

Phnom Penh

Urban Transport - State of Play

Insights from the Asian Transport Observatory (ATO)

Uploaded Jan 2025



List of Abbreviations

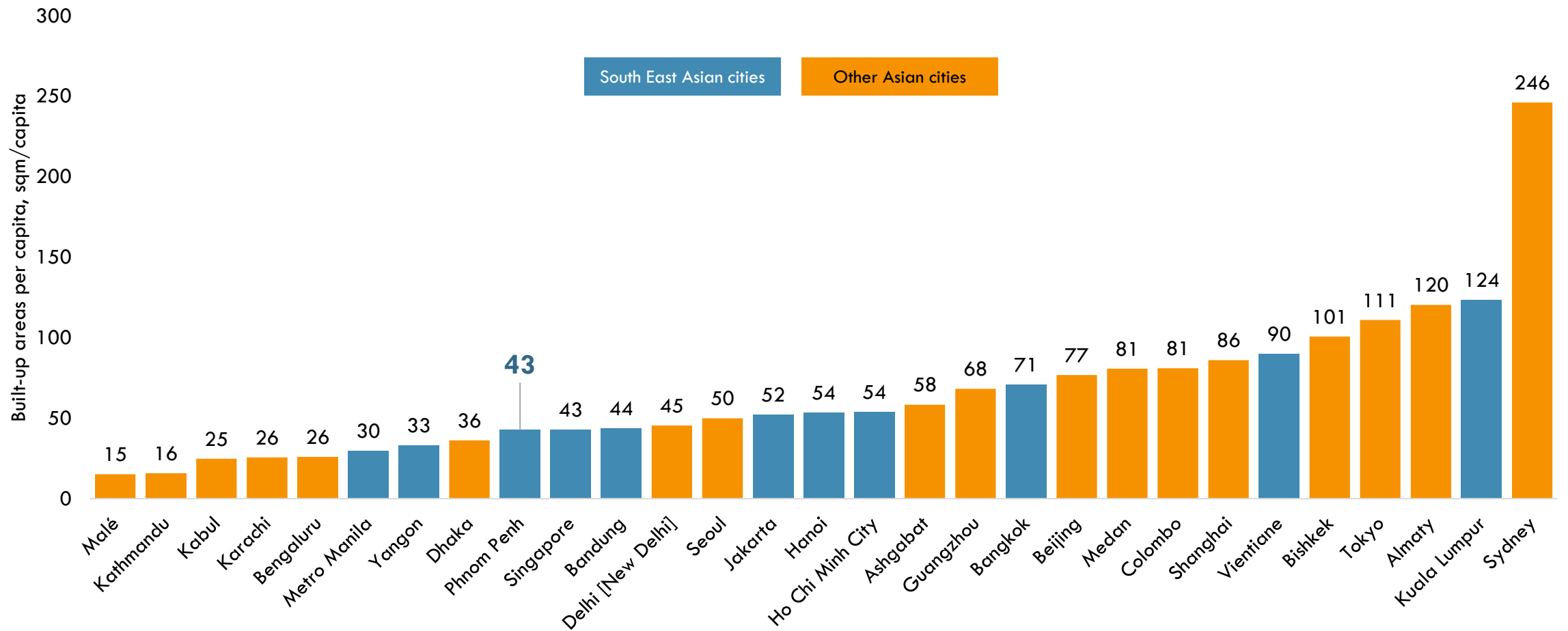
2W	2 wheeler
4W	4 wheeler
CAIT	Climate Analysis Indicators Tool
CBA	Phnom Penh City Bus Authority
CBD	Central Business District
CIESIN	Center for International Earth Science Information Network, Columbia University
COVID-19	COronaVirus Disease of 2019
DPWT/PPCA	Department of Public Works and Transport
EDGAR	Emissions Database for Global Atmospheric Research
GDP	Gross Domestic Product
GHS	European Commissions - Global Human Settlement Database
IPT	intra-para transit
JICA	Japan International Cooperation Agency
JST	Japan Science and Technology Agency
MC	Motorcycle
MEF	Ministry of Economy and Finance
PiBO	Project for Improvement of Public Bus Operation in Phnom Penh
PPAP	Phnom Penh Autonomous Port
PPCA	Phnom Penh Capital Administration
PPTUMP	Project for Comprehensive Urban Transport Plan in Phnom Penh Capital City
RHS	Ride hailing services
STT	Sahmakum Teang Tnaut
SUTI	Sustainable Urban Transport Index
UN Habitat	United Nations Human Settlements Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UVC	Urban Voice of Cambodia
WB	World Bank

