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TTMA'S POSITION ON PROPOSED RAPID RAIL SYSTEM FOR TRINIDAD AND TOBAGO



INTRODUCTION

The Honourable Patrick Manning, Prime Minister of Trinidad and Tobago, has indicated in his 2006-2007 Budget Presentation that the Government is moving ahead with its plan to introduce a Rapid Rail system in this country, and that a contract for the Design, Build, Operate and Maintain the Trinidad and Tobago Rapid Rail Project (TTRRP) should be awarded before the end of 2006.

However, the Trinidad and Tobago Manufacturers' Association is very concerned that no details were given about the cost of such a major infrastructural development project.

The Government has apparently made its choice even though the Comprehensive National Transportation Study –estimated to cost TT \$23.9 million - is yet to be submitted, and without public consultation on the issue.

According to a Government document titled *Budget Promises Made...and Delivered* submitted with the 2006-2007 National Budget, a Mass Transit System Study, "in tandem with and emanating from preliminary indicators of the CNTS and in order to provide alternative transportation choices, and plan for future growth in traffic throughout Trinidad" is underway, and is expected to be completed by the end of the 3rd quarter 2006.¹

Why is the Government rushing ahead with implementing a Rapid Rail System if the Mass Transit System Study has not been completed?

While the TTMA welcomes any initiatives aimed at alleviating the traffic congestion problems being experienced across Trinidad and Tobago, the Government must explain to the citizens of this country why it is moving full steam ahead with this one alternative without the benefit of a proper study which would show what are the possible alternative options, and which is the best option for this country.

The Association of Professional Engineers, in a Position Paper dated August 21, 2006, stated that it was concerned about the GORTT's approach to the planning and implementation of the proposed Rapid Rail Project.

APETT claimed in its report that the TTRRP would have a Capital Cost of **TT\$20 billion**, with an Annual Operating and Maintenance Cost of about **TT\$3B**.

APETT also noted that Rapid Rail is just one alternative mode of providing service for the traveling public, pointing to Bus Rapid Transit as another option.

¹ *Budget Promises Made...and Delivered* – GORTT –Government at your service – Highlights of achievement 2006



APETT strongly recommended that a decision to invest in rail be made only after a rigorous comprehensive transportation planning exercise for the following reasons:

- Rail investment is high capital and “lumpy.” A rail line segment must be fully completed and tested before starting operation and realizing benefits. It cannot be gradually phased in or tested. If there is an error in estimating the demand or location it cannot be cheaply or easily corrected.
- Rail lines are fixed and cannot easily change to adjust to changes in land-use and communities that create new patterns of housing and employment.
- Rail systems frequently require a transfer or some type either from a bus or a private automobile. This is a major disincentive for private automobile users who enjoy tremendous flexibility and freedom when they use their cars.
- Rail trains can be delayed behind a stalled train or other vehicles on the tracks. Thus the impact of a breakdown may disrupt significant portions of the system.
- The entire rail system can be disabled by accident, sabotage or industrial arrest.²

Implementing a Rapid Rail System in this country will incur a massive cost – not just in the construction phase, but in its annual operation, and it is therefore imperative that a major investment study be undertaken prior to embarking on such a significant infrastructure development project.

The TTMA is urging Government to hold on its decision to follow through with a rapid rail system in this country until the findings of the Comprehensive National Transportation Study are submitted and put out for public consultation.

The TTMA hopes, in this document, to present the alternatives to Rapid Rail for Government’s consideration.

² APETT Position Paper – Trinidad Rapid Rail Project Pg iv



THE CASE FOR RAPID RAIL

The Government of Trinidad and Tobago has indicated that it intends to award a contract for a 120 km Rapid Rail system along the East-West and North-South corridors by December of 2006. For some countries, Rapid Rail systems have been successful in achieving the goal of efficiently transporting people in a short time; but there are disadvantages to using RRT systems as well.

ADVANTAGES OF LIGHT RAIL

Eric Bruun, in his presentation to the Transportation Research Board in 2005, noted that light rail systems have higher capacity, are cleaner, quieter, more comfortable, and in many cases faster, when compared to other types of transportation, including buses.

He claimed that data indicates that Bus Rapid Transit is more cost effective below 1600 passengers per hour, but above 2000 passengers per hour bus headways become so short that average speed falls and per-passenger costs increase.

