COMPARATIVE CASE STUDIES

THREE IDB SUPPORTED URBAN TRANSPORT PROJECTS

Executive Summary

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context

High rates of urbanization and motorization, in combination with underinvestment in transport infrastructure and inadequate urban planning, have put enormous pressure on urban roadways in Latin America and the Caribbean (LAC), resulting high levels of congestion, air pollution, traffic accidents, and overall low mobility.. In response, 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.

The urban transport portfolio of the Inter-American Development Bank (IDB, or the Bank) has risen alongside these trends –from just 17% of the transport portfolio in 2000-2004 to 33% in 2009-2013– with roughly half of the mass transit projects devoted to BRT systems. The Bank's support for BRT systems and for sustainable urban transport generally, is likely to become increasingly important in the coming decade because of several institutional strategies and commitments to support sustainable urban transport systems: the GCI-9 Agreement, the Sustainable Transport Action Plan, the Sustainable Cities Program, and the Rio+20 Commitments.

This evaluation, the first evaluation of IDB's support for such projects, seeks to inform such future urban transport operations.

From among the 17 urban transport projects approved between 2000 and 2012, **OVE chose to study three of the four cases of completed BRT systems funded by the Bank, those in Lima, Cali, and Montevideo**. OVE used a mix of quantitative and qualitative evaluation methods to derive lessons learned from project design and implementation and assess the extent to which the projects were able to achieve key objectives –including (i) improving transit system performance, (ii) improving mobility and travel times, particularly for the poor, and (iii) reducing local and global pollution– and identify the factors that contributed to each project's successes and challenges.

results

Overall, the urban transport projects were highly relevant to the cities' mobility problems and resulted in several important and positive outcomes, including increased mobility and lower emissions in Cali and Lima.

However, in Montevideo the suboptimal choice of corridors, designs flaws, and political economy issues that impeded planned reforms undermined the project's intended outcomes Cali's system sought to comprehensively reform nearly 100% of the urban transport system, while in Lima and Montevideo, single corridors were chosen. The success of Lima's system stood out, garnering the highest travel-time savings of the three cases. While Lima's system included feeders, it still lacks integration with other public transit modes in the city. Cali's system 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 in Cali in particular, but also to some extent in Lima were made that benefited the populations. In Montevideo, because of a poor design and corridor choice, as well as a lack of bus sector reforms related to a combination of institutional, policy and political-economy issues, few if any mobility or environmental benefits were realized; however, passengers benefited from improved sidewalks, a new electronic fare card system, integrated tariffs, and an internet based information system enabling passengers to get advice on the best route combination from any origin to any destination in the city.

The choice of corridors had a strong influence on the degree of mobility benefits derived from the dedicated busways.

In Lima and Cali, dedicated busways were appropriately placed in corridors with high public transport demand and congestion, where buses operating in mixed traffic experienced significant delays. In Montevideo, the dedicated corridors were considered lower-risk demonstration projects, so they were located in relatively uncongested avenues where negative construction impacts would be lower, but where they could potentially benefit low-income residents. However, key operational reforms were not implemented because of the weak institutional and technical capacity of the municipality and failure of negotiations with incumbent, consolidated, and well-organized bus companies. As a result, any benefit of the busway was seriously reduced. 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.

The projects had important explicit or implicit objectives of improving mobility for the poor, which in turn had potential to foster economic development.

However, although several of the corridors and/or feeders were placed in or near low-income or poor neighborhoods, little or no diagnoses of mobility needs of the poor were conducted to inform the projects' design. In Cali and Lima, low-income and poor people who live near the BRT routes still use the traditional bus system more than they do the BRT system, suggesting that while the BRT systems served some of their mobility needs, the traditional systems, which have different fares and service characteristics, are still meeting a greater portion of these needs. In Lima, the most often-cited barrier to using the BRT system or its feeders was a lack of service to their destinations, indicating a need for deeper analysis of mobility patterns in order to achieve pro-poor objectives. In Cali, a growing share of the poor are using the BRT system; however, poor service quality in comparison to the traditional bus service was the top stated reason for not using the system among non-BRT users from lower socio-economic strata who live near the service, indicating room for improvement of system characteristics with respect to pro-poor objectives. The evaluation also identified gaps in coverage of the BRT system feeders, particularly where buses cannot reach into steep hilly areas.

