



Photo: CAO Cities

Curitiba is one of four cities trialling electric and hybrid buses in Latin America

How bus rapid transit can offer workers a better quality of life

The daily commute for thousands of people in Latin American cities is an extraordinary feat of endurance. Long journeys, overcrowding, dilapidated vehicles and comparatively expensive fares combined with the knock-on effects of ill health and fatigue leads to low productivity at work and a poorer standard of living. **Kirsty Tuxford** investigates what cities are doing to combat transport problems for their working population

It is 4am and dark as Fernando Carbajal leaves his house in the suburbs of Mexico City. As he crosses the road he is lucky that a microbus screeches to a halt and he runs to join the pack of workers trying to get on. But like yesterday and three times last week, there are no seats left. With no other means of transport available, he grabs on to the rails on the outside of the bus hanging on literally for his life as the

vehicle takes off towards the city. Three hours later, his precarious ride over, he jumps from the moving vehicle. It is 7am and with his eyes still streaming from the fumes, another day begins.

“I only lived 20 kilometres from work but it took three hours each way,” recalls Carbajal, who has now moved to London and finds commuters’ complaints trivial in the face of his own experience back home. “Once I was on the microbus

in Mexico City with my wife and the driver was drinking beer. He crashed into another car and decided to drive off before the police could catch him.”

Unfortunately Fernando’s tale is all too familiar as rapid urbanisation puts huge strains on transport and on the health and comfort of workers trying to make a living in our growing cities. More than half of the 22 million residents of Mexico City live in places where

public transport is unreliable, expensive, polluting and unsafe.

But in Mexico City at least, the authorities are now looking at proper solutions to public transport that can assist commuters and reduce the threat to their health. Since Fernando moved from Mexico City, the city government has installed a bus rapid transit (BRT) system, which has led to the removal of many of the unregulated minibuses.

“The replacement of minibuses with high capacity and low emissions buses reduces pollutants, which positively impacts air quality and improves health conditions, and the presence of the police at the system stations ensures the safety of users,” says Guillermo Calderon, director general of Mexico City’s BRT system, Metrobús.

Success for Mexico City’s BRT system

Bus rapid transit systems often provide dedicated bus-only lanes and priority for BRT vehicles. Mexico City’s 29 kilometre long *Avenida de los Insurgentes* was the first corridor to be travelled by the Metrobús. When it opened in 2005, there were 36 stations and two terminals, and 97 new articulated buses replaced 350 standard buses. Buses are frequent, and back when the first line opened, had a minimum capacity of 9,000 passengers per hour—far more than the best US light rail systems, according to the Bus Rapid Transport Policy Centre. In 2011, the Metrobús system carried a total of 188 million passengers at an operating cost of US\$80 million per year.

Today there are four Metrobús lines, with a new route, Line 4, launched on April 1 2012. Line 4 is using 46 Euro V, low emission buses, and eight hybrid buses. “The Volvo Buses of Metrobús Line 4 will carry more than 14 million passengers a year,” says Armando Quintero, Secretary of Transport in Mexico City. “The short-term goal is to double the length of the actual network. This is equivalent to five more lines, but there are also other potential corridors which have been evaluated.”

Metrobús is intermodal—linking with several other forms of public transport, including Mexico City’s cycle hire scheme and its metros, and Line 4 provides a link to the city’s international

Breathe easier with Metrobús

Estimated reductions in key pollutants that Mexico’s Metrobús removes from the air each year:

- 690 tonnes of nitrogen oxide, a compound that causes smog, acid rain, global warming, and a variety of health complications including emphysema and bronchitis.
- 2.8 tonnes of fine particulate matter, known to cause asthma, chronic bronchitis, and lung disease.
- 144 tonnes of hydrocarbons, which are associated with smog, cancer, and other health problems.

Source: EMBARQ, the World Resource Institute Centre for Sustainable Transport

airport. Metrobús links residential, commercial and business districts, and the buses have increased travel speed and consequently, reduced travel time by 40 percent. The service is free for people over 70 years old, the handicapped, and for children under five-years-old.

Although Metrobus is a big improvement to urban mobility, there is still work to do in terms of embracing workers in outer parts of the metropolis. “Metrobús currently has presence in 11 of the 16 municipalities of Mexico City; unfortunately there are still many people who depend on the minibuses for transport, since the Metrobús system operates on trunk routes without interference in the feeder routes,” explains Calderon.

