Sustainable Transport in Colombia: Bogotá and the *Transmilenio*

In 2009, transport was responsible for 23 per cent of global CO_2 emissions (IEA 2011) and more than 80 per cent of estimated growth in transport emissions is predicted to come from road transport in developing countries (IEA 2009). Sustainable transport therefore has to be a key component of low carbon development strategies in developing countries. In Latin America, a number of countries have demonstrated (rhetorical) commitment to addressing this challenge, through

adopting the Bogatá Declaration on Sustainable Transport Objectives (see Box 1). In Bogotá the *Transmilenio* Bus Rapid Transit (BRT) system has been accredited with reducing the level of carbon emissions which derive from transport. It has provided jobs, improved access and mobility across the city, and structured ticket fares in a pro-poor fashion. However, affordability still remains an issue and it is not clear whether the infrastructure will withstand future climate impacts.

Bus Rapid Transit systems should...

- be developed in a way that ensures they are inclusive *and* affordable. *Transmilenio* runs free feeder buses from low-income communities at the outskirts of the city that are yet to be incorporated into the main system. A uniform ticket price ensures that poorer communities located further from the city centre are not penalised with higher costs.
- incorporate sympathetic and well-planned transitions between one system and another. Furthermore, if possible, employees and bus companies being phased out should be integrated into the new system in order to protect jobs and enhance legitimacy.

- be climate-proofed. If BRT systems are developed using probabilistic ensembles of climate projections, they offer city planners an opportunity to undertake development that addresses anti-poverty, low carbon *and* climate resilient objectives.
- be supported through the Clean Development Mechanism (CDM). *Transmilenio* and other BRT systems, such as *Metrobus* in Mexico City, are being funded through the UNFCCC compliance market. BRT projects offer an opportunity for donors to acquire certified emissions reductions (CERs), whilst effectively contributing to sustainable development in host countries.

Learning lessons from Bogotá's *Transmilenio*

1 BRT systems can significantly reduce emissions of greenhouse gases and other pollutants, contributing to a healthier and more sustainable city

By reducing private vehicle use, introducing advanced bus technology, and increasing efficiency, *Transmilenio* has helped the city of Bogotá cut carbon emissions, whilst substantially improving the city's transport system.

2 *Transmilenio* has substantially cut journey times across the city and at a relatively low cost

Dedicated lanes and efficient coordination, which characterise the BRT system, has dramatically improved mobility across the city. Moreover, though the system required significant investment, improvements in mobility were achieved at a price much lower than what it would have cost to develop an underground metro network.

3 Issues surrounding political economy can stall progress and impact upon the affordability of bus fares

In the case of Bogotá, political alliances which existed prior to the introduction of the new bus network made the process of reducing and regulating the number of non-BRT buses very difficult. This failure has contributed to a rise in bus fares and is undermining *Transmilenio's* ability to cater for low-income citizens. It is this which has the biggest adverse implications for the adaptation benefits – both in poverty reduction and climate-proofing terms – that schemes like the BRT can yield.

The evolution of Bogotá's BRT

The capital city of Colombia, Bogotá, has a population of around 7 million and has suffered at the hands of an inefficient and congested transport system. This system was based upon private motorised transport and a large collection of uncoordinated and competing bus companies. In an attempt to rectify this issue, city planners introduced a Bus Rapid Transit (BRT) system. The *Transmilenio* was established in 2000 and sought to address issues of road safety, pollution, public transport inefficiency, and sustainability. The BRT system is characterised by large capacity buses, dedicated lanes and raised stations that enable fast boarding and pre-board ticketing. Its integrated ticketing system enables free transfers, and buses are linked via a global positioning system, allowing them to be coordinated centrally. The introduction of the BRT system was coupled with a scrappage programme aimed at reducing the traditional network of private bus companies. Once complete, the *Transmilenio* will be comprised of 350km of dedicated bus lanes. The system operates as a public-private partnership; private companies run the bus fleet and ticketing system, whilst the public sector maintains and develops the accompanying infrastructure required.

