BANGKOK, THAILAND

URBAN TRANSPORT PROFILE

December 2024

Asian Transport Observatory

Summary

Bangkok, a bustling metropolis of 17.4 million people, faces the challenges of rapid urbanization and increasing transport demand. The city's population density has surged, with limited road infrastructure (1 km per thousand capita compared to the national average of 10) and growing car ownership (566 vehicles per thousand residents). While Bangkok has made significant strides in developing its rapid transit system, expanding from 59 km in 2010 to 108 km in 2023, it still lags behind other major cities. This has led to heavy reliance on private vehicles, contributing to significant congestion (77th out of 387 cities globally) and air pollution (emitting 2871 tonnes of PM 2.5 in 2020). Despite these challenges, Bangkok has ambitious plans for expansion, with at least 60 km of MRT, 3 km of LRT, and further BRT lines under construction or planned.

A key target for Bangkok is to shift towards sustainable and efficient public transport. Currently, only 40% of the population has convenient access to public transport, although this is above the South East Asia average of 21%. Increasing the modal share of public transport, which currently fluctuates depending on data sources (from 5% to 60%), is crucial. Bangkok's development plans aim to create a "green and convenient metropolitan" with multimodal transport options. This includes expanding the rapid transit network, improving bus services (currently 263 routes), and promoting walking and cycling. Improving urban access is also critical, with targets to increase access to healthcare, schools, and public spaces, while also developing protected bike lanes.

Furthermore, Bangkok needs to address transport externalities. The city ranks high in CO2, CH4, and N2O emissions, and over half the population is exposed to floods. Reducing air pollution and greenhouse gas emissions from the transport sector should be a priority. Policy priorities include promoting electric vehicles, improving fuel efficiency, and shifting to cleaner modes of transport. Additionally, improving road safety and resilience to natural disasters are important targets. By implementing these strategies, Bangkok can move towards a more sustainable, efficient, and resilient urban transport system.

About the Urban Transport Profiles

The Asian Transport Observatory (ATO) Urban Transport Profiles provide a comprehensive snapshot of urban transport dynamics for 40 cities in the Asia-Pacific region. These profiles compile data from official city reports, relevant sources from reputable research organizations, multilateral development institutions, international experts' reports, secondary studies, and all other research endorsed or guided by city governments. Featured cities are benchmarked against other cities, where data is available, in the region, subregional averages — and in some cases, global cities — offering valuable comparative insights. In cases where data is not available, placeholders for the graphs are retained. Each profile also includes a curated list of relevant urban transport policies and documents, presenting a concise overview of the city's policy framework. By covering a wide range of transport-related indicators, these profiles serve as a critical resource for understanding and improving urban transport systems.
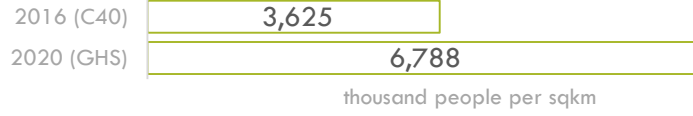
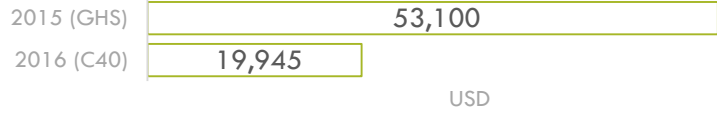## Disclaimer

General

Population 17.4 million
(2020) (GHS)

Land area 1,569 sqkm
(2017) (C40)

Population density 7 thousand per sqkm
(2020) (GHS)

GDP per capita 20 thousand USD
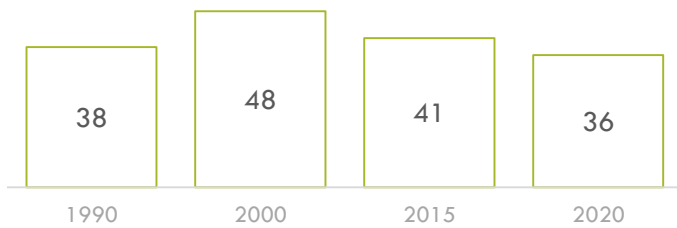(2016) (C40)

Population density

2016 (C40)	3,625
2020 (GHS)	6,788

thousand people per sqkm

GDP per capita

2015 (GHS)	53,100
2016 (C40)	19,945

USD

Scatter plot: GDP per capita, USD (log-scale, 2015) (GHS) versus Population density, persons/sqkm (log-scale, 2020) (GHS). Legend: Global cities, Rest of Asia-Pacific, Cities of South East Asia, Bangkok.

Urban Form and Structure

Builtup area per capita
sqm per capita (GHS)

1990	2000	2015	2020
38	48	41	36

Mean block density
blocks per sqkm (2020) (ITDP)

Legend: Cities of South East Asia, Rest of Asia-Pacific

Builtup area per capita
(GHS)

Scatter plot: sqm/capita (2020) versus GDP per capita, USD (log-scale, 2015). Legend: Global cities, Rest of Asia-Pacific, Cities of South East Asia, Bangkok, South East Asia average.
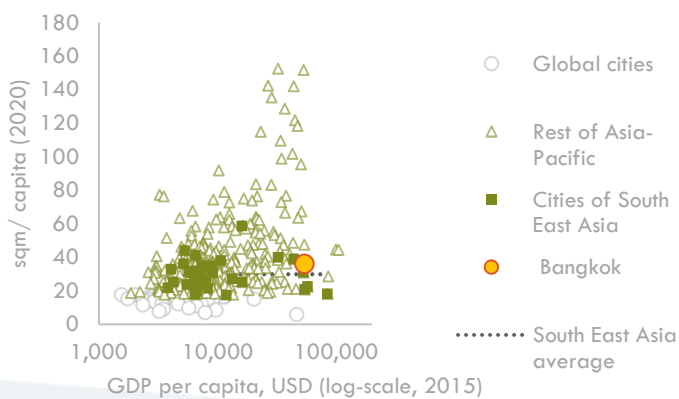
Intersection density
(Oke et.al. (2019) (OSM))