In addition, the widespread policy in LAC countries that BRT systems are financially self-sustaining, combined with a flat fare structure, implies that, at least for shorter trips, the fares may be less affordable than traditional buses with distance-based tariffs (Lima). However, for longer trips with multiple transfers, the integrated flat tariff (providing free or reduced priced transfers) increases affordability. The evaluation found that in Cali the BRT was in fact slightly more affordable than the traditional sector, while in Lima the monetary cost per trip in the traditional bus sector was lower. Subsidies provided through vouchers to the poor are more efficient than those targeted at fares generally; however, lower fares may serve also to promote usage by all user groups and encourage more environmentally sustainable mode choices among non-captive public transit users. Another argument for subsidizing BRT systems is their public benefits in reduced pollution and congestion and the need to counter-balance implicit subsidies toward non-sustainable forms of passenger transport such as private automobiles.

Weakness in the design and implementation of complementary measures to support the infrastructure investments– such as public-private partnership (PPP) contracts pedestrian planning, and bus scrapping programs –presented risks that were realized to varying extents in each of the cases and that hampered the achievement of expected project benefits. These project components could have benefited from increased Bank involvement and support during design, implementation and operational phases. Although some land developments around the corridors were realized, none of the projects included transit-oriented development (TOD) strategies in their design. While these components could increase project complexity and require increased inter-institutional coordination, they could not only support increased ridership over time, but also potentially enhance revenue through innovative financing schemes such as land value capture.

The implementation of the urban transport projects required coordination and buy-in among numerous institutions and stakeholders, and were influenced by a myriad of factors including the project design, and institutional, policy, and political-economy contexts.

Achievement of environmental objectives was hindered by slow implementation of programs to scrap polluting buses, incomplete reforms of the bus sector, lower-than-expected ridership, and increasing private vehicle ownership.

Lima's fuels and vehicle choices benefited from a Bank-supported technical cooperation, enabling substantial corridor-level emissions reductions. However, numerous old polluting buses remain in operation in the initial years of the program. In Cali, while the large scale of the project implied the greatest emissions benefits, the resurgence of informal buses could threaten to dampen these emissions benefits. Finally, in Montevideo, failed dialogue with bus companies thwarted the planned bus fleet modernization, and poor intersection engineering has resulted in reduced operational efficiency and little to no reduction in emissions.

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 of scale and quality, and the significant public benefits such systems can bring when well designed, implemented and maintained, calls for a reexamination of assumptions of cost recovery and consideration of operational subsidies.

suggestions

OVE makes several suggestions for future Bank-supported urban transport projects centered on BRT systems.

1. The Bank should support municipalities in choosing appropriate corridors for BRT systems.

   - Corridors with low demand and congestion stand to benefit little from an exclusive dedicated busway, particularly absent the implementation of other necessary reforms in support of the system such as government supported land use policies that would shape land use around corridors to increase demand (such as in the case of Curitiba). BRT corridors should be selected based upon three basic criteria: (i) high public transit demand, (ii) ability to connect major activity centers to support the demand, and (iii) existing or predicted near-term levels of congestion that create significant bus service delays. The Bank should continue its efforts through TCs or other mechanisms to support the development of urban transport plans, ideally in coordination with land use planning, to inform corridor choices.

   - When considering pilot BRT systems on relatively minor corridors (in terms of demand and levels of congestion), the risk of negative impacts during construction should be carefully weighed against the likelihood that other institutional reforms that are necessary for bus system improvements will be implemented. Corridors lacking congestion should be avoided altogether and may be better candidates for other bus system improvement measures (e.g. improving stop spacing, bus arrival information systems, providing signal priority at intersections, among others). This requires generating buy-in on the part of key stakeholders, especially the bus consortia, through early and ongoing dialogue.

2. The Bank should offer increased support and technical assistance during loan preparation and implementation for the necessary complementary reforms (e.g. route-restructuring, station designs, fleet modernization, inter-modal integration, institutional frameworks, PPP arrangements among others) and engage in dialogue to foster sustained and strong political buy-in of key stakeholders early on.

