to result from the contract. 10,300 of these jobs are anticipated to be situated in Ontario with another 4,500 jobs located in other provinces, primarily in Quebec and to a lesser extent in Manitoba.

Within Ontario, job distribution is assumed to reflect the geographic distribution of suppliers and service providers to Bombardier. Based on previous Bombardier contracts (e.g.TTC T1 subway car order and the base LRV contract supplier plan), about 6,195 jobs are expected to be generated in the Thunder Bay area and 4,105 jobs in Greater Toronto.

As with direct employment, the actual number of jobs and individuals benefiting from this employment will be higher due to part-time work and the different goods and services needed over the production period.

TABLE 4-2: INDIRECT EMPLOYMENT (FTES)

	GTA (INC. IN ONTARIO TOTAL)	ONTARIO	PQ & MANITOBA	TOTAL
BASE CONTRACT	1,200	3,000	1,300	**4,300**
1ST CAR OPTION	2,905	7,300	3,200	**10,500**
TOTAL	**4,105**	**10,300**	**4,500**	**14,800**

4.3 Wages, Salaries and Benefits

Wages, salaries and benefits resulting from both direct and indirect employment associated with the LRV contract is expected to total almost $1.2 billion in wages, salaries and benefits from the base contract and the first vehicle option over the ten years. Approximately $885 million are expected to be received by Ontario residents, $260 million by Quebecers and $23 million by Manitobans. Within Ontario, $655 million is expected to be received by workers in the Thunder Bay area and $230 million by Greater Toronto residents.

The following table shows a breakdown of expected wages, salaries and benefits that are expected to be received by direct and indirect workers as a result of the base contract and first car option.

As with employment, these figures are understated and in reality will be higher as the economic impact of wages and salaries resulting from induced employment are not taken into account.

TABLE 4-3: WAGES, SALARIES & BENEFITS FROM DIRECT & INDIRECT EMPLOYMENT ($ MILLIONS)

	GTA (INC. IN ONTARIO TOTAL)	ONTARIO	PQ & MANITOBA	TOTAL
BASE CONTRACT	$70	$245	$90	**$335**
1ST CAR OPTION	$160	$640	$190	**$830**
TOTAL	**$230**	**$885**	**$280**	**$1,165**

4.4 Induced Employment

In addition to direct and indirect employment, the contract will result in additional jobs through induced employment resulting from the expenditure of wages, salaries and benefits by direct and indirect workers. According to Statistics Canada, Canadians spend 75.7% of their earned income on goods and services. These expenditures in turn support additional employment in a variety of sectors. As a consequence, the total number of direct and indirect jobs and associated wages, salaries and benefits resulting from the contract are understated.

4.5 Tax Revenues

Ontario personal taxes that will result from wages, salaries and taxable benefits earned from direct and indirect jobs supported by the contract are estimated based on an assumption that the majority (80 percent) of workers will fall into the middle tax bracket with taxable incomes of between $36,848 and $73,698. This assumption is based on the average wage rate of Bombardier plant employees, who represent the majority of employees supported by the contract. In addition, 15 percent are estimated to fall into the highest tax bracket with incomes over $73,698 to take into account managers, supervisors and others earning higher salaries and 5 percent in the lowest tax bracket with incomes under $36,848 to account for part-time and lower income earners. In addition to personal taxes, the contract will be subject to Ontario Retail Sales Tax.

Based on the above assumptions, the contract is expected to return over $83 million in personal income taxes to the province of Ontario over the contract period, with additional revenues resulting from induced employment income. In addition, it would receive $158 million in Ontario Retail Sales Tax. Thus, in total, the contract would yield $240 in tax revenues to the province. These revenues will benefit the province by being recycled back into the provincial economy and serve to partly offset any capital grants the province chooses to make to the City.

Federal personal taxes will also result from the wages, salaries and taxable benefits of direct and indirect workers in Ontario as well as the other provinces (primarily Manitoba and Quebec). Federal tax revenues are estimated using wage, salaries and benefits derived from the Statistics Canada multipliers for both direct and indirect employees assuming a similar tax bracket distribution to that used for Ontario. However, federal tax rates include a fourth tax bracket at the highest level and have slightly higher income thresholds than Ontario at the first two levels.

It was assumed that 80 percent would fall into the second federal tax bracket applied to incomes between $38,832 and $77,664, which is comparable to the middle Ontario's middle tax bracket. 5 percent are assumed to fall into the lowest tax bracket (under $38,832), 10 percent at the first level of the highest tax bracket (between $77,664 and $126,624) and 5 percent at the very highest level ($126,624 plus).

Based on the above assumptions, the contract is expected to generate $244 million in personal income tax revenues for the federal government, again with additional revenues accrued from induced employment income. Like Ontario, these tax revenues positively benefit the country as they recycle back into the economy and again partly offset any federal capital grants to the TTC.

In addition to the above, Quebec and Manitoba are expected to receive $48 million and $4 million respectively from personal income tax resulting from wages, salaries and benefits earned by their residents.

