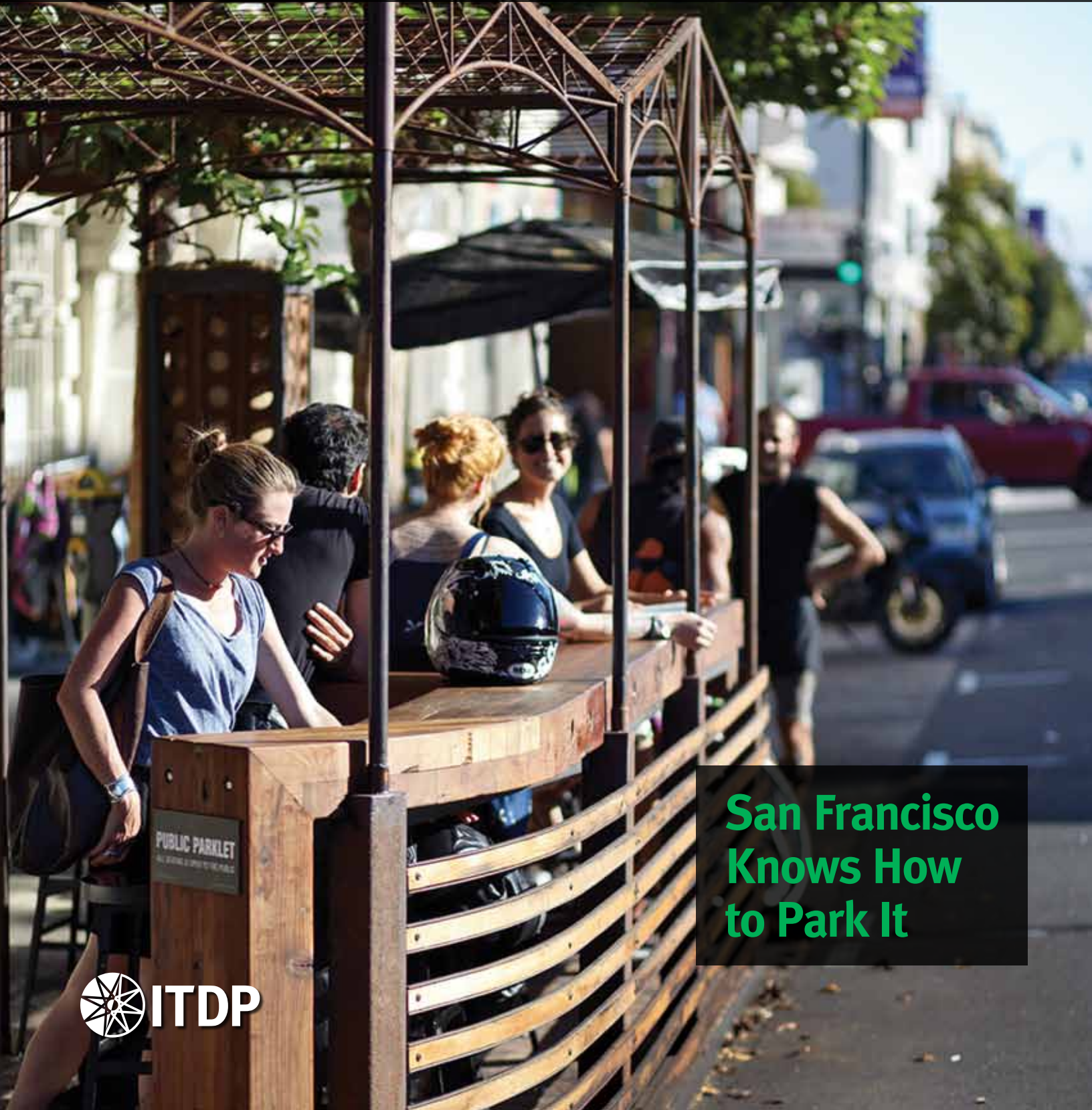
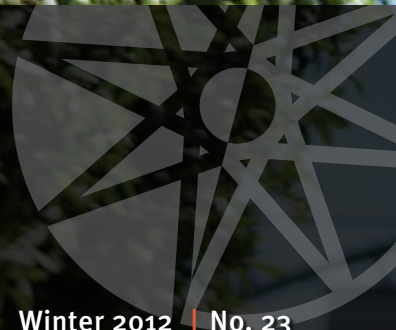


# sustainable

## TRANSPORT

Winter 2012 | No. 23



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Cover:  
San Francisco has pioneered several reforms  
related to parking this year, including its  
"Pavement to Parks" program which reclaims  
parking spaces and turns them into parks like  
this, Four Barrel Parklet.

Image: Bruce Damonte Photography  
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# Strange Weather, Changing Streets, Stormy Relations

By Walter Hook



On the streets, things are changing.  
A cultural shift is happening.  
Suddenly, sustainability is cool.

Growing up, my family often used to hike in Glacier National Park in Montana. Recently, I took my kids there, knowing that by the time they are adults the glaciers will be gone. In September, a hurricane hit New York. My family went to the Catskill Mountains to escape it. Warm rain kept falling and falling, and mountain paths turned into rushing rivers. On the ride home back to the city, several bridges were washed out moments after we crossed them. In late October, a snowstorm, with flakes the size of tennis balls, blanketed our neighborhood in a matter of minutes. Today, it's 70 degrees outside. The weather is getting strange.

National leaders now tell us we might have a global deal on climate by 2020, but the International Energy Agency says if we don't do something in the next five years, it will be too late.

While an international agreement remains remote, on the streets things are changing. A cultural shift is happening. Suddenly sustainability is cool. Any change causes friction, and this cultural shift is no exception. But if this shift continues and accelerates, change on the street could keep the weather from getting too strange.

## New York City

Here in New York City, we have 260 miles of new high-quality bike lanes, built over the past four years, and the number of cyclists has tripled. The year started cold and brutal, however, with a backlash. The press turned on our transport commissioner, Janette Sadik-Khan, and on our bike lanes. Disgruntled, well-heeled residents with ties to our lackluster former transport commissioner fought to remove the new Prospect Park



The Prospect Park West bike lane in Brooklyn, New York.

West bike lane, the only decent northbound bike lane in central Brooklyn. Transportation reform suddenly hit black ice.

With the spring weather, however, the cultural mood swung as wildly as the weather. Cyclists mobilized, and surveys showed supporters of the bike lanes outnumbered detractors two to one. Cycling seemed to be everywhere, from Armani fashion advertisements to movies to design



trends. The momentum continued throughout the summer, when a judge rejected the lawsuit to remove the Prospect Park West bike lane. In September, Sadik-Khan announced the roll out of a 10,000-unit bike-sharing system by 2012. The debate moved from “Why do we need to have bike lanes?” to “Can I have a bike-share station on my block?” My morning commute was suddenly a river of bicyclists: young, old, parents with kids, students, serious spandex-wearing cyclists, and new bike commuters with their baskets and bells struggling with all those gears.

Cycling to work one morning, a jaywalking pedestrian crossing mid-block suddenly stepped in front of me. I swerved. The pedestrian started screaming at me. The pedestrian’s rage took me aback. Cars that could kill her were swerving all around us, but my bicycle was like a red cape to a bull. There is something intimate, personal, and in-your-face about pedestrian-on-bicyclist conflict that gets under the skin more than pedestrian-car conflicts where you can’t really see the driver’s face and it feels more like a pointless fight with a machine.

Are we cyclists really that bad? I started counting traffic violations on my way to work. Cars and delivery vehicles double park across bike lanes and bus lanes. Bikes run traffic lights. A tsunami of pedestrians cross against the light at popular intersections. We all misbehave. Is it just a New York thing?

One issue is the timing of traffic lights. New York City has green waves that are timed to car speeds. Inevitably, cyclists can’t keep up and fall to the back of the traffic light cycle, pushing to catch the yellow. Meanwhile, as soon as the last car traffic passes in a wave, all the pedestrians begin to cross the street, even though they still face a red signal. Jaywalking pedestrians clash with cyclists rushing to catch the yellow. Then the light turns red, and law-abiding pedestrians clash with cyclists running the red. A

ITDP staff and guests inspect Bogotá’s bike lanes during the annual staff meeting in June.

million incidents a day, and pedestrians and bicyclists, face to face, suddenly hate each other.

The mix of traffic on our streets has changed. The traffic lights still think it’s 1950. Copenhagen has green waves set to cycling speeds and Holland is removing traffic lights at low-volume intersections and uses slow-speed roundabouts. It’s time to introduce these things in New York. In the meantime, we cyclists need to make an extra effort to be polite. The political backlash is in part a backlash against our behavior. Deep breaths. We are all ambassadors for sustainable streets.

## Johannesburg

Last February, Sadik-Khan, along with New York City’s planning commissioner, Amanda Burden, accompanied me to the opening of ITDP’s Our Cities Ourselves (OCO) exhibition in Johannesburg to share their experiences regarding New York City’s recent changes. The exhibition, which initially opened in New York in June 2010, shows visions of ten international cities in 2030 if they embrace sustainable transportation principles. Rehana Moosajee, the member of the mayoral committee (MMC) for





Top: People are flocking to the newly pedestrianized Madero in Mexico City and business is booming as a result.

Above: Chicago Mayor Rahm Emanuel and ITDP President Enrique Peñalosa met in August to discuss gold-standard BRT for Chicago.

transport, took us on a tour of the Rea Vaya BRT system and then a visit to the Mandela House in Soweto. Just a few years ago, it was unthinkable for a group of affluent foreigners to take public transit to the middle of Soweto.

PioTrans, a company composed of the minibus taxi operators who used to run on the same route, had finally taken over as the operating company for Rea Vaya. This day did not come easily. Protection rackets, minibus importers, and other groups threatened by the new BRT system organized strikes, protests, and demonstrations. Threatened interests hired thugs to attack the home of Rehana Moosajee, and some of the drivers were shot at. This is a cultural battle for sustainability on a whole different level.

