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SHAPING CITIES OF THE FUTURE

MOBILITY AND
ACCESSIBILITY
PROGRAM 2017



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CATALYZING TRANSFORMATIONS IN TRANSPORTATION



An historic shift to urban centers has brought opportunity and prosperity to billions—but also daunting challenges. Crippling traffic congestion, worsening air pollution and an ever-growing demand for reliable mobility services plague many cities, with direct consequences for people, from students in Mexico City to commuters in Bangalore and public servants in Belo Horizonte.

In 2010, FedEx and WRI Ross Center for Sustainable Cities committed to use their mutual expertise to help solve these challenges and deliver real results for decision-makers and residents. Through the Mobility and Accessibility Program, sponsored by FedEx, we're delivering new data, new insights and new technology to catalyze the transformation of transit systems in China, India, Brazil and Mexico. Our paramount goal is to provide high-quality public transport that connects people to jobs, schools and opportunities.

In just seven years, our initiative has had an impact in 36 cities on three continents. We're proving that the public and private sectors can work together to move people and goods reliably and efficiently, with less damage to the environment. By combining the FedEx mastery of transportation logistics, technology and safety with WRI Ross Center's independent research and sharing it directly with key decision-makers, we're shaping the transit systems of the future. In the following pages, you'll meet people who are benefitting from our work, and others who are making transformations happen.

During 2017, our successes advanced better public transportation choices, building on the global trend toward electric vehicles. In Bangalore, our recommendations persuaded city officials to commit to an all-electric bus fleet to slash transit emissions by at least 20 percent, starting with 150 buses in 2018. In Belo Horizonte, our tool to analyze the economic and environmental impact of buses guided the city to commit to 40 percent bus electrification by 2030, starting with a pilot project of 25 electric buses in 2019. In Mexico, we applied our bus selection tool to help the national government determine its preferred clean bus technology, which will incentivize adoption of cleaner fleets in cities across the country. In Zhuzhou, our comprehensive survey of transit users contributed to the city's decision to implement a new, efficient bus rapid transit system by 2019.

These results reflect the immense potential of our collaboration. By scaling up our projects, expanding our involvement, and sharing our information with transportation planners across the world, the Mobility and Accessibility Program is helping leaders realize the goal of affordable, high-quality, safe and sustainable transport, and making our cities cleaner, healthier and more productive for millions.

We thank FedEx, including the 121 FedEx leaders and other team members who have joined us on this journey, and look forward to building on our successes in the years to come



Ani Dasgupta

Global Director

WRI Ross Center for
Sustainable Cities

Since 2010, the Mobility and Accessibility Program has benefitted nearly 5 million daily transit users, trained 9,269 transit professionals, and reduced 63,908 tons of CO₂ emissions—the equivalent of removing 12,415 passenger vehicles from the roads for one year.

DRAFT

IMPROVED NETWORK, EASIER TRIPS

Before the sun rises, Suvarna Reddy is bustling around the small home she shares with her son and his family. The 58-year-old grandmother will cook, clean and pack lunches before taking her grandson, Baljit Singh, to school. Then she'll catch the bus to work—a journey that was once the most stressful part of her day.

Suvarna cooks for three different households, each five to seven kilometers from one another. Often, she travels to the main market in the city center to purchase groceries for her employers. She uses the bus because any other mode would be extremely expensive—an auto-rickshaw trip, for example, costs twice as much. But for many years, her commute was an ordeal.

“It used to take over 40 minutes to get from one home to another,” she recalls. “I had to wait for a long time before I got the bus, and would never get to sit. I always feared falling when I had to stand, because the buses were so old and unstable.”

More than 5 million passengers like Suvarna ride Bangalore’s transit system

daily; for each of them, the bus is a lifeline to employment and opportunity. In 2013, knowing that better buses were the key to local economic productivity, the Bangalore Metropolitan Transport Corporation asked the experts at the Mobility and Accessibility Program (MAP) to help improve its system. Together, they conceptualized, planned and implemented the BIG Bus Network along high-demand corridors.

