

A Sustainable Asset Valuation of a Bus Rapid Transit System in Bandung

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- The valuation of the wider economic, social, and environmental benefits of the bus rapid transit (BRT) system is what makes it an investment-worthy project. The benefit-cost ratio (BCR), including the wider benefits, ranges from USD 6 to 7 per dollar invested.
- The time savings represent the largest share of benefits of the BRT system. Integrating the value of time saved into the cost-benefit analysis shows the tremendous societal value of the project.

Bandung is West Java Province's capital city and Indonesia's third-largest city. It is located about 180 km southeast of Jakarta. The city covers an area of approximately 167 km² and has a density of 14,834 people per km². The city has a population of approximately 2.5 million people.

Motorcycles are the predominant mode of transportation in Bandung, accounting for around 75% of all personal movement in the main transport corridors and two thirds of all vehicle movement. Four-wheelers account for around 20% of trips, and public transportation, which consists of large bus services such as the TransMetro Bandung and DAMRI, accounts for only 5% of trips, even less outside these main corridors. The latter account for around 10% of public transit ridership.

Bandung has been facing significant urban mobility and transportation challenges, as it is constrained by a dense and congested urban road network that is over-reliant on individual motorized transportation modes, predominantly motorcycles. This unsustainable mobility pattern results in high traffic volumes and congestion, health and safety concerns, and CO₂ emissions. These problems are projected to worsen with climate change and continued urban development, which centres around private transportation modes.

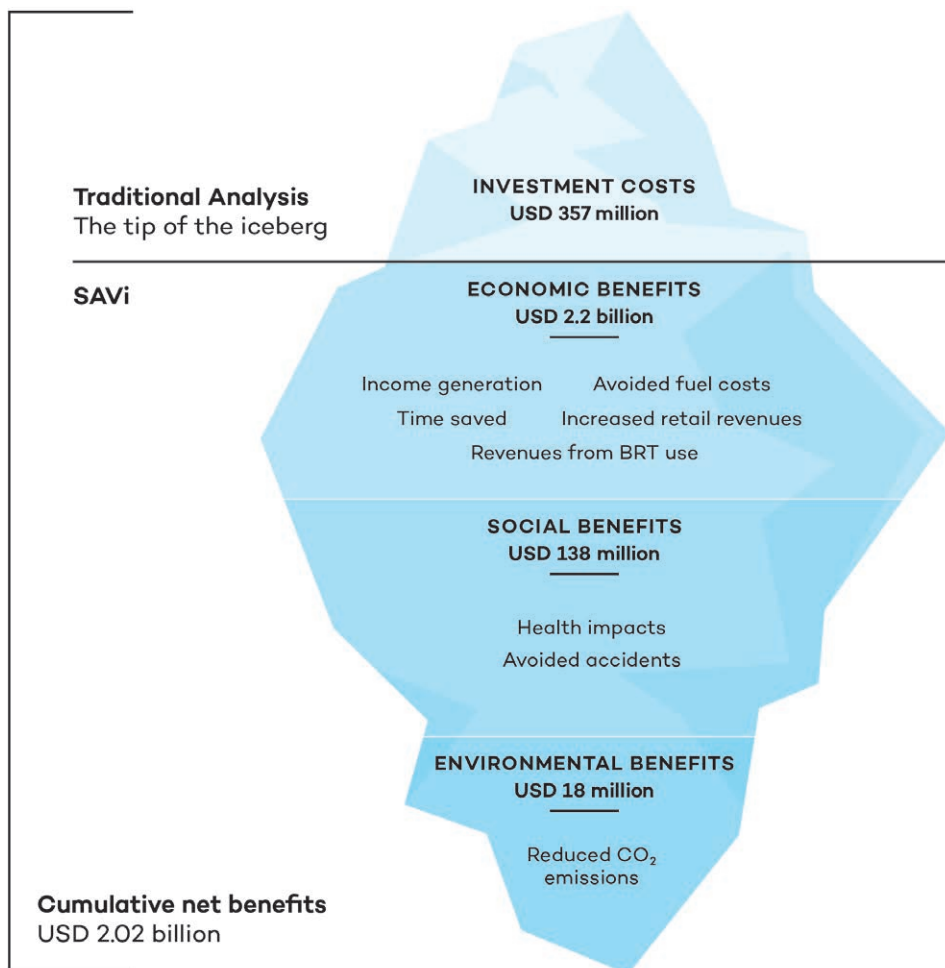
To address these challenges, Bandung City, together with the Indonesian Ministry of Transport and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), explored the option of a city-wide BRT system. The BRT could increase mobility options through public transportation and provide a safe and sustainable transportation mode for current and future users. A comprehensive BRT system could lead to a shift from individual motorized transportation modes to BRT and meet sustainable, low-carbon mobility targets. The BRT system's length is projected to be 27.4 km, and it is expected to transfer 204,000 passengers per day after its fourth year of operation in a fleet of 357 buses. The estimated cost of the BRT infrastructure is IDR 939.119 billion (USD 65.941 million).

