

Urban Leaders Find Transportation Paths to Global Green Growth

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Abstract

A key driver of environmentally friendly transportation is visionary urban leadership that advances better ways to manage traffic and street space. Innovative leaders often get their inspiration by seeing what other cities are doing to advance best practices. Global challenges of rapid urbanisation, environmental degradation, and demands for economic vitality and livable communities are common themes driving global green growth initiatives. These are also key to reducing greenhouse gases. This paper provides an overview of the accomplishments, obstacles, experiences gained and directions taken by selected cities that have sought cost-effective transportation solutions and achieved measurable results, improving the environment and quality of urban life and economies.

Introduction

Today, most of the world's cities suffer from sharply rising traffic congestion, health-impairing air pollution, sprawling development, an inefficient transportation network, and energy insecurity. Without changes in policies and investments, transport related CO₂ emissions are projected to increase worldwide by 57% between 2005 and 2030, with 80% of that growth to occur in developing countries, where population and incomes are growing most rapidly.

But that projection does not take into account the potential transformation in many cities' transportation systems as new information, communications, and smart management and operations strategies come into wider use. By 2030, people living in developing regions will

comprise 80% of the world's urban population and the share of people living in cities will rise, from 50% today to over 70% (Department of Economic and Social Affairs 2006). The first half of the 21st century will become known as the time of global urbanisation. Yet, only by smart urbanisation will humanity find a way to manage global climate change and a host of other problems. What are the transportation pathways that will deliver green global growth?

Many find hope that those pathways are being created by innovative leaders in developing cities in Latin America, Asia and Africa, joined by others in Europe and North America. From Seoul to Ahmedabad, Capetown to Bogotá, from Paris to New York, mayors have demonstrated cutting-edge ways to reshape urban mobility and enhance livability,

combining new intelligent transportation systems with bricks-and-paving stone street-space reallocation, and smart urban design.

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Harnessing private sector involvement towards public-private partnerships and creative infrastructure management can be a key to success. Projects that advance global discourse often involve integrated transport and land use planning, such as the implementation of a well designed Bus Rapid Transit (BRT) system (Table 1) with good pedestrian and bicycle linkages (Table 2), and the demolition of an elevated highway to create a new public space. Let's look at some of the cities from around the world that have used transportation reforms to reduce greenhouse gas emissions, bring new mobility options to the neediest communities, stimulate economic development and improve overall quality of life.

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BRT Systems Moving Cities Ahead Bogotá, Colombia

Former Bogotá Mayor, Enrique Peñalosa, oversaw the conception and opening of an extensive, cost-efficient, high quality and high capacity public transit system between 1998 – 2001, even as expensive metro proposals in

other cities continued to languish for years without any progress. TransMilenio (Figure 1), as the BRT system in Bogotá is known, used lessons learned from Curitiba, Brazil, which debuted the first ever BRT system in the 1970s, unveiling an even more ambitious system that quickly became a gold standard in BRT development. Bogotá's system consists of 9 lines that use exclusive busways with over 1,000 branded buses carrying 1.6 million passengers a day. Elevated stations, level passenger boarding and wide vehicle doors optimise getting on and off the buses. The capital construction costs for the system amount to \$5.5 million per kilometre.

Figure 1: TransMilenio buses in Bogotá are highway based and also enter the downtown area



Before the introduction of TransMilenio, thousands of independent mini-bus drivers provided the only public transit system in the city. These drivers formed operating companies and participated in a competitive tendering process to run TransMilenio. The Bogotá system pays private operators to drive special red TransMilenio buses based on a set number of kilometres driven, so if a bus needs to be rerouted to another corridor, its income is not

affected. With performance-based contracts, operators are penalised if they fail to provide other expected services, such as, keeping the vehicles clean and being on-time (Wright and Hook 2007).

Approximately 400 feeder buses bring passengers from outskirt locations onto the system. Pedestrian and bicycle paths leading from low-income and impoverished neighbourhoods are integrated into the system design. TransMilenio is so successful that it is often overcrowded during non-peak hours – a major complaint by passengers.

