

Public transport

funding and financing:

A best practice guide for transport agencies, operators and cities



“Public transport is an investment, not a cost. It is an investment for a prosperous economy, and for an inclusive society”

Mohamed Mezghani

Secretary General
International Association of
Public Transport (UITP)

“An advanced city is not a place where the poor have cars. It’s where the rich use public transportation”

Enrique Peñalosa

Former Mayor of Bogotá, Colombia

Source : Pedro Andre from Pexels

Executive summary

Investment in public transport infrastructure is one of the **most impactful measures** public and private institutions can take to reduce congestion and transport emissions, **enhance urban resilience** and make cities more inclusive and economically productive.

However, cities and transport agencies across the world face financial challenges. The COVID 19 pandemic caused a sharp drop in ridership and farebox revenue, pushing transport agencies to the edge of a fiscal cliff and forcing them to reduce public transport services. Other cities have had long-standing challenges in attracting financing to build new public transport infrastructure.

This report is aimed at city officials, transport financiers, authorities, operators and practitioners. It sets out examples of **best practice** and a non-exhaustive list of **recommendations** to strengthen public transport funding and finance strategies. Additional research resources are signposted throughout the report, offering readers the opportunity to deep-dive on specific topics.

The below **definitions** are used throughout the report:

- **Transport financing** refers to raising the upfront capital, often through debt or equity, to fund transport infrastructure projects. It will often primarily cover capex costs, but can also be used to cover opex costs.
- **Transport funding** refers to revenue streams that are used for repaying this capital and to pay for the operation or maintenance of the infrastructure asset in the long-term.





Jakarta, Indonesia

Source : Rangga Cahya Nugraha from Unplash

Contents

- 1. Introduction and challenges**
- 2. Recommendations**
- 3. Case studies: public transport funding**
- 4. Case studies: public transport finance**
- 5. Key takeaways**

1. Introduction and challenges

There is a need to rethink how public transport networks are financed and funded globally. Since 2020, transport agencies across the world have struggled to recover from the drop in public transport passenger numbers and to close the funding gap from **declining farebox revenue**. Operating expenses have also been on the rise, due to increases in energy and labour costs.

This has had an impact on the quality of public transport, with various ripple effects on the frequency, reliability, accessibility or safety of these services, in turn negatively affecting the level of public transport ridership. Other cities have struggled to return to pre-pandemic levels of ridership and to adapt to new ways of commuting, leading to cuts in public transport service provision.

If the issue of revenue shortfalls is not addressed, public transport networks are at risk of falling into a downwards spiral of operations and maintenance decline, passenger dissatisfaction and a further drop in ridership levels, with dire consequences for emissions and air quality. This in turn affects the perception of public transport as an attractive and useful mode of transport to invest in.

Sustaining and increasing the amount of finance and funding available for public transport investment is critical for ensuring that cities remain liveable, inclusive, economically productive and climate resilient.



This report therefore aims to strengthen cities and public transport authorities' ability to attract financing and sustain funding for public transport projects.

Annual metro ridership per capita 2022

Since 2020, transport agencies across the world have struggled to recover from the drop in public transport passenger numbers

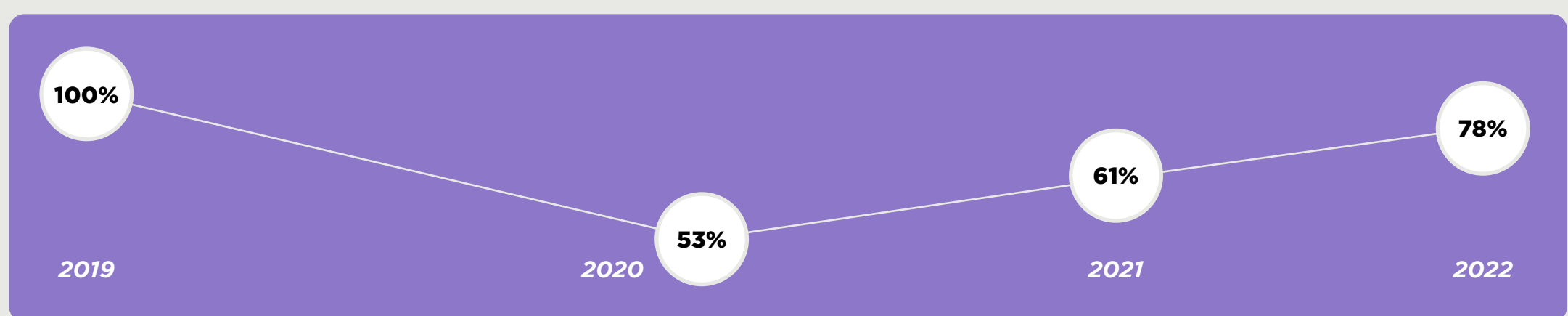
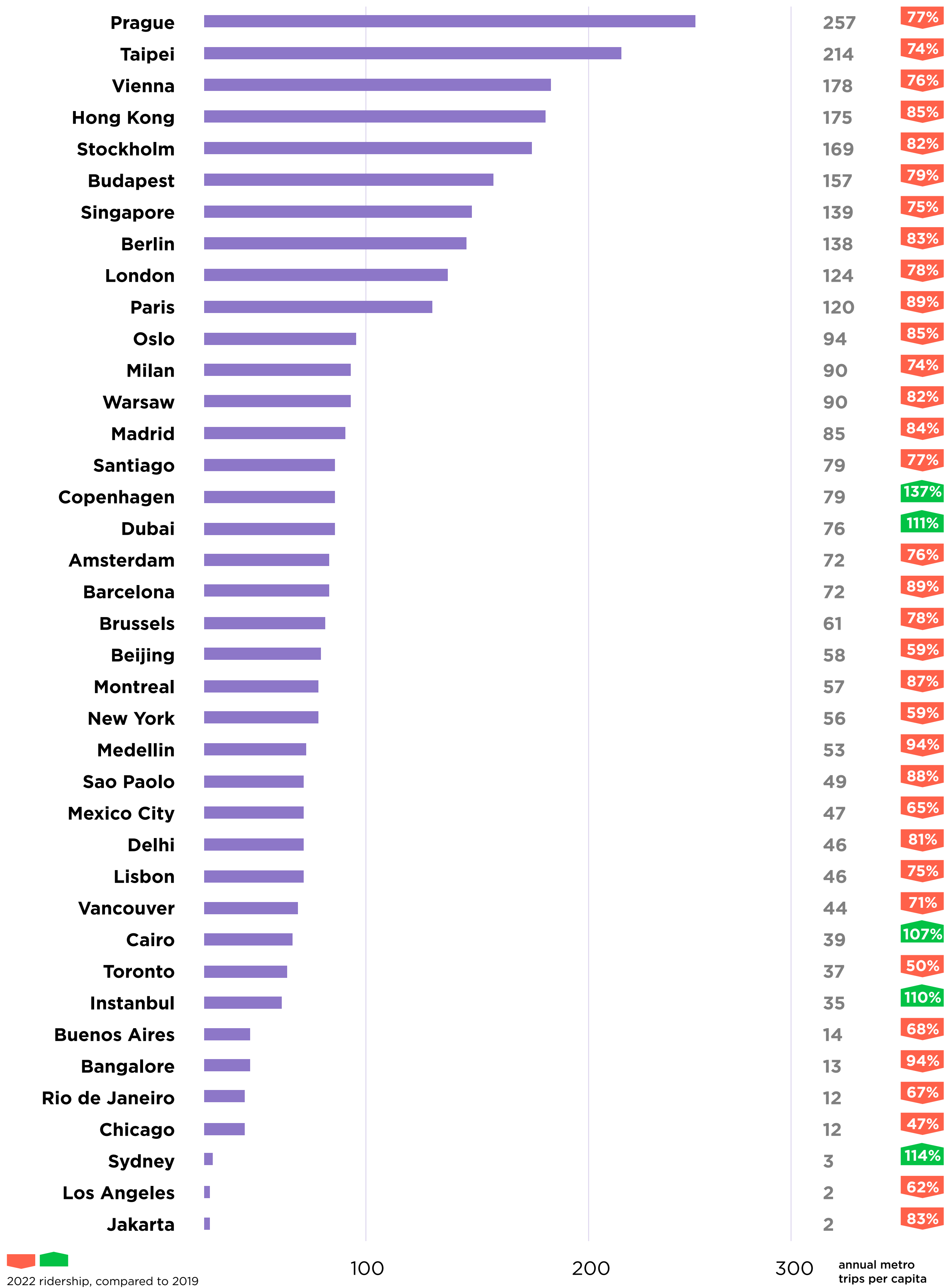


Figure 1. Annual ridership per capita of key metro systems in select cities (2022)
Source: UITP, [Public Transport Metrics from 46 Cities Worldwide](#) (2022)

How transit agencies' revenue sources changed from before to during the pandemic

In key megacities around the world, the proportion of transit agencies' revenue coming from fare collection after the COVID pandemic declined.

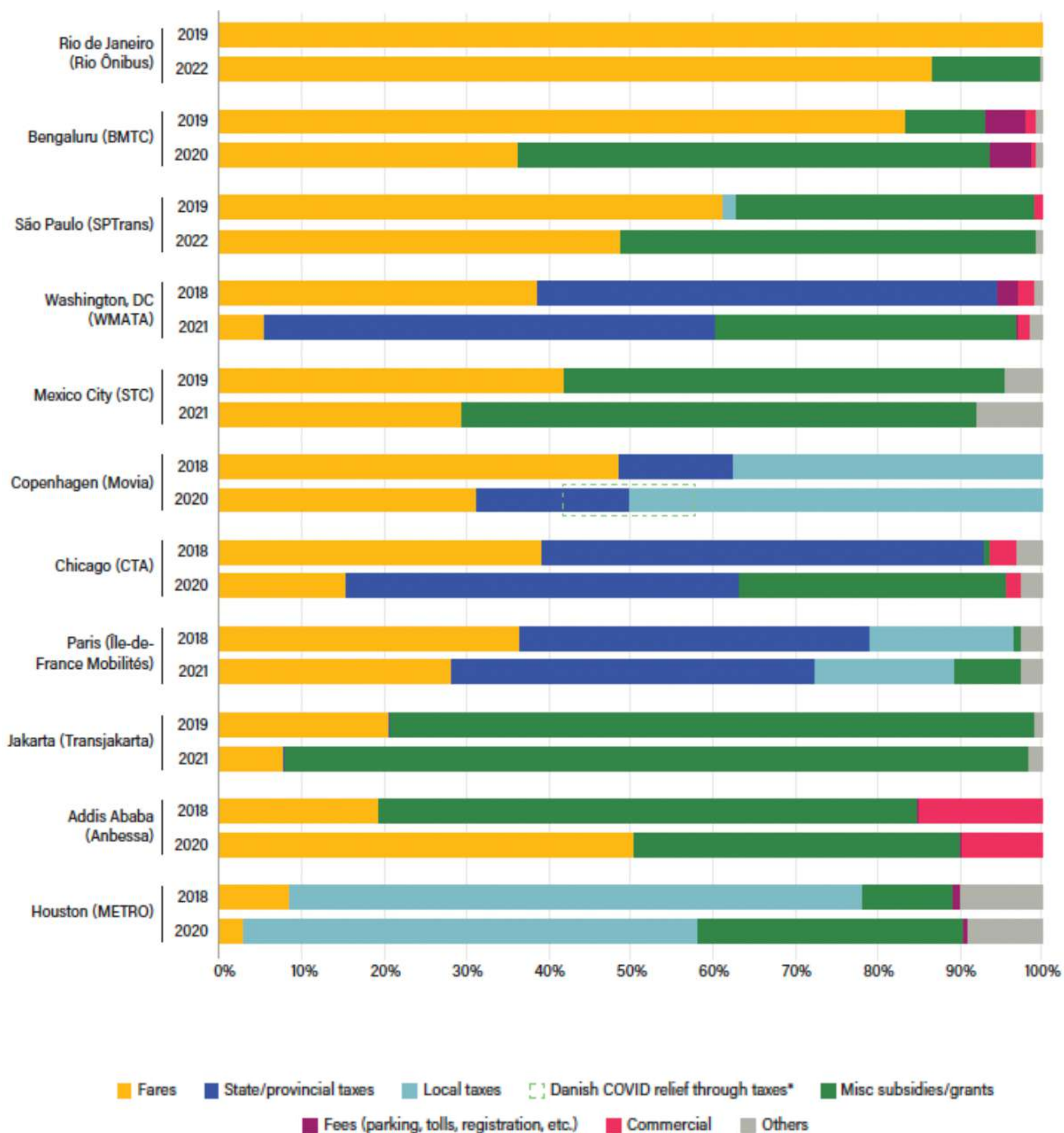


Figure 2:
How transit agencies' revenue sources changed from before to during the pandemic (2024)
Source: WRI, [A Fare Look: Funding Urban Public Transport Operations](#) (2024)

Challenges with public transport finance & funding

There are long-standing **challenges contributing to public transport finance and funding shortfalls**. A few key challenges are summarised below:

- **The ‘new normal’:** the COVID pandemic has created an enduring shift in people’s mobility behaviours, with hybrid/remote work and online shopping creating changes in the demand for public transport. Traditional ‘predict and provide’ planning approaches may not work as effectively, while scenario planning - or ‘decide and provide’ approaches - may become a more effective means to capturing farebox revenue while acting as an opportunity to influence overall investment and planning decisions.
- **Limited legislative or fiscal authority:** revenue collection from urban transport levies, such as tolling or congestion charges, may be implemented and managed separately by a national organisations, departments of transport or tolling companies. Similarly, government subsidies will be decided and granted at different levels of governance from the national, regional to federal level. This in turn limits a public transport authority’s ability to generate, centralise and ringfence new revenue streams for public transport investment.
- **Scope creep, short-termism, inaccurate cost and revenue projections:** transport projects are particularly prone to scope creep (new features being added in to the project along the way), short-term financial windows, inaccurate cost and revenue forecasts (with infrastructure capital costs being frequently underestimated) and future demand for public transport services being overstated (IGC, 2018).
- **Non-continuous government subsidies:** a compounding challenge to the farebox revenue gap is the unpredictability of government subsidies, which are subject to political changes and may not always be a reliable source of ongoing revenue for repaying multi-year capital or operational costs. In some regions, the weakening of public funding sources has compounded this problem.
- **Rising operational costs:** operating expenses have also been on the rise, due to increases in energy and labour costs.
- **Projected drop in fuel tax revenue:** a commonly used revenue source for public transport investment in some regions is a fuel tax, levied on the sale of gasoline and diesel for vehicles with internal combustion engines (ICEs). As the global transition towards electric mobility accelerates, and as more and more governments introduce bans on ICE vehicle sales, a decline in revenue from fuel duty is expected.
- **Farebox revenue gap:** on average, revenues from public transport fares cover 30-40% of total operating costs (ITF OECD, 2024). Relying on farebox revenue as the main source of funding creates a concentration risk: a drop in farebox revenue heightens public transport authorities’ dependence on the support of external actors to bridge the revenue gap, such as national government for subsidies. In the case of informal transport, there is the added challenge of receiving little to no financial support from government.



