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Public Transport



KEY FINDINGS

- Public transport presents one of the most powerful and cost-effective solutions available to tackle our pressing climate crisis and development challenges. The environmental benefits are substantial: buses and trains can slash greenhouse gas emissions by around two-thirds per passenger-kilometre when compared with private vehicle use.

- Beyond environmental impact, public transport serves as a vital catalyst for economic opportunity and social equity. Public transport can generate economic returns that are about five times greater than the initial investment made in it, making it one of the most cost-effective ways to improve urban accessibility and economic productivity, and reduce traffic and parking congestion problems. When properly implemented, these systems provide affordable access to essential activities and services such as employment, education, health care and urban amenities for diverse populations.

- The window for capitalising on post-pandemic mobility transitions is narrowing.

- Successful public transport uptake requires unified urban visions that integrate public transport with land-use planning, governance that discourages car dependency, sustained funding and bold political leadership. Transport agencies must quickly adapt service patterns to reflect changing community needs, focusing on improving service frequency, reliability and safety to attract riders.



Demand, use and access

- Public transport serves as the connective tissue to help people realise their capabilities, getting them to where they need to be and directly contributing to more liveable, healthy and economically viable communities. At its core, "access" is a matter of transport justice, distributive in nature and wrestling with the question of how fairly transport systems serve different population segments and areas.

- In 2022, convenient access to public transport services – as captured through Sustainable Development Goal (SDG) indicator 11.2.1 – ranged widely across regions, with the lowest access (0-40%) in Africa, South Asia, and Central America, and the highest access (80-100%) in western Europe, Australia and Canada.

- Average access to public transport can be misleading even for urban areas when socio-economic and individual factors – such as income, gender, disability status, race and ethnicity – create systematic barriers to public transport use. Public transport affordability is commonly measured by examining the cost of a monthly pass relative to household income.

- Safety concerns result in curtailed access, especially for vulnerable travellers such as women, children and people with disabilities who make trips during off-peak hours or in isolated areas. These challenges are compounded by distinct patterns of "trip chaining": women generally make shorter but more complex journeys as they balance employment, caregiving responsibilities and household duties. Traditional transit network services often poorly accommodate such linking of multiple destinations in a single trip.

- Improving travellers' comfort, safety and security is a key way to increase mobility and economic productivity, and reduce traffic problems. This includes redirecting funding from urban highway and parking expansion towards safer public transport services – including improved vehicles, stations, walkways and bikeways – as well as prioritising transit-oriented development that provides convenient access to frequent and affordable services for low-income families and those with special needs.

- Since the start of the COVID-19 pandemic in 2020, its effects have continued to impact public transport ridership globally, with an estimated loss of 75 billion riders between 2019 and 2023. Recovery patterns have varied widely by region, as large Asian and European cities experienced higher gains in ridership than cities in North and South America.

- As a cultural shift due to the COVID-19 pandemic, the role of remote work has played out differently around the world.

- Although multiple factors have contributed to globally reduced ridership levels – including lifestyle changes from remote work, reduced commuting and rising living

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costs – service quality remains the primary driver of public transport use. Investing in quality and abundant local passenger transport is critical to increasing this use.

- The development of public transport infrastructure has continued globally, with varying levels of expansion across different modes. Around 1,300 kilometres of new metro lines opened worldwide in 2024, contributing to a more than tripling of the total metro length since 2000. Light rail, tramway and streetcar networks added 120 kilometres, and bus rapid transit expanded nearly 170 kilometres.
- China led in metro system developments, representing two-thirds of 2024 openings and 45% of 2023 additions.
- As cities in emerging economies continue to develop, metro systems have experienced relatively consistent growth in network length between 2011 and 2023. Between 2010 and 2023, 73 new urban agglomerations worldwide launched their first metro systems, with China accounting for nearly half of these openings.
- After two decades of rapid growth, implementation of bus rapid transit (BRT) and bus corridors has slowed in recent years. As of February 2025, BRT networks served 191 cities globally, carrying around 32 million passengers daily. Latin America led globally with the most daily passengers (19 million), the highest number of cities served (64) and the most extensive total corridor length (more than 2,000 kilometres).
- Some cities, especially in Latin America, have experienced challenges in the service quality of BRT as demand outpaces investments in capacity. These challenges reflect institutional and financial constraints rather than technical limitations of the bus systems themselves. With proper investment and management, BRT and bus systems, hold substantial potential – and eventual necessity – for sustainable urban mobility.
- Electric buses continued to grow in popularity, with 50,000 electric buses sold globally in 2023 and 70,000 in 2024 (30% annual growth). Electric bus sales represented around 6% of total bus sales in 2024 and expanded the worldwide e-bus fleet to around 730,000 units. China remained the global leader, but other Asian countries have taken a growing share of the market, and even Sub-Saharan Africa is experiencing new developments in electric bus deployment.
- China has remained the world leader in electric bus deployment, although its share of global sales fell from around 99% in 2017 to less than 70% in 2024, due to lower domestic demand and expanding sales elsewhere. The Chinese e-bus market has achieved maturation, with around 65% of its stock deployed before 2019, and at the end of 2022 the country withdrew subsidies for purchases of battery electric and plug-in hybrid electric buses. Chinese manufacturers including BYD and Yutong continue to dominate exports.
- Growing interest in electric buses has been driven by a decrease in their total cost of ownership – making them more competitive with conventional alternatives – although high upfront capital costs and supply chain constraints have affected adoption rates. Since 2022, electric bus manufacturers have faced multiple challenges related to market share and industry dynamics.

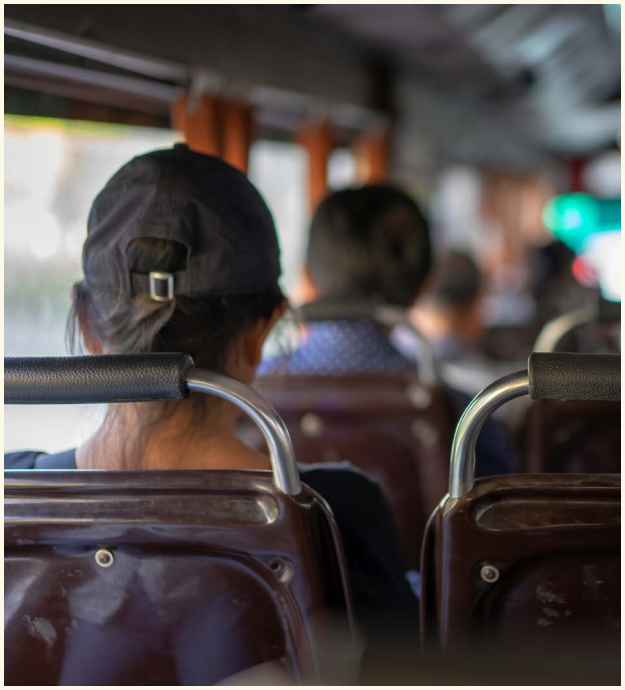
KEY FINDINGS

Sustainability and climate trends

- Public transport is widely recognised as a cost-effective strategy for decarbonising transport. Buses and rail contribute lower emissions than other passenger transport modes (such as cars and planes) on both a life cycle assessment (LCA) and a well-to-wheel (WTW) basis. Buses show median emission values of 43 grams of CO_2 per passenger-kilometre on a WTW basis and 48 grams of CO_2 per passenger-kilometre for LCA, whereas rail exhibits median emissions of around 29 grams for WTW and 33 grams for LCA.

- Battery electric buses emit 3-4 times fewer greenhouse gases than internal combustion engine buses, according to a 2024 study in Latin America. Electric and zero-emission buses also offer quieter, smoother rides and reduce local air pollution, providing benefits in marginalised communities historically impacted by vehicle emissions. The most substantial emission reductions can be achieved when electric buses are powered by renewable energy sources rather than fossil fuels.

- Privately owned vehicles are projected to dominate urban passenger transport globally by 2050. Improvements in vehicle efficiency and technological advances, as well as shifts towards low-carbon modes and improved land use planning, are expected to contribute to a 23% decrease in urban passenger transport emissions by 2050. An additional 8% reduction could be achieved by combining public transport systems with shared mobility options (such as cycling, walking and ridesharing), while simultaneously improving and integrating informal transport networks.



- One study estimates that achieving climate goals will require rapid transit systems in the world's 50 highest-emitting cities to expand and double in infrastructure between 2020 and 2030. More ambitious policy measures and investments will be needed.

- Public transport systems play an important role in improving air quality by reducing private vehicle dependency and its associated emissions, particularly through fleet renovation and the adaptation of new powertrain technologies.

- Public transport fleets can present environmental challenges depending on the fuel type, vehicle age and technology. Although heavy-duty vehicles such as buses and freight trucks represented less than 5% of vehicles on roads in 2019, they generated as much as two-thirds of urban air pollutants, including NO_x, black carbon, $PM_{2.5}$ and sulphur dioxide (SO_2), by mass. As such, public transport needs to be closely linked to transport planning, low/zero-emission zones and related activities.

- Farebox recovery ratios, defined as the share of operating costs covered by fare revenues, vary widely across public transport agencies globally. Asian agencies typically exhibit higher ratios than their North American and European counterparts. In 2022, nearly 90% of US public transport agencies recovered less than one-fifth of their operating costs through fare revenue, highlighting heavy dependence on local and federal government subsidies.

- Since the COVID-19 pandemic, operating costs for many public transport agencies have risen due to inflation, energy price rises, and wage growth, whereas fare revenues have tended to remain below pre-pandemic levels. European metropolitan areas illustrate these financial pressures.

- In addition to reducing greenhouse gas emissions, efforts towards climate adaptation and resilience have become equally vital in the public transport sector. Public transport is exposed to risks linked to biological, societal and meteorological/hydrological hazards.