Later, in the summer, the PioTrans drivers went on strike. Interest groups threatened by the new BRT system rallied and seem to be behind it. Rea Vaya services were suspended for more than a month. Customers were furious. Changes in public attitudes swung from pro to con as wildly as the weather. Finally, in early September, the strike was settled and progress on the next phase of the BRT began again. Culture is changing and that change is causing friction. South Africa is full of hope, but the battle for sustainability is fought street by street, and it's not over.

## Mexico City

In March in Mexico City, our Latin American Regional Director Bernardo Baranda and I got on Mexico City's new shared bikes, and we rode down beautiful new bike lanes on La Reforma, the most important avenue in the city. Bernardo's team played a key role in the design. We stopped to observe a young couple kissing in the spray of a new fountain at the recently pedestrianized Plaza de la República, then continued down the recently pedestrianized Madero, the ancient road through the heart of the Zócalo, Mexico's famous historical plaza.

While Mexico City has improved a lot, the government in 2007 had promised over 300 km of bike lanes. So far, only 22.5 km have been built. Then, advocates took to the streets in October painting a guerilla bike lane, called Wikicarril, to highlight how quick and cheap it is to build cycling infrastructure. The DIY bike lane was quickly erased. But in November, they repainted the 5-km lane for under USD 1,000.

In July, David Byrne came to Mexico City as part of the Latin American tour for his book, *Bicycle Diaries*. With his visit, we launched the 5% for Biking and Walking Campaign, where we asked the national government to set aside 5% of its budgets for biking and walking projects. As a result, for the first time ever, the national government included non-motorized mobility in its budget. While it isn't the full 5%, biking and walking are on the national agenda now.

## Chicago

With the election of Rahm Emanuel and his appointment of Gabe Klein as transport commissioner, all eyes of the sustainable transport community are on Chicago. For the first time, with support from the Rockefeller



Foundation, ITDP is working in the U.S., and for now we're focusing on Chicago. The stars are aligning, no clouds in the sky.

Chicago's strong sustainable transport community, including the Active Transportation Alliance (ATA) and the Metropolitan Planning Council, has helped put sustainable transportation high on the mayor's priority list. BRT is one of those priorities.

This past year, ITDP, with the help of international BRT experts, created the BRT Standard, a scoring system to be released in 2012 that recognizes and evaluates BRT systems and scores them gold, silver, or bronze. Chicago is talking about "gold standard" BRT both downtown and on Western Avenue. They have already rolled out some great new bike lanes. On my bike ride along the proposed BRT corridors with ATA, I sensed a difference in street culture from New York: drivers stop to let you pass, and cyclists tend to be more polite to pedestrians. I was the rudest person on the road, and felt self-conscious. Maybe we New Yorkers can change.

## Tehran

While national relations between Iran and the rest of the world deteriorate further, I was invited by Amirkabir University to speak at a technical workshop in Tehran. Last year, we awarded Tehran an honorable mention at the Sustainable Transport Awards, and I decided to go and check it out. Evidently, news of the award, and the fact that the Iranian national government didn't allow Mayor Qalibaf to go to Washington to receive the award, was on the cover of Iranian newspapers for six days.

Though the city is still car-oriented, the change of direction in the last few years is impressive. Despite Iran's massive oil reserves, Tehran is doing everything it can to reduce its dependence on oil. Nothing could have prepared me for the graciousness with which I was welcomed, nor the seriousness with which my comments were taken. I was shown a beautiful metro, built largely with Chinese assistance, and a massive 102-km BRT system serving over 1.6 million daily passengers, making it one of the biggest BRT systems in the world. Despite having only ITDP's *BRT Planning Guide* as a technical reference, the quality is impressive. Tehran also has hundreds of kilometers of new bike lanes, thousands of new public bicycles, wide new sidewalks complete with rushing fountains, and a new pedestrian plaza in front of the Grand Bazaar. I visited the control center and the congestion-charging zone.

My meeting with Mayor Qalibaf lasted over an hour. He is a sharp, pragmatic man. He told stories of how difficult it was to introduce the first BRT line. The University of Tehran was against it, as was President Ahmadinejad, a traffic engineer. Like other great municipal leaders before him, Qalibaf stuck to his guns, and now most people support the measures.

Down at the street level, from Tehran to New York, change is in the air. If enough of us embrace that change, it might just be enough to bring down the global temperature.

Image: ITDP



Morteza Khashaypoor shows ITDP CEO Walter Hook the new bike lanes and bike-share system in Tehran.



# Tehran's Transport Turnaround

By S. Mehdi Hashemi and Farshad Jalali,  
Intelligent Transportation Systems Research Institute,  
Amirkabir University of Technology, Tehran, Iran

**Editor's Note:** While U.S. and Iranian relations, at the national level, remain strained, there are opportunities for constructive exchange of best practices and lessons learned at the city level among transit professionals. This technical exchange can also foster a better understanding of cultures and promote peace and friendship.

Sustainable transportation is probably not the first thing that most people think about when it comes to oil-rich Iran, but Tehran, the country's capital city, is changing expectations with new bus, bike, and pedestrian networks. Iran's largest city has 7.2 million residents, which swells during the day

to nearly 12 million as people commute into the city. Like many cities, Tehran suffers from severe congestion, but where it differs is that the city's political leadership has moved aggressively to address the problem.

Tehran set an ambitious target of having 75 percent of its projected

25 million daily trips made by public or semi-public transport systems by 2025. To meet this target, the city has already built an extensive bus rapid transit (BRT) and cycling network and implemented the first congestion-charging system in the Middle East. This unexpected leader has left forward to



Images: Left-Mahmoudreza Shirinsokhan; Right-Kamshots via Flickr

Tehran's new metro and BRT are the backbone of its transportation system.





become a global model for sustainable transport.

### Tehran's Public Transit System

Urban rail is the cornerstone of Tehran's public transport system. Tehran opened its first line in 1998 after years of delay. Thirteen years later, the system carries about 1.5 million passengers daily on four lines that total nearly 125 km. The system is one of the fastest growing metros in the world, outside of China. The goal is to expand the system by 250 percent to create a 430-km network by 2025. Additionally, Iran is using this to spur economic development by trying to become self sufficient in manufacturing trains and trams.

But given its goal of 75 percent of trips made by transit, the city recognized that it will need more than just a metro. So, in 2006, the city asked the Intelligent Transportation Systems Research Institute (ITSRI) of Amirkabir

University of Technology (AUT) to study additional public transport options.

Tehran has had a public bus service since the 1920s, but over time the buses and the quality of service declined dramatically. As old, unreliable buses struggled in dense mixed traffic, the bus network came to be viewed as an option of last resort, mostly for the poor who had no other choice.

ITSRI proposed a rethinking of the city's bus system using BRT. BRT would get the buses out of congestion and would help attract passengers who were not taking the bus. ITDP's *BRT Planning Guide* played a vital role in informing the research of ITSRI.

### Reinventing Buses with BRT

For its first BRT line, Tehran chose the most congested east-west corridor that runs through the city center. Mayor Mohammad Bagher Qalibaf's strong support of this project was necessary to

Good quality BRT is proving to be an effective way to combat congestion as drivers switch to using the buses.

overcome opposition from a wide range of skeptics, ranging from Tehran University's leadership to Iran's president. The support of the mayor allowed the city to incorporate high quality design features in the first BRT line. As a result, the first line, which opened in 2007, includes a dedicated, centrally-aligned busway and pre-boarding payment system. The system also features articulated, low-floor buses.

During the first year of operation, ridership on the corridor increased by 77 percent. Now, 450,000 passengers use this BRT line each day.

The first line revitalized the image of bus-based transit in Tehran and attracted new riders, specifically white-collar, educated citizens who switched from private cars and shared taxis.



## Improving Air Quality and Saving Fuel

- Air pollution and emissions were reduced by 46 percent along BRT Line 1 (Azadi Square – Tehranpars corridor).
- Over 1,495,000 liters of petrol are saved daily on Line 2, due to reduced trips by private cars and motorcycles.
- On Line 7 (Qods Square – Rahahan Square), over 27 percent of private car trips have been diverted to BRT trips.

Line 1's success also overcame previous opposition, with most neighborhoods now eager for BRT service. The success also ensured the commitment of the mayor and other authorities to implement the entire BRT network that ITSRI designed.

Four years after the first line opened, the system now has six lines totaling 176 km, with an additional four lines being planned. The system carries nearly 1.6 million passengers daily.

ITDP's CEO, Walter Hook, recently visited the city and used ITDP's new BRT Standard Scorecard to rank the city's BRT lines. Two rated as silver, and an additional two rated bronze. Unfortunately, as time has gone on, the city has sacrificed some of the high quality design features from the first corridor.

## Success Stories from the BRT

Tehran's BRT network has yielded economic, social, and environmental benefits for the city. The system has reduced travel and waiting times for passengers, which has helped increase ridership and decrease private car use.

Because of the fuel efficiency of the new buses being used on the corridor and the fact that these buses are no longer stuck in traffic, air quality has improved and CO<sub>2</sub> emissions reduced.

The creation of BRT has also attracted new riders to public transit and changed the demographic profile of the average transit rider. Studies show that BRT is attracting younger, more educated riders. A recent survey conducted by an independent research group found that over 65 percent of the 2,200 people

interviewed felt that implementing BRT has been the city's most effective initiative to mitigate traffic congestion in the central business districts.

Local businesses have also come around to BRT despite initial resistance. Businesses along Line 2, which runs through Molavi, a major shopping center, originally opposed BRT, fearing that restricting car access and prioritizing buses would hurt their businesses. Today they report that business has improved since the BRT was introduced.