Bangkok, Thailand

Source : Markus Winkler from Unplash

Percentage of total operating revenue coming from fare collection (2022)

On average, revenues from public transport fares cover 30-40% of total operating costs.

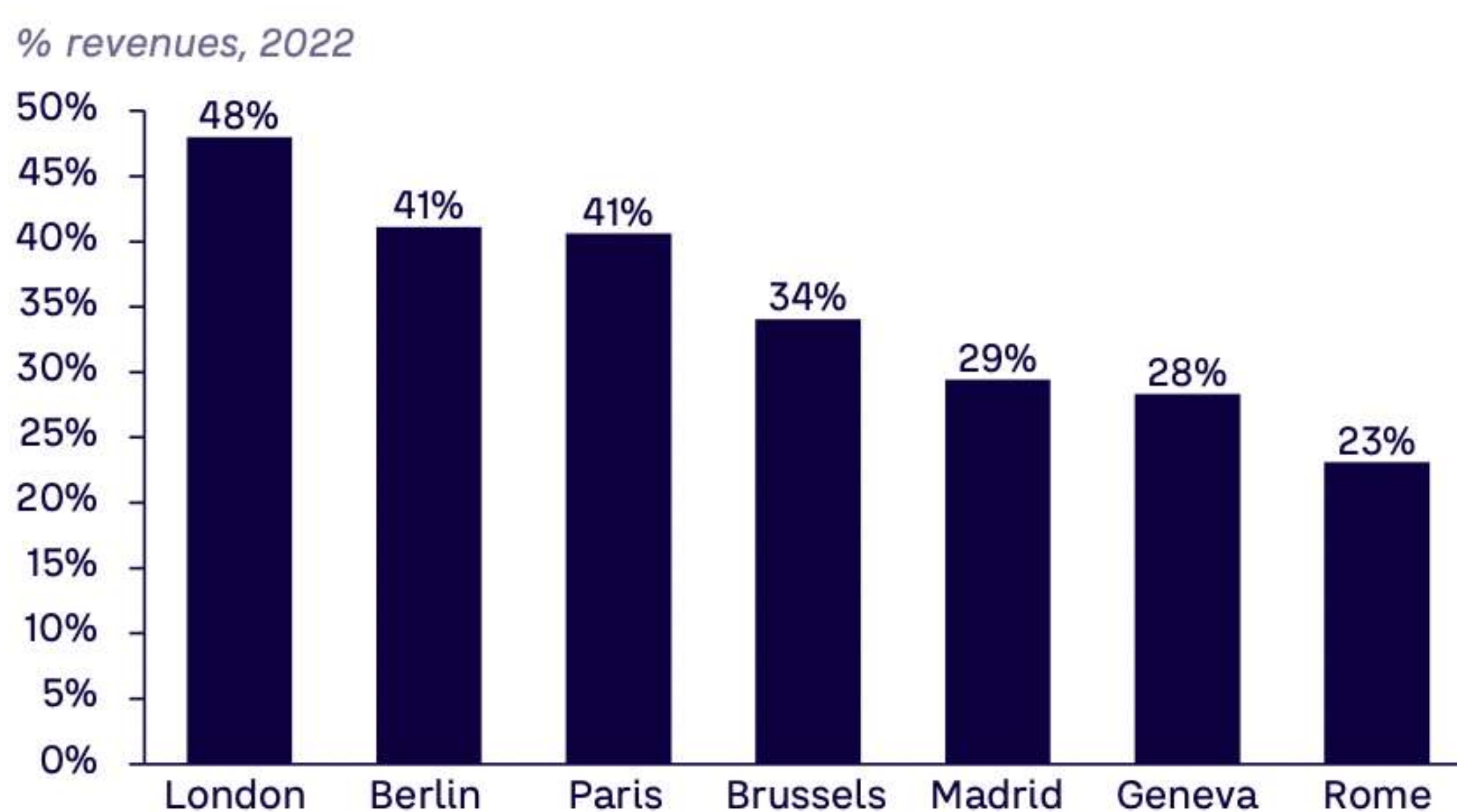


Figure 3:
Percentage of total operating revenue coming from fare collection (2022)

Source: Arthur D. Little, Public transport fare models (2022)

Recommendations

Here are some solutions C40 cities, transport agencies and operators are using to **rethink their financing and funding strategies**. The following section dives into each of these in more detail.

1. Measure and evaluate: understand mode share, develop GHG emissions inventory by mode of transport, identify mode shift targets and opportunities, and prioritise most strategic investment over the long-term.

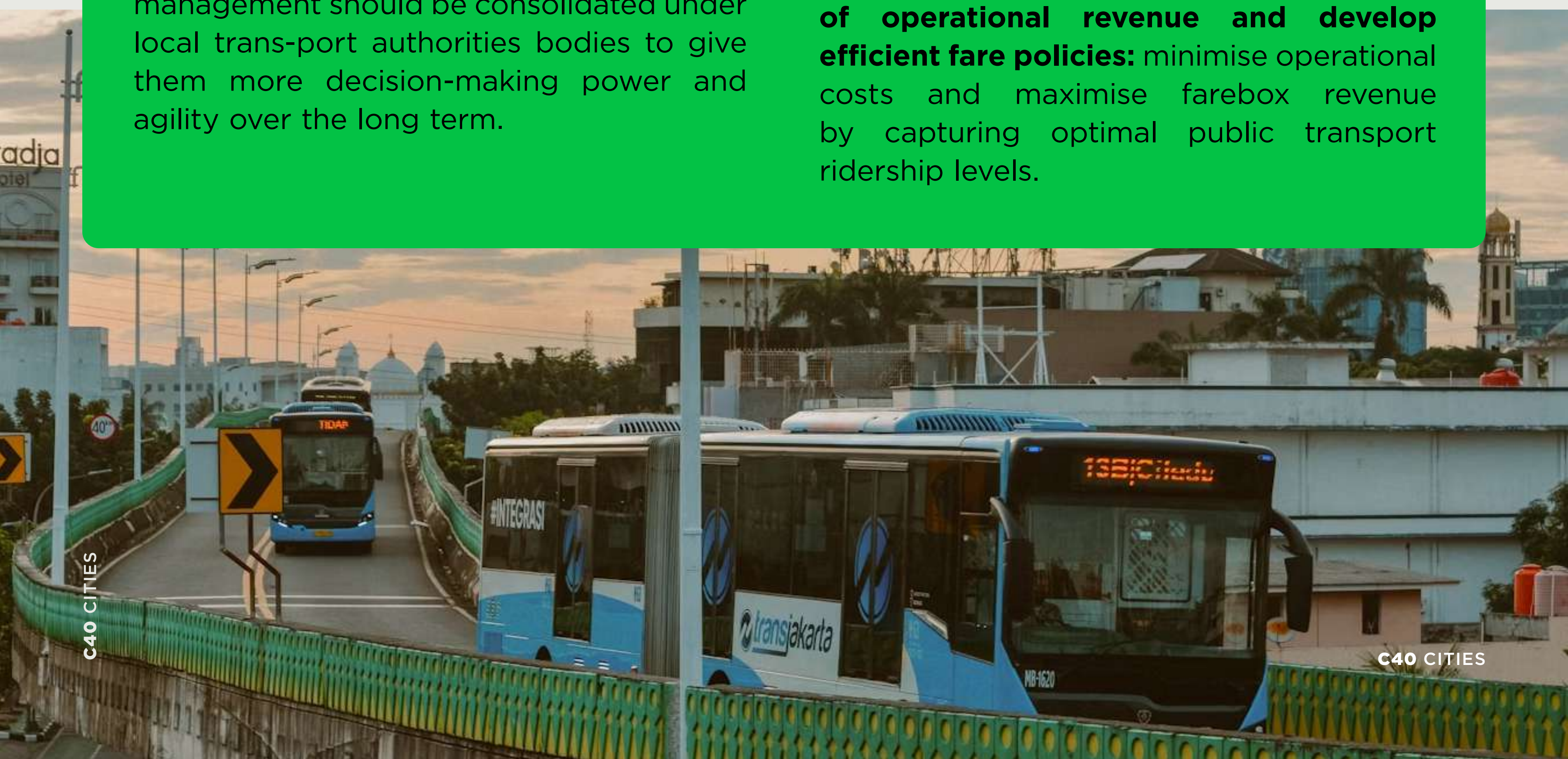
2. Implement integrated transport and land use planning models: such as transit oriented development (TOD) to increase density, reduce the need for private car usage and parking, and increase public transport ridership.

3. Consolidate local, long-term revenue management powers: it is important that revenue collected for public transport investment is ring-fenced and ideally, decision-making power on revenue management should be consolidated under local transport authorities bodies to give them more decision-making power and agility over the long term.

4. Develop a bankable project: there are many important steps involved in preparing a project for financing and implementation. Building a robust business case and funding strategy is arguably the most important step for unlocking financing, but this needs to be done in a way that aligns with the economic, social, political, legal and institutional factors that investors look for in a project.

5. Diversify & blend funding streams: to reduce the concentration risk of depending on farebox revenue and government subsidies to operate their public transport network, transit agencies should diversify and blend their revenue sources.

6. Strengthen the day-to-day management of operational revenue and develop efficient fare policies: minimise operational costs and maximise farebox revenue by capturing optimal public transport ridership levels.



Jakarta, Indonesia,
Source : Syahril Fadillah from Unplash

1. Measure and evaluate

Here are a few steps cities, transport departments and public transport agencies can take to make more strategic investments in public transport:

- Calculate existing modal share and assess proportion of trips or vehicle-kilometres travelled by public transport.
- Establish a baseline of urban road transport emissions by mode (GHG inventory), using a systemic lens (e.g. considering formal and informal transport networks in Global South cities).
- Draw emission trajectories with different future scenarios, including a high-impact scenario where public transport becomes the main mode of transport in the city.
- Define emission reduction and mode share targets over the long-term.
- Evaluate most effective public transport actions on the basis of:
 - Potential for GHG emission reductions
 - Impact on equity and inclusion outcomes
 - Financial returns
- Prioritise investments that increase the attractiveness and ridership of public transport networks over prestige or geopolitically strategic projects.

How Improving Public Transport and Shared Mobility Can Reduce Passenger Emissions



International Transport Forum

How Improving Public Transport and Shared Mobility Can Reduce Urban Passenger Carbon Emissions

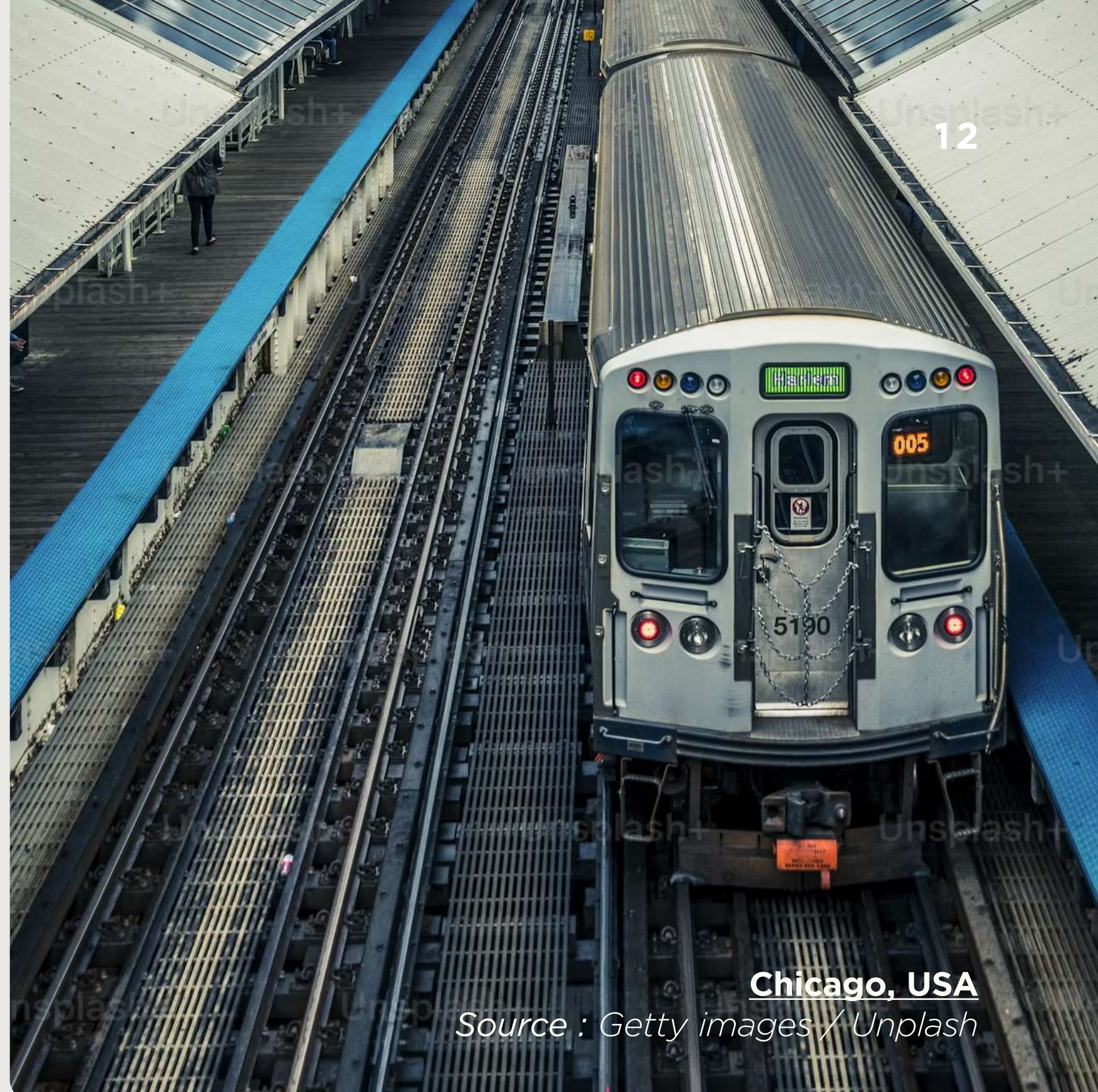
Scenario Results and Policy Findings



2. Implement integrated transport and planning

Integrated land use and transport planning is a key prerequisite for transit-oriented development (TOD), increasing density, reducing the need for private car usage and encouraging an increase in public transport ridership. Some best practices to keep in mind with integrated transport and land use planning are:

- Ensure close collaboration between transport and land use planning teams to promote transit-oriented development.
- Encourage public-private partnerships between city governments or transport authorities and developers, as this can help fund transport projects through value-sharing agreements, using mechanisms such as development right sales, voluntary developer contributions, property leasing or joint ventures.



