

A Sustainable Asset Valuation of the Sustainable Transport Strategy in Bogota

SUMMARY OF RESULTS

A Sustainable Asset Valuation of the Sustainable Transport Strategy in Bogota

Bogota is the capital and largest city in Colombia, home to a rapidly growing population of more than 8 million inhabitants. The city has an under-resourced public transportation network that has been unable to keep pace with urban population growth over the past few decades. Bogota experiences serious traffic congestion problems, long commuting times, high accident rates, and elevated levels of noise and air pollution. Currently, 13.4 million transport trips are made daily, amounting to more than 16 million trips if all municipalities in the city's metropolitan area are considered. Public transport accounts for 44.2% of trips, while private transport modes, including cars, motorcycles, and taxis, amount to 25.3% of trips. Active transport modes such as walking and cycling represent 24% and 6.5% of trips, respectively.

The city's over-reliance on private vehicles has resulted in economic inefficiencies due to worsened congestion, high greenhouse gas emissions, and raised pollution levels. It also reinforces unequal access to mobility as not every citizen can afford private transportation modes. Transforming the transport sector in Bogota is therefore critical in assessing these multiple challenges. The Sustainable Transport Strategy focuses on three main public transport systems in Bogota: the TransMilenio Bus Rapid Transit (BRT) system, non-motorized transport (NMT) infrastructure (which is currently operational and expanding in the city), and the Metro de Bogota mass rapid transit (MRT) system (which is currently under construction and is expected to be operational by 2028). The implementation and reorganization of these existing and future public transport systems have the potential to contribute to the economic, social, and environmental development of the City of Bogota. Examples include increased productivity, generating and improving access to employment opportunities, and reducing traffic congestion and greenhouse gas emissions while providing quality transit for disadvantaged public transportation users.

- **TransMilenio BRT system:** The TransMilenio BRT system is the main form of public transport in Bogota. Implemented in the late 1990s, it was initially one of the largest and most successful BRT systems in the world. The BRT system has 12 interconnected lines that usually run in dedicated lanes, totalling 112 kilometres. There are more than 3,500 buses in operation, providing services to 2.3 million people daily.

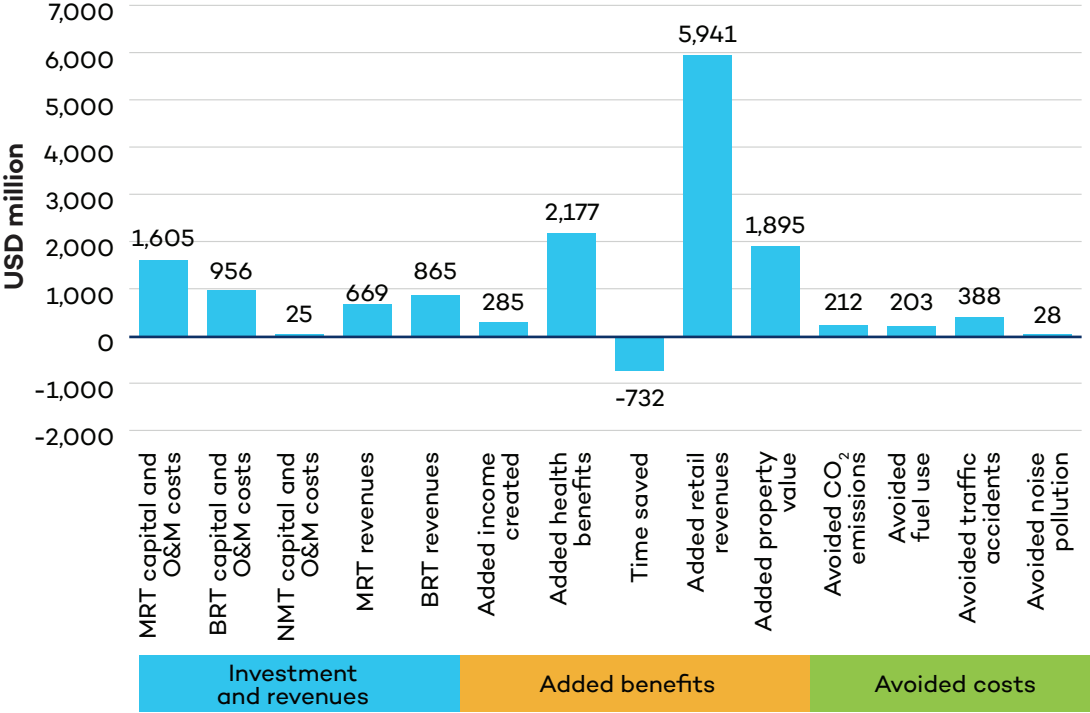
- **NMT infrastructure:** Since the late 1990s, the City of Bogota has constructed more than 600 kilometres of dedicated bicycle paths, known locally as “ciclorrutas,” which form part of an elaborate NMT network. The NMT network has contributed to a significant increase in daily cycling trips in Bogota, and it has led to positive environmental impacts, saving around 57,000 tonnes of CO₂ per year.
- **Metro de Bogota MRT system:** The Metro Line 1 of the Metro de Bogota MRT system, an elevated MRT line that will be fully automatic and driverless, is currently under construction. Upon completion, the MRT system will be the first modern metro system in Colombia, the main transit line for the public, and a major passenger transport system in the city, connecting Bogota’s city centre with the southern and northern districts. The MRT system is expected to accommodate 1.05 million passengers per day, covering a distance of almost 25 kilometres, with stations located within 1 kilometre of 80% of Bogota’s population by 2030. The total investment costs of the MRT system amount to USD 5 billion.

