COMPARATIVE CASE STUDIES OF THREE IDB-SUPPORTED URBAN TRANSPORT PROJECTS

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Bus rapid transit (BRT) systems have become an increasingly popular approach to addressing mobility and environmental problems in urban areas in Latin America and around the world. This paper presents lessons learned from an in-depth comparative case studies of BRT projects – in Lima, Cali, and Montevideo. Lima’s system garnered the highest travel-time savings and corridor-level emissions reductions of the three cases. Cali’s system also provided several benefits, including substantial travel-time savings for trips along the trunk lines and had a much wider impact on emissions reductions in the city because of its ambitious scale and more successful bus scrapping program. In Montevideo, because of poor design and corridor choice, as well as a lack of institutional and bus sector reforms, the system realized few if any mobility or environmental objectives; however, passengers benefited from improved sidewalks, a new electronic fare card system, integrated tariffs, and a system enabling passengers to access information on the best route combination from any origin to any destination in the city. Little or no diagnosis of mobility needs of the poor was conducted to inform their design with usage rates of the BRT systems by the poor lower than expected. The projects generated some positive land use developments; however, none incorporated a transit-oriented development (TOD) strategy in their design.
BACKGROUND

The Latin America and Caribbean (LAC) region has experienced growing urbanization and motorization during recent decades, generating large mobility challenges and negative externalities such as high rates of congestion, pollution, and traffic accidents. Urbanization rates in LAC countries have risen from just 50% in 1970 to 80% in 2013 (United Nations, 2011). In addition, rising incomes have contributed to a surge in vehicle ownership rates in the past two decades, with the average per capita auto ownership rate for 10 LAC countries grew from 0.09 in 1990 to 0.20 by 2008. Growth in motorcycle ownership has surpassed that of autos in many cities, where motorcycles make up 10-49% of the vehicle fleet. Overall motorization rates are expected to more than double by the year 2030 (relative to 2002). Public transit accounts for a significant share of passenger travel in LAC cities—approximately 43% of trips (CAF-OMU, 2007). However, as a result of widespread privatization and deregulation in the 1980s and '90s, in many countries the sector is characterized by an over-supply of numerous small private operators that operate informally in aging and highly polluting vehicles and compete fiercely for passengers (also known the “penny war”), contributing to unsafe conditions and compounding levels of congestion and pollution in urban areas (WHO, 2004).

Several LAC cities have begun to prioritize investments in public transit infrastructure over traditional approaches of widening and expanding roads and highways. Bus rapid transit (BRT) systems, designed to operate at capacities at or near those of metro systems, have grown rapidly as a lower-cost alternative to rail-based transit. These investments have typically been coupled with institutional and policy reforms aimed at re-regulating public transportation provision through a mix of centralized planning and public-private partnerships. They have been especially attractive to cash-constrained developing countries on the premise that their operational costs can be covered by fare revenues.

Common approaches involve replacing a variety of transportation services by a single operation agency under a public-private partnership (PPP) arrangement, renovating aging public transport vehicle fleets, setting common standards for drivers and vehicle maintenance, establishing an integrated fare system, and improving feeder bus systems. Although business models can vary by region, a common BRT business model used in LAC cities includes three components managed by one public agency: (i) the infrastructure, (ii) the bus operations, and (iii) the fare collection. Under this model, all three components are purchased through competitive bidding; the first is fully paid for by the government, but the last two entail service provision agreements in which some risks are shared with the private sector, and they are paid in part, or in full, from the revenues generated by the project (ITDP, 2007).

BRT systems have encountered several glitches during implementation (Hildago, et al, 2007). A lack of government funding has hindered the prioritization of planning and feasibility studies. In addition, several systems have suffered from design issues related to rushed implementation, many of which were then solved in the first months of operation. In many cases, the systems implementation have encountered infrastructure and fare collection system delays, contractual problems, a lack or delay in driver training and user education on the new system, and protests by displaced transport operators.

1 Capital costs range from US$2.4-3.5 million/km for the BRT systems developed in Curitiba, Mexico City, or Guayaquil (minor physical improvements) to US$3.8-12.5 million/km for those in Bogotá or Pereira (for instance, because of the reconstruction of corridor roadways) (Carrigan, et al, 2013).
During operations, while users have enjoyed reduced travel times, a common issue has been overcrowding in peak hours, pavement maintenance (due to poor materials or construction), and quick deterioration of barriers for bus. Institutional weaknesses inhibit the achievement and sustainability of project results in even the best-designed systems (Mitric et al., 2009; IEG, 2013). Three organizational shortcomings are often cited as affecting BRT performance: (i) loose coordination (organizational, inter-municipal) between key actors; (ii) weak governance arrangements regarding the BRT oversight agency; and (iii) deficiencies in the operational arrangements between public and private sector actors.²

**Methodology & Case Descriptions**

We use a comparative case study approach to identify key factors that have affected implementation of three Inter-American Development Bank (IDB) supported BRT systems, and to assess the extent to which the projects were able to achieve their key objectives of improving mobility and access for the general population and for low-income populations, and reducing local and global pollution and traffic accidents. The BRT cases were selected according to three criteria: (i) IDB projects that included a BRT system investment as one component; (ii) the BRT system is in service; and (iii) the projects were initiated within the past 10 years. Of the four projects that met these criteria, three were selected for case study: Urban Transport in Lima (PE-0187), Cali Integrated Transit System (CO-L1001), and Montevideo Urban Transportation Program (UR-L1025).³

For each case, interviews were conducted with a range of stakeholders including the project team leaders at the IDB, local and national authorities involved in planning, managing, and operating the urban transport systems; academics; the private sector; bus companies; and citizen groups. Data on the systems’ operational and design characteristics — operating speeds, demand, bus productivity, ridership, vehicle emissions rates, modal shift estimates, and socioeconomic data on users— as well as reports from user surveys were collected to estimate the extent to which the projects were able to achieve their stated objectives. Additionally, emissions impacts compared with the business-as-usual scenario were estimated, and, in Cali and Lima, a surveyed of low-income and poor populations living in the area of influence of the system was conducted to ascertain the degree to which they benefited from the projects.