intersections per sqkm

- Metro Manila: 12,063
- Kuala Lumpur: 2,666
- Vientiane: 830
- Phnom Penh: 806
- Surabaya: 796
- Bandung: 796
- Jakarta: 795
- Davao City: 228
- Singapore: 210
- Hanoi: 143
- Bangkok: 184
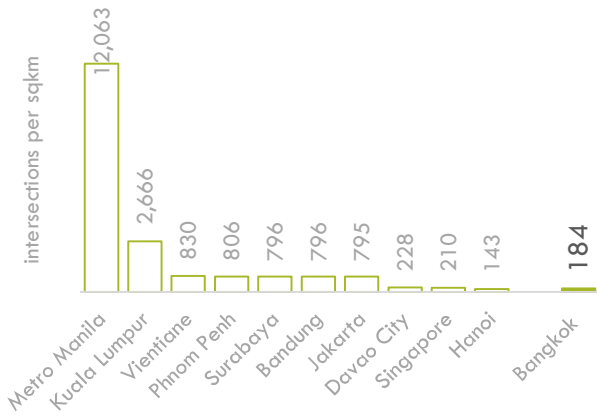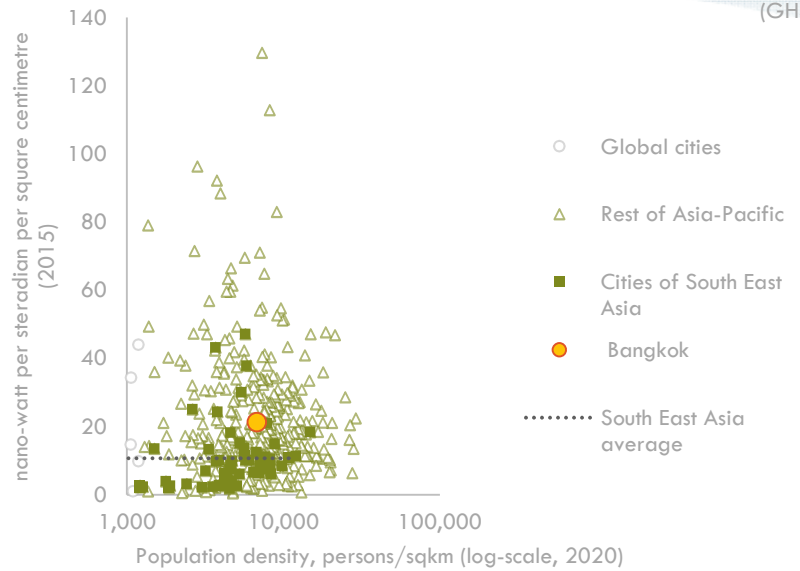
(a) Night time light intensity studies illustrate urban forms and patterns by mapping human activity, infrastructure, and connectivity, offering insights into urban sprawl, density variations, and transport network

Night time light intensity (a)
(GHS)

Population density, persons/sqkm (log-scale, 2020)

nano-watt per steradian per square centimetre (2015)

Legend:
- Global cities
- Rest of Asia-Pacific
- Cities of South East Asia
- Bangkok
- South East Asia average

Urban Transport Infrastructure

Road availability
kilometers per thousand population (2019) (Oke et.al. (OSM) and GHS)

- Thailand (national average)
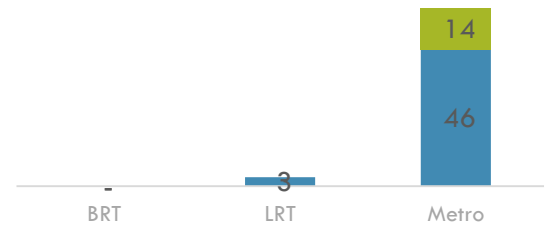- Bangkok
- Cities of South East Asia
- Rest of Asia-Pacific
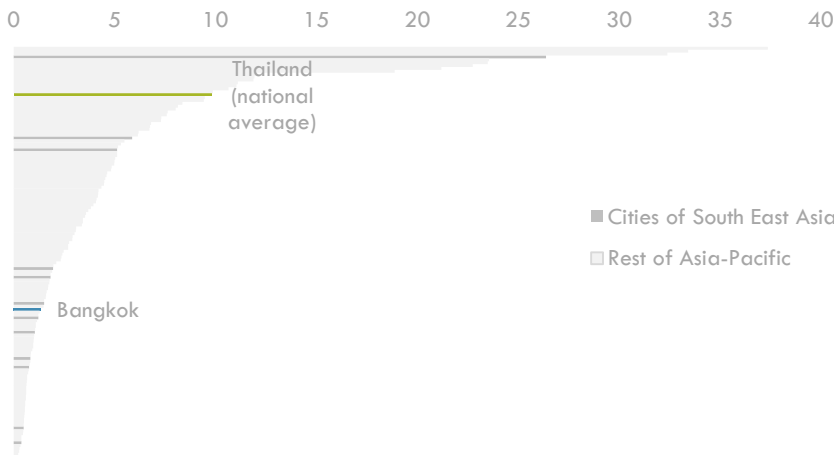
Road kilometers n.d.

Rapid transit infrastructure
(2024) (TE)

- Under construction
- Planned

- BRT: -
- LRT: 3
- Metro: 46 (under construction), 14 (planned)

Rapid transit infrastructure
kilometers (ITDP, Primary data)

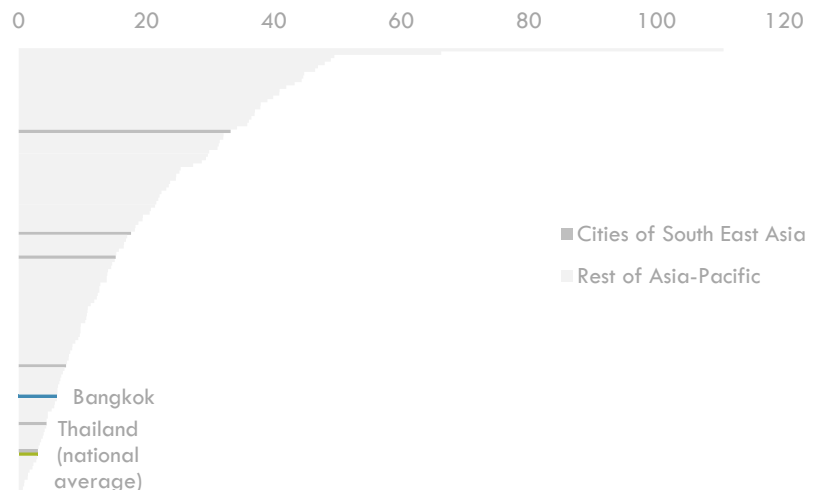Metro, BRT, LRT
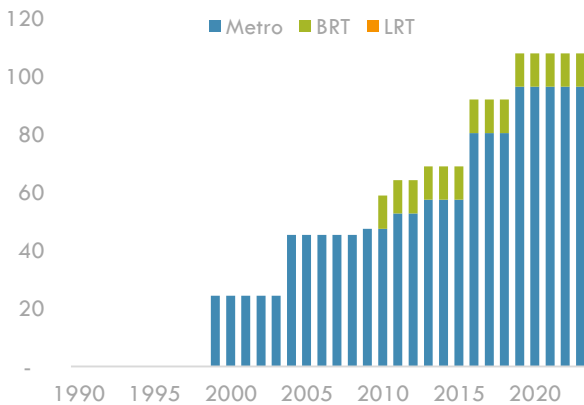
BRT 12 kilometers
LRT none
Metro 97 kilometers
Total 108 kilometers