Brunn also noted that Light rail systems are generally cheaper to build than heavy rail, since the infrastructure is relatively insubstantial, and tunnels used in most metro systems are generally not required.³

Another argument in favour of Light Rail is that it provides the opportunity for improved economic development along the rail lines. The US Federal Transit Administration said light rail's economic development impact comes about, in part, because of the high capital investment that gives a sense of permanence.⁴

DISADVANTAGES OF LIGHT RAIL

According to Charles S. McCaleb, author of *Rails, Roads & Runways: The 20-Year Saga of Santa Clara County's Transportation Agency*, light rail tends to be safest when operating in dedicated rights-of-way with complete grade separations.

Light rail vehicles, he said, tend to be more reliable and have longer service lives than the typical monorail vehicle, and the generally lower capital cost of construction usually offsets any weight disadvantage.

The opening of new light rail systems, McCaleb argued, has sometimes been accompanied by a marked increase in car accidents involving automobiles driving around gates, running red lights and making illegal turns. Though such increases may be temporary, he noted that long-term conflicts between motorists and light rail operations can be alleviated by segregating their respective rights-of-way and installing appropriate signage and warning systems.⁵

³ Eric Bruun (2005) *Bus Rapid Transit and Light Rail: Comparing Operating Costs with a Parametric Cost Model*, Transportation Research Board Annual Meeting, <http://www.trb.org>

⁴ US GAO report: *Mass Transit – Bus Rapid Transit Shows Promise September 2001*

⁵ Charles S. McCaleb, *Rails, Roads & Runways: The 20-Year Saga of Santa Clara County's Transportation Agency*



ADVANTAGES AND DISADVANTAGES OF MONORAIL

The online encyclopedia, *Wikipedia.org* said the primary advantage of monorails over conventional rail systems is that they require minimal space, both horizontally and vertically.

"They are quieter, as modern monorails use rubber wheels on a concrete track. Also, monorails are capable of climbing, descending and turning faster than heavy rail systems, though not light rail systems.

"Unlike conventional rail systems, straddle monorails wrap around their track and are thus physically incapable of derailling, unless the track itself suffers a catastrophic failure, which is why monorails have an excellent safety record.

"However, as monorail stations are usually elevated, special arrangements (such as lifts and elevators) must be made to permit access by disabled passengers. Able-bodied passengers may be dissuaded to use the system because stations are hard to access.

"Monorail vehicles are generally smaller than those on heavy-rail metros, leading to a higher cost per passenger per mile." ⁶

⁶ http://en.wikipedia.org/wiki/Monorail#Advantages_and_disadvantages



THE CASE FOR BUS RAPID TRANSIT

From as early as 1966, international studies showed the benefits of Bus Rapid Transit. A study conducted by the American Automobile Manufacturers Association, *Transportation and Parking for Tomorrow's Cities*, stated that BRT could involve lower capital costs, provide greater coverage, better serve low and medium-density areas, and more readily adapt to changing land-use and population patterns than rail-based systems.⁷

More recently, the Government Accounting Office (GAO) in the USA, in a 2001 study pointed out:

- BRT is more flexible than light rail. Since rail lines are fixed, they cannot respond to changes in land use, whereas BRT service can be rerouted and shifted over time to correspond with changing transportation needs.
- BRT systems can provide long distance service without requiring transfers, which is a disincentive to passengers.
- BRT systems can be phased in step by step. Rail must be fully completed before service can begin.
- BRT systems that use HOV lanes can easily be converted to high-occupancy/toll (HOT) lanes to decrease congestion in regular lanes and to generate capital. BRT, HOV and HOT lanes yield more utility at minimal expense, less conflict between technologies, and the opportunity to generate revenue.

CAPITAL COSTS OF BUS-RAPID TRANSIT VS. LIGHT-RAIL TRANSIT

According to the US GAO report, Bus Rapid Transit has a clear capital cost advantage over light-rail systems. The US GAO identified three main locations of BRT implementation: Busways, HOV lanes, and arterial streets.

In capital costs, the report said rapid rail cost US\$35 million per mile against US\$12 million for busways, US\$9 million for buses on HOV lanes, and around US\$1 million for buses on arterial streets.

