

sustainable transport

Winter 2008 • Number 20

Bogotá: Under Siege?
The Promise and Peril of Biofuels
Guadalajara's Cycling Renaissance



ITDP *Institute for Transportation
& Development Policy*

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Cover photo:
*TransMilenio, Bogota's
bus rapid transit system, at night.*
By Carlos Carvajal



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**The Institute for
Transportation and Development Policy**

127 West 26th Street, Suite 1002
New York, NY 10001

Tel. 212-629-8001 • Fax 212-629-8334
mobility@itdp.org • www.itdp.org

Editor: Aimée Gauthier

Contributing Editors: Walter Hook, Ellen Mitchell, Michael Kodransky

Art Direction: Cliff Harris

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Transportation Alternatives

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ITDP is non-profit advocacy, research and project-implementing agency whose mission is to promote sustainable and equitable transportation practice and policy in developing countries. ITDP is registered in the United States as a charitable organization that is eligible for tax-deductible contributions under the Internal Revenue Service code. ITDP members include bicycle activists, transportation planners, economic development specialists, small business owners, environmentalists, and other professionals from the U.S. and around the world

Letter from the Executive Director
Walter Hook



Stimulating a Car-Free Recovery

With the global economy in free fall, governments from China to the United States are preparing to spend hundreds of billions of dollars to avert a depression. The US is contemplating a bailout of the three largest US automakers, as well as a significant increase in foreign assistance to developing countries hoping to restore America's damaged reputation and build lasting economic partnerships.

The World Bank and the International Monetary Fund (IMF) are also likely to be called on by governments to increase lending. There is no question that national governments and the multilateral development banks have to do something to restore consumer confidence and get the global economy moving again.

Spent wisely, it could be used to create more sustainable and equitable cities of the future, with green, affordable housing linked by world class bus rapid transit, tree-lined bikeways, and high quality public spaces adorned with public art. But misused, this money could be spent locking the world's 6.6 billion people into a long term dependence on oil and private automobiles and dooming the planet to irrevocable climate change.

It will be a fight. China has announced a 586 billion US dollar economic stimulus package to be spent mostly on transportation and urban infrastructure. However, China is building highways faster than any country in the world, and with all land owned by the government, land acquisition is much faster.

In the US, there are plans to use the stimulus package to double the national highway system. Detroit's requested bailout is increasing daily. The same companies that bet the bank on gas guzzling SUVs are now asking the taxpayers to save them. Curiously, China's auto industry, which is already government-owned, is also asking for a bailout.

Some environmentalists are suggesting we place strict conditions on any auto industry rescue plan, requiring them to make cleaner, more fuel efficient cars, limiting executive pay, etc. The problem is, as taxpayers, one priority should be to get our money back. Making the big three greener will not necessarily make them more profitable. Their problems are deep and probably irreversible. GM's \$40,000 plug-in hybrid may do nothing for its bottom line, especially with fuel prices falling.

Certainly it will be an economic disaster if the US auto industry collapses. A big part of their debt, and why they can't compete with foreign companies, is the cost of providing health and pension benefits to retired workers. The government should consider assuming responsibility for some of these debts as part of a general health care reform. But other industries, like the publishing and newspaper industry, are collapsing as well.

Right now, there is a serious risk that any US government stimulus package will follow the financial bailout, favoring corporations that

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have the best lobbyists, rather than those investments that generate the most jobs or reduce CO₂ emissions the most.

The auto and road construction industries are far less labor intensive than they were fifty years ago. Pouring money into these capital intensive industries may do far less to bolster employment and revitalize the economy, dollar for dollar, than alternative public investments.

The metric for the bailout, as well as any stimulus, should be to give priority to investments that save or create the most jobs per dollar, while reducing the most tons of CO₂ per dollar. There are lots of great projects that would use government dollars far more wisely than bailing out Detroit. Maintenance of existing infrastructure should always be the first priority. Many cities from New York to Denver are considering costly rail extensions, but options like bus rapid transit that deliver more for less should be prioritized.

In a time like this, a good offense is far more important than ecological defense. An exciting project that creates jobs, reduces air pollution, and helps moderate income people commute faster and more comfortably every day is more important today than ever before.

ITDP initiates and supports projects that actually get built, not just policy reform. We have been able to redirect hundreds of millions, if not billions, of dollars in transportation investments towards environmentally sound projects that show the public a more desirable alternative to automobile dependence.

2008 has been an incredible year. TransJakarta, a project initiated by the DKI Jakarta Government at ITDP's urging, expanded to 97 kilometers long. It is now the longest trunk bus rapid transit (BRT) system in the world. Delhi, India initiated a 5.9 kilometer BRT system, which has the best pedestrian and cycling facilities in India. These systems have flaws, but they brought real improvements to millions of transit passengers and will hopefully lead to fundamentally different futures.

Ahmedabad, India, Johannesburg, South Africa, and Guangzhou, China all broke ground on very promising new BRT systems. ITDP was heavily involved in initiating and developing all of these systems, which will become opera-

tional in 2009. The Guangzhou and Ahmedabad systems also have great integration with new cycling facilities.

These systems are coming on line just as governments are preparing major stimulus packages. These projects have already redirected hundreds of millions of dollars in funds that otherwise would have gone to elevated highways and flyovers benefiting private motorists. If they are successful, expect this approach to be replicated all over Asia and Africa.

South Africa's BRT system will also transform the low income informal minibus operators into viable companies, creating well paid and meaningful jobs. In the past, under apartheid, the minibus taxi industry was one of the only places where black South Africans could invest their savings. If these taxi operators can make the transition from informal collectives to viable businesses, these businesses could become economic powerhouses all over Africa.

In Mexico City, special lanes for bicycles along a 14.9 kilometer stretch of the central Reforma Avenue, one of the main boulevards of the city, will open in 2009. The city has plans to build over 600 kilometers of bikeways by 2015, increasing cycling from 0.7 percent of all travel in the city to 5 percent in less than ten years. According to officials,

that many cyclists would cut annual emissions by 2.4 million tons of carbon dioxide, 5,000 tons of nitrogen oxide, 80,000 tons of carbon monoxide and 100 tons of particulate matter.

These are the sorts of projects that an economic stimulus should be funding – ones that give us the best performance per dollar spent on tackling climate change and poverty. Transit-accessible, afford-

able and energy-efficient housing, internet infrastructure, alternative energy investments, all should take priority over projects that just dig us further into the trap we are already in.

If we are going to demand performance from others, we need to demand performance from ourselves. Our work is now prioritized based on the impact it has in reducing CO₂ equivalent emissions per dollar spent, as well as jobs created or increasing the incomes of people below the median income. If a small group like ITDP can be held accountable, surely we should be holding the billions of dollars of economic stimulus accountable for their real long term impacts on poverty and the environment. 🌱



People and cyclists take over the streets during Paseo Dominical, Mexico City's car-free Sundays.



TransJakarta: Putting on Lipstick While Running to Catch the Bus

By Ratna Yunita

In Indonesia, there is an expression, “putting on lipstick while running.” Naturally, the lipstick may get a little smeared, but at least you will catch the bus. In just four years time, Jakarta, a city of 8.5 million people known for paralyzing traffic jams and choking air pollution, built the world’s longest bus rapid transit (BRT) system. With such a rapid rollout, however, there was bound to be some smeared lipstick.

On January 14, 2004, the Provincial Government of DKI Jakarta officially opened the first corridor of TransJakarta, the first full BRT system in Asia. During its first year, it served 15 million passengers and was viewed by many as the saving grace for the streets. Beginning with just 12.9 kilometers, TransJakarta is now 97.35 kilometers – bigger than the oldest BRT system in Curitiba, Brazil and the renowned system in Bogotá, Colombia.

The wider and well-paved new sidewalks built in conjunction with the BRT marked a revolution in pedestrian facilities in a city where less than 40 percent of the roads had sidewalks. However, it still serves fewer passengers than systems one-fourth its size, and congestion continues to clog the streets. Despite that, people in Jakarta remain obsessed with owning a fancy car or even a simple motorcycle.

Vehicle ownership is growing at nine percent every year, with over 1,500 new motorcycle registrations and 500 cars registered every day. Of the nine million vehicles in Jakarta, 69.2 percent are motorcycles and 20.8 percent are cars. Every year, over 600,000 new vehicles enter Jakarta.

The distressing condition of the roads is impacting Jakarta’s economic productivity and socio-economic growth. Traffic congestion in Jakarta costs around 1.4 billion USD per year, excluding the costs from the impact on health

from traffic air pollution. According to a survey by Bambang Susantono of the Indonesian Transportation Society, 60 percent of total journey time is either spent stopped or moving at very slow speeds of 20 kilometers per hour or less.

The enormous amounts of private vehicles and chaotic traffic jams are causing reduced fuel efficiency and severe air pollution from vehicle emissions. The State Ministry for National Development Planning stated that the city’s transportation sector contributes up to 90 percent of the city’s carbon monoxide and hydrocarbons and 76 percent of the nitrogen oxides.

According to INSTRANS, a non-governmental organization in Jakarta, 18.6 percent of TransJakarta passengers have shifted from using private vehicles based on a survey conducted in 2007. This number is rising due to the increased price of oil.

TransJakarta is regarded as a good alternative public transportation system in terms of the facilities such as the quality of its air-conditioning and affordable prices. Pre-paid boarding also distinguishes TransJakarta from the other buses. Drivers are more professional, not having to worry about ticket sales. But more needs to be done for TransJakarta to be a competitive alternative and truly transform the image of the city.

TransJakarta in Progress

TransJakarta operates currently in seven corridors with a total of 114 stations. By 2008, the system had reduced carbon dioxide by 32,310 tons per year and nitrogen oxide by 386 tons per year.

According to BLU TransJakarta, the public agency that manages the system, 208,000 passengers used TransJakarta per day between January to June 2008, which is up 29 percent from 161,000 passengers during the same period in 2007. The system uses 248 compressed natural gas (CNG) buses and 91 diesel buses.

Nonetheless, ridership is far lower than other BRT systems. TransMilenio has 84 kilometers of dedicated infrastructure and car-

	Emission				
	Nitrogen Oxides NOx	Particulate Matter PM	Carbon Monoxide CO	Carbon Dioxide CO2	Hydrocarbons HC
Without Busway (tons/day)	1.53	0.18	11.25	135.48	2.63
With CNG Busway (tons/day)	0.24	0.00	0.02	28.78	0.22
Reduction (tons/day)	1.29	0.18	11.22	107.70	2.41
Reduction (tons/year)	385.68	53.42	3,367.24	32,309.69	722.84

Emission Reductions from TransJakarta CNG Buses

Image: Michael Reppogle

Jakarta | TransJakarta

ries 1.4 million passengers per day. While TransMilenio was designed for higher capacities and suffers from some overcrowding, even systems that have less than a fourth of that amount of infrastructure carry more passengers per day than does TransJakarta. Optibus, Leon, Mexico's BRT system, is 26 kilometers and carries 220,000 passengers per day with articulated buses.

Anticipating increased demand and recognizing the need to provide high quality mass transit, BLU TransJakarta has

There are severe delays for passengers and overcrowded conditions at the stations where two BRT lines cross and many people transfer from one line to another. TransJakarta has introduced some services that provide direct connections between different lines that alleviate the need to transfer, but more direct connections could significantly reduce overcrowding.

Some of the corridors are operating with far fewer than the intended number of buses because of contractual disputes, again leaving passengers facing very long delays and overcrowding. Critical to solving these operational problems is to put TransJakarta, the bus operators and fare collection system operators on a sounder legal footing with contracts that more clearly lay out responsibilities and penalties.