(2023) (ITDP)

Rapid transit availability
kilometers per million urban population (2021) (ITDP, Primary data)

- Cities of South East Asia
- Rest of Asia-Pacific
- Bangkok
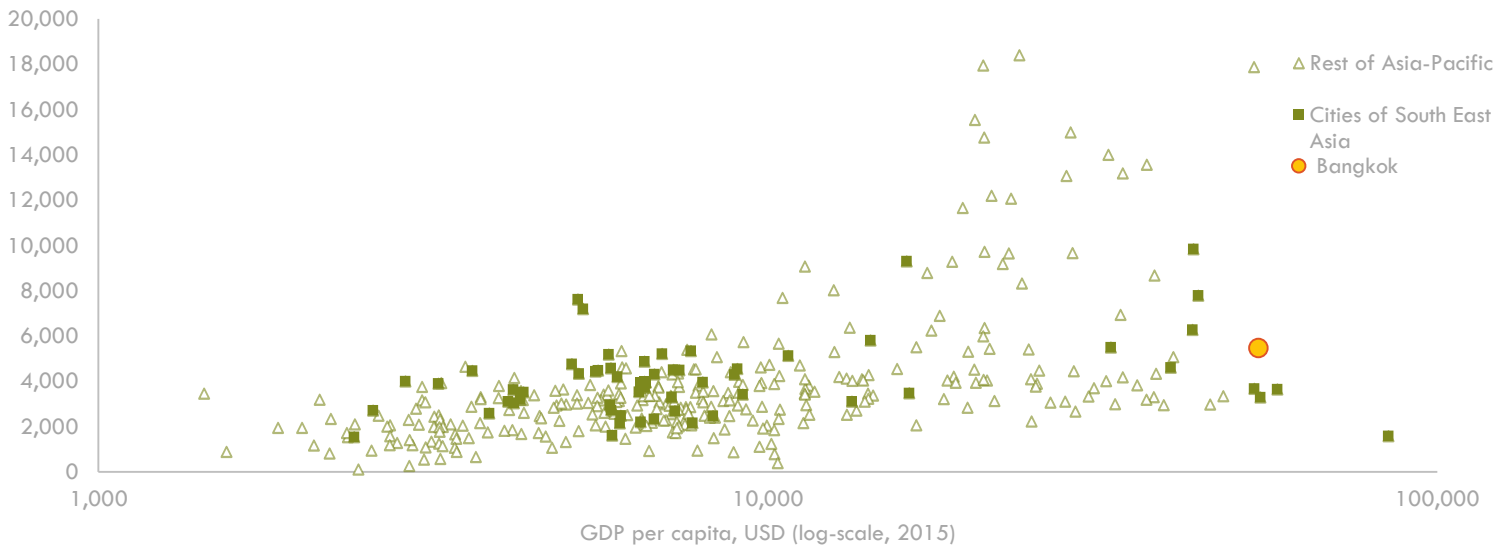- Thailand (national average)

Approximate transit coverage 5% of land area

(2015) (ITDP and GHS (European Commission))
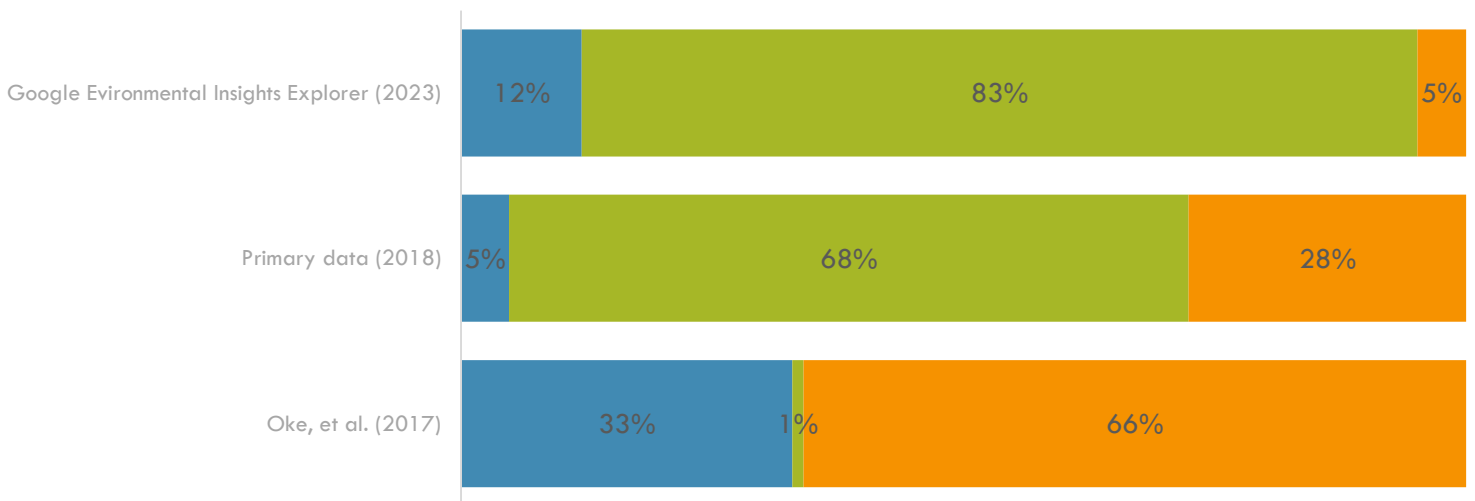
Transport Activity and Services

