

INNOVATIVE FUNDING MECHANISMS FOR PUBLIC TRANSPORT

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ABSTRACT

Public transport investment is expected to unlock economic benefits on the back of enhanced worker mobility and creating network capacity for urban development. However, the costs of these projects can be substantial and – in the context of South Africa – rely largely on national grant funding. This paper explores mechanisms for leveraging the benefits of public transport projects to unlock innovative funding sources and alleviate pressure on grant funding. Increased accessibility of land arising from public transport provision is capitalised into property value increments, which accrue to existing owners. Land value capture mechanisms seek to capture a share of this increment through partnership with the private sector. International and local examples demonstrate how land value capture instruments can offset some or all of the costs of public transport projects. Beyond land value capture, public transport is also eligible for climate change mitigation funding and financing on the grounds of its role in carbon emission reduction strategies. While the income from these funding initiatives is unlikely to replace the need for grant funding, it can alleviate pressure on the fiscus.

1. INTRODUCTION

1.1 Growing Need for Public Transport

Private vehicle use in South Africa is increasing rapidly, while scheduled public transport services are in decline: The vehicle population has increased by 40% from 9 million in 2010 to 12.7 million in 2019 (RTMC, 2010) (RTMC, 2021). In the meantime, Metrorail patronage has decreased 97% from over 54 million average monthly passenger trips in 2008/9 to 1.7 million trips in 2021/22, while bus mode share has dropped from 20% in 2003 to 17% in 2020 (Stent, 2022) (NHTS, 2020).

These factors combined result in:

- Increased road congestion, which in turn results in increased road maintenance cost to government;
- Increased carbon emissions; and
- Increased inequality, as those who cannot afford private transport are cut off from accessing opportunities.

It can therefore be argued that significant investment in scheduled public transport may be justified in light of the expected compounding societal cost of continued decline in public transport.

1.2 Benefits of Public Transport Projects

Investing in public transport has a range of benefits beyond just enabling movement of people at affordable fares. These benefits are outlined below.

- **Improved labour mobility and productivity:** Employees with a wider range of movement have greater choice in matching their skills with work opportunities, resulting in greater productivity. Similarly, businesses that have a broader geographic reach of both customers and workers are more profitable, resulting in greater investment and employment growth. Over time, higher levels of spatial efficiency, labour productivity and firm profitability enhance the competitive advantage of the city, attracting investment from beyond its borders.
- **Reduced cost of urban sprawl:** The rapid growth of cities increases the cost of providing and maintaining infrastructure. The road network must be expanded to accommodate suburbs that are spread further out, and the maintenance requirements for this network are increased due to increased private vehicle use, the length of road networks, and the distance between consumers, depots and other facilities. Public transport can reduce this cost by accommodating urban development without a commensurate increase in private vehicles (Stratecon, 2020).
- **Reduced carbon emissions:** By reducing the number of private vehicles on the road (relative to a scenario without public transport), public transport can aid in reducing carbon emissions. The emissions per person for people using public transport are much lower than for private vehicle users, because public transport carries more people in fewer vehicles (Stratecon, 2020).
- **Increased development opportunities:** Well-designed, high-capacity public transport stations or hubs can generate additional demand for development in surrounding areas, as residential developments benefit from the access to mobility and commercial developments benefit from high foot-traffic. Implementing new public transport routes can improve the desirability of neighbourhoods and, in turn, the viability of new development. Under ideal conditions, inner-city regeneration on the back of large-scale public transport intervention may induce citywide economic benefits.

This last benefit is discussed in more detail in the following section.

1.3 Property Value Increases Attributed to Transport Projects

As noted above, properties in medium- and high-density urban contexts are generally more attractive when served by public transport, and this increased demand drives value increases and also unlocks previously unattractive sites for development. Some examples of this effect in play are outlined below:

- Property prices within walking distance of the nearest metro station in Helsinki have risen by 7.5% above other locations (World Economic Forum, 2014).
- The Washington DC metro cost \$9.5 billion to build by 2001 but has created \$10-15 billion in new land value (World Economic Forum, 2014).

- Property taxes in Toronto rose by 45% downtown and 107% near suburban metro stations, compared with a 25% increase elsewhere (World Economic Forum, 2014). Values of office space adjacent to the station were, on average, 30% higher than in the city as a whole (World Economic Forum, 2014).