One benefit for all though has been the improvement in air quality. A study by the BRT Policy Centre found that Mexico City’s Metrobús is cutting CO₂ emissions by 35,000 tonnes annually and reducing citizens’ exposure to harmful exhaust fumes (see box). “The latest reports show us, that since 2005 with Metrobús Line 1, until September of 2011, with three lines already operating, the Mexico City Government had saved a total of 894,203 tonnes of greenhouse gas emissions,” says Calderon. “All these improvements mean better air quality, a better life and a more competitive city. Don’t forget about carbon credits either, which help the city’s public finances.”

Mexico City’s BRT success has been measured with a new ‘BRT Standard’ scoring system developed by leading BRT experts including representatives from Embarq, the Institution for Transportation & Development Policy (ITDP), the World Bank and the Asian Development Bank (see www.brstandard.org). Since the start of 2012,

the system has been employed as a rating tool with the goal of encouraging the development of BRTs in cities.

The BRT Standard gives ratings for several aspects of BRT services including: service planning; infrastructure; station design and station-bus interface; quality of service and passenger information systems; and integration and access. Marks are deducted for things such as slow speeds, low passenger numbers, lack of right of way for the buses and poor maintenance.

Mexico’s BRT has been rated as a silver standard, scoring 75 out of 100 with the city achieving top marks for having safe, wide, attractive and weather-protected stations, platform-level boarding, and stations set back from intersections. A far cry from commuters having to hang on to the outside of a vehicle.

“BRT systems generate benefits to the population in general, not only for the users of the public transport systems,” says Calderon. “The road realignment and the operating conditions allows operating at a higher speed, therefore transfer times are reduced, we estimate that for this reason 180 million man hours are saved annually, which has a direct impact on the quality of life of the inhabitants of Mexico City.”

C40 unveils hybrid and electric bus programme

Beyond Mexico, the story of poor urban transport for workers and the affect on health and productivity has been well documented in other parts of Latin America.

The World Bank, while announcing in January 2012 the upgrading of Rio de Janeiro’s urban rail system, said that in Brazil’s metropolitan areas, a lack of adequate urban transport is a major



Photo: Gobierno de la Ciudad de Buenos Aires

BRT systems offer platform-level access for convenience and speed

bottleneck for development, access to jobs, health and education, as well as a major source of pollution and carbon emissions.

Rio de Janeiro has 12 million residents and faces important challenges keeping citizens mobile. Low-income inhabitants suffer the most—46 percent of the poorer residents from peripheral communities travel daily to the city centre, many enduring journeys like Fernando Carbal's.

Fundação Getúlio Vargas, a higher education institution that conducts academic research, has reported that a lack of transport in Rio de Janeiro accounts for more than 10 percent of patients who did not get adequate access to health services. Like Mexico City, Rio de Janeiro has also turned to special bus programmes as part of the solution to the problem.

Rio is one of four C40 cities—the others are Curitiba, São Paulo and

According to C40, urban transport is the fastest-growing source of carbon emissions

Bogotá—which have been taking part in a hybrid and electric bus test programme, with promising results. The C40 Hybrid & Electric Bus Program in partnership with the Clinton Climate Initiative (CCI) is supported with a US\$1.5 million grant from the Inter-American Development Bank (IADB) with the goal of demonstrating the reduced emissions and improved efficiency of hybrid and electric buses compared to diesel.

The buses are being tested in real traffic conditions to reveal their true environmental performance and

economic benefits, and the data gathered from the initial tests, have been presented to cities to help garner their support for low-emission public transport. Demonstrating the benefits of the new buses to cities is vital because these buses are more expensive to buy than their more commonly used diesel counterparts.

According to C40, urban transport is the fastest growing source of carbon emissions. The results from the Rio de Janeiro and São Paulo trials show that hybrid buses used there have significantly lower emissions of hydrocarbons, carbon oxide, nitrogen oxides, carbon dioxide and particulate matter, and they're more fuel-efficient.

Fuel efficiency also means that passenger fares can be kept low. "The cost of fares will be the same or less," says Manuel Olivera, C40 city director in Bogotá. "But the operational costs of the hybrid and electric buses are going to be lower compared to diesel buses because of less fuel use in the case of hybrids while electric energy is less expensive than diesel, in the case of electric buses. Regarding electricity we're not playing with the international cost of the diesel fuel, which is increasing in price, and then normally the passenger ends up paying. With electric energy you clearly know how much you are producing in your country and what the price is so you can rely on that price in the long run."