Chicago, USA

Source : Getty images / Unplash

- Reinvest profits into transport improvements: direct profits from property and commercial developments should be ring-fenced for not just financing public transport expansion, but also service enhancements and system maintenance.

Hong Kong's Rail + Property model or Transport for London's Public Transport Access Level (PTAL) model are great examples for capturing and quantifying developer's contributions towards public transport improvements.





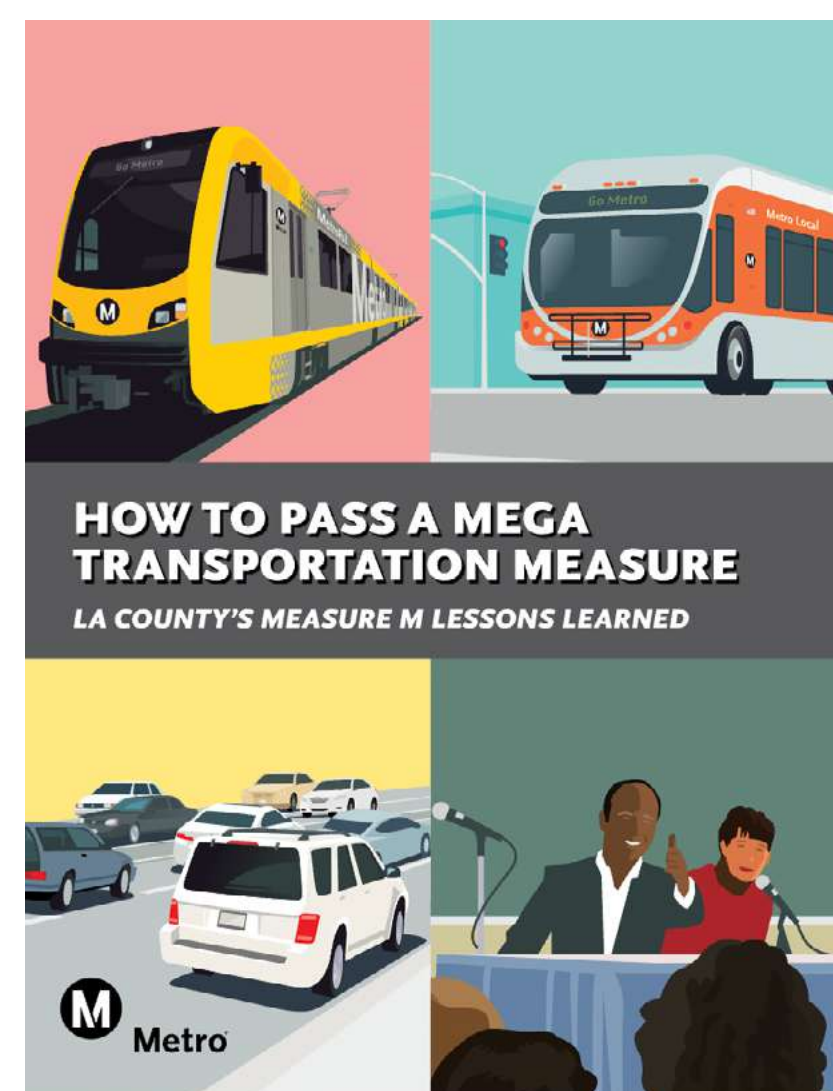
3. Consolidate local, long-term revenue management power

There are a few key principles cities and transport authorities can follow to guarantee sustainable and impactful investment in public transport improvement, maintenance and expansion:

- Consolidate decision-making power on transportation revenue management at the local level to better respond to constituents' needs (e.g. Transport for London).
- Develop policy instruments that commit to devoting long-term investment into public transport (e.g. Los Angeles Measure M).
- Earmark and ring-fence funding dedicated for public transportation to ensure it does not get reinvested into other transportation projects like highway construction (e.g. Auckland Homeowner Levy).
- Set up an institutional body to integrate and streamline intergovernmental investment decisions between local and national entities (e.g. Crossrail Limited - CRL).
- Build public support by developing a communication and advocacy strategy that demonstrates the benefits of investing in public transport (and the costs of not doing so).
- Engage different stakeholders in the governance of public transport revenue (unions, passenger groups, disability groups, active mobility advocacy groups...) to build and maintain broad public consensus for well-funded public transport.

The passage of **Measure M** in 2016 by the Los Angeles County is a great example of how a transport authority can rally federal government and local constituents behind a shared agenda over the long-term to tackle traffic congestion. The Measure M created a transportation sales tax that would exist “until voters decide to end it.” This ‘no-sunset’ provision’ signalled the county’s long-term commitment to funding transport infrastructure and helped to provide more bonding capacity to source more revenue for completing projects. It is expected to generate \$120 billion in revenue over forty years.

Key learnings gained through the implementation of Measure M

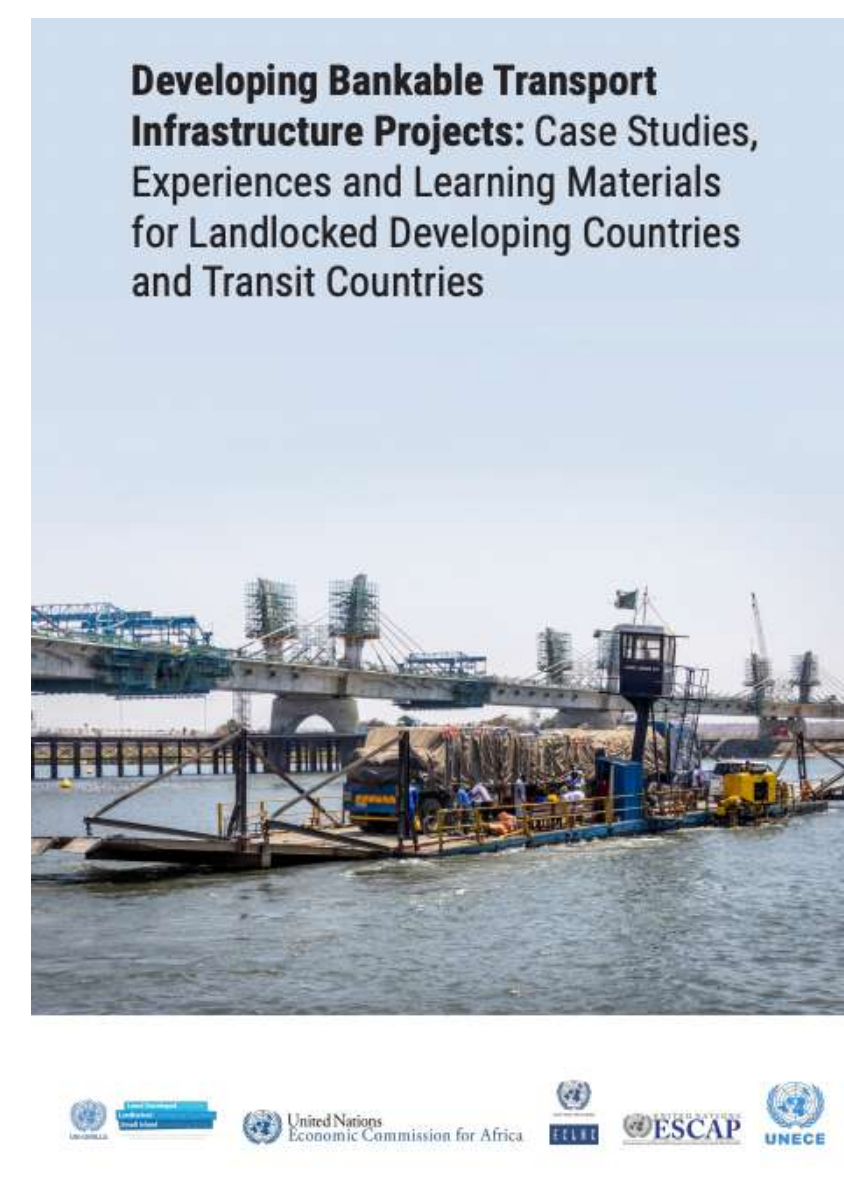


4. Develop a bankable project

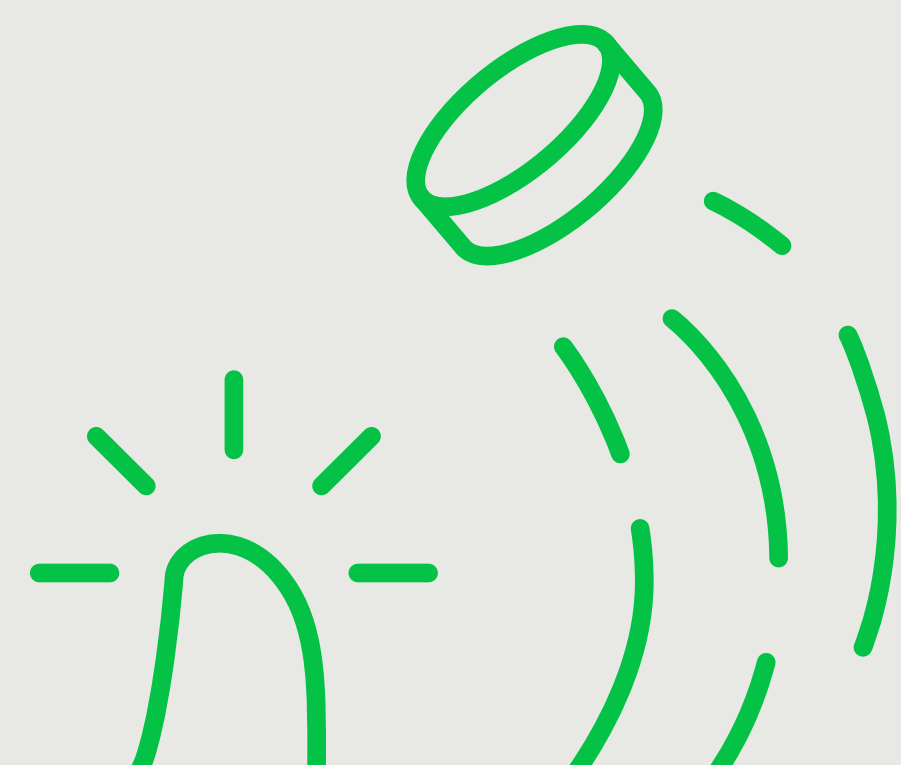
There are many important steps involved in preparing a project for financing and implementation. Building a robust business case and funding strategy is arguably the most important step for unlocking financing, but also for ensuring the longevity of an efficient and viable public transport project. Here are a few key considerations to keep in mind when developing the financial model and business case for your transport project.

- **Conduct independent audits of the financial model:** transport projects are particularly prone to optimism bias and therefore inaccurate cost and revenue forecasts (IGC, 2018), with infrastructure capital costs being frequently underestimated, scope creep, unexpected costs and future demand for a public transport services being overstated. It is important to stress test key budget assumptions and ridership levels forecasts.
- **Develop contingency financing plans for worst-case scenarios:** unexpected challenges can arise during the construction of a transport project, which can delay construction timelines and impact CAPEX costs. For example, the London Crossrail project had a 26% budget overrun.
- **Structure financial model over a long period of time:** inclusive of operational, maintenance and potential expansion costs over the average lifespan of public transport assets. It should be noted that with public transport projects, capital costs typically account for 20-50% of total costs, and operational and maintenance costs account for 50-80%.

Learning Guide: 'Developing Bankable Transport Infrastructure Projects'

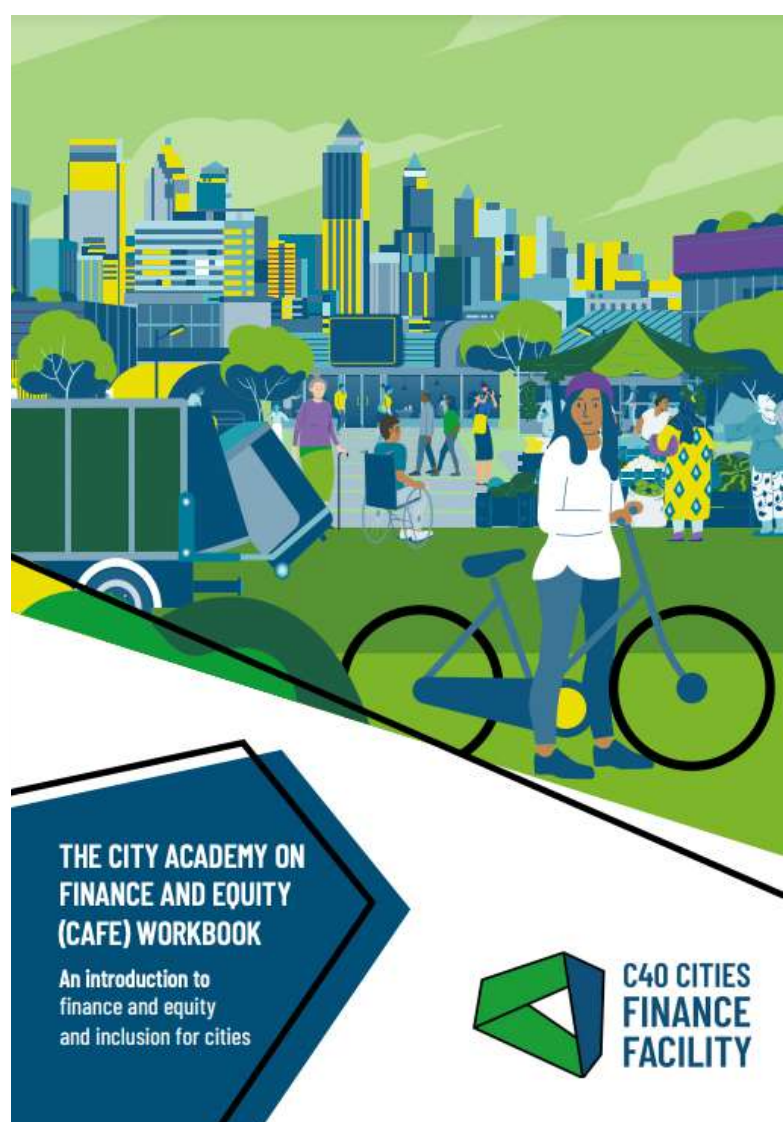


- **Align with the economic, social, political, legal and institutional factors that investors look for in a project:** Depending on the type of lender being approached, the definition of 'bankable' will vary significantly. The Learning Guide 'Developing Bankable Transport Infrastructure Projects' lays out the key economic, social, political, legal and institutional factors that a private or public investor looks for to determine whether they will finance a project. It also presents a number of case studies and the lessons learned on the journey to making them bankable. City governments and other project proponents should carefully research, consider, identify, select and align with financiers specific lending terms and conditions before embarking on the project preparation stage.