This value-add, while positive for the overall economy, seldom gets fed back into the fiscus, funding public transport systems that generated the value in the first place. The value add is usually captured by (1) commuters, (2) the private sector through increased development opportunities and property values, and (3) to some extent by local governments, who benefit from increased rates income. Given the public investment required for public transport projects, the viability of public transport investment will be enhanced if city governments were able to recover some of the value that they create.

There are a number of mechanisms that can be used to ensure that the benefits of investment in transport projects are also used to support and sustain the project itself. These are outlined in the following section.

2. INNOVATIVE FUNDING AND FINANCE MECHANISMS

This paper explores two key mechanisms for capturing the benefits of transport projects:

- Increased development opportunities create the possibility for land value capture.
- Reduced carbon emissions create the possibility for climate change mitigation funding / finance.

2.1 Land Value Capture

Land value capture is a mechanism that enables government to recover and reinvest the land value increases that result from public investment. Transport infrastructure improves the accessibility of land, which increases its rental and capital values. These increases usually accrue to existing owners or developers, but governments can share in the value-add through:

- Once-off windfall tax on the owner, which can be used to contribute to the development.
- Ongoing betterment tax on all properties that experience increased value.
- Leveraging government land for sale or development through a profit-sharing agreement. A key part of this is proactively improving the value of the land through development rights and zoning.

Based on a review of best practice, Option 3 is the preferred LVC mechanism. It is more appealing to the private sector because it is not a tax, and because government has skin in the game and so is incentivised to ensure the property value is increased.

2.1.1 Hong Kong Case Study

Hong Kong's Mass Transit Railway (MTR) is a good example of the potential of LVC to leverage public transport investments. A report by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2014) outlines the MTR's business model. The MTR is run by the MTR Company (MTRC), whose Railways + Property (R+P) model takes the place of subsidies or capital grants. It makes a profit through a combination of fare revenue, commercial station retail rentals and residential and commercial property developments.

The R+P Model works as follows:

- Government grants development rights for sites that the MTRC plans to develop for a railway.
- MTRC buys the land from government at the present value.
- MTRC builds railways and develops properties in partnership with private developers.
- Once the railway infrastructure is complete, the property value increases significantly.
- MTRC benefits from the land value enhancement as it receives lease payments from developers, which in turn funds railway construction and running costs.

It is important to note that Hong Kong has several unique contextual factors that underly the successes of their LVC initiatives:

- a) The shortage of land in Hong Kong means that private developers have limited options other than the MTRC's developments (Pegasys, 2020).
- b) Real estate prices in Hong Kong have risen significantly, with house prices multiplying by 15 between 1980 to 2014 (Pegasys, 2020). This has meant that private developers are willing to participate in the R+P model and take all development costs and risks as they have optimistic expectations for the property market going forward.
- c) High passenger volumes on the railway system creates a huge commercial potential for the properties within the vicinity of railway network (Pegasys, 2020).
- d) Hong Kong's Government owns most of the land within the City, and therefore it allows the MTRC to comfortably negotiate development rights for a certain land parcel without having to deal with the private sector. This provides development rights certainty for private developers (Pegasys, 2020).
- e) The supporting relationship between the Government and the MTRC, as well as the land policy has enabled the planning and granting of development rights along railway lines (Pegasys, 2020). For private developers, having MTRC as partner has also made it easier from a coordination perspective.
- f) It has taken years to build the in-house expertise that the MTRC has, and it would be difficult to replicate this in cases like one-off projects or with limited market potential (Pegasys, 2020).

While these contextual factors were key to the success of LVC in Hong Kong, this case study still provides valuable insights for applying LVC to the South African context.

Firstly, Land Value Capture is a long-term project. Revenue generated by MTR's property operations 1998 – 2016 is nearly double the cost of new railway projects (Aveline-Dubach & Blandeau, 2019). However, it is important to note the long timeframes to build the revenue stream from R+P investments. Public funding provided the impetus in terms of the initial capital investment, and during construction of the railways in the 1980s and 1990s, MTR suffered net losses (Aveline-Dubach & Blandeau, 2019). It took almost 20 years to generate more than HK\$ 1 billion in a year, after which revenues increased drastically over the next 20 years (Aveline-Dubach & Blandeau, 2019).

This delay in profitability is because it takes time to build a diversified property portfolio, build private sector trust and demonstrate value add, develop institutional capacity and knowledge, and start generating significant revenue from LVC.