With more efficient routes, increased frequency, low fares, integrated services and 987 new low-emissions vehicles, the update has dramatically advanced the quality and capacity of Bangalore’s public bus network, improving millions of citizens’ access to jobs and education. With WRI Ross Center’s help, the city is now using transmitted data to improve services and purchasing 3,000 new buses with state government funding. The BIG bus network will expand from four to 12 corridors, which will positively impact 2.5 million users by 2020.

“The new buses come every five to ten minutes,” marvels Suvarna. “I don’t have to wait a long time before I get a bus to get to any of my work places. Even when I have to go to the market, I can get a direct bus. I get there much more comfortably and a lot faster. And that gives me more time to spend with my family.”

“For millions, the bus is a lifeline to employment and opportunity.”



BANGALORE, INDIA

At right, Suvarna at home with grandson Baljit.



OPTIMIZING CITY TRANSIT OPTIONS

Célio Bouzada, 56, has dedicated his career as a transportation specialist to improving the quality of life for the people of Belo Horizonte, Brazil. “As a public servant, I work for the good of the city,” he says. As president of BHTRANS, the regional transportation agency, he’s focused on strengthening and improving a system that moves more than 1.3 million people daily.

“Belo Horizonte, like all large cities in Latin America, has serious problems with traffic. It’s congested,” says Bouzada. “It’s our challenge to change the culture, to find resources, to implement new means of transit. And with the tools provided by FedEx and WRI Ross Center, we’re doing that, especially on our bus rapid transit (BRT) system, MOVE.”

MOVE, inaugurated in 2014, streamlined routes on three priority corridors to achieve remarkable gains. The User Satisfaction Survey, a Mobility and Accessibility Program (MAP) tool that BHTRANS deployed in 2015, showed that it reduced the average 75-minute bus commute by 30 minutes, and increased user satisfaction by 60 percent. Now, nine other Brazilian cities have joined Belo Horizonte in a new Quality of Service Benchmarking Group to track their own results and compare best practices.

Bouzada lists other benefits of the collaboration between FedEx and WRI Ross Center. “The Day One of Operations tool allowed us to plan for emergencies and incidents, and Safety First training boosted the skills of our drivers. We

also offered a great BRT marketing seminar, which gave new insights into how to make transport work.” Particularly valuable, he says, were the technical exchanges with cities that had implemented similar systems.

Technical assistance from FedEx and WRI Ross Center also helped to build the 2030 mobility plan for the city of Belo Horizonte. The plan calls for changes that will improve air quality, replacing the diesel-fueled bus fleet with cleaner options. With support from FedEx and WRI Ross Center, BHTRANS has already begun a pilot program to evaluate the feasibility of electric buses. “We want to develop a phase-in plan, research new suppliers, identify sources of financing, and research necessary law changes in the regulation aspect,” says Bouzada.

“Transport is responsible for half the city’s pollution. If we can reduce pollution, that will impact the health of children, adults and, above all, the elderly. A cleaner public transport system, with faster travel, means a nicer city for everyone.”



At right, Célio Bouzada and BHTRANS passenger



BELO HORIZONTE, BRAZIL



“A cleaner public transport system, with faster travel, means a nicer city for everyone.”

MEXICO: THE STUDENT

A FASTER, CHEAPER, SAFER COMMUTE

Mornings were never five-year-old Pablo Bautista's favorite time of day. His mother, Brenda, would rouse him at 6 a.m., hurrying him through eating breakfast and dressing so that they could catch a taxi for the 45-minute ride to España Elementary School. The taxi was expensive—and often mired in traffic—but their only alternative, a minibus, was overcrowded, dilapidated and dangerous.

Things changed in 2012, when Mexico City's Metrobus debuted Line 4 as part of its bus rapid transit (BRT) system. FedEx and WRI Ross Center experts advised city transportation planners on the project, which crosses Mexico City's downtown and has been a key factor in regenerating the historic area and boosting economic growth. The route now carries 65,000 passengers a day, cuts travel times by half and lowers carbon dioxide emissions by 10,000 tons a year.