While the fixed costs of building these three options varied, with busways being the most expensive, the US GAO pointed out that each option was less expensive per mile than light rail.

As shown in figure one (p.6), light rail costs an average of US\$34.8 million per mile to build, whereas busways cost US\$13.5 million per mile, or **60.2** percent less than light rail.

The US GAO noted that HOV lanes and arterial streets built for BRT use cost even less, at US\$9 million per mile and \$680,000 per mile, respectively. These systems cost 61 percent, 74 percent and 98 percent less than light-rail systems, the report stated.⁸

⁷ Wilbur Smith and Associates, under commission from American Automobile Manufacturers' Association (H. S. Levinson, Principal Investigator). *Transportation and Parking for Tomorrow's Cities*, New Haven, CT, 1966.

⁸ US GAO-*Mass Transit –Bus Rapid Transit Shows Promise September 2001*

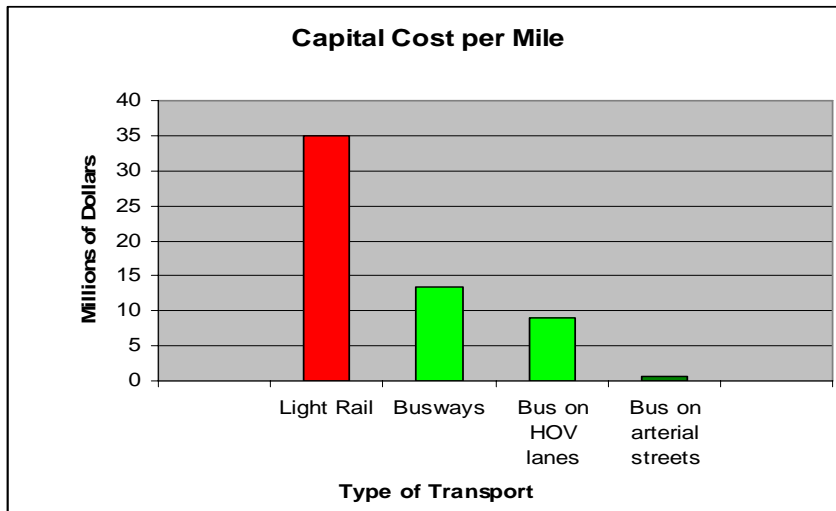


Figure One - Source: US G.A.O.

Growing evidence shows that Bus Rapid Transit is a more cost effective method of transportation. The Bus Rapid Transit Policy Centre points out that:

- BRT systems can operate at speeds nearly twice as fast as conventional buses and roughly equivalent to light rail, getting people quickly to their destination.
- BRT systems are flexible – vehicles can operate on neighbourhood streets and on designated roadways.
- BRT systems have capital and operating costs substantially lower than rail.
- BRT can take advantage of Compressed Natural Gas and other clean technologies.⁹

The US Government Accounting Office said Bus Rapid Transit may also include any of the following features:

- Traffic signal priority. Buses receiving an early or extended green light at intersections reduce travel time.
- Boarding and fare collection improvements through pre-paid or electronic passes and low-floor and/or wide door boarding.
- Limited stops improve operating speeds.
- Improved stations and shelters.
- Intelligent Transportation System technologies to maintain more consistent distances between buses and inform passengers when the next bus is arriving.
- Cleaner and quieter vehicles.
- Exclusive lanes to bypass congested traffic.¹⁰

⁹ <http://www.gobrt.org/whatis.html>

¹⁰ US GAO-*Mass Transit –Bus Rapid Transit Shows Promise September 2001*



RIDERSHIP:

Bus Rapid Transit has high ridership, comparable to rapid rail systems. According to a report issued by the Transit Cooperative Research Program, the number of weekday bus riders reported for systems in North America and Australia ranges upward from 1,000 in Charlotte to 40,000 or more in Los Angeles, Seattle, Adelaide, and Brisbane. Daily ridership in Ottawa and the South American cities is substantially higher and usually exceeds 150,000 per day.

The report showed that increases in bus riders because of BRT investments were as a result of expanded service, reduced travel times, improved facility identity, and population growth.

The TTCRP document stated that:

- BRT can provide sufficient capacities to meet peak-hour travel demands in most corridors in the United States and Canada.
- BRT should be rapid and reliable. Reliably high speeds can best be achieved when a large portion of the service can be provided on separate rights-of-way.
- BRT implementation and operating and maintenance costs are generally less than those of rail rapid transit.