VKT per capita

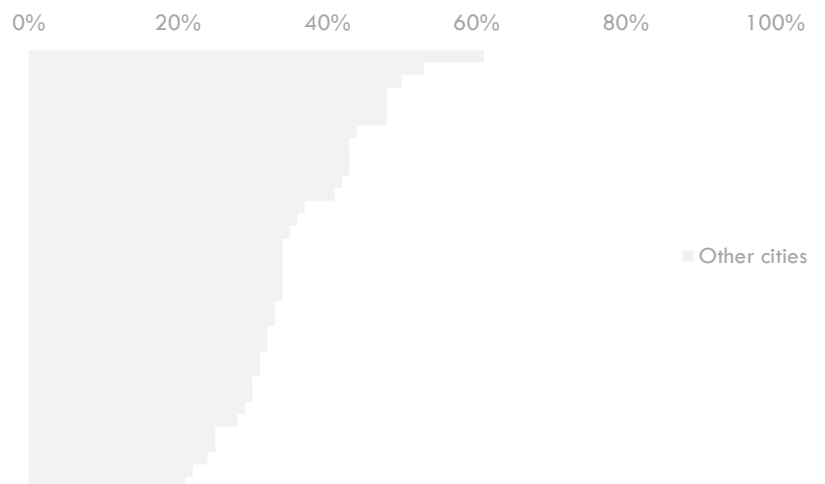Vehicle-kilometer per capita (2022) (ClimateTrace)

GDP per capita, USD (log-scale, 2015)

Legend:
- △ Rest of Asia-Pacific
- ■ Cities of South East Asia
- ○ Bangkok

Trips Mode share (b)

Share, %

Legend: ■ Walking and cycling ■ Private ■ Public transport (bus, ferry, informal public transit, etc)

Source	Walking and cycling	Private	Public transport
Google Evironmental Insights Explorer (2023)	12%	83%	5%
Primary data (2018)	5%	68%	28%
Oke, et al. (2017)	33%	1%	66%

(b) The methodologies used for mode share assessments vary across different studies, making direct comparison of results inadvisable. Specifically, the Google Environmental Insights Explorer derives its assessments from mobile data analysis, while primary data studies typically rely on survey-based approaches. In contrast, the study by Oke et al. utilizes a combination of secondary data sources.

Metro ridership n.d.

Congestion ranking 77th out of 387 cities

Congestion level

Percent increased travel time vs. uncongested conditions (2021) (TomTom)

■ Other cities

Vehicle motorization

Vehicles per thousand population (Primary data)

Bangkok, 2012

- Bangkok
- Cities in South East Asia
- Rest of Asia-Pacific

(c) It should be noted that, in most cases, scrapped vehicles are not de-registered, which may result in slightly inflated numbers.
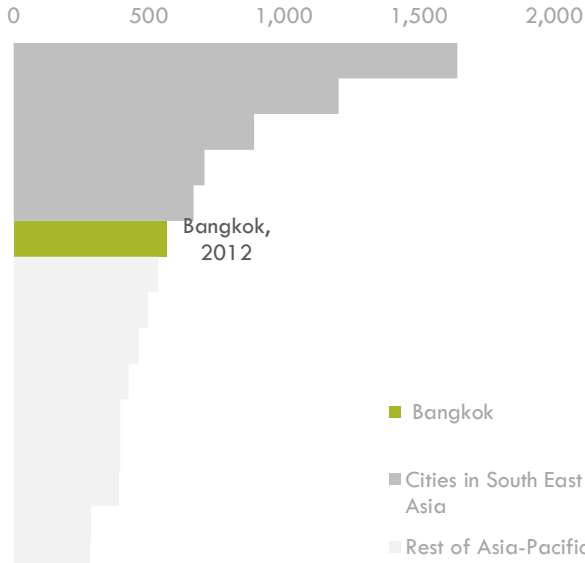
Vehicles registered (c)

Thousand vehicles (Primary data)

Vehicles considered: Car, Taxi, 2W, 3W, Bus, Freight vehicles, Others
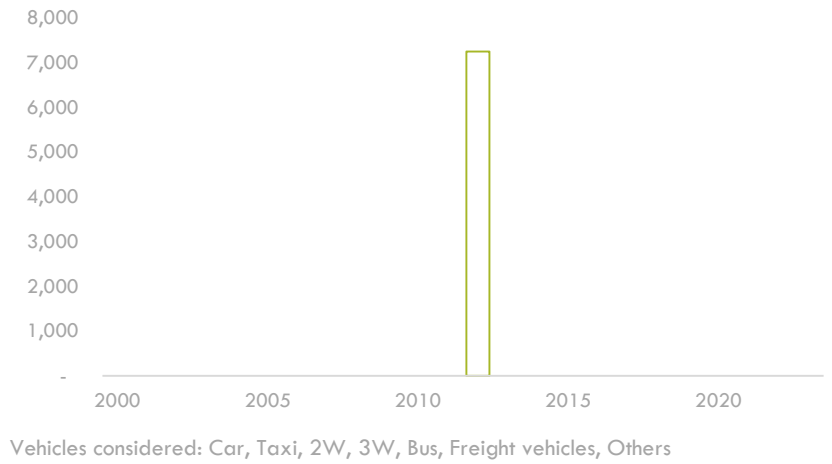
Bus fleet (operational)

Bus (and other public transport) fleet (Primary data)

Urban Access

Access to urban public transport

Share of population with convenient access to public transport (2023) (CIESIN)

GDP per capita, USD (log-scale, 2015)

- Global cities
- Rest of Asia-Pacific
- Cities of South East Asia
- South East Asia average
- Bangkok
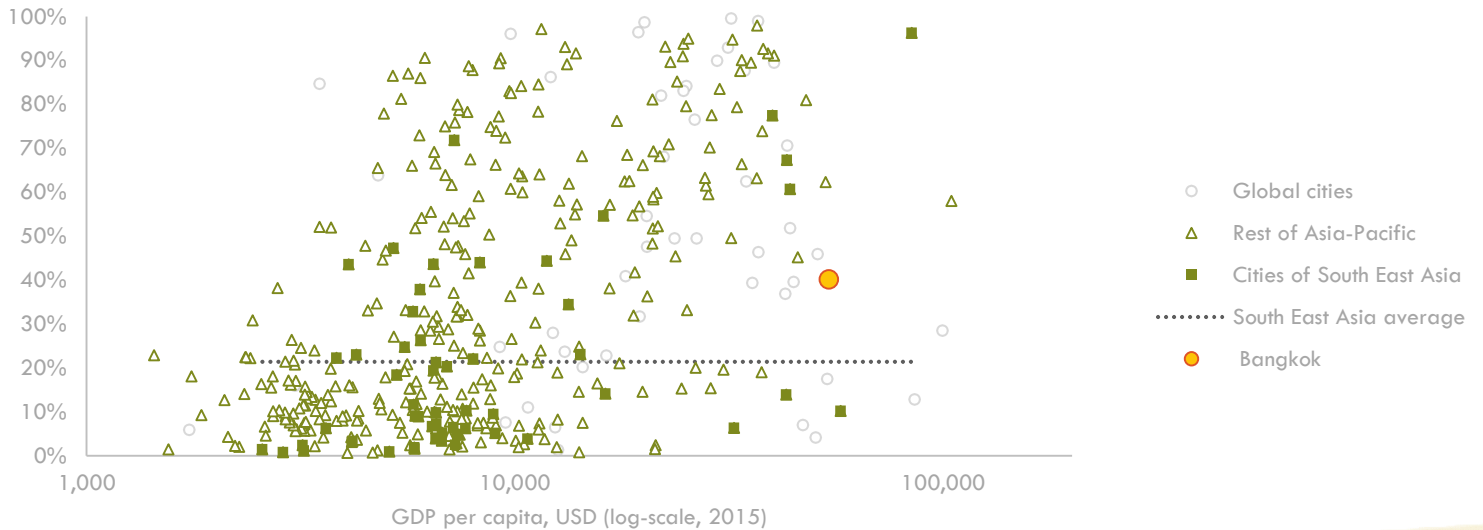
Access to urban public transport (d) - by source