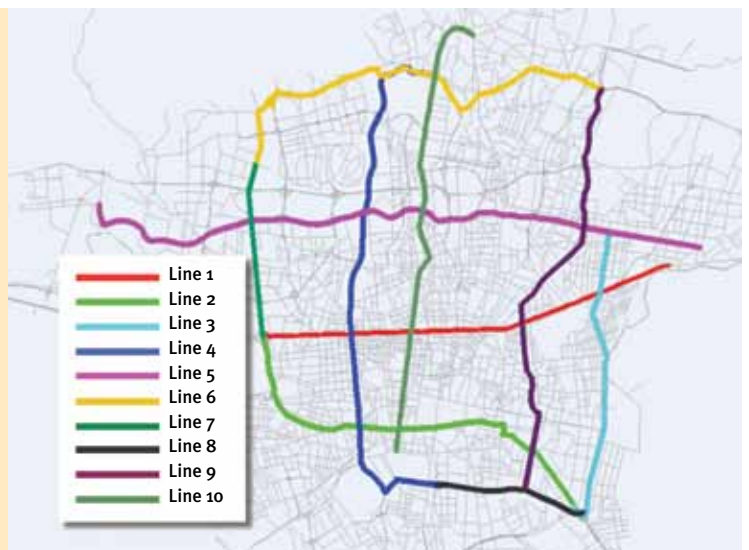
## Improving Transit Quality

In addition to expanding BRT and the metro, Tehran has taken other steps in recent years to make the public

Tehran's plans for a 10-line BRT network.

## Tehran BRT Features:

- Multi-door buses for faster boarding and alighting
- Weather-protected stations
- Air conditioning system
- Universal access
- Passenger information system, including bus arrivals
- LCD system for display of information and advertisements
- Electronic ticketing system
- Intelligent control center to monitor and adjust operations
- All stations equipped with video monitoring cameras for safety







transport system more efficient and attractive. Private operators now run more of the city's normal bus services and are providing a higher quality of service with newer, nicer buses. These new buses are also more energy efficient, with 50 percent of Tehran's active bus fleet now fueled by CNG. Tehran also introduced an integrated electronic fare collection system in 2010. This allows passengers to pay for the bus and the metro with one fare card. All city-operated buses are equipped with e-card readers and e-ticketing is being piloted in privately operated buses on the Qods-Rahahan BRT line.

## Cycling in Tehran

It is not just Tehran's bus network that is getting a makeover. The city is also beginning to explore how to

make bicycles part of its transportation network. This is no small feat given the city's geography. Traveling from south to north through the city, the elevation rises by 800 meters, making cycling a challenge. East-west travel is slightly flatter and as the city spreads along this access, cycling becomes a more viable option.

The Tehran Transportation and Traffic Master Plan analyzed demand for cycling and outlined a network of over 368 km of dedicated cycling routes (see map) to be built by 2025. This network has grown to a 525-km network as plans have been refined.

The network will also be integrated with other modes including the metro, BRT, and regular buses. And the city has begun to install a bike-share system with the goal of providing additional connec-

*Top left: Planned cycling network (in red) for Tehran (2005). Above left: A bicycle-share facility along a bike lane. Most of the bike stations are staffed, more like a traditional bike rental facility.*

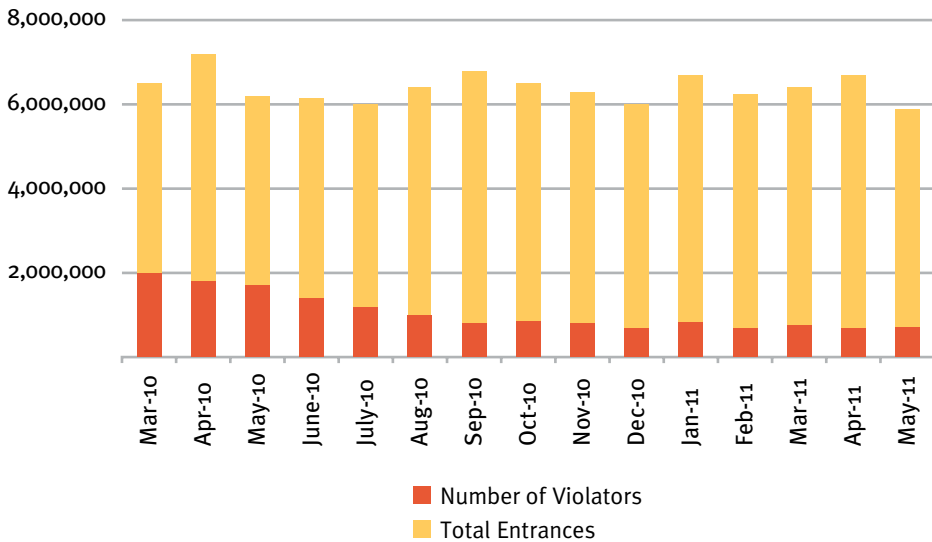
*Above: Inside the bike-share station.*

tivity between modes.

Today, Tehran has 158 km of bike paths and eighty-nine public bicycle rental stations. The city plans to build an additional 148 km of exclusive bicycle paths in 2012 and add 1,000 bicycle rental stations, which will accommodate 100,000 bikes. The bicycle rental/bike share program expansion will be done in cooperation with the private sector.

Cycling is still seen, however, primarily as recreation. The challenge to having more cycling options will be to break that image. Even today, most low-income residents prefer to use motorcycles instead of bikes. The city hopes that by taking a

### Illegal (Unpaid) Entries into the Restricted Traffic Zone



Illegal entries into the restricted zone dropped once Tehran introduced automated license-plate recognition. Total entries into the zone have remained fairly constant.

rapid transit; second, the city needed to reduce the amount of road space available to private cars via “road diets”; and finally, the city had to find a way to tighten the control and enforcement of the RTZ.

Tehran began researching ways to improve RTZ enforcement starting in 2006. After an extensive review of technologies and several field tests, the city identified a solution: automatic number plate recognition (ANPR). This was chosen in large part because it relies on license plates, which are already required by law, instead of requiring drivers to install additional items.

However, existing ANPR technology was all based on English characters. The city formed a public-private partnership to develop an ANPR technology that would work with Persian characters, and in late 2008 the new technology was ready to use.

By April 2010, 303 cameras with ANPR technology were installed at over 104 locations around the perimeter of the RTZ. The city began a test of the system in June 2010.

The cameras continuously take pictures at each entrance route and transmit them to a system that uses image processing to recognize and match the plates with a central database of vehicles authorized to enter the RTZ. If the plate is not in the database, a violation is issued, and a ticket enclosed with the picture taken from the car is delivered to the address of the vehicle owner within forty-eight hours.

The installation of the system itself seems to have acted as a deterrent to drivers who were previously evading the manual enforcement system. While there has been a small reduction in total monthly entrances, there has been a much sharper decline in viola-

neighborhood-based approach to investing in cycling, this will create the necessary groundwork that enables people to feel safer and want to cycle.

### The Technological Fix

In addition to improving transit and cycling to attract drivers out of their cars, the city has begun to step up its efforts to manage traffic through congestion charging. Though the city has a long history of demand management, it has just recently upgraded to a more modern and efficient system that is helping to reduce congestion downtown.

Tehran implemented a restricted traffic zone (RTZ) in 1979 to address both traffic and security issues. The RTZ gained greater significance when the Iranian Parliament enacted the Air Quality and Pollution Management Law in 1994. Tehran was the first city in the country to improve its traffic management regulations to meet the requirements of the law.

A permit is required for vehicles entering the RTZ, which is 32 km<sup>2</sup>. Exceptions are made for authorized

emergency vehicles (e.g. fire trucks and ambulances), all police and military vehicles, diplomatic cars, public transport vehicles (buses, minibuses, and trucks with public plates), as well as taxis. Drivers of private vehicles must register and pay for an annual permit, and receive tags to place on their windshield. Until recently, 600 police officers manually enforced the RTZ by checking permits at 105 entrance gates, with some additional mobile patrols.

However, in the past five years, the manual enforcement system has not been as effective as hoped. A 2009 study showed that 35 percent of vehicles entering the RTZ were unauthorized—159,000 vehicles out of 450,000. And although police officers did their best, they were only able to catch and fine less than 2 percent, about 3,000, of the violators.

Also in the last five years, air quality has gotten progressively worse. To address this, the Urban Management Department developed a three-pronged approach to curb private car use. First, the city needed to expand mass transit options including the subway and bus



tions. Air quality and traffic flow has improved, and the Urban Management Department now has more flexibility in its management of the RTZ.

Now in addition to annual passes, drivers can request a daily or weekly permit into the RTZ via the internet and can pay the fee online. The driver's

number plate is registered in the authorized vehicles database for the time period requested.

### The Complete Street Ahead

Tehran is working hard to meet its ambitious goals for sustainable transport, proving that even a city in one of

the world's most oil-rich nations can look beyond the automobile. If the city meets its goals, they will leave comparatively oil-poor cities in the dust. The city's innovative and comprehensive strategy is setting an example for cities around the world about defying expectations and leading the way.

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# Buenos Aires Tangos Towards Sustainability

By Clara Rasore, ITDP

Mario, a sixty-two-year-old coffee-store employee and a faithful lifetime bus rider, admits he was initially annoyed when the city announced it would be constructing new bus lanes and re-routing the bus line he has taken for more than twenty years.

The work was being done in preparation for the first bus rapid transit (BRT) line in Buenos Aires, which opened in May 2011. Metrobús, as it is called, has already become a success. Ridership is up 20 percent on the corridor, and the first line serves nearly 100,000 passengers each day.

“At first, when I was told about Metrobús I didn’t understand how it could possibly work. I thought that taking lanes away from cars and giving them to buses would cause the remaining car lanes to fill up with traffic and people would demand the whole thing to be reversed,” said Mario.

His concerns were grounded in experience. A few years ago, the city created exclusive, but not physically separated, bus lanes on some of the larger avenues. People were promised time savings because the buses had their own lanes and would no longer be stuck in traffic, but those savings were not realized. “I thought the story would repeat itself,” said Mario. “In the old scheme, there was no enforcement of the bus-only lanes and buses would get delayed. It was very frustrating.”

The city was committed to realizing those time savings for the commuters, as well as providing a higher quality of service, as it began to plan the Metrobús service. The first corridor includes an exclusive and physically separated bus lane running down the center of a 12.5-km stretch of Juan B. Justo Avenue. This avenue is a central artery that connects the neighborhood of Palermo to Liniers. Until recently, it was exhaustingly congested and noisy—a jumble of cars, taxis, and buses competing against each other for priority on the street. The segregated

bus lane allows the buses to get out of that congestion and get people to their destinations more reliably and quickly.