Phase I of the *Transmilenio* was funded by the public sector; however, due to the reduction of greenhouse gas emissions associated with the development, phases II–IV are being funded by the Dutch government through the Kyoto Protocol's Clean Development Mechanism (CDM) (GTZ 2007). After only two years of operation, **traffic collisions and pedestrian accidents along the main corridor decreased by 94 per cent**. In the same period, **road related fatalities also decreased by 94 per cent** (Echeverry *et al*. 2005). The service has significantly reduced travel time across the city and is said to be used by all sections of Bogotá society (*ibid*.). *Transmilenio* has upgraded city-wide transport significantly and cost substantially less than the development of an underground metro system. However, one of the central issues associated with the BRT service has been its popularity; the overcrowding of the service during peak times has been noted as a key concern, despite the fact that extra buses run during these hours (Gilbert 2008).

The introduction of the BRT system was part of a wider urban development project, started by ex-mayor Enrique

The Bogatá Declaration on Sustainable Transport Objectives

In 2011, ten Latin American countries signed the Bogatá Declaration on Sustainable Transport Objectives (BDSTO), which outlines strategies that seek to advance efficient and environmentally sustainable transport systems that benefit all.

Key strategies include:

the promotion of and investment in inter-urban transport systems as alternatives to cars and flight;

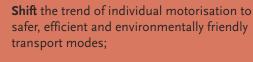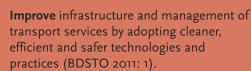the promotion and preservation of cycle and pedestrian infrastructure, and;

greater investment in public transport infrastructure.

The slogan '*avoid, shift and improve*' summarises the declaration's intent.

Avoid unnecessary travel by motor vehicles;

Shift the trend of individual motorisation to safer, efficient and environmentally friendly transport modes;

Improve infrastructure and management of transport services by adopting cleaner, efficient and safer technologies and practices (BDSTO 2011: 1).

The BDSTO makes recommendations, which, if followed through, could lead to examples of low carbon, climate resilient development. Through the provision of efficient, affordable low carbon transport, developing nations can reduce significant proportions of greenhouse gases (GHGs), helping to mitigate the effects of climate change. Also, ensuring that new transport infrastructure is developed in a way that considers the possible effects of future climate shocks can improve the resilience of societies, contributing to adaptation.

Peñalosa, who sought to radically alter the image of the city through the development of public spaces, pedestrianised zones, cycle paths and the *Transmilenio*. In his eyes, these developments acted as 'social equalizers' providing low-income groups, who were unable to afford private motorised vehicles, with better transport links and free leisure facilities (Cervero 2005). Peñalosa initiated a new policy narrative whereby urban development was conceptualised as a way of developing a more integrated, egalitarian and sustainable city – a narrative that sought to reconfigure the relationship

between people and 'public space'. Large investment in infrastructure for non-motorised and public transport was justified on account of its impact upon equality. Inclusive investments for all, such as cycle lanes, pedestrian highways and the BRT system, demonstrated a commitment to the public good over private ownership. Likewise, actions such as: the removal of cars from sidewalks, car-free Sundays and establishing a highway solely for *Transmilenio*, exhibited consideration to those on low incomes who do not benefit from investment in motorised transport infrastructure. The theme of equality was a key driver in the development of Bogotá's cycle paths, known as *ciclorrutas*. *Ciclorrutas* were deliberately designed to run through low-income and wealthy areas in order to promote integration and a sense that all citizens had an equal stake in city-wide development. Peñalosa's policy narrative sought to engage with broader notions of wellbeing, placing a greater emphasis upon non-material assets with the aim of improving the quality of life of all Bogotá's citizens.

Bogotá's *Transmilenio* in action

Looking at *Transmilenio* from an LCCRD perspective

The provision of Bogotá's BRT system has contributed to a significant reduction of CO_2 emissions, and therefore its development is proven to assist with climate change mitigation efforts. By replacing the uncoordinated network of small and antiquated buses with larger, more modern models with improved fuel efficiency, per passenger emissions are being reduced. Moreover, through the provision of a more reliable and comfortable service, *Transmilenio* is also helping to deter journeys undertaken in private motorised vehicles, which have higher emission rates per person. By 2012 it is estimated that around 3.8 million tonnes of CO_2 equivalent will have been avoided based upon a baseline scenario (GTZ 2007). It has also been asserted that the service contributes to a 14 per cent drop in emissions per passenger (Rogat *et al*. 2009).