KEY FINDINGS



Policy and investment trends

- Safe, convenient, reliable and affordable public transport is key to successful and thriving cities and communities. Public transport has strong links to the positive achievement of 14 of the 17 United Nations Sustainable Development Goals.
- During 2022-2024, several important policy shifts across public transport systems had notable effects at the national and international levels. Governments have applied a wide range of policy strategies, from outright bans on fossil fuels to generous tax incentives, with mixed but noticeable progress.
- Public transport in many countries is often cushioned by fuel tax exemptions and/or direct subsidies, but these supports become harder to sustain during price and political fluctuations, especially in countries already experiencing financial stress.
- A 2025 study of urban rail projects worldwide – including metros, subways and light rail systems – estimated the global weighted average cost at around USD 238 million per kilometre, based on 696 lines across 189 cities; however, construction costs vary dramatically across countries.
- Public transport agencies that have maintained revenue stability have adopted diversified funding models including real estate development, advertising and regional transport taxes. The COVID-19 pandemic prompted agencies worldwide to reconsider their revenue sources and fare policies, with some offering fare-free services.
- While fare-free transit has gained political attention and been extensively implemented in countries such as Brazil, an emerging consensus suggests that targeted policies – such as subsidies for specific populations (e.g., students, elderly, etc.) – may be more sustainable than blanket fare-free systems, since transport infrastructure requires funding regardless of fare structure. Ultimately, effective fare policies must balance access, sustainability and financial viability within broader integrated transport strategies.
- As of 1 August 2025, a total of 29 countries had submitted their third-generation Nationally Determined Contributions (NDCs) to the UN Framework Convention on Climate Change (UNFCCC); of these, 25 NDCs included content related to transport, but only 15 featured content (either as targets or actions) on public transport.
- Public transport actions in the third-generation NDCs were aimed at improving and expanding services and increasing access. However, the low number of NDCs submitted as of 1 August 2025 made it difficult to identify detailed trends and to compare actions to previous generations of NDCs.
- In the second generation of NDCs (submitted to the UNFCCC between 2020 and 2023), 67% of countries prioritised action with public transport. Identified gaps included a lack of ambitious targets, clear timelines for activities, and specifying ministries and budgets.
- Efforts to decarbonise public transport must be paired with strategies to adapt to and withstand potential climate-related hazards. Strengthening the synergy between mitigation and adaptation is essential to ensure that investments in low-carbon public transport remain effective amid intensifying climate stress and more frequent extreme weather events.



Context, challenges and opportunities

Public transport presents one of the most powerful and cost-effective solutions available to tackle our pressing climate crisis and development challenges. The environmental benefits are substantial: buses and trains can slash greenhouse gas emissions by around two-thirds per passenger-kilometre when compared with private vehicle use.[1] This has led the United Nations' (UN) recent climate action assessment to designate increased public transport ridership as not merely beneficial, but "essential" for meaningfully curbing climate change.[2]

Beyond environmental impact, public transport serves as a vital catalyst for economic opportunity and social equity. Public transport can generate economic returns that are about five times greater than the initial investment made in it, making it one of the most cost-effective ways to improve urban accessibility and economic productivity, and reduce traffic and parking congestion problems.[3] **When properly implemented, these systems provide affordable access to essential activities and services such as employment, education, health care and urban amenities for diverse populations.**

The safety and accessibility advantages are also compelling. Transit-oriented communities have much lower per capita traffic fatality rates than automobile-dependent areas, while public transport systems remain far safer and more affordable than personal car travel.[4] Safe and reliable public transport plays an important role for women, whose trip patterns are more complex than men's given the role that women play in the mobility of care.

Globally, public transport use varies based on differences in urban development approaches, infrastructure availability, pricing policies and cultural attitudes towards shared mobility. Even before the COVID-19 pandemic, North American cities demonstrated extreme car dependency with 92% of journeys by private vehicle and only 4.6% by public transport.[5] Car use in northern and southern European cities was 50-75%, while western Europe recorded 35-63% of trips by car with high rates of active transport (walking and cycling) (25-50%).[6] East Asian cities maintain balance with 46% public transport use and 19% by car.[7] Latin American cities tended to be split roughly equal between active mobility, public transport and cars.[8]

The window for capitalising on post-pandemic mobility transitions is narrowing, particularly in North America, which has one of the higher rates of remote work adoption.[9] In many regions, COVID-19 experiences led to a shift away from public transport towards walking and cycling and private vehicles.[10]

Successful public transport uptake requires unified urban visions that integrate public transport with land-use planning, governance that discourages car dependency,

sustained funding and bold political leadership. Transport agencies must quickly adapt service patterns to reflect changing community needs, focusing on improving service frequency, reliability and safety to attract riders.

Demand, use and access

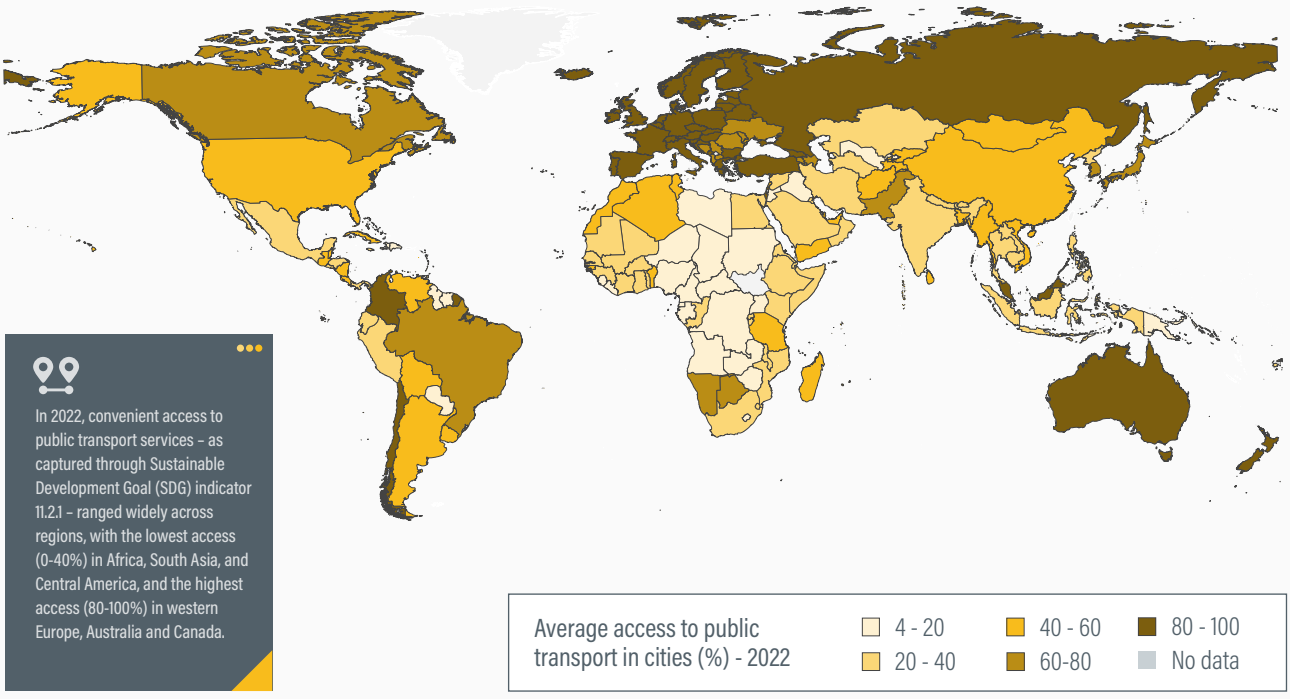
Public transport serves as the connective tissue to help people realise their capabilities, getting them to where they need to be and directly contributing to more liveable, healthy and economically viable communities. At its core, "access" is a matter of transport justice, distributive in nature and wrestling with the question of how fairly transport systems serve different population segments and areas.[11] Access is conceptually defined as "the potential for interaction" and has become a key indicator in urban and transport planning, as it captures the relationships among transport, land use and people.

In 2022, convenient access to public transport services – as captured through Sustainable Development Goal (SDG) indicator 11.2.1 – ranged widely across regions, with the lowest access (0-40%) in Africa, South Asia, and Central America, and the highest access (80-100%) in western Europe, Australia and Canada (Figure 1).[12]

Average access to public transport can be misleading even for urban areas when socio-economic and individual factors – such as income, gender, disability status, race and ethnicity – create systematic barriers to public transport use. Public transport affordability is commonly measured by examining the cost of a monthly pass relative to household income (Figure 2).[13] In lower- to middle-income groups, economic barriers may effectively render even nearby public transport services inaccessible.

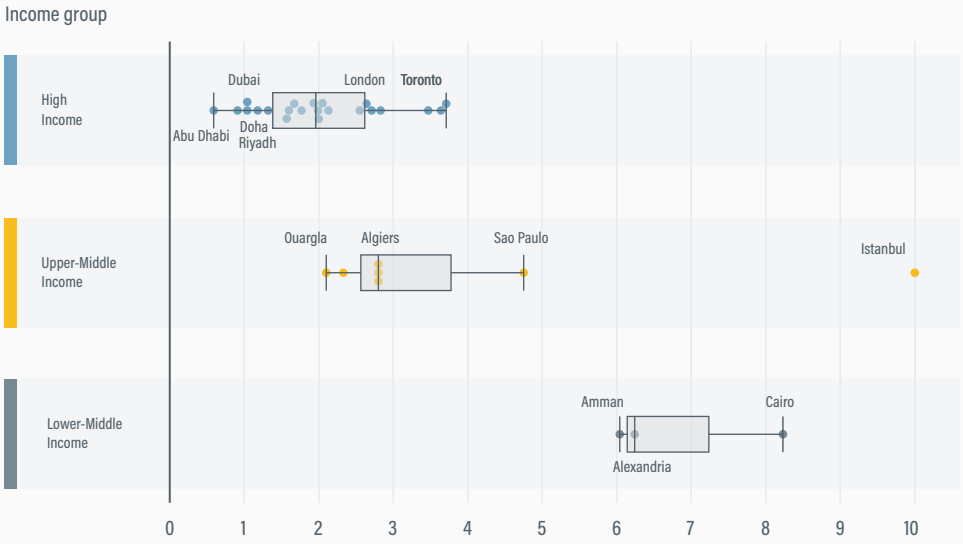
Safety concerns result in curtailed access, especially for vulnerable travellers such as women, children and people with disabilities who make trips during off-peak hours or in isolated areas. These challenges are compounded by distinct patterns of "trip chaining": women generally make shorter but more complex journeys as they balance employment, caregiving responsibilities and household duties.[14] **Traditional transit network services often poorly accommodate such linking of multiple destinations in**

FIGURE 1. Share of urban population with convenient access to public transport (population-weighted average), by country, 2022



Source: See endnote 12 for this section.

FIGURE 2. Ratio of monthly pass cost to average monthly income (%) in selected cities, 2025



Average access to public transport can be misleading even for urban areas when socio-economic and individual factors – such as income, gender, disability status, race and ethnicity – create systematic barriers to public transport use. Public transport affordability is commonly measured by examining the cost of a monthly pass relative to household income. In lower- to middle-income groups, economic barriers may effectively render even nearby public transport services inaccessible.