**Lima**

With about 9 million inhabitants, Lima represents one-third of the population of Peru and is the center of the country’s political and economic life. In 1991, after struggling for years with an undersupply of public transport vehicles, the government liberalized the system by eliminating fare regulations and barriers to entry. This created an oversupply of aging minibuses. In 2003 the public transport fleet had an average age of 16 years, contamination by fine particulate matter was twice the levels considered safe by WHO,⁵ and there were 44,604 traffic accidents⁶ and an average of two deaths per day; 78% of traffic fatalities were pedestrians (WHO, 2009).⁷ Traffic congestion affected everyone, but particularly the poor workers living in the outskirts of the city, whose average trip

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² Including flaws in contract design for PPPs, tensions between rising operating costs and the politically sensitive fee-setting process, or weaknesses in oversight capacity by the BRT public agency.

³ Urban Transportation Curitiba II (BR-0375) was excluded from the study because it was an addition to an already well-established system that was developed outside of Bank financing and has been well studied.
lasted 90 to 180 minutes. While more wealthy districts are located closer to the center of the city, the poor are located at the peripheries, except from the coast, presenting considerable barriers for access and social inclusion.

In 2003 IDB approved the Metropolitan Lima Urban Transportation Program (PTUL, PE-0187) as part of the financing package required to build and operate the first stage of Lima’s public transport system, COSAC 1. The total public investment was originally estimated at US$134.4 million, of which US$90 million was jointly financed by loans of the IDB and the World Bank (US$45 million each), and the rest by the MML. Unlike most other public transport projects, this effort didn’t have the financial or technical support of the national government.

The objective of the loan was “to improve mobility conditions for the population of Metropolitan Lima, particularly among lower-income groups” through the implementation of “an efficient, reliable, environmentally sound and safe rapid transit system.” The total investment was originally estimated at US$134.4 million, of which US$90 million was jointly financed by two loans from IDB and the World Bank (US$45 million each), and the rest by the Metropolitan Municipality of Lima. In support of the loan, the IDB approved several grant operations that financed pre-investment studies, studies on intelligent transport technology, and studies to analyze the viability of clean fuels. El Metropolitano BRT consists of 28.6 km of segregated busway, with 35 stations, two terminals, and a central transfer station. The project also included components for institution building, improving the urban environment (e.g. paving of parallel streets, restoration of sidewalks, landscaping, and improvements to public plazas, air quality monitors, among others).

Cali

Cali is the third-largest city, and one of the most densely populated cities, in Colombia. At the beginning of this century, the city’s transport system was highly chaotic and fragmented, partly informal, inefficient, and polluting. An unregulated and growing oversupply of public transport and lack of structured routes or bus stops had led to severe competition for passengers, creating high levels of congestion, overlapping routes, and low public transit productivity. Nearly 40% of the buses were more than 20 years old, and the fleet had poor or no emissions control technologies (Moller, 2006). During rush hour, the average bus speed was 8-12 km/h and, on average, it took 90 minutes to cover routes that were about 40 km long. Air quality in Cali was also poor, largely because of the numbers of aging transit vehicles and the congested driving conditions. The levels of poverty and inequality in Cali were very high at project inception. In 2005, a third of the population lived under the poverty line. Low-income and poor populations tend to be concentrated in the western hills and, especially, the eastern areas of the city reducing access to jobs and markets in the center.

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4 Of the public transport fleet, 90% was low-capacity vehicles (minibuses and pick-ups), and 10% was buses.
5 For particulates with a diameter of 2.5 micrometers or less, the World Health Organization suggests a level of 25 parts per million, while in Lima it is around 50 parts per million.
8 IDB approved several grant operations to support preparation of the loan.
9 For the trunk lines, in 2005 the measured total suspended particles averaged 108 μg/m³, sulfur oxide 6.8 μg/m³, and carbon monoxide 4 ppm.
10 Taimur, et al., 2012.
In 2002, the Government developed a National Program for Urban Transport to develop integrated public transport systems in several Colombian cities, seeking financial support from the multilateral development banks. The city of Cali had initially envisioned a light rail system supported by several buses operating on trunk lines and feeder routes. However, feasibility and alternatives analyses determined that a BRT system was the more cost-effective and affordable option for the city (DNP, CONPES 3166, 2002).

The city took an ambitious approach, attempting to reform the entire public transport system rather than piloting a few corridors. The project sought to improve the transportation alternatives for Cali, especially for low-income populations, by modernizing and integrating the bus transportation system to connect the low- and middle-income areas with the areas where job-generating activities and social services are concentrated. The modernization of the transportation system included measures to improve service quality; reduce travel time, accidents, and air pollution; and increase service frequency and reliability. The system included complementary corridors, and involved the construction of five trunk lines and their related infrastructure (stations, terminals, and line terminals), the construction of patios for bus operators, and the extension of the upgraded bus fleet.

Montevideo

Montevideo is both the capital of Uruguay and one of the country’s 19 administrative regions. In 2004, the city contained 41% (1.32 million) of the national population. The operation of public transportation is formalized and highly concentrated, with five cooperatively owned bus companies providing service for about one million people per day (2007). In the five companies the majority of the shareholders is also workers, such as bus drivers or fare collectors, and own a share of the vehicles. The transportation system lacked dedicated infrastructure to prioritize public transport over other modes, and service had not adapted to demand. As a consequence, the system’s overall productivity and efficiency were low. These factors, coupled with growth in motorization and an aging bus fleet, led to significant growth in congestion in some areas, affecting both mobility and air quality.

In 2005, Montevideo initiated a two-phase Mobility Plan, proposing the creation of a system organized around exclusive segregated public transport corridors. The IDB supported the first phase of the plan (2008-2010), for the construction of two trunk lines and their related infrastructure through the Montevideo Urban Transport Program (Loan UR-L1025), approved in 2008. The objective of the Bank’s program was to improve mobility and the efficiency of the urban transportation system –to provide “an accessible, safe, efficient and sustainable transportation system” (IDB 2008) by upgrading mass transit infrastructure and restructuring and streamlining services. The Bank’s program was intended to finance infrastructure for exclusive and preferential bus lanes, terminal stations, feeder lanes, and traffic-light systems.

11 Density in the city (2,500 hab/km²) is higher than the average of the large LAC cities (1,747 hab/km²) (CAF, 2007) and strongly contrasts with the rest of the country (19 hab/km²).