The City Academy on Finance and Equity Workbook



- **Demonstrate strong equity and inclusion outcomes:** Governments, climate funds, development finance institutions and other lenders place a higher premium on projects with high development potential or with high social impact, such as good labour standards or gender inclusion practices implemented during construction or operation phases. Projects demonstrating how they lead to equitable and inclusive outcomes have a higher chance of securing project financing. **In particular, projects should ensure that they remain first and foremost affordable for the majority of the population.** The C40 Cities Finance Facility has put together a useful guide to help city officials in the Global South explore equity and inclusion aspects when preparing the financing of an urban infrastructure project.

Examples of financing sources:

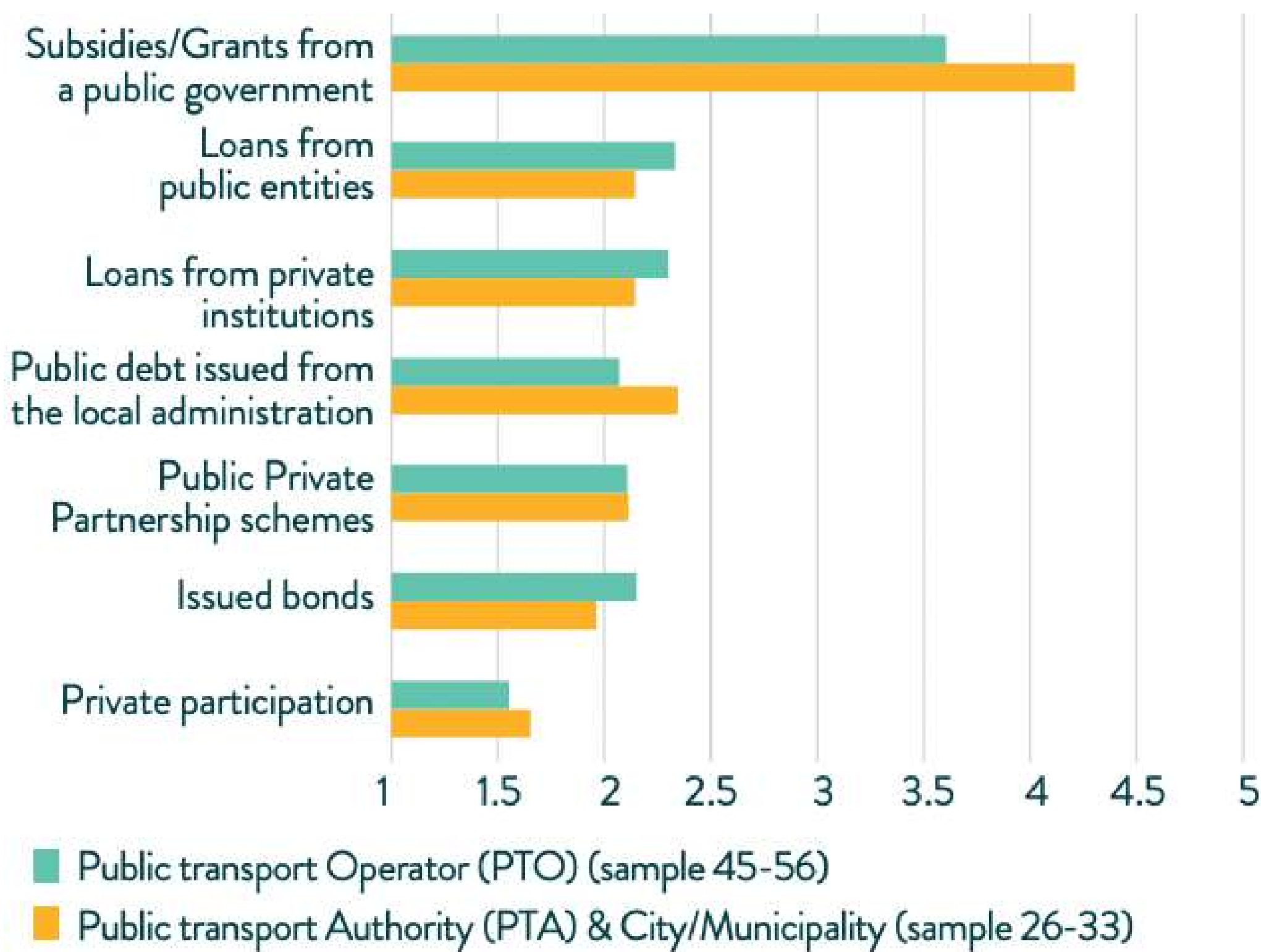
Source	Type	Financing mechanism
Governmental	<ul style="list-style-type: none"> • National government • Regional / federal government • Local government 	<ul style="list-style-type: none"> • National budgets • Taxes • Grants
International financiers	<ul style="list-style-type: none"> • Development Finance Institutions • Bilateral donors • Climate funds • NGOs & technical agencies 	<ul style="list-style-type: none"> • Grants • Concessional loans • Guarantees
Private sector	<ul style="list-style-type: none"> • Banks • Institutional investors • Companies / transport manufacturers • Households & individuals 	<ul style="list-style-type: none"> • Commercial loans • Green bonds • Equity finance
Public transport revenue*	<ul style="list-style-type: none"> • Transport authority • Department of transport • Road department 	<ul style="list-style-type: none"> • Farebox revenue • Operational costs optimisation • Land value capture • Road user charging • Corporate levy • Property taxes

* Projected public transport revenue can also be used to cover or repay the CAPEX costs of a new transport infrastructure project.

Mix of financing instruments utilised for the financing of infrastructure projects in 2024

A brief by UITP showed that in 2024, public transport infrastructure projects mainly rely on public financing (subsidies and grants), with private participation and bonds playing a smaller role and loans (private or public) playing an intermediary role.

Average answer rate (scale 1 lowest - 5 highest)



Source: UITP, [Global Economic Outlook: Taking the Pulse of The Public Transport Sector, 2024](#)

Madrid, Spain

Source : Nicolas SantaCruz from Pexels

5. Diversify and blend sources of funding

To reduce the concentration risk of depending on farebox revenue and government subsidies to operate their public transport network, transit agencies should diversify and blend their revenue sources.

The COVID-19 pandemic and the years that followed also introduced new mobility patterns, as more people started choosing online shopping or remote working over in-person activities. This has exposed public transport networks to declining or unpredictable ridership levels, turning farebox revenue into a riskier revenue stream.

Finally, a commonly used revenue source for public transport investment is fuel duty, levied on the sale of gasoline and diesel for vehicles with internal combustion engines (ICEs). As the global transition towards electric mobility accelerates, and as more and more governments introduce bans on ICE vehicle sales, a decline and eventual extinction in revenue from fuel tax is expected. This challenge will need to be overcome by setting up new, innovative, and blended revenue streams. To gain a better understanding of the options available to cities and transport authorities, we recommend reading the ITF ‘Report on Decarbonisation and the Pricing of Road Transport’.



The Future of Public Transport Funding

There is a wide range of potential sources of income that can be blended together to provide a sustainable financial basis for public transport systems:



Farebox revenue



Revenue from optimisation of operational costs



Land value capture



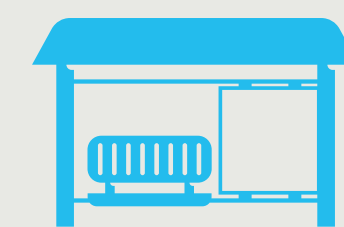
Road user charging



Corporate levies



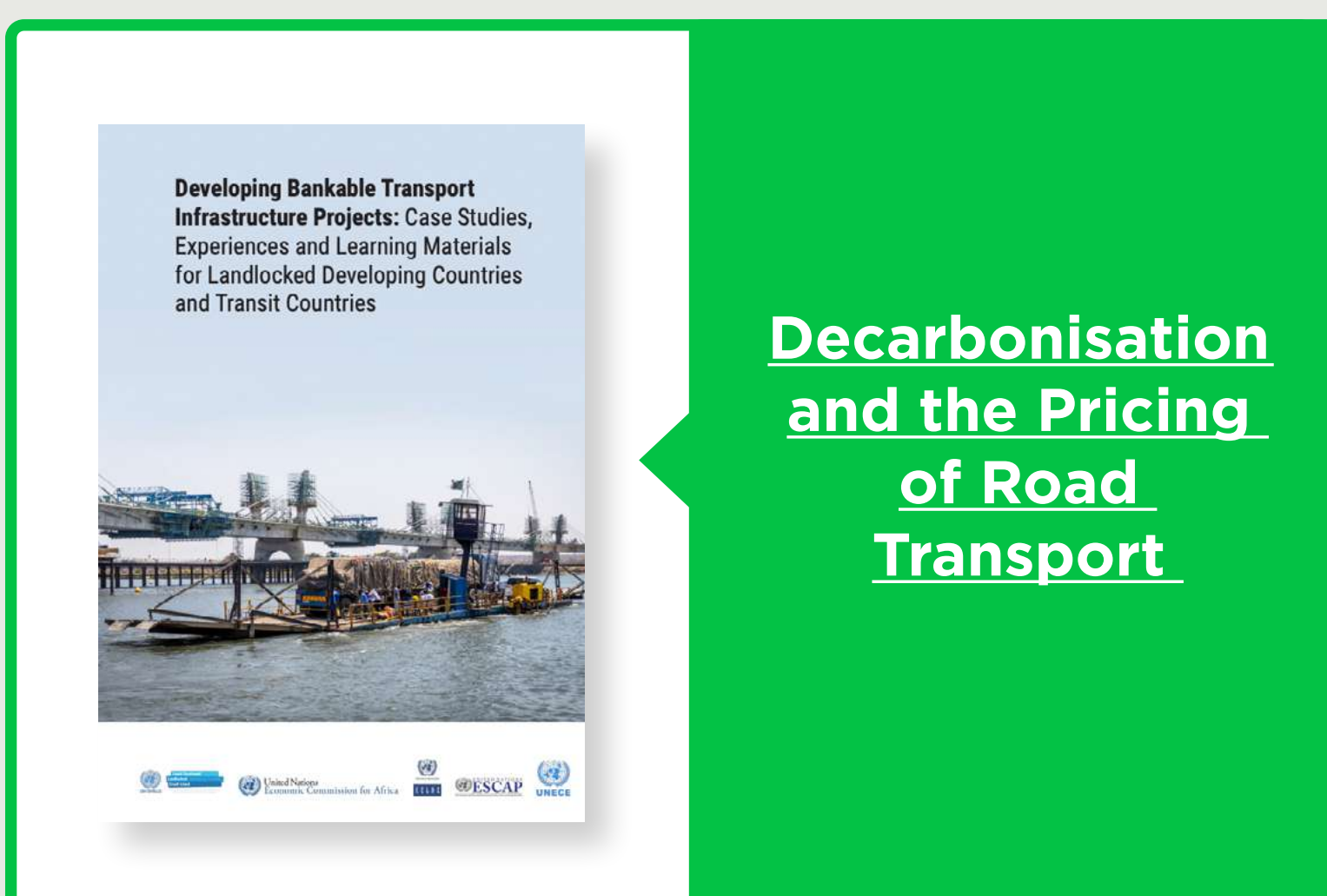
Property taxes



Advertising and sponsorship revenue

The table on the next page goes into more detail on each of these income categories.

To gain a better understanding on each of these sources of funding, we also recommend reading the report prepared by the International Transport Forum “The Future of Public Transport Funding”.



Decarbonisation and the Pricing of Road Transport

Examples of funding sources:

Source	Mechanism	City examples
Farebox revenue	<p><i>Improving attractiveness = increasing ridership. Possible measures includes:</i></p> <ul style="list-style-type: none"> • Optimising fare pricing model • Smart ticketing • Features to increase passenger satisfaction • Management of fare evasion • Integrating informal public transport operations 	<ul style="list-style-type: none"> • Hong Kong • Vienna • Washington DC • New York City • Jakarta
Operational costs optimisation	<ul style="list-style-type: none"> • Energy consumption • Enabling exclusive right of way • Multimodal network • Integration of autonomous features 	<ul style="list-style-type: none"> • New Delhi, Barcelona • Casablanca, Curitiba • Dubai, Beijing
Land Value Capture (LVC)	<ul style="list-style-type: none"> • Land value uplift / transit-oriented development 	<ul style="list-style-type: none"> • Hong Kong
Road user charging	<ul style="list-style-type: none"> • Parking levy • Fuel duty / road traffic insurance tax • Congestion / area / emissions / Vehicle Kilometres Travelled (VKT) charge • Ride Hailing tax / vehicle ownership fees • Tax on tolls • Speeding fines 	<ul style="list-style-type: none"> • Vancouver • Singapore • London • San Francisco
Corporate levy	<ul style="list-style-type: none"> • Employer payroll tax • Business rate (or retail & sales tax) 	<ul style="list-style-type: none"> • France • US, UK
Other taxes	<ul style="list-style-type: none"> • Homeowner or real estate tax • Private developer contributions • Employer payroll tax 	<ul style="list-style-type: none"> • Auckland, NYC • London • France
Other sources	<ul style="list-style-type: none"> • Advertising • Sponsorship 	<ul style="list-style-type: none"> • London • Dubai



Hong Kong, China
Source : Glen Zi from Pexels

5. Strengthen the day-to-day management of operational revenue and develop efficient fare policies

To strengthen day-to-day management of operational revenue, transport agencies can put in place strategies to minimise operational costs and maximise farebox revenue by capturing optimal public transport ridership levels.

