

Method of Calculating Economic Impact Using a Discounted Cost-Benefit Analysis. Regional Connector

Based off of the information that was gathered and several assumptions, the Fort Worth Street Car Segment will add \$2,956,006 to the economy annually once complete and add 32 jobs. The Dallas Segment will add \$3,483,137 and 38 jobs to the economy once complete. The total project will create 70 new jobs and add \$6,439,143 worth of economic activity once complete. During construction, the project will add \$127.1 million in economic activity and 921 jobs to the nation during each of the two years of construction.

$$W_t = B_t - C_t$$

$$J = W_t / Y$$

$$B_t = (CO_2 * Z) + (G_t * M_G) + (Pass_M * M_T) + (Pass_T * V_T)$$

$$C_t = \frac{PV(1+r)^t * r}{(1+r)^t - 1}$$

W_t = Net effect

B_t = Benefits

C_t = Costs

G_t = Government Spending

M_G = Multiplier for Construction

M_T = Multiplier for Transit Miles

r = Interest Rate

t = time

Y = Economic output per job.

J = Total jobs created

PV = Present Value

V_T = Value placed on transit

B_t = Benefits used available data on benefits to core economic activities (excluding real estate). Consideration has been given to the economic benefit of hours saved and pollution reduction. The net benefit is \$15,142,475 in 2030.

C_t = Costs are based on the total cost of the project (PV) from all sources of \$189.2 million. The total cost includes \$81.2 million to build bridges that are required for a flood control project that involves building bridges over a new river channel. Since the benefits of this portion of the project is flood related and outside the scope of the model, it has been excluded from the long term cost. The remaining \$108 million in costs have been annualized to match benefits. The amortized cost is \$8,703,332 annually once built.

G_t = Government Spending is the amount spent on actual construction and related costs that occurs in any given period. This excludes right of way costs of \$19.7 million. The total cost is \$169.5 million with \$60 for the Fort Worth Streetcar, \$48 million for the Oak Cliff (Dallas) Streetcar, and \$61.5 million for the Fort Worth bridges.

M_G = this is the multiplier applied to construction spending. It is a made up number assumed to be 1.5, within the range provided by the Congressional Budget Office for infrastructure projects is 1.0 to 2.5.

M_T = Multiplier for Transit Miles represents the escalating value of using transit for 1 additional mile. According to AAA, the cost of operating a vehicle for 1 mile is \$0.52. This number was then divided by the average occupancy of a passenger vehicle of 1.2 to get 0.43.

CO_2 = Carbon Dioxide reduced. NCTCOG found this at 0.903 tons per day for the Fort Worth Streetcar and 1.26 tons per day for the Dallas Streetcar. I then multiplied by 250 to get an annual total. This model did not take into account possible delays caused by streetcars stopping on streets.

$Pass_M$ = Passenger Miles are expected to be 2,988 miles for Fort Worth and 2,818 miles for Dallas available for this project. Both routes we assumed that passengers would ride for half of a mile. Fort Worth should see 747,000 passenger miles a year, while Dallas will get 704,500 passenger miles.

$Pass_T$ = Total Passengers using the streetcars each day is 11,612 in 2030. The number has been multiplied by 250 to get 2,903,000 passengers a year. Fort Worth will have 1,494,000 annually or 5,976 passengers daily, and Dallas will have 1,409,000 annually or 5,636 passengers daily by 2030.

PV = Total cost of the project in today's dollars is \$189,200,000, though we used \$108 million in the model after excluding \$81.2 million for the bridges.

r = the interest rate in this model is set at 7% as required in TIGER grant application.

t = Time is the number of years that will be used to price the project out over. The model is set at 30 years.

V_T = Value placed on transit is the base value for a single person using mass transit. This represents the base value per trip for expenses avoid like parking or cab fare. Parking rates range from \$20 for Dallas Stars games, to \$14 at DFW Airport, to \$5 for surface parking in downtown Dallas. The value in the model is set at \$5.

Y = Economic output per job was found by the White House Council of Economic Advisors to be \$92,000 per job.

Z = the cost of 1 ton of Carbon Dioxide set at \$33. This number is set by the TIGER grant application requirements.

NCTCOG Presentation

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TxDOT Fort Worth's website for DFW Connector Project

http://ftp.dot.state.tx.us/pub/txdot-info/ftw/dfw_connector/fact_sheet.pdf

Texas Transportation Institute at Texas A&M Study on Traffic Congestion

http://tti.tamu.edu/infofor/media/archive.htm?news_id=5206