The Sustainable Asset Valuation (SAVi) methodology provides governments and investors with a comprehensive analysis of the costs and benefits of their infrastructure project or policy intervention throughout its life cycle. It considers a wide range of

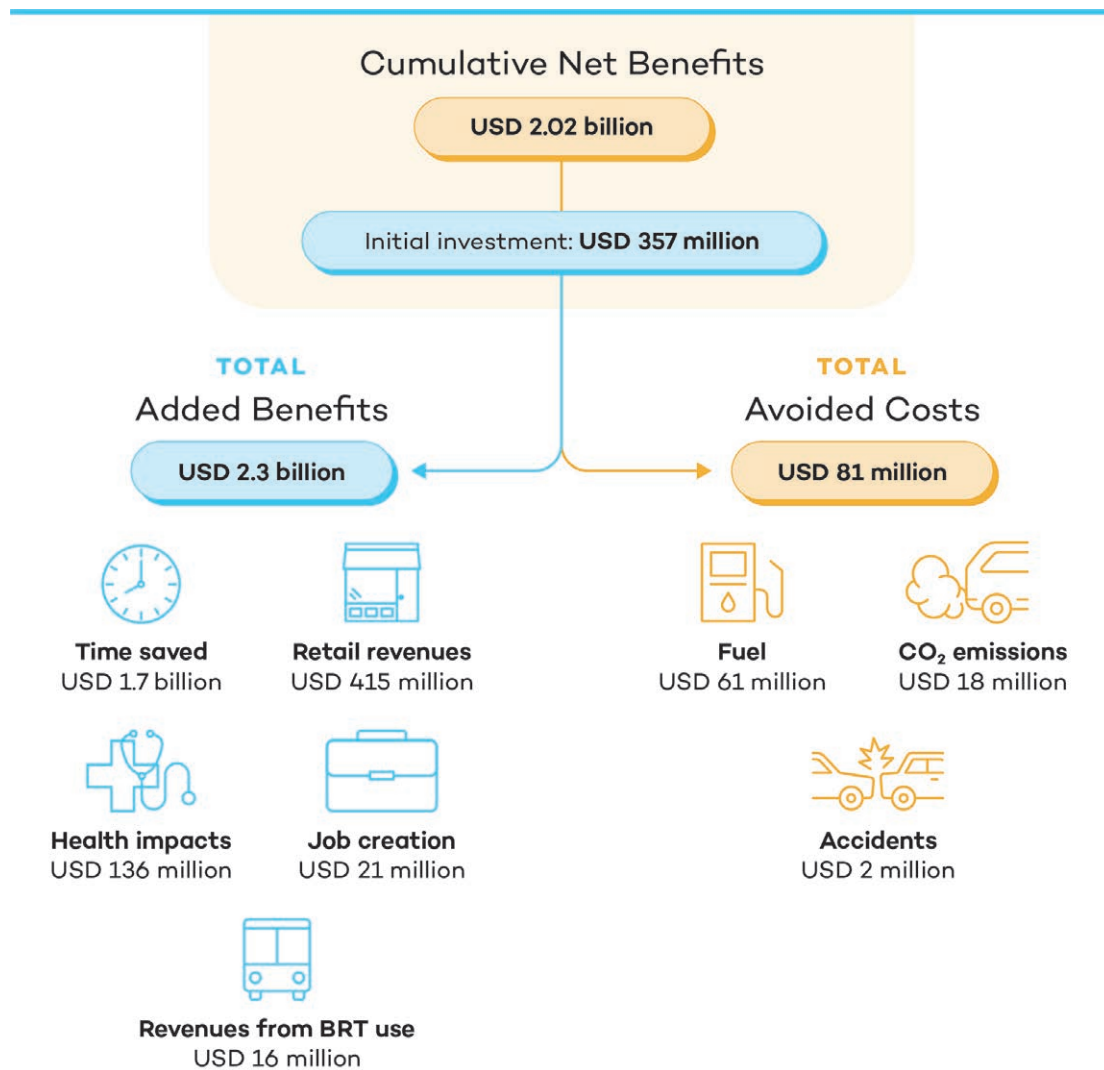
economic, social, and environmental risks and impacts, which are typically overlooked in traditional valuations, looking below the surface for the broader knock-on effects of implementing a transportation project.