Section 1: Phnom Penh city – State of play



Urban form and structure

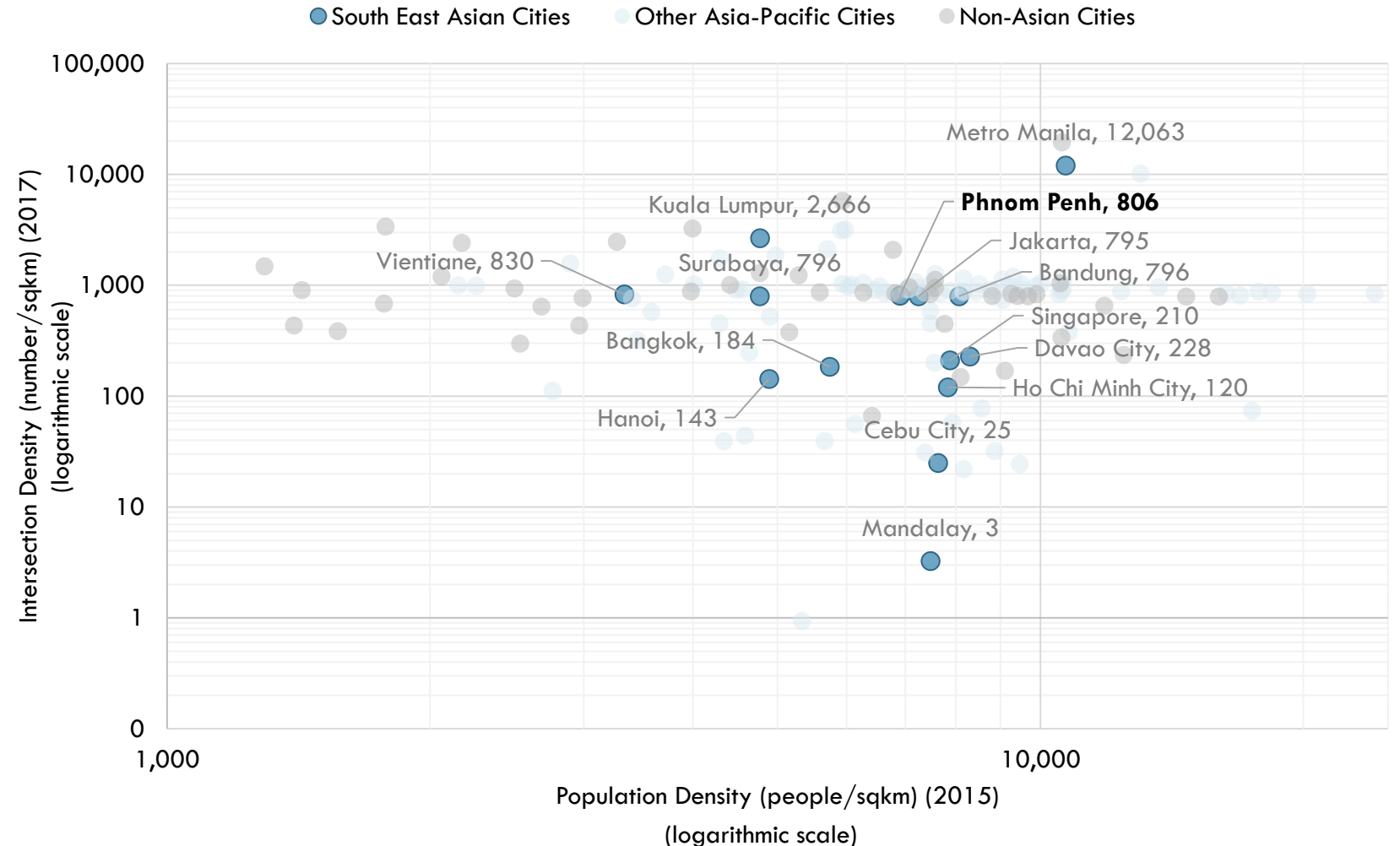
Built-up area per capita



- Phnom Penh has 43 sqm of built-up area per capita, less than major Southeast Asian cities