Buses also spend 13.3 to 30.3 percent of their travel time at traffic lights. While bus frequencies are too high for traffic signal pre-emption to be effective, the intersections need to be reconfigured and signal phasing changed to help reduce traffic signal delay.

Delays at junctions and the lack of an operational control system also lead to buses bunching, resulting in irregular intervals between buses. If the wait is too long, especially during rush hour, people end up forming a long queue to board the bus. Without any explanations of the delay, passengers get frustrated, sometimes pushing each other onto the bus quickly and overcrowding it. In some very congested sections, the buses also operate in mixed traffic, further contributing to delay.

According to Rene Nunumete, manager of operations control of BLU TransJakarta, the bus operational problem is also caused by the inefficiency of the CNG refueling process. All but Corridor I buses use CNG, and the CNG buses being used can only travel about 100 kilometers before needing refueling. Because there are only three CNG refueling stations for the entire system, each refueling trip takes two hours.

Passengers also complain about the lack of information. Currently, information is provided in stations by ticketing officers, security officers and by a display. Complaints have been lodged about unfriendly ticketing and security

Passengers buy their tickets before entering the station. This pre-paid boarding makes getting on the bus much quicker and easier.



Jakarta's new sidewalks along the BRT corridor

committed to expanding its infrastructure and improving service. Three more corridors, for an additional 75.10 kilometers and 206 buses, are expected by October 2009.

One effort to improve customer service included BLU TransJakarta collaborating with a private company to install water fountains in several stations. Not only to attract more passengers, the fountains are intended for passengers observing Ramadan, the Islamic month of fasting, to be able to break their fast in the station during their commute home. The cost of the water purifiers is 20 million IDR each, or about 2,136 USD each.

Despite this, the system faces complaints from the passengers, mostly relating to convenience, safety and speed. "Why does it take so long for the bus to come? I have been waiting more than 15 minutes here," said a pregnant passenger who was waiting in the Harmoni station.

The four main areas of concern are long queues for passengers to board, lack of passenger information, insufficient bus frequency and the condition of the stations.

Long queuing times and insufficient bus frequency are caused by design and operational problems. The initial corridors were constructed for buses with only one door, constraining the number of people who could get off or on the bus at a time. The new corridors are fixing this problem, but the alterations are not completed on the most congested corridors.



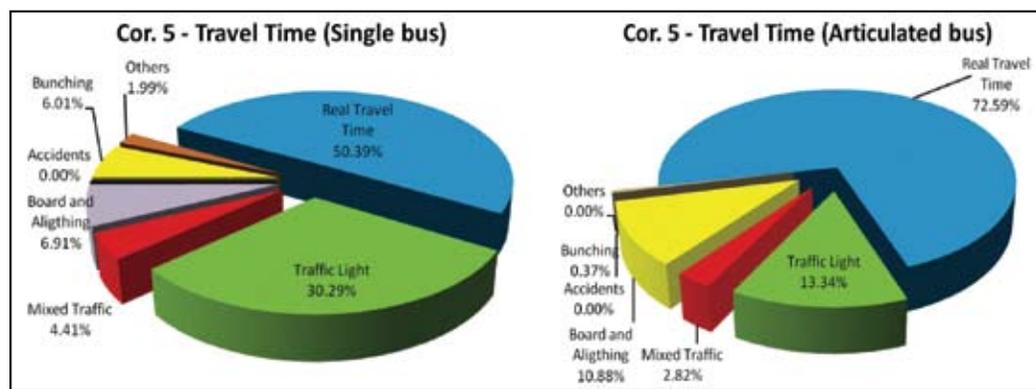
officers when explaining about the routes and transfer stations. Improperly printed route maps are too small to read and have no color index in order to differentiate each route.

On September 1, 2008, drivers on two corridors decided to strike, affecting thousands of passengers and the image of the system in the passengers' eyes. Many passengers had no information about what was happening. While the city responded

Beyond that, another critical piece, on which the Institute for Transportation and Development Policy Indonesia will be focusing, is conducting a public education campaign to address problems and attract new passengers. The project will promote the benefits of taking BRT, not just for commuting but for shopping, entertainment, school, etc. The infrastructure must be well established and managed. This might

increase the demand on TransJakarta.

The campaign will emphasize behavior and lifestyle with positive messages such as the health benefits of walking to the stations and the chance of meeting people from a diverse array of jobs and backgrounds. The goal will be to change points of view about public transportation from one of



Delay Percentage of Total Travel Time (Corridor 5)

by deploying buses from other corridors to provide service, if TransJakarta had a real-time communication strategy, passengers would have been able to quickly decide whether to patiently wait for substitute buses or take other public transportation. This event would not have hurt the system's image as much.

Often, especially in transfer stations and during peak hours, the stations are overcrowded and uncomfortable. Many passengers complain about cleanliness of the stations, as well as the maintenance. Many would like stations to be bigger with better air flow so that passengers will not feel so hot, especially as they wait in long queues.

Integrating TransJakarta

John A. Black, a lecturer at the University of Sydney, Australia, says sustainable urban development should encourage people to use public transportation, and the development of BRT and other forms of sustainable transport should support each other. Being a safe, reliable and comfortable mass transportation mode is not enough for TransJakarta; it must be well-integrated with other transportation modes if Jakarta really wants to reduce its congestion and pollution.

TransJakarta stations should be integrated with the rail stations or built nearby to facilitate easy transfer between the two. Having good pedestrian access means improving the sidewalks along the roads. Providing parking facilities for non-motorized vehicles, especially at the main terminals, will help create a low-cost, low-impact feeder system. Integration with other modes and strong land use planning will help reduce congestion.

inconvenience and for the low-income to one of quality, convenience and interaction for everyone.

Marketing the system will attract more users, but only if the government solves the operational problems and works



Transfer stations are overcrowded and uncomfortable.

to integrate well with other modes of transportation in the city. Luckily, the government is committed to TransJakarta, reflected in the allocation of 150 billion IDR (16.3 million USD) by the government to operate the three corridors that will open in October 2009.

Expansion of the system, however, needs to be equally complemented by strong attention to the level of service provided by the system. Only then, will TransJakarta help transform the city's image of infamous congestion into a famous, world-class example of progressive mobility for its citizens. 🌿

Image: Karl Fjellsrom



Vélib One Year Later

By Luc Nadal

On Bastille Day, one year after Paris unveiled the most ambitious public bicycle program to date, the idea of a more humane, less arrogant city has gained ground. Vélib users collectively logged over 27.5 million trips. Ninety-four percent of them said that they were happy with the system. Vélib captured imaginations with the timely blend of practicality, mobility, style, fun, exercise and environmental benefits.

Vélib helped the city calm traffic and improve air quality in measurable ways. Proving that places filled with people attract activity and activity attracts people, it also reinforced the vitality of public spaces, particularly at night after the metro closes.

Tens of thousands of Vélibers on the street has encouraged Parisians to dust off their own bikes and join the movement, boosting a renewal in cycling. Recreational riders took to commuting. Local sales of bicycles jumped 35 percent. “Velib is the most amazing advertising campaign we could have

dreamed of,” confided a bicycle industry representative.

Mayor Bertrand Delanoë easily won reelection six months after the launch due, in part, to the success of Vélib. Many people visit Paris to experience Vélib, and delegations from foreign cities are lining up to meet with project executives to explore how they could do something similar.

As of July 15, 2008, the system had grown to 16,000 bikes and 1,200 stations. Vélib had 75,000 trips per day on aver-

Above: The stylish system attracted stylish riders.

age, rising to 120,000 trips on a typical sunny day. The system had 200,000 annual subscribers who pay a yearly fee to use the bikes whenever they want. Many more use by paying the daily or the weekly fee.

Vélib is first a public transportation success, filling an important gap for short trips and integrating well with other transportation modes. Two-thirds of users say their Vélib trip is usually a segment of a longer journey. A majority of long-term subscribers use Vélib daily to go to work or school. More than half of users took more trips than they would have before. About one in five reported driving less than they used to.

Meanwhile, the city earned about 20 million euros (29.9 million USD) in revenue from Vélib subscriptions and rental fees. It was originally anticipated that the revenue from these fees would be around 30 million euros. The city also received 3.5 million euros (5 million USD) from the operator of the

to empty ones by van and trailers has surpassed expectations.

To encourage people to return bikes to underused stations, the city recently announced a 15-minute credit as a reward for users returning bicycles to specific stations, particularly those located on hill tops.

Under heavy use and occasional rough treatment, the bicycles have been wearing and tearing faster than expected, causing strains in maintenance and prompting a reinforced second generation of bikes.

Theft and vandalism have run higher than expected. The operator has replaced thousands of bicycles at a cost of 3 to 6 million euros a year. About 3,000 bikes have been stolen and as many vandalized.

Nonetheless, Vélib is set to expand soon to the first ring of suburbs with an addition of 4,500 bikes to the 20,600 initially planned. The deal faces legal challenges because of a potential monopoly situation created by the proprietary



system that won the contract to implement and manage the system in return for exclusive rights to outdoor advertising in public space.

The operator is required to pay this fixed yearly fee, as well as penalties according to the contract. As the system transitions from implementation to regular maintenance, the city is set to receive these penalty payments based on the strict performance benchmarks and standards written into the contract.

Ensuring that both bicycles and open spaces for returns are available at each station has proven a challenge. The capacity of the system to auto-regulate was overestimated, and the need for manually transferring the bicycles from full stations

Maintaining balance between the stations, so that they are neither completely full nor completely empty, has been one challenge for Vélib.

nature of the bicycle and how it locks into the stations, as well as the computerized management systems. The system's operator clearly is in a strong bargaining position when it comes to bidding on the expansion.

As operators and the government work to alleviate the problems what remains is Vélib's transformation of Paris by revitalizing public spaces and providing cycling for a whole city. 🌿

Guatemala City: Bus Rapid Transit Comes to Central America

By Oscar Edmundo Diaz

“People behave the way that they are treated” is an old adage that is proving true in Guatemala City.

In a city of 3.5 million people, 68 percent use public transport – a service that before 2007 was characterized by irregular frequencies, poor service, dangerous driving and high levels of pollution. In 2007, the city opened TransMetro, the first full bus rapid transit (BRT) system in Central America. The change from the old bus system to TransMetro has been dramatic. People feel respected by this new system and, in turn, respect it.

The city created the Guatemala 2020 Master Plan to improve the quality of life for its citizens partly based on a culture of respect. The plan also sought to improve public services. The new

BRT system was expected to combine those two goals.

In addition to creating a new metropolitan transport authority, the plan also introduced traffic demand management measures such as reduced parking for automobiles, flexible scheduling for work and study and limiting heavy truck access in the city. The plan also looked at the possibility of using mobility-related taxes to support public transportation.

On February 3, 2007, TransMetro began operations of Phase 1. Open from 5 a.m. to 11 p.m., the system moves 150,000 passengers per day. The first corridor has 8.5 kilometers of exclu-

sive busways and 2.5 kilometers where the buses operate in mixed traffic. The total network will consist of ten corridors with a total extension of 95 kilometers of exclusive lanes by 2020.

As has happened in Curitiba and Bogota, political will determined the city's ability to achieve its goal. Mayor Álvaro Arzú set the context with the Plan 2020, but Deputy Mayor Enrique Godoy spearheaded the BRT project. Described as a “doer,” he fought significant opposition in order to get TransMetro running.

He also was behind several improvements in the city center, including Pasos y Pedales, Guatemala City's car-free Sunday. Starting in Reforma-Américas, it runs through five different areas around the city. Eventually the project will include more streets that will connect the areas together. Godoy also oversaw the implementation of public activities, such as Tai Chi classes, extreme sports, aerobics and volleyball stations.