12 Buses were running at 16 km/h (6-8 km/h in the center of the city) on average (TC document).

13 A technical cooperation –Apoyo a la Preparacion del Programa de Transporte Urbano de Montevideo (UR-T1015, US$720,000– supported the preparation of the Montevideo Urban Transport Program.
COMPARATIVE CASE ANALYSIS

At project inception, all three cities were experiencing rapid urbanization, urban sprawl, and growing private vehicle ownership rates that brought high levels of congestion, pollution, and traffic accidents. Lima and Cali had low levels of overall mobility, severe traffic congestion, an oversupply of transit vehicles, high levels of air pollution, and significant informality in the public transport sector. Montevideo had a more developed and formalized and cooperatively owned public transport sector run by five bus companies, and comparatively much lower levels of air pollution and congestion. Nevertheless, there, too, increasing car ownership and urban sprawl had been undermining the effectiveness and sustainability of the city’s transport system in the city and contributing to increasing emissions from transport as well as a rising number of traffic accidents. Table 3.1 provides an overview of the three projects, along with Table 1 and

Project Design

The three projects shared similar objectives, but there were striking differences in their design and scope. The projects pursued the common objective of improving mobility through improvements to public transport corridors and systems—in Lima and Cali, particularly the mobility of the poor—while also improving the safety and environmental sustainability of the transport system by implementing a BRT system and accompanying components. The ambitious scale of Cali’s program implied significantly greater potential to address the city’s transport issues, compared to the more incremental approaches in Lima and Montevideo. Cali’s system proposed to transform the entire public transport system, reaching 98% of the city. Lima’s was planned as the first part of a future network of five BRT corridors, with this first segment serving roughly 5-6% of the city’s public transit demand. Montevideo’s corridors (also planned as part of a future network of BRT corridors) were estimated to carry approximately 17% of the public transit demand in the city. While Cali’s “big-bang” approach offered the potential for larger-scale benefits, it also carried higher risks in terms of added complexity and potential scale of unintended adverse impacts if problems arose during execution and operation.

In Lima and Cali, the BRT system corridors connected important activity centers of the cities, serving high levels of public transit demand but also suffering from significant traffic congestion that impeded public transit service efficiency. In Montevideo, the project was developed in two corridors with relatively lower demand and congestion; conceived as a lower-risk demonstration project that also could improve transport for lower-income residents, it stopped well short of the downtown central business district.

The projects included key components to reduce transport-related air pollution such as improved bus operations, vehicle scrapping programs, and the use of low-emissions buses operating on cleaner fuels. Project fuels and vehicle alternative analyses varied in quality and effectiveness in guiding fleet renovation. For example, in Montevideo a study on vehicle and fuels alternatives was conducted, but the analysis lacked information on cost-effectiveness, and there were no economic incentives for the bus companies to adopt new technologies. Therefore, the only fleet renovation process occurring in the corridor responds to a recent local regulation requiring new

15 In Montevideo, this was an expected co-benefit of the project, although not an explicit objective.
16 The renovation process is slow—around 10% annually, according to the city’s environmental agency.
buses to meet Euro III emissions standards, leading to a slow renewal process. While plans to restructure routes would have improved energy efficiency, the omission of any fleet renewal program considerably reduced the project’s potential to address environmental concerns.\(^{17}\) The projects in Lima and Cali included components to reduce the oversupply of old polluting buses, introduce lower-emissions buses, and implement bus scrapping programs; however, the financial incentives in the scrapping program designs were not strong enough, particularly in Lima, to fulfill scrapping goals. In addition, in Lima, no system for scrapping was yet in place at program inception.\(^{18}\) However, the bank funded an instrumental study that analyzed cost-effective options for clean fuels and led to the adoption of low-emissions CNG buses. In addition, a Peruvian Government mandate to promote the use of natural gas, following its investment in the pipeline to connect Lima and Callao to the Camisea Gas Project, helped support the choice of CNG and led to significant emissions benefits for the BRT project.\(^{19}\) In Cali, the bus fleets were planned to be renewed according to national laws, and Euro III emissions standards were required at the time of project design.

In Montevideo, the companies fiercely opposed reforms such as the introduction of new buses to their fleet\(^{20}\) or change the fare collection model, for which they had little economic incentives, particularly given the low perceived return on such investments in a low density and demand corridor. In contrast, in Cali and Lima the bus companies were required through concessions contracts to purchase new low-emissions vehicles. The systems incorporated a range of bus sizes and types tailored to service levels; doors on both sides of the buses gave them the flexibility to operate on both the trunk and feeder routes.

In all three cases, the BRT corridor alignments passed through or reached into low-income or poor neighborhoods, and in two, the design included feeders that reached into poor areas to provide connections to the main BRT trunk lines. However, beyond placing the projects in or near low-income and poor neighborhoods, the projects lacked in-depth diagnoses of mobility needs, spatial and temporal traffic patterns, and affordability needs of the poor to inform the projects’ design. Moreover, two of the projects’ planned elimination of the traditional bus services, often operating informally, that reached far into poor neighborhoods, presented a risk of unintended reductions in poor people’s access to public transit. In contrast, the BRT projects were designed to reconfigure these traditional services from long-established routes to a trunk-and-feeder configuration; to what extent such a configuration serves the mobility needs of the poorest income strata is unknown.

\(^{17}\) Moreover, the minimum emissions standards dictated by the recent law were constrained by the low-quality diesel fuel produced by outdated fuel refineries that were only slated to be revamped after the law was passed. As a result, although the law is an improvement, vehicles are required only to meet relatively low emissions standards (Euro III), rather than the more stringent ones that would be available with higher-quality fuels, (Euro IV and Euro V).

\(^{18}\) Source: Interviews, Ministry of Housing (Lima, Peru).

\(^{19}\) Increasing the demand for natural gas would prove beneficial for COFIDE as they had to fulfill their commitments with the private investors, and El Metropolitano was a particularly convenient project to support. With a supply of 10 million cubic meters of gas per day and very little demand, COFIDE had the responsibility of promoting projects that encouraged natural gas consumption or risk paying the investors the revenue guarantees agreed in the contract.