Source: See endnote 13 for this section.

a single trip. Recent research highlights gender-based disparities in safety perceptions and mobility patterns associated with public transport worldwide. Factors such as inadequate lighting, desolate environments and intoxicated individuals greatly increase perceived risk. Lack of proper facilities such as safe passenger waiting areas contributes to security risks for women.[15]

- A 2022 study on public transport safety perceptions in 18 cities globally found high rates of sexual harassment victimisation, ranging from 70% in São Paulo (Brazil) and Lagos (Nigeria) to around 30% in Guangzhou (China) and Tokyo (Japan); female students consistently reported feeling less safe than male counterparts.[16]
- A study in Peshawar (Pakistan) in 2024 revealed that 66% of female users of bus rapid transit aged 18-30, and 52% of those aged 31-45, reported experiencing harassment at transport stations, with visual harassment being most prevalent.[17] Young women were particularly vulnerable: 54% of users under 18 and 56% of users aged 18-30 reported harassment on buses.[18]

Improving travellers' comfort, safety and security is a key way to increase mobility and economic productivity, and reduce traffic problems. This includes redirecting funding from urban highway and parking expansion towards safer public transport services – including improved vehicles, stations, walkways and bikeways – as well as prioritising transit-oriented development that provides convenient access to frequent and affordable services for low-income families and those with special needs.

Since the start of the COVID-19 pandemic in 2020, its effects have continued to impact public transport ridership globally, with an estimated loss of 75 billion riders between 2019 and 2023.[19] Recovery patterns have varied widely by region, as large Asian and European cities experienced higher gains in ridership than cities in North and South America.[20] Many smaller cities worldwide continue to struggle with reduced ridership and operating costs.

- In the United States, public transport ridership rebounded to 85% of pre-pandemic (2019) levels in the first quarter of 2025.[21] In 2024, US ridership grew by 491 million passenger trips (7%) to reach a total of 7.7 billion passenger trips.[22]
- Public transport ridership in Canada grew 8.8% in 2024 to around 1.6 billion passenger trips, or roughly 84% of the pre-pandemic (2019) volume.[23] Despite annual increases since 2021, operating revenue remained at USD 2.71 billion (CAD 3.9 billion) in 2024 – around 94% of 2019 levels – due to ridership shortfalls.[24]
- In Brazil, bus ridership had been in decline even before the pandemic-related disruption. Between 2013 and 2023, monthly passenger numbers fell by 176 million passengers (45%) to reach a total of 214 million passengers.[25]
- European public transport agencies recorded 10% growth in ridership in 2023, although most urban transport systems remained below 2019 levels.[26] In Valencia (Spain), ridership in 2023 was up 17% over 2019 levels, attributed in part to discounted fares.[27]
- China's urban rail systems have experienced strong recovery, reflecting rising post-pandemic demand as



well as network expansion. Annual passenger volumes nationwide surged 52% in 2023 (from 19.4 billion trips to 29.4 billion trips) and were up 9.5% in 2024 (to 32.2 billion trips).[28] In Shenzhen, passenger volumes grew 72.5% in 2023, rising from 1.6 billion trips to 2.7 billion trips.[29]

- Ridership on Singapore's public transport system rose from a pandemic low of 5.0 million passengers daily in 2020, to 7.2 million passengers in 2023 and 7.5 million passengers in 2024 (although still 3% below the 2019 peak of 7.7 million).[30] Urban rail services showed an especially strong recovery, with 2024 ridership of 3.41 million daily trips surpassing the 3.38 million recorded in 2019. [31]

As a cultural shift due to the COVID-19 pandemic, the role of remote work has played out differently around the world. In US cities, the ongoing debate over "return to office" has severely affected public transport systems, whereas elsewhere the recovery of public transport has been stronger despite remote work.

- The Bay Area Rapid Transit (BART) system in San Francisco (United States) carried only 46% of its pre-pandemic ridership as of October 2024.[32]
- Helsinki (Finland) has one of the highest work-from-home rates in Europe, yet it achieved 90% recovery of public transport ridership by summer 2024.[33]

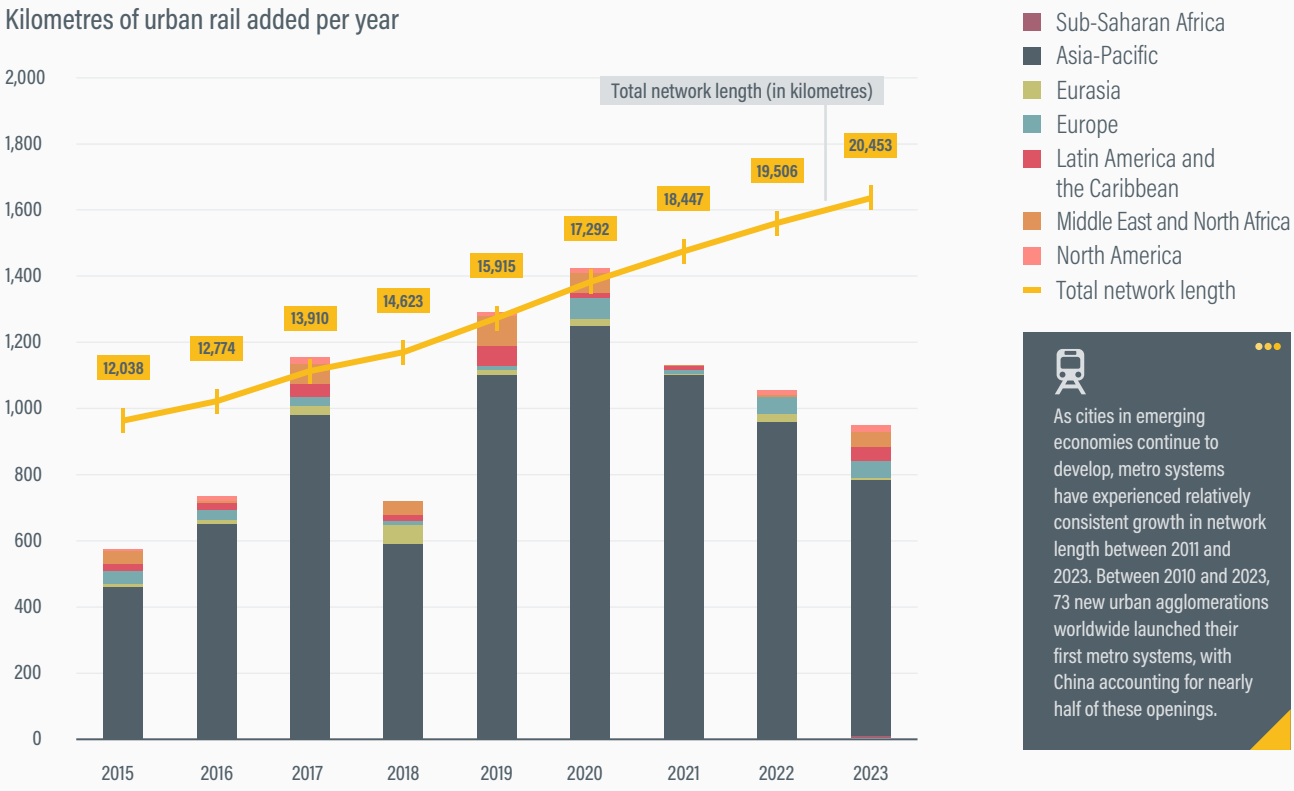
Although multiple factors have contributed to globally reduced ridership levels – including lifestyle changes from remote work, reduced commuting and rising living costs – service quality remains the primary driver of public transport use. Investing in quality and abundant local passenger transport is critical to increasing this use. Frequent, reliable service directly correlates with higher user satisfaction and increased ridership.[34]

The development of public transport infrastructure has continued globally, with varying levels of expansion across different modes. Around 1,300 kilometres of new metro lines opened worldwide in 2024, contributing to a more than tripling of the total metro length since 2000.[35] Light rail, tramway and streetcar networks added 120 kilometres, and bus rapid transit expanded nearly 170 kilometres.[36]

- Metro systems consistently dominate new developments: of the 1,760 kilometres of urban public transport added in 2023, metros accounted for 64% of the total route distance – well above the shares for commuter/regional rail (16%), light rail (10%) and bus rapid transit (6%).[37]
- **China led in metro system developments, representing two-thirds of 2024 openings and 45% of 2023 additions.**[38] This expansion has occurred mainly in major cities, including new loop lines in Guangzhou and Xi'an in 2024.[39]

As cities in emerging economies continue to develop, metro systems have experienced relatively consistent growth in network length between 2011 and 2023 (Figure 3).[40] **Between**

FIGURE 3. Metro network length by region, 2015-2023



Source: See endnote 40 for this section

2010 and 2023, 73 new urban agglomerations worldwide launched their first metro systems, with China accounting for nearly half of these openings.[41]

- A metro line was opened in at least one urban area in China every year between 2010 and 2022.[42]
- The Pearl River Delta region, a mega urban agglomeration that includes Guangzhou, Hong Kong, Shenzhen, and surrounding areas, had the most extensive metro service in the world in 2024, at 1,667 kilometres.[43]
- As of 2025, India's metro system spanned more than 1,000 kilometres across 23 cities, making it the world's third largest after China and the United States.[44] Delhi's ongoing metro expansion is expected to surpass New York's system in the coming years.[45]
- Viet Nam's first metro line began operations in Ho Chi Minh City in December 2024, 12 years after construction began in 2012.[46]
- In Quito (Ecuador), metro operations began in December 2023 with a 22-kilometre inaugural line and 15 stations; this fully electric transport system is projected to reduce carbon dioxide (CO_2) emissions by 67,000 to 84,000 tonnes annually.[47]
- Ahead of the 2024 Olympic Games, and to boost network capacity and connectivity, Paris (France) expanded Metro Line 14 by around 16 kilometres (adding eight new stations) and extended RER Line E by 8 kilometres (adding three new stations), alongside tramway upgrades.[48]
- After 38 years of planning, excavation, and delays, the driverless metro system in Greece's second largest city, Thessaloniki, opened in November 2024, featuring more than 300,000 archaeological artefacts discovered during construction and displayed throughout its 13 stations.[49]
- In the United States, three long-awaited rail projects finally opened in 2022 after decades of planning: Boston's Green Line extension, Los Angeles' Crenshaw Line, and Washington, D.C.'s Silver Line extension to Dulles Airport.[50]