With the opening of Line 4, Pablo and Brenda have a much-improved public transit option. They can walk seven minutes from their home in Santa María la Ribera and board an express

bus at the Buena Vista station, shaving 15 minutes off the trip to school. The new routine saves Brenda money as well as time: their bus fares cost just 12 pesos (62 cents), one-fifth of what she once paid for a taxi.

Creating an efficient BRT line in Mexico City's historic center, where Aztec ruins, municipal buildings, pedestrians and cars compete for space, was a formidable challenge. Since 2010, with support from FedEx, WRI Ross Center has provided Metrobus with key elements for success. These include safe driving instruction for more than 1,000 bus drivers and recommendations on hybrid, low-floor fleet selections that fit the needs of the area. Currently, the WRI Mexico team is formulating national recommendations for minimum bus specifications to improve urban bus services across the country.

With clean, comfortable transport solutions in place, the neighborhoods surrounding Line 4 have begun to change. Businesses downtown estimate their sales have increased as much as 70 percent with the higher pedestrian flow. Brenda and Pablo feel so safe on their commute that sometimes, when Brenda has a work meeting and no time to drop her son at school, she lets the 10-year-old walk from the bus by himself. And that makes a good morning for both of them.

“The new routine saves Brenda and Pablo time and money.”



At left, Pablo and Brenda map their commute on Line 4.



FEDEX AND WRI FELLOW APPLIES GLOBAL EXPERTISE

Twenty-nine-year old Lu Lu, a transport analyst for WRI China, is a passionate believer in the value of mass transit. “In dense urban areas, decent public transport services aren’t just amenities—they’re necessities,” she says.

Lu understands the challenge firsthand: her own commute in Beijing takes two to three hours a day. Millions of Chinese citizens face similar transportation woes. Since 2000, China’s urban population has surged from 456 million to 793 million, and the total number of cars now exceeds 200 million, second only to the U.S.

When Lu was nominated for the third class of the WRI Ross Center Transportation Fellowship, sponsored by FedEx, she considered it a golden opportunity to apply FedEx expertise to the Mobility and Accessibility Program’s (MAP) work in China’s urban centers. “Governments can enhance the quality of transit by learning from private entities,” she says, and she’ll spend the next several months doing just that.

Six international Fellows from Brazil, India, China, Mexico and the United States spent a week at FedEx World Headquarters in August 2017, learning about vehicle patterns, transport technology, driver safety and other topics. Now, they’re utilizing these lessons for in-country projects focused on sustainable urban transport solutions. Lu has focused on applications in Zhuzhou, a city of 1.2 million, which is building a new bus rapid transit (BRT) system to open in 2019.

With FedEx support, WRI China implemented MAP’s User Satisfaction Survey, which indicated Zhuzhou riders’ desire for direct service, dedicated bus lanes and better integration with other ground transport. With the survey results, Lu and her team influenced the city’s decision to create a new, 28-kilometer BRT system which will deliver faster, cheaper, more efficient service. Now, Lu’s goal is to maximize sustainability in the fleet, which will serve 70 percent of the city—more than 400,000 riders daily. WRI China is advising the city on strategic placement of stations and platforms, and will help optimize operation of its 200 electric buses.

Lu and the Fellows are also developing a guideline for maintaining and managing electric bus fleets throughout their lifecycle. “Electric buses have lower emissions and are much quieter, but they’re expensive. And many cities are hesitant to buy them because they have limited knowledge of operation and maintenance costs,” Lu explains.

“Thanks to the knowledge we learned from FedEx, we are developing a thorough review of electric bus asset management and operations, and we’re giving cities the facts they need to give citizens the best possible transport options.”



Lu Lu, center, with FedEx and WRI Ross Center Transportation Fellows at FedEx World Headquarters.

“Governments can enhance the quality of transit by learning from private entities.”



Russ Musgrove shares FedEx vehicle management insights with Fellows.