The report concluded that Bus Rapid Transit can attract new riders and induce transit-oriented development, and can be more cost-effective and provide greater operating flexibility than rail transit.¹¹

According to another report, the *Review of Bus Rapid Transit* by Calgary Transit, BRT passenger capacities can exceed conventional bus service and can approach LRT capabilities. BRT service can accommodate between 5,000 to 8,000 peak hour without higher capacity buses or provision of a separate right of way. Buses capable of accommodating up to 120 passengers can boost this capacity to 12,000 peak hour.¹²

¹¹ Transit Cooperative Research Program – *Volume 1 Case Studies in Bus Rapid Transit*

¹² Calgary Transit –March 2002-*A Review of Bus Rapid Transit*



EXAMPLES OF SUCCESSFUL BUS RAPID TRANSIT SYSTEMS:

CURITIBA

The Federal Transit Administration has said that the bus system of Curitiba, Brazil, exemplifies a model Bus Rapid Transit system, and plays a large part in making Curitiba a livable city. A report titled *Issues in Bus Rapid Transit* said the buses run frequently -- some as often as every 90 seconds -- and reliably, commuters ride them in great numbers, and the stations are convenient, well-designed, comfortable, and attractive.

"Curitiba has one of the most heavily used, yet low-cost, transit systems in the world. Even with one automobile for every three people, one of the highest automobile ownership rates in Brazil, and with a significantly higher per capita income than the national average, around 70 percent of Curitiba's commuters use transit daily to travel to work."¹³

UNITED STATES

The City of Los Angeles implemented two significant BRT services -- 'Metro Rapid' - along nearly 70 kilometres of two urban arterial roads, which began operating in June 2000 at a total cost of US\$13 million per km.

According to a report titled *A Review of Bus Rapid Transit*, The Los Angeles Metro Rapid service uses standard, low floor buses with a distinctive paint scheme. Traffic signal priority is provided at all intersections outside of the downtown, and enhanced bus stops are being constructed at a spacing of 1.4 kilometres.

"The Los Angeles BRT service has been very successful in achieving its goals over a short period of time. Corridor ridership has increased by 27 percent and transit travel time has decreased by 25 percent. These services carry about 40,000 passengers per day," the report stated.¹⁴

CANADA

The most successful bus system on the North American continent is the OC Transpo in Ottawa, Canada, according to an article by Edson L Tennyson titled *Impact on Transit Patronage of Cessation or Inauguration of Rail Service*. "Aided by a population increase of 400 percent, transit ridership has increased 241 percent. This represents a loss of market share but is by far the best results of any major bus system.

"To assist in coping with rapid growth and to update the transit system, Ottawa has built an expanding exclusive bus-way at a cost of several hundred million Canadian dollars. However, this project has not had the desired effect. Ridership that had been growing because of the transit incentives has begun to decline as the busway was phased in."¹⁵

¹³ Federal Transit Administration Report: *Issues in Bus Rapid Transit*, p. 10

¹⁴ Calgary Transit --March 2002--*A Review of Bus Rapid Transit*

¹⁵ *Impact on Transit Patronage of Cessation or Inauguration of Rail Service* - Edson L Tennyson 1989



SUSTAINABILITY

The Canadian Centre for Sustainable Transportation defines Sustainable Transportation as one that:

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations.
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy.
- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.¹⁶

OPERATING COSTS OF BUS-RAPID TRANSIT VS. LIGHT-RAIL TRANSIT

When comparing the cost of one system to another, consideration must be given not only to the price of initial construction, but the ongoing costs of operation, as well. The US GAO, in its report, *Mass Transit – Bus Rapid Transit Shows Promise*, used three measures to evaluate operating cost, and in every case the majority of cities have lower operating costs for their BRT systems than for their light rail systems. Figure two shows that the operating costs per vehicle mile are lower for BRT systems than for light rail. The GAO's estimate for Denver's BRT system is that BRT costs 80.8 percent less per mile to operate than light rail.¹⁷