Minimising operational costs:

- Reducing the amount of energy consumed (e.g. rail regenerative braking)
- Using Fully Automated Operations (FAO) systems to run public transport operations (e.g. reacting in quasi real-time to peaks in demand to increase capacity along certain transport corridors)
- Ensuring that public transport is given priority over private modes (e.g. dedicated bus lanes to reduce time spent in traffic, and the number of vehicles & drivers required for frequent services)

Maximising farebox revenue:

- Optimising fare pricing model: adopting peak & off-peak fares, implementing concessional fares for specific target groups
- Smart ticketing: setting up an inclusive, digital and frictionless payment process, increases intermodality and reduces physical cash management risks
- Features to increase passenger satisfaction and ridership levels (e.g. digital services, safety measures, priority lanes)
- Management of fare evasion

To gain a better understanding of the best fare model or smart ticketing solution to implement

for your city, and to learn about leading case studies around the world, we recommend reading the reports prepared by Arthur D Little “Public Transport Fare Models” and by UITP “Demystifying ticketing and payment in public transport”.



[Demystifying Ticketing and Payment](#)



[Public Transport Fare Models](#)



[Fare's Fair](#)

3 Case studies

Measures to increase public transport funding:

Increasing farebox revenue

- Smart ticketing: Hong Kong
- Annual passes: Vienna
- Fare capping: London
- Fare evasion: Washington DC & NYC
- Modal integration of informal transport

Minimising operational costs

- Regenerative braking: Barcelona
- Solar panels: New Delhi
- Fully Automated Operations: Dubai
- Exclusive right of way: Curitiba & Casablanca

Implementing road pricing policies

- Parking levy: Vancouver
- Congestion charge: Singapore
- Ride-hailing tax: San Francisco
- Homeowner levy: Auckland
- Real estate tax: New York City

Other taxes

- Employer tax: Paris

Advertising and sponsorship revenue

- Digital and physical ads: London
- Station naming rights: Cairo, Kuala Lumpur

Increasing farebox revenue

Smart ticketing

Hong Kong was one of the first cities to deploy a smartcard system across its public transport network in 1997. It is known as the “Octopus” card and can easily be topped up online or in convenience stores.

Prior to its deployment, users of public transport were required to go through a more cumbersome process of having the exact fare amount in cash or buying prepaid tickets.

The introduction of smart ticketing has enabled:

- Reduction in physical cash management risks, lower operational costs and improved farebox revenue

- A frictionless payment process across different modes (rail, minibus, taxis) and improved inter-modality
- A more seamless public transport experience
- The collection of data on customer profiles and behavior for transport service improvement

In part thanks to this smart ticketing system, Hong Kong has the world’s highest farebox recovery rate, typically returning between 150-180% of operating expenses. The majority of fare revenue from Hong Kong transport operations is collected through Octopus Cards.^{1,2}

Annual passes

Vienna introduced a new fare pricing model in 2011, whereby the annual passes to use public transport across the city decreased from €449 to €365. This explains in part why the city saw a 57% increase in the number of residents using annual public transport passes between 2011 and 2019. Additionally, the share of public transport rose from 36% to 39% between 2011-2013, which represented a five-fold increase from the average annual growth rate of public transport modal share in the previous decade.

Fare capping is generally perceived positively by public transport users, who see it as a simpler way to pay for tickets and as a way to save money.

Finding the right fare model is critical in helping transport authorities capture the optimal levels of ridership and in increasing their farebox revenue.^{3,4}

¹ Maggie Hiufu Wong (2015). Hong Kong's MTR: [Taking a ride on the world's most envied metro system](#). CNN

² Ming LT (2011). Value Chain Flexibility with RFID: [A Case Study of the Octopus Card](#). International Journal of Engineering Business Management.

³ The “Vienna Model”: [365 Days of Unlimited Public Mobility](#). Climate Action Stories. The Schwarzenegger Climate Initiative.

⁴ Ralph Buehler, John Pucher & Alan Altshuler (2017). [Vienna's path to sustainable transport](#). International Journal of Sustainable Transportation

Fare capping

London has set up a daily and weekly capping system for fares across its Transport for London network, adjusted to the zones being travelled through, the modes used (bus, metro, rail) and the day of the week travelled. This dynamic pricing model was designed to increase revenue from regular commuters, while also offering a fairer and more predictable pricing structure. It has been a successful overall in increasing ridership, but it is worth noting that the impact on revenue has been more complex to assess.

Fare evasion

Washington DC: between 2019 and 2024, the Washington Metropolitan Area Transit Authority (WMATA) saw its fare evasion rate increase from 14% to 70%, leading to an annual loss of \$40 million. To combat this loss, WMATA has installed higher fare gates and increased the amount of transit officers stationed at fare gates to fine fare evaders. Since 2023, more than 1,200 gates were installed across the Metrorail system, leading to an 82% drop in fare evasion.^{5,6}

New York City: the Metropolitan Transportation Authority is also implementing a host of initiatives to combat fare evasion, including by launching a Fare Evasion Lab which will act as a test bed for piloting new fare compliance technologies.^{7,8}

Modal integration of informal public transport

Jakarta: the city offers a best practice case study on how 'informal' public transport services can be integrated into formal public transport services to maximise ridership and fare revenue. Since 2017, the city has been working to bring privately-operated Mikrotrans (minibuses) into the Transjakarta BRT network through its "Jak Lingko" scheme.



Read C40's case study on the Jak Lingko scheme [here](#) to learn more about it.

In so doing, the transport authority has been able to capture a new share of public transport users, seeing its coverage of public transport double between 2017 and 2022, from 42% to 82%.⁹

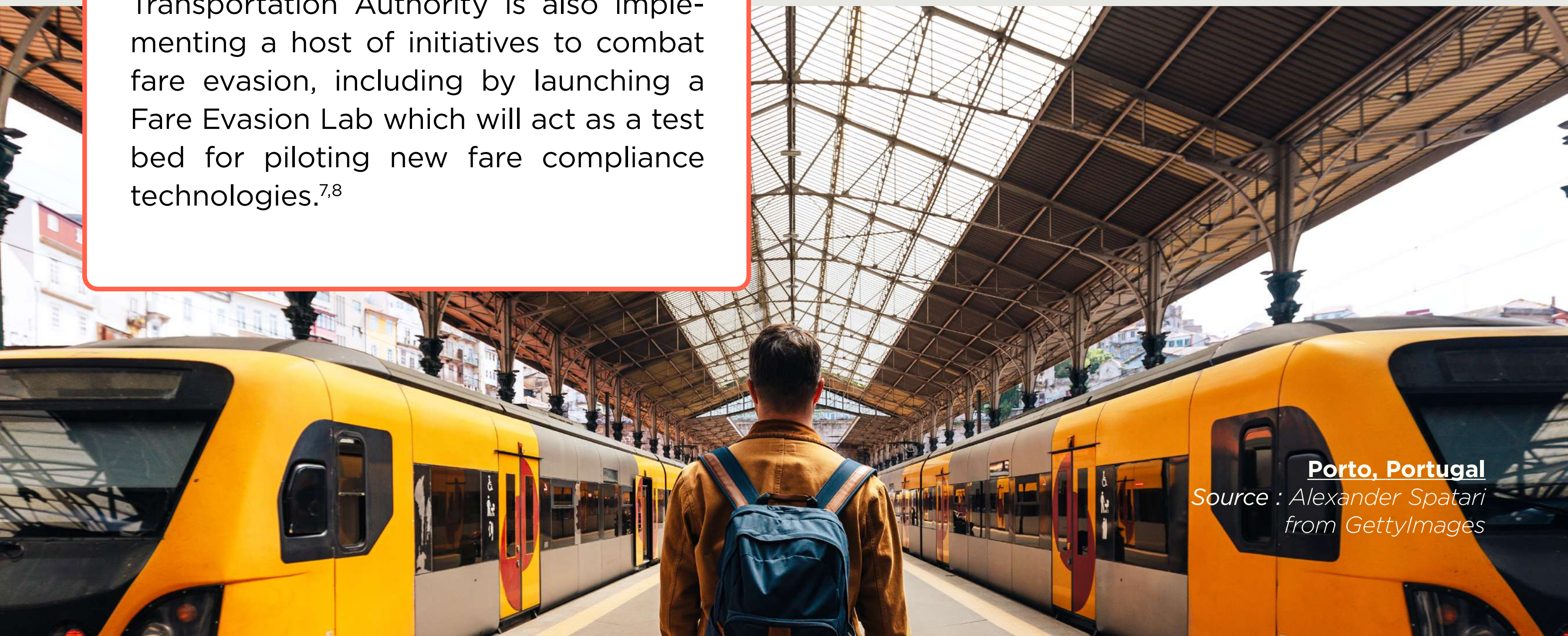
⁵ MTA (2024). [MTA Announces Progress on Reducing Subway Fare Evasion](#). MTA Press release.

⁶ MTA (2024). [Report of the Blue-Ribbon Panel on MTA Fare and Toll Evasion](#). MTA Publication.

⁷ Joseph Olmo (2024). [Metro fare evasion crackdown: Here's what to expect in DC](#). NBC Washington.

⁸ Paola Belloso (2024). [Metro installs more secure faregates in effort to prevent fare evasion](#). DC News.

⁹ C40 Cities Climate Leadership Group (2023). [How Jakarta integrated informal minibuses into the public transportation network](#). C40 Knowledge Hub.



Porto, Portugal

Source : Alexander Spatari from Gettyimages

Minimising operational costs

Reducing energy costs through regenerative braking

Barcelona: the city has been installing energy inverters on the city's metro network to convert the kinetic energy from braking into electricity, which is in turn used to power the trains, station amenities (lighting, escalators and ventilations systems) and a network of EV chargers located just outside subway stations. Once completed, the METROcharge project will supply 41% of the total energy needed to run the network's trains.

The energy savings generated by this regenerative braking technology will be recouped through energy savings and revenue from the EV charging stations, which are providing a steady income stream for drivers paying to charge their cars. It is expected that the investment costs will be offset within five years.^{10,11}

Reducing energy costs through renewable energy supply

New Delhi: in 2024, the Delhi Metro Rail Corporation (DMRC) announced that around 35% of its total daytime energy demand was being met by renewable sources, enabled in part by an offshore solar plant and the rooftop solar panels installed on the roofs of its metro stations and bus depots. It also uses regenerative braking across its metro network.

DMRC's metro expansion plans include measures to increase the number of solar panels installed across the network's infrastructure, with the goal to meet about 70% of its energy demand with renewable energy.

This will not only help the transport operator reduce the cost of its energy bill, but will also reduce its carbon footprint.^{12,13,14}

¹⁰ Michael Thompson (2024). [Barcelona's Subway System Turns into a Power Station](#). Sigma Earth.

¹¹ Nathalie Donback (2024). [Barcelona is turning subway trains into power stations](#). Grist.

¹² Abhishek Jaiswal (2023). [Sustainable transportation: Delhi Metro leads by example in green mobility](#). Clean Mobility Shift.

¹³ Surbhi Goyal (2019). [60% of Delhi Metro now powered by solar energy from Madhya Pradesh](#). World Bank Group.

¹⁴ Priyangi Agarwal (2023). [Elevated plans: Delhi metro eyes solar share of 50% in 8 years](#). Times of India.



New Delhi, India
Source : Peer org.

Fully Automated Operations (FAO)^{15,16}

The potential uses of artificial intelligence (AI) to automate operations in public transport are broad, and in some cases, have demonstrated important capital and operational cost savings for transit agencies and operators. This can be done in a way that avoids job loss, with more staff resources becoming available for maintenance or safety jobs.

China's high speed rail network is in part operated by an AI system in Beijing. The system processes real-time data from across the country and is able to spot and resolve track problems in a timely and efficient manner, reducing maintenance costs.

Dubai is another example of a city using FAO on its metro operations, leading to savings in energy consumption by 15%.



¹⁵ Thales (2022). [Thales and Dubai Roads and Transport Authority save 15% of energy of Dubai Metro](#). Thales.
¹⁶ Kriti Rai. [High Speed Railways in China](#). Organisation for Research on China and Asia - Article.

FAO Impact on CAPEX and OPEX costs (by UITP)

Fleets	Infrastructure	Increase in cost	Reduction in cost
Keeping the same capacity offer than a conventional line, FAO achieves fleet savings ranging from 5%-10%, thanks to the increase in commercial speed gained through optimised speed profiles & dwell times, and automated turn back. This increased fleet productivity can be used to reduce the number of trains or, alternatively, the number of cars per train, leading in this case to infrastructure savings.	FAO offers similar or even higher capacity with shorter trains, which result in shorter platforms, smaller stations & workshops.	Higher technical profiles required to maintain FAO systems	FAO lines are equipped with better diagnostic means, facilitating maintenance optimisation
Improved maintenance regimes under FAO minimise the need for a reserve fleet for maintenance, as opposed to the conventional planning of up to 15% fleet reserve.	Automated coupling and uncoupling also allows for the design of smaller workshops.	Extra maintenance costs for track protection system devices	Fewer equipment parts on the tracks
	FAO allows to park trains in tunnels or stations, reducing the size of stabling yards.		Reduced costs in materials and labour time, as a result of more predictable and focused asset wear due to the accuracy and regularity of FAO

Enabling exclusive right of way

Tramways and **Bus Rapid Transit (BRT)** corridors are effective transport planning measures that cities can implement to give exclusive right of way to low-carbon mass transit solutions, while reducing public transport operational costs.

This exclusive right of way can help reduce public transport users' time spent in traffic, making such modes more attractive than private cars that do not benefit from this advantage.

It also means that less vehicles are required to ensure frequent services, helping to reduce operational costs for operators.

Casablanca (Morocco) and **Curitiba (Brazil)** are two cities which have implemented a tramway and BRT system respectively.



Casablanca, Morocco

Source : Oussama Rahib from Unsplash



Curitiba, Brasil

Source : C40 Cities

Implementing road pricing policies

Parking levy

Vancouver: a parking levy was first implemented in the city in 2006. It is managed by a parking vendor company and remitted for administration to TransLink, the Greater Vancouver's regional transportation agency. The money raised is reinvested to fund road and transit operations, such as increasing the network coverage and frequency of bus services. In 2023, the parking levy made up about 5% of Translink revenue.