PROVIDING THE RIGHT TOOL FOR THE RIGHT JOB

Cities need the best available data and analytical tools to implement high-quality public transportation systems.

FedEx and WRI Ross Center provide these essentials with the Quality of Service Toolkit, which has been utilized in four countries across the world to identify problems and implement solutions.

With these tools, the work of the Mobility and Accessibility Program over the past seven years has scaled to new cities and geographies. The impacts listed on these pages reflect new milestones achieved in 2017.



Vehicles and Fuels Bus Selection Tool FEDEX EXPERTISE: Fleet Management

This tool helps government agencies compare the full lifecycle costs and emissions of buses using different technologies and fuel types. It utilizes the latest research to evaluate vehicles, assist in fleet planning and provide recommendations for cities in India, Mexico, Brazil and Chile.

2017 Impact:

- Belo Horizonte, Brazil used the tool to plan its adoption of electric buses; by 2030, 40 percent of the fleet will be electric.



Day One of Operations FEDEX EXPERTISE: Operational and Contingency Planning

This tool supports Brazilian cities in achieving maximum responsiveness through operational and contingency plans for bus rapid transit (BRT) systems and high-demand bus corridors, as well as providing technical assistance.

2017 Impact:

- Uberlandia, Brazil, used the Day One tool to trouble-shoot its upcoming second BRT line, helping determine that operations and communication required improvement before the launch. WRI Ross Center will work with Uberlandia on the necessary preparations to open the 6-kilometer BRT, with expected ridership of 12,000 passengers daily.



User Satisfaction Survey

FEDEX EXPERTISE:

Customer Satisfaction /
Quality Performance Indicators

This tool helps cities in Brazil, Mexico, China and Turkey evaluate bus riders' satisfaction with their transit system's performance. The resulting data informs decisions about where to direct improvements, assists in measuring the impact of changes, and establishes benchmarks for performance. WRI Ross Center provides technical assistance to cities for creating and implementing action plans.

2017 Impacts:

- Zhuzhou, China, accounted for survey feedback, prioritizing direct services, faster operation and service reliability in the design of its new BRT system. The system will launch in 2019, cover 28 kilometers, carry 400,000 passengers daily, and include 200+ electric buses.
- Four more Brazilian cities—Sao Paulo, Santarem, Uberlandia and the Belo Horizonte metropolitan region—applied the survey in 2017 for the first time to establish benchmarks, with plans to apply it a second time. Nine cities total have committed to apply the User Satisfaction Survey annually starting in 2019.



Safety First

FEDEX EXPERTISE:

Safety First / Accident
Tracking & Analysis

This tool adapts the FedEx safety expertise to train bus drivers, incentivize driver performance, and measure the impacts of trainings and programs. WRI Ross Center developed a crash data collection methodology and analysis tool, and provided technical assistance to Brazilian cities.

2017 Impact:

- To date, more than 4,300 bus drivers were trained in safe driving practices in three Mexican cities (Mexico City, Guadalajara, Leon) and in four Brazilian cities (Belo Horizonte, Rio de Janeiro, Fortaleza, Joinville). Now, WRI Ross Center is updating and reapplying the safe bus driver training manual in Mexico to enhance and scale safety.



Quality Indicators

FEDEX EXPERTISE:

Quality Driven Management

This tool establishes a set of 130 indicators focused on quality, directly applicable to the operation of transport systems. Each was developed based on research and global best practices. WRI Ross Center provides technical assistance to cities to apply the indicators to guide system improvements.

2017 Impact:

- Belo Horizonte, Brazil, piloted the use of Quality Indicators, then provided feedback to WRI Ross Center and FedEx to adapt and improve the indicators and methodology. Now, nine cities—all members of the Bus Quality of Service Benchmarking Group—have committed to implementing the indicators and exchanging best practices.



Quality Management Diagnostic

FEDEX EXPERTISE:

Quality Management /
Operations Planning

This tool provides a comprehensive assessment of a transit project's quality at each phase of its development, evaluating risks and determining areas for improvement.