This SAVi assessment shows that the proposed BRT system in Bandung would provide a more efficient, convenient, safe, and affordable transportation alternative while also delivering substantial monetary benefits. The [technical report](#) presents the results of a variety of scenarios, with a higher and lower range for the value of the various added benefits and avoided costs.

For this summary, we have presented our findings using the most conservative estimates. We found that the BRT system in Bandung would generate a cumulative discounted net benefit of IDR 31,181 billion (USD 2.02 billion), considering a project period of 28 years, from 2022 to 2050. When accounting for the full range of benefits for the city, the BRT system results in an integrated BCR of 6.67 per USD invested.

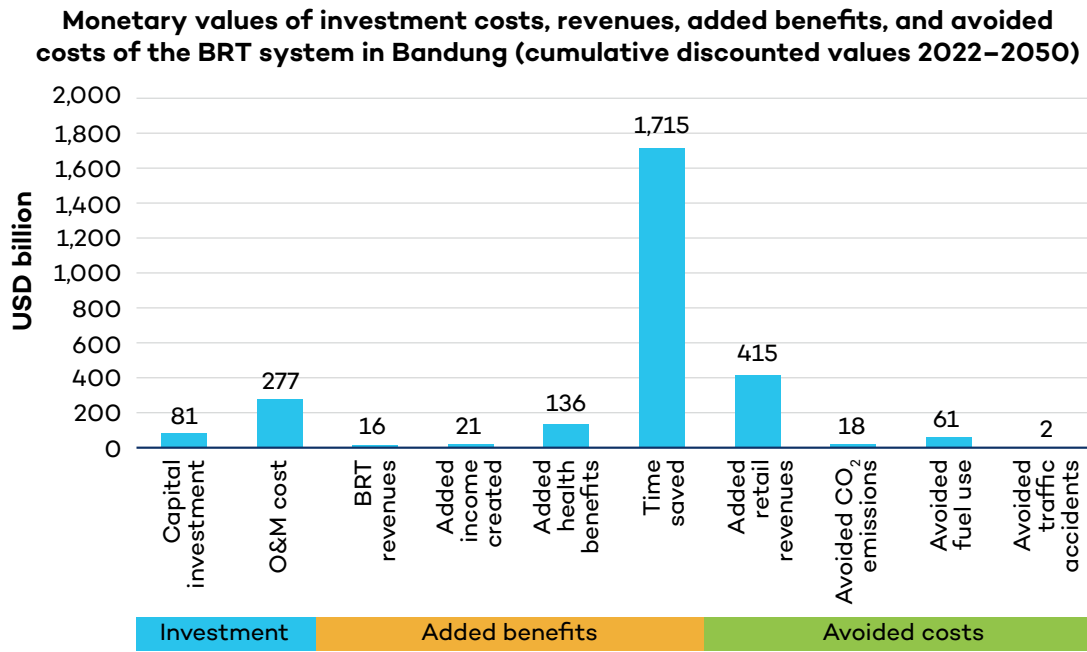


The BRT system in Bandung will produce significant economic, social, and environmental benefits that are typically overlooked in traditional infrastructure assessments, such as economic benefits related to the value of time saved, positive changes in retail revenues, and health benefits from increased physical activity and reduced levels of air pollution. The SAVi assessment also shows the resulting fuel use savings and CO₂ emissions reductions.



The greatest impact of the BRT system in Bandung is the **added benefit of time saved for transportation users through reduced traffic and congestion, valued at IDR 26,385 billion (USD 1.7 billion)**. Transport-related time savings increase economic productivity by allowing employees to work more hours and increase leisure time, which has a wide range of benefits, including health benefits and benefits to the local economy through higher retail revenues. There is also the **added benefit of increased retail revenues around BRT stations, which is valued at IDR 6,392 billion (USD 415 million)**. The citizens of Bandung will spend additional time walking to and from BRT stations, which is associated with higher retail spending. The proposed BRT system also has the potential to greatly improve public health. An added benefit of at least IDR 2,089 billion (USD 136 million) could be achieved through increased physical activity (and its associated health benefits) and the reduced health costs resulting from decreased air pollution, both of which will ultimately result in reduced mortality in the city's population. In addition, cumulatively over the project period, the BRT system will create 677 jobs; lead to 646 avoided traffic accidents, including 205 avoided fatalities; and reduce at least 1.2 million tonnes of CO₂ emissions into the atmosphere.