\(^{20}\) New buses were opposed by bus companies under the pretext that they needed to run on the busway and in mixed-lane traffic in other sections and that the size of the investment required on their part may not be justified by the scale of the project relative to the city (interviews with bus companies).
**Implementation**

The urban transport projects were affected by a myriad of factors that arose during implementation, including construction challenges and cost over-runs, design issues in PPP contracts, weak technical and institutional capacity, delays in infrastructure that compromised service quality and efficiency, political cycles, and political economy issues. Policy reforms that had been planned to support the infrastructure investments were undermined to varying degrees in each case by the weak institutional and technical capacity of the local governments, political cycles, and strong resistance to reforms by incumbent stakeholders, and inadequate public consultation processes. For example, in Lima, while the IDB and World Bank supported technical studies for solid transport engineering and infrastructure designs, the projects suffered from implementation issues surrounding supporting measures such as PPP designs, pedestrian planning, and flaws in station design. In Montevideo, high levels of risk aversion resulted in poor corridor choice in a relatively uncongested and low demand corridor, reducing the potential benefits of a dedicated busway. Under such circumstances, most of the mobility outcomes (due to enhanced bus speeds) were dependent on such complementary measures as bus restructuring, fleet modernization, off-board electronic payment systems, level boarding, and traffic light reconfigurations; however, these were reforms that never fully materialized. Low technical capacity, the lack of strong institutional reforms, and the political power of bus companies impeded effective implementation of these critical measures, negatively affecting project outcomes. As a result, even where the national Government had a highly supportive regulatory role and extensive experience with BRT systems (Cali), unforeseen issues, weak local technical capacity, and fragmented local institutional structures resulted in design and implementation issues that adversely affected the project’s results.

Weak technical and institutional capacity at the local level and political cycles contributed to cost overruns and delays. In Lima, rising construction costs, exchange rate fluctuations, and the addition of the underground Central Station more than doubled costs, from the initial budget of US$125 million to around US$350 million. Cali’s project cost nearly four times as much (US$1,481 million versus US$395 million) and took three years longer than expected (8.3 versus 5.2 years), while Lima’s took twice as long (7 years versus 3.6). Although Montevideo’s first project finished two years later than planned (6 versus 4), one of the two planned corridors is still under construction, with additional funds from the government.

In Cali, high turnover among Metrocali’s management and staff created low institutional capacity to assess the quality of engineering designs that had been outsourced to external consulting firms. The unexpected discovery of unmapped underground utility services in Lima and particularly in Cali required the redesign of trunk lines and stations and led to construction delays. This, in turn led to problems such as prolonged congestion in construction zones and adverse impacts on affected businesses. Preexisting capacity weaknesses in the city’s planning department (outside the project) and a weak linkage between the project and overall city planning contributed to these issues. In Lima, the low wages established by government policy meant that executing agency staff had limited technical capacity and experience with BRT projects (World Bank Implementation Completion Report). This, in combination with high staff turnover and declining support for the project associated with political cycles, caused several disruptions and delays in the project’s start-up. In Montevideo, although the BRT construction was well under way according to plans, in 2011, the

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municipality decided to revise previous technical studies on route rationalization, unnecessarily delaying construction.

Delays sometimes presented opportunities for improvements in project design, such as the use of natural gas buses in Lima. Cost over-runs also sometimes resulted from requests by municipalities for additional infrastructure that enhanced the projects, such as an underground station that enabled a thriving mall development in Lima and increased public spaces in Cali. The projects’ preliminary designs at loan approval allowed the flexibility to adapt to unforeseen construction issues and to respond to changing government priorities, while at the same time added uncertainty regarding final infrastructure costs. Despite over-runs, the systems were still a significantly more cost-effective means of providing rapid mass transit compared to rail based technology. However, in Cali and Lima cost overruns resulted in reallocations of IDB funding across planned components, so that local governments needed to either find alternative sources of funding or reduce the scope of the components. As a result, system efficiency and service levels were adversely affected by unbuilt portions of infrastructure in Lima and particularly in Cali, which still has several terminals and infrastructure unfinished and required additional government funding to cover cost overruns.

More informative than participatory public consultation processes, with limited bottom-up feedback in the project design phase led to public backlash against project externalities in some cases. For example, in the historic neighborhood of Barranco, Lima, overly narrow environmental studies failed to identify barrier effects to properties and adverse impacts from displacing traffic congestion into neighboring streets, leading to a formal complaint through the World Bank’s Inspection Panel mechanism.22 In addition, inadequate assessment of and planning for pedestrian traffic across the planned busway led to significant barrier effects at numerous locations along the BRT corridor and unsafe pedestrian crossings into the BRT lanes, which also gave rise to citizen complaints.23 Finally, a program to mitigate job losses related to downsizing the bus sector through retraining, microcredit, and compensation programs was not implemented because of cost overruns and political issues, compromising environmental and social objectives.24 In Cali, as a result of construction cost increases, funding for measures anticipated by the Bank’s social safeguards policy were delayed or reduced in scope, leading to negative economic and social impacts. For example, the program to retrain bus drivers in new occupations was incompletely implemented, spurring large protests by traditional bus operators. In Montevideo, both civil society and the bus companies reported in interviews that they felt there was a lack of consultation by the municipality during the construction phase. As a result, there were several protests in the area of the BRT construction even before the opening of the corridor.25

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22 Given that the scale of the bidirectional busway was large in comparison with that of the historic and narrow streets, the busway design was insensitive to existing urban form in this section of the city. The system has also generated additional traffic congestion in neighboring streets, which is adversely affecting the neighborhood, although the share of traffic attributable to the BRT rather than other factors is difficult to assess.

23 The busway impeded pedestrian crossings along major activity centers in up to 8 locations along the corridor (pedestrian crossings were incorporated in response) and also impeded homeowners’ access to their garages. Personal communication with Oswaldo Patino, consultant, February, 2015.

24 The mayor implemented a “Zero Impact Policy” and called for bus operators to be relocated to other parts of the city to avoid rather than mitigate adverse impacts. The mayor was planning to run for president, and this solution posed fewer political risks compared to disbanding operators and placing them in new businesses.

Project outcomes

Lima’s BRT systems saved passengers significant travel time for trips along the trunklines. Besides incorporating the basic BRT features, it included an integrated feeder and trunk system, passing lanes, high-capacity articulated buses26 with wide doors and universal access, and a programming and control center. The system’s passing lanes allowed higher system capacities and the addition of highly popular express and super express services27 between high-demand stations. Lima’s system faced several challenges in the first years of operation that led to lower than expected net emissions benefits, demand and service levels, and financial sustainability concerns. In Cali, the engineering and operational design of the BRT corridors also included several of the best practice engineering features of a BRT system mentioned above, with well-designed stations, multiple integrated routes, feeders and complementary buses. It also included several positive and important improvements to public spaces and extensive pedestrian and bikeway infrastructure. However, the system’s operational and implementation issues have led to low public approval ratings in recent years, lower-than-expected mobility benefits, and significant social upheaval surrounding reforms to the traditional bus sector.28 Montevideo’s project design was diluted to such an extent from the original plans that, aside from the establishment of a 6.3 km dedicated busway, new bus stops, a bus terminal, and electronic payment cards, the system incorporated no other design features associated with a BRT and is not improving mobility or reducing emissions in the corridor.29 (See Table I.1 for a summary of project results for all three case studies).