2017 Impact:

- PROTRAM, Mexico's federal public transport support program, adopted the diagnostic in 2015 as a means of examining proposed transit projects that will potentially impact more than 15 million people. Now, WRI Ross Center is co-creating with PROTRAM a web platform that will help national and local officials track the quality and stages of transport projects in cities across Mexico.



MEASURING IMPACT AND EFFECTIVENESS

WRI Ross Center for Sustainable Cities uses Key Performance Indicators (KPIs) to accurately track the collective impact of our work. KPIs enable us to measure how our projects have improved human well-being and to encourage a streamlined and effective approach to project planning. The result has been the successful growth of our organization and impact.

Our collaboration with FedEx from 2010 to 2017 has achieved the following milestones for the Mobility and Accessibility Program:

	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
CO ₂ Emissions Avoided (tons)	-	-	10,000	10,000	10,000	10,000	12,574	11,334	63,908
People Benefitted	-	77	424	920,968	600,665	730,735	950,161	1,749,834	4,952,864
People Trained & Engaged	-	-	138	1,886	3,500	2,524	620	601	9,269
FedEx Volunteers	-	5	32	11	35	9	-	29	121



WRI ROSS CENTER TRANSPORTATION FELLOWSHIP

The WRI Ross Center Transportation Fellowship, sponsored by FedEx, provides WRI Ross Center staff with the unique opportunity to garner expertise and knowledge from FedEx and apply it to on-the-ground projects. Now in its third year, the fellowship consists of two phases: a one-week training and a team project.

This year’s training occurred at the FedEx World Headquarters in Memphis, Tennessee in August 2017. Six international Fellows learned from 26 FedEx experts about sustainable transport marketing strategies, vehicle and fuel technologies, asset management, driver safety and more. They will now apply their training to a one-year sustainable mobility project on Asset Management for Electric Buses. Based on FedEx knowledge and on-the-ground experience from Chinese e-bus operators, the Fellows will create a guideline to help cities maintain and manage electric fleets throughout their lifecycle.



2017-2018 WRI Ross Center Fellows

- Aldo Cerezo, Mexico

Lu Lu, China

Jone Orbea, Mexico
- Virginia Tavares, Brazil

Roshan Toshniwal, India

Hein Tun, United States



FedEx Experts

- Alison Nenon

Amy Alfieri

Charlie Saurenman

David Bullock

David Weaver
- Dermot Murray

Diego Guadalupe

DJ Vaughn

Genie Stevens

Gigi Wolfe
- Jenny Robertson

John Dunavant

John Holmes

Lee Travis

Morgan Schultz

Natashia Gregoire
- Neil Gibson

Nik Pande

Paul Harp

Russ Musgrove

Scott Payne
- Shane O’Conner

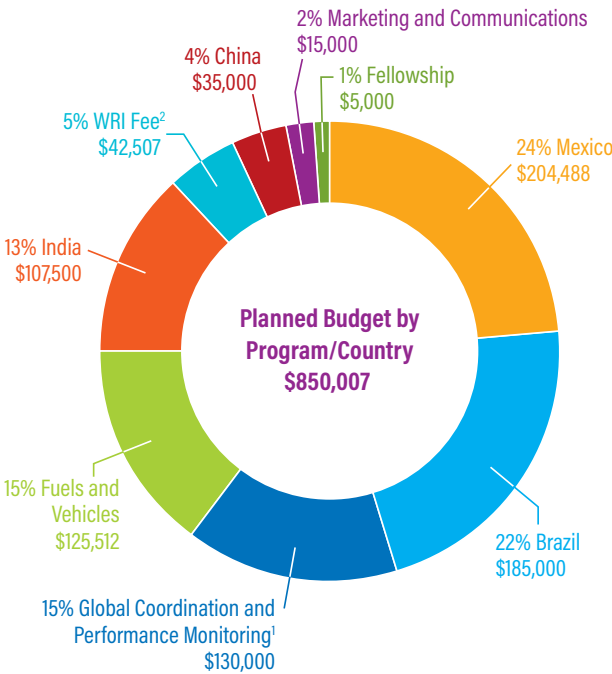
Thomas Griffin

Tim Miller

Tom Lopez

Wayne Skinner

FINANCIAL REPORT 2017



¹ This line includes expenses for the DC-based MAP project management team, which coordinates the global efforts of the in-country MAP teams.