Share of population with convenient access to public transport

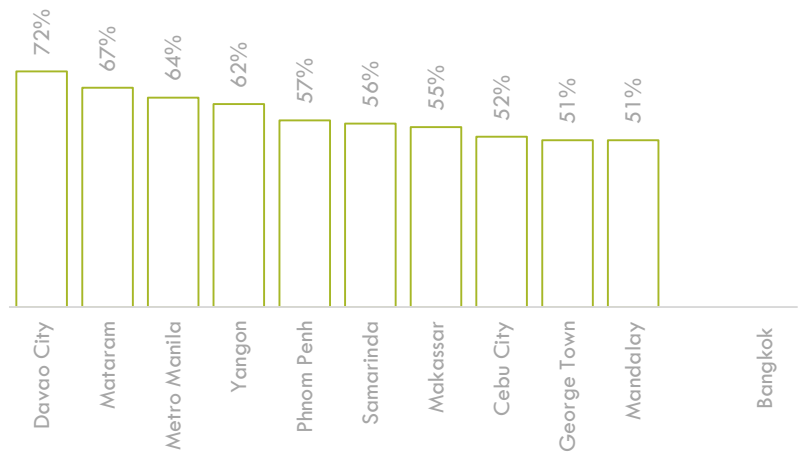|	
2017-2019 (UNESCAP - SUTI)	
2020 (UN Habitat)	**26%**
2023 (CIESIN)	**40%**
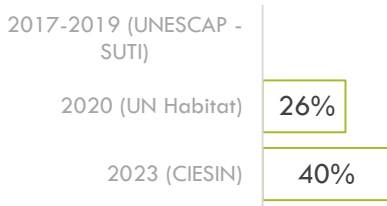
(d) "Access to urban public transport" is computed as share of population who live within a walking distance (along a street network) of 500m to a low capacity public transport system (eg bus, tram) and 1000m to a high capacity public transport system (eg trains, ferries, etc). Only public transport stops which are mapped are included in the analysis which may include both formal and informal stops. Many cities (mostly in the developing countries) have informal public transport systems which are not fully mapped - meaning that they may record higher levels of access to public transport than reported in this dataset.

(e) People Near Services measures the percentage of the city's population living within a 1km walk of both healthcare and education. These services are especially vital for babies, toddlers, and their caregivers, who should be able to reach them on foot.

(f) Percentage of the city's population that lives within 100m of a car-free place. These car-free places include pedestrian-only alleyways, nature trails, playgrounds, pedestrianized squares, and anywhere else that is not used by cars and trucks (except, in some cases, emergency vehicles).
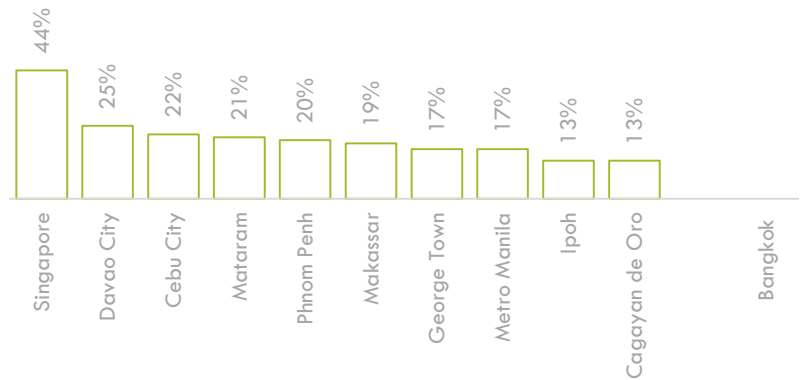
People near services (both healthcare and schools) (e)

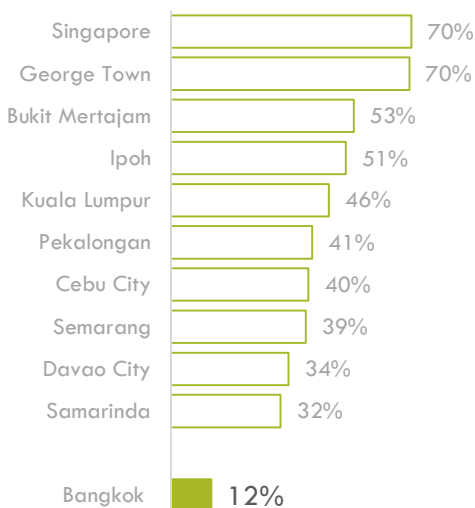(Share of population) vs. highest 10 cities in South East Asia (2020) (ITDP)

Davao City	Mataram	Metro Manila	Yangon	Phnom Penh	Samarinda	Makassar	Cebu City	George Town	Mandalay	Bangkok
72%	67%	64%	62%	57%	56%	55%	52%	51%	51%	

People near car-free places (f)

(Share of population) vs. highest 10 cities in South East Asia (2020) (ITDP)