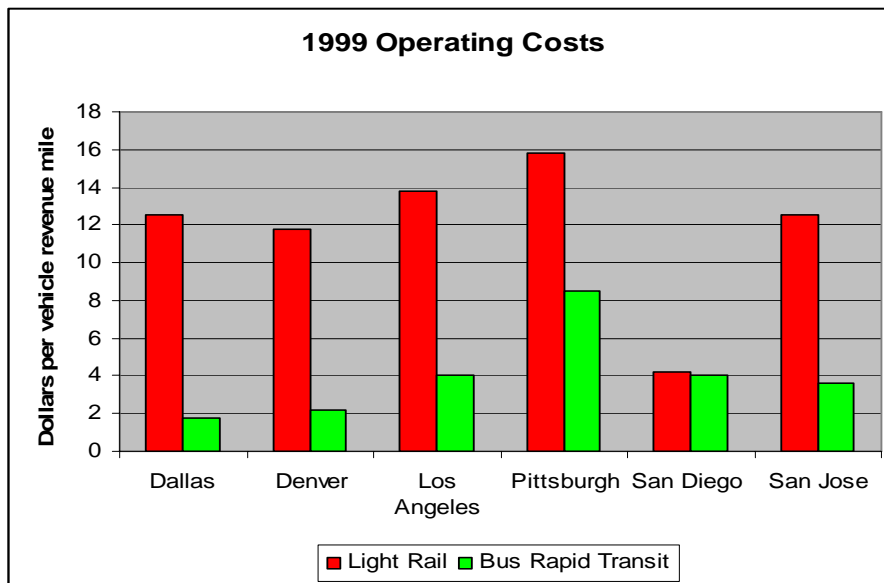


Figure Two – Source: US GAO

¹⁶ <http://cst.uwinnipeg.ca/>

¹⁷ US GAO-*Mass Transit –Bus Rapid Transit Shows Promise September 2001*



The Figure below shows a comparison of operating cost per passenger mile, using data from the US GAO report.

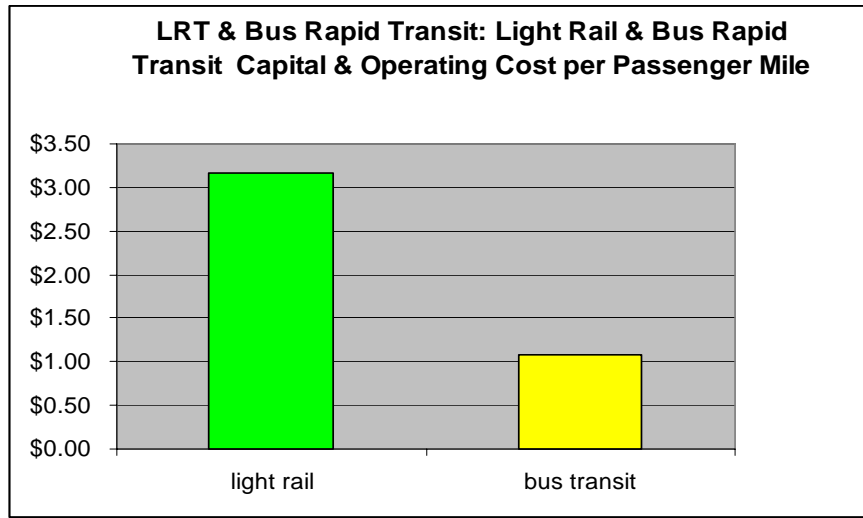


Figure Three – Source www.publicpurpose.com

SELF SUFFICIENCY:

Rail transit

In the case of light rail transit, a report titled *Calgary's CTrain – Effective Capital Utilization* showed that Calgary has resulted in a low operating cost per passenger.

The report said Calgary's CTrain has proven that the significant investment was worthwhile. LRT was selected because it would provide a cost effective means of delivering an attractive, high capacity service with a higher level of reliability, speed and comfort compared to conventional bus service.

"For 2005, the average hourly operating cost of LRT is approximately US \$139.40. This figure includes operating, maintenance and utility costs. With an average of 600 boarding passengers per operating hour the average cost per LRT passenger is only US \$0.23. In comparison, the average cost for bus passenger boardings is approximately US\$1.28 or almost 6 times the cost of carrying an LRT passenger." The report admitted, though, that buses have considerably lower capital cost and have different capabilities.¹⁸

Another report titled *Rail Transit in America, A Comprehensive Evaluation of Benefits*, argues that even though rail transit has a cost, it is offset by economic benefits. The report said Rail transit requires about US\$12.5 billion annually in public subsidy, which averages about US\$90 additional dollars annually per rail transit city resident; compared with US\$13.8 billion bus transit subsidies.