The BRT comes at a crucial moment for the city. Car sales in Buenos Aires have nearly doubled in the past year alone, and traffic congestion with it. As congestion rises on the streets, it is rising also as a concern for the government, as leaders strive to keep the city moving.

Historically, Buenos Aires was interested in investing in mass transit. In the 1940s, Buenos Aires was on track to have a robust metro system, but the project was interrupted due to political and economic crises. The project was picked up again at the end of the twentieth century, but in the intervening years the city, like many others worldwide, gave increasing priority to motor vehicles and built numerous highways and urban avenues. These new roads, coupled with insufficient public transit options, led to many residents choosing to drive.

In 2007, the political tides changed and a new local government was elected to lead the city. The new administration came into office with a commitment to sustainable mobility, and BRT was among the main ideas it was considering. Government officials prepared initial proposals for a



Metrobús is Buenos Aires’s first BRT line. Opened in May, it already serves nearly 100,000 passengers daily.





BRT system but progress towards these proposals was quickly abandoned as the city turned its attention towards more pressing issues.

The city had promised to construct 10 km of subway per year, but political and economic conditions made that promise nearly impossible to deliver. With the help of ITDP and the Clinton Climate Initiative, the city realized that BRT would deliver a mass transit solution but at a fraction of the cost and in a fraction of the time than that of a subway. The city decided to pursue BRT and began the necessary data collection to design the system.

The city conducted extensive research including what types of buses to use and how to finance the system. It also collected data about passenger demand, traffic patterns, bus service and quality, and commuting times, to create appropriate routes and service plans.

Metrobús faced many obstacles, including regulatory challenges as the national government was ostensibly in charge of regulating buses in the city. Other concerns came from local business owners, worried about truck deliveries along the corridor. Though parking was never permitted along the avenue, many businesses used the curb as an informal loading zone. The installation of new no-parking signs and yellow-painted curbs during the early phases of BRT construction prompted a lot of grumbling. But the grumblers quickly realized they were on shaky ground, since they had been breaking the law all this time.

Some residents objected to the BRT as well. They feared the dedicated

Mario, a lifelong Buenos Aires bus rider, was skeptical at first that the BRT would work. Today he is a convert.

lanes would worsen the neighborhood's already horrendous congestion, as well as noise and air pollution. Other residents who lived near the corridor also worried that the traffic diverted from Juan B. Justo would congest their streets. The government was extremely concerned about this, but those fears, as well as those of bus riders like Mario, have proven to be unfounded.

Metrobús has reduced traffic on Juan B. Justo for buses and mixed traffic alike. Bus riders appreciate the higher quality of service and the time savings. Now, passengers wait for less time, as the buses come about every two minutes during peak hours, two to four minutes during the midday and ten to fifteen minutes at night. Travel times along the route have been reduced 40 percent, making a trip that used to take fifty-five

CONTINUED ON P. 35



# Going for the Gold: Introducing the BRT Standard

The BRT Standard is a scoring system that has been developed by leading bus rapid transit (BRT) experts for the purpose of acknowledging systems that have the characteristics of the world's best BRTs. It will be released in the beginning of 2012 as a way to recognize and encourage higher quality systems.

It is a simple tool to measure easily observable features of any system. Using the scorecard to the right, Metrobus's Insurgentes Corridor in Mexico City is a silver-standard BRT with a score of 75 out of 100. The image below highlights some of the factors that contribute to that score.

For more information, go to [www.brtstandard.org](http://www.brtstandard.org).

Stations are in center and shared  
by both directions of service  
**Score: 3/3**

Safe, wide, attractive,  
weather-protected stations  
**Score: 3/3**

Platform - level boarding  
**Score: 6/6**

Bus lanes in central  
verge of the road  
**Score: 7/7**

Universal access  
**Score: 3/3**

Stations set back from intersections  
**Score: 3/3**

Segregated  
right-of-way  
**Score: 7/7**

Improved safe and attractive pedestrian  
access to system and along corridor  
**2/2**



# BRT Standard 2012

## SERVICE PLANNING

	Max Score	Metrobus, Mexico City
Off-vehicle fare collection and fare verification		
Multiple routes use same BRT infrastructure	7	7
Peak period frequency	4	4
Off-peak frequency	4	4
Limited and local stop services	3	3
System control center	3	0
Routes in top 10 demand corridors	3	1
Operates late nights and weekends	2	2
Part of (planned) multi-corridor BRT network	2	2

## INFRASTRUCTURE

Bus lanes in central verge of the road		
Segregated right-of-way	7	7
Intersection treatments	7	7
Physically-separated passing lanes at stations	6	6
Emissions standards	4	0
Stations set back from intersections	4	2
Stations are in center and shared by both directions of service	3	3
Pavement quality	3	3
	2	2

## STATION DESIGN AND STATION-BUS INTERFACE

Platform-level boarding		
Safe, wide, attractive weather-protected stations	6	6
3+ doors on articulated buses or 2+ very wide doors on standard buses	3	3
Multiple docking bays and sub-stops	3	3
Sliding doors at BRT stations	2	1
	1	0

## QUALITY OF SERVICE AND PASSENGER INFORMATION SYSTEMS

Branding of vehicles and system		
Passenger information	3	3
	2	1

## INTEGRATION AND ACCESS

Universal access		
Integration with other public transport	3	3
Improved safe and attractive pedestrian access to system and along corridor	3	0
Secure bicycle parking at stations	2	2
Bicycle lanes in corridor or on parallel streets	2	1
Bicycles permitted on vehicles	2	0
Bicycle sharing systems at BRT stations	1	0
Subtotal	1	0

## POINT DEDUCTIONS

Minimum average commercial speed below 13 kph/8 mph		
Peak passengers per hour per direction (pphpd) below 1,000	-10	
Lack of enforcement of right-of-way	-5	
Significant gap between bus floor and station platform	-5	
Bus stop/station encroaches on sidewalk or busway	-5	
Overcrowding	-3	
Poorly maintained buses and stations	-3	-3
Distances between stations too long or too short	-3	
Total Score	-2	

100

75

# Finding Atlantis: Cape Town Reconnects

By Aimée Gauthier, ITDP, with additional reporting by the Cape Town Partnership

Majestic Table Mountain rises over Cape Town, South Africa. The city is bound by waterfront and rugged, steep hills, but where there are no natural barriers, the city has begun to spill over into uncontrolled sprawl. This sprawl is exacerbated by the spatial legacy of apartheid that persists even in post-apartheid South Africa, with townships remaining far from and unconnected to economic centers. Cape Town, with its new MyCiTi Integrated Rapid Transit system, however, is beginning to erase the divisions of the apartheid era and create a more compact, connected, and integrated city.

Like most South African cities, Cape Town bears the geographic scars of the apartheid era, when many blacks and “coloureds,” a South African term for people considered to be mixed race, were relocated to townships far from the city center. Years after the end of apartheid, township residents, often among the most disadvantaged of the urban population, remain at a huge disadvantage, with long, sometimes treacherous commutes to the city center, where many of the economic opportunities are located. MyCiTi’s first bus rapid transit (BRT) corridor, which opened in May 2011, is finally beginning to erase these scars.

Affordable, safe, and reliable public transportation is vital to Cape Town’s ability to improve the economic prospects and quality of life for township residents. The new transit corridors can serve as the guide rails for new development, instead of allowing unplanned sprawl.

The good news is the South African national government is devolving significant authority over public transportation to cities, giving Cape Town more options. In 2009, the national government passed new legislation that



MyCiTi is Cape Town’s bus rapid transit service. The city is banking on BRT to stimulate economic development and connect township residents to the city center more quickly, safely, and cost effectively.

allowed municipalities to take control of planning for all public transport and the implementation of road-based public transport services, including the contracting of independent service providers, from the national and provincial government. These changes gave South African cities, which have widely drawn geographical boundaries introduced by the post-apartheid democratic constitution, the opportunity for greater control over their public transport systems.

The national government also encouraged cities and provincial governments to focus on integrated transportation solutions. Cape Town took up the mantle with plans for its new Integrated Rapid Transit (IRT) system. The centerpiece of its new initiative is a new BRT system called MyCiTi that will complement the existing suburban rail

network. When it opened, it became the second full BRT system to open on the continent and the first to incorporate cycling facilities.

MyCiTi’s first corridor presently runs along the city’s west coast, from Table View to the downtown Civic Center. It will eventually connect Table View to Atlantis, a township established in the mid 1970s as a settlement for coloureds. Located about 30 miles (50 km) away from Cape Town, Atlantis was supposed to be a model township but it is plagued with unemployment, disinvestment, and crime. One reason the city chose this corridor was to connect residents of Atlantis with economic and educational opportunities and help reinvigorate the township.

Because there was no rail service along this corridor, BRT would provide





## Until recently 67 percent of all trips in Cape Town were made by car—the highest rate of car use of any South African city

residents to and from the townships. Though minibus operation provided economic opportunities for blacks in an era when other avenues were cut off, now minibus operators work in informal associations without guaranteed income or work hours in an industry plagued with sometimes violent conflict over routes. By creating formal companies, both operators and drivers benefit from

agglomeration of minibus associations and another that would be a joint venture of GABS with a few other minibus associations. But in February 2011, GABS threatened to go to court to halt the start of the new service unless they were accommodated as a separate, third operating company.

Despite these challenges, in the end, the city has signed contracts for the interim service with three companies. Two are made up of former minibus operators and the third company is Golden Arrow Bus Services.

So far the system has been a success, attracting a significant new market. Approximately half of the current MyCiTi riders used to drive instead,

a new service without cannibalizing existing ones. The city has among the highest rail ridership in the country: 33 percent of all motorized trips are made by rail in Cape Town, and the city aims to protect that ridership. The rail service is controlled, however, by the national government, and there has been little investment in its infrastructure in the past twenty years. While there is increasing cooperation in planning and talk of devolving significant authority to the cities, it is not clear when that will happen.

This area also presented the city's best opportunity to incorporate the existing but informal minibus transit providers into formal companies and partner with them to operate services in the new transit corridor.

Cape Town's minibus industry filled a key public transportation gap during the apartheid period, shuttling

better working conditions and stability, and passengers benefit from better and more reliable services.