After the implementation of the wide-reaching system, a referendum was passed by overwhelmingly popular vote to hold a Car-Free Day every year, forbidding private vehicles from being driven in the city during one workday. Roads normally used for cars become boulevards for walking and cycling while TransMilenio continues to operate smoothly. This measure exists in conjunction with Ciclovía – Bogota’s world renowned Car-Free Sundays event.

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Guangzhou, China

The world’s highest frequency and capacity BRT system opened in February 2010 in Guangzhou, China. The 22.5 km system is the first BRT to directly connect to a metro system and the first BRT system in China to

include bicycle parking in its station design. It has the world’s highest number of passenger boardings at BRT stations and the world’s longest stations in the world. Already carrying 750,000 passengers a day, it is expected to soon carry even more. Infrastructure costs to build the GBRT were 30 million yuan renminbi (US\$ 4.4 million) per kilometre.

More than 40 bus routes use Guangzhou’s “open” BRT system, which is designed to enable many more one-seat rides, as many routes originate or end in neighbourhoods beyond the BRT corridor itself. Real time passenger information systems and operational control systems boost convenience, help keep buses on time, and support performance contracting. The BRT was faster to implement than a new metro line would have been, with the conceptual plan, engineering design and construction each taking one year to complete. Building the Guangzhou BRT took five years from start to finish, including times when the project was placed on hold.

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Ahmedabad, India

India’s first world-class BRT system opened in 2009 in Ahmedabad, a city of 6 million residents. The system is called Janmarg, or the “people’s way”, reflecting a strategic transportation focus on moving people rather than vehicles. It is a “closed system”, with buses

Table 1: Some notable cities advancing BRT

Location	Notable Features
Cali, Colombia	Cali's MIO system launch is part of a national government initiative to build BRT systems in cities with more than 600,000 inhabitants. MIO already meets 46% of the city's public transport demand.
Curitiba, Brazil	The first BRT system in the world, inaugurated in the 1970s and used by over 75% of the population.
Guadalajara, Mexico	The initial Macrobus line runs 16 km. When complete, it will take 55,000 private vehicles off the road.
Guangzhou, China	The highest capacity BRT system in Asia, this 23 km system that opened in 2010 carries over 750,000 passengers daily.
Guatemala City, Guatemala	This first Central American BRT opened in 2007. The initial 11 km include dedicated median busways with on-level boarding stations. The system cut travel time by 20%.
Hangzhou, China	The second city in China after Beijing to unveil a BRT system, which includes bus prioritisation with facilities for cyclists and pedestrians.
Istanbul, Turkey	Metrobus BRT carries 450,000 passengers a day over 43 km of segregated busway, so travel speeds reach 40 km per hour – reducing travel time by 75%.
Jakarta, Indonesia	TransJakarta uses mostly CNG buses in 10 corridors, carrying over 300,000 daily riders.
Johannesburg, South Africa	After violent protests from taxi drivers, the first true BRT system in Africa, Rea Vaya ("We Are Moving"), opened and is carrying 18,000 daily passengers.
Mexico City, Mexico	The Metrobus system carries 320,000 passengers a day. Accidents dropped by 30%, and the corridor saw a 5% modal shift from private vehicles to public transport.
Pereira, Colombia	The first city to emulate the success of TransMilenio in Colombia, it carries 155,000 passengers per day.

using dedicated lanes instead of mixing with traffic, spanning over 88 km and connecting the downtown commercial district of Kalupur with outlying neighbourhoods. Most of the network passes through low and middle income neighbourhoods. Janmarg is meant to improve the quality of commuting in the city through dedicated bus lanes, bicycle tracks, pedestrian facilities and parking management. Some of the infrastructure highlights of the system include segregated lanes, high floor buses, level passenger boarding, external ticketing and real-time bus arrival information. Completion of the network is expected in 2011; half of the system is now in operation. Ridership is now about 32,000 passengers daily, with that number expected to grow greatly. Eventually, the city envisions an integrated fare scheme between normal bus service, Janmarg and parking. The capital cost of Janmarg was US\$1.8 million per kilometre.