However, the report said that for rail transit, the extra costs are offset several times over by economic benefits, including US\$19.4 billion in congestion costs savings, US\$8.0 billion in roadway

¹⁸ *Calgary's CTrain – Effective Capital Utilization*, Presented at the 2006 Joint International Light Rail Conference St. Louis, Missouri 2006 April 8 - 12



cost savings, US\$12.1 billion in parking cost savings, US\$22.6 billion in consumer cost saving, and US\$5.6 billion in reduced crash damages.

The Report also argues that Rail transit tends to increase regional employment, business activity and productivity, and can contribute to urban redevelopment.¹⁹

However, although both reports claimed that operating costs for LRT were sometimes below those for bus transit, neither report showed evidence that the LRT systems highlighted were capable of achieving self-sufficiency.

There are examples of light rail systems that have fallen far short of expectations in terms of ridership and cost effectiveness.

In San Jose, California light-rail construction costs have not been excessive relative to other light-rail lines, but its low ridership means high operating costs per rider. A report in the Thoreau Institute titled *San Jose Case Study Part Two: Light Rail* stated that these high costs are a major factor in a financial crisis that is facing San Jose's transit agency, the Santa Clara Valley Transportation Authority (VTA).

"When compared with other light-rail lines in the U.S., San Jose's light-rail vehicles appear to be running almost empty. On average, San Jose buses carry 9.2 people at any given time, which is about 86 percent of the national average. But San Jose light-rail vehicles carry only 14.8 people at any given time, which is less than 57 percent of the national average," the report said.²⁰

In St. Louis operating cost per rider in 2001 totaled US\$1.59 and revenue per rider totaled 60 cents. Fares would need to be nearly tripled for the transit system to cover its operating cost.²¹

Bus Rapid Transit

Research shows that in some countries, the authorities have been able to achieve self-sufficiency in their Bus Rapid Transit systems. Successful Bus Rapid Transit systems utilize private sector participation in order to reduce the fiscal burden on public authorities.

The graph below, taken from data from Federal Transit Administration's National Transit Database and the Federal Highway Administration's Highway Statistics, shows that there is disparity in the levels of subsidies for bus and light rail transit.

The subsidies for rail transit per vehicle mile are 50 percent higher for light rail, while the subsidies per passenger mile are similar.

¹⁹ *Rail Transit in America, A Comprehensive Evaluation of Benefits*, By Todd Litman of the Victoria Transport Policy Institute, August, 2006 p.34, 48

²⁰ *San Jose Case Study Part Two: Light Rail* - Thoreau Institute, www.ti.org

²¹ Garrett, Thomas A., *Light-Rail Transit in America Policy Issues and Prospects for Economic Development*, August 2004

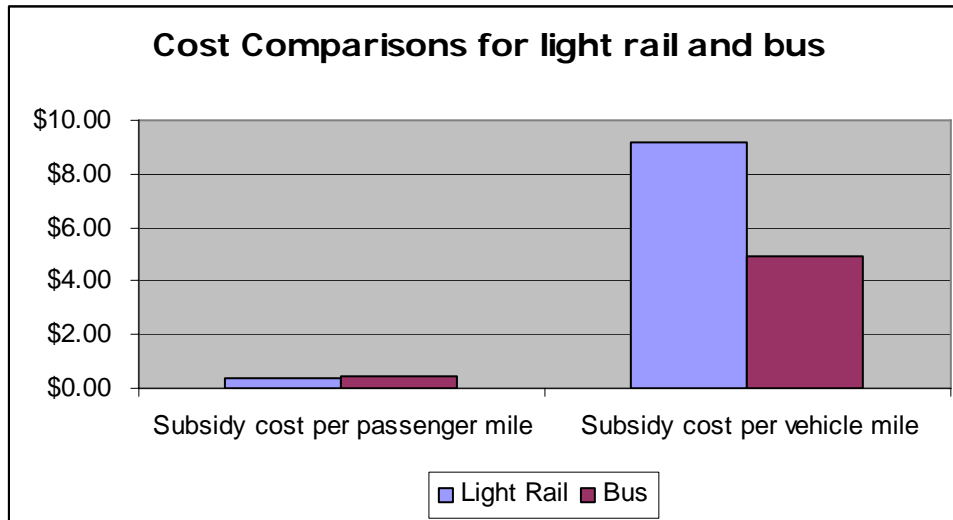


Figure Four - Data taken from the Federal Transit Administration's National Transit Database and the Federal Highway Administration's Highway Statistics.