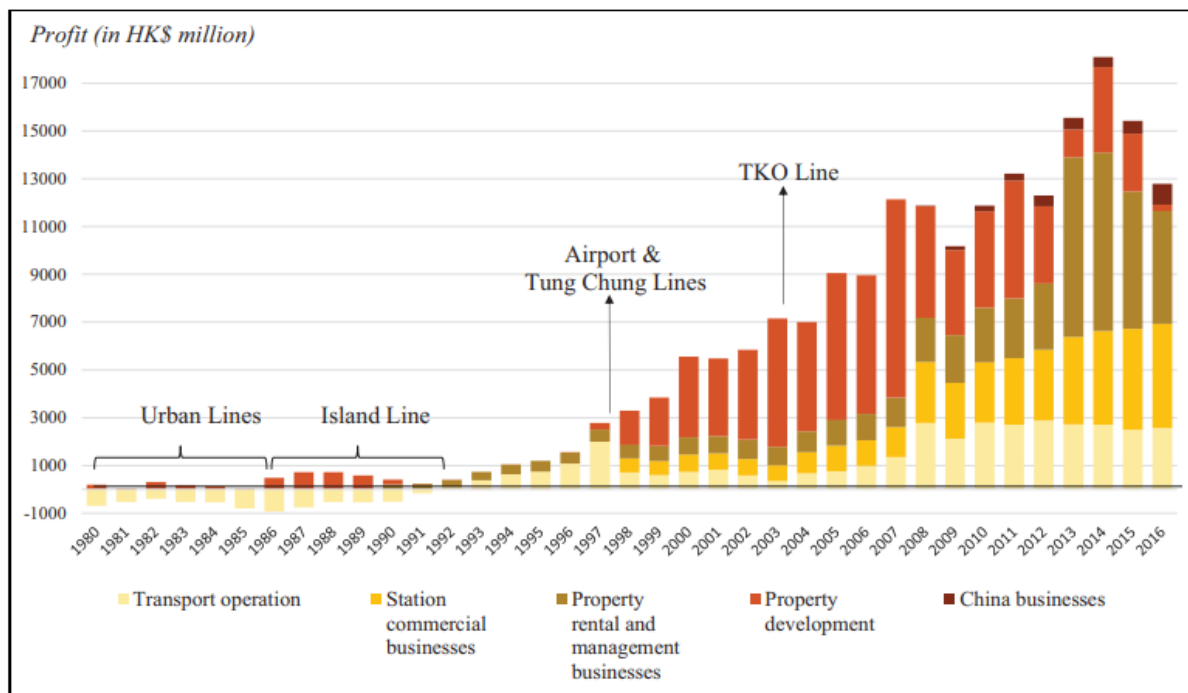


Figure 1: MTRC profit history (Aveline-Dubach & Blandeau, 2019)

The second lesson is that legislation needs to enable transport entities to engage in commercial development of land. This will enable government to partner with the private sector and share in the profits of land development.

Finally, government needs to be involved upfront through contribution of land and appropriate zoning. In this type of LVC, land is government's key asset. By offering government-owned sites in desirable locations and adjusting the zoning of these sites to maximise potential profits, government is able to create the leverage needed in a partnership with the private sector.

2.1.2 Gautrain Case Study

The Gautrain is an example of a South African public transport system with the potential to incorporate LVC mechanisms. The Gautrain is a high-speed rail system between Johannesburg, O.R. Tambo Airport and Pretoria. It is run by the Gautrain Management Agency and has been operational since 2012.

A recent study was prepared for National Treasury, Development Bank of SA and Gautrain Management Agency on the funding and financing of future stations as part of the extension to the Gauteng Rapid Rail Integrated Network (GRRIN). This included an analysis of the impact of the Gautrain on property prices before and after the introduction of the Gautrain, as well as in nodes that were served versus unserved by the Gautrain. A visual analysis of two Gautrain-served nodes before and after the introduction of the Gautrain (see Figure 1) indicates that there has been significant development around these nodes since the Gautrain was introduced (Pegasys, 2020).

This conclusion is supported by analysis of valuations data from the City of Johannesburg, which compared the real change in commercial property values before and after Gautrain implementation (between 2013 and 2018). Many Gautrain-served nodes significantly outperformed unserved nodes in terms of property values (Pegasys, 2020).