All this helped Mayor Arzú get reelected. Internal politics, however, caused a rift between the two men. Before stepping down from the new reelected government, Godoy accepted a Sustainable Transport Award honorable mention on behalf of Guatemala City in January 2008, mainly for the success of TransMetro.

TransMetro's buses are able to achieve average speeds of 35 kilometers per hour, when previously the average bus speed ranged from four to ten



Image: TransMetro

Left: Over 150,000 passengers use the system every day.



display advertisements. Worries about visual pollution have been dispelled; the city controls the size and quantity of the advertisements.

TransMetro is owned and operated by the city government, and the drivers and mechanics are hired through outsourcing. Having a monopoly operator, even (or especially) if it is the public sector, can compromise the quality of service. Outsourcing maintenance may lead to sub-optimal upkeep that will increase the operating costs ultimately paid for by the operating company or the government and not the mechanics.

A large percentage of the population rides the system for free, undermining the financial viability of the system. A national law mandates that the elderly and students do not pay. Also, fare evasion is high. If a passenger fails to insert the token into the turnstile, the turnstile lets them through anyway. At the stations, the exits are open, having no turnstile or any other device to control access and avoid passengers entering there without paying. Due to lack of enforcement, some passengers ride for free.

There is a saying in Central America that it is easier to increase the price of milk than the fare of the bus. The fare is currently very low at 1.0 quetzal (0.13 USD), while TransMetro estimates that real cost of operating the system is between 2.25 – 2.5 quetzals per person (0.30 – 0.33 USD). The government, afraid of increasing the fare for fear of huge protests and vandalism, will continue to subsidize operations. The income of the system is not a concern for the government, but this leaves the system with a weak financial model. If no measures are taken, the financial footing of the system is going to get weaker as the system expands.

The city, supported by the Inter-American Development Bank, has awarded the studies for the Phase 2 – the north-east corridor. Given the public response to TransMetro so far, Phase 2 is likely to be as successful as the first one. However, fixing the financial model will be the key to securing the sustainability of the system. 🌱

kilometers per hour. These speeds are mostly due to the fact that the system has five underpasses that avoid intersections and only two traffic lights in the segregated infrastructure sections. This has reduced the travel times from 1 hour and 15 minutes to 18 minutes for express service.

The system operates with 65 high-floor articulated buses that can hold up to 165 passengers each and have doors on both sides. The city procured 17 new buses and retrofitted 48 to begin operations. Ten more will be added to the system later this year. It uses a token-based fare system.

Thirteen closed stations, where people have to pay first before entering the station like in a subway, are located about every 600 to 800 meters and are connected to a control center. At the stations, there are well-marked yellow lines to indicate where people should stand in order to allow passengers to get off. No person crosses that line until all passengers have disembarked. One main interchange station integrates TransMetro with feeder buses, as well as intercity buses so that those buses do not need to travel into the city.

Guatemala, a country with scarce resources, has an annual average income of \$2,150 USD. Despite a lack of money, the city created a state-of-the-art system using creative financing to build the infrastructure. The construction of one station was financed by the owners of a shopping mall,



*Top: People wait patiently behind the yellow line until all the passengers get off the bus first.
Below: A customer service agent stands ready to help passengers enter the station.*

including the underground passageways linking the mall and the station. New shops were built in those passageways, and for the first 12 years, the owners will keep the profit from renting those shops. After that, all proceeds will belong to the city. This is similar to what the Hong Kong subway did to generate additional income for the system and cover the losses of the subway operation.

Some pedestrian bridges linking the sidewalks to the stations in the middle of the road were financed by the private sector in return for permission to

Bus Rapid Transit's New Wave

Ahmedabad, Guangzhou, and Johannesburg

A decade ago, bus rapid transit was virtually unknown outside of Latin America. Bus rapid transit (BRT) is a bus-based mass transit system that adopts many of the characteristics of the best metro systems in order to offer a speed of service and a level of comfort and convenience previously only associated with metro systems, but at a fraction of the cost.

Since 2004, systems with some elements of BRT have opened across Asia – several in India, Indonesia and China. Though all of them have some unique elements, none of them broke any significant ground, nor can they compare with Bogota's TransMilenio in terms of speed, capacity or quality of service. As a result, public support for BRT remains tepid in Asia, and Africa has yet to open a full system.

In 2008, three systems broke ground that promise to fundamentally challenge the public's perceptions of bus-based travel, offering important innovations in BRT design and implementation. The Jan Marg system in Ahmedabad, India, promises to be the first full featured BRT in India. The Guangzhou system promises to be the first high capacity, high speed 'direct service' BRT system. The Rea Vaya system in Johannesburg promises to be the first full featured BRT system in Africa.

Ahmedabad, India

Jan Marg, Ahmedabad's bus rapid transit (BRT) system, is scheduled to start commercial operations in the summer of 2009. It will be the first integrated system developed in India with segregated corridors supported by feeder services and integrated with the existing public transport system. A lot is expected from this launch after the unimpressive debut of 'limited bus-way systems' in Delhi and Pune that came under much media criticism.

The initial launch of the system will have 50 buses providing service along a 38 kilometer network of segregated busways with 58 median-aligned stations. It will use electronic ticketing and give high quality passenger service.

Full implementation of a city-wide system will take another two and a half years and increase the system to 90 kilometers of segregated busways with 200 trunk buses and 90 feeder buses providing service. Half a million passengers are expected to use the system every day.



Top left: An elevated section of the BRT will significantly reduce travel time for passengers. Top right: Tree shaded pedestrian paths, cycling tracks and public spaces will line the new busway. Bottom: The stations will have electronic ticketing and real time information displays.



Guangzhou, China

Guangzhou's BRT commenced construction on November 30, 2008 and will be operational by the end of 2009. With an expected peak ridership of at least 20,000 passengers per hour in one direction, the system will have more than double the passenger capacity of any other BRT system in Asia. More than 600,000 passengers will use the corridor each day. This system will be the first to combine the convenience of direct services with the speed and station quality normally only found on trunk and feeder BRT systems.

Major stations will include footbridges and escalators, and the system features a connecting tunnel to underground metro stations in three locations, integrating with two different metro lines. Continuous bike lanes are provided along the corridor, and 5,500 bike parking spaces have been included in the design of the BRT stations. The construction cost is around \$6 million US dollars per kilometer.



Left: The BRT system, running in the middle of the road, has passing lanes at the stations which increase the system's speed and capacity. Middle: Senior engineer Duan Xiaomei explains to reporters about the new system during the groundbreaking ceremony. Right: The groundbreaking ceremony for the Guangzhou BRT was held on November 30, 2008.

Johannesburg, South Africa



The first full bus rapid transit system in Africa is expected to open in 2009 in Johannesburg, South Africa. The Rea Vaya system, which means "We are moving!" in Sotho, hopes to transform public transport in South Africa and be a model for the continent. Phase 1a, currently under construction, will link downtown Johannesburg to its most famous suburb, Soweto. Over 69,000 passengers are expected to ride the system daily when it opens, using smart cards to access the system. It will have 25 kilometers of segregated bus corridors with 27 stations.

Phase 1B, totaling 63 kilometers, will be open in time for the 2010 FIFA Soccer World Cup tournament being held in South Africa. The full Phase 1 will expand the system to 122 kilometers of segregated bus corridors and 162 stations. Expected to open by 2013, 434,000 passengers per day are anticipated to use the system.

Left: The first prototype Rea Vaya BRT station at Joubert Park in the downtown officially opened in November 4, 2008.

Right: Stations will have turnstiles for controlled access to the system, ticket machines, real-time information displays, and wheelchair access.

bogotá: edging back from the brink

By Ando Despacio

In the past ten years, thousands of policymakers, planners and city officials from all over the world have visited Bogotá to ride the iconic shiny red buses of its bus rapid transit system, to walk, run, and rollerblade down streets closed to cars on Sunday, and to pedal along its extensive network of segregated bikeways. Inspired, these officials return to their cities and try to implement similar, and in some cases better, transport policies in their home cities.

Last year, the citizens of Bogotá defeated the re-election bid of former independent Mayor Enrique Peñalosa, the lead architect of Bogotá's sustainable transport transformation. They voted instead for Samuel Moreno, the candidate of the Left-oriented Polo party. Mayor Moreno's transportation policies were a mirror image of Peñalosa's, and his promises to build a metro were part of his electoral success.

Initially, the new administration was promising no more investment in TransMilenio, the bus rapid transit system. Investment was to be directed to the metro and elevated highways. Since then, however, it seems that the Moreno administration has been forced by reality to be more pragmatic, announcing plans for expansion of TransMilenio.

While advocates for sustainable transportation policies have spent the last months struggling to come to terms with this partial repudiation of Peñalosa's vision by Bogotá voters, it appears that financial reality will get the final vote. While Mayor Moreno's transport program originally promised to undo much of the Peñalosa legacy, it increasingly appears that the reports

of the demise of the Bogotá model were premature.

Transformation of Bogotá

Riding a bicycle in Bogotá before 1998 was exhilarating, to say the least. Cyclists jumped sidewalks and potholes and swerved between traditional buses that fought among themselves for passengers. Bike lanes were something



Ciclovía gives Bogota residents a chance to reclaim the streets on carfree Sundays.



that only existed on postcards from Holland.

Bus passengers, struggling to read the route written on a small sign in the front windshield, would weave among buses to find the right one. They needed to ring the driver two blocks before their stop, sometimes getting a slight electric shock from the button. The buses were filthy and dangerous.

Walking on sidewalks was a constant battle. Pedestrians traversed up and down staircases in the middle of the sidewalks while dodging parked cars and looking out for potholes or fragmented sidewalks. The minority riding in cars were kings. They parked wherever they wanted, blocked pedestrian crossings and shouted at people to get out of their way.

In 1998, Bogotánians would have never guessed that their city would be transformed into an award-winner

Above: TransMilenio carries over 1.4 million passengers a day.

that would be the subject of countless interviews, documentaries, articles and books. But their city was.

The transformation began in 1995 with Mayor Antanas Mockus' efforts to make Bogotá a more self-aware city. To promote a "citizen culture," Mockus employed mimes on the street holding cards that depicted either a thumbs-up or thumbs-down. The mimes used the signs to reinforce good, and reject bad, citizen behavior. Using humor in this way, Mockus fostered a civic pride in Bogotánians. They began to believe that their "flirty" city, as Mockus coined it, could be improved.

The physical transformation occurred mainly under the leadership of Mayor Enrique Peñalosa after 1998. First, he overhauled transport policy. This shift in policy gave priority to pedestrians and transformed public transport into a high functioning, high quality mass transit system.

During his tenure, almost all parking bays were closed in the downtown area

and many were converted to protected sidewalks. Other sidewalks were widened and given either high curbs or bollards to help protect them from parked cars. Over 300 kilometers of bikeways were built in part to give priority to cyclists, as well as link them to mass transit. No longer having to weave and dodge potholes and buses, cyclists felt much safer and that resulted in more people cycling. Bike use increased from 0.58 percent to 4 percent.

Most famously, Peñalosa's administration planned, designed and opened TransMilenio, the exemplary and innovative bus rapid transit (BRT) system. Opening in 2000, Phase 1 of TransMilenio was the first functioning mass transit system for the city. And it fundamentally changed the way the world views BRT systems. Suddenly, BRT could move 45,000 passengers at 29kph in each direction during the peak hour, a capacity and speed comparable to most metro systems.

The capital of a country previously

Image: Carlos E. Pardo

Bogotá | Back from the Brink



Investments in cycling infrastructure included bicycle bridges like this one.

noted only for kidnappings and guerilla war became a model of cutting edge transport policies for the rest of the world. Since then, for the most part, successive mayors, including a second term for Mockus, continued to support and enact similar policies, including opening Phase 2 of TransMilenio, building more bikeways and expanding sidewalks.