After two decades of rapid growth, implementation of bus rapid transit (BRT) and bus corridors has slowed in recent years.[51] **As of February 2025, BRT networks served 191 cities globally, carrying around 32 million passengers daily.**[52] **Latin America led globally with the most daily passengers (19 million), the highest number of cities served (64) and the most extensive total corridor length (more than 2,000 kilometres).**[53] BRT systems offer dedicated lanes,

faster journey times and higher capacities than conventional bus-based transit. During their early expansion, BRT systems typically garnered strong community enthusiasm.[54]

- After ten years of development, TransBrasil in Rio de Janeiro (Brazil) opened in February 2024 as the city's fourth BRT corridor, featuring 20 stations along the Avenida Brasil; the system expects to serve up to 250,000 people daily by 2030 and to reduce peak-hour travel times up to 50%.[55]
- As of 2024, the extensive Karachi Breeze network in Pakistan included two operational lines (Green and Orange), two under construction (Red and Yellow), and two planned (Blue and Brown), totalling 112.9 kilometres with around 90 stations.[56] The Green Line became partially operational in late 2021 but remained incomplete as of mid-2025, while the Orange Line became fully operational in 2022.[57]
- Although metro expansion remains limited in the United States, BRT improvements in 2024 included the launch of Metro Rapid Route A in Madison (Wisconsin) – featuring articulated battery-powered buses and centre-running bus lanes – and the entry into service of the IndyGo Purple Line in Indiana, connecting downtown Indianapolis and Lawrence via 31 stations along a 24.5 kilometre corridor. [58]
- In Dar es Salaam (Tanzania), the BRT Phase 2 infrastructure has been completed, but operations were pending the arrival of clean natural gas buses by mid-2025.[59]

Some cities, especially in Latin America, have experienced challenges in the service quality of BRT as demand outpaces investments in capacity.[60] These challenges reflect institutional and financial constraints rather than technical limitations of the bus systems themselves. With proper investment and management, BRT and bus systems, hold substantial potential – and eventual necessity – for sustainable urban mobility.

Electric buses continued to grow in popularity, with 50,000 electric buses sold globally in 2023 and 70,000 in 2024 (30% annual growth).[61] Electric bus sales represented around 6% of total bus sales in 2024 and expanded the worldwide e-bus fleet to around 730,000 units.[62] China remained the global leader, but other Asian countries have taken a growing share of the market, and even Sub-Saharan Africa is experiencing new developments in electric bus deployment.

- In 2024, India and the Republic of Korea overtook the United States to become the second and third largest national electric bus markets by sales volume (after China), with more than 3,200 and 2,800 sales, respectively.[63]
- In India, electric bus registrations grew around 81% in 2024 (from 1,919 units to 3,616 units), although electric buses still represented only 4% of annual bus registrations.[64] Delhi, Gujarat, Karnataka and Maharashtra together accounted for more than three-quarters of the country's total electric bus registrations in 2023.[65]
- Electric bus sales in Europe, the world's second largest market, grew nearly 15% in 2024, bringing the region's sales share to more than 13%.[66]
- Battery electric bus registrations in Europe increased 53% in 2023 to reach 6,354 units across the European Union (EU-27) plus Iceland, Norway and Switzerland.[67] In 2024, zero-emission (battery electric and hydrogen) buses comprised nearly half (49%) of new city bus registrations in the region, up from 15% in 2020.[68]
- Madrid (Spain) established Europe's largest electric bus charging facility in 2024, with capacity to charge 118 buses simultaneously.[69]
- In Latin America and the Caribbean, electric bus sales rose from around 600 in 2020 to more than 2,000 in 2024.[70]
- Latin America's electric bus fleet grew 13% in 2024 to reach 6,055 vehicles, following average annual growth of 33.5% since 2017 (driven by battery electric bus adoption initially in Chile and Colombia, and later in Brazil and Mexico).[71]
- In late 2023, Mérida (Mexico) launched IE-Tram, the country's first all-electric BRT system, projected to serve more than 25,000 daily passengers.[72]
- Dakar (Senegal) launched Africa's first fully electric BRT system in December 2023.[73]
- In Kenya, private sector innovation has driven electric bus adoption through companies such as BasiGo, which had sold 35 buses to 11 co-operatives in Nairobi as of late 2024 and established the country's first dedicated electric bus assembly in partnership with Kenya Vehicle Manufacturers.[74] Working directly with co-operatives and *matatu* (minibus) owners, transit electrification presents an opportunity to catalyse broader reform in Kenya's informal transport sector. (See 4.6 Informal Transport.)

China has remained the world leader in electric bus deployment, although its share of global sales fell from around 99% in 2017 to less than 70% in 2024, due to lower domestic demand and expanding sales elsewhere.[75] The Chinese e-bus market has achieved maturation, with around 65% of its stock deployed before 2019, and at the end of 2022 the country withdrew subsidies for purchases of battery electric and plug-in hybrid electric buses.[76] Chinese manufacturers including BYD and Yutong continue to dominate exports: between 2017 and 2023, they supplied more than 85% of electric city buses in Latin America and expanded their share in the EU from 10% to 30% of total bus sales.[77]

Growing interest in electric buses has been driven by a decrease in their total cost of ownership – making

them more competitive with conventional alternatives – although high upfront capital costs and supply chain constraints have affected adoption rates.[78] **Since 2022, electric bus manufacturers have faced multiple challenges related to market share and industry dynamics**, including higher raw material costs following the Russian Federation's invasion of Ukraine, intensified price competition and industry consolidation pressures.[79] These pressures contributed to industry restructuring: for example, major US manufacturer Proterra filed for bankruptcy in August 2023.[80]

Box 1. Artificial intelligence, big data and public transport

Public transport authorities have long employed big data analytics for real-time predictions, schedule optimisation, maintenance forecasting and passenger flow analysis. Curation of transit data in the format of General Transit Feed Specification (GTFS) by organisations such as MobilityData and DigitalTransportforAfrica enables trip planning and accessibility analyses, among other applications. Many of these data-driven approaches now integrate with newer artificial intelligence (AI) capabilities, especially generative AI deploying Large Language Models, to create more responsive and interactive transit solutions globally.

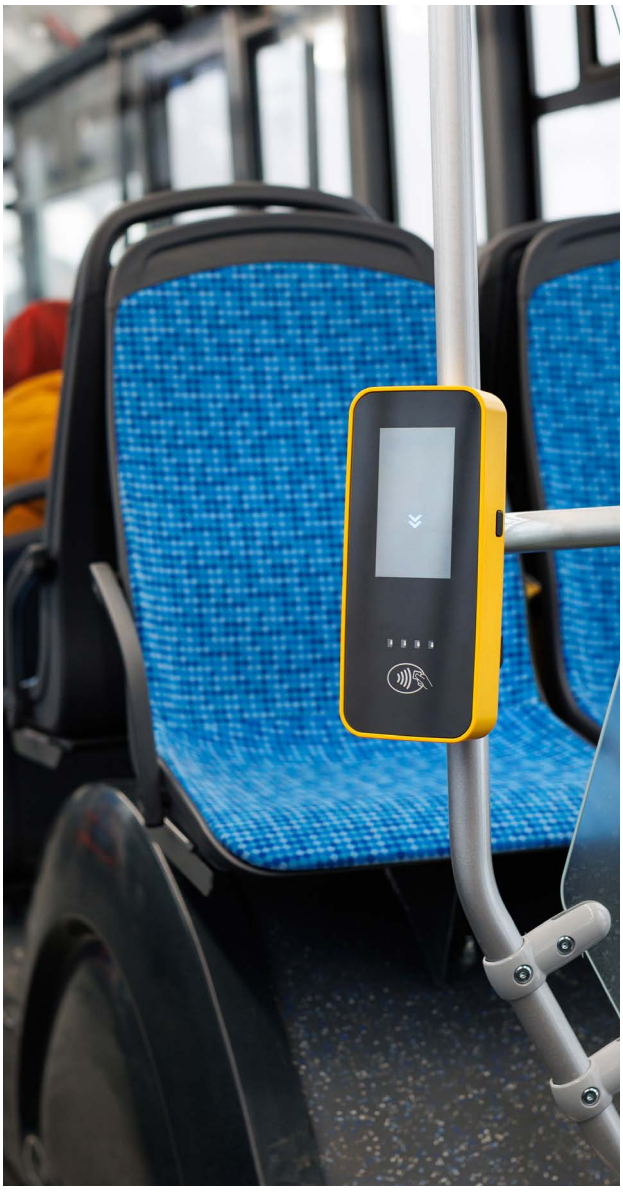
Modern AI systems help urban planners process multi-modal data sources; ingest structured data alongside videos, text, audio and visual inputs to enhance prediction accuracy; and improve customer interfaces.

- In 2025, Japan's JR East began deploying a generative AI system for signalling equipment failures across rail lines in the Shinkansen and Tokyo areas – the first of its kind in the country. The system automatically generates incident reports from radio communications, simplifies data input, and provides estimated causes and repair timelines, targeting up to 50% faster service restoration.
- Barcelona Metro (Spain) has deployed an AI ventilation control system that optimises air quality and thermal comfort in real-time. The system was initially implemented in 2020 to help limit the spread of COVID-19, and since 2022 it has balanced meteorological conditions, energy costs, and fan performance, achieving a 1.3 degrees Celsius temperature reduction, 25% energy savings, 21% improved fan efficiency and 11% increase in passenger satisfaction.
- Using Google's AI technology, the Chicago Transit Authority (United States) launched the chatbot "Chat with CTA" in 2024; it provides multilingual customer support in five languages, handling real-time updates, incident reporting and customer feedback on non-emergency topics such as cleanliness, maintenance and service disruptions.

Despite these potential advantages, serious challenges remain around the need for human oversight in safety-critical public transport operations. Privacy concerns have intensified as data collection on passenger tracking becomes more sophisticated. The lack of transparency behind AI's complex decision-making processes can create accountability challenges when the automated systems affect thousands or millions of daily passengers.

Additionally, the substantial energy requirements of AI systems present a sustainability paradox for public transport's decarbonisation goals. In 2022, data centres supporting AI consumed around 460 terawatts globally, with AI training clusters requiring seven to eight times more energy than typical computing workloads. For transit agencies promoting low-carbon mobility, these energy requirements must be carefully considered within sustainability frameworks.

Source: See endnote 81 for this section.