This success in reducing emissions demonstrates the potential for BRT systems to contribute to the necessary transition towards a 'green economy'. However, to what extent can *Transmilenio* claim to have assisted in the task of reducing poverty? One way in which the system caters for low-income groups is the structure of its ticket prices; all journeys aboard the *Transmilenio* cost the same. This can be seen as pro-poor owing to the fact that many of those from low-income backgrounds reside in settlements at the outskirts of the city. A uniform ticket price ensures that those who need to use the service over a greater distance are not required to pay more. Furthermore, *Transmilenio* includes a free feeder bus service which runs from the more remote and often less affluent areas that are yet to be integrated into the BRT network. The

development of Bogotá's BRT system has also created jobs for the city. Phases II–VI (2006–12) has been accredited with establishing 1,500 unskilled labour positions (GTZ 2007). In addition to this, **the BRT has improved transport links from poorer communities**; under the former system, bus companies did not provide a sufficient service to poorer districts during evening hours.

The affordability of public transport is integral to creating an inclusive transport system that benefits all. However, in recent years concerns have been raised about the ascent of *Transmilenio's* ticket prices in relation to wages. This is a core concern for two reasons:

1 Affordable public transport is essential if poor urban residents, often living in informal settlements, are to be able to take advantage of a wider range of economic opportunities across their city (Satterthwaite 2011).

2 Part of tackling emissions in developing countries is to provide strong incentives to choose public transport over private vehicles: in many ways this is an adaptation required for mitigation purposes.

Therefore, if price limits uptake of public transport, both adaptation and mitigation objectives may be compromised, even though the potential for achieving both is palpable in schemes like the BRT.

A key explanation for this stems from problems which arose with the scrappage programme. During phase I, new bus companies operating under *Transmilenio* were required to buy 2.7 old buses for every new bus they wanted to run. This scheme appeared to work well. However, in phase II the requirement was increased to 7.7 buses for every new bus. By this point, old bus

operators realised they possessed financial assets and began demanding more money (Gilbert 2008). On top of this, the scrapping process was undertaken by one company who lacked the capacity to deal with the number of buses being scrapped. City authorities, intent on overhauling the old system, also wanted to scrap old bus routes. This resulted in strikes called by the Association of Small Transporters. Subsequent negotiations resulted in the creation of a fund to compensate traditional bus operators, to be levied from the profits of bus companies. However, very few companies ever contributed to this fund (*ibid*.). In addition to this, illegal bus companies continued to operate as part of the old system with some undercutting ticket prices available on the BRT.

The transport sector in Bogotá has long since wielded notable power within the city; political campaigns of different parties have been supported by bus operators and this has awarded companies with significant influence over transport policies and city politics (*ibid*.). Opposition to the BRT system was reduced through efforts to integrate existing bus companies and employees into the new system; however, with so many independent companies operating, it was inevitable that not all could be incorporated. The failure to initiate a successful transition between the two systems, due to an ineffectual scrappage scheme, 'pirate' bus operators and the influence of bus companies in city politics, contributed to the rise in BRT ticket prices which has affected its ability to cater for those on low incomes.

The extent to which the BRT system contributes to climate resilience is questionable. Whilst the development of infrastructure is understood to contribute to a reduction of vulnerability to climate impacts, it is difficult to judge the extent to which *Transmilenio* directly, or indirectly, reduces vulnerability. Furthermore, there is no evidence that possible future climate impacts were taken into account when the service was being designed and developed. For these reasons, *Transmilenio* is most likely an example of low carbon development, rather than an example of a 'triple-win'.

Further reading

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Authorship

This *Case Study* was written by Guy Crawford, a Research Assistant at IDS. It complements the Tackling Poverty in a Changing Climate Learning Cycle of the Learning Hub. The opinions expressed are those of the author and do not necessarily reflect the views of IDS.

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