Other cities have implemented parking levies, like Montreal, Paris, Tokyo or Nottingham, leading to reduced car use, congestion and an increase in public transport ridership. More cities are also exploring this as a new source of transit funding, such as Toronto, Melbourne and Auckland.^{17,18,19}

Congestion charge:

Singapore: in 1998, the city-state introduced a Electronic Road Pricing (ERP) as a way to optimise road usage and reduce congestion. The government covered the cost of installation for the in-vehicle units, which charges users automatically when they enter the charging zone.

Following its introduction, the ERP successfully reduced traffic volume in the city centre by 15%.

The ERP scheme also generates approximately \$40 million per year in net profits, which is equivalent to around 10% of the local transport authorities' income.

As a point of reference, London's congestion charge generated around 4% of Transport for London's total revenue in 2019.^{20,21}

¹⁷Patrick Johnstone (2024). [Translink Funding](#). Blog.

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¹⁹Paul Barlow (2006). [Parking site Tax Implementation. Case Studies in Sustainable Transportation](#). Urban Transportation Showcase Program.

²⁰Caitlin Rollison & Matthew Coombes (2023). [Gear shift: International lessons for increasing public transport ridership in UK cities](#). Centre for Cities.

²¹Environmental Defense Fund - EDF (2006). [Singapore: A pioneer in taming traffic](#). EDF Factsheet.





Ride-hailing tax:

San Francisco: Transportation Network Companies (TNC) - like Uber and Lyft - make up a key part of San Francisco's (SF) urban mobility landscape. It has been estimated that TNCs account for 20% of driving in SF, cannibalising demand for public transport.

In response to this, the city passed a new motion in 2019, the Traffic Congestion Mitigation Tax - also called the TNC tax - to impose an excise tax of 1.5% to 3.25% on fares for rides facilitated by ride-sharing or ride-hailing companies.

Annually, this tax generates USD \$30-35 million, which is roughly equivalent to 2% of the San Francisco Municipal Transportation Agency (SFMTA) revenue sources. Around half of this is used to fund transportation improvements, including maintaining and expanding the fleet of the Muni Metro light rail system, improving transit frequency and reliability and increasing access to transit. The other half is used to fund safety projects for pedestrians and cyclists.^{22,23,24}

Other taxes

Homeowner levy

Auckland in 2022, the city's council proposed the Climate Action Targeted Rate (CATR), which is a property tax that levies around 58 USD per year on homeowners. The revenue collected from this tax is in part ringfenced for reinvestment into public transport and will focus on rolling out new bus services and improving the frequency of existing bus services.²⁵

²² San Francisco County Transportation Authority (2024). [TNC Tax Funding Overview](#). SFCTA Website.

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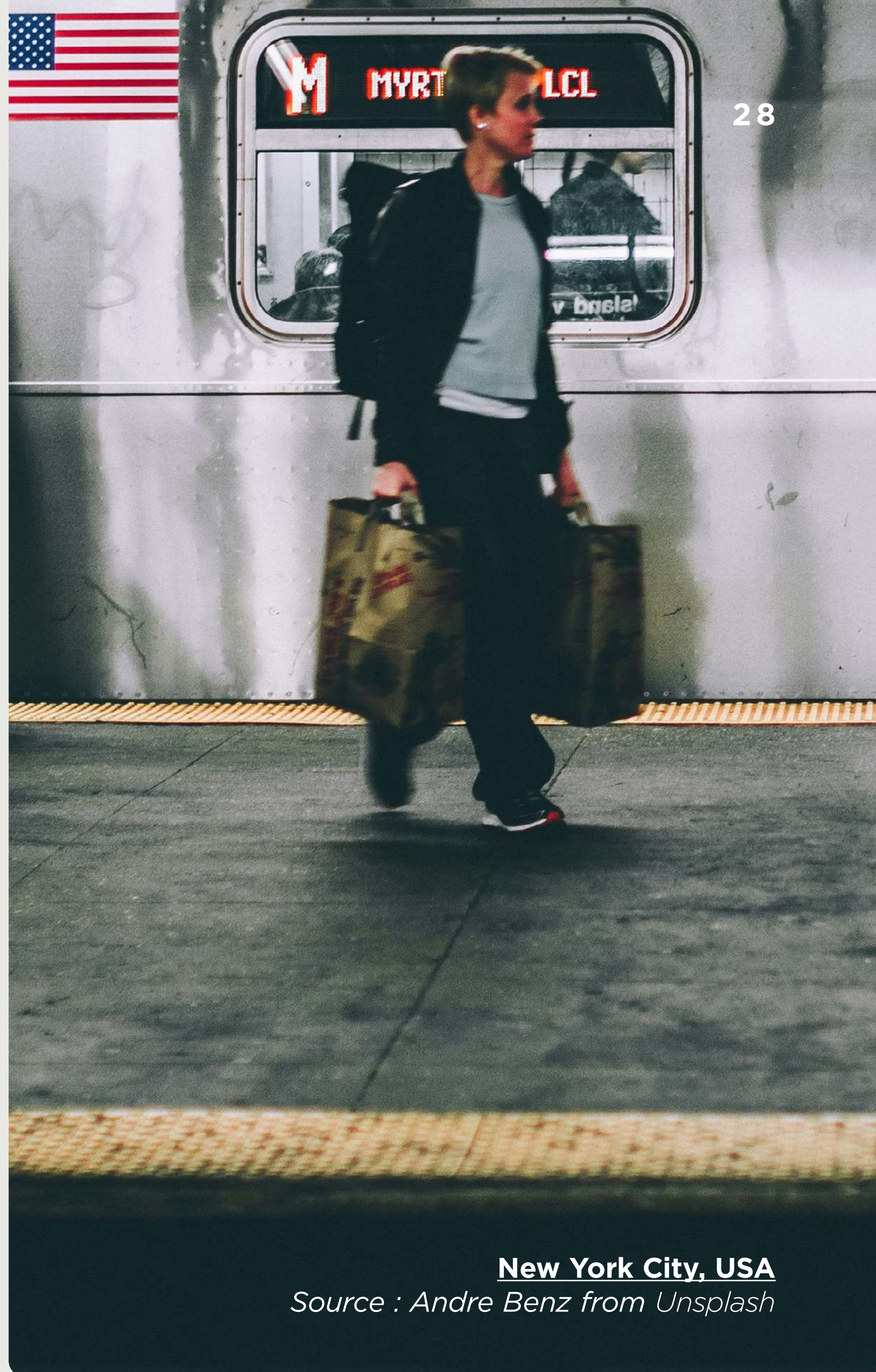


Real estate tax: casinos and mansions

New York City In 2024, the city's Metropolitan Transportation Authority derived around 45% of its revenue from dedicated taxes, including a real estate tax which accounted for 3% of that revenue.* In, 2026, a new casino tax is also expected to come into effect, accounting for around 3% of the forecasted total revenue. This tax will be levied on casino licences sold by the city to casino developers.

The real estate tax, also called the “mansion tax”, is a one-time tax on properties over USD\$ 2 million. The revenue generated is used to back bonds that the MTA sells to borrow additional capital for funding infrastructure upgrades.²⁶

* The rest of MTA's revenue is made up of farebox revenue (27%), toll revenue (14%) and state subsidies (9%).



New York City, USA
Source : Andre Benz from Unsplash

Employer tax:

Paris: Île-de-France Mobilités, the French government's authority coordinating the different companies operating in the greater Paris and Ile-de-France region, is in charge of collecting the “Versement Mobilité”*.

It is a payroll tax levied on organisations employing more than 10 people and varies between 1.2% to 2.5% of gross wages. The underpinning logic to this taxation model is that public transport is a public good that employers and employees indirectly benefit from, and therefore should contribute to.

In 2022, 51% of Île-de-France Mobilités's budget came from the Versement Mobilité.

Paris's public transport system is therefore funded in majority by this local payroll tax. This revenue mechanism has allowed Île-de-France Mobilités to diversify its funding sources and minimise its reliance on fare revenue and government subsidies.

The same taxation model is used in other cities of France, with over 250 transport authorities benefitting from the ‘Versement Mobilité’, accounting for around 50% of their total revenue and representing the main revenue source for transport authorities across France.^{27,28,29}

* “Versement Mobilité” can be translated to “Mobility Payment”

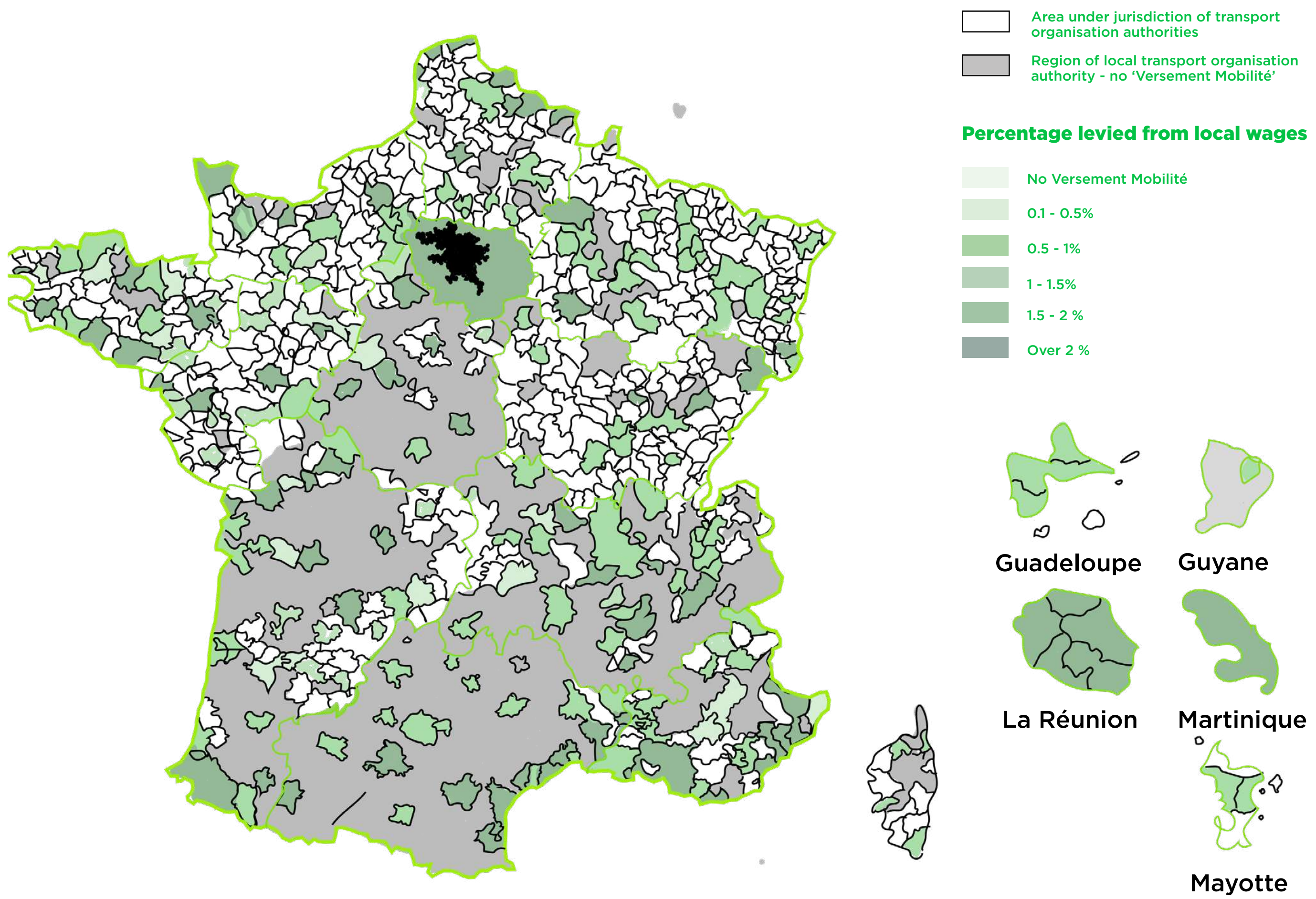
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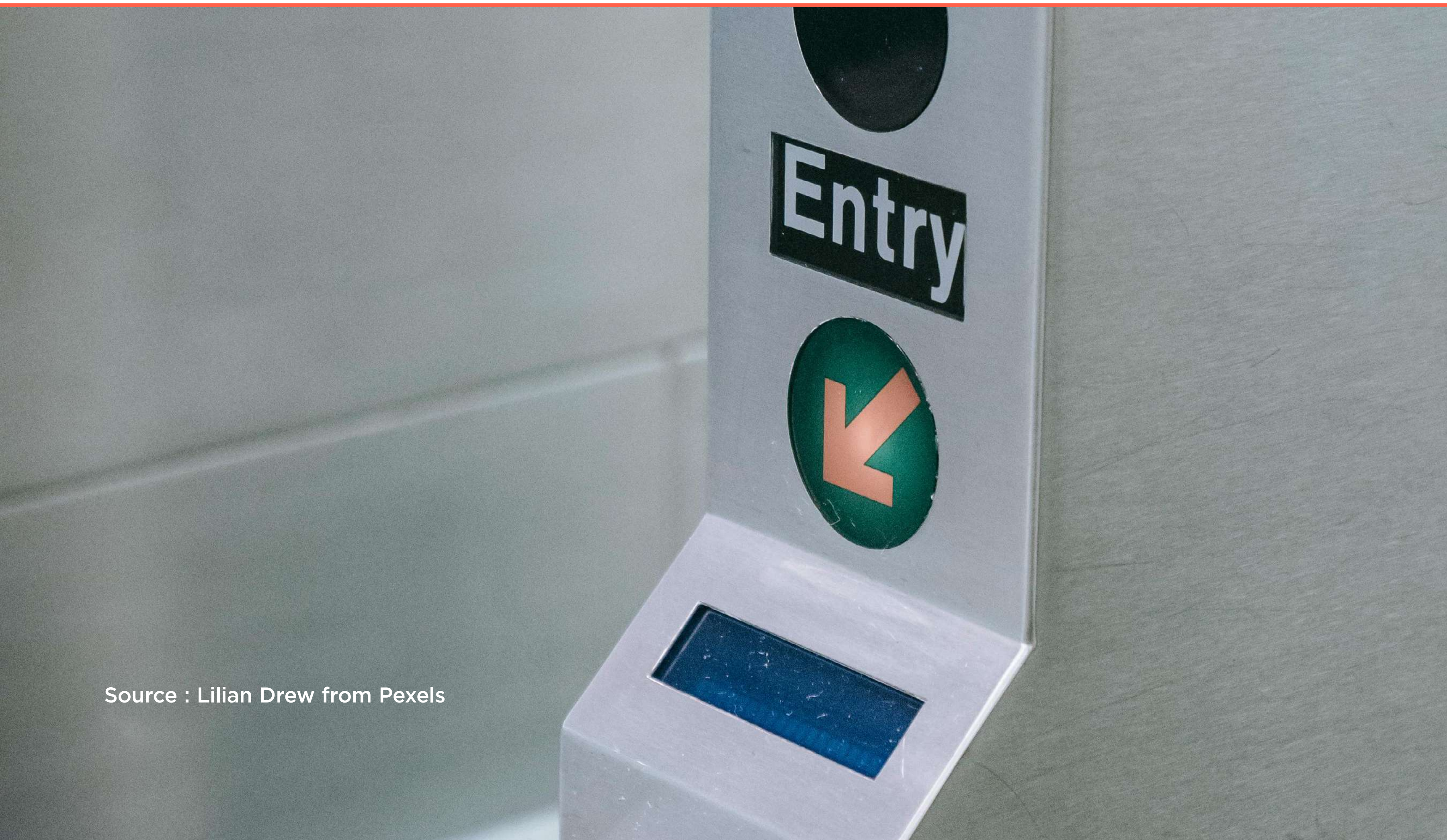
²⁸ Cyprien Richer (2021). [Le versement-Mobilité et la question territoriale : vers une redéfinition de la ressource suite à la Loi d'Orientation des Mobilités ?](#) Transports, Infrastructures & Mobilité.