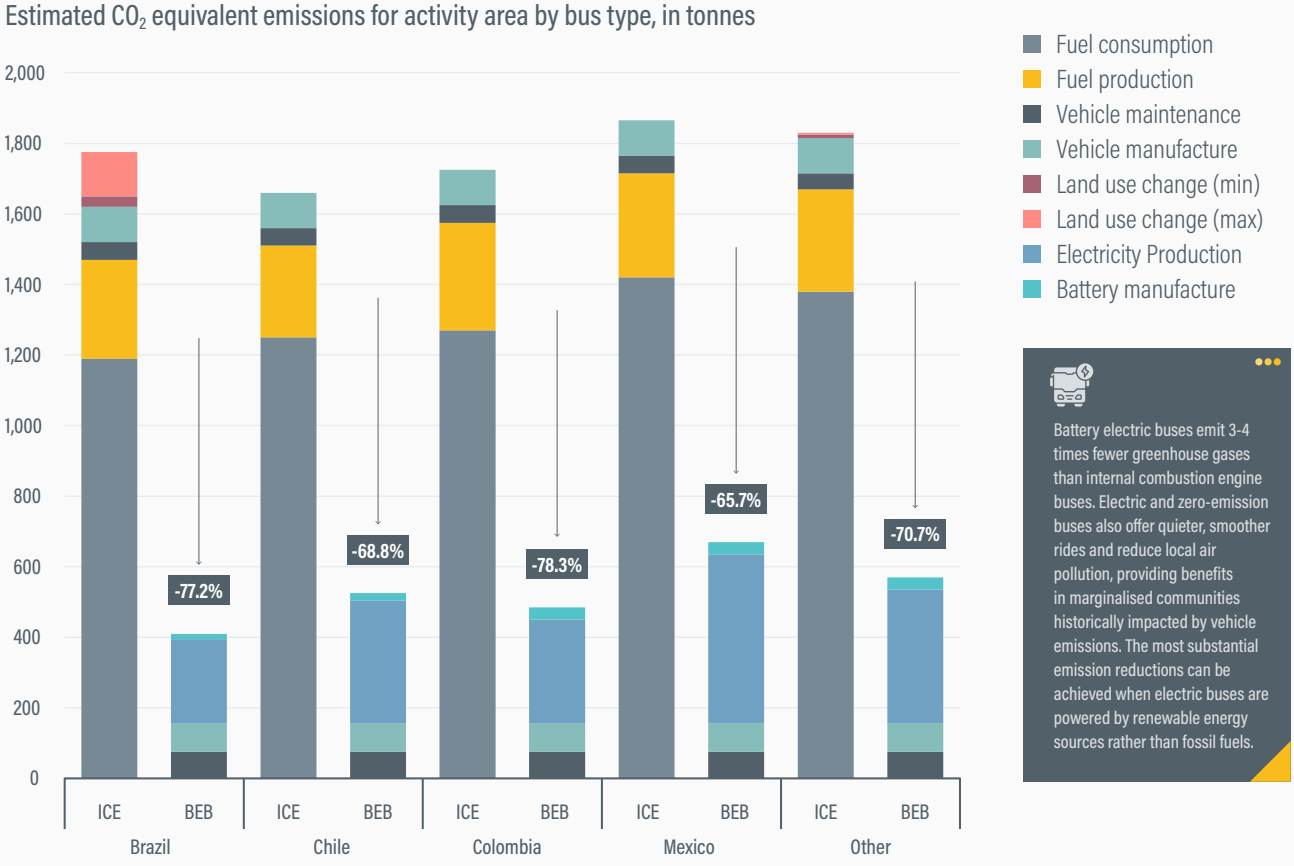
Sustainability and climate trends

Public transport is widely recognised as a cost-effective strategy for decarbonising transport. Buses and rail contribute lower emissions than other passenger transport modes (such as cars and planes) on both a life cycle assessment (LCA) and a well-to-wheel (WTW) basis. Buses show median emission values of 43 grams of CO_2 per passenger-kilometre on a WTW basis and 48 grams of CO_2 per passenger-kilometre for LCA, whereas rail exhibits median emissions of around 29 grams for WTW and 33 grams for LCA.[82] To reduce emissions, cities have introduced electric and zero-emission buses to their fleets.

Battery electric buses emit 3-4 times fewer greenhouse gases than internal combustion engine buses, according to a 2024 study in Latin America.[83] **Electric and zero-emission buses also offer quieter, smoother rides and reduce local air pollution, providing benefits in marginalised communities historically impacted by vehicle emissions.**[84] **The most substantial emission reductions can be achieved when electric buses are powered by renewable energy sources rather than fossil fuels.** For 12-15 metre buses in 2024, the life-cycle emissions for battery electric units compared to internal combustion engine units were 77.2% lower in Brazil and 78.3% lower in Colombia, but they were only 65.7% lower in Mexico, due to the different carbon intensities of the countries' respective electric grids (Figure 4).[85]

Privately owned vehicles are projected to dominate urban passenger transport globally by 2050.[86] **Improvements in vehicle efficiency and technological advances, as well as shifts towards low-carbon modes and improved land use planning, are expected to contribute to a 23% decrease in urban passenger transport emissions by 2050.**[87] **An additional 8% reduction could be achieved by combining public transport systems with shared mobility options (such as cycling, walking and ridesharing), while simultaneously improving and integrating informal transport networks.**[88]

FIGURE 4. Comparison of life-cycle emissions of 12-15 metre buses in Latin America, 2024



Battery electric buses emit 3-4 times fewer greenhouse gases than internal combustion engine buses. Electric and zero-emission buses also offer quieter, smoother rides and reduce local air pollution, providing benefits in marginalised communities historically impacted by vehicle emissions. The most substantial emission reductions can be achieved when electric buses are powered by renewable energy sources rather than fossil fuels.

Note: ICEB = internal combustion engine buses; BEB = battery electric buses

Source: See endnote 85 for this section.

(See 4.6 Informal Transport.) However, even these combined measures remain insufficient to meet the emission reduction goals of the Paris Agreement.[89]

One study estimates that achieving climate goals will require rapid transit systems in the world's 50 highest-emitting cities to expand and double in infrastructure between 2020 and 2030.[90] More ambitious policy measures and investments will be needed.

Public transport systems play an important role in improving air quality by reducing private vehicle dependency and its associated emissions, particularly through fleet renovation and the adaptation of new powertrain technologies.

- Since 2017, Stockholm (Sweden) has successfully transitioned its public transport system to 100% renewable energy.[91] In February 2024, the city became the world's first capital city with bus services that are 100% fossil free; nearly two-thirds (64%) of Stockholm's buses are fuelled by biodiesel, resulting in CO_2 emission reductions of up to 90% when compared to conventional fuels.[92]
- In June 2022, Germany temporarily introduced a USD 9.3 (EUR 9) monthly ticket for regional and public transport, effectively reducing fares up to 90%; during the month, pollution levels nationwide fell an estimated 8%.[93]
- A 2024 study demonstrated that the Cablebus Line 1 in Mexico City (Mexico), inaugurated in July 2021, reduced nitrogen dioxide (NO_2) levels in areas near the cable car system by around 13%, helping to improve air quality in a city where the high-altitude mountain plateau creates pollution-trapping effects.[94]
- A 2025 modelling study on the impacts of medium- and heavy-duty electric vehicle policies in New York City found that complete electrification of these vehicles could save USD 2.4 billion in health costs by 2040, primarily from NO_2 reduction, while also preventing 248 premature deaths and 173 childhood asthma emergency department visits.[95] The greatest health benefits would occur in communities with the highest percentages of historically marginalised populations.[96]

Public transport fleets can present environmental challenges depending on the fuel type, vehicle age and technology. Although heavy-duty vehicles such as buses and freight trucks represented less than 5% of vehicles on roads in 2019, they generated as much as two-thirds of urban air pollutants, including NO_x, black carbon, $PM_{2.5}$ and sulphur dioxide (SO_2), by mass.[97] As such, public transport needs to be closely linked to transport planning, low/zero-emission zones and related activities. (See 4.2 Integrated Transport Planning.)

Farebox recovery ratios, defined as the share of operating costs covered by fare revenues, vary widely across public transport agencies globally. Asian agencies typically exhibit higher ratios than their North American and European counterparts.[98] In 2022, nearly 90% of US public transport agencies recovered less than one-fifth of their operating costs through fare revenue, highlighting heavy dependence on local and federal government subsidies.[99] To improve farebox recovery ratios, public transport agencies must improve service efficiencies (for example, with dedicated bus lanes and transit priority at intersections), and increase ridership and load factors by improving service quality and providing travel demand management (TDM) incentives for travellers to use public transport for more urban trips. Overall, the financial sustainability of these systems depends on the balance between operational costs and revenue generation.