The City Today

By 2007, almost 10 years after Peñalosa's mandate began, Colombia's gross domestic product had increased substantially, the US dollar had devalued, and, as a consequence, more people could afford automobiles. Motorization started to gain momentum.

In 2006, car sales hit a record high of 200,000 units sold as opposed to 60,000 sold in 1999. Motorcycles became far more popular. Advertisements for motorcycles targeted bus passengers telling them to "pay for your motorbike for the same price of your

public transport ticket."

Citizens also grew accustomed to a mass transit system. Now an 84-kilometer network, TransMilenio was a much more robust system with almost 1.4 million passengers a day. The number of routes and the complexity of the network increased, and to an extent, quality of service began to suffer.

Surveys like Bogotá's *Cómo Vamos* showed citizens' perception of public transport on a scale of 0 to 5 rose from below 3 before 1998 to above 4 in 2001 after TransMilenio opened. In 2004, however, the high rating started to fall to an average of around 3.5. People complained that the buses were too crowded and fares were too high.

During the 2007 mayoral campaign, transportation became one of the major election issues. Former Mayor Peñalosa was running against Samuel Moreno, and Moreno sought to differentiate himself from Peñalosa by promising a metro as the solution to dissatisfaction with public transportation. The citizens voted for "the subway candidate." Moreno became mayor on January 1, 2008.

Even though Moreno's party is more left-wing, his transportation policies were not as progressive. "The left has no ideologically coherent policy on transportation, and as a result, left political parties sometimes take diametrically opposed positions on transportation policies in different cities around the world," said Walter Hook, executive director of the Institute for Transportation and Development Policy.

Initially, the driving characteristic of Moreno's transportation policy was its opposition to that of Peñalosa. As Lee Schipper, visiting scholar of University of California Berkeley, said: "The risk is that when an opposition party comes in, they want to destroy what is good just because it was introduced by the "other" side. Correct me if I'm wrong, but that is clearly what is happening in Bogotá."

On April 14, 2008, Luis Bernardo Villegas, the city's new Secretary of Mobility, presented Moreno's transport plans. He proposed a standard busway on Avenida Séptima, the important road through the central business district that was previously slated for the next TransMilenio corridor. Villegas also announced plans for elevated highways, saying "We will have similar roads as those in Mexico City, Los Angeles or Detroit." He also promised new car parking.

The government announced plans



Infrastructure in Bogota makes it safe for children to bike.

"Listen, this is a metropolis, we have one million cars in this city and I drive 300 kilometers a day. Peñalosa did a lot, but we still need more." - Taxi driver Elio Ulloa

for a metro, but gave no determination of where it would go. Several corridors were discussed, and rumors were flying that the new metro would be built down Avenida Caracas, effectively destroying TransMilenio.

During elections, Moreno said he would finance all transport improvements with the funds from traffic violations and tickets. Meanwhile, Villegas was saying, "We cannot build more BRT (TransMilenio) because we have no more money."

Realizing that parking ticket revenues are only a small fraction of the funds needed, the city has approached both the World Bank and the Inter-American Development Bank for loans. Both development banks have warned of the high costs, extensive delays in construction time, and other difficulties associated with metro systems.

The World Bank loan is paying for a feasibility study for a metro, but the terms of reference do not even define where the metro will be. This will be determined by the study. The studies for the metro are expected to take three years, and construction would take a minimum of three to five additional years, so the citizens of Bogotá would have all the construction headaches and none of the benefits by the time Moreno is due to leave office in 2010. President Alvaro Uribe has promised to pay for 70 percent of the metro, about \$110 million out of \$160 million, but not until after 2015.

But if nothing is done in the interim, transport problems will reach crisis proportions. Based on modeling done by the Universidad de los Andes jointly developed by German Lleras, Juan Pablo Bocarejo and Fernando Acevedo, a do-nothing, "business-as-usual scenario" results in traffic being paralyzed by 2012.

This worries taxi driver Elio Ulloa. "Listen, this is a metropolis, we have

one million cars in this city and I drive 300 kilometers a day. Peñalosa did a lot, but we still need more. Samuel [Moreno] promised a metro, but that one will take three more years just in studies. After that, who will give us the metro?" he said.

Gilma Jimenez, councilwoman for Peñalosa's political party, said "The Mayor promised a metro on Séptima in order to avoid building TransMilenio, and today there won't be one or the other. I think nothing different from an ever-worsening traffic jam will be seen in the Séptima. Neither the central government nor the city has the kind of money to build what is being proposed, but the media, the technical people and the public opinion don't seem to understand this."

Since then, however, the Moreno administration is changing their stance and has announced that construction on two of the three original Phase III corridors of TransMilenio will commence in late 2008: along Avenida El Dorado to the airport and along Carrera 10.

Villegas, the Secretary of Mobility, has been replaced by the former general manager of TransMilenio, Fernando Álvarez. This offers hope that the Secretary of Mobility will be more progressive in his transportation views.

Remaining controversial is what to do with Avenida Séptima, Bogotá's "high street." It is the continuation of Carrera 10 and was to be the third leg of TransMilenio Phase III. Originally, the Moreno administration intended to build a standard busway down Avenida Séptima, but as part of the discussions

about what to do with this corridor, metro, light rail and bus rapid transit were all discussed.

A busway will not solve Séptima's transit and congestion problems. Asking passengers traveling on TransMilenio along Carrera 10 to transfer to a subway or a light rail does not make sense. But putting a BRT down that road with passing lanes was never



TransMilenio passengers: slightly less satisfied

going to be easy. The road is narrow and the buildings along it are expensive. The current discussion has now shifted back to the original proposal of extending TransMilenio down Séptima, but without passing lanes.

Regarding bicycles, the mayor has also promised to build an additional 20 kilometers of bikeways to complement the existing 345 kilometers. Bogotá has a relatively high percentage of cyclists. Due to the increase in cars, motorcycles and new, inexperienced drivers on the road, bicyclists are now at a higher risk than ever, particularly at intersections or on roads leading to bikeways.

Adriana Hurtado used to cycle a lot

Image: Aimee Gauthier

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in Bogotá before she was pregnant. Getting on a bike again after two years, she was stunned by the deterioration in conditions. “I thought I was going

Wednesday night bike rides are occurring, led by Andrés Vergara, whose sole interest has been to show citizens of Bogotá the bikeways of the

city itself,” explained Edgar Enrique Sandoval, the first general manager of TransMilenio, about why Bogotanos voted for Moreno. But it is beginning to be understood inside the city. The question is “where to now?”

Jaime Ortiz-Mariño, one of Moreno’s advisors and one of the founders of the Sunday Ciclovía, argues that sustainable transport policies cannot compete with the status of car ownership. “I am not against TransMilenio, large scale bikeways or automobile restriction... One key issue is that, right now, the amount of users who shift from public transport to individual vehicles exceeds in great numbers those who are shifting from individual vehicles to public transport, let alone to bicycle use.”

Yet, as Peñalosa states, “In Karachi, Manila, Lagos, Cairo, those cities would give anything to have a BRT. In Bogotá we are in a rush to finish it as irresponsibly as possible. What we really need to do is to charge for use of automobile, and use that to subsidize an even better public transport and better roads, build BRT trunk lines everywhere, integrate the bus system, improve sidewalks, and build more bikeways.”

Darío Hidalgo, the former deputy manager of TransMilenio and the former director for the metro project of Bogotá in the late 1990s, argues that we should “...not concentrate so much on the metro issue, but on many other topics of mobility and urban development that the city must confront.”

Sustainable transport advocates the world over who suffered something of a crisis of faith when Peñalosa lost his re-election bid can rest a bit easier knowing that Mayor Moreno is showing increasing pragmatism as he settles into office. Meanwhile, the changes that were so strongly associated with one man’s vision are becoming the common heritage of Bogotá’s citizens, and civil society groups are mobilizing to protect and defend the revolutionary changes that Bogotá introduced to the world. 🌍

With special thanks to Mario P. Velez for assisting in compiling information and conducting interviews for this article.



to be run over by someone,” she said. “They’re so crazy out there. It seems like another city.”

Metropolis Alive

What Bogotá never really had in the 1990s, and did not really emerge until 2008, was real citizen participation and advocacy for transport. Since the current mayor started implementing his new policies, groups of citizens have begun to form, such as the “Bicibogotá,” which represents bicycle users’ rights and promotes proper policies and the use of the bicycle.

The local Chamber of Commerce has taken the lead in proposing changes and improvements to the city’s transport projects in an open letter to the mayor. They have advocated for greater priority of people-centered modes and have proposed a reevaluation of the policies that have been put forward. An organization representing residents along the Avenida Séptima has officially requested the mayor to build TransMilenio on that avenue.

city without charging them to be led. These rides last until midnight with groups of up to 150 people. Even a “critical mass” group has emerged to prove to people that bicycles are not stopping traffic, but that they are traffic, as in the famed San Francisco-born initiatives.

With this engaged citizenry, a new mobility secretary and announced expansion of TransMilenio, there is hope that Bogotá will continue to be a worldwide model for sustainable transport policies. But it is not clear that Bogotá will continue to be the source of cutting edge transportation policy and projects.

The Future of Sustainable Transport

“Peñalosa thought of implementing a series of novel projects for Bogotá, wanting to make it a world class example in terms of urban development and mobility. Unfortunately, these statements were understood better in other places than inside the

Designing Harbin's Roads for Tomorrow's Transit

By Karl Fjellstrom

Like other Chinese cities large and small, Harbin is rapidly building a new central business district (CBD) along with a network of new roads serving new development areas. Perhaps the most pressing transportation issue in China today is the design of these new roads.

The way to influence the design of these new roads in the short to medium term does not involve national or provincial standards, regulations, or guidelines. Rather it involves helping to set de facto standards at the city level through high quality demonstration projects. One such attempt at a demonstration project was undertaken by the Institute for Transportation and Development Policy (ITDP) together with Nelson Nygaard, a consulting firm specializing in non-motorized transport planning, and the Guangzhou Municipal Technical Development Corporation (GMTDC) in Harbin in early 2008 before the spring thaw allowed road works to begin on the city's new CBD.

Harbin is a city of around five million inhabitants, the capital of Heilongjiang province in the far north of China. Although founded only 100 years ago, it has a rich history and culture which is reflected in stimulating streetscapes and an urban form reminiscent of historical European cities.

After completing a sustainable transport study funded by the Asian Development Bank in 2007, the city hired ITDP, Nelson Nygaard, and GMTDC to revise the transportation design of the new CBD.

This work, completed in early 2008, mainly involved overhauling the road and intersection designs and revising the standard cross-section designs for all roads. Designs and renderings of future BRT stations were included to ensure that adequate space is left for future BRT implementation without requiring road widening or reconstruction of the entire road right-of-way.

The key design recommendations of the report were approved, construction specifications have been changed, and the revised designs are currently being implemented, including the provision of space required for future BRT implementation.



Harbin is located 1,000 kilometers northeast of Beijing.



Top left: In narrower road ways, the proposed cross-section offsets the BRT stations so that they can have passing lanes, as illustrated in this rendering of Chilun Road. Top right: A green median, like the one shown in this rendering of Kang'An Road, is recommended so that the BRT system can expand to a higher capacity by including passing lanes without having to rebuild the road. Bottom right: The needs of pedestrians, buses, and non-motorized vehicles are being neglected while car ownership is exploding.

Images: Clockwise from top left: GMTDC; GMTDC; Karl Fjellstrom

Cycling Renaissance in Guadalajara

By Tom Bertulis

Guadalajara, known for its glittering nightlife and as the home of tequila, is poised to reclaim its title as Mexico's original "cycling town." Since its peak in the 1920's, the numbers of cyclists have been in decline. But today, an increasing number of cyclists weave among colorful Mariachi bands near sweet-smelling mango stands and criss-cross the streets of this hip and vibrant city.