Figure 2: Bicycle riders enjoy the first ever Summer Streets in NYC



Improving Walking and Cycling Infrastructure New York City, USA

More than 50 acres of road space in New York City (NYC) have been reclaimed from traffic lanes and car parking spaces to meet the goals

of PlaNYC 2030, a comprehensive long-term sustainability vision announced on Earth Day in 2007 by Mayor Michael Bloomberg. A large component of the plan, after decades of car-oriented policies, is to create a more balanced transportation network in the city by the year 2030. NYC Department of Transportation Commissioner, Janette Sadik-Khan, succeeded in overseeing the creation of new public plazas and the installation of over 322 km of new bicycle lanes – 8 km of which are protected, installation of more than 6,000 bicycle racks, more than two dozen bicycle parking shelters and a 45% increase in bicycle commuting (NYC Department of Transportation 2009).

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The most iconic transformation occurred in Times Square with the pedestrianisation of Broadway after a century of accommodating car traffic. The city adopted a strategy that was championed by Copenhagen, Denmark – taking small nibbles of street space away from cars until reaching a groundswell of noticeable changes. Much of the street reclamations have been done initially using fast and cost-effective coloured paint on asphalt, followed later by permanent reconstruction. As part of improving the street experience, over 98,000 trees were planted and a Car-Free Sundays programme was launched, called Summer

Streets (*Figure 2*), inspired by Bogotá's Ciclovía. The city also launched a Select Bus Service that incorporates partial elements of BRT, such as, advanced fare collection, dedicated lanes and signal prioritisation.

Figure 3: Vélib stations are accessible everywhere within the city of Paris



Paris, France

The Paris Vélib, combines the French words for bicycle (vélo) and freedom (liberté), and has revolutionised bicycle sharing and showcases a new kind of individualised mass transit system. The design is already being mimicked in cities like Hangzhou, China. Vélib solves the problems of bicycle storage, maintenance and parking. Mayor Bertrand Delanoë and Deputy Mayor Denis Baupin saw an opportunity to offer advertising space to the company JCDecaux in exchange for management of the system. Approximately 4,000 car parking spaces were replaced with 1,451 Vélib stations that hold 20,600 public bicycles for hire (*Figure 3*). Registered users pay a small fee to rent a bicycle and can return it to any station around the city, provided there is docking space. JCDecaux shuttles bicycles between stations to maintain a balance in the system and assures there are enough available bicycles

at every station. If a station is full, users are directed to the next available docking space. A survey of users found that 15% of Vélib trips had shifted from car travel. Vélib users can hire a bicycle at any time of the day or night, which is a good complement to the metro that closes around midnight. Approximately 30% of bicycle traffic consists of Vélib users (Le Mairie de Paris 2007). To support an increase in cycling, Paris built nearly 400 km of new bicycle lanes and also increased general bicycle parking facilities.

A cornerstone of the mobility plan under Deputy Mayor Denis Baupin, Vélib is one of many Paris transportation innovations aimed at revitalising community life in public spaces. In addition to improving conditions for cyclists, Paris has prioritised pedestrians by renovating public squares and plazas, widening sidewalks, adding new landscaping and installing raised crosswalks. Slow speed 30-km zones have been introduced to increase pedestrian safety.

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A national directive passed in 2008 mandates that these zones include contra-flow bicycle lanes, which will further increase cycling in the coming years. The city also closes down a major stretch of highway along the Seine River for one month in the summer to create 3 km of beach areas known as Paris Plages. Lastly, a new system called Mobilien, which uses

elements of BRT, opened along three corridors in 2007. All these improvements led to a decrease in private vehicle traffic by 20% and a 9% reduction in carbon dioxide emissions.

Table 2: Other notable cities promoting walking and cycling.

