Facilitating, Enabling, and Triggering Sectoral Transitions: South Africa

Case Study 14. Public Transport in South Africa

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Context

The development objectives for public transport projects include improving efficient mobility and inclusive access to jobs, services, and socioeconomic opportunities, while also minimizing negative externalities such as local and global emissions, traffic injuries, and fatalities. To this end, many cities are implementing mass transit solutions, including BRT, which integrates dedicated road infrastructure, specialized vehicles and stations, advanced payment and management systems, and other features to maximize the efficiency, attractiveness, and sustainability of bus services. The main challenges include traffic congestion, a lack of priority for public and nonmotorized transport, maintaining affordable fares while minimizing public subsidies, and market failures leading to poor operating and maintenance practices, underinvestment, and poor performance in the sector.

Residents of South Africa's large cities, particularly the poor, suffer from long commutes and large spatial mismatches between jobs and housing as a legacy of apartheid. About two-thirds of public transport trips in South African cities are by paratransit by minibuses, the predominant transport mode for the working classes due to their affordability and ubiquity. Paratransit is usually a demand-responsive, self-organized service by an association of vehicle owners that contract drivers on a daily revenue target system and respond quickly to urban growth. Paratransit business models and relatively weak regulation enforcement contribute to cut-throat competition, reckless driving behaviors, and poor-quality vehicles, which in turn lead to excessive emissions and other negative impacts.

Policy

In 2007, the South African government approved a BRT strategy for its major cities in preparation for the 2010 World Cup. By 2014, the national government was spending R5.5 billion (around $500 million) annually on planning, building, and operating BRTs, and subnational governments were responsible for operating costs (Department of Transport 2022). Over 100 kilometers of dedicated bus lanes were operating in cities including Johannesburg, Cape Town, and Tshwane, and dozens of bus routes transported tens of thousands of persons per day. But the financial sustainability of these systems was a concern, as fare revenues relative to operating costs were lower than expected. Poor access and a lack of integration meant that many potential BRT users

were unable to conveniently reach access points or their final destinations, and they walked or continued to use paratransit. Travel patterns with large tidal movements in peak hours, and low ridership in off-peak and the counter-peak direction also hampered the efficiency and sustainability of BRT systems, affecting ridership and increasing the need for public subsidy.

By 2014, the government recognized the need to improve BRT systems, including by extending their reach and access by connecting them to bus and paratransit services. The Department of Transport launched its Integrated Public Transport Network (IPTN) strategy in 13 cities. As part of this strategy, the city of Cape Town wanted to test the levers available to create a better service for users and a more sustainable business model for operators, while reducing externalities for society by incorporating paratransit to its IPTN. With these goals in mind, in 2017, the city launched a minibus taxi transformation pilot project in Mitchell's Plain, a densely populated township situated 27 kilometers from Cape Town's central business district. The pilot included five operating routes providing a scheduled paratransit feeder service connecting Tafelsig, a local suburb of Mitchell's Plain, and the Mitchell's Plain transport hub. The pilot focused on measures to improve business and operational efficiency, including pooling vehicles with centralized dispatch, centralized revenue and cost management, vehicle tracking and fleet management systems, introducing service headways, replacing drivers' daily revenue targets with monthly salaries, and an accounting system. The pilot did not include any public investment in vehicles or companies; rather, it was supported by business and consulting services facilitated by the city.

Results and Impacts

South Africa's transport sector contributes 12 to 15 percent of the country's total GHG emissions and is one of the fastest-growing sectors due to growing private motorization. The National Green Transport Strategy for South Africa (Department of Transport 2018) established several goals for 2030, including a 20 percent relative shift from private motorized transport to public transport; converting at least 10 percent of buses and minibuses to CNG, petrol, or EVs; and significantly expanding BRT systems in large cities while ensuring the security, reliability, and frequency of services. BRT systems operating in cities around the world have demonstrated the ability to reduce emissions by moving massive numbers of people more efficiently, attracting passengers from more polluting private motorized transport modes, and supporting compact urban development. The Johannesburg Rea Vaya BRT system was estimated to reduce public transport emissions by 69 percent (around 400 $ktCO_2e$ for 2011–21 for Phases 1A and 1B) through mode switching and improved efficiency of new and larger Euro IV buses. The Durban BRT system shows similar GHG emission potential reductions of 60 percent by inducing a shift to cleaner vehicles (principally Euro V BRT buses and minibuses) and more efficient operations (Gopaul, Friedrich, and Stretch 2019).

The Cape Town pilot shows that it is possible to achieve better services and reduce fuel consumption and emissions through improved business practices, operations, and labor and vehicle efficiency at negligible cost and without losing jobs. This is a triple win: for users, operators, and society. This small-scale pilot showed impressive results in terms of service quality, reliability, and emissions. First, it rationalized the fleet size from 78 minibuses to 40 well-maintained vehicles (including three spares) while expanding service coverage from three to five licensed routes. Second, it improved employment conditions for drivers, moving from an average work pattern of 12-hour days in a 7-day week to 7.5-hour days with scheduled breaks and one day off in a 7-day cycle. Third, it reduced fuel consumption and associated emissions by 45 percent by transporting the same volume of passengers with fewer vehicle kilometers. A before-and-after passenger survey showed improvements in overall passenger satisfaction, waiting times, pick-up/drop-off locations, fares, crew conduct, vehicle comfort, road safety, and personal security.

The benefits of paratransit transformation projects and related sector reforms can be replicated in other cities and greatly expanded by including fleet renewal mechanisms and EVs. This will require greater public investment, as well as enabling private finance and fiscal incentives to support a green transition. Scalability also requires attention to the paratransit market structure, route lengths, travel behaviors, and competition with other operators. The World Bank is currently helping the South African government to analyze the technical, financial, and institutional feasibility of scaling up such policies and the possibility of creating a national program or financial facility to support fleet renewal, including EVs and other emerging vehicle technologies. The World Bank's South Africa Country Climate and Development Report estimates that electrifying 5 percent of South Africa's 412,000 public transport vehicles by 2030 would cost $2.8 billion and create some 58,000 new jobs (World Bank 2022l).

Key Takeaways

Improving public transport infrastructure and services is important, not only for equitable access to economic opportunities, but also as a pathway to decarbonize urban mobility. This is consistent with an avoid-shift-improve strategy (World Bank 2021e) that supports compact urban development patterns by reducing the need for private vehicles, shifting passengers away from more polluting motorized modes, and improving operations and technologies (World Bank 2021a). As the South Africa case shows, a comprehensive strategy should include mass transit investments supported by sector reforms and efficient regulations to create IPTNs and continuous improvement of existing operators with better business practices and technologies. Studies show that optimizing public transport planning and operations with the user in mind is as important as vehicle propulsion technology to achieving reduced emissions and other development objectives.

More than 3 million public transport and paratransit vehicles operate in Sub-Saharan Africa alone, from full-size buses to minivans and moto-taxis. If countries can modernize a share of these vehicles and improve their business practices, as shown by the Cape Town pilot, there is great potential for positive climate and development impacts. Investing in cleaner public transport fleets, improving paratransit operations, and supporting other sustainable urban mobility policies can help contain or reduce emissions while providing better services to users.