These cyclists belie a troublesome truth – Guadalajara, the second largest city in Mexico, is a long way from being a safe, comfortable, and easily accessible city for the average *Tapatio*, as people from Guadalajara are known. Too many people in this city will not cycle on the streets for fear of fast-moving automobiles.



Young boy cycles through the downtown

But as the Bob Dylan song once proclaimed, "the times, they are a-changing." Dylan, who was said to have been inspired by Jack Kerouac's famous poem "Mexico City Blues," could easily have been referring to Guadalajara. The city has announced plans for a 367 kilometer bicycle network developed this year by the Institute for Transportation and Development Policy's (ITDP) Mexico office. Construction on the initial pilot bikeway, the first step toward transforming Guadalajara into a truly cycle

friendly city, has begun.

This unprecedented momentum is due in part to Guadalajara's position as host of the 2011 Pan American Summer Games.

From Car Conurbation Toward Cycling City

More than four million people live in the greater metropolitan area of Guadalajara, and the driving culture is typical of a Latin American city of its size. Drivers generally do not yield to bicyclists and pedestrians, and they are unlikely to obey signs and lane markings. The streets heading towards the tourist-laden city center are saturated with cars zipping by in every direction.

In Guadalajara, car ownership grew more than 50 percent from 2000 to 2008. There is one car for every three persons, as compared to a one to four in Mexico City. These two-ton steel conveyances are bad for the citizens' fragile lungs. Residents are exposed to annual average concentrations of fine particulate pollution (PM10) exceeding 50 micrograms per cubic meter, the annual average standard in both Mexico and the United States. Consequently, health, mobility, and environmental issues are at the forefront of the city's attempts to transform into a sustainable model for the entire nation.

Guadalajara boasts 212,000 daily cycle trips, or about 3.5 percent of all

trips made using a vehicle. The majority of these users cannot afford a car, and cycling has been equated as a "lower class" activity.

Bright Idea for Bicycles from Bogotá

Fortunately, that perception is changing faster than you can say *¡Híjole, ahí vienen las bicis!* In the spirit and style of Bogotá's famous *Ciclovía*, *Vía Recreativa* opened in Guadalajara in 2004. Every Sunday, the *Vía Recreativa* is reborn when nearly 60 kilometers of roadways are closed to cars and open to cyclists, pedestrians, rollerbladers, joggers, and skate-



Bicycle art at bike parking

boarders. During six hours, as many as 120,000 people participate in the festive event, which stretches across the city and enjoys widespread popularity.



An aerial view of
Guadalajara's historic downtown

the cyclists from pedestrians to minimize conflict between the two users, a design aspect often overlooked. Critically, measures were implemented to slow speeds and mitigate safety issues at intersections, where most crashes occur.

Federalismo Avenue is a two-way street, and it will have bike paths on both sides of the street that follow the direction of the rest of the vehicular traffic. Generally, bi-directional bike lanes are not recommended as they create confusion at intersections for both drivers and pedestrians who are not expecting bikes to be coming from the other direction.

To minimize the conflict between

In the last year, new grassroots activity has sprung up like sunflowers across the city. Numerous local groups, like Colectivo Ecologista Jalisco and GDLenBICI have played an important role in improving cycling in the city.

Weekday rides have been attracting upwards of 900 cyclists each. Like the *Vía Recreativa*, these rides attract new cyclists, who enjoy participating in these celebrations of cycling and feel safe doing so. These events have begun a shift in perception of cycling in the city, and many *Tapatíos*, especially the young and active, are viewing cycling as trendy and chic, a rarity in a Latin American city.

Enthusiasm comes not only from *los ciudadanos*, the citizens. Biking also enjoys a high level of support from top local and state government officials, who are working to develop a world-class cycle network. Safe cycle-routes could increase bicycle use from 3.5 percent to 7 percent.

Breaking Ground on Guadalajara's First Bike Facility

Guadalajara is pressing forward to implement its bicycle network plan, beginning with the priorities that ITDP identified after conducting an origin-destination analysis.

The city has begun constructing the first segment of the cycle network along Federalismo Avenue, a high-speed, high-volume north-south corridor through the heart of the city. The first 4.5 kilometers of this *vía confinada*, or segregated bike facility, is scheduled to be completed in early 2009, with an additional 3.5 kilometers to be built after that.

Already a popular route for cyclists, especially for long distance trips, the design of the bikeway tried to resolve the segregation versus integration debate. Through extensive public involvement and community outreach, two main needs were identified: those of new users who prefer segregated lanes that protect them from cars; and those of advanced cyclists who prefer directness and speed.

To meet both of these needs, a "dual system" design was used where cyclists are protected from the motor vehicles with a row of parked cars, but can easily navigate out of the bike facility to integrate with motor vehicles in the street. A green area with trees separates

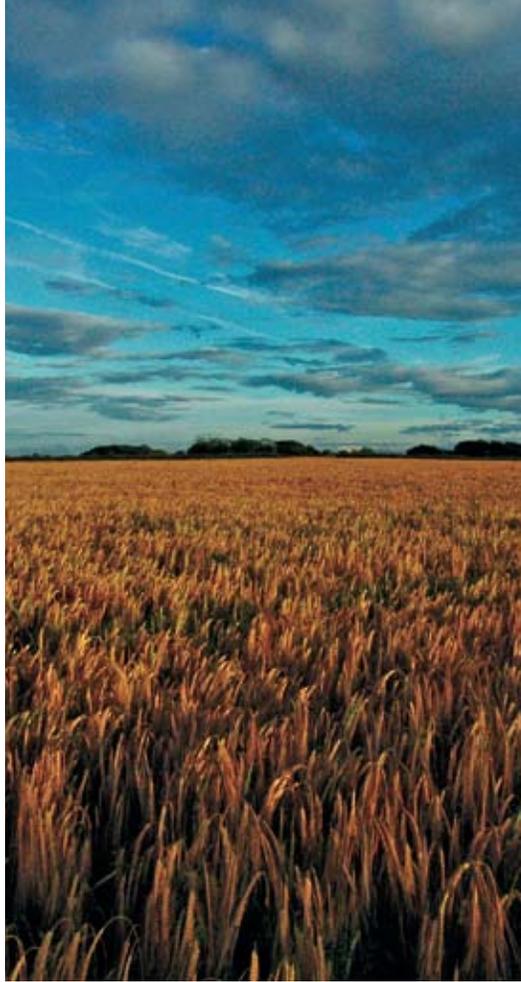


The raised cycle track on Federalismo Avenue
is under construction.

bikes going straight and motor vehicles turning right, the city decided to reduce the turning radius for cars in order to slow them down. After several field tests with the help of ITDP staff, it was determined that 3-meter radii would slow cars substantially while still allowing large buses to safely navigate the intersection. The engineers also agreed to remove car parking to increase sight distance.

A further suggestion to add a raised table so pedestrians and bicyclists could cross at the level of the sidewalk was

continued on p. 35



The Promise and the Peril of Biofuels:

Trends in Reducing CO₂ in the Transport Sector

By Walter Hook Recently, a room full of Americans boisterously chanted “Drill, Baby, Drill.” Was it a scene from the Paul Thomas Anderson film, “There Will be Blood?” No, it was the Republican National Convention.

Though the slogan did not turn out to be a winner and oil prices have tanked with the economy, we now have an idea what America is like when gasoline prices rise over \$4 a gallon. The political will to stop offshore drilling vaporized. U.S. voters may stop at nothing to keep fuel prices low. The world should beware.

The U.S. cannot drill its way out of oil dependence. Offshore drilling would have only a marginal impact on fuel prices, and only after about a decade. The oil and auto interests that dominate global transportation policy know the oil age is ending. They have seen the future, and they are betting that biofuels and dirty fuels, such as oil shale, liquid coal and tar sands, will replace oil eventually.



*Drill, Baby, Drill;
Grow, Baby, Grow;
or Bike, Baby, Bike?*

rently requires a 20-25 percent ethanol blend. Brazil is also mandating a five percent biodiesel blend by 2013. The European Union currently has a 5.75 percent biofuel share and will require an increase to 10 percent by 2020. China has promised to use a 10 percent ethanol blend by 2010 in 10 provinces.

The United States' Energy Independence and Security Act of 2007 requires oil companies to increase the amount of biofuels they sell from 6.4 billion gallons a year, 4 percent of our current fuel consumption in 2007, to 46 billion by 2030. The act also requires that at least 50 percent of vehicles produced by 2020 be capable of operating on E85, a fuel blended with 85 percent ethanol.

Ethanol is produced in three main ways: from the fermentation of sugar-based feed stocks like sugar cane, from starch-based feed stocks like corn, or from lignocellulose, which is the non-edible material in plants like wheat or corn stalks. Biodiesel is made from oil-producing plants, such as soybeans and palm fruit.

While burning biofuels generates about 20 percent less CO₂ per kilometer traveled, the full greenhouse gas impact also depends on the CO₂ generated producing the fuel and shipping it to markets. Generating ethanol requires growing the biomass and heating the material for fermentation.

U.S. ethanol producers are mostly using natural gas and some coal. The net energy balance is a ratio of how much energy is required to harvest an energy source compared to the amount of energy that the source produces. The net energy balance for corn-derived ethanol is 1:1.3, meaning it takes one unit of energy to generate 1.3 units of energy from corn ethanol.

Brazilian sugar cane-derived ethanol has a net energy balance of 1:8. To get this high energy balance, however, cane fields need to be burned, generating CO₂. Optimists place their hopes on cellulosic ethanol produced from leftover plant material, also known as second generation ethanol. The energy balance for this varies from 1:2 to 1:20.

The land use impacts are a major worry. When land is converted to agricultural use, particularly when fertilizer is used, nitrogen oxides are released, which contribute to climate change and other problems. Many experts believe that demand for sugar and particularly soybeans for biofuels will indirectly increase the rate of deforestation. A decline in forests will lead to a decline in the amount of CO₂ absorbed. According to the Institute for Agriculture and Trade Policy, the expanding use of biofuels also presents a significant risk of destroying the earth's biodiversity, mostly due to deforestation but also from a shift to producing monocrops.

Deforestation is currently responsible for 80 percent of Brazil's greenhouse gas emissions. Indonesia and Malaysia

In fact, in the federal financial bailout bill, billions of dollars worth of tax breaks for producing dirty fuels were included as part of the renewable-energy incentives. In September, the Bush Administration opened up two million acres of public land for oil shale development and, in November, issued new regulations for commercial oil shale development on those lands.

To prevent catastrophic climate change, greenhouse gas emissions need to be reduced by 2050 to 50 - 60 percent of 1990 levels. Transport is responsible for roughly a quarter of these emissions. Based on current trends, the transport sector's carbon dioxide (CO₂) emissions will increase by 2.5 times by 2050.

Expert opinion, once optimistic that biofuels might reduce CO₂ emissions, are now saying that emissions from the full fuel production cycle of biofuels may be higher than normal petroleum-based fuels, even for sugar cane and cellulosic ethanol.

The best way to get carbon out of fuel is to pass low carbon fuel standards and let the market determine how best to meet the target. The best way to promote fuel efficiency is a fuel or carbon tax and some effort to stabilize fuel prices. Political will for such measures remains weak.

Biofuels

Whether people believe ethanol and biodiesel are a good or a bad idea, biofuels are coming. Many countries are adopting ill-advised biofuel mandates. This powerful political signal has led to a seismic shift in energy sector investments.

Brazil was the first to mandate an ethanol mix and cur-

Images: Left to right - Dani Simmonds via Morguefile; Jimmedia, www.gokinetic.co.uk, cornfieldandolouds_irey.jpg; Carlos F. Pardo

Left: Indonesia is the world's largest producer of palm oil. Plantations, like this one in Cigudeg, Bogor, are expanding.