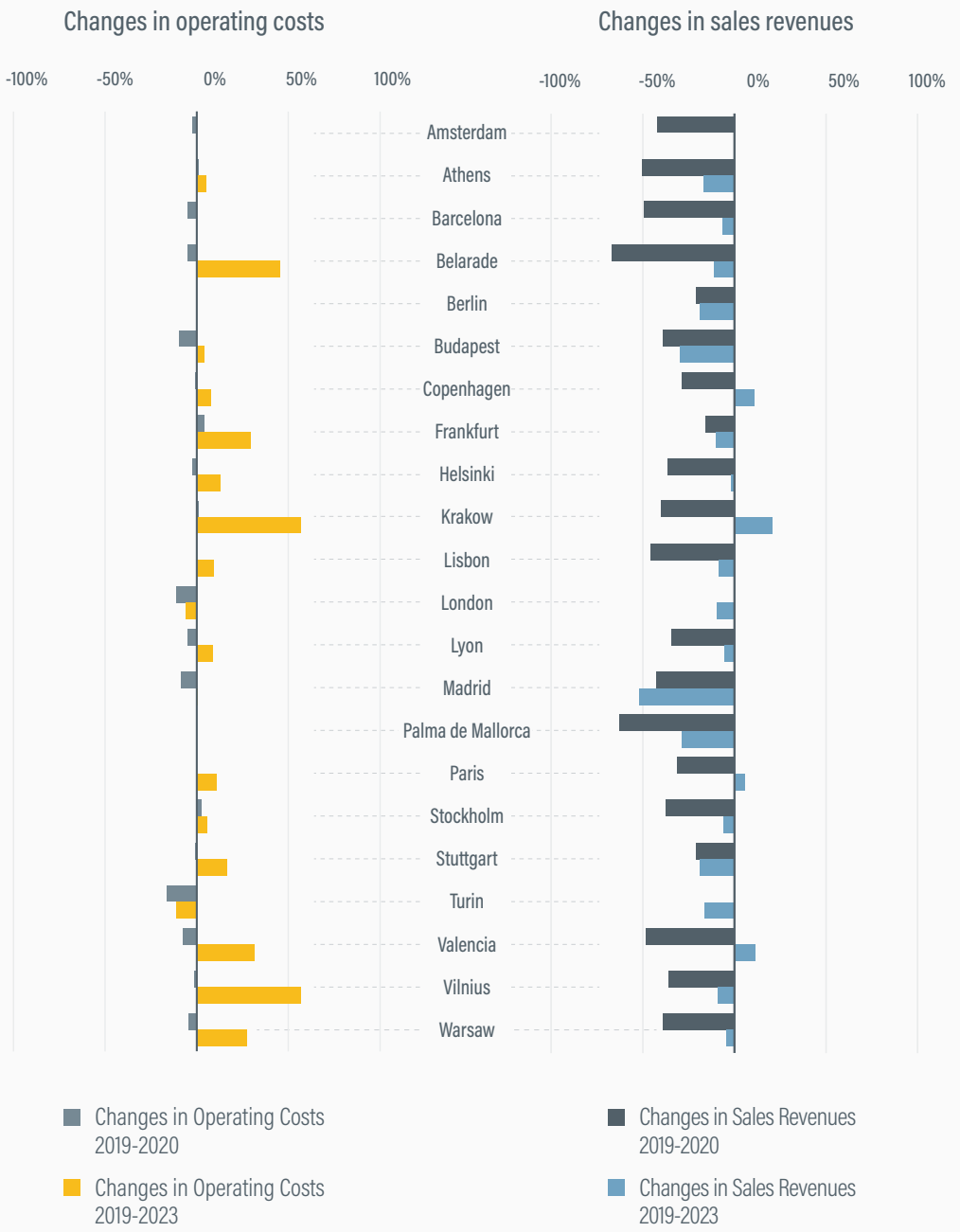
Since the COVID-19 pandemic, operating costs for many public transport agencies have risen due to inflation, energy price rises, and wage growth, whereas fare revenues have tended to remain below pre-pandemic levels. European metropolitan areas illustrate these financial pressures (Figure 5).[100]

- Cities in Europe that experienced modest changes in operating costs between 2019 and 2023 included Amsterdam (Netherlands; -2.4%), Athens (Greece; 5.1%) and Copenhagen (Denmark; 7.5%).[101]
- European cities that faced substantial increases in operating costs included Belgrade (Serbia; 45.5%), Frankfurt (Germany; 29.1%) and Krakow (Poland; 57.0%).[102]
- Between 2019 and 2023, revenue from transport sales grew in Rotterdam (Netherlands; 13.6%) but fell in Athens (Greece; -16.7%), Belgrade (Serbia; -11.0%) and Frankfurt (Germany; -18.1%).[103]

In addition to reducing greenhouse gas emissions, efforts towards climate adaptation and resilience have become equally vital in the public transport sector. Public transport is exposed to risks linked to biological, societal and meteorological/hydrological hazards. Service providers and users operate in environments increasingly strained by climate-related events, including heatwaves and flooding and their compounding and cascading effects. Adaptation is broadly defined as making adjustments to address and protect against expected or actual climate impacts, and is increasingly urgent as rising temperatures and extreme weather events pose growing threats to transport infrastructure.

- **Biological hazards:** The COVID-19 pandemic had profound consequences for the public transport sector, as countries grappled with physical distancing requirements that fundamentally conflict with the nature of mass transport operations. Studies have found that consistent

FIGURE 5. Transport operating costs and revenue recovery in European cities, 2019-2020 and 2019-2023



Since the COVID-19 pandemic, operating costs for many public transport agencies have risen due to inflation, energy price rises, and wage growth, whereas fare revenues have tended to remain below pre-pandemic levels. European metropolitan areas illustrate these financial pressures.

Source: See endnote 100 for this section.

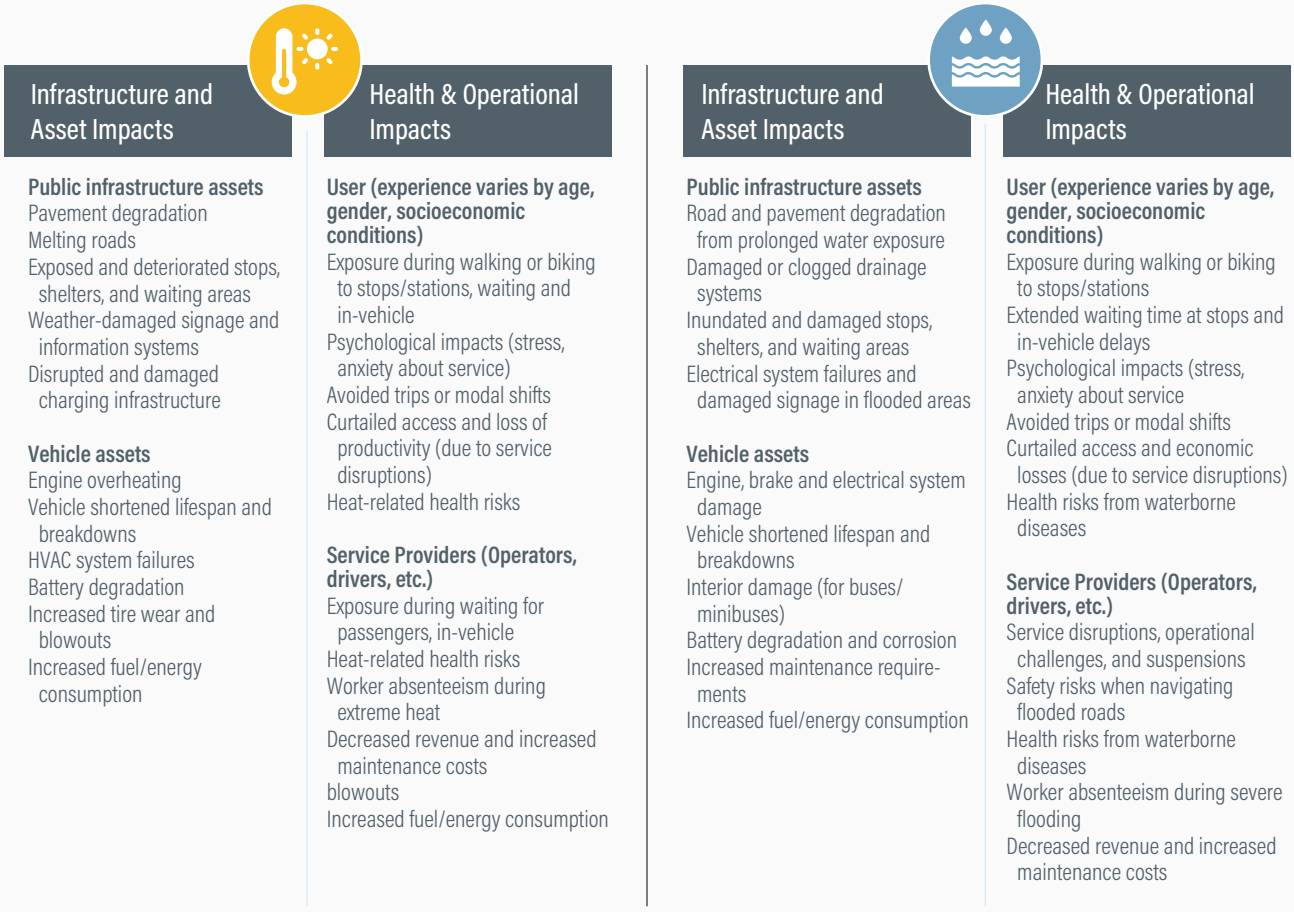
use of face masks in enclosed environments such as transport vehicles can greatly reduce transmission risks.[104] However, further research is required to determine how best to adapt to such hazards in the future. In addition to operational challenges and health concerns, the pandemic raised questions around public transport's underlying economic sustainability, equity access and long-term mobility goals.

- **Societal hazards:** The Russian Federation's invasion of Ukraine in 2022 illustrated how conflicts can disrupt public transport systems, not only in directly affected nations (in the Russian case due to sanctions) but also in surrounding regions. In Ukraine, Kyiv Metro suspended regular service early in the invasion, repurposing its tunnels as bomb shelters.[105] Across the EU, countries experienced changing mobility patterns in response to spiking fuel prices. A

study of 25 EU countries found that the 2022 energy crisis altered travel behaviours, with strong correlations between rising petrol and diesel prices and public transport use in Bulgaria, Denmark, Latvia, Poland and the Slovak Republic (with ridership in Bulgaria surpassing pre-pandemic levels).[106]

- **Meteorological and hydrological hazards:** Without major emission reductions, up to three-quarters of the global population could be exposed to lethal heat-humidity conditions by the end of the century, up from under one-third in 2000.[107] Urban flood risks are also expected to rise due to climate change and urbanisation, disrupting public transport operations.[108] In many cities, heat and flooding risks are compounded – sometimes occurring on the same day or triggering one another.[109] These hazards pose challenges for public transport authorities, operators, manufacturers and wider stakeholders, as they threaten infrastructure by damaging roads, tracks, and vehicles, often leading to service disruptions, delays and suspensions. The resulting impacts create ripple effects on mobility, access to essential services, public health, safety and economic productivity (particularly for users with limited transport alternatives) (Figure 6).[110]

FIGURE 6. Impacts of extreme heat (left) and flooding (right) on public transport users, service providers and physical assets



Source: See endnote 110 for this section.

Policy and investment trends

Safe, convenient, reliable and affordable public transport is key to successful and thriving cities and communities. Public transport has strong links to the positive achievement of 14 of the 17 United Nations Sustainable Development Goals.[111] They include:

- SDG 1 (No Poverty) – by providing access to education and economic opportunities;
- SDG 3 (Good Health and Well-being) – through better road safety, improved air quality, increased physical activity getting to and from fixed stations, and improved access to health centres;
- SDG 5 (Gender Equality) – by providing safe and independent mobility to empower women and girls to reach education and job opportunities;
- SDG 7 (Affordable and Clean Energy) – by creating demand for clean and sustainable electricity, through electrification efforts;
- SDG 8 (Decent Work and Economic Growth) – by creating jobs and connecting people to opportunities;
- SDG 9 (Industry, Innovation and Infrastructure) – by allowing optimisation of investments in resilient infrastructure; and
- SDG 11 (Sustainable Cities and Communities) – by expanding public transport, notably through target 11.2.[112]

During 2022-2024, several important policy shifts across public transport systems had notable effects at the national and international levels. Governments have applied a wide range of policy strategies, from outright bans on fossil fuels to generous tax incentives, with mixed but noticeable progress.