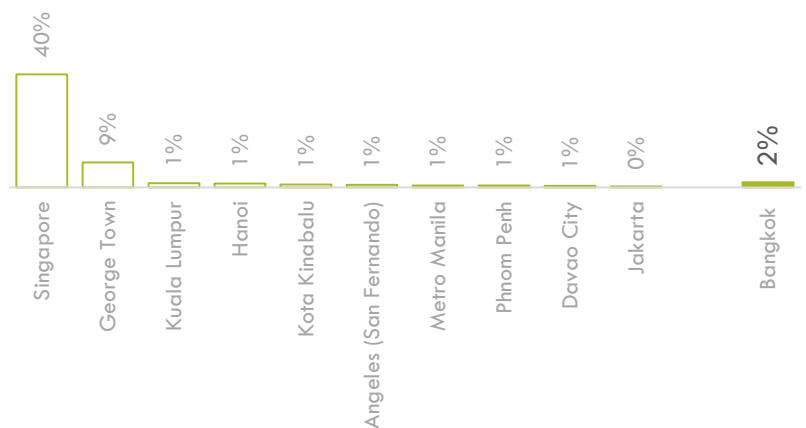| Singapore	Davao City	Cebu City	Mataram	Phnom Penh	Makassar	George Town	Metro Manila	Ipoh	Cagayan de Oro	Bangkok
44%	25%	22%	21%	20%	19%	17%	17%	13%	13%	

People near open public space

(Share of population) vs. highest 10 cities in South East Asia (2020) (UN Habitat)

Singapore	70%
George Town	70%
Bukit Mertajam	53%
Ipoh	51%
Kuala Lumpur	46%
Pekalongan	41%
Cebu City	40%
Semarang	39%
Davao City	34%
Samarinda	32%
Bangkok	**12%**

People near protected bikelanes

(Share of population) vs. highest 10 cities in South East Asia (2020) (ITDP)

Singapore	George Town	Kuala Lumpur	Hanoi	Kota Kinabalu	Angeles (San Fernando)	Metro Manila	Phnom Penh	Davao City	Jakarta	Bangkok
40%	9%	1%	1%	1%	1%	1%	1%	1%	0%	**2%**

Transport externalities

Road transport - CO2 emissions

Thousand tonnes (2022) (ClimateTrace)

△ Rest of Asia-Pacific
■ Cities of South East Asia
○ Bangkok

Road transport - N2O emissions

Tonnes (2022) vs. highest 10 cities in South East Asia (ClimateTrace)

City	Value
Bangkok	345
Jakarta	596
Kuala Lumpur	182
Yogyakarta	174
Surabaya	170
Ho Chi Minh City	159
Hanoi	108
Bandung	96
Medan	85
Yangon	68
Semarang	67
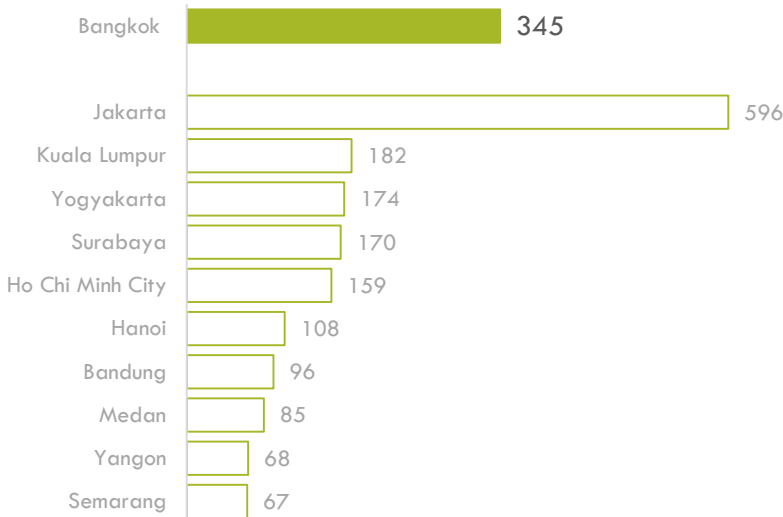
Population exposure to disasters

Share of population (2015) (GHS)

51% Exposed to floods — Exposed to storm surges
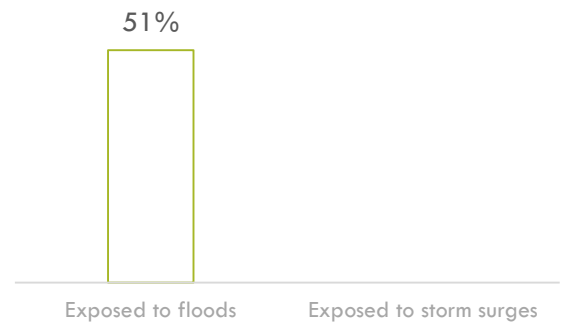
Road transport - CH4 emissions

Tonnes (2022) vs. highest 10 cities in South East Asia (ClimateTrace)

City	Value
Bangkok	2,090
Jakarta	4,565
Yogyakarta	1,329
Surabaya	1,299
Kuala Lumpur	1,023
Ho Chi Minh City	965
Bandung	733
Hanoi	653
Medan	652
Semarang	511
Yangon	451
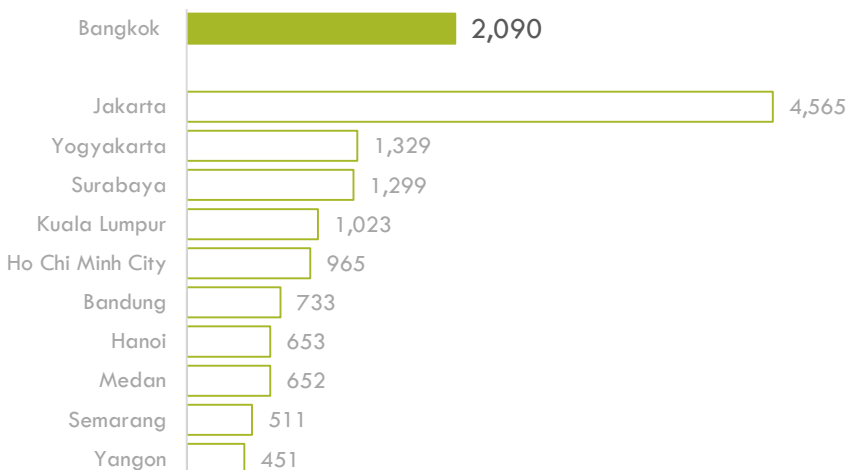
Urban built-up area exposure to disasters

Share of urban area (2020) (GHS)