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Map of the percentage levied from local wages across France to generate the Versement Mobilité (2025)



Source: [Cerema](#)



Source : Lilian Drew from Pexels

Advertising and sponsorship revenue

Digital & physical advertisement

London: London's public transport agency, Transport for London (TfL), has been relying on commercial advertisement across its network to generate non-fare revenue. They have been doing so since the late 1800s, installing ads on buses, at bus stops, on train platforms, on escalators or inside carriages, combining physical and digital advertising spaces.

In 2022/23, around 10% of TfL's total revenue was derived from commercial advertisement activities.

More often than not, transport operators will contract the management of commercial advertisement to a dedicated company.^{30, 31}



Station naming rights

Dubai: The RTA, an agency, which runs the city's public transport system, set up a program in 2018 to manage station naming rights. It gives corporations and brands an opportunity to bid for a station to be named after themselves, in exchange for a fee. Similar programs have been run in the metro systems of Cairo, Delhi, Kuala Lumpur, Madrid, New York City and Mumbai.

The sponsorship revenue derived from such programs is minimal compared to the total revenue public transport authorities manage, but can be helpful in diversifying public transport sources of funding.

As a reference point, Dubai's Metro naming rights program generated a revenue of around USD 545 million from 2010 to 2020, with a per station naming right cost of around USD 19-25 million.³²

³⁰ London Transport Museum, [Publicity pays: posters and advertising on London's public transport network](#), London Transport Museum website.

³¹ Mayor of London (2023), [Revenue from advertising](#), Mayor's Question Time, London Assembly Gov Website.

³² World Bank Public Private Partnership, [Station Naming Rights Dubai Program Overview](#), World Bank Group.





Dubai, United Arab Emirates
Source : Max Avans from Pexels

4. Public transport financing

- **Blended international financing:**
Dakar's Electric Bus Rapid Transit
- **Partial subvention model:**
Sao Paulo's e-bus transition
- **Green bonds:**
Vancouver's financing of public transport
- **Blended public & private financing:**
London Crossrail project
- **Land value capture:**
Hong Kong's Rail + Property model



Dakar's Electric Bus Rapid Transit Project

Blended international financing: loan, grant and equity

Project summary: In May 2024, the city of Dakar launched a fully electric BRT system, covering a network of 18.3 km with a fleet of 144 articulated e-buses, a first for the African region.

Project structure: The Executive Council for Sustainable Urban Transport (CETUD), the organizing authority for urban public transport in Dakar, was responsible for coordinating the development of the BRT project.

The acquisition, operation and maintenance of vehicles and associated systems is managed by Dakar Mobilité (a private company owned by Meridiam, a global investor and FONSI, Senegal's sovereign fund) through a 15-year concession agreement. ^{1,2,3,4}

Cost item	Financier	Type of financing	Amount
BRT Equipment	AFD (Proparco) + Emerging Africa Infrastructure Fund (Ninety-One)	Loan	€85.4 million
Replacement of e-bus batteries at end of life	AFD (Proparco) + Emerging Africa Infrastructure Fund (Ninety-One)	Loan	€6.4 million
Additional financing (e.g. technical assistance)	European Union + PIDG	Grant	Around €16 million 6.4 million
Dakar Mobilité (BRT operating company)	Meridiam and FONSI	Equity	Undisclosed

¹Zimsphere (2024). [Senegal: the long-awaited solar-powered Dakar BRT finally goes into service.](#)

²EU Delegation to Senegal - Press team (2023). [Dakar Mobilité secures financing for the first-ever 100% electric BRT bus system in sub-Saharan Africa.](#) EU Press Release.

³Meridiam (2023). Press release: [Dakar Mobilité secures financing for the first-ever 100% electric BRT bus system in sub-Saharan Africa.](#)

⁴Dave Spooner (2020). Dakar [Bus Rapid Transit: Labour Impact Assessment Research Report 2020.](#) Global Labour Institute Report.

Project timeline:

Structuring a blended financing mechanism is a multi-year process, involving multiple financial feasibility and impact studies, alongside extensive multi-stakeholder coordination and negotiations. In the case of Dakar, it took around 22 years between the moment the financing mechanism was conceptualised, finalised and the project was implemented.

Date	Action
2002	Former Mayor of Bogotá visits Dakar, at workshop organised by CONNEX and SYSTRA. Dakar authorities express interest in potential development of a BRT system
2002- 2017	Various plan versions & studies developed for BRT project
2004	Pre-Feasibility Study by ITDP
2015-2016	Series of consultations and meetings with community representatives and residents by CETUD authority
2016	Preparation of a pilot experiment of a transport system on reserved lanes in Dakar - Economic analysis of the project proposed by IFC. Ministries of Infrastructure, Land Transport and Opening-up, CETUD
May 2017	World Bank loan approved for pilot project
2017-2023	BRT Pilot Project funded by the World Bank
May 2019	Sustainable Asset Valuation (SAVi) of BRT project by the IISD
Oct 2019	First e-bus prototype is presented
2020	Labour Impact Assessment of BRT project on informal transport industry and workforce conducted by Global Labour Institute
May 2024	Launch of the electric BRT project



Dar es Salaam, Tanzania

Source : Hendri Lombard World Bank



Vancouver, Canada
Source : TransLink.ca

Vancouver's Green Bond financing program

Bonds issued by a public transportation authority

Project summary: *Since 2018, Vancouver's public transportation authority, TransLink, has been issuing green bonds* to finance, "in whole or in part, existing and future capital projects that provide environmental benefits to TransLink and the region, while supporting the achievement of environmental and climate goals".*

Project structure:

- Its first ever bond was issued for a total amount \$400 million, and resulted in an oversubscribed round with 41 investors, mainly made up of pension funds (72%) and insurance companies (12%).
- Funding is allocated towards SkyTrain operations, upgrade and maintenance, refurbishment and purchase of vehicles, e-bus and other renewable energy transport programs and cycling and pedestrian infrastructure costs.

Project results:

- TransLink's innovative bond financing scheme has allowed it to bounce back quicker from the pandemic shock, becoming the agency with the third highest bus ridership in North America in 2023.
- As an example, its investment to add 11 km and six new stations to the Skytrain Millennium Line (ML) resulted in annual ridership increasing by 24% from 2022 to 2023.^{6,7}

* Singapore is another example of a city issuing green bonds to invest in the expansion of its public transport network. See more information [here](#).

⁶ TransLink (2023). [TransLink Green Bond Impact Report](#). TransLink Report.
⁷ TransLink (2018). [TransLink Green Bond Framework](#). TransLink Report.

London's Elizabeth Line project

Blended public and private sector financing

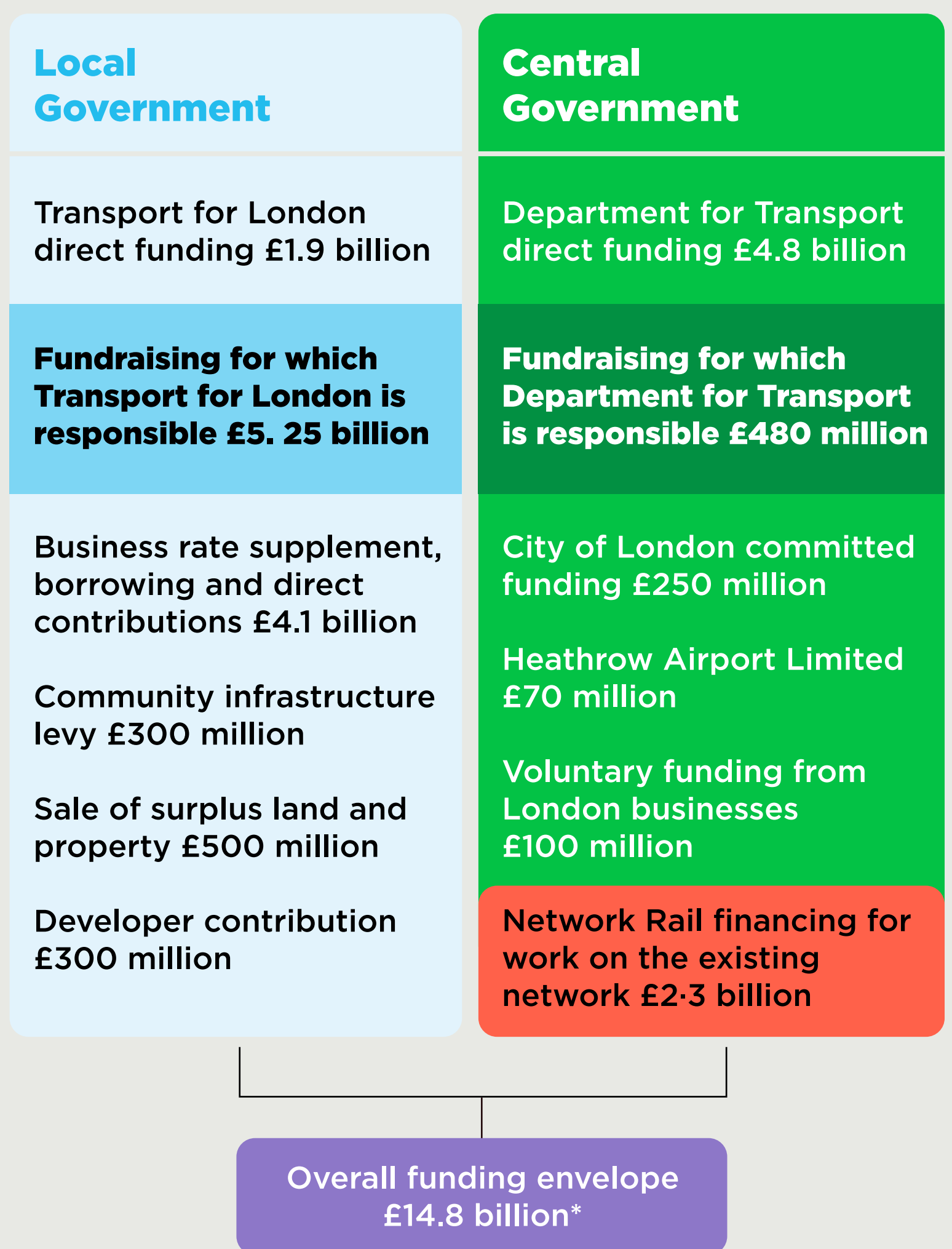
Project summary: *Crossrail, later renamed the Elizabeth Line, is a new high-frequency commuter rail project connecting West London to East London. The project was first conceptualised in 2002 by the Cross London Rail Links Ltd (CLRL), a company formed to respond to the growing demand and pressure on public transport services in the Greater London area. A business case was commissioned and a funding structure was agreed by all project stakeholders in 2007. Construction began in 2009 and the line opened in 2022.*

The financing model used was a mix of public and private sources leveraged at both the local and national level, including from London's businesses, private developers and Heathrow Airport (one of London's major airports connected to the Elizabeth Line).

Project structure:

- CLRL was initially owned on a 50:50 basis by the Strategic Rail Authority (SRA) and Transport for London (TfL). It became the nominated company to take forward the scheme. In 2008, 100% of the ownership was transferred to TfL, becoming in effect a quasi-independent delivery vehicle/subsidiary of TfL. CLRL was then renamed to Crossrail Limited (CRL).

- The financing sources came from local and central government, each responsible for collecting additional financing from businesses and developers.