- In 2024, Ethiopia became the first country to completely ban imports of non-electric vehicles , aiming to reduce its annual petrol and diesel import bill of USD 7.6 billion.[113] The move builds on the country's 2022 imposition of a 200% customs duty on fossil fuel vehicles (versus just 15% on electric vehicles).[114]
- Egypt demonstrated its commitment to low-emission mobility by deploying 260 electric buses for the 2022 UN Climate Change Conference in Sharm El-Sheikh (COP 27).[115] Although a national strategy has been announced, a detailed five-year roadmap for petrol and electric bus adoption was still pending as of mid-2025.[116]
- In 2025, Morocco announced that it would invest USD 10.7 billion in public transport and high-speed rail to enhance connectivity and drive economic growth.[117]
- India concluded its nine-year FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) policy in March 2024, after providing subsidies totalling USD 1.37 billion (INR 11,500 crore) to support 1.6 million electric vehicles, including more than 5,100 e-buses.[118] The successor scheme, PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM e-DRIVE), was launched in September 2024 with an allocation of USD 1.29 billion (INR 10,900 crore) over two years.[119]
- Bus electrification in India is driven by the National Electric Bus Program, targeting 50,000 e-buses by 2027 in major cities, and by PM-eBus Sewa, a USD 6.9 billion (INR 57,613 crore) programme deploying 10,000 e-buses across 169 smaller cities.[120]
- In the United States, the 2021 Infrastructure Investment and Jobs Act authorised funding of up to USD 108 billion for public transport through 2026, including USD 5.6 billion for the Low or No Emission Vehicle Program.[121] As of 2024, the US Environmental Protection Agency's Clean School Bus Program had allocated nearly USD 2 billion to replace around 5,000 school buses with electric models.[122] The Inflation Reduction Act (IRA) of 2022 offers complementary tax credits for electric vehicle infrastructure, although both acts faced political headwinds in 2025. (See 3.5 North America Overview and 5.2 Road Vehicle Electrification.)
- The EU's Green Deal Industrial Plan, launched in 2023 as a response to the US IRA, addresses the growing global competition in clean technologies by backing net zero industries through subsidies and streamlined regulation, including simplified procedures and a more favourable investment environment.[123]
- The amended EU Regulation on Heavy-Duty Vehicle CO_2 Emissions, adopted in 2024, sets more ambitious binding targets for urban buses, calling for 90% of new city buses to be zero-emission by 2030, and 100% by 2035.[124]
- In Latin America, Uruguay created a Sustainable Mobility Trust Fund in November 2023 to incentivise electric bus adoption and replace diesel-focused subsidies.[125]
- In 2022, São Paulo (Brazil), with a bus fleet of more than 13,000 vehicles, banned new diesel bus procurement in line with its Climate Law.[126]
- Bogotá (Colombia) ended purchases of fossil-fuelled buses in early 2022.[127]

Public transport in many countries is often cushioned by fuel tax exemptions and/or direct subsidies, but these supports become harder to sustain during price and political fluctuations, especially in countries already experiencing financial stress. The impacts vary depending on countries' different policy priorities and responses when balancing mobility needs against broader fiscal constraints.

- Colombia began phasing out its Fuel Price Stabilization Fund (FEPC) in 2022 due to the fund's growing fiscal burden.[128] By early 2024, petrol subsidies had been mostly removed, and diesel subsidies were reduced by USD 0.18 (COP 800) per gallon.[129] The original plan called for reductions of COP 1,904 but was revised downward

after protests from freight truckers and public transport operators facing rising operational costs.[130]

- In Malaysia, diesel subsidy costs surged dramatically from USD 300 million (RM 1.4 billion) in 2019 to USD 3 billion (RM 14.3 billion) in 2023.[131] In June 2024, the government responded by raising diesel prices more than 50% and shifting from blanket subsidies to a targeted, tiered system.[132] For public transport, under the new fleet card programme Sistem Kawalan Diesel Subsidi (SKDS 1.0), operators pay a lower diesel rate of USD 0.42 (RM 1.88 per litre), while non-subsidised users pay the full USD 0.75 (RM 3.35) per litre.[133]
- The Philippines allocated USD 52.6 million (PHP 3 billion) for its 2024 transport fuel subsidy programme, of which USD 43 million (PHP 2.5 billion) was earmarked for direct fuel subsidies to public utility vehicle drivers, including those operating jeepneys, tricycles, ride-hailing services and delivery vehicles.[134] The subsidy programme aims to ease immediate fuel price pressures while supporting long-term development goals, especially in the context of the Public Utility Vehicle Modernization Program. However, ongoing transport strikes since 2023 have protested the programme, which mandates replacing the iconic traditional jeepneys with more expensive, eco-friendly models.[135]
- In May 2023, Nigeria's removal of fuel subsidies caused petrol prices in Abuja to triple, reaching USD 0.45 (NGN 700) per litre; transport fares doubled nationwide, and intra-city bus fares rose around 98%.[136] The abrupt policy shift led inflation to hit a 27-year high by December 2023, making basic goods unaffordable for many people.[137] In response to the economic strain and public backlash, the government partially reinstated fuel subsidies in early 2024, along with additional relief measures such as halving public transport fees and offering free train rides during the holiday season.[138]

A 2025 study of urban rail projects worldwide – including metros, subways and light rail systems – estimated the global weighted average cost at around USD 238 million per kilometre, based on 696 lines across 189 cities; however, construction costs vary dramatically across countries.[139]

- US urban rail projects exhibit exceptionally high costs, with the Second Avenue Subway Phase I in New York City reaching around USD 1.7 billion per kilometre (adjusted in 2023 dollars); this was driven by factors such as complex underground conditions, extensive consultant costs and stringent regulatory requirements (such as maintaining four traffic lanes during construction).[140]
- In Hong Kong, the Tung Chung Line Extension cost around USD 3.1 billion (HKD 24.2 billion) for just 2.5 kilometres, or roughly USD 1.2 billion per kilometre; this reflected the challenge of building in one of the world's most densely populated areas, requiring extensive community facility relocations and complex engineering in limited space.[141]
- Metro construction in Italy demonstrates cost effectiveness, averaging 57% below global benchmarks at around USD 120 million per kilometre; this results from procurement reforms implemented since the 1990s that prioritised transparency and competition, strong in-house public sector capacity for planning and design, and standardised designs that reduce engineering complexity.[142]

Public transport agencies that have maintained revenue stability have adopted diversified funding models including real estate development, advertising and regional transport taxes.[143] **The COVID-19 pandemic prompted agencies worldwide to reconsider their revenue sources and fare policies, with some offering fare-free services** (Table 1).[144] Advocates of fare-free transit argue that eliminating fares repositions public transport from a market commodity to a public good (thereby addressing social exclusion and inequality), whereas critics raise concerns about potential service quality deterioration due to funding shortages for operations and maintenance.[145] In the United States, many public transport systems that relied on COVID-19 relief funds later faced funding gaps as the temporary funding expired.

- New York City (United States) and Bangkok (Thailand) use congestion charging to fund public transport improvements, while London (United Kingdom) uses its ultra-low emission zone as a funding stream.[146]
- Queensland (Australia) trialled reducing its public transport fares to USD 0.31 cents (AUD 0.50) in August 2024 and then made the programme permanent in February 2025.[147] The number of public transport users was 18.3% higher than during the same six-month period (August to February) a year prior and 5% higher than pre-pandemic levels of 2019, and users had saved around USD 112 million (AUD 181 million) through the first six months of the programme.[148]
- Kansas City, the first major US city to implement fare-free public transport in 2020, had a projected USD 26 million funding gap as of 2025 and was considering transitioning to a USD 2 base fare while maintaining free access for seniors and people with disabilities.[149]

While fare-free transit has gained political attention and been extensively implemented in countries such as Brazil, an emerging consensus suggests that targeted policies – such as subsidies for specific populations (e.g., students, elderly, etc.) – may be more sustainable than blanket fare-free systems, since transport infrastructure requires funding regardless of fare structure. Ultimately, effective fare policies must balance access, sustainability and financial viability within broader integrated transport strategies.

TABLE 1. Selected fare-free transit systems and their funding mechanisms, as of January 2025

Transit agency and/or location	Date implemented (status if available)	Funding mechanism	Additional notes
Belgrade (Serbia)	January 2025	Not available	With a population of 1.7 million, Belgrade became the largest European city to implement fare-free public transport for all residents. Covers buses, trams and trolleybuses.
Brazil	Various	Not available	Number of cities with free public transport grew from 42 in 2020 to 136 as of September 2024. A 2024 study found that the fare-free policy resulted in a 4.3% emission reduction and a 3.8% increase in jobs, with the benefits outweighing the costs.
Chapel Hill Transit, Chapel Hill (United States)	2002 (active)	University partnership, municipal* funding, federal/ state subsidies	Celebrated 50th transit anniversary in 2024. Ridership grew from 3 million (2002) to 7 million (2019). Longest-running major fare-free system in the United States.
Corvallis Transit System, Corvallis (United States)	February 2011 (active)	Transit Operations Fee on utility bills (USD 3.89 per single-family household, as of February 2025)	Ridership increased 37.9% in first year of fare-free service. Utility fee provides stable funding that grows with costs. Experienced service reductions in 2022-2023 due to driver shortages.
Colorado Zero Fare Transit Program, Colorado (United States)	Summer 2023-2025 (active – ongoing seasonal)	State funding through Senate Bill 24-032	Statewide programme offering fare-free transit during July-August to reduce ground-level ozone. Includes multiple transit agencies across Colorado.
DASH, Alexandria, (United States)	September 2021 (active)	City subsidy (USD 1.7 million), VA Transit Ridership Incentive Program (TRIP) grant (USD 7.1 million through 2025)	Record ridership of 4.5 million boardings in FY2023. 54% of riders started using DASH after fare elimination. 62% of new riders cited free fares as reason for riding.[150]
Estonian County Buses, Estonia (rural areas)	2018 (partially active as of January 2024)	National and regional government funding	Free transit in rural counties was largely abolished in January 2024 but remains available for people under 19 and over 63.
Indian states of Delhi, Karnataka, Kerala, Punjab, Tamil Nadu and Telangana	2021	Not available	Free public transport for women. Women's use of public transport increased 60-99% in the six cities.
Intercity Transit, Olympia (United States)	January 2020 (active through at least 2028)	Sales tax increase approved by voters in November 2018	Initially a five-year "Zero-Fare" demonstration project. Extended its pilot due to the COVID-19 pandemic. Ridership increased 40% in the first two months before the pandemic.
Kharkiv (Ukraine)	2022	Not available	Introduced fare-free public transport to support residents during the ongoing conflict.
Luxembourg Public Transport, Luxembourg (nationwide)	February 29, 2020 (active)	National government funding	First country to make all public transit free nationwide, although first-class train service still requires payment. Limited modal shift impact but improves social equity.
Malta Public Transport, Malta (nationwide)	October 2022 (active)	National government funding	Second country (after Luxembourg) to implement nationwide fare-free transit. Available for residents only on most routes through personalised Tallinja Card system; excludes some express and on-demand services.
Spain	2022	Free passes, government subsidies; discounts were extended through June 2025, with plans to introduce a new subsidy model starting in July	Free commuter train passes (Cercanías and Rodalies) in metropolitan areas. Subsidised urban transport systems. The policy was introduced to combat inflation and rising living costs exacerbated by the economic effects of the Russian Federation's invasion of Ukraine.
Stavanger (Norway)	Not available	Not available	First Norwegian city to offer free public transport to its residents. Aim was to reduce the number of car trips by 70%.
TaM, Montpellier (France)	December 2023 (active)	Local taxes, using a redistributive policy to restore purchasing power while supporting environmental transition; mobility payments from companies with 11-plus employees	Largest French metropolis with fare-free transport. Eligible for 510,000 inhabitants across 31 municipalities; residents only. 33% ridership increase in first year.