Mobility and system performance

Demand for the systems was initially much lower than projected in all cases; however, with improvements to services and completion of key infrastructure, demand has been growing rapidly over time in Lima and to some extent in Cali. In Cali, while the actual demand has grown, to 550,000 passengers per day (as of 2013), it is still only 54% of that projected and well below the point at which tariffs will cover operating and maintenance costs (700,000 passengers/day). In Lima, initial demand was also well below the expected level (220,000 per day versus 600,000 predicted). Ongoing adjustments and improvements to the system—such as the addition of express and super express services, an integrated tariff, and on-going route restructuring—have bolstered demand to near the target values (approximately 590,000 on a typical weekday). Ridership on Montevideo’s system is around 95,000 per day. The expected demand was not included in the loan proposal; however, the project’s alternatives analysis estimated potential demand on both corridors, assuming route restructuring, to be 257,000 to 260,000 passengers per day.

Lower-than-forecasted demand is attributable to unfinished infrastructure, continued competition from traditional and informal buses, and the incomplete set of buses in operation, resulting in lower service quality. Financially struggling bus companies have kept the number of buses in the system lower than needed, leading to longer intervals between buses, and thus longer wait times, crowding

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26 Articulated buses are buses with two rigid sections and a pivot joint for maneuverability, allowing longer overall length (about 25 meters) and higher passenger capacity (around 200 passengers).

27 In express services, buses skip several stops to enable faster transport between high-demand origins and destinations.

28 The system received 85 out of a possible total of 100 points on the ITDP international BRT scorecard.

29 Montevideo’s system received 42/100 points on the BRT scorecard as scored by Gerhard Menckhoff during the team’s mission.
on buses in peak hours, and lower demand for the system. In Cali, while 852 buses were planned to meet service level needs, only 76% (644 buses) are in operation. In Lima, the system opened with only 22% of the envisioned buses, 64% were in operation by 2011, and now nearly a full set of buses is in operation (280 of the 300 planned). However, crowding on buses is an issue in peak hours due to too few buses in service. Demand for Montevideo’s system has been growing over time; however, between the opening of the system (December 2012) and August 2014, the number of passengers transported per day on the busway has remained stable (about 95,200/day). This trend is not surprising, since the second corridor is still under construction and the first corridor has failed to improve operational efficiency and travel times.

Lima’s BRT has achieved relatively high levels of transit capacity and bus speeds and Cali’s a moderate level, while Montevideo’s capacity fell slightly. Lima’s BRT carries an impressive volume of 32,000 passengers per direction per hour (pphd) in the most heavily traveled sections, with estimated average commercial speeds of 20 km/h, with higher speeds for express services (24-27 km/h). Cali has moderate peak-hour passenger volumes (21,100 pphpd) on the trunk line (DNP, 2011), with a system-wide passenger load of 13,000 pphpd and average bus speeds of 17.7 km/h (Data provided by Metrocali, 2014). In Montevideo, peak-hour volume on Avenida Garzon probably declined compared to before the project to about 2,200 passengers in each direction, a relatively low level for a BRT busway. Lima’s high performance is related to all-around strong BRT system design, choice of a high demand corridor, and frequent buses. However, its performance, like Cali’s, could be higher, with more buses in operation, shorter bus headways, and measures to reduce bus bunching. Montevideo’s system could benefit from improved intersection treatments to enable faster bus speeds and from increasing the use of electronic fare cards (to enable faster boarding), perhaps through pricing incentives (such as lower fares for those who use the electronic smartcards rather than cash).

System productivity, measured as passengers per kilometer, increased in two of the cases, with Lima’s having the highest, followed by Cali. In Montevideo, basic system characteristics indicate that IPK could not have improved (see Montevideo Case Study).

Weak technical capacity, coupled with political economy issues around incumbent bus operators, has also resulted in incomplete bus system restructuring and lower-than-expected system performance, particularly in Montevideo. In Lima and Cali, bus routes that were part of the BRT system were restructured to fully utilize the segregated corridor and include express and local services; however, both systems have suffered to some extent from competition from traditional bus operators. In Montevideo, bus lines were not significantly restructured, resulting in suboptimal utilization of the corridor and minimal to no mobility and emissions benefits. Bus companies acknowledged the importance of restructuring bus routes to better serve passenger

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30 System capacity is measured as passengers transported per hour per direction. Transit system capacity is a function of several factors: bus speeds, ridership, number of buses in service, size of buses, number of bus lanes, and bus service frequency.

31 In comparison, Bogota’s Transmilenio system, which has the highest peak hour passenger throughput of any system, exceeding those of many metro systems, is roughly 37,700 (in 2013). Source: http://www.chinabrt.org/en/cities/bogota.aspx

32 According to the executing agency.

33 Given the political resistance from bus companies to off-board fare payment, this might be a more feasible option.

34 Except for the creation of Line G, which operates along the entire corridor and carries only a fraction of the demand, the other routes remained unchanged, so that buses use only small portions of the 6 km busway.
demand and to improve operating efficiency, however, they opposed reforms that in their view posed threats to jobs, control over fare collection and distribution, and service provision. Lima’s and Cali’s BRT systems saved passengers significant amounts of in-vehicle travel time along the trunk line routes; however, in Montevideo, passengers complained of increases in travel times of 6 to 10 minutes. Lima’s passengers have saved the most in-vehicle travel time—on average 34% (from 53 minutes before to 35 minutes after the project). The addition of express and super express services has likely bolstered time savings considerably. In Cali, travel-time savings are on average 29% (65 minutes to 46 minutes on the north-south trunk-line). However, system-wide in-vehicle travel-time savings were more modest (5-6 minutes on average) because not all bus lines operate in dedicated lanes. In addition, wait times for buses and crowding have been increasing given the under-supply of buses to the system.