60% Exposed to floods — Exposed to earthquakes
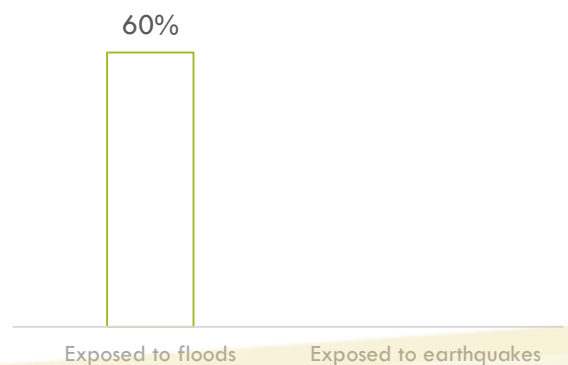
Transport PM 2.5 emissions

(GHS)
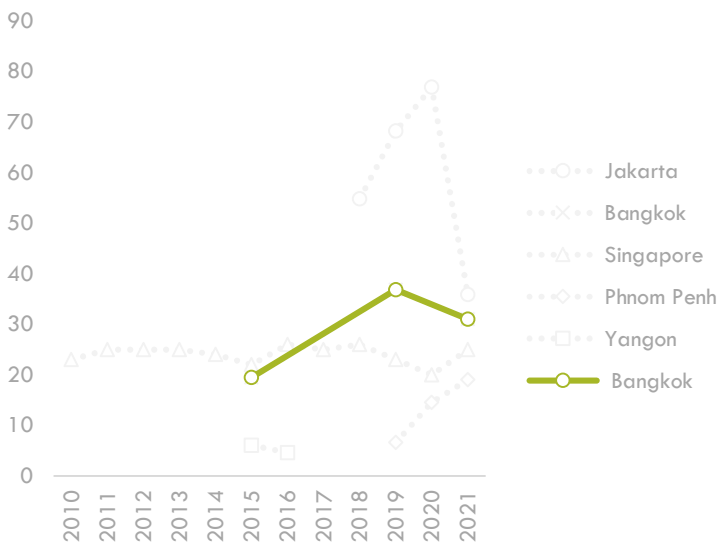
Grams per capita (log-scale, 2015)

GDP per capita, USD (log-scale, 2015)

○ Global cities
△ Rest of Asia-Pacific
■ Cities of South East Asia
● Bangkok

NO2 concentration

ug/m3 (vs. highest 5 cities in South East Asia) (WHO)

Jakarta
Bangkok
Singapore
Phnom Penh
Yangon
Bangkok

PM 2.5 concentration

ug/m3 (vs. highest 5 cities in South East Asia) (WHO)

Hanoi
Jakarta
Ho Chi Minh City
Kuala Lumpur
Haiphong
Bangkok

Road crash fatality rate

Deaths per 100,000 population

Bangkok (Primary data): 10
Bangkok (ESCAP-SUTI)
Thailand (2021): 25
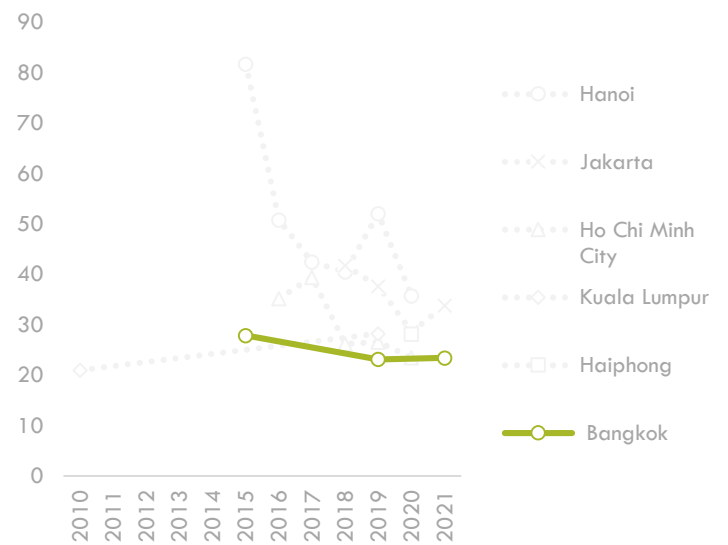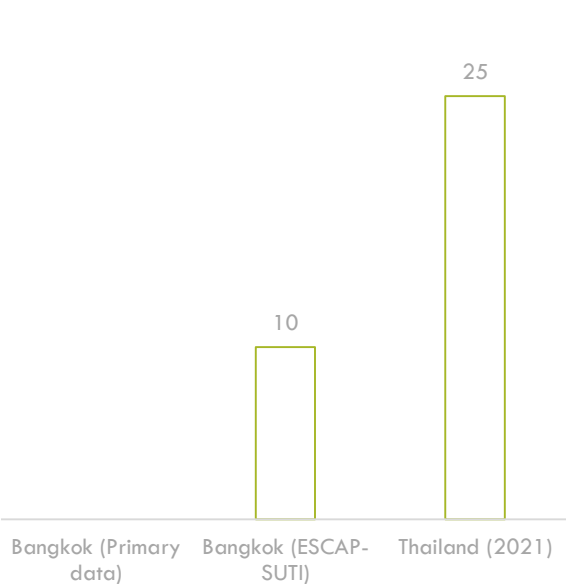
Road crash fatality rate

Deaths per 100,000 population (Primary data)
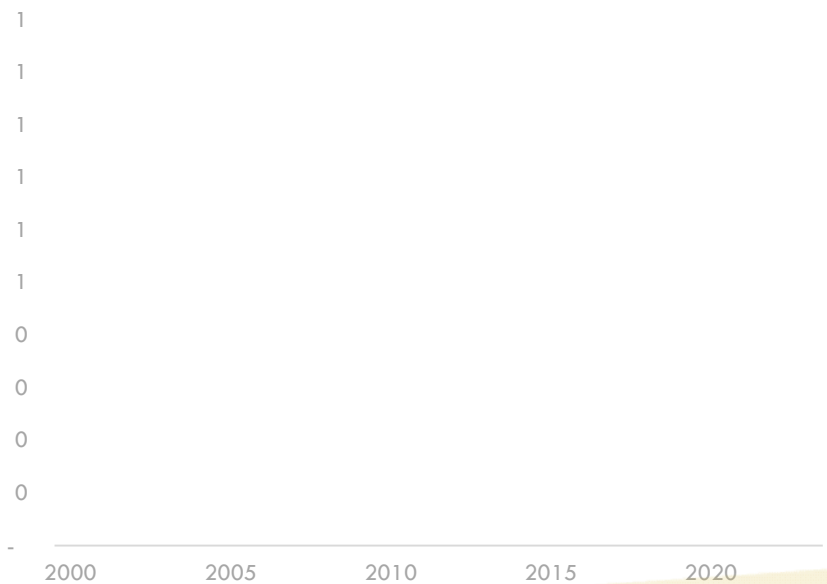
Transport related Indices

