



Overview of TransDec Model Use in CSIF Funding

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1.0 Overview of TransDec Model Use in CSIF Funding

The TransDec model is used by the federal government to measure costs and benefits of a project, compared to not building it and remaining with the status quo. In this case, the current Viva Phase 1 was considered to be the base condition. The future condition was the Y1 Project, BRT operating in dedicated busways on Yonge Street between Finch Terminal and the Richmond Hill Centre. The analysis considered many factors based on prescribed terms from Transport Canada. These factors include actual operating data, model forecasts, and cost estimates and are outlined below.

1.1 General Assumptions

The TransDec analysis uses a timeline for investment, commencement of service, and underlying financial conditions. For this analysis, a period of analysis of 25 years has been assumed commencing in 2006 when the initial investment in the project occurs through to 2031, with 2009 representing the opening year of service. A discount rate of 10% and an inflation rate of 2% is matched to this period in the model and required by Transport Canada.

1.2 Factors in the TransDec Model

The model measures the change in several travel characteristics in a before and after manner, that is, with and without the Y1 Project. These include transit ridership and, transit travel time in peak and non-peak hours, set against highway travel time and highway user costs in the same periods.

The predictions of how people decide to travel are based on observed data and predicted future levels, such as fare levels and automobile costs. Some of these are given already in the TransDec model; others are supplied by local sources and our own models.

Other factors in assessing benefits and costs are secondary to these primary choice variables. These are given for the most part within the TransDec model. They include positive and negative environmental impacts, social mobility factors, accessibility benefits, and livable community benefits. Estimates of the cost of completing the project, derived from local sources, are then compared in the before and after conditions.

1.3 Results

Model outputs have shown that the benefits are significantly greater than the costs of the project and would justify the investment of the costs to reap those benefits. This is one major impulse to the decision of senior governments to join York Region in funding the Y1 Project. A summary of these benefits, compared to project costs is shown in the table below. This table of TransDec model results was a vital part of York Region's successful application for CSIF funding.

Table 1 – TransDec Model Outputs

Primary Evaluation Criteria	
Net Present Value, \$M	388.87
Benefit Cost Ratio	2.06
Internal Rate of Return, %	30.98
First Year Benefit Cost Ratio, %	33.97
Payback Period, years	3.86

Present Value of Benefits	
Economic Value of Transit to Low Income People, PV \$M	36.33
Spending Effect on Social Services, PV \$M	3.82
Total Community Development Benefits, PV \$M	-
Residential Development Benefits, PV \$M	-
Commercial Development Benefits, PV \$M	-
Travel Time Savings, PV \$M	669.60
Vehicle Operating Cost Savings, PV \$M	12.49
CAC Emission Cost Savings, PV \$M	0.29
GHG Emission Cost Savings, PV \$M	1.83
Accident Cost Savings, PV \$M	33.02
Total Travel Cost Savings, PV \$M	717.23
Total Project Benefits, PV \$M	757.38

Project Costs	
Total Project Cost in Constant Dollars, \$M	813.69
Total Capital Cost in Constant Dollars, \$M	394.75
Total OM Cost in Constant Dollars, \$M	418.94
Present Value of Total Costs, PV \$M	368.51

2.0 Further Details of the Major Factors

This section provides additional technical discussion of the factors that were used in the TransDec model for the York Region application.

2.1 Ridership Projections

Daily ridership projections and growth rates were established for each condition using the Region's emme2 model for 2011 and 2031 horizon years. In this situation, ridership is defined as the number of transit trips occurring within 2 km of the defined corridors of the project.

Ridership growth for the project is defined as the difference in the percentage of trips diverting from auto, bus, and taxi under today's conditions but in the future, as compared with conditions with the Y1 service in place. In this case there would be no net diversion from transit trips as they are included in the opening year ridership for both cases. The incremental growth in ridership is effectively entirely from auto and to a lesser extent, taxis.

The percentage of ridership in peak time, measures the % of ridership in both peak periods compared to the daily total. This value is based on existing Viva ridership data.

2.2 Transit Travel Time

These assumptions are based on both emme2 model results and default assumptions within the TransDec model. The values of time associated with the various conditions were generally assumed to be at the upper end of the range provided in TransDec to reflect the higher costs of living in the G.T.A. compared to other parts of the country.

2.3 Highway Travel Time

Highway travel times and growth rates were also established through the Region's emme2 model for 2011 and 2031 horizon years. Vehicle Kilometers Traveled are measured for the trips occurring within 2 km of the proposed transit corridors.

2.4 Highway User Costs

Highway User costs were generally established based on the default values provided in the TransDec model. These values appear to be somewhat dated as they seem to be expressed in \$1997, however the exact origin of specific values remain unclear and these defaults provide a conservative estimate for these values. The exception to this assumption is the fuel cost, which has been adjusted to \$0.80/litre to more accurately reflect present day conditions.

2.5 Environmental Costs

The environmental cost assumptions were also left as the default values provided within the model which seems to adequately approximate the costs associated with the various environmental concerns, and reflect a conservative approach to the analysis.

Population growth over the analysis period was based on region wide projections for the same time period through to 2031. The bus fleet composition was also assumed to be fairly conservative, with the BRT vehicle fleet being at least partially composed of hybrid fuel technology.

2.6 Affordable Mobility

Affordable Mobility assumptions were established through a number of sources. Average transit fares, parking costs, and taxi fares are based on actual conditions within the Region.

2.7 Cross-Sector Benefits

These benefits are primarily based on the default values within the TransDec model, with the exception of the percentage of trips for work purposes based on results from the Region's emme2 model.

2.8 Project Costs

This cost schedule represents a best estimate of the costs, reflective of the overall scope of the project over the period of analysis. These costs include capital costs associated with any property acquisition requirements, construction of running-ways and stations, design and engineering, as well as the incremental vehicle and O&M costs required for the project over the current Viva Phase 1 system through the period of analysis.