



Transit X, LLC offers a concept proposal for

Monterrey, Mexico

For a privately-funded mobility service that is

High Capacity • Automated • Wait-free
Solar powered • Final destination • Resilient





Economics for Monterrey, Mexico

Inputs are underlined.

Size of region	<u>970</u> km²	
Number of people in region (residents + visitors)	<u>1,130,960</u>	
Travel distance per year by all people (residents and visitors)	16,398,920,000 km	10,185,664,596 mi
Percentage of all travel that occurs within the region	<u>90%</u>	
Region's area that is conveniently served by paved roads	<u>70%</u>	
Area to serve	<u>679</u> km²	
Desired coverage (percent of people convenient to Transit X)	<u>55%</u>	
Estimate #1 for network length based on desired coverage	<u>457</u> km	
Length of paved roads (non-highway) in region	<u>1,698</u> km	
Estimate #2 for network length based on paved roadways	<u>467</u> km	
Transit X network length	467 km	
Total fixed costs for Transit X	\$1,085,339,063	
...per person	\$959.66	
Mode share of travel on Transit X	<u>47%</u>	
Distance traveled on Transit X, per year	6,899,845,590 km	4,285,618,379 mi
...per day	18,903,687 km	11,741,420 mi
Daily number of people riding Transit X	<u>528,724</u>	
Distance per Transit X customer per day	<u>36</u> km	<u>22.2</u> mi
Average trip distance	<u>12</u> km	
Cost for an average trip	\$3.35	59.33 Mexican Peso
Distance traveled during peak hour	1,890,369 km	1,174,142 mi
Number of pods needed to meet peak demand	16,409 pods	
Pod shed parking volume	586 standard 53' trailers	
Cost of pods	\$82,045,000	
Cost of pods per person	\$73	
Milage per year per pod	420,492 km	
Revenue per pod per year	\$118,263	Mexican Peso
Yearly payment to municipality for RoW	\$100,148,718	1,772,632,311 Mexican Peso

System Economics

Total system cost	\$1,167,384,063	20,662,697,906 Mexican Peso
OPEX (O&M Costs)	\$81,716,884	1,446,388,853 Mexican Peso
Equity	\$583,692,031	10,331,348,953 Mexican Peso
Financed	\$583,692,031	10,331,348,953 Mexican Peso
Revenue from fares	\$1,940,581,572	34,348,293,828 Mexican Peso
EBITA (Profit)	\$1,858,864,688	32,901,904,974 Mexican Peso
Debt service	\$75,879,964	1,343,075,364 Mexican Peso
OPEX + Debt service	\$157,596,848	2,789,464,217 Mexican Peso
Net income	\$1,782,984,724	31,558,829,610 Mexican Peso
Operating Margin	<u>96%</u>	
One-time fixed costs (per person)	\$1,032	18,270 Mexican Peso
Operating costs (per passenger-km)	\$0.02	0.40 Mexican Peso
Equivalent number of cars taken off the road	475,851 cars	
Yearly cost of cars removed (per person)	\$3,787	67,025 Mexican Peso
Breakeven revenue distance per day	1,535,190 km	953,534 mi
Breakeven (people riding daily)	42,938 people	
IRR (Internal rate of return)	153%	
Payback period (profits pays back equity)	4 months	
Network capacity (number of pods)	13,917 pods	
Peak demand as % of maximum track capacity	118%	

Externalities (estimated)

Reduction in CO2 emissions	817,631,702 kg CO ₂	
Public cost for maintaining roadways per year	\$86,572,500	1,532,333,250 Mexican Peso
Reduced waste products per year	44,611,071 kg	
Travel time saved (hours per person per year)	634	
Cost savings per household per year over personal car ownership	\$4,421	
Increase in household income from time saving and car costs	31%	
Reported injuries avoided per year	4,278	
Lives saved per year	43	
Land freed from less street parking and parking lots	TBD	
Health care cost savings from lower pollution	TBD	
Municipal revenue from leasing rights-of-way	\$3,119,640	

Change in local temperature heat island (degrees C)	TBD
Change in global temperature	
Change in sea level	

Assumptions	Value		
Ratio of road length to track length	2		
Convenient walk time to Transit X route	5	min.	
Walking speed	4.9	km/h	(3 mph)
Width of convenient swath along track	0.82	km	(1 mi)
Fixed cost for main route per km	\$3,100,000	54,870,000	Mexican
Fixed cost per km for branch	\$1,550,000	27,435,000	Mexican
Percentage of main route vs. all routes	50%		
Average cost of fixed infrastructure per km	\$2,325,000	41,152,500	Mexican
Distance traveled per person per year across all modes	14,500	km	(9,006 mi)
Mode share % of people convenient to Transit X	85%		
Percentage of daily travel during peak hour	10%		
Max capacity: number of pods per km of track	149	pods	
Max track capacity during peak hour as % of capacity	20%		
Average speed of pod	72	km/h	
Average # of trips for people riding Transit X	3	per day	
Occupancy per pod	2	people	
Maximum occupancy per pod	4	people	
Empty pods: Percentage non-revenue vehicle travel	25%		
Cost per pod	\$5,000	88,500	Mexican
Median household income	\$30,000	531,000	Mexican
Typical fare per km	\$0.28	4.98	Mexican
(per mile)	\$0.45	8.01	Mexican
O&M per year as a % of capital costs	7%		
Percentage debt financed	50%		
Length of loan/debt	20	years	
Interest rate for financing	8%		
kg CO2 emissions	2.37	per liter of gasoline	
Monetary value of 1 hour personal time	\$8	132.75	Mexican
Public roadway maintenance costs per year per km	\$51,000	902,700	Mexican
Infrastructure's footprint per km	5.78	m²	(62 sf)
Lease rate per m²	\$1,156	20,465	Mexican
Parking footprint for road vehicle	23	m²	(247 sf)
Cost of land per km²	\$100,000	1,770,000	Mexican

	Transit X	Car
Service life (years)	20	12
Full cost of vehicle per year	\$200	\$9,000
Public cost to maintain infrastructure (per km)	\$0	\$100,000
Energy Efficiency (MPGe)	1000	20
mass of CO2 per vehicle per km (kg)	0	0.1185
Vehicle mass (kg)	45	1950
Average speed of travel (km/h)	72	16
Average travel time (hours)	0.50	2.23
Fare per km	\$0.28	\$0.62
Number of deaths per 100M passenger-km	0.00001	1
Number of injuries per 100M passenger-km	0.0006	62
Volume to park (cubic meters)	5.7	70.9

Assumptions	Value		
% of HH income for 16km travel	15%		
Width of convenient swath for road	0.4	km	

Currency conversion	
Currency name	Mexican Peso
Equal to US\$1	17.7

IRR flows 12 years

-	\$1,167,384,063
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TBD: ratio of main route vs. branch route length should be dependent upon density and mode share.
if high density, then less branches. if higher convenience to Transit X, then more branching.
Add: health care costs from air pollution

Add: capital depreciation
Add: other sources of revenue

<http://ccggovernment.carr.org/ccg/pubworks/Maintenance%20Information%20Brochure.pdf>
<https://ohioauditor.gov/trainings/lgpc/2012/Are%20Your%20Road%20Dollars%20Struggling%20to%20Keep%20Up%20with%20Deterioration.pdf>