TABLE 4-4: TAX REVENUES ($ MILLIONS)

	ONTARIO	QUEBEC	MANITOBA	FEDERAL
Personal Taxes	$83	$48	$4	$244
Sales Tax	$158	-	-	-
Total	**$240**	**$48**	**$4**	**$244**

5. CONCLUSIONS

In summary, the LRV contract is expected to support 5,700 person-years of direct employment and 14,800 person-years of indirect employment over ten years. Approximately 16,045 of these jobs will be located in the Thunder Bay area, adding well-paying job opportunities to the local market, which has been suffering from job and population loss in recent years. The remaining jobs in Ontario (4,455 FTEs) supported by the contract are expected to be in Greater Toronto area, bolstering a wide range of supplier and service industries reliant on the hard hit manufacturing sector. In addition, induced employment and wages, salaries and benefits will also result from household and personal expenditures by direct and indirect workers in both regions of the province.

TABLE 5-1: SUMMARY OF BENEFITS TO ONTARIO & CANADA

TYPE OF BENEFIT	BENEFITS
Direct & Indirect Employment	20,500 person years
Wages, Salaries & Taxable Benefits	$1,165 million
Ontario Tax Revenues	$240 million
Federal Tax Revenues	$244 million

Direct and indirect employment supported by the contract is estimated to generate approximately $1,165 million in wages, salaries and benefits in Canada. $885 million are expected to be paid within Ontario over the contract period, and this excludes employment income associated with induced employment. The infusion of an estimated $655 million of these earnings into the Thunder Bay area and $230 million in Greater Toronto will provide a welcome boost to Ontario's presently hard-hit manufacturing sector.

Ontario will also benefit an estimated $240 million in personal income tax revenues resulting from direct and indirect employment income earned and Ontario Retail Sales Tax paid on the contract, with additional tax revenues expected from induced employment income. The recycling of these monies into the Ontario economy is a significant advantage and will also at least partly offset a capital grants by the province to the City of Toronto. The federal government will also benefits from an estimated $244 million in personal tax revenues, again partly offsetting any capital grants they may make.

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Shirocca Consulting is an independent consulting practice founded on the experience and expertise of its two principals Teresa Watts and Glen Leicester. Established in 1998, the firm offers strategic advice and consulting services in project development, project management, planning and economic evaluation in the fields of transportation, land development and resource management. Shirocca's expertise in transit includes more than 35 years of involvement in planning, operations and management, including governance and organizational structures for new agencies and negotiation of a wide variety of operating, cost sharing and funding agreements involving multiple partners.

Since its inception, the firm has completed a wide range of projects both in Canada and the US. Its clients include:

- Auditor General of British Columbia,
- Bombardier Transportation,
- City of Edmonton, AB,
- City of Ottawa, ON,
- Columbia Power Corporation,
- Institute of Chartered Accountants of British Columbia,
- Institute of Chartered Accountants of Saskatchewan,
- Institute of Chartered Accountants of Manitoba,
- Province of British Columbia, Rapid Transit 2000 Project,
- Siemens Canada,
- Southern Railway,
- State of Alaska,
- Suncor,
- Town of Banff, AB,
- Town Of Canmore, AB,
- TransLink (Greater Vancouver's transportation authority),
- University of Alaska Fairbanks
- Van Horne Institute

The firm offers its services both independently and in association with other specialized senior professionals with whom it has on-going alliances as well as part of consortiums with major consulting firms.

Teresa Watts - Principal

Teresa Watts is a project manager, planner and economist with over 34 years of professional experience in Canada, the US and internationally. During the course of her career, she has led and participated in a wide variety of feasibility, planning, design, construction and implementation projects in transportation, land development and resource management.

Prior to establishing Shirocca Consulting in 1998, Teresa served for three years as Vice-President of Delcan Corporation, one of Canada's most respected civil engineering firms, and headed a planning and socio-economic/environmental subsidiary company of Delcan for 8 years that she founded in 1989.

In recent years, her professional activities have increasingly focused on project management and providing strategic and technical advice and review of major projects for senior management, boards and oversight agencies, such as the Auditor General of British Columbia.

Her most recent major project roles include: Project Manager for the $1.7 to 3.4 billion Calgary-Edmonton High Speed Rail Pre-Feasibility Study; Deputy Project Director for Vancouver's $1.2 billion rapid transit project; and, Manager, Design and Strategic Planning for the $200 million West Coast Express commuter rail project. The latter two projects are two of British Columbia's largest infrastructure projects and were both completed in record time and under budget. She was awarded the Professional of the Year in 2000 for her work by the Institute of Transportation Engineers.

Marlyn Chisholm - Associate

Marlyn Chisholm has a Master Degree in Economics from the University of British Columbia and over 22 years of experience working for public and private sector clients. She has successfully undertaken many economic, social and market assessments in a variety of industries, including transportation, forestry, tourism, hydro-electric energy, and civil projects. Her projects have included regional economic and tourism strategies that often deal with transportation issues; also economic impact, market, benefit-cost, and feasibility assessments.