Right: Deforested area in the Amazon cleared for a soy bean plantation



have also seen accelerated deforestation due to increased prices of palm oil. Palm oil plantations in Indonesia consumed 150,000 acres in 1985 and today consume one million acres.

These two countries produce 85 percent of the world's palm oil, of which about a quarter is used for biodiesel, mostly for export to Europe to meet their biofuel targets. According to Friends of the Earth, 48 percent of palm oil production in Indonesia and Malaysia involved deforestation.

Increased demand for biofuels has also been blamed for increasing food prices. Although the relationship is not simple, there is cause for concern. Food prices have been increasing internationally for a variety of reasons. Both the Organization for Economic Development and Cooperation and the United Nations Food and Agriculture Organization argue that the subsidies for biofuels have contributed significantly to increases in food prices.

The World Bank claims that with every one percent increase in food prices, the caloric intake of the poor decreases by 0.5 percent. With over 800 million people in the world suffering from malnutrition and hunger, there is a real risk

Institute, noted that the amount of grain it takes to fill a 25-gallon tank with 100 percent ethanol would feed one person for a year.

Second generation ethanol from cellulose would reduce the impact on food prices. Fuel produced from grasses grown on marginal lands, trees thinned from forests to prevent forest fires, non-food agricultural production like corn and wheat stalks, or recycled paper products are all inexpensive and would not compete with food uses.

Second generation ethanol is not yet commercially viable, and some experts caution that viability may be more than a decade away. Many political leaders support subsidizing research and production to help reach viability. Subsidies are



Left and right: Ethanol and biodiesel fuel powered vehicles

that the world's wealthy motorists will feed their cars while starving the world's poor.

If all the grain produced in the U.S. were converted to ethanol, it would satisfy only 16 percent of our total fuel consumption. Lester Brown, head of the Earth Policy

already available in the U.S., stimulating some preliminary investment into production, but more research is needed.

The economic viability of ethanol depends entirely on the price of oil and the price of the biomass used to produce it, both of which are extremely volatile. Many smaller US ethanol producers went bankrupt when corn prices rose sharply and oil prices fell.

Images: Top - Achmad Rabin Team; Bottom left - Jeffrey Beall; Bottom right - Propelluels.com



Fuel Efficiency and CO₂

More fuel efficient vehicles will need to be part of any CO₂ solution. As with alternative fuels, the economic viability of fuel efficient vehicles depends in part on future oil prices.

Globally, fuel prices are heavily influenced by government policy. High fuel taxes are typical in Europe and have led to far more fuel efficient vehicle fleets. On the other extreme, oil consumption is subsidized in Venezuela, Indonesia, Nigeria, and in the oil producing states of North Africa and the Middle East. If the political system cannot produce stable, higher fuel prices, the market alone will not produce more fuel efficiency vehicles.

Experts believe that, by 2015, fuel consumption per vehicle could be reduced by 35 to 45 percent through reductions in vehicle weight, improved engine efficiency, optimized hybrid engines and a variety of other measures.

Manufacturers know from experience that without regulatory pressure, their customers need to cover the incremental cost of more fuel efficient vehicles from fuel savings within 18 months or else the vehicles will not sell. The greater the fuel price increases, the more rapidly these fuel efficiency advantages are likely to come to fruition. The likely continuation of extreme fuel price volatility, however, is a disaster for motor vehicle manufacturers who have no way to predict consumer interest in more fuel efficient vehicles.

The other option is fuel efficiency standards. In almost all countries, according to the International Energy Agency, fuel economy savings had a rebound effect where consumers bought bigger and heavier vehicles and increased their travel distances, so fuel consumption did not decrease. Changes in the way the fuel efficiency standards are written, however, could overcome this problem.

Hopes for Alternative Vehicles

Fearful of increasing fuel taxation or imposing low carbon fuel standards or tighter fuel economy standards, politicians the world over are hoping that an alternative vehicle can save us. Politicians are promising tax credits for fully electric or plug-in hybrids, the current flavor of the month.

All hybrids use a battery that powers an electric engine, in addition to having a normal internal combustion engine that runs on liquid fuel. Liquid fuel engines are most efficient when operating at a constant rate, so normally the liquid fuel engine only charges the battery or provides a stable, low level of power while the electric engine is used for needed surges of power. Hybrids also recapture some power because the braking system is used to charge the battery.

While conventional, battery-powered hybrids like the Toyota Prius are already profitable, the market for plug-in hybrids, which draw power from the electricity grid, is still marginal. There is also not much CO₂ advantage of plug-in hybrids either unless the power used to generate the electricity is ultra clean.

General Motors, which is likely to go bankrupt unless it receives a federal bailout, has been advertising their plug-

Ethanol produces approximately one-third less energy per gallon than conventional gasoline and thus requires more to power a vehicle the same distance. Just between July and December of 2008, a gallon of gas in the U.S. fell from \$4.10 to \$1.80. In December, a gallon of E85 retailed for \$1.566, which, after adjusting for the lower energy content, costs \$2.061 per gallon.

Brazilian sugar cane-based ethanol is the only biofuel that is commercially viable without subsidies, though Brazilian ethanol production was heavily subsidized since the mid-1970s.

In the United States, fuel companies receive a \$0.51 subsidy per gallon for blending ethanol into their gasoline. Direct farm subsidies total about \$14.5 billion U.S. dollars. This translates into about a \$0.09 per gallon subsidy to ethanol. U.S. ethanol producers are also protected by a \$0.54 import duty and \$0.03 value added tax per gallon. Without the tariff, Brazilian ethanol would be 30 percent cheaper than corn ethanol and would be more competitive with oil.

Even with all these subsidies, corn ethanol is only profitable in the US as an additive. It will be tempting for President-elect Obama to maintain the import duty to protect US ethanol producers, but there is no economic or CO₂ justification for it.

Ultimately, the economics of production will determine how ethanol is produced. Look for biofuels to be dominated by the same handful of agrobusinesses that currently control the world's grain supply.

Archer Daniels Midland (ADM) produces a third of total ethanol in the U.S. and saw a 42 percent jump in profits earlier this year. Cargill, the largest U.S. agribusiness, recently invested in new ethanol production facilities capable of producing one billion gallons a year. Both companies have bought ethanol production facilities in Brazil. Shell is buying some ethanol companies focused on cellulosic ethanol. ADM and Daimler have a joint venture to produce biodiesel production from jatropha, an oil rich plant.

From an environmental and equity perspective, by far the best way to reduce greenhouse gas emissions is by reducing private car use.



Measures like bus rapid transit and cycle paths have also proven to reduce CO₂ emissions.

in hybrid, the Volt, for more than a year, though it is not expected to be commercially available until 2010 or later. Its ability to attract customers at its reported \$40,000 break-even price tag is highly doubtful, even with the \$7,500 tax break given to purchasers.

Honda USA thinks that plug-in hybrids are unlikely to survive. The technological trajectory of battery development is in the direction of increased power rather than increased storage capacity. Therefore, Honda believes that the cost advantages of conventional hybrid vehicles over plug-in hybrids or fully electric vehicles will increase rather than decrease. Honda sees greater hope for optimizing conventional hybrids.

One type of fully electric vehicle which requires no technological innovation but which receives insufficient attention is the electric trolleybus. There are 340 cities around the world with electric trolleybus systems. Because of the need to build and maintain the overhead wires, the systems are five times more expensive to build than conventional bus systems and more expensive to maintain, but they are cheaper than light rail systems. If diesel prices continue to increase relative to electricity prices, electric trolleybuses may begin to make better economic sense.

Hydrogen fuel cells can now be mass produced, but hydrogen cars are currently extremely expensive, costing several hundred thousand dollars each to produce. Within 10 years, manufacturers are expecting that to drop to under \$100,000 due to increased volumes. Another main hurdle besides cost for hydrogen cars is that they require specialized infrastructure for refueling, which is not widely available.

Vehicles that run on compressed natural gas (CNG) are on the agenda in areas proximate to natural gas reserves or near a pipeline. Many vehicle manufacturers already make CNG engines. The problems are more with the time it takes to refuel and the availability of refueling stations.

CNG production is concentrated in the former Soviet Union countries and the same main Middle Eastern, oil producing countries, but there is a lot of uncertainty about the production capacity. CNG is a little better than oil from a CO₂ perspective. The main benefit is that CNG generates fewer particulates than all but the cleanest diesel or gasoline vehicles, but it is worse for nitrogen oxide and carbon monoxide emissions.

Images: Top - Shreyas Gadgil; Bottom - Luc Nadal

Reducing CO₂ through Travel Reduction and Modal Shift

In short, alternative fuels and vehicles are unlikely to solve our transport and environment problems. From an environmental and equity perspective, by far the best way to reduce greenhouse gas emissions is by reducing private car and motorcycle use.

In developed countries, experts believe that car use can be reduced by about 30 percent in most urban areas using proven techniques like bus rapid transit (BRT), congestion charging, parking regulation, and traffic cells, as well as promoting cycling and walking.

In developing countries, low incomes still suppress motor vehicle use. Trying to stabilize the car use so that private vehicles are less than 20 to 30 percent of the total trips made in developing country cities would be an optimistic goal, but still assumes an increase rather than a decrease in CO₂ emissions.

Where there is space for parking and incomes are rising, like in Beijing and Delhi, car use is exploding. Where there is economic growth but less income or less space for parking, like in much of South and Southeast Asia, motorcycle and taxi use is exploding. As incomes rise and vehicle costs come down, income will become less and less of a restraint on vehicle use.

Ahmedabad, with an average income of under \$1,000, has a higher private vehicle mode share (40 percent), than Copenhagen (23 percent) which has a higher average income of \$55,000.

Evidence from Bogotá indicates that BRT systems reduce CO₂ emissions by about 60 percent per passenger-kilometer traveled. Usually these systems will attract about a 10 percent shift in users from private cars if the system is well designed.

Evidence from Singapore and London indicates that congestion charges can also bring CO₂ benefits, but the charge needs to continually rise to constrain auto use. Road pricing in London reduced car trips by 30 percent at first, but then leveled out at 20 percent as motorists got used to the higher prices.

Milan and Berlin have also recently introduced variations of vehicle restrictions to their central business districts. Milan charges a fee for vehicles based on emissions, while Berlin restricts access to the 'eco zone' to all but the cleanest vehicles. Cities like Paris and Berlin are also bringing about modal shift by removing road capacity, slowing speeds, and removing parking.



Making cities better for people and the planet includes investing in public spaces like this plaza in Bogotá (left). Delhi's sidewalks, upgraded as part of the BRT corridor construction, included space for vendors (below).



Evidence from Rio and Bogotá indicates that one kilometer of bike facilities, if properly designed and located, will generate about 2,000 additional daily bike trips, given that a minimum of 100 kilometers of bike lanes are built. About 20 percent of these trips are pulled from car or taxi trips, and the rest from bus or walking trips. In China and India, where some cities have bike mode shares greater than 20 percent, preserving this mode share results in much greater CO₂ benefits.

For a long time, leaders of the environmental movement believed that technological solutions were the best hope for reducing transport sector greenhouse gas emissions. Today, reducing CO₂ emissions by encouraging people to switch modes not only looks more politically viable, it looks vital to minimizing the risks associated with the almost certain transition to biofuels and dirty fuels. 🌱

2009 Sustainable Transport Award

Every year, the Sustainable Transport Award is given to the city that has made the most significant progress during the year in improving public transportation, cycling, walking and public space, in reducing transport sector emissions, and in reducing private car use. The nominees are judged based on measurable improvements in air quality and the importance of the measures as an innovation.