The Sustainable Asset Valuation (SAVi) methodology provides policy-makers and investors with a comprehensive analysis of the costs and benefits of infrastructure projects and strategies throughout their life cycles, considering a wide range of economic, social, and environmental risks and impacts that are overlooked in traditional valuations.

The SAVi assessment of the Sustainable Transport Strategy in Bogota shows that the public transport systems (BRT, NMT, and MRT) in Bogota can provide efficient, safe, and accessible modes of transportation that have positive economic and environmental impacts as well as social benefits to the city’s population.

This summary note presents the key results of the assessment of one of the sustainable transport scenarios. This scenario evaluates the wider impacts of three public transport systems: those currently in operation—the TransMilenio BRT system and the NMT—and the MRT system under construction. This combination of investments amounts to a cumulative net benefit (discounted) of COP 45,821 billion (USD 12,237 million). The technical report includes more background to these results, as well as sensitivity analyses for different added benefits and avoided costs.

Figure 1. Monetary values of investment costs, revenues, added benefits, and avoided costs of the Sustainable Transport Strategy in Bogota



Source: Authors' calculations.

The results of the assessment demonstrate that the three public transport systems result in economic growth for Bogota, either directly through increased revenues or employment creation or indirectly, through stimulating retail and property value increases. Moreover, the use of the public transport systems leads to significant health benefits for Bogota's residents by encouraging physical activity and reducing air pollution. Other indirect benefits include the reduction of CO₂ emissions and traffic accidents. The only negative values are found when looking at time saved, as increased cycling and walking to and from public transport stations leads to additional time spent commuting.

The greatest impact resulting from the Sustainable Transport Strategy in Bogota is the added benefit of increased retail revenues around public transport stations, amounting to cumulative discounted values of COP 29,124 billion (USD 5,941 million). The citizens of Bogota will spend additional time walking to and from public transport stations, which is associated with higher retail spending. In addition, public transport system use will lead to significant health benefits resulting from increased physical activity and reduced air pollution costs, both of which will ultimately lead to reduced mortality in the city. The cumulative added health benefits of the Sustainable Transport Strategy amount to COP 10,673 billion (USD 2,177 million). The public transport systems will also cause property values around stations to rise, showing a cumulative added benefit of COP 9,291 billion

(USD 1,895 million). However, higher real estate prices resulting from the public transport systems (and the MRT in particular) will possibly increase the cost of living in the city centre of Bogota and make properties less affordable.

Integrated valuations, such as this SAVi assessment, build a fuller picture of long-term effects than conventional benefit-cost ratio (BCR) assessments. A traditional BCR for this project considers only the tangible impacts (e.g., capital costs, operations and management costs, and MRT and BRT revenues) and amounts to a BCR of 0.6. However, SAVi’s sustainable BCR (S-BCR)—which draws on the full range of economic, social, and environmental added benefits and avoided costs—is higher, amounting to an S-BCR of 4.5.

Table 1. Net results of value-added benefits and avoided costs

		MRT 8%
Cumulative net benefits (undiscounted)	COP billion	235,748
Cumulative net benefits (discounted)	COP billion	45,821
Cumulative net benefits (discounted)	USD million	9.4
BCR		0.6
Sustainable BCR (S-BCR)		4.5

Source: Authors’ calculations.

Overall, the Sustainable Transport Strategy’s benefits outweigh the investment costs by 4.5 in the sustainable transport scenario that considers all three MRT, BRT, and NMT public transport systems. In addition, when only investment costs and revenues are considered in the analysis, the BCR amounts to 0.6, indicating the project is not economically viable. *When a wide range of tangible and intangible economic, social, and environmental impacts are valued, the benefits are approximately seven times higher.*

It is crucial that policy-makers design and implement processes that enable the recognition and accounting of these wider benefits so that decisions are made in favour of transport investments that provide the greatest benefits to society while minimizing their environmental impacts.



Why Use SAVi?

SAVi calculates the environmental, social, and economic risks and externalities that impact the financial performance of infrastructure projects. These variables are typically ignored in traditional financial analyses.

SAVi is a simulation tool that is customized to individual infrastructure projects. It is built on project finance and systems dynamics simulation.

Visit the SAVi webpage: iisd.org/savi

About SAVi

SAVi is a simulation service that helps governments and investors value the risks and externalities that affect the performance of infrastructure projects.

The distinctive features of SAVi are:

- **Valuation:** SAVi values, in financial terms, the material environmental, social, and economic risks and externalities of infrastructure projects. These variables are ignored in traditional financial analyses.
- **Simulation:** SAVi combines the results of systems thinking and system dynamics simulation with project finance modelling. We engage with asset owners to identify the risks material to their infrastructure projects and then design appropriate simulation scenarios.
- **Customization:** SAVi is customized to individual infrastructure projects.

iisd.org/savi