Drawing from the Curitiba, Brazil model, *Urbanizao de Curitiba*, a state-owned company, monitors and coordinates the 16 private companies that operate the bus lines, and maintains the infrastructure of the system. The private companies receive licences for specific lines and are paid not per passenger but per km. The system is completely financed by the bus fares without any public subsidies.²²

Bogota's TransMilenio BRT provides another example. A report called *Institutional and Regulatory Options for Bus Rapid Transit in Developing Countries*, noted that public funds were only used for planning and infrastructure, at a cost of about US\$5.3 million per kilometer.

According to the report, TransMilenio requires no operating subsidies and earns substantial profits for its operators. "This long-term economic and financial sustainability beyond the initial capital investment resulted because it was the primary goal of the planning process from inception to implementation," the report claimed.

The report concluded that for developing countries:

BRT Systems should be designed from their inception to be self financing

All BRT systems should create the conditions for ensuring full cost recovery for their ongoing operating costs and the costs of bus procurement. Hence, operations can and should be contracted out to private operators.

Reaching Financial Self Sufficiency May Require Route Restructuring

Many BRT systems may require cutting competing routes in order to be self financing. Private operators should pay for the cost of bus procurement.

All operating contracts should be awarded based on fair competitive bidding.

Operating contracts should stipulate rewards and fines based on clear service quality indicators to ensure high quality bus service, and more than one private bus company should operate on any given route.²³

²² World Bank Report, *Innovative Solutions for Public Transport; Curitiba, Brazil*

²³ Institute for Transportation and Development Policy – *Institutional And Regulatory Options For Bus Rapid Transit In Developing Countries* January 2005



CONCLUSION:

The Trinidad and Tobago Manufacturers' Association joins the Association of Professional Engineers in calling on the Government to **hold** on awarding contracts for its proposed Rapid Rail project, until a Major Investment Study is completed, and a Comprehensive Urban Area Transportation Planning Study shows that the proposed Rapid Rail project is the best option for solving the country's transportation problems.

The Institute of Transportation Engineers in its Transportation Planning Handbook, 2nd Ed. P. 422 states as follows:

"The MIS (Major Investment Study) is reserved for situations where it is clear that a large investment is required and offers a rigorous method to evaluate the trade-offs, for example, between additional expressway lanes, HOV (High Occupancy Vehicle) lanes or fixed guideway rail transit. Just as the public and stakeholder groups were involved in the development of the plan, this same requirement exists on a more focused basis for the MIS."

As noted earlier, the proposed Rapid Rail Project is expected to have a Capital Cost of **TT\$20 billion**, with an Annual Operating and Maintenance Cost of about **TT\$3B**. That works out to **TT\$8 million per day** – a cost that will be borne largely by the taxpayers of this country.

It is imperative, therefore, that the citizens of this country be given the opportunity to air their views and concerns about the proposed project. The TTMA is therefore calling for Public Consultation on this issue.

The TTMA is also concerned about possible cost overruns on a project of this magnitude. According to a paper in Engineering News Record titled *New Urban Rail in America: Exorbitant Costs, Negligent Benefits*, pointed out that "On average, rail transit systems have construction cost overruns of nearly 50 percent, and operating costs for rail systems are, on average, 80 percent greater than expected."²⁴

Historically, large development projects in this country have often exceeded their initial projected costs, and in light of this, the TTMA is calling for transparency and accountability in the selection of a plan of action to deal with the country's transportation issues, and in the award of contracts for the type of project selected.

The TTMA is strongly opposed to the implementation of a Rapid Rail system in Trinidad and Tobago, and is urging Government to hold on its decision to follow through with the TTRRP until the findings of the Comprehensive National Transportation Study are submitted and put out for public consultation.

²⁴ *New Urban Rail in America: Exorbitant Costs, Negligent Benefits*, Engineering News Record



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