Note: This table showcases various funding mechanisms in the public transport sector, using fare-free systems as a standardised comparison point. Affordable fares should be combined with service quality improvements to attract and retain users, creating a positive feedback loop that benefits the entire system.

* The term "municipal" may represent different governmental structures in different countries. In the United States, municipal typically refers to city or town government, whereas in other countries municipal authorities may have different powers, responsibilities and funding mechanisms.

Source: See endnote 144 for this section.

As of 1 August 2025, a total of 29 countries had submitted their third-generation Nationally Determined Contributions (NDCs) to the UN Framework Convention on Climate Change (UNFCCC); of these, 25 NDCs included content related to transport, but only 15 featured content (either as targets or actions) on public transport (Andorra, Botswana, Brazil, Canada, Kenya, Lesotho, Maldives, Moldova, Monaco, Nepal, Somalia, Singapore, the United Kingdom, the United States and Uruguay).[151] Belize, Botswana, Canada, Lesotho, Moldova, Monaco and Nepal outlined specific targets related to public transport, covering expansions, modal shifts as well funding targets.

- Botswana's new NDC commits to increasing the share of public transport in total transport use to 30% by 2030.[152]
- Canada aims to contribute USD 2.1 billion (CAD 3 billion) per year for public transport through the Canada Public Transit Fund from 2026 onwards.[153]
- Lesotho's NDC has a target to increase the share of public transport from around 10% in 2022 to 30% by 2030.[154]
- Moldova's NDC features a transition to hybrid vehicles for public transport by 2030, followed by 50% fleet electrification by 2040 and complete electrification by 2050.[155]
- Monaco's NDC commits to replace all public buses with electric vehicles by 2030.[156]
- The new NDC of Nepal targets effective public transport systems in all cities by 2035; an integrated electric bus, trolley and light-rail system of at least 50 kilometres by 2030 and 100 kilometres by 2035; and at least 50 cable-based transport services by 2030 and 150 by 2035.[157]

Public transport actions in the third-generation NDCs were aimed at improving and expanding services and increasing access. However, the low number of NDCs submitted as of 1 August 2025 made it difficult to identify detailed trends and to compare actions to previous generations of NDCs.

- Andorra highlights in its 2025 NDC that all public transport has been free since 2022.[158]
- Brazil aims in its NDC to reduce dependence on private transport by improving public transport.[159]
- Canada's NDC mentions ambitions in Vancouver to reduce vehicle emissions by promoting a shift to public transport; British Columbia plans to electrify public transport.[160]
- Kenya's NDC emphasises a comprehensive approach of promoting low-carbon, climate-resilient and efficient transport systems that are gender responsive and accessible to all, through electrification, modal shifts, urban mass rapid transport systems and overall greening of transport.[161]
- Singapore's NDC highlights the "Walk-Cycle-Ride" approach, including expanding its rail network from around 270 kilometres as of 2025 to 360 kilometres in the early 2030s, putting 8 in 10 households within a 10-minute walk from a train station.[162]
- The United Kingdom's NDC highlights a complete overhaul of public transport services and integrating transport networks to make the sustainable choice the most convenient choice.[163]
- The US NDC emphasises the need to invest in affordable, accessible, reliable public transport and rail to reduce emissions and to promote benefits for communities with environmental justice concerns.[164]
- Uruguay's NDC features the optimisation of public transport services through improved accessibility and affordability.[165]

In the second generation of NDCs (submitted to the UNFCCC between 2020 and 2023), 67% of countries prioritised action with public transport.[166] Identified gaps included a lack of ambitious targets, clear timelines for activities, and specifying ministries and budgets. High-income countries focused on clean vehicle technologies, whereas low- and middle-income countries focused on infrastructure and system improvements. However, in many cases the public transport-related policies or measures outlined in second-generation NDCs were vague in both terminology and intended on-the-ground impact.

Efforts to decarbonise public transport must be paired with strategies to adapt to and withstand potential climate-related hazards. Strengthening the synergy between mitigation and adaptation is essential to ensure that investments in low-carbon public transport remain effective amid intensifying climate stress and more frequent extreme weather events. Although the shift to electric buses can lower emissions, it introduces new vulnerabilities to power supply disruptions. Without adequate adaptation and the integration of transport and climate resilience, disruptions may erode public confidence and push users back towards more emission-intensive, privately owned vehicles, jeopardising climate goals.

- During China's 2022 heatwave and drought, hydropower outputs in Sichuan Province were halved, causing blackouts and temporary shutdowns of electric vehicle charging stations.[167]
- Ahmedabad (India) has advanced its Heat Action Plan by piloting cooling interventions such as high-pressure misting systems and shaded structures at bus stops to reduce heat exposure for commuters.[168]
- In Phoenix (United States), the Cool Corridors Program, launched in 2022, aims to create shaded routes by planting up to 200 trees per mile to provide safer, cooler walking environments for residents, including those accessing transit stops and services.[169]
- In Poland, the cities of Poznań, Siemiatycze and Warsaw

have installed "green bus stops" – nature-based solutions that have green roofs and vegetated retention-infiltration systems – which are designed to retain stormwater, reduce local flooding and mitigate urban heat.[170]

Partnerships in action

- Between 2021 and 2025, the **TUMI E-Bus Mission** spearheaded an ambitious initiative to build strong coalitions at the global and local levels, collaborating with 20 Deep Dive Cities and inspiring action in 100 additional cities.[171] Through roadmaps, technical support, and knowledge exchange, the Mission enabled cities to design e-bus fleets tailored to their contexts. By bringing together public and private sector partners, it created a lasting foundation for a global community committed to advancing cleaner, greener and more sustainable urban transport.[172]
- The World Resources Institute's (WRI) **Reimagining Public Transport** project helps cities in Brazil, China, India and Mexico improve public transport's mode share, quality, efficiency and prosperity. It also supports WRI's Mobility and Accessibility Program, the TUMI E-Bus Mission and global efforts such as the World Bank's Sustainable Mobility for All.[173]
- **Transforming Transportation**, organised by the World Bank and WRI's Ross Center for Sustainable Cities, is an annual gathering of high-level decision makers and cutting-edge thinkers focused on sustainable, equitable transport solutions for low- and middle-income countries.[174] The March 2026 event will feature a week-long programme, side events and partner meetings delivered in a dynamic hybrid format combining in-person networking, high-level sessions and virtual participation to engage its global community.[175]
- The **Access to Climate Finance for Transport** initiative, supported by the High Volume Transport programme of the UK Foreign, Commonwealth and Development Office, aims to assist low- and middle-income countries in obtaining climate finance for low-carbon transport solutions.[176] Between January and June 2024, WRI and partners engaged a broad range of stakeholders through five multi-stakeholder convenings, workshops and roundtables.[177]
- In 2024, the International Association of Public Transport (UITP) developed the **Public Transport National Determined Contributions Template**, a guidance document on how to integrate public transport targets in the new third-generation NDCs. Countries can use the template to explore options that reflect national priorities and address key implementation and financing needs. It consists of 4 key elements (and 14 key policies and actions): 1) Articulate a vision for the desired state of the future that puts public transport at the heart of urban transport climate action; 2) Accelerate transformations with ambitious targets in order to bring about change and accelerate ambition; 3) Detail the actions to reach the vision, targets and objectives that will help to bring about higher ambition and better urban mobility built on a backbone of public transport; 4) Elaborate indicators linked to the SDGs to monitor and verify progress against the actions so it accelerates change and delivers multiple sustainability benefits.
- The research project on **Inclusiveness, Accessibility, and Equity in Public Transport** was launched in March 2025 by UITP's Asia-Pacific Centre for Transport Excellence. The project aims to address the growing need for public transport systems that are inclusive, accessible and socially equitable, particularly for underserved and marginalised groups in growing Asia-Pacific cities.[178]
- Funded by Horizon Europe, the three-year **GOLIA** initiative (Governing, Optimising and Leveraging Innovations proActively) brings together 21 partners, including **UITP**, to rethink how mobility is planned, governed and delivered.[179] It focuses on three key areas – climate resilience, social inclusion and governance – to help cities build mobility systems that can withstand environmental, political and structural disruptions.[180]
- UITP's **Public Transport Benefits Toolbox** offers brochures, posters, visuals and other resources to help communicate the value of public transport to the public, policy makers and other stakeholders.[181]
- In April 2025, the International Union of Railways (UIC) and Southwest Jiaotong University hosted the **UIC World Congress on Railway Training** in Chengdu (China), gathering training directors, executives, human resource professionals and rail education institutions to promote best practices, showcase innovative research, address new training challenges and share knowledge across the industry.[182]
- UIC, through its Africa Programme, launched the **UIC Taskforce 'Women in Rail in Africa'** to develop recommendations, conclusions, and initiatives that enhance women's contribution to the rail sector in Africa – both as part of the workforce and as passengers.[183]

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