² 5% of the funds received from all corporate grants are used for implementing WRI's core operations. This helps ensure the success of our overall programs.

³ Subgrants to WRI Mexico and WRI Brasil.

⁴ Includes a small GHG tax from business travel and electricity use.

⁵ General and Administrative Expenses: Organization-wide shared costs including senior leadership, accounting, grant and subrecipient management, human resources, web management, audit, and related services.

Expenditure Report October 2016–September 2017	
Salaries	\$134,196
Benefits	\$53,705
Occupancy	\$17,879
Project-Related Office Services & Supplies	\$6,812
Research Expenses	\$30,583
Conference Expenses	\$31,363
Publications	\$5,385
Communications	\$10,019
Travel	\$54,214
Project-Related Electronic Network	\$13,236
Research Materials & Quality Assurance	\$10,783
Subgrants ³	\$371,959
Other Direct Costs ⁴	\$1,559
G & A Expenses ⁵	\$56,382
5% WRI Fee ²	\$42,507
TOTAL	\$840,581

ABOUT FEDEX

At FedEx, we believe a connected world is a better world. We're also passionate about making connections that improve people's lives and make the world a better place. FedEx links over 90 percent of the global GDP and as our business grows, the link between emerging economies and the global marketplace strengthens. As urban growth continues to explode worldwide, the need for sustainable transit systems and solutions has never been more critical. That's why we value our relationship with WRI Ross Center. Together, we can help address pollution, congestion and driver and pedestrian safety issues. In the process, we can help connect urban residents with greater opportunities. For more information about other environmental and citizenship efforts, download the 2017 FedEx Global Citizenship Report at [csrfedex.com](https://www.fedex.com/csrfedex.com).



ABOUT WRI

WRI is a global research organization that spans more than 50 countries, with offices in the United States, Brazil, China, India, Mexico and more. Our more than 550 experts and staff work closely with leaders to turn big ideas into action at the nexus of environment, economic opportunity and human well-being. Learn more at www.wri.org.



ABOUT WRI ROSS CENTER FOR SUSTAINABLE CITIES

WRI Ross Center for Sustainable Cities helps create accessible, equitable, healthy and resilient urban areas for people, businesses and the environment to thrive. Together with partners, it enables connected, compact and coordinated cities. The Center expands the transport and urban development expertise of the EMBARQ network to catalyze innovative solutions in other sectors, including water, buildings, land use and energy. It combines the research excellence of WRI with 15 years of on-the-ground impact through a network of more than 200 experts working from Brazil, China, India, Mexico and Turkey to make cities around the world better places to live.

Web: [WRIcities.org](https://wricities.org)
Blog: [TheCityFix.com](https://thecityfix.com)
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Learn more about the FedEx and WRI Ross Center Mobility and Accessibility Program at mobility.embarq.org.

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PHOTO CREDITS

On the Cover: A passenger on the BIG Bus Network in Bangalore, India. Cover photo, pg. 15 Benoit Colin/WRI Ross Center for Sustainable Cities; pg. 2, 16 Mariana Gil/WRI Brasil Cidades Sustentáveis; pg. 5 Bhargav Shandilya and Tariq Thekaekara; pg. 7 (top), 14 Luísa Zottis/WRI Brasil Cidades Sustentáveis; pg. 7 (bottom) Marcelo Vasconcelos Araújo/WRI Brasil Cidades Sustentáveis; pg. 9 Ari Santillán/WRI México; pg. 11, 17 Carin Hall/WRI Ross Center for Sustainable Cities; pg. 12 GuoZhongHua/Shutterstock; pg. 13 City Clock Magazine/Flickr.



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