Historically, there has been mistrust among these minibus associations toward the government. This corridor had fewer minibus associations running services, allowing for a simpler outreach process and a higher likelihood of success. Even so, the industry responded by disrupting meetings and calling a city-wide strike, bringing transport to a halt for hundreds of thousands of residents.

In addition to the minibuses that ran along the corridor, Golden Arrow Bus Service (GABS), a formal subsidized bus company, also provided services. The city initially wanted two BRT operating companies—one consisting of an

MyCiTi's first BRT route will connect the township of Atlantis with the city center.



Images: Top: Robert Bellon; Left: Cape Town Partnership

and records indicate a 15 percent drop in car commuter traffic in the peak periods along the parallel route. The system has also slashed travel times for passengers. A trip that used to take over an hour by car, now takes a scant thirty-five minutes from end to end on the BRT.

Using BRT is proving to be more cost-effective for customers, which early, anecdotal data suggests is the main reason drivers are making the shift. In a series of interviews conducted with commuters on the buses, many have pointed to household savings on the costs of petrol, parking, and motor vehicle wear and tear. One interviewee reported, “I want us to be a one-car family, because I’ve worked out how much we’re spending on owning our cars and it’s ridiculous.”

The system is also bringing improved reliability and peace of mind to low- to middle- income residents who previously took minibuses but feared arriving late to work, resulting in docked pay or worse. Members of the emerging middle class will incur debt to

invest in a vehicle, even before buying a home, because reliable mobility is key to keeping their jobs.

While continuing to grow, daily ridership remains low compared to other international systems. The largest recorded daily ridership is currently 12,469 passengers. But this is only the initial leg of the service, and over the next two years, ridership is expected to increase to well over 100,000 passengers per day as extensions to service are opened. The current service continually runs with full buses during the peak times and off peak ridership has significantly exceeded expectations.

The system is breaking new ground in other ways as well. It incorporates a high-quality 16-km bikeway parallel to the BRT corridor—the longest on the entire African continent. Cape Town also allows BRT riders to bring their bikes on the buses. The city has started installing bike parking at railway stations, including secure, covered bike parking that is protected by security during daytime hours at some locations.

Detailed designs for more cycle ways

have been completed and will be let to tender, with the expectation that they will be finished by May 2012. This includes cycle ways in Delft, Atlantis, Behlar, Retreat, Eerste River, Blackhearth, and a feeder route to the BRT in Joe Slovo. To date, the city has invested nearly 300 million Rand (37.7 million USD) in non-motorized infrastructure citywide.

Although Cape Town has a well-developed recreational cycling culture, including the annual Cape Argus Cycle Tour with about 30,000 cyclists riding the 110-km route, bike commuting is still rare. Only about one percent of daily commuting trips are made on a bicycle, and the new cycle lanes are not being well used yet. It will take a more fully connected bike network to encourage more cycling. Allowing people to bring bikes on transit will help overcome the very long distances between where people live and where they work. Promo-

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MyCiTi is truly an integrated transit system. Below left: new greenways run parallel to the BRT corridor. Below right: bike parking at train stations allows riders to bike and ride.





tional events and education would also help encourage more cycling.

Recently, Mayor Patricia de Lille announced that Cape Town plans to open a new MyCiTi service to the south-east to connect to Mitchells Plain and Khayelitsha—two of the biggest townships in Cape Town—by December 2013. There is significant political pressure for expansion of the BRT service, especially to serve formerly disadvantaged areas. In part to respond to this pressure and meet the December 2013 deadline, the government may try to route the BRT on the N2, a limited-access highway. This is only regarded, however, as a temporary intervention while capacity on the rail service is increased and until the infrastructure for more suitable BRT routes is completed.

Routing the next BRT line in areas closer to where people are, such as along Klipfontein Road where most of the buses and minibuses currently run, is optimal from a passenger perspective, as well as for encouraging opportunities for development and densification. People could more easily walk and cycle to it and the system would be better integrated into their communities.

Expansion plans are complicated because this new corridor has more minibus operators, which will make negotiations more challenging. Cape Town has been working on the minibus transition for Phase One for over three years. While huge advances have been made shifting the relationship from outright confrontation to participation of minibus operators as service providers in the new system, the transition is still not complete. This will be the critical piece to get right for the success of the system and two years may not be enough time to transform the existing chaotic and often violent transit service



## MyCiTi BRT Features

The BRT service includes a fully segregated corridor complemented by feeder services at Table View and in the downtown. Estimated ridership shows that 50 percent of trips are made on the feeder services and 50 percent on the main trunk corridor. The system uses high-floor buses and level station platforms. The system is accessible for people with disabilities.

Currently, MyCiTi uses a paper ticketing system, but the contract for an automatic fare system has been awarded and is being implemented, with one hundred volunteer commuters involved in testing the system to iron out problems prior to wider introduction. The new fare system will be the first to be implemented in terms of national regulations which require compliance with Euro-Mastercard-Visa (EMV) standards, thus integrating them with a national electronic payment system for small pur-

chases where the national banking system provides much of the fare system back office. This is substantially new technology globally, and if successful is likely to be replicated widely.

The stations' designs incorporate high-quality public art. They are enclosed and weather protected. Many of the stations between the main Table View and the downtown have very low usage, in part because of the nature of the development patterns and in part because there are no feeder services bringing passengers to that part of the corridor. The route does not intersect developments located nearby and remaining minibus services are still allowed to ply the route. It does not make sense as a passenger to take a minibus to the BRT station, transfer, pay an additional fee, and wait for the bus when he or she can just take the minibus to their destination.

in the new areas into formal sector companies. The goal of expansion, though, is encouraging and a signal that Cape Town is committed to bringing its sustainable transportation plans to life.

Cape Town is known for being one of

the most beautiful places in the world. Once the city builds out its integrated transport network, Cape Town is likely to flourish into one of the most livable cities in the world—one that is inspiring and enduring, just like its geography.

# Parking: A Bad Romance

By ITDP Staff

Walking along a downtown street in any Indian city, you find yourself winding through motorbikes, cars, and three-wheeled auto rickshaws parked helter-skelter along the road. The few scraps of sidewalk are not enough to accommodate both street vendors and pedestrians. As a result, you often end up walking in the street or in the mud under the hot sun.



This scene of chaos at the curb in Delhi is typical of many cities in India.

Most people think the solution to this roadside chaos is more off-street parking facilities. However, contrary to popular opinion, more off-street parking does little to fix the problem and can create a different but equally untenable situation at the curb. In newer, wealthy areas of Indian cities, where off-street parking is often plentiful, sidewalks are rare and pedestrians pass by gated residential compounds along faceless walls surrounding parking lots. There is no place to walk and nowhere to walk to.

Off-street parking regulations not only create poor walking environments, but also lead to congestion and sprawl. New parking spots in new developments generate new trips, which cause more cars to clog up the streets. India and China are expected to add 250 and 350 million new urban residents, respectively, by 2030.

Existing zoning codes, which regulate off-street parking, will ensure that the new development built to accommodate these residents will “lock in” car dependency, congestion, and sprawl. Our streets, our air, and our planet will not be able to handle this.

Building more parking is like a bad romance. You want it, but when you get it, it doesn’t work out. But parking policy can be harnessed to help create the types of cities we want. To do that, both on-street and off-street parking have to be better regulated and managed.

## Best Practice in Off-street Parking

Zoning regulations form the framework that determines what type of development may occur, guiding everything from parking requirements, land use, building density, and setbacks. When done right, these codes allow the city to realize its vision and protect the public interest. However, when they are out of date or do not line up with the city’s vision, codes can actually keep cities from becoming the places they want to be.

Europe has many of the best practices for zoning regulations in the world, using them to foster sustainable development and transportation. In cities like Amsterdam and Zurich, zoning regulations manage parking tightly, especially in downtowns or near mass transit, by limiting the number of parking spaces a developer can build. Large developments are also required to do traffic impact assessments to ensure that the roads can absorb traffic generated by these new parking spaces without further congesting. If the impact is found too severe, the number of allowable parking units may be cut even further.

Zoning regulations also regulate



the building density of the development through floor area ratio (FAR), the amount of total space of a building relative to the plot of land (see sidebar). Best practices in Europe use FARs to encourage growth and density in city centers and along transit. There, it is common to have FARs of eight or higher. This increase in FAR is also beneficial to developers because it increases the number of rentable units they can build, thus increasing their profitability.

Parking requirements are typically framed as a ratio based on the FAR or per dwelling unit. In downtowns and near transit in European cities, there is often an inverse relationship where the higher the FAR, the lower the required parking.

### Practice in Developing Cities

Much of the developing world, particularly India and China, is borrowing outdated and incomplete zoning regulations—including off-street parking minimums and low FAR—from the U.S. suburbs and other car-dominated societies, not from best practices. But cities in developing countries can adapt best practices, like those in Europe, to manage their own parking and urban development.

In much of India, as in most of the developing world, things work differently. The FAR is set at a fairly low level, typically between one and three. While this acts as a de facto limit on parking and mitigates severe traffic impacts of the sort that one witnesses in cities like Jakarta, this does cause a sprawling urban development pattern as the cities grow. The FAR also tends to be quite uniform across the city, not recognizing the opportunity to create density in strategic areas.

Many Indian cities also require developers to dedicate at least 15 per-

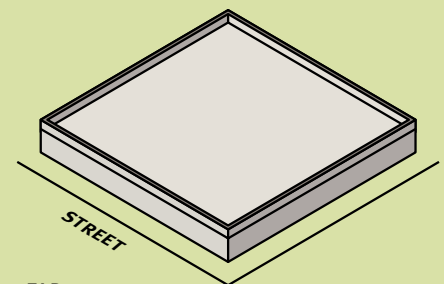
cent of the FAR of commercial building to parking spaces or one or two parking spaces per residential home, regardless of where those developments are located. These regulations mimic those used in suburban locations in the U.S. or Europe where motor vehicle ownership is much higher and where people have few alternatives to the motor vehicle for their daily travel. The combination of required minimum parking and low FAR results in low-density construction with significant parts of the land use dedicated to parking.