Figure 2: Aerial view of two Gautrain stations (Rosebank and Sandton) showing the increase in development from 2007 (prior to the introduction of the Gautrain) to 2019 (after the Gautrain was operational) (Pegasys, 2020)

Data shows that aggregate demand for sectional title units has reoriented towards Gautrain-served nodes since 2012, which provides basis for increased land values and supports spatial restructuring. Commercial properties in Gautrain-served nodes have significantly outperformed unserved nodes. As shown in Figure 3, the rates revenue differential between served and unserved nodes for commercial properties exceeded R100 million per year by 2018 (Pegasys, 2020).

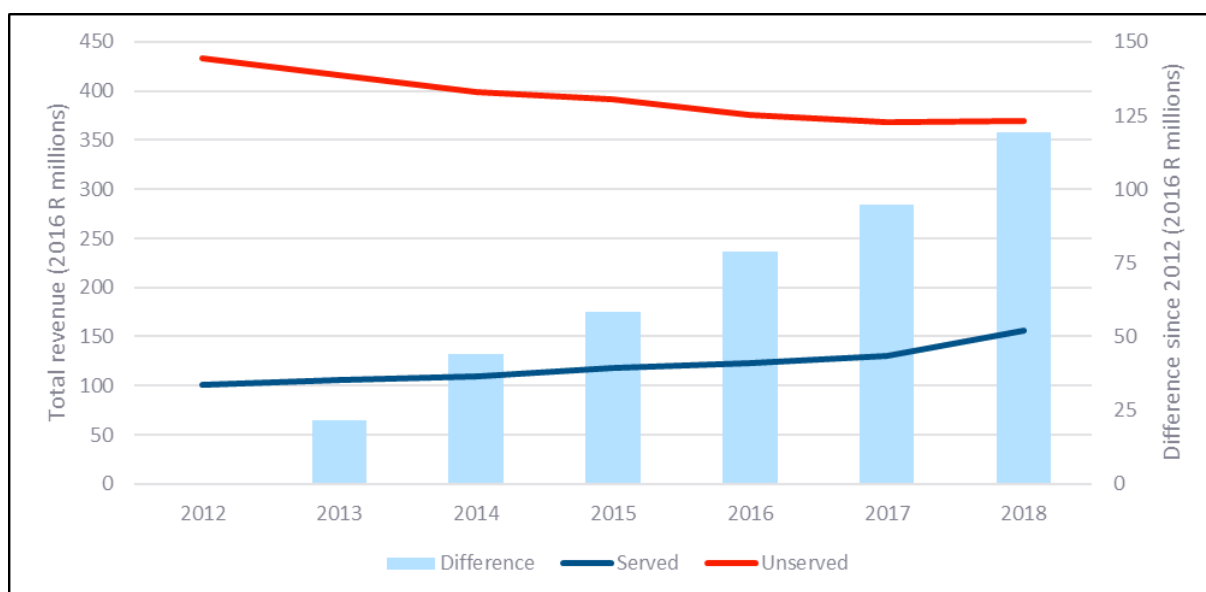


Figure 3: Difference in revenue from Gautrain-served versus unserved properties (sectional title residential)

Value from the implementation of Gautrain has mainly been captured by private sector through increased profits. In planning for extension of the GRRIN, it was acknowledged that there was a need to ensure that some of the value created is shared with the project itself.

To understand the value add of the future Rapid Rail network, future station precincts of Randburg, Cosmo and Little Falls stations were analysed for:

- Underutilised land.
- Land ownership (Municipal and State-owned).
- Development informants & constraints.

Based on this analysis, it was estimated that R2 billion in additional rates could be generated by 2040 (Pegasys, 2020). Figure 4 shows the development opportunities identified for Randburg station.