Container port performance index

Index is resultant of the sum of a weighted average of indices for each of the five vessel sizes: feeders (<1,500 TEUs), intra-regional (1,500–5,000 TEUs), intermediate (5,000–8,500 TEUs), neo-Panamax (8,500–13,500 TEUs), and ultra-large container carriers (>13,500 TEU)

Bangkok 273rd out of 370 cities

(2023) (WB)

Critical Infrastructures Spatial Index for the transportation sector

CISI is an index that spatially explicit indicates the coverage or lack of transport infrastructure. The CISI is expressed in a dimensionless value ranging between 0 (no CI intensity) and 1 (highest CI intensity). The index aggregates high resolution geospatial information on multiple CI assets per CI system

Bangkok 0.07/1.00

(2020) (GHS)

SUTI Geometric Mean

The geometric mean in the Sustainable Urban Transport Index (SUTI) by UNESCAP is a mathematical approach to aggregate scores across its 10 sub-indicators, including public transport ridership, safety, affordability, air quality, and access to transport

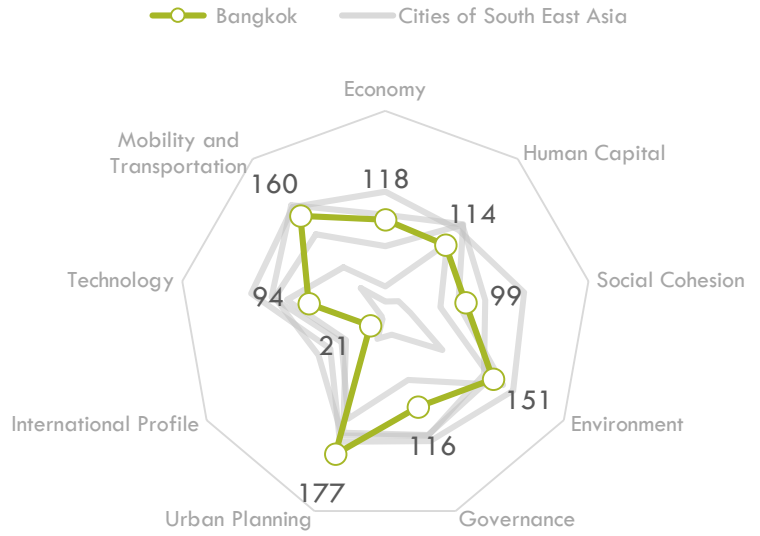**Bangkok** 42 score out of 100

(2024) (UNESCAP - SUTI)

Cities in Motion index ranking

The Cities in Motion Index (CIMI) is a composite indicator evaluating cities across nine dimensions—governance, urban planning, technology, environment, international profile, social cohesion, human capital, mobility, and economy—focusing on sustainability and quality of life. It uses a weighted aggregation model to combine sub-indicators for a holistic assessment of urban performance

Bangkok 116th out of 183 cities

(2024) (IESE)

Cities in Motion index ranking by subcomponent

Ranking (vs. other Cities of South East Asia) (2024) (IESE)

—○— Bangkok   —— Cities of South East Asia

Economy 118
Human Capital 114
Social Cohesion 99
Environment 151
Governance 116
Urban Planning 177
International Profile 21
Technology 94
Mobility and Transportation 160

Transport relevant policy documents

Year published	Document name
2013	20-year Development Plan for Bangkok Metropolis
2021	Sustainable Urban Transport Index for Bangkok and Impacts of COVID-19 on Mobility
n.d.	Bangkok Master Plan on Climate Change 2013-2023
n.d.	Mass Rapid Transit Master Plan in Bangkok Metropolitan Region (M-MAP)

References

ATO Urban Policy Tracker	Asian Transport Outlook (ATO). (2024). ATO Urban Policy Tracker. https://asiantransportoutlook.com/
C40	C40. (2024). Greenhouse gas emissions interactive dashboard. https://www.c40knowledgehub.org/s/article/C40-cities-greenhouse-gas-emissions-interactive-dashboard?language=en_US
CIESIN	CIESIN. (2023). SDG Indicator 11.2.1: Urban Access to Public Transport, 2023 Release. https://www.earthdata.nasa.gov/data/catalog/sedac-ciesin-sedac-sdgi-uapt-2023-2023.00
ClimateTrace	Climate Trace. (2024). Data Downloads. https://climatetrace.org/data
GHS	GHS. (2024). GHSL - Global Human Settlement Layer. https://human-settlement.emergency.copernicus.eu/ghs_ucdb_2024.php
Google Evironmental Explorer	Google. (2024). Environmental Insights Explorer. https://insights.sustainability.google/places/ChIJbTgmYNLIlzMR0HiSrNoj7V8?ty=2023&hl=en-US
IESE	IESE. (2024). IESE Cities in Motion Index. https://www.iese.edu/media/research/pdfs/ST-0649-E.pdf
ITDP	ITDP. (2024). The Atlas of Sustainable City Transport. https://itdp.org/publication/the-atlas-of-sustainable-city-transport/
Oke et al.	Oke et al. (2019). A novel global urban typology framework for sustainable mobility futures. https://iopscience.iop.org/article/10.1088/1748-9326/ab22c7#erlab22c7s3
OSM	OSM. (n.d.). Open Stret Map. https://www.openstreetmap.org/#map=4/21.84/82.79
Primary data	This includes city official reports or MDB/ Research organisation/ Third party report endorced/ accepted/ guided by the city government
TE	Transport Politic. (n.d.). Transit Explorer Global Data. https://www.thetransportpolitic.com/transit-explorer/transit-explorer-data-and-sources/
TomTom	Tom Tom. (2023). Traffic index Ranking. https://www.tomtom.com/traffic-index/ranking/
UITP - GUMI	UITP. (2022). Global Urban Mobility Indicators 2022. https://www.uitp.org/publications/global-urban-mobility-indicators-2022
UN Habitat	UN Habitat. (2021). Urban Indicators Database. https://data.unhabitat.org/
UNESCAP - SUTI	UNESCAP. (n.d.). Sustainable Urban Transport Index (SUTI). https://www.unescap.org/our-work/transport/suti
WHO	WHO. (2024). WHO Ambient Air quality database. https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database
WB	WB. (2024). The Container Port Performance Index 2023. https://documents1.worldbank.org/curated/en/099060324114539683/pdf/P175833138892300871be641a5ea7b90e0e6.pdf