Unlike European and U.S. cities, many of which have had mass transit since the late nineteenth century, mass transit in many Indian cities is a recent phenomenon. As a result, neither the parking requirements nor the FAR take advantage of the opportunity to provide better access to transit. Now that cities in India and other developing countries are building metros and BRT systems, zoning regulations can be used to encourage growth along transit corridors to create better, people-oriented developments.

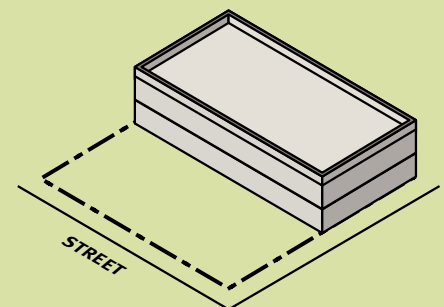
Ahmedabad has this opportunity, but it will need to revisit its zoning codes. The city just celebrated the two year anniversary of Janmarg, its high-quality bus rapid transit system. Along one stretch, huge billboards advertise a new real estate development. The marketing materials brag of the proximity to mass transit, while promising “Enough Parking Space for All Members.” While developers recognize this opportunity, the zoning regulations still encourage lower density developments with lots of parking. Without the proper regulations, developers are loathe to take the risk of not offering parking, considered an amenity by consumers, while their competitors do.

### Floor Area Ratio (FAR)

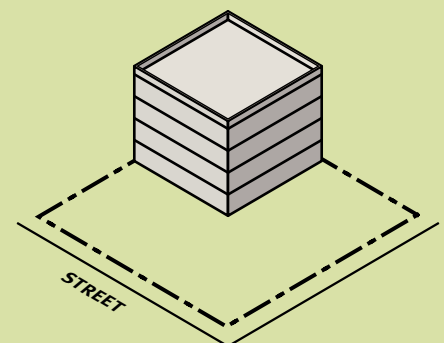
Floor area ratio, also known as floor space index, establishes how big the building can be in relationship to the land on which it is located. It gives the developer flexibility in what the building looks like but sets a maximum on total space that the builder cannot exceed. All three illustrations show a FAR of 1, but show how different that can look when actually built.



FAR=1.0  
10,000 sf building covering 100% of lot



FAR=1.0  
10,000 sf building covering 50% of lot



FAR=1.0  
10,000 sf building covering 25% of lot

Adapted from the NYC's Zoning Handbook, 2011 Edition



New developments along the BRT corridor in Ahmedabad advertise enough parking for all members even though it is adjacent to mass transit.

India is hardly alone in having outdated zoning codes. China's national off-street parking guidelines also encourage car use with minimum parking requirements and lower FARs of around two. There are, however, some emerging good practices occurring in new developments in China. Since a significant number of regulatory changes are decided at the municipal level, they are, in practice, quite flexible. This has allowed the massive new Taikoo development, which is located along the Guangzhou BRT system, to have a higher density using an FAR of eight, while decreasing the parking requirements. With 1,010 parking spaces for 417,000 square meters of rentable space, only 4 percent of the floor area is dedicated to parking. This is low even by international standards and consistent with good practice; best practice would include even fewer parking spaces.

### On-street Parking in Developing Countries

For off-street parking reforms to have any impact, cities will also need to grapple with their on-street parking

chaos. Whereas regulation of off-street parking is mostly a zoning issue, on-street parking is a management and enforcement issue. Poor on-street parking management is not only degrading the walking environment and worsening parking woes, it is also a lost opportunity for municipal revenue collection.

Sorting out this growing on-street parking mess will require both new regulations and new infrastructure. First, an inventory of on-street and off-street parking supply, both public and private, needs to be established. Then, cities can define where exactly vehicles are allowed to park and for how long. Finally, they can set appropriate charges for parking using meters that encourage people to park for less time, increasing the rotation at the curb and allowing more access to stores or services by more people. Most importantly, police departments then need to be given the tools, resources, and equipment to enforce these new regulations.

If the municipality manages on-street parking well and charges for it, it can enjoy a regular income stream. Some cities make a commitment to

invest the funds raised from parking into the local community in the form of better sidewalks, street furniture, landscaping, or security, maintenance, and cleaning. Barcelona invests the net revenue from parking into its bike-share program.

For all on-street parking solutions, enforcement will be the key to success. Cities will need to be tougher in policing bad parking behavior—including parking on the sidewalks, blocking pedestrian flow, and creating a dangerous walking environment. Cities will also need to enforce parking rules and regulations, including time limits on parking meters. Without fines and enforcement, any new parking system will be ineffective.

Some cities in India are leading the way. In Pune, the traffic police created detailed maps available online that illustrate parking rules for every street in every city district, helping to inform both drivers and officers about what to enforce. Meanwhile, Chennai has installed multi-space parking meters in several locations, including T. Nagar, one of the city's most popular shop-



ping districts. The fees are a move by the municipal government to better manage existing parking supply and bring some order to the street with all the competing interests—pedestrians, street vendors, cyclists, autorickshaws, two-wheelers, and four-wheelers.

### Additional Challenges

In countries where the majority of residents cannot afford to buy a car, mandating parking spaces in new developments raises concerns about equity. In India, a typical size housing

of construction. These regulations force developers to invest in parking instead of in transit or other forms of access that would benefit more people.

Another issue facing developing countries is the prevalence, and importance, of the informal market, which are untaxed and unregulated activities. The informal market is estimated to account for over half of GDP and employment in developing countries, particularly those in lowest-income countries. And the informal market operates numerous on-street parking services in many cities in

parked vehicles and streets littered with parked cars. Patrons pay quite a bit of money for this “service,” which, if formalized, could be collected by the municipality and spent on municipal improvements.

ITDP has been working with the city government to devise a plan to capture this revenue and reinvesting it into neighborhood improvements. In 2012, the city plans to implement a new payment regime. Multi-space meters will be installed to better manage the rotation of cars. The hourly parking rate will be 8 pesos, while valet parking service charge between 30 and 60 pesos per parking stay. This new official parking rate will help recoup the true value of the parking space. As ever, success will depend on good enforcement.

Cities like Mexico City are taking the first step to create sensible on-street parking policies. Finding mechanisms to turn these informal interests into transparent and taxable formal sector companies is a unique challenge to these cities and will be critical to solving the chaos at the curb.

### Ending the Bad Romance

Cities today can leapfrog over the mistakes of the past, but not with all these parked cars in the way. To avoid a traffic nightmare, cities in developing countries must stop thinking of off-street parking as a solution to their on-street parking problems. Parking supply affects decisions people make about how they will travel, impacting congestion, air quality, and quality of life. Using parking regulations smartly means ending the codependency on the car and creating sustainable communities. By unpacking their zoning policies and better managing the curb, cities can end the bad romance with parking.



Valet parking operations offer “protection” for private cars on the streets of Mexico City. Parking is not free, but without regulation the government fails to capture any of the revenue generated by these informal operations.

plot for poorer urban residents is 8–23 square meters while the average size for a parking spot plus circulation space is 26 square meters. Cars are getting more space than families.

If the development caters to lower to middle income people, many of whom will not be able to afford to own cars, the parking regulation needlessly drives up the cost of their housing, often accounting for 15–20 percent of the total cost

developing countries.

In Mexico City’s fashionable Condesa district, the informal market is helping to manage parking. During the evening hours, both residents and the clientele of restaurants and clubs vie for a limited amount of on-street parking. As such, there has been a boom in unregulated parking valet services, commonly known as *franeleros* or *viene-viene*. These informal services offer “protection” to

# SFpark: San Francisco Knows How to Park It

Dani Simons, ITDP

In December 2006, the United States Department of Transportation (USDOT) created the Urban Partnerships program, a \$1 billion fund that directs grants to cities with the most aggressive congestion-relief programs. In August 2007 the USDOT announced five final partner cities: Miami, Minneapolis/St. Paul, New York City, San Francisco, and Seattle. New York City had arguably the most ambitious plan of all the partners, to implement a London-style congestion charge. Unfortunately, after a struggle with the state legislature, the city was unable to obtain the permissions it needed to implement congestion charging and had to drop out of the program. New York's loss was San Francisco's gain.

Unlike New York, San Francisco hedged its bets. Instead of putting all of its weight behind one big program, it proposed ten measures to reduce congestion. As it turns out, one of them, SFpark, has emerged as the most innovative congestion management tool in use in the United States today.

SFpark is San Francisco's variable parking pricing program administered by the San Francisco Municipal Transportation Agency (SFMTA). Federal funding contributed \$19.5 million to SFpark, and required a 20 percent local match. The program's innovative wireless parking sensors help ensure parking availability for San Francisco's drivers by regulating parking prices.

**SFpark has emerged as the most innovative and exciting congestion management tool in use in the United States today.**

The program aims for approximately 15 percent of all parking spots open at any given time, or about one spot on each block.

Project planning began in 2009, and the SFMTA selected 7,000 of San Francisco's 28,800 metered spaces and 12,250 spaces in fifteen of twenty SFMTA-managed parking garages to be part of a pilot. By April 2010, SFMTA announced it had completed the nation's first parking census, creating an inventory of every publicly accessible on- and off-street parking space in the city. San Francisco has 440,246 parking spaces, of which about 275,000 are on-street curbside parking. Knowing the supply allowed the city to begin to get its hands around managing demand.

As they took inventory of the spaces, they also began installing sensors in spaces in the pilot neighborhoods, as well as a few control areas. The sensors wirelessly send updates on whether the space is vacant or occupied to a nearby node. The node constantly gathers this data and transmits it back to a central hub.

The SFMTA made the data available in real time to the public, making finding parking easier for drivers. While the SFMTA uses this data to better understand occupancy rates and turnover in order to adjust pricing to optimal levels, they also realized that many savvy techies would quickly create new applications that would help drivers find available parking spaces more quickly. Parking information is provided via the SFpark website, as well as via an iPhone app; an Android app is forthcoming. This information is also fed into the region's 511 phone-based traffic information system, as well as electronic signs that are displayed at high-traffic locations in the city.