However, the BRT system’s operating and maintenance costs are also considerable, amounting to a cumulative value of IDR 4,257 billion (USD 277 million). Overall, the BRT system in Bandung is expected to revitalize Bandung’s economy in the form of time savings for transportation users and increased retail revenues for business owners. It will also deliver significant health benefits to Bandung’s citizens. All of these beneficial factors improve life in Bandung City and reduce road-related expenses.



Integrated valuations, such as this SAVi assessment, build a fuller picture of the long-term effects that the conventional BCR is unable to consider. A traditional BCR for this project that considers only the tangible impacts (e.g., capital costs, operating and maintenance (O&M) costs, BRT revenues, income creation from employment, and avoided costs of fuel use) amounts to 0.27 for every USD invested. This would therefore not be considered an investment-worthy project by traditional standards. However, the sustainable BCR (S-BCR), which considers the project from a societal point of view and is based on an estimate of the full range of economic, social, and environmental added benefits and avoided costs, amounts to 6.67, demonstrating the huge socio-economic value the BRT system would offer. The calculations of both BCRs are based on discounted values.

Cumulative net benefits (undiscounted)	53,201 (USD 3.45 billion)
Cumulative net benefits (discounted¹)	31,181 (USD 2.02 billion)
BCR	0.27
S-BCR	6.67

Overall, the project’s benefits outweigh the investment costs by almost seven times. This SAVi evaluation also demonstrates that advancing sustainable transportation investment options, such as the BRT system in Bandung, requires identifying, assessing, and valuing these societal benefits and avoided costs so that city planners and project developers can advocate for their implementation and financing.

¹ The process of converting a value received in a future time period to an equivalent value received today.

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 transportation investments, which provide the greatest benefits to society while minimizing their environmental impacts.

Read the full technical report of the SAVi assessment of the BRT in Bandung [here](#).



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.

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