This year's finalists are **Beijing**, China; **Istanbul**, Turkey; **Mexico City**, Mexico; **Milan**, Italy; and **New York City**, USA. All of these cities have shown creativity, ingenuity, and dedication in implementing sustainable transport solutions. The 2009 winner will be announced at the award ceremony on January 13, 2009 at the Washington Hilton. For more information, please go to www.st-award.org.



New York City, United States of America

Throughout 2008, the city continued to implement PlaNYC 2030, its comprehensive long-term sustainability vision. The city reclaimed 49 acres of road space, traffic lanes and parking spots from cars for bike lanes, pedestrian areas, and public plazas. Protected on-street bike lanes were part of the 140 miles (255 kilometers) implemented. Bike ridership has increased by 35 percent over the past year. Over 98,000 trees were planted, a select bus service was implemented, and car-free Sundays introduced. The Department of Transportation also recycles 40 percent of its asphalt. The city mandated that the taxi fleet switch to hybrid vehicles, and many taxis switched, though the measure was later struck down by the courts. New York was also the first US city to seriously pursue a congestion charge, though it was blocked by the State Legislature.

Mexico City, Mexico

In 2008, Mexico City expanded their Metrobus BRT system, increasing daily ridership from 260,000 to 320,000. Accidents dropped by 30 percent in the corridor, and five percent of the passengers shifted from private vehicles. Mayor Ebrard also initiated car-free Sundays called Paseo Dominical. This has helped to stimulate a growing cycling and walking culture. Mexico City also nearly completed construction on the next major BRT line, Eje 4. A bicycle master plan and a pilot new bikeway were also approved but are not yet implemented.



The Sustainable Transport Award Ceremony

January 13, 2009, Washington, DC

All are welcome. For more information, go to www.st-award.org.

Nominees

Beijing, China

Beijing implemented vehicle restrictions for the Olympics that were re-instituted due to popular demand. This restriction, which requires owners to leave their automobiles home one day each week, gets 800,000 vehicles off the streets every day. The government mandated Euro IV fuel standards. The city added a new line to the metro system and two new lines for the BRT system in 2008, extending the hours for both. Beijing increased their bus fleet, while decreasing the fleet of government vehicles by 30 percent. One-third of the police fleet is also now patrolling using bikes and electric bikes.



Milan, Italy

In January 2008, Milan introduced Ecopass, which charges vehicles to access the central Cerchia dei Bastioni area, charging more for the most heavily polluting vehicles. This is the first application of the European Union's "polluter pays" principle. Since February 2008, there has been a 19.2 percent traffic reduction within the enforcement area and an 8 percent reduction outside the enforcement area and period. As a result, public transport speed increased by 11.3 percent, passenger ridership increased on public transport by 9.7 percent, and in two months, there was a 3.9 million euro financial return. Because of this, carbon, dioxide has decreased by 12 percent during the enforcement period, and particulate matter has decreased by 19 percent.

The STA steering committee includes: The Institute for Transportation and Development Policy (ITDP), Environmental Defense Fund (EDF), the Clean Air Initiatives (CAIs) for Asia, Latin America, and Africa; Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), EMBARQ - The WRI Center for

Istanbul, Turkey

After pursuing many high cost, not terribly sustainable transport projects, Istanbul has quickly moved to open Metrobus, a BRT system that now carries 450,000 passengers a day over 43 kilometers of segregated busway. Metrobus was built on expressways, so its average travel speed is an exceptionally fast 40 kilometers per hour. The new system has reduced travel time for its customers by 75 percent. The system is also integrated with the underground metro and existing bus services. Other cities in Turkey are looking to this low cost, quickly implemented example as a model.



Sustainable Transport, ICLEI - Local Governments for Sustainability, International Association of Public Transport (UITP), the Transportation Research Board's (TRB) Committee on Transportation in Developing Countries, and the United Nations' Centre for Regional Development (UNCRD).

Lagos, the economic and financial capital of Nigeria, launched Africa's first bus rapid transit-like system in March. One of the fastest growing cities in the world, Lagos is home to extremely chaotic traffic conditions and very poor public transport. The Lagos Bus Rapid Transit Lite, as it is called, was a first response by the government to address this problem and transform the image of public transport. This transformation has begun, but much work remains.

The 17.5 million people in the Lagos metropolitan area make about six million trips a day using cars, motorcycles, and buses. That is expected to grow to 15 million motorized trips a day soon. Out of these trips, 60 percent are made in minibuses called Danfo, 25 percent by car, 18 percent by a motorcycle taxi service called Okada, six percent by bus called Molue, and one percent by rail and water.

The BRT lite, the first organized mass transit system in the city, opened and ridership has surpassed expectations.

transit systems, in addition to road expansion improvements. As part of the plan, the Lagos Metropolitan Area Transport Authority (LAMATA) was created in 2002 as the only transportation authority in charge of coordinating and implementing transportation initiatives in Lagos State.

The consultants hired to work on the master plan developed it under the assumption that BRT systems can only handle between 7,500 to 15,000 passengers per hour, although BRT systems can handle at least double that amount of passengers by introducing passing lanes at stations. Bogotá's TransMilenio currently moves 43,000 passengers per hour per direction during peak hours.

The BRT Corridor

LAMATA quickly moved forward to implement the BRT lite, and in 2008, the Lagos system, supported by the World Bank, was launched by Governor Babatunde Fashola. Phase

Lagos Opens Bus Rapid Transit Lite

By Oscar Edmundo Diaz

Passengers appreciate the safety of the system, as well as the reliability. Even though it is not a perfect system, Lagos is now the baseline for African cities.

In 2002, the Lagos State Government created a strategic transport master plan which included an integrated mass transit system of seven bus rapid transit (BRT) corridors, three rail lines, and water

1 is 22 kilometers long, running from Mile 12 to Lagos Island. Phase 2, under construction now, will run from Iyana Ipaja, a neighborhood to the north, to Maryland, one of the busiest stations on the Phase 1 route.

The infrastructure cost 4.5 billion Nigerian naira, or about 38.3 million US dollars. The investment per kilometer was 1.7 million USD. Two private operators provide the service using 220 red and light blue standard buses with a capacity of 75 passengers each.

Ridership has surpassed expectations by 200 percent, with 180,000 passengers on average per day. Travel time has reduced by 40 percent and waiting time has reduced by 35 percent, according to LAMATA, although there are still long queues to board the buses. The system has its own lighting system in a city where public power is off at night and people ride buses and walk in the dark. Commuters feel that robberies will not happen on the BRT Lite.

Passenger ridership exceeded expectations by 200 percent.

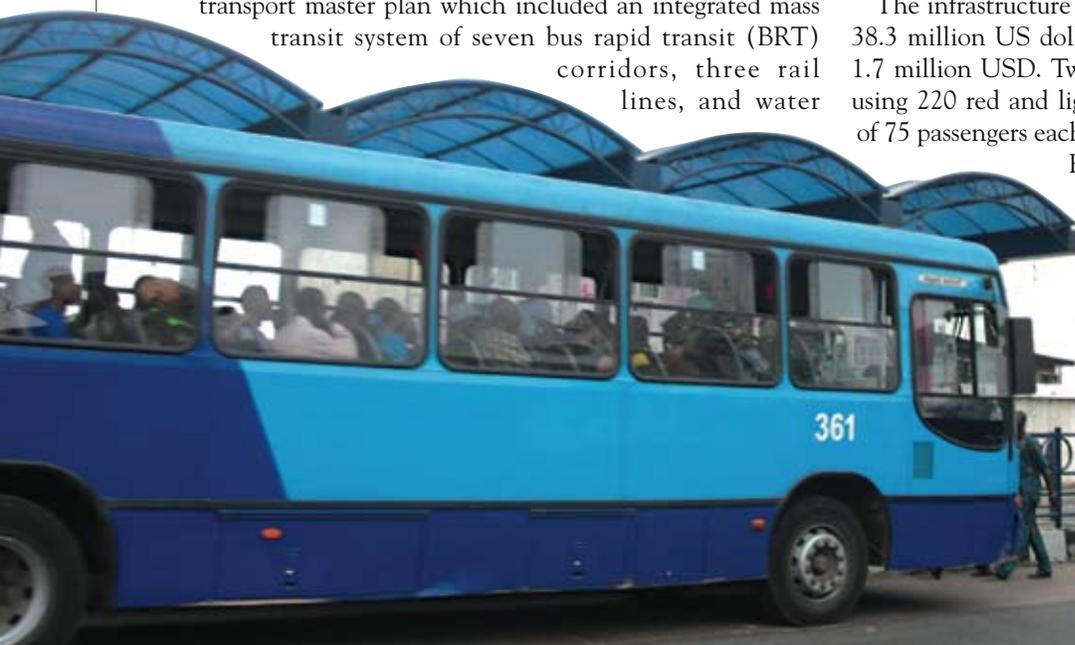


Image: Oscar Edmundo Diaz

With a distance-based fare of 50 – 100 Nigerian naira (0.43 – 0.86 USD), the system's operations are not subsidized, even though the fare is lower than other services. The system employs and trains 400 bus drivers and officers.

One company, the National Union of Road Transport Workers (NURTW), invested 8.35 million USD in new buses for the system. This was financed by Ecobank Nigeria. NURTW provides local service in the blue buses. The second operator is LAGBUS, a state-owned company, which provides express service using red buses.

The buses run in a dedicated, curb-aligned corridor for 65 percent of the corridor and in mixed traffic in the rest. Bus speed is quite good on the dedicated corridor, but buses become jammed in congestion once they reach mixed traffic. Curb-alignment has caused some problems with less than disciplined bus drivers stopping to pick up passengers at places other than stations. Curb alignment compromises efficiency because of conflicts with turning vehicles and increases infrastructure cost because two stations on either side of the road must be built instead of a shared one in the median.

The system has 26 stations and passengers pay before boarding the bus. Most of the stations are open bus shelters, making it difficult to implement and control the prepaid fare collection system. The corridor also has three terminals and a modern, well-designed bus depot. The system is open from 6 a.m. to 10 p.m.

The main way people get to the BRT system is sidewalks – something Lagos urgently needs. Hundreds of people walk on the road because there is no infrastructure for pedestrians, and every night they risk their lives in the dark. Bicycles could bring people to the system, but there are no bike lanes leading to the stations and no parking for them once there. Importing bicycles into the country is currently banned.

Political support for the system has been strong. Governor Babatunde Raji Fashola moved past politics becoming an ardent supporter of the system even though his predecessor, Bola Tinubu, started the project. He rode the system on its first day.

The governor, despite critics from the opposition and general public, warned drivers at the opening: "I want to particularly appeal to our military officers and men, police officers and men, bullion van drivers, commercial drivers and others who are not authorized to go on the BRT track to refrain from doing so. Anyone who flouts the rules governing the BRT corridor, no matter his or her status, will face the wrath of the law." Cars invading the BRT corridor are fined with 50,000 naira (425 USD).

The system lacks a clear identity though, with no distinctive branding other than blue and with no name for the system. Because of this, it is seen as a replacement to the old yellow Danfos and Molues, and not a modern mass transit solution. Its public image is not helped by calling it a BRT

lite, but that can be rectified if LAMATA upgrades the system to what they call BRT Classic and implement other lines with higher capacity, 100 percent segregated corridors, better branding, median-aligned corridors and closed stations.

Despite the worldwide benefits and proven successes of BRT, LAMATA still believes that rail solutions are better. In the material explaining the Lagos BRT system, LAMATA states: "the light and heavy rails as well as the subway metro systems are appropriate, but very expensive to construct and operate. The traditional bus service is highly patronized because it is flexible and inexpensive. But it has the problems of negative public image, air and noise pollution, slow speed and ramshackle state of the buses"



Lagos has impressive road dividers to keep car traffic out of the corridor.