The pricing portion of the pilot began in April 2011. First, the city installed new on-street parking meters in the pilot zone. A few days before the system launched, the city was able to make an announcement that won drivers over. SFpark meters now allow drivers to park for up to four hours, up from the one or two hours drivers were previously confined to. In some locations, time limits were removed altogether. The SFMTA said, "SFpark will use demand-responsive pricing rather than short time limits to achieve parking availability goals."

In July 2011, the SFMTA announced SFpark's first rate adjustment. The agency led with the message that two-thirds of SFpark spaces would maintain or decrease their current pricing levels, downplaying the fact that rates would increase at 30 percent of parking spaces. The SFMTA will



Image: SFMTA

San Francisco created an integrated plan to introduce residents to the new SFpark program that included both outreach and advertisements like the one shown here.





continue to adjust rates every six weeks or so and no more than once a month through August 2012.

According to Jay Primus, the SFpark program manager, the agency has prioritized openness and transparency throughout the whole process. They met with hundreds of individuals, as well as community and business groups, to brief them on the project goals and to listen and learn from their concerns. All communications and marketing efforts are still central to the project.

This approach has paid off. Public discourse and press around the SFpark program have been remarkably positive, even more remarkable when compared with the heated, often angry debates that congestion pricing touched off in New York City.

According to an article in the *San Francisco Chronicle*, the paper of record for the city, “The start of San Francisco’s groundbreaking parking program already has a hard-won accomplishment—making the search for a legal parking space less aggravating.”

Reducing congestion is vital to a city’s economic competitiveness, but unlike congestion pricing, parking pricing, if implemented and communicated correctly, can give drivers a more immediate benefit at their “point of purchase.”

Prior to starting SFpark, surveys showed that drivers in the Bay Area valued parking convenience and that many avoided San Francisco altogether because they found it too hard to find a parking spot. This was worrisome for business and government leaders who saw profits and tax revenues slipping away to other Bay Area cities. Today people who choose to drive in or into San Francisco not only have better information on where to search for a spot thanks to new data and convenient apps, but they also have a better shot at finding a vacant space on any given block. For those that choose to use their cars to travel in the city, they can park them for longer once they arrive, eliminating the stress of leaving a movie halfway through to feed a meter or re-park.

“Making parking more convenient does not create more driving,” says Primus. “After all we’re not increasing overall supply. By creating a better management system we are opening the door for a more informed public conversation about parking, and what we choose to use these spaces for, be it parking, a ‘parklet,’ or a bike lane.”

The one criticism of the program is that it does not incorporate revenue-sharing, which would take additional revenues generated via higher curbside

Left to right: SFpark introduced new state-of-the-art meters that allow drivers to pay with coins, credit/debit cards, and SFMTA parking cards; SFpark Project Manager Jay Primus demonstrates the new SFpark app for iPads; a screenshot of the SFpark app that helps drivers find parking availability in real time.

rates and give them back to the local communities for streetscape improvements. Given the SFMTA’s current priorities and budget constraints, the agency is keeping revenues and investing some of them into public transportation including Muni.

The pilot project will run through the end of summer 2012. SFMTA will be monitoring and evaluating the success of the pilot based on how well it improves parking availability, reduces congestion (including circling and double-parking), reduces greenhouse gas emissions, improves Muni performance, and improves commercial vitality. Coincidentally, the agency was already scheduled to upgrade parking meters citywide in 2012, when the old meters will have reached the end of their eight-year life expectancy.

While the SFMTA has yet to release findings on the program’s impacts, local transportation experts are singing its praises. Gabriel Metcalf, executive director of the San Francisco Planning and Urban Research Association (SPUR) says: “So far, SFpark has been a huge success. What most people notice is the fact that they can pay the parking meter with a credit card instead of quarters. That one little change has totally changed the experience of parking from a customer perspective. And the city is still generating revenue from parking; it’s just from actual payments instead of citations. I think this illustrates the bigger lesson about parking that SFpark has taught us: people don’t mind paying to park, they just want it to be convenient.”

# Our Cities Ourselves Goes Global

ITDP's Our Cities Ourselves program has reached millions of people around the world—from mayors to urban designers, urban planners, transport engineers, and city residents—since it opened in New York in the summer of 2010. Since then, it has travelled around the world, to Mexico, Argentina, Brazil, South Africa, India, and China.

The exhibition features the visions of ten of the world's leading architects. Guiding the visions are the “Our Cities Ourselves: Principles for Transport in Urban Life,” developed by ITDP with Gehl Architects and Nelson Nygaard. The next stage of the program is to see how we can work in collaboration with cities worldwide to put the principles into practice.



## Mexico

Images: Alberto Venegas

Above: Architect **Jose Castillo**, designer of the Mexico City rendering in ITDP's Our Cities Ourselves exhibition, discusses his ideas with ITDP President **Enrique Peñalosa** and Vice Minister of Urban Development and Land Order of the Federal Government, **Sara Topelson**.

Top right: ITDP Mexico Public Transport Director **Roberto Remes** leads a discussion on site in Tacubaya of the potential for its transformation



and revitalization given improved transportation infrastructure.

Middle right: Mexico City's exhibition opened on February 3, 2011 at the **Museo Franz Mayer**, and had 25,000 visitors in its six-week run.

Bottom right: During the exhibition's run in Mexico City, Museo Franz Mayer held many public programs, including one for school children.



## Brazil

Images: Conrado Krivochen

*Left:* Fetranspor, one of Rio de Janeiro's bus operators and a partner for the Our Cities Ourselves exhibition in Rio, brought in school children from the surrounding favelas.

*Bottom left:* **Richard Rogers**, designer of Paris's Centre Pompidou and the Lloyd's of London building, and former adviser to the mayor of London, delivers a lecture on "The Language of Architecture" to hundreds at the Our Cities Ourselves exhibition in Rio de Janeiro.

*Below:* **Carlos Minc**, minister of environment of the state of Rio, with former minister and ITDP Brazil board member **Sergio Besserman**, at the opening reception, where they spoke on the ways that sustainable transport could change the fabric of the city.

*Bottom:* A visitor looks at the 2030 visions for Rio de Janeiro.







## Argentina

Images: Clara Rasore and Patricio Tejedor

Top: **Enrique García Espil**, president of the Sociedad Central de Arquitectos; **Emiliano Espasandin** of PALO architecture studio; and **María Eugenia Estenssoro**, national senator, coalición cívica, Buenos Aires, and mayoral candidate for Buenos Aires 2011, examine the Buenos Aires vision for 2030.

Above left: **Daniel Clarin**, minister of urban development, Buenos Aires, tours the exhibit and pays

particular attention to the Principles for Sustainable Transport, as the city has released a sustainable mobility plan as well.

Above right: Banners lined the front of the **Museo de Arquitectura y Diseño de la Sociedad Central de Arquitectos** for the length of the exhibition.



# India

Images: ITDP

Below left: The exhibition was opened by prominent politicians and officials, including **Shri Asit Vora**, mayor, Ahmedabad; **Shri I. P. Gautam**, principal secretary, urban development, government of Gujarat; and **Shri G. Mahapatra**, commissioner, Ahmedabad Municipal Corporation (AMC). Delhi resident and author of the best-selling *Delhi: Adventures in a Megacity*, **Sam Miller**, read from his book which documents the power of walking.

Below right: Our Cities Ourselves was a chance for Ahmedabad

students to imagine what they would like their city to be. They drew their own visions after seeing the exhibition and learning about the principles.

Bottom: The Ahmedabad exhibition included the work of six of the city's most prominent architects, each of whom took a key site and envisioned it according to the Our Cities Ourselves principles. The result was a powerful vision of how the city could benefit, since endorsed by a number of prominent politicians and decision makers.





# Truckin': Down a Dead End Street

Contributors: Colin Hughes, ITDP; Zoltán Gyarmati, ITDP Europe; Bram van Ooijen, ITDP China; and Sophie Punte, Clean Air Initiative for Asian Cities (CAI-Asia)

City life is fed by the movement of goods—but these movements often start thousands of miles away. The toothbrush you buy in your neighborhood is from China. It carries the iconic “Made in China” label, but the soft bristles actually come from Botswana. Once assembled, it gets shipped on a mega-sized container ship to your local port, which still may be hundreds of miles away from you. From there, it is transferred to either a train or a truck to reach your city, where it is transferred to another truck that eventually delivers it to your local shop using a handcart.

This complicated chain of actions is known as freight transport and is expected to triple within the next forty years worldwide. Freight significantly contributes to greenhouse gas emissions, congestion, air and noise pollution, and traffic crashes. Coping with this growth, especially the negative externalities, will require creative solutions to these global supply chains.

In the United States, freight contributes 27.9 percent to the greenhouse gas emissions coming from transportation, up from 23 percent in 1990. This growth in emissions is mainly from the increase in heavy-duty truck use.

By 2020, 90.1 million tons of freight



In Macau, China, only small trucks are allowed to make deliveries, and only during morning hours.

per day are expected to move throughout the U.S., a 70 percent increase from 2002. Similarly, heavy-duty truck use is expected to increase 245 percent in China, 126 percent in India, and 45 percent in Latin America by 2030. Sustainable cities and countries will need to ensure more efficient and less harmful ways to move these goods.

At a national level, freight transport has serious financial implications related to the creation and maintenance of railways, ports, bridges, and highways. A robust freight network is vital for economic growth. National governments, multi-lateral develop-

ment banks, and private sources invest billions of dollars each year in expanding and improving the efficiency of freight infrastructure. National governments need to be part of the solution to help contain “logistics sprawl.”

However, cities also need to drive freight innovation. On city streets, heavy-duty trucks can be seen making difficult turns in tight spaces, blocking traffic while unloading, creating safety issues for cyclists and pedestrians, adding disproportionately to the wear and tear of roads as well as contributing to noise and air pollution. Typically, freight accounts for 40–50 percent of the air





Germany regulates national transport through toll gantries like this one that uses license-plate recognition technology.

and noise pollution from transport in a city, but accounts for only 10–15 percent of the vehicle miles travelled. How freight is regulated at the local level adds up to big reductions for a country's carbon footprint, as well as real effects on the city streets in terms of congestion, health, and the local economy.

What local and national governments have in common is a great variety of regulatory, modal, and technological tools to optimize the efficiency of freight networks and minimize negative consequences. Below are a few initiatives that are pioneering the freight management field.