In Montevideo, the project led to an increase rather than decrease in travel times for passengers and considerable public backlash against the project (7 minutes on average were added to routes that now had to stop in the new terminal, which was 500 m from the trunk line). Prohibiting left-hand turns and giving buses signal priority at intersections improves operational speed and reduces potential vehicle-bus conflicts. These measures were implemented in Lima and Cali, but in Montevideo, as a result of strong opposition from drivers inconvenienced by such restrictions, the municipality reversed them. Since the street had only two lanes approaching the intersection, this resulted in an increased number of signal phases, longer delays for buses, and increased hazards of vehicle conflicts and accidents. Additionally, intersection vehicle detectors are not in operation, causing unnecessary stops and slowing bus speeds, as buses receive little green-light time and thus reducing the system’s efficiency and capacity. The off-board fare collection system, important to facilitate fast passenger flows, was also omitted because of opposition from bus companies concerned about possible job losses of onboard fare collectors and fare revenue losses.

**Mobility for the poor**

In Lima and Cali numerous feeder buses reach into the poor neighborhoods, providing access to the BRT trunk terminals and destinations in between. However, in Lima feeder service to poor neighborhoods to the west is lacking, and in the north, 11 km of trunk-line service remains unfinished. In addition, in some cases, feeder routes did not reach far enough into neighborhoods, leading to long walk times to reach the feeder bus stops. In Cali, poor neighborhoods receive good coverage in the eastern portions of the city although several areas on the western side of the city do not receive adequate connections and service, especially in steep

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35 CUTCSA, especially, was skeptical about a project that would involve more equal participation and coordination among all operating bus companies (Departamento de Planificación Urbana).

36 Prohibiting left-hand turns reduces severe crashes by 22%. Signals have been incorporated at intersections to enable safe left-hand turns across the busway for mixed traffic. Several intersections have long cycles, with up to five phases lasting from 80-120 seconds (field visits). Efficient BRT operations would minimize the number of traffic-signal phases (IDTP, 2013).

37 Off-board payment systems would entail a separate company to collect and redistribute fare revenue based upon bus kilometers traveled, resulting in possible revenue losses for the operators with the highest passenger load factors per bus kilometer.

38 The new mayor’s plans to complete the last 11 km of the system will enable the trunk line to reach even deeper into poor neighborhoods, north of the current terminal in Naranjal.

39 Interviews with NGOs and citizen groups (Cali).
and hilly zones lacking sidewalks and stairs, where many MIO buses had difficulties with the terrain. Hilly areas are now served by informal jeeps (SDG, 2013), which the transit agency is working to integrate into the BRT bus system. In addition, some low income users initially had trouble understanding the system and trusting some features (e.g., smart cards), reporting that the maps and instructions were overly complex and difficult to understand. Notably, 10% of survey respondents among non-BRT users (but regular public transit users) living near the feeder routes cited long walks to bus stops as a barrier. Increasing integration with other public transit modes, and reducing access time, both in terms of distances to bus stops and wait times for buses, are two measures that could increase ridership and utility of the BRT systems for the poor.

In Lima, the system has attained its goal of having 60% of its riders from socio-economic strata C, D, E (low-middle income, poor, and extreme poor, respectively). However, 43% are poor (D) and extreme poor (E), and the poor still use the traditional public transit system at higher rates (1 km from trunk and feeders). Roughly half (54%) of strata C, D, E, use the BRT system at least once a week. Rates of usage are much lower among the extreme poor, with 57% of the extreme poor not having used the BRT in the previous week.\(^4\) Much higher shares – 95% of the poor and 97% of the extreme poor – had used other public transit modes at least once a week. The results indicate that while the BRT system serves the poor, other public transit systems in their neighborhood continue to serve a larger share of their mobility needs. Similarly, an ex post evaluation commissioned by Metro Cali in 2013 found that the MIO is the main mode of public transport among public transit users; however, the system is used more by the middle class (stratum 3) than the poor and extreme poor (strata 1 and 2). For the extreme poor (stratum 1), modes such as informal camperos are important (close to 10%).\(^4\)

Our survey analysis revealed that public transport that 26% of all the trips taken by low-income users involve the BRT\(^4\). When excluding walking trips, the BRT is serving a greater portion of trips, with 42% of their trips are by the BRT and 58% by other non-BRT public transit. Therefore, the BRT systems seem to be providing benefits to the poor who utilize it, though the higher rates of usage of other public transit modes among those who live in walking distance of the systems indicates that the BRT service characteristics could be improved to better meet pro-poor objectives. This is particularly relevant in the case of Cali, where the system was intended to serve nearly all the city’s public transport demand, as compared to Lima, which only serves a single corridor and operates alongside other services.

Route-destination mismatch, or system coverage, service quality, and long lines at stations were among the top reasons poor people cited for not using the BRT system.\(^4\) In Lima, non-BRT public transit users stated that they did not use the Metropolitano because (i) the routes did not serve their destinations (67%), (ii) lines at stations to charge cards and enter buses were too long

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\(^4\) We define middle income as stratum C, poor as stratum D, and extreme poor as stratum E. For example, 33% of poor and 37% of the extreme poor used other public transit five days a week, while daily use of the BRT among the poor was 15% and among extreme poor was 8%. In 2013, BRT trips comprised approximately 2.2% of all trips taken by middle-income groups, 0.6% of those taken by the poor, and 0.2% of trips by the extreme poor (OVE analysis of JICA Origin Destination survey, 2013).

\(^4\) The ex post evaluation shows that the number of users from the poor areas is close to 260,000 for Stratum 1 and 211,000 for stratum 2.

\(^4\) A survey conducted for this study of poor (strata 1-2)

\(^4\) Survey respondents to this question were poor regular public transit users living in the area of influence of the BRT system that did not use the BRT at least once a week.
(21%), and (iii) the buses were often delayed (13%). In Cali, non-BRT users in strata 1 and 2 stated they did not use the MIO because (i) other modes of public transit were faster for their destinations (32%), (ii) the MIO buses were often delayed (18%), and (iii) lines at stations were too long (18%). In addition, in interviews with a local NGO in Lima, the prohibition of large packages and bags on BRT buses was cited as a barrier for some poor micro-entrepreneurs who need to transport their products on public transit services.