LAMATA can fix the negative public image and slow speed by upgrading the system to a full BRT. But LAMATA is moving forward with a rail system. While BRT and rail are supposed to complement each other as mass transit systems in Lagos, the branding and investment in marketing the rail system illustrates that BRT is not getting the same attention that would help make it a serious mass transit option.

One month after the opening of the BRT lite system, LAMATA said that it would invest 70 billion naira (600 million USD) in a rail system for Lagos to open by 2011, even though construction has not started. The government is holding road shows in the United Kingdom and Dubai complete with high quality renderings and models of the rail system. The estimated cost per kilometer from the government is 15 to 17 million USD. The private sector investment, mainly for rolling stock, is estimated to be one billion USD.

While the BRT system has been the only project that has had any effect on daily commuters in the last 40 years in Lagos, it remains to be seen whether they will build upon this success with improvements to the system, or if it will be relegated as a better bus service. 🌱



Cycling's Unexpected Ally in Brazil

By Jonas Hagen

As thousands of frustrated motorists and public transport users continue to sit in hundreds of kilometers of traffic jams in Brazil's two largest cities, two forward-thinking car insurance companies are teaming up with city governments to promote the use of a cleaner, healthier vehicle – the bicycle.

Sul America and Porto Seguro, two private insurance companies best known for auto insurance, are behind innovative responses to the growing gridlock in São Paulo and Rio de Janeiro. In 2008, Sul America began encouraging the bicycle as a better alternative to the car in Rio, and Porto Seguro introduced programs that protect the environment through promoting bicycle use in São Paulo.

Sul America is teaming up with the Instituto Pereira Passos (IPP), Rio's urban planning authority, to pay for the maintenance of existing bike racks and installation of new ones, for a total of 4,200 racks. In exchange, they receive

the exclusive right to advertise on the bike racks.

Zeca Vieira, Sul America's marketing manager, explained that the company decided to launch this particular program in Rio because "Cariocas [residents of Rio] are more oriented to the outdoors. In Rio, the conversations are about the weather and the beach. In São Paulo, people deal with traffic 365 days a year, so they always comment on it." This program complements Radio Sul America, which informs motorists in São Paulo of traffic jams.

The slogan for the campaign is "promoting a better alternative to the car," and this motto is on the bike racks, bumper stickers, posters and repeated in television and radio spots.

Rio de Janeiro has 140 kilometers of bike lanes – the largest network in Brazil. These are used by nearly 290,000 people daily, avoiding approximately

Photo: Rio's bike lanes by the beach

Image: Jonas Hagen

66,000 tons of carbon dioxide emissions annually if those same trips had been made by bus. The city government has plans to double the amount of cycle lanes and to promote bicycling as a means to get to public transport stations.

This planning has been accelerated in the second half of 2008 by Mayor Cesar Maia's public bicycle program, which is scheduled to open by the year's end. Phase One includes 50 stations where people can pick-up and drop-off one of the 500 bicycles of the planned system. Thirty-five kilometers of bike lanes have been mapped to accompany this project.

Although some neighborhoods in Rio report that 8.6 percent of trips are made by bicycle, the numbers of cyclists are likely much higher, according to José Lobo of the Brazilian NGO Transporte Ativo. While the municipality estimated 1,500 bicycle trips daily in Rio's Copacabana neighborhood, 779 trips occurred on one street alone on a Wednesday in July 2008, according to a study released by Transporte Ativo.

"The image of cycling is changing in the city. People are associating bikes with ecology and progressive thinking. Middle-class people used to think of the bicycle as strictly for fun on the weekends or as transport for people

who didn't have enough money for a car. Now, you see more and more students and professionals riding bikes to school or work," said Lobo, who has been working with the IPP and Sul America providing a cyclist's perspective on the initiative. "When a company known for car insurance promotes the bicycle, people respond."



Left: Ruan Carlos performs no-fee bike maintenance at Ipanema. The seaside traffic lanes are car free every Sunday in Rio. Right: Sul America bike racks at Copacabana are among 4,200 racks the company plans to implement and maintain in Rio.

"The Sul America project has greatly increased our ability to get bike racks implemented," said Claudia Tavez of the IPP. "In many outer-lying areas of the city with high bicycle use, we always wanted to install bike parking but did not have the funds. Now, we will be able to install racks in commercial centers, such as Bangú and Campo Grande, and offer enclosed bike parking at train stations, such as the Santa Cruz station, where hundreds of cyclists park their bikes every day. This is good news for cyclists, the city government and Sul America."

In addition to installing bike racks, Sul America also employs six bicycle mechanics that patrol Ipanema, Copacabana and other seaside areas on weekends and holidays. These mechanics help stranded cyclists

Sul America got a lot of compliments." These compliments were received mostly via the company's Web site, Carlos went on to add.

In São Paulo, renowned for its epic traffic jams, the number of congested miles during rush hour in 2008 reached more than 120 miles (190 km) on average out of 522 miles (835 km) of monitored roadway. A record was set on May 9th with 166 miles (266 km) of congested roads. Despite having car restriction policies like the "rodizio" in place, many commuters spend between three and four hours behind the wheel a day. The rodizio prohibits certain cars from streets during rush hours based on the last digit of the license plate number.

In recent years, São Paulo's auto fleet has been growing at around 7.5 percent, with 800 new cars coming into the city every day. With only 38 miles of subway and a bus transport system that residents rank as one of the worst public services, even top transport officials in the city admit that commuters will be spending ever-increasing



The status of cycling is rising in Rio.

Images: All three photos - Jonas Hagen

Brazil | Insurance Companies Take the Lead

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amount of time stuck in traffic.

In 2008, Porto Seguro set up complementary services for its insurance clients using bikes, such as its “Bike Rescue,” “UseBike,” and “Bike Appraisal” programs. In addition, it is developing a pilot public bicycle scheme for São Paulo.

Under the “Bike Rescue” program, broken-down cars that do not require

towing receive repairs, such as changing tires, gas refills, battery charges, or jump-starts, from cycling mechanics. “Bike Rescue” operates in central São Paulo city, and in some coastal cities of São Paulo State, including Santos, Brazil’s largest port.

Meanwhile, the “Bike Appraisal” program allows insurance agents to conduct appraisal services directly in clients’ homes by using company bikes to travel there.

The “UseBike” program is a small-scale public bicycle scheme in which car owners insured by Porto Seguro can use bicycles that are parked in one of the seven parking lots operated by a company called Estapar. The bicycle parking facilities also have space for the general public to park their bikes. While this program currently operates in the central part of São Paulo, Porto Seguro says that this program will be gradually expanded to other regions

Round-up of Developments in Brazilian Cities

Teresina: This city of 779,939 people has an existing network of 50 km and intends to add 55 km of bike-ways in less than two years.

Brasilia: Over 100 kilometers of bikeways are designed and ready to be built, for a total network of 420 km. After implementation, scheduled for 2009, Brasilia will have the country’s largest cycling network.

Belo Horizonte: is finishing a mobility plan that includes 50 km of BRT, a 260 km bicycle master plan, and safer, more comfortable sidewalks and pedestrian crossings.

Rio de Janeiro: The city is planning a public bicycle system with 50 stations and 500 bicycles. The first eight stations are scheduled to launch in December 2008.

Santos: 15 % of trips are made by bicycle in Santos, according to the latest origin/destination survey. A new cycle lane that provides a crucial connection to a ferry landing will be completed by the end of 2008, bringing the entire network to 19 km, while the municipality has long-term plans for a 60 km network.

São Paulo: Construction of a 12 km bicycle lane in the Eastern section of the city is finished and the final design work for the 15 km Butantã bicycle path is underway. Investments in metro and commuter rail in the São Paulo metropolitan region will total 10 billion USD for 2007-2010.

Curitiba: The “Green Line,” the new 18-kilometer bus rapid transit corridor, is under construction. Built on a former interstate highway, the city is converting it into a public transport corridor, complete with bike lanes, ample space for pedestrians and a linear park.

Florianópolis: 15.5 km of bike lanes will be added to the existing 23 km cycle network by the end of 2008.

Porto Alegre: The city completed a 495-kilometer bicycle master plan in 2007, with 18.5 km designed and ready for construction.



Brazil

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of the city.

Porto Seguro is sponsoring a pilot public bicycle program that makes 80 bicycles available at 10 metro stations in the center, southern and eastern zones of the city. Inspired by Paris' Velib system, the bikes will be free to use for 30 minutes. Thereafter, it will cost 2 reals (a little less than one US dollar) for each hour of use, or 50 reals (about 24 USD) for an entire day.

Despite São Paulo's virtually nonexistent cycle network, the number of daily bicycle trips more than doubled from 1997 to 2007 from 160,000 to 345,000, according to the latest origin/destination survey. 🌿



The Use Bike program provides bikes and bike parking to insurance members.

Guadalajara

continued from p. 21

rejected by the traffic engineers. They were hesitant to slow speeds of motor vehicles and failed to see the benefits that speed reduction brought for all users.

What is unique in Guadalajara (and especially refreshing for some) is that rather than getting bogged down in "process," the project went out to construction in record time with final construction details being determined in the field by a diverse stakeholder group.

Hierarchy of Solutions

The cycle network was developed using the European model known as the "Hierarchy of Solutions." The hierarchy begins by looking at traffic reduction and traffic calming measures, followed by opportunities for spot improvements and reallocating road space, before finally looking at segregated cycling facilities.

The problem identifies that the perceived risk from cars and the speeds that those cars travel is at the heart of what makes it difficult to cycle in a city. The problem spots in a city are more

important to fix than the links between the spots in order to attract and retain cyclists. In the bicycle network master plan, the most problematic intersections were identified to be modified to ensure cyclists' safety.

According to the model, reducing volumes of traffic is the first priority as we weave cycle networks into our collective urban fabric. In many cases when a city wants to become cycle-friendly, instead of bike lanes being the first step, the city should implement progressive Paris-style parking measures to reduce motor vehicle volumes. That is one of many mechanisms to reduce traffic volumes and is one reason why ITDP is pressing for new parking measures in Guadalajara.

Attempts to reduce traffic volumes in Guadalajara are complicated by the lack of a developed mass transit system which would give alternative forms of transport to those looking to drive less. However, mass transit is also coming to Guadalajara. A bus rapid transit (BRT) system, called MacroBus, is being planned on a major thoroughfare in Guadalajara and should soon be complemented by a network of BRT routes throughout the city.

Bike Innovations for a Bright Future

Even as the BRT network is being planned, construction on the 367 kilometer bicycle network has already begun.

ITDP opted to use the Dutch cycling guide "Sign Up for the Bike" in developing the cycle network. Ideally this network, which follows the "Safe, Comfortable, Attractive, Coherent, and Direct" design philosophy, will soon make Guadalajara a bicycle-friendly city with a target of 7 percent of its residents cycling.

With over 30 USD million of resources in place for the network this year alone, and the recent contracting of a trio of consultants (Arquitectura Urbana, Alta Planning, and Walk and Bike for Life) to develop a long-term bicycle master plan and strategy, the future looks bright for cycling in Guadalajara.

Bob Dylan also wrote: "Tomorrow Is a Long Time," a thought not lost on the people of Guadalajara as they work today to transform their city. Guadalajara, the "Pearl of the West," may once again become Mexico's cycling town. 🌿

Image: Jonas Hagen

2009 Sustainable Transport Award Ceremony

*for visionary achievements in
sustainable transportation and urban livability*



Nominees are: **Beijing, Istanbul, Mexico City, Milan, New York City**

January 13, 2009
6:30 pm – 7:30 pm

Doors open at 6:00 pm,
with light refreshments and cash bar

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