### Germany: National and Local Change

Germany is at the nexus of several European countries with over one-third of trucks using German highways coming from neighboring countries. The large amount of heavy-duty trucks was adding to the country's carbon footprint, as well as creating unsustainable wear and tear on the roads. To address this, Germany instituted the first ever national tolling scheme for long distance hauls.

In January 2005, phase one of the distance-based toll, called German LKW-Maut, began. Fees depend on truck-axle standards, emissions, and vehicle-kilometers travelled. Revenue from the tolls is invested in road maintenance, as well as rail and inland waterway infrastructure. Payments can be made using an on-board device detected by GPS at

checkpoints that utilize license-plate recognition technology, as well as at manual payment terminals or via the internet. The tolling scheme has resulted in empty hauls decreasing by nearly 7 percent.

Additionally, Berlin and many other German cities have instituted low-emission zones (LEZ), or Umweltzone. These zones regulate which cars and trucks can enter based on their emissions. Vehicles must display a special sticker on the windshield, indicating the vehicle's emission level. By 2010, this resulted in at least 29,000 polluting trucks being banned from entering Berlin's Umweltzone, with many shifting to cleaner delivery methods. Now, only trucks with green stickers that have catalytic converters are permitted to enter Berlin; diesel-engine vehicles are banned.

### Budapest, Hungary

The metropolitan region of Budapest is an important node, wedged between numerous countries along the pan-European logistics route. Budapest's citizens absorb all the negative consequences of being in the path of an international freight-transit corridor. Moreover, trucks make up just 10 percent of vehicles on Budapest streets, yet they are responsible for up to 30 percent of all transport-related air pollution.

Hungary, like all European Union member states, needs to meet certain standards such as air pollution caps in the city. In order to meet these stan-

dards, the Municipal Government in Budapest started to take certain measures to reduce greenhouse gas emissions coming from transportation.

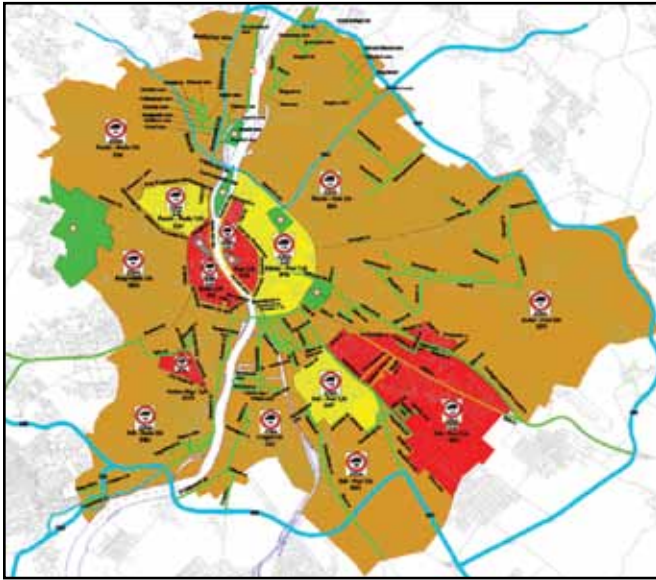
In 2004, Budapest enacted one of the European Union's most stringent freight management schemes, limiting access for trucks based on time, weight, and zone. All of Budapest is a "limited access zone" for trucks, which requires all trucks over 12 tons to get a permit

### Steps to Regulating Urban Freight

- Set clear program goals which may include: reducing congestion, improving air quality, promoting more orderly curbside access, saving businesses and customers money by saving time and fuel costs
- Understand traffic and business conditions
- Create policies that are sensitive to local conditions and help meet program goals
- Any policies that regulate urban freight must also ensure smooth delivery of goods



Images: Top-Toll Collect GmbH; Bottom-Zoltán Gyarmati



Budapest uses an “eco-zone” model similar to other European cities to regulate truck access and discourage larger and more polluting trucks from entering the most congested parts of the city.

before entering. For reference, most cars in the U.S. are about 1.5 to 2 tons.

Additional spatial and temporal restrictions apply to smaller trucks as well. Freight trucks under 3.5 tons can make deliveries without a permit outside of normal business hours. Special permits are needed for other times, although exemptions are granted for certain types of freight (i.e., perishables). For trucks entering residential and preserved-heritage areas of the city there is a more stringent restriction. No trucks over 3.5 tons are allowed.

The city offers discounts on permits for less polluting trucks as a way to encourage cleaner vehicle use. For example, a Euro 5 truck receives a 50 percent discount. This has encouraged private freight companies to shift to cleaner vehicles.

The effect has been a reduction in truck traffic on city streets. The outer ring road of Budapest was full of these big vehicles, but they completely disappeared since the measures were implemented.

## The Netherlands

In the last few years policy makers, shop owners, and citizens have pushed Dutch cities to implement better urban

freight solutions for city centers. Cities in the Netherlands have responded through a variety of measures that restrict truck access based on some combination of time, location, emissions standards, weight, and noise.

This comprehensive approach has led to real reductions in emissions and more efficient logistics across the country.

All larger cities in the Netherlands limit truck entry to certain limited time windows. Utrecht, for instance, allows delivery between 6 am and 11:30 am and from 6 pm to 7 pm. Amsterdam limits trucks based on noise and weight; trucks louder than 65 dBA cannot enter at night and vehicles over 7.5 tons are forbidden to enter the city center.

Currently twenty cities in the Netherlands have set up “environmental zones” (similar to the German Umweltzone), which permit only trucks with Euro IV or Euro III with diesel particulate filters to enter, as well as those that use fuels other than diesel. Since the zones were implemented in 2007, fine dust and NO<sub>2</sub> levels in these cities now not only meet European standards but are also substantially lower than in cities without environmental zones.

These restrictions have sparked a number of innovative urban freight solutions. One is the use of electric boats to make deliveries to cafes and shops adjacent to the canals of Amsterdam and Utrecht. Another is Binnenstadservice (literally “inner city service”). This company provides urban freight solutions for eight of the larger cities in the Netherlands.

Binnenstadservice sets up freight

consolidation centers outside of the city center, which serve as joint delivery addresses for participating shop owners in the city center. Regular delivery trucks deliver everything at this center. Then smaller natural gas and electric vehicles deliver the bundled goods to the shops. As an incentive, shop owners can choose the time of delivery and are allowed to receive deliveries outside of the regularly permitted delivery windows. This system keeps trucks away from a city’s most valuable areas and helps municipalities in reaching its goals for air quality, safety, congestion, shopping climate, and urban quality of life. The outcome is more organized streets with less trucks congesting city streets and the curb.

## Guangdong Province, China

How do you tackle the fuel use and emissions from 10 million trucks in China that transport 24 billion tons of freight, twice as much as in the United States, and growing? The answer is: start small. With World Bank support, and backed with the expertise from the U.S. EPA and Cascade Sierra Solutions, a U.S.-based truck NGO, the Clean Air Initiative for Asian Cities (CAI-Asia) tested tire and aerodynamics technologies on about ten trucks of private companies and the garbage fleet in Guangzhou, China.

Based on the findings from the pilot, CAI-Asia estimates that if these technologies were installed on Guangdong Province’s 825,000 heavy-duty trucks alone, 3 million hectoliters of diesel, equivalent to USD 2.74 billion, 8 million tons of CO<sub>2</sub> emissions and 1.2 tons particulate matter (including black carbon) would be saved each year. These findings helped to convince Guangdong authorities to start a USD 14 million





As freight transport is expected to quadruple by 2030, it is imperative that trucks be clean and well regulated.

Guangdong Green Trucks Demonstration Project, with GEF co-financing,

which will install new technology on several thousands of trucks and explore technology financing options. The project will also investigate ways to optimize freight logistics, as Guangdong authorities estimate that as many as 40 percent of truck hauls are empty, thus wasting fuel.

CAI-Asia is continuing to expand its work on clean freight in China. With Energy Foundation support, CAI-Asia has designed a Green Freight China

Program with five components: Clean Technologies, Freight Logistics, Financing Mechanisms, Knowledge & Capacity, and Partnerships between government and the private sector. The program is modeled on the US SmartWay program, and comes at the right time for China. "Energy efficiency is a key factor in making the freight sector in China more competitive," stated Mr. Xu Yahua, deputy director-general, Road Transportation Department, Ministry of Transport.

## Buenos Aires

CONTINUED FROM P. 15

minutes, a speedy thirty-six minutes.

When passengers do have to wait, they wait in comfort in large, weather-protected stations like no other in the country and then board clean and reliable buses.

"Clearly it is not only a change in infrastructure but also in mind-set that needs to be achieved in order to discourage vehicle dependency by offering a more fast, efficient, modern,

and sustainable option," said Guillermo Dietrich, the Deputy Secretary of Transport for Buenos Aires.

As Enrique Peñalosa said in his last visit to Buenos Aires, "It's a matter of social equity and simple proportion, if a bus can carry one hundred people, then that bus should have one hundred times more priority than a car that only carries one."

The BRT system in Buenos Aires is considered to be one of the most important improvements to the city's urban mobility in the last four years.

Metrobús has been designed as a multimodal mobility solution, not just an isolated system destined to serve a specific area.

The early success of the first line has been encouraging for the government, which was re-elected in July. One of its campaign promises was the expansion of the BRT network. Now it has already begun to collect data and plan for the second phase of Metrobús. With plans for expansion, the city and its citizens, like Mario, are hopeful that Buenos Aires will continue its transformation.

## Better By Bike!

The Bicing program in Buenos Aires keeps on growing. Launched in December 2010, the bike-share program has already expanded from three stations and one hundred bikes to twenty stations and over seven hundred bikes. The city has also built 70 km of protected bike lanes, closing in on their goal of completing 100 km before the end of the year. "We are satisfying the increasing demand of the people who are now using bikes not for entertainment or recreation but to go to work or to school, and we are expecting a big increase in the next few months when the weather gets warmer," said Rodríguez Larreta, one of the government officials working on the program. There are now 22,300 registered bike-share users in Buenos Aires and counting.



Images: Top-Karl Fjellstrom; Bottom-Clara Rasore

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