*The final cost amounted to £15.9 billion.
Source: ICE Publishing



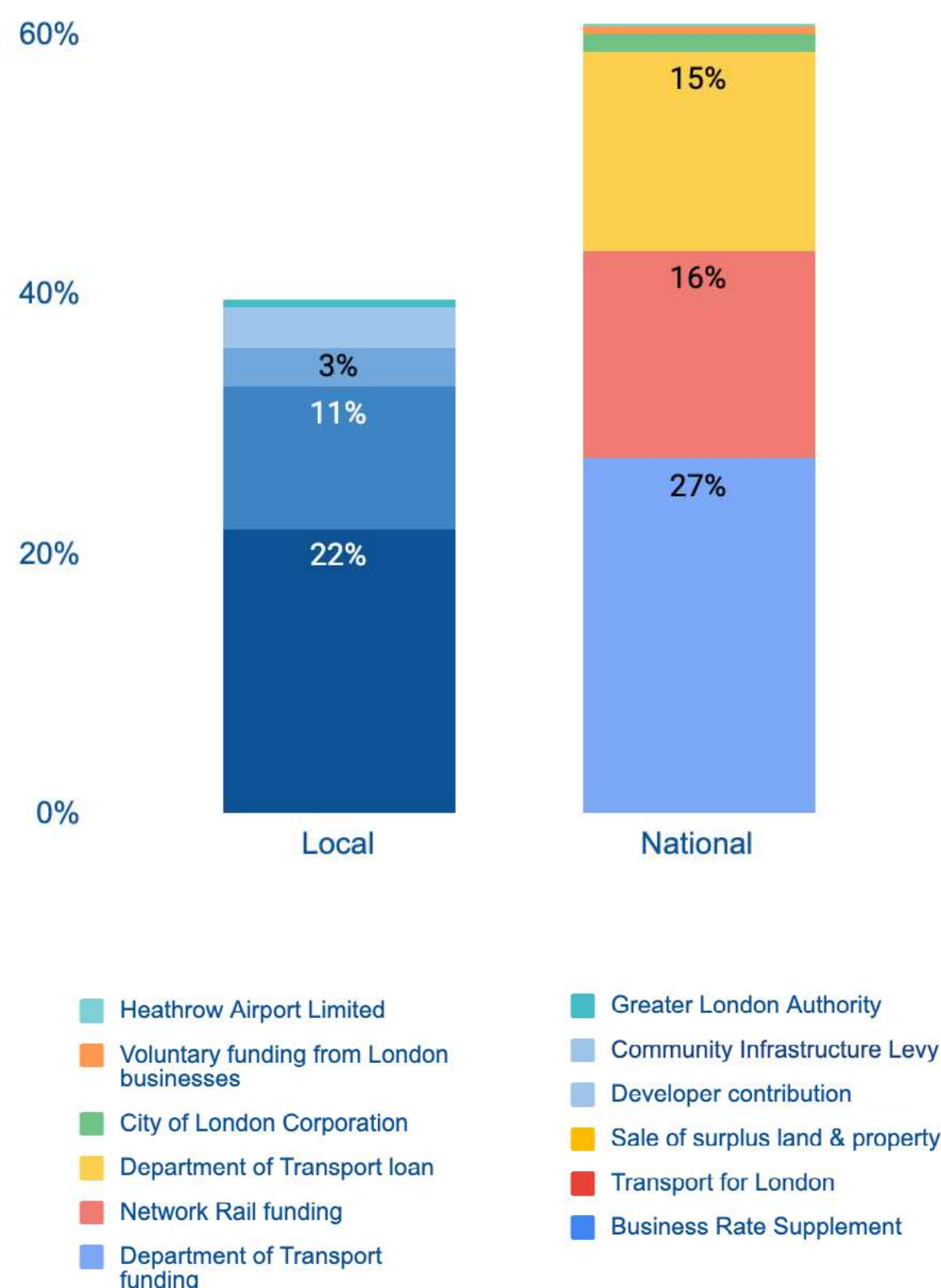
London, UK
Source: Cross London Rail Links



Project outcome:

- TfL coordinated the business case for the Crossrail project.
- London First, an influential business-based lobby group, was closely involved in the process, and played an important role in making the case that Crossrail would transform and benefit London’s business community through improved access to central London and “agglomeration effects”. This argument was instrumental in the creation of private financing sources, such as the business rate supplement (BRS), the developer contribution and the community infrastructure levy (CIL).
- The Greater London Authority (GLA) and TfL further used the projected income generated by the BRS, the CIL and future revenue of the Elizabeth Line as hypothecation to secure a loan from the Department of Transport.
- Despite the project’s success in securing funding from multiple sources, the opening of the line was delayed causing revenue loss from fares and a need for additional finance injections from government.^{8,9,10}

Breakdown of project costs



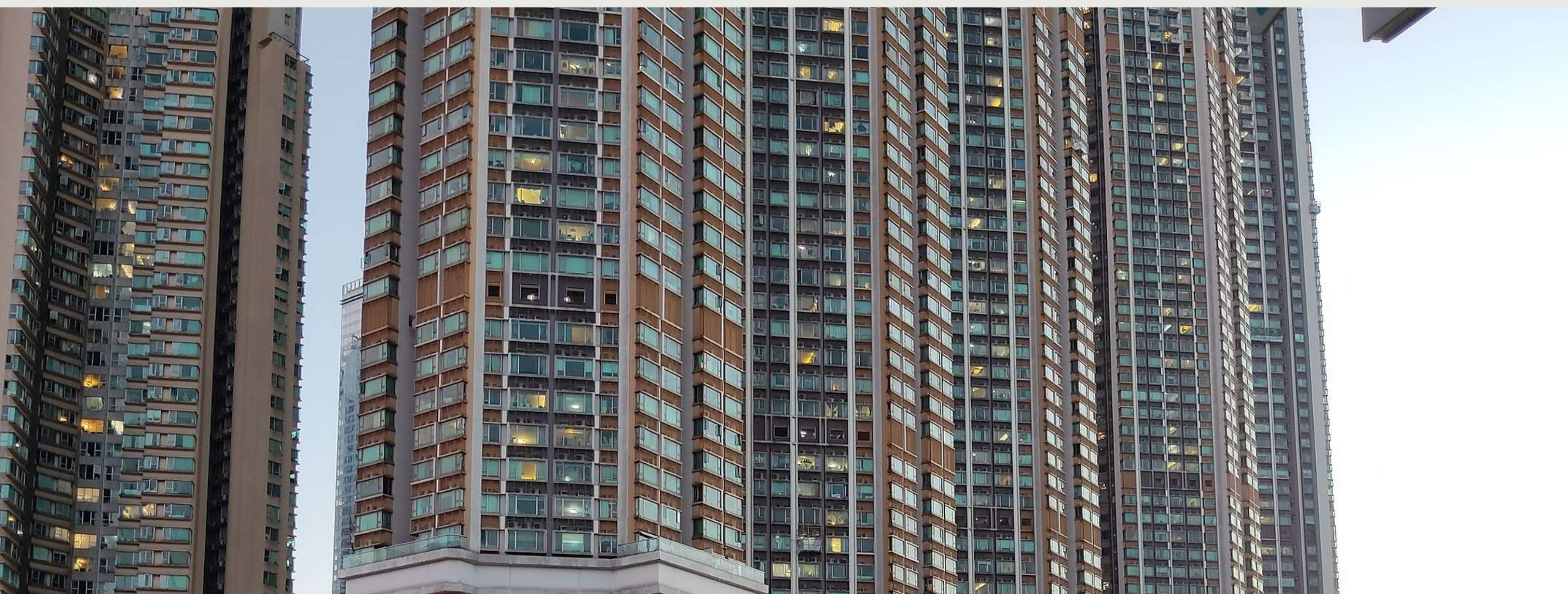
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Hong Kong's Rail + Property Model

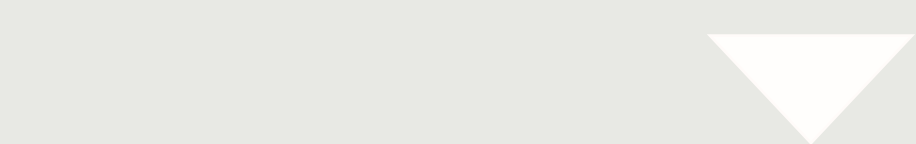
Land value capture and joint development financing

Project summary: *Hong Kong's Rail + Property (R+P) model was pioneered in the 1980s by the Mass Transit Railway Corporation (MTRC), now MTR Corporation (MTRC), a publicly listed company majority-owned by the Hong Kong government. The model was established to finance railway expansion without relying heavily on public subsidies. Under this approach, the Hong Kong government grants MTRC development rights over land near new railway stations at pre-railway prices. MTRC then partners with private developers, sells or leases the properties at a premium (once railway development creates a land value uplift), and reinvests profits into railway operations and expansion.*

Project results:

This model has been highly profitable, generating billions in revenue annually. In 2022 alone, MTRC earned HK\$50.4 billion (US\$6.4 billion), with a significant portion from property development and rental income. The financial success of R+P has allowed Hong Kong to maintain one of the world's most efficient and financially sustainable public transit systems, with over 90% of daily commutes made on public transport. Unlike many global cities where transit systems struggle with deficits, MTRC operates profitably, reinvesting earnings into railway maintenance, expansions, and service improvements, making Hong Kong a global benchmark for transit-oriented development. The city's transit-oriented development is also characterised by high-density, further contributing to increased ridership of public transport.

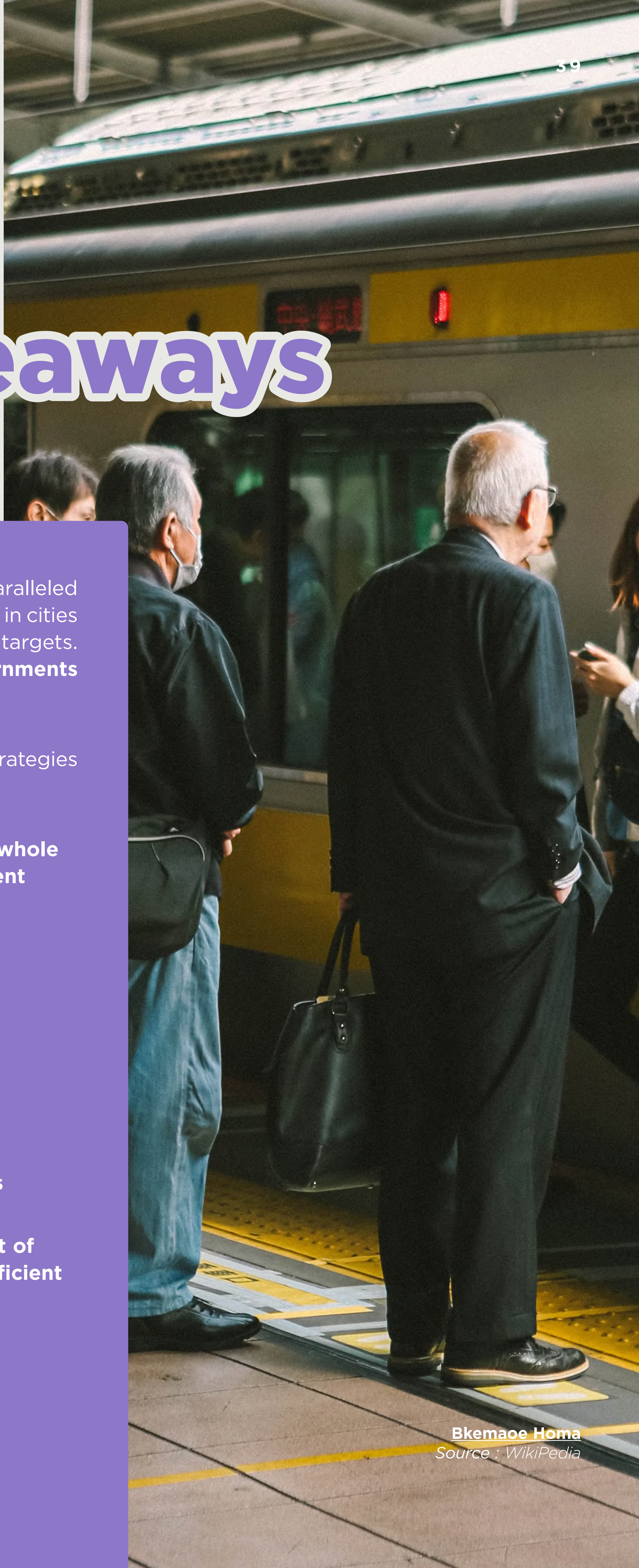
5. Key takeaways



Investment in public transport offers unparalleled opportunities for improving quality of life in cities while meeting climate emission reduction targets. **It is a critical public good that governments should prioritise investments in.**

Public transport funding and financing strategies should aim to:

- **Measure and evaluate systems as a whole to prioritise most strategic investment**
- **Integrate transport and land use planning models**
- **Consolidate long-term revenue management powers**
- **Develop bankable projects**
- **Diversify and blend funding streams**
- **Strengthen day-to-day management of operational revenue and develop efficient fare policies**



Authors & acknowledgement

This report was created by C40's Transport Team and authored by Louise Ribet, Senior Manager Public Transport at C40 Cities.

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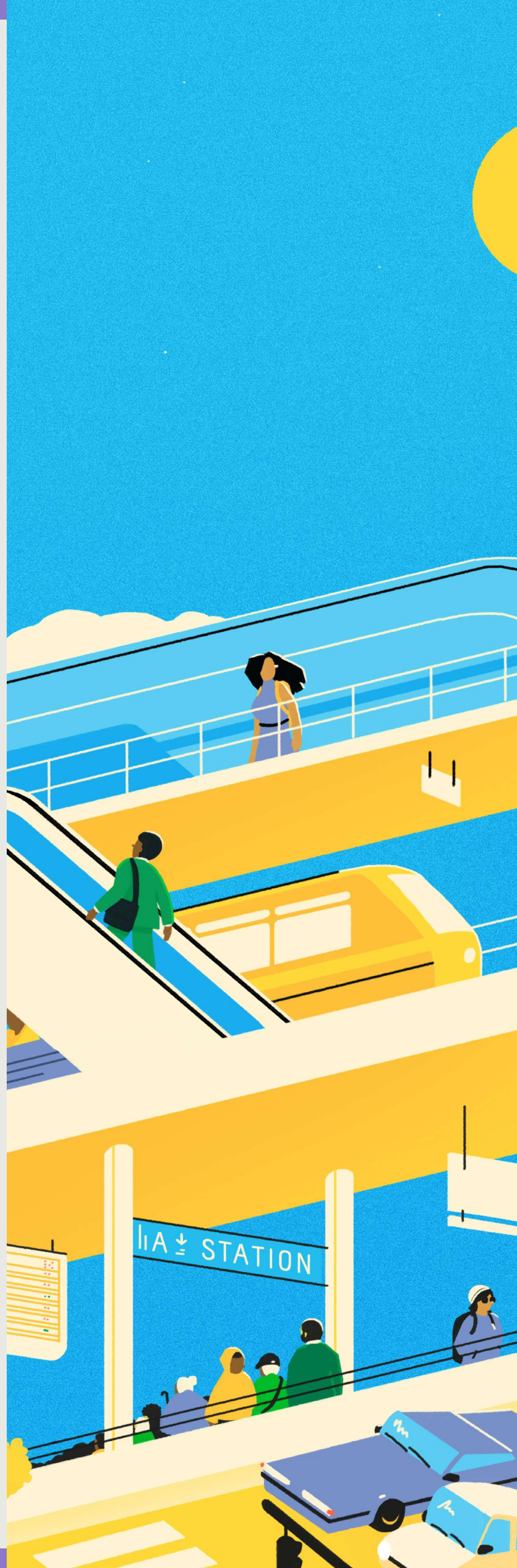
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For more information

C40 Cities is a global network of nearly 100 mayors of the world's leading cities that are united in action to confront the climate crisis. For more information on C40 Cities work in the transport sector, please email: transport@c40.org

The findings of this report support the 'Future is Public Transport' campaign, co-led by C40 Cities and the International Transport Workers' Federation (ITF) to support the improvement, expansion and electrification of urban public transport. It was launched in 2021 during the pandemic by a coalition of mayors, unions, civil society organisations, and business operators. Find out more on the [campaign website](#).

Report published: March 2025.



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