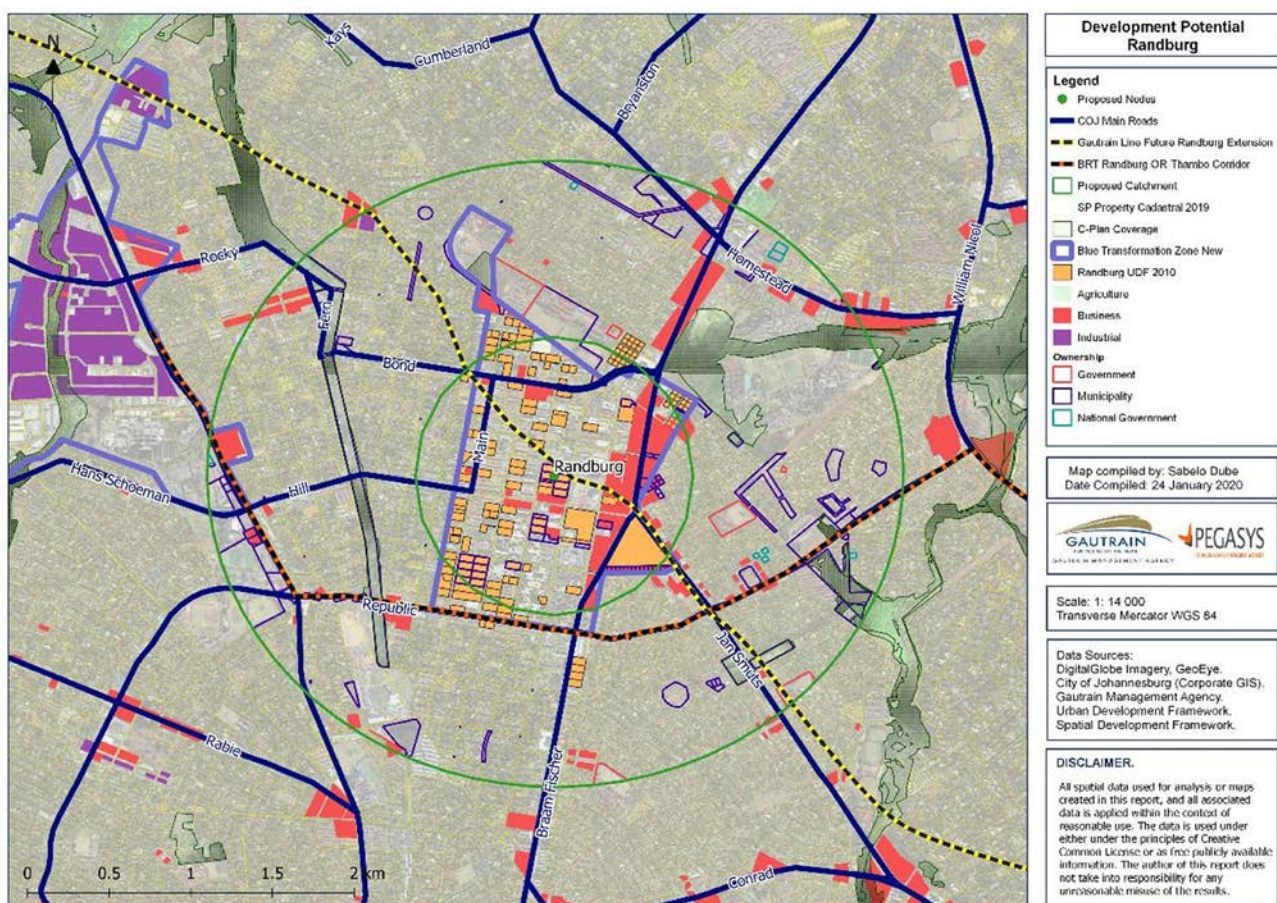


Figure 4: Identification of vacant land and constraints surrounding the proposed Randburg station (Pegasys, 2020)

As part of the GRRIN extension study, a public-private partnership (PPP) model was developed to unpack how LVC could potentially work. Currently, when local government requires a privately owned site for a transport project, it expropriates the land and compensates the owner (Pegasys, 2020). While this gives government full control over the development of the site, it also gives them full responsibility of the development costs.

An alternative approach that would assist in unlocking the value of the land would be for local government to:

- a) Transfer the land around a station to a property PPP for development purposes.
- b) Review the land for possible re-zoning to unlock further value.

Figure 5 demonstrates how this arrangement was applied to the Gautrain example. The City of Johannesburg (CoJ) transfers land to the GMA through a Land Transfer and Agent Agreement, including development rights for the land. The GMA forms a PPP with private sector developers to develop the land, taking a share in the profits of the development and potentially stipulating development of specific public transport infrastructure. In return, the developers get a rates rebate from the CoJ, and CoJ ultimately benefits from the increased rates contribution paid by the final owners who purchase units in the development. This model can be used purely as an income stream to the Gautrain project, or also as a means of developing aspects of the Gautrain itself.