Cape Town, South Africa	Continued government support for Car-Free days
Dakar, Senegal	Organised West Africa's first ever Car-Free day
Santiago, Chile	Implemented new bicycle lanes and Car-Free Sundays

Managing the Demand of Vehicles Driving into the City

London, UK

In 2003, London adopted a groundbreaking congestion pricing plan in an effort to tackle traffic gridlock, improve air quality and generate funds for the city's transport system. Drivers entering the congestion zone (*Figure 4*) during peak hours are required to pay a hefty fee. Enforcement is through automated license recognition, with multiple payment channels. The congestion pricing initiative was so successful in improving mobility conditions that neighbourhoods near the border requested that the zone be extended. In 2007, the congestion zone was doubled and the price was increased. About 70,000 fewer vehicles enter the congestion zone on a daily basis. Congestion dropped by 21% that year and carbon dioxide emissions decreased by 16%. More than £123 million (US\$194 million) is generated annually from the congestion zone pricing and reinvested in public transport

improvements. Bus travel times significantly improved after implementation of the congestion zone and bus ridership increased by 45%. Older, dirtier trucks pay a special steep daily charge to enter the city.

Figure 4: The congestion zone is indicated with signage and street stencils in central London



Cities such as Shanghai and Shenzhen in China are looking to introduce a London-style congestion scheme in their commercial centres to address traffic problems. Most London boroughs also charge a steep curbside parking fee to dissuade driving. Some boroughs, such as Camden and Richmond upon Thames, have even introduced CO₂-based residential parking permits with the most polluting vehicles paying a higher price. A percentage of the parking revenues from every borough helps to fund the Freedom Pass programme, which enables disabled and elderly residents to use public transit free of charge (London Councils).

Beijing, China

As the 2008 Olympics approached, Beijing faced crippling traffic jams, severely compromised air quality and soaring collision rates due to the rapid growth in private vehicle use. City officials undertook an ambitious

task, working on a variety of fronts, to make transportation better and cleaner in time for the Olympic Games. Beijing instituted vehicle restrictions on weekdays based on odd/even license plate numbers. The success of the measure led to an extension of the programme, which is enforced through automated license plate recognition systems.

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Drivers must leave their automobiles at home one day each week, leading to 800,000 vehicles staying off the streets every day. The city also expanded the metro and existing BRT systems in 2008 with new lines and additional hours of operation. Beijing increased the regular bus fleet, while decreasing the fleet of government vehicles by 30%. Additionally, one-third of the police fleet is now patrolling using bicycles and electric bicycles. Measures to restrict automobile use have been complemented with investments in public transit infrastructure and policies to promote alternative modes.

Integrated Transport and Public Space Planning

Seoul, South Korea

Under the leadership of Mayor Lee Myung Bak, a 6.4 km elevated highway that once covered the Cheonggyecheon River in the center of Seoul was replaced in 2005 with a riverfront park, high quality walkways

and public squares (Figure 5). Removing the road has cut traffic congestion in the area and the popularity of the measure led to 84 additional elevated roadways being short-listed for demolition. The city government also retrofitted over 58 km along the former highway corridor with exclusive median bus lanes, and added more than 100 additional bus lanes as part of a broader initiative to improve all aspects of Seoul's transportation system. In 2007, Lee Myung Bak was elected President of South Korea largely due to his leadership in transforming the Cheonggyecheon area into a national public resource. President Lee had prioritised environmental stewardship as Mayor and improved the quality of life in Seoul.

Figure 5: The highway that covered the Cheonggyecheon River was replaced with a riverfront park



Guayaquil, Ecuador

Improvements to deteriorating public spaces and other public works projects formed an important part of Mayor Jaime Nebot's plan

to revitalise the city of Guayaquil. His vision included enhancing pedestrian facilities that link to the city's waterfront and hilly Santa Ana district. He also oversaw the opening of Metrovía in 2006, the city's BRT system that stretches 45 km and serves nearly 500,000 daily passengers. The private bus services in Guayaquil were included in the Metrovia operating consortium while over 500 of the fleet's oldest and highest-polluting buses were removed from the road. In the same year, the city also launched its first Car-Free Sunday, closing streets to traffic and allowing thousands of residents to enjoy safe walking and cycling opportunities.

Conclusion

Any city can profoundly impact on sustainability and livability by employing some of the cost-effective transportation best practices being advanced world wide and learning from the experience of neighbours. BRT, non-motorised transport, travel demand management, and integrated transportation and land use planning, implemented with intelligent traffic and transport management systems, can change the way residents experience a city in a positive way. The solutions also tackle larger issues: reducing emissions, saving commuters time, improving access to economic opportunities and decreasing air pollution.

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