    - During project preparation, design and implementation, the Bank should take steps to improve the likelihood that local governments will implement important supporting measures based upon sound technical analyses and best practice guidelines, providing incentives and possibly conditions on loan disbursements for critical components. Although difficult to legally enforce, conditions can serve as points of discussion during supervision missions. Agreement can be fostered through dialogue with the client that engenders mutual understanding of the importance of such measures for project success. In addition, the Bank should promote a dialogue among key stakeholders- such as the executing agencies and incumbent bus operators- to help garner consensus on needed sector reforms.

    - PPP models have been widely utilized in LAC, with varying success in terms of bus service quality and financial sustainability, calling for a re-examination of the PPP model and possibly increased government participation. Where a PPP model is utilized, project teams should provide technical assistance that includes analyses of the risk of demand shortfalls and mitigation measures and the inclusion of well aligned incentives between governing entities and private bus operators to provide ongoing high-quality bus service, possibly in collaboration with the Bank's private sector arms. PPP contracts should be flexible enough to allow necessary adjustments to changing conditions that might affect service after operations begin.

    - The Bank should provide increased assistance for cost-effectiveness and alternatives analyses of fuels and bus technologies (as in Lima). This support should give careful consideration to the design of compensation schemes and economic incentives for fleet renewal (to facilitate vehicle scrapping and to spur bus companies to invest in low-emissions vehicles).

    - The design (size, layout, and access and egress points) and placement of stations should be adequate to handle peak passenger flows; provide a comfortable, weather-protected environment for passengers; allow level boarding; and enable efficient bus flows. This requires adequate demand forecasts at the station level and well-designed pedestrian planning to support a rational distribution of the passengers among and within stations. Stations should also provide adequate, clear, and accessible user information on bus routes and arrival times that is legible to all user groups. Stations and the system as a whole should be designed to integrate well with other environmentally sustainable modes and existing public transit systems. Implementing off-board fare payment systems with sufficient, well-placed kiosks for recharging cards is important to reducing delays associated with passengers boarding, station congestion, fare revenue loss, and passenger delays due to long lines to charge fare cards.

    - Projects should include robust institutional and technical capacity-building components that are protected from potential infrastructure cost over-runs and that increase executing agencies' ability to effectively oversee, manage, and update route planning over time in response to changing demand patterns. In addition, clients may benefit from more technical advice in the initial BRT operational phase with issues such as scheduling, bus operations, and over-crowding.

3. Given the two-way interaction between transport supply and land development, urban planning should be carried out in an integrated manner and involve inter-institutional coordination between both transportation and planning agencies. To this end, the Bank should support ridership and access to stations by environmentally sustainable modes, and work to integrate BRT systems with land use planning, such as through transit-oriented development (TOD), especially in medium-sized and growing cities. This could be fostered through increased collaboration between the urban development and transport divisions of the bank, technical assistance and grants for transit-oriented land use planning around corridors (including zoning and design of incentives to increase density and mixed uses), and a long-term programmatic approach in cities.

4. Urban transport projects should incorporate components for well-designed pedestrian and bikeway facilities connecting to BRT and mass transit systems. Systems should be integrated with surrounding public transit modes (e.g. restructured route systems) as well as non-motorized modes. Pedestrian facilities should be planned to enable safe and comfortable access to and around stations for all user groups, including the disabled, elderly, and children. In particular, studies of high-demand areas for pedestrian crossings should be conducted to avoid unintended barrier effects created by the busway. Bikeway facilities that are part of an inter-connected network are more likely to be utilized than those that are fragmented.

5. The inclusion of objectives and specific components to improve access and mobility for the poor in the Bank's urban transportation programs is essential to the Bank's mission of economic development and poverty reduction. To this end, the Bank should deepen its diagnosis of mobility needs of low-income populations to inform project design, including analyses of issues around access, spatial mismatches between skill-appropriate jobs and housing, travel patterns, and affordability. This is relevant both from a safeguards point of view –projects that seek to radically reform the informal bus sector should be careful to avoid unintended negative impacts on mobility for the poor– and for projects with explicit objectives of improving transit for the poor. To improve mitigation measures for displaced bus drivers, the Bank should enhance social safeguards components and protect their funding from potential infrastructure cost overruns.