Flat public transit fares that allow free transfers may increase affordability for longer trips involving transfers. In Lima, before the BRT was in operation, someone living in the poorest areas who wanted to reach the center of the city would have to pay a mototaxi to reach a micro stop, then pay a micro to get to a colectivo or bus stop, and finally get the colectivo or bus to complete the journey; the cost of the trip could add up, and the trip could take two to three hours. Lima’s survey from 2004 shows that more than 50% of the population in the far north (where the poor are concentrated) paid more than US$1 per trip for public transit. Therefore, the new BRT system and feeders may be more affordable for poor people who need to travel downtown; and the flat fare represents a cross-subsidization, since the poor tend to live in the periphery. However, for shorter trips the BRT may be more expensive: the traditional system charges by distance beginning at 0.50 soles, whereas until very recently the Metropolitano cost 1 sol for the feeder.44 Similarly, given the trunk-feeder configuration and reduced stop spacing within segregated corridors, the BRT would have a comparative advantage for longer trips as in Lima, a possible explanation for the longer average travel times on the BRT. In Montevideo, although the project was expected to benefit low-income passengers,45 the lack of bus system improvements implies little mobility benefit for low-income residents in the project’s area of influence. However, the development of an integrated fare system combined with the introduction of smart cards (2010) could have improved affordability for the poor.

Emissions

Emissions of pollutants decreased in Cali and Lima but showed no change or a possible increase in Montevideo. In Montevideo, transit vehicles remained old and polluting, and changes to the operational characteristics of the corridors decreased the efficiency of bus service (more signals and stops and possibly slower average bus velocities). Consequently, emissions were not improved and may have actually worsened. Our estimates range from an increase of 8% (140 ton/year) for CO₂ emissions and 12% for NOₓ to a slight reduction of 40-80 tons per year (1.65-3.30%).46 In Cali, the large-scale system was estimated to reduce CO₂ by 40-60% and PM₂.₅ by 66%, implying significant public health benefits. Lima’s BRT reduced emissions by 78,600 to 204,500 tons per year of CO₂ from 2012 to 2015, representing 3-8% of the total emissions from the city’s entire public transport system.47 The system’s impact is considerable at the corridor level for PM₂.₅, with estimated reductions of 17% in 2012 and 19% in 2013, close to the project’s target of 20%.

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44 In early 2015, after OVE’s survey, Protransporte lowered feeder fares from 1 sole to 50 centavos.
45 The residents who use buses in this area were mainly low-income. Between 2007 and 2009, only about 7.73% of the poor households owned a car versus about 35% for the non-poor (IMM, 2009).
46 Given uncertainties surrounding the baseline, bus operating speeds (OVE received conflicting data from various sources, ranging from16 km/h to 23km/h as the baseline). Emissions estimates by OVE with consulting services of Juan Pablo Bocarejo, Universidad de los Andes.
47 This reflects that the corridor carries 500,000 daily trips (in 2013), representing less than 5% of the 11 million daily trips across the whole public transport network in Lima.
Vehicle scrapping programs have progressed slowly because of weaknesses in PPP contract design, poor enforcement, and incomplete or missing social programs for displaced bus operators. Nevertheless, although the process has been politically difficult, Cali has managed to scrap 74% of old vehicles. In Lima, only 26% of old vehicles have been scrapped (as of May 2014). Bus companies contracted as part of the PPP for the BRT system could pay a fee in lieu of scrapping vehicles as part of their contracts; most bus drivers preferred this option because the fee was lower than the economic revenues from keeping the buses in service and also Lima had no established scrapping system. In Cali, public transit fares were earmarked into a special fund, and bus companies are contractually responsible for ensuring that vehicles are scrapped; however, due to unfinished infrastructure and financial sustainability issues, several bus operators are unwilling to scrap their buses.

**Bikeway and Pedestrian Planning Outcomes**

Bike lanes and pedestrian infrastructure were shaped mainly by local demand, funding availability, and policies, resulting in varying design qualities. In Lima, a positive feature of the project was the inclusion of bicycle parking at bus terminals, and several bike lanes were built with funding through a Global Environment Facility grant. However, although the project had set a target of doubling bike trips, bike paths are reportedly not yet widely used. In addition, as a result of poor pedestrian planning and infrastructure, passengers needing to access stations are often forced to walk along overly narrow sidewalks and brave busy unprotected intersections, generating significant safety hazards.

In Montevideo, pedestrians have benefited from increased signalization of previously unprotected intersections in a corridor that was characterized by high levels of pedestrian-vehicle collisions. Cali’s pedestrian and bikeway components were of particularly high quality because of a supportive regulatory environment and high local demand for such infrastructure improvements. The project included 24 km of bikeways (half of which have been built to date), generally well-designed pedestrian infrastructure around stations, pedestrian overpasses, and well-utilized public spaces. Pedestrian and bicycle design associated with the project benefited from national standards regarding pedestrian access around public transit infrastructure, although an ex-post evaluation found some discontinuities in pedestrian infrastructure at specific locations (SDG, 2013).

Although the projects’ designs did not include extensive land use development around stations, several improvements to the urban environment — such as public plazas, landscaping, and an underground mall — were part of the projects’ design and benefits. In Lima, an underground station spurred a thriving shopping mall development. Montevideo’s project attempted to create a shopping center at its terminal (Colon); however, the location of the terminal in a low-density area with relatively low passenger demand seems to have limited the intended urban development impacts as shops remained empty at the time of the team’s mission. Although TOD was not a part of Cali’s original plan, a study of land use changes in Cali after the implementation of the project found increased densification around the trunk-line station stops (SDG, 2013). Over time in Montevideo, if

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48 National governments did not have a policy of funding bicycle infrastructure in any of the cases.

49 The World Bank’s Project Completion Report states that bike surveys revealed a lack of familiarity with the bike paths; the paths were also under-promoted because of their late implementation and lack of advanced planning. Increasing integration of the bike network, improving safety, and extension into higher-demand areas are some measures that might improve usage.
appropriate improvements and adjustments are made to the system to enable faster service and attract more users, land use development could emerge. In all three cities, TOD could provide revenue opportunities to support the BRT operating costs through taxes on real estate value added to properties near stations where land value increases as a result of transit investments. This would require inter-institutional coordination, the capacity to track land value increases, and the application of well-designed tax and levy instruments (Smolka, 2013)

**PPP Models and Financial Sustainability**

Flaws in PPP designs and risk allocation structures have undermined planned bus reforms and project outcomes, particularly project sustainability. In both Cali and Lima, the financial risk of unmet system demand forecasts was placed mostly on the private operators, while the cities lacked strong incentives to take politically sensitive or financially costly measures that could increase such demand, such as restructuring the competing bus services, scrapping the old buses, and finishing key infrastructure segments that had been delayed by cost overruns. To compensate for the unmet demand (and on the grounds that several aspects of the infrastructure and other factors that affect demand have not been implemented), cities are not enforcing several of the contract clauses designed to improve service quality, such as fines, liquidated damages, and tow truck availability.