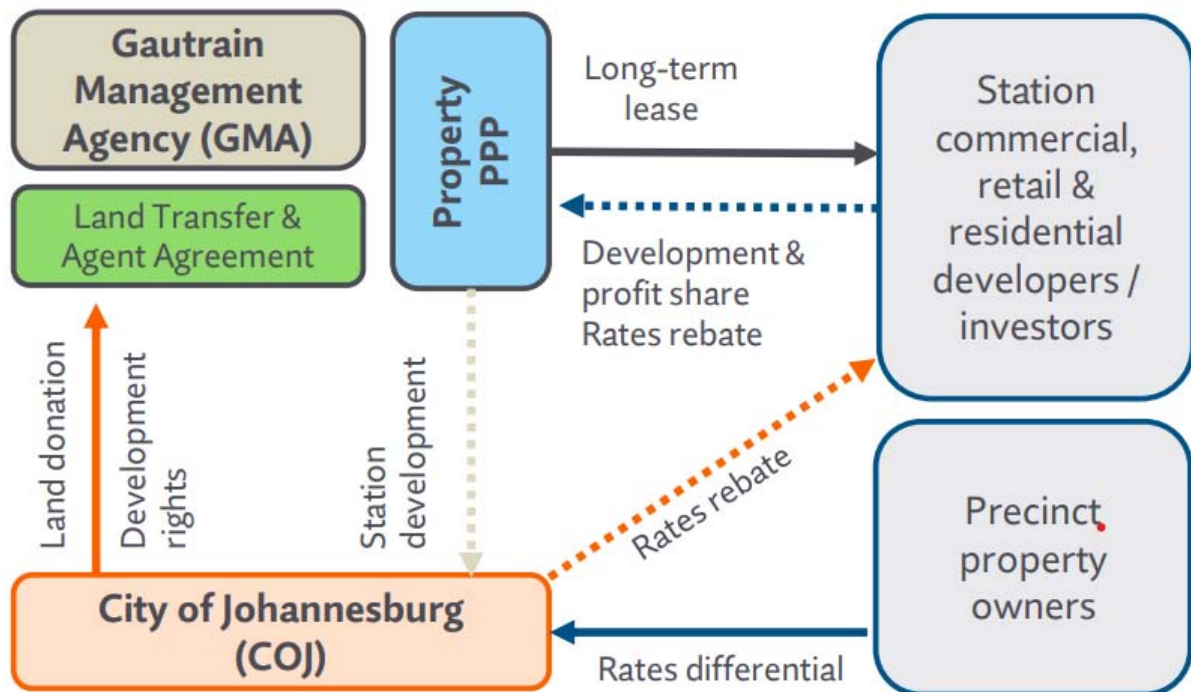


Figure 5: Public-private partnership model for the GRRINE (Pegasys, 2020)

2.1.3 PRASA Case Study

Another local example of LVC is the PRASA¹ model. This involves presenting land or property for development and inviting the private sector to tender. PRASA retains ownership of the land and the developer enters into a long-term lease agreement. This arrangement enables PRASA to reserve certain rights for itself, such as the right to co-invest in the development and share in the profits (Pegasys, 2020).

¹'PRASA' here refers to the partnership between PRASA CRES and Intersite. PRASA CRES is the division responsible for managing PRASA's property portfolio, including a commercial programme for upgrading stations and creating retail opportunities. Intersite is a subsidiary of PRASA established to exploit commercial opportunities for PRASA by focusing on the growth of the property portfolio, investments and ad hoc developments.

One example of this model in action is the Cape Town station development. Here, PRASA put out a tender for development of the station forecourt, which included space for developers to add commercial / residential units to generate profit (Pegasys, 2020). The winning bidder received the right to enter into the lease and profit-sharing agreement with PRASA, and to develop the site into student accommodation (Pegasys, 2020). The development will also include upgrades to the forecourt public square, as well as retail developments on the ground floor (BusinessTech, 2022).

PRASA will enjoy 49% profit participation in these developments, in addition to the rental income from the developer (Pegasys, 2020). However, at the end of the lease period, the improved site will revert to PRASA.

2.2 Green Funding / Financing

Public transport plays a key role in lowering carbon emissions by reducing private vehicle use. This means that public transport projects are eligible for 'green' / climate change mitigation funding. Some of the key climate mitigation funding mechanisms are discussed here, although there are no precedents available for these mechanisms being used to directly subsidise public transport.