6. The Bank should support LAC governments in considering whether to subsidize BRT system operational costs and the use of innovative financing mechanisms to ensure long-run financial sustainability and affordability.

    - Such subsidies can be efficient and welfare-enhancing when designed to provide incentives for high-quality service (i.e., targeted subsidies conditioned on service quality measures). To improve affordability for the poor, targeted vouchers may be more effective, however, lower fares may serve also to promote usage by all user groups and encourage more environmentally sustainable mode choices among non-captive public transit users.

    - Land value capture mechanisms, while requiring inter-institutional coordination, could be a significant source of revenue under specific conditions –e.g. land value increases resulting from transit investments and well-designed tax and levy instruments -and has the potential to significantly improve the long-term financial sustainability of urban transportation projects. Payroll taxes earmarked for transit (as used in France), are another public transit finance mechanism that could be considered.

7. As complements to BRT systems, future urban transport projects, should seek to integrate other innovative public transit reforms that incorporate incumbent private bus operators (e.g., colectivos, mini-vans, paratransit). Such operators have traditionally filled the gaps in centrally planned public transport systems, and/or in a context of deregulation, offering flexible and demand-responsive services, but often with several negative side effects such as pollution, high accident rates, or gaps in coverage. Appropriate strategies could include regulatory reforms to mitigate these negative effects (e.g., emissions control standards, safety and vehicle standards) while harnessing and improving the mobility benefits. Traditional colectivos that operate informally and according to demand (formally known as paratransit) can fill an important role in cities' peripheral areas, serving as both feeders to BRT systems along high-demand corridors and complementary services in lower-demand corridors; they should be integrated in such reforms rather than treated solely as threats to viability. The use of modern ITS technology (e.g. GPS, Internet, and mobile phones) makes possible innovative business and regulatory models in which oversupply and aggressive driving behaviors could be monitored and controlled. This might be implemented in collaboration with the Bank's private sector windows.

IDB Urban Transport Portfolio Analysis

The IDB's support for transport projects in urban areas has grown rapidly in recent years, with annual lending volume and the number of projects growing in absolute terms, and as a percentage of the transport-sector lending portfolio (Figure X1). Average annual urban transport lending between 2000 and 2004 was US$ 56.5 million, 16.5% of the transport sector portfolio, while for the period 2009-2013, average annual lending was US$ 653.3 million, and represented 33.2% of transport lending. The Bank also finances important improvements to urban infrastructure, including local roads and pedestrian facilities, within loans for neighborhood upgrading or broader urban development projects. Of all urban development projects in the past 15 years (2000-2014), 49% have included improving transport infrastructure as one of their components or activities.

OVE identified 83 loans approved between 2000 and 2014 with urban transport components, managed within the urban development division (IFD/FMM, 46 loans), the transport division (INE/TSP, 32 loans), and the structured corporate finance window (SCF/SCF, 5 loans). Among the urban transport related loans from IFD/FMM, 87% are related to the development of pedestrian and bicycle facilities, local roads and streetscape upgrades. On the other hand, 78% of the loans approved and managed by INE/TSP or SCF/SCF are mass transit projects, which in most cases also include improvements for local streets, pedestrian and bicycle infrastructure, and institutional strengthening for transportation planning agencies.

Supporting the trend that made Latin America the region with fastest adoption of BRT system, most of IDBs support for mass transit transportation has focused on this technology. During the period analyzed (2000-2014), IDB approved 35 loans for mass transit projects, of which 17 (49%) where for building or supporting BRT systems. Following BRTs, IDB has also approved loans for integrated public transport systems (9 loans, 26%), metros (6 loans, 17%), and improvements to conventional buses (3 loans, 9%). IDB has financed the construction of BRT systems in 11 different cities, 5 cities in Brazil and 1 each in El Salvador, Honduras, Colombia, Peru, Paraguay, and Uruguay. The lending amount for BRT projects ranges from US$ 16 million to US$ 200 million, with an average amount of US$ 85.5 million. In terms of cities, there is a wide range, going from small like Blumenau and Cascavel in Brazil (334,000 and 309,000 inhabitants respectively), to Lima, with 8.7 million inhabitants. The median for city size is 2.4 million inhabitants. Finally, IDB has also approved technical cooperation grants to support the planning and development of BRT systems in 7 other cities.

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