Finding the funds

The programme was launched in Rio in June 2011 and São Paulo followed in August and September. Both hybrid and baseline diesel buses were used and the results have shown that the hybrid buses were more fuel efficient than normal diesel buses, with reductions in fuel consumption ranging between 37 and 40 percent. While Rio is taking a more cautious approach before ordering additional buses, São Paulo has already placed an order for 50 new hybrid buses and added a subsidy on the tariff to cover the additional capital costs of the buses. "Financing is an issue for the other cities," explains Olivera. "Because normally it's not the city who pays for the buses; the operator who runs the buses pays. Our figures show that the project is feasible because the buses can be paid for over a

five- to seven-year period, and if you have a contract to operate the bus for 20 years, then you have 13 years to exploit the bus.”

In Brazil, BNDES (National Bank of Economic and Social Development) is also engaged in promoting low-carbon technologies such as hybrid and electric by offering six different financial lines and programmes to develop the market.

“The additional cost of buying a hybrid or electric bus can be financed by money that is coming from the Climate Trust Fund, set up by the World Bank and the IADB,” says Olivera. The exact details are being finalised but the loans will have favourable terms such as low interest rates and long repayment periods spanning 10 years or more. In Colombia, the CTF programme financing will make US\$40 million available to banks to loan to the bus operators, and this will increase to US\$80 million to cover infrastructure.

“With the CTF in Bogotá and a subsidy in São Paulo we are covering the additional costs,” says Olivera. “That’s the way to start moving the market, and once it is growing, the cost of the production of these buses is going to be reduced and then there’ll be more support for the market to move on.” And when production costs come down, that saving can be passed on to the passenger.

The programme is considering the needs of city inhabitants—including the poorest residents. “People are very impressed when there is no noise and no emissions—anywhere in Latin America—they feel very uncomfortable because of those things,” says Olivera.

Trials start in Bogotá this April with electric and hybrid buses. “These buses, once in a fleet, will serve as feeder buses linking to the BRT system,” explains Olivera. “They will bring people from the poorest areas to the trunk lines so they can access the main transport system.”

Acclaim for BRT in Buenos Aires

Buenos Aires was a runner-up this year in the ITDP’s Sustainable Transport Award for Cities due to its BRT route—the country’s first. The congested city was living with the result of past decisions to build numerous highways, which encouraged people to drive.

“Buenos Aires is working strongly on mobility, to improve the quality of life for the people,” says Guillermo Dietrich, secretary of transport in Buenos Aires.

A plan for a subway was shelved due to political and economic conditions, so the ITDP and Clinton Climate Initiative helped the city realise plans for the BRT system at a fraction of the cost and in less time. The city conducted research on different types of buses and financing, and compiled data on passenger demand,

popular bike-sharing system, Bicing, and the metro. The government is already collecting data with a view to constructing phase two of its BRT system.

Since the BRT came into operation, demand has increased by 20 percent says the city. According to the results of a poll of 1,773 people, 22 percent are new users of the Metrobús. And the average rating out of 10 given to the system is 7.87. The poll showed that 47 percent of the users questioned prefer the Metrobús to the



Buenos Aires BRT system is intermodal linking with its Bici cycle hire network

traffic patterns, quality of service and commuting times.

A dedicated bus lane for the new BRT system means that buses can travel rapidly, avoiding congestion. The construction of these lanes raised objections from some local business owners who were upset that their delivery trucks would no longer be able to illegally park on the curb whilst unloading—but in the eyes of the law they had no recourse and had to accept the new BRT routes.

Benefits for passengers are clear: reduced waiting times (during peak times buses arrive every two-to-four minutes), travel time along the route reduced by 40 percent, comfortable weather-protected stations and clean reliable buses. The system doesn’t run in isolation, and like other successful transport solutions, it is intermodal, connecting with alternative forms of transport such as the city’s

subway—mainly due to its speed. “Travel time along the route is reduced by 44 minutes,” says Dietrich. “Passengers will spend seven days less travelling per year.”

Initial investment for the system was ARS100 million (US\$23 million), which included the construction of 22 stations, the installation of security cameras, the refurbishment of lighting and traffic signs and the paving of the entire avenue. Each Metrobús cost more than US\$300,000, which was met by the bus companies.

With financing now available to assist with the purchase of low-emission buses through programmes like that of C40, Latin American cities have a viable way of tackling their public transport problems and of raising the standard of living for their residents. Stories like Fernando Carbajal’s will be reminders of a better future for citizens rather than a grim record of the daily commute. ■