2.2.1 Carbon Tax

Carbon Tax was implemented in South Africa through the Carbon Tax Act of 2019. It employs the "polluter pays" principle to disincentivise consumers from using carbon-intensive processes or products (SARS, 2021). Consumers who breach a certain threshold are charged a rate per ton of carbon emissions released in a year. The tax will therefore have the most impact for large firms in carbon-intensive industries such as oil refinement, but it is being implemented in phases to allow industries time to adopt more carbon-efficient systems.

While this tax penalises carbon-intensive initiatives, it does not currently have a mechanism to incentivise or support low-carbon initiatives. This could be achieved by ringfencing carbon tax income for use on low-carbon projects such as public transport.

In 2021/22, Carbon Tax generated R1.4 billion revenue for the government (National Treasury, 2022). While this is a negligible amount compared to the annual subsidy required for public transport (R31 billion in 2021/22), it could be designated for projects specifically aimed at improving the energy efficiency of public transport (National Treasury, 2021). The amount collected is also expected to increase substantially, since a number of temporary exemptions are currently in place.

2.2.2 CO₂ Tax on Motor Vehicles and Aviation

In addition to the new Carbon Tax, two other Environmental Levies whose income could be ringfenced for public transport are Motor Vehicle CO₂ Emission Tax (paid by manufacturers) and Air Passenger Tax. Both apply to carbon-intensive private transport modes only affordable to middle- to high-income commuters. Income from these taxes could be used to fund public transport, which reduces carbon emissions by reducing total vehicle mileage, and offers subsidised transport to predominantly low-income commuters.

The combined revenue from these taxes in 2021/22 was R2.3 billion (National Treasury, 2022). As noted previously, this amount could be used towards specific public transport projects with a low-carbon focus.

2.2.3 Green Bonds

Unlike the other two mechanisms, green bonds focus on supporting low-carbon initiatives rather than penalising carbon-intensive ones. Green bonds are a way of providing loan financing to environmentally friendly projects, potentially at concessionary rates (Climate Bonds Initiative, 2021).

These bonds are usually issued by a bank or government, who have identified specific projects that meet the 'green' criteria of the bond. These criteria vary based on the bond, but usually relate to improved energy efficiency, reduced waste, protection of ecosystems, and a transition to low-carbon transport (Climate Bonds Initiative, 2021).

By purchasing green bonds, investors are essentially loaning money to these green projects, which must then repay the loan with interest in regular instalments. The projects benefit from access to capital, while investors enjoy interest on their bond investment. This type of upfront capital financing can be particularly beneficial for public transport projects, which can require significant upfront investment in infrastructure.

Green bonds can benefit projects either through concessionary rates, or allowing longer repayment periods which better match the long term nature of public transport investments. For example, a rail system can be utilised for 20 years with minimal further capital investment. Being required to repay a loan over 5 years results in a mismatch between the 20-year benefit and the 5 year cost.

Several entities have issued green bonds in South Africa, including African Development Bank, Nedbank, the City of Cape Town, and the CoJ. This mechanism could therefore be used to finance public transport projects, noting that the bond value would ultimately need to be repaid.

3. CONCLUSIONS

The economic benefits that public transport systems create can be used to generate income for the systems themselves. Since public transport projects can increase the value of surrounding properties, some of this value add can be used towards the project itself through LVC mechanisms. Likewise, public transport results in lower carbon emissions, and so this benefit can be leveraged to access specific funding sources for low carbon initiatives.

The innovative finance mechanisms explored here should be seen as supplementary sources of funding. It is very rare for public transport to operate without government subsidy. Only in cities like Hong Kong, which have a unique combination of supporting factors, can public transport run subsidy-free. South Africa is not Hong Kong, and we cannot expect our public transport systems to operate without government support. However, South Africa's fiscus is under immense pressure from competing funding needs, and alternative public transport funding mechanisms can help to alleviate some of this pressure. Public Transport investments are also often capital intensive, putting a strain on annual fiscal allocations. Concessionary finance can help by allowing public transport investments to be paid off over a longer time frame. This helps to better match the (long term nature) of public transport benefits with the repayment period.

Implementing innovative funding mechanisms takes time and institutional capacity. LVC mechanisms in particular are a long-term strategy, as it takes time to build trust between government and private sector partners, and to build up a track record of successful

developments to prove that partnering with government is a safe and viable investment. The benefits of LVC can also take many years to realise, as can be seen in Hong Kong.

However, the long-term nature of these benefits should not discourage governments from adopting these innovative mechanisms. Long-term goals still need to be initiated and worked towards in the short-term.

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