In Cali, 20- to 25-year concession contracts for the bus and fare collection operations proved to be too rigid to account for all the changes that could happen in such a long period of time. In both Lima and Cali, a shortage of fare-charging machines, attributable to binding contractual provisions with fare collection companies, has led to long lines at stations to charge cards, a black market for trips, and a loss of revenue for bus operators, in the case of Cali.

While all three projects were expected to be financially self-sustaining, the fare revenues in Cali and Lima have been insufficient to fully cover operating expenses. In both cases, fare revenues are still below the price bid by the private operators, putting financial stress on the operators, the city, and related financing institutions. As demand remains below expectations in Cali and took several years to achieve in Lima, fare revenues have been insufficient to cover all the systems’ operational expenses and the debt service for the buses. According to the bus operators in Lima, they were initially receiving only 56% of the price per kilometer they had bid, barely covering operation and administration expenses. However, with some improvements to the system and fare policy, demand has increased, bringing revenue rates up to 91% of costs per programmed kilometer. In addition, bus operators have not begun paying back the loans they incurred to purchase buses; after 10 years, the initial payment period of the buses, the buses will have reached full depreciation, resulting in significant sustainability issues. Similarly, in Cali’s MIO system bus operators with lower financial liquidity have gone bankrupt and were bailed out by other investors. Financial struggles of the bus companies can result in a vicious downward cycle in which bus companies remove buses from

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50 Placing the demand risk solely on the operators affects the quality of service since the operators had no way to increase their revenues except by reducing operating costs and not paying their debt obligations. The city should have a bigger share of this risk since it is responsible for reorganizing the competition, building the infrastructure, programming, and promoting the service.

51 In addition, in Lima, the fact that the board of the executing agency is disproportionately represented by bus companies (4 of 5 members) has, according to the municipality, given the companies too much negotiating power related to fare increases (interviews with Protransporte staff).
operation to lower costs, leading, in turn, to lower demand and fare revenues, and larger cost-recovery shortfalls.

**Institutional Strengthening**

The institutional strengthening components helped raise the local capacity of the agencies charged with managing the BRT systems, but they would have benefitted from a broader scope and greater timeliness. The three projects helped increase capacity in the BRT management agencies and were successful in orienting these agencies towards results. In all cases, the BRT agencies adopted detailed corporate results frameworks, carried out targeted trainings, and strengthened staffing in such areas as planning, infrastructure design, legal services, external communications, and customer services. The adoption of the semiautonomous agency model for implementing and operating the system created islands of excellence and technical expertise that, nevertheless, were not immune to political influences; nor are they yet well integrated with other key functions of the local government, such as planning, infrastructure, or traffic management. In Cali and Lima, the average tenure of the agency director was one year or less, reflecting the BRT agencies’ lack of real managerial autonomy or stability. In the three cities, staff turnover rates were moderately high (up to 9% a year in Montevideo for 2014), making it difficult to retain institutional capacity despite the projects’ earlier investments in training. Finally, in both Lima and Cali, despite low local capacity at project inception, the implementation of the institutional component was delayed by cost overruns related to the infrastructure component. In contrast, in Montevideo, earlier support through a Japanese Trust Fund technical cooperation helped build capacities from project initiation.

**Conclusions**

The urban transport projects resulted in several important and positive outcomes, including increased mobility, reduced travel times, and lower emissions in two of the three cases. Lima’s system, garnered the highest travel-time savings of the three cases. Cali’s system, receiving strong support from the national government, also provided substantial travel-time savings for trips along the trunk lines and had a much wider impact because of its ambitious scale. In addition, important improvements to public spaces were made in Cali and Lima. In Montevideo, while few if any mobility or environmental benefits were realized, the increased signalization of intersections may have increased the safety of pedestrian crossings in the high-velocity and multi-lane corridor. Passengers also benefited from improved sidewalks, a new electronic fare card system, integrated tariffs, and a system enabling information on the best route combination from any origin to any destination in the city. In future years, as the city grows, the segregated busway may provide an increased benefit in terms of reducing congestion delays, particularly if other supporting measures and design improvements are made to the system. Although the systems incurred cost over-runs, they still provided significantly more cost-effective mass transit improvements compared to rail-based alternatives.

Nevertheless, several issues adversely affected their development outcomes that offer lessons for future projects. The choice of corridors for a BRT system had a strong influence on mobility benefits. In Lima and Cali, dedicated busways were appropriately placed in high-demand

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52 Data retrieved from IMM (2015).
corridors that experienced significant levels of congestion. In contrast, in Montevideo, the BRT pilot corridors were considered as demonstration projects and were placed in two relatively uncongested corridors with lower negative construction impacts but potential social benefits. However, the operational and institutional reforms that would have generated the most enhancements to bus performance, particularly given low levels of congestion, were not implemented due to weak institutional and technical capacity of the municipality, combined with failed negotiations with incumbent, consolidated, and well organized bus companies. Cali’s system, given its scale, had wider benefits but also greater risk due to its comparative complexity and has suffered from service quality and implementation issues. Lima’s corridor may have resulted in increased benefits due to a more focused incremental approach, though the system is still lacking integration with other public transit modes and suffers from unfinished infrastructure. Although all the projects included improving mobility for the poor as either explicit or implicit objectives, the Bank and local governments did not conduct sufficient diagnosis of mobility needs of the poor to inform project design. Moreover, design weaknesses in several key complementary measures to support the infrastructure investments—such as PPP contract design, pedestrian planning (in Lima), and scrapping programs—presented risks that were realized to varying extents in each of the cases, hindering expected project benefits.

Several institutional and technical capacity weaknesses, political cycles, and political economy issues adversely affected the degree of support for the transport sector reforms in all of the projects at various stages, as well as the completion of BRT lines that had been planned for the future. Regulatory capture presented barriers to policy reforms in two of the cases to varying extents, particularly when such reforms would entail significant losses to some stakeholders. Finally, the systems in Cali and Lima are facing financial sustainability issues, as are many other BRT systems across the LAC region. The increasing demands placed on such systems in terms scale and quality, and the significant public benefits they can bring, when well implemented and maintained, calls for the consideration of operational subsidies to improve long-term sustainability and results.
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