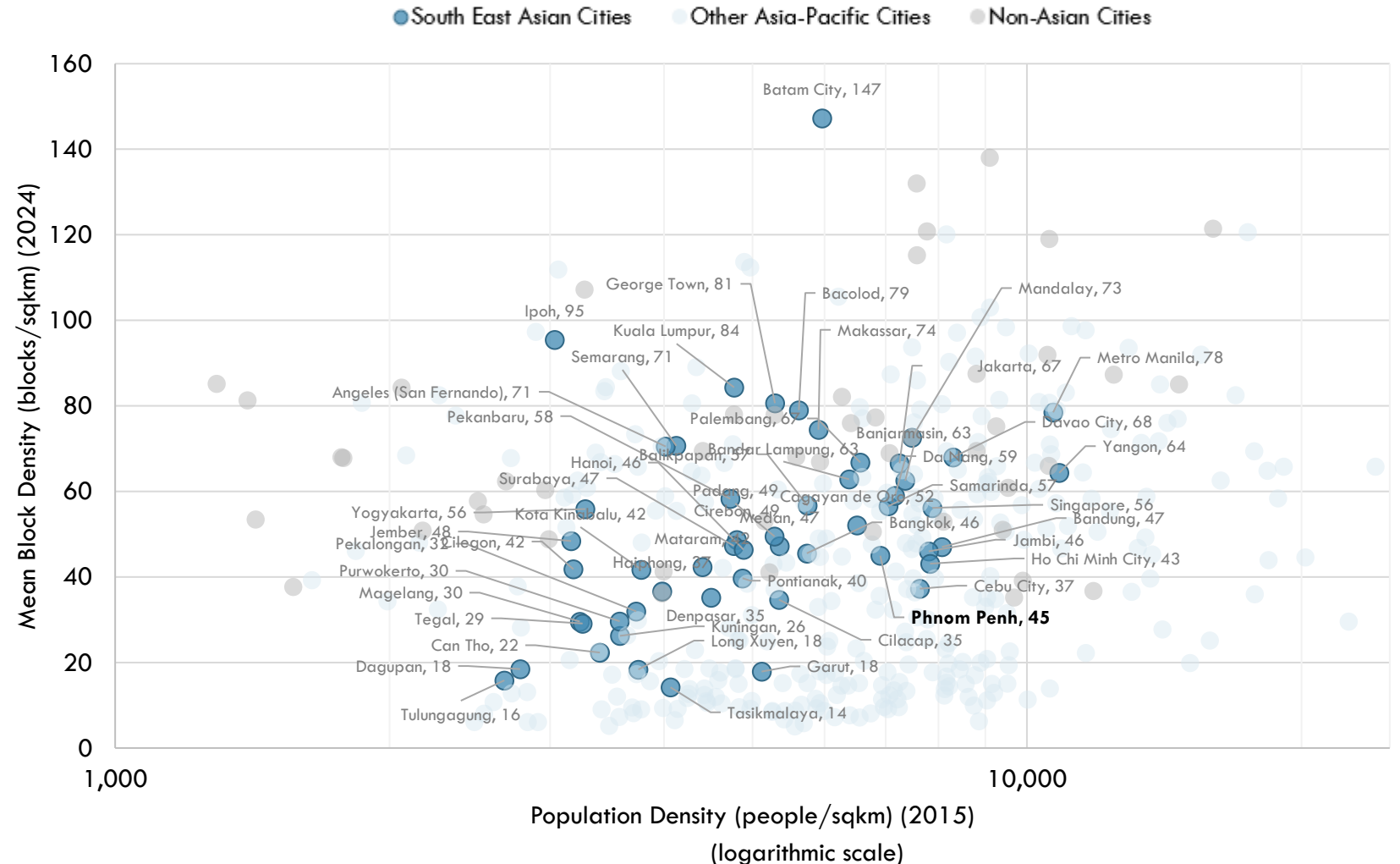
Intersection density

- Phnom Penh has a high intersection density of 806 per sq km among the Southeast Asian cities
- High intersection density can promote walkability and cycling by creating a more fine-grained street network with shorter distances between intersections. Additionally, a dense network of intersections can provide greater redundancy and route options, potentially improving traffic flow and reducing travel times in case of incidents.
- On the other hand, high number of intersections can lead to increased traffic light frequency, potentially causing stop-and-go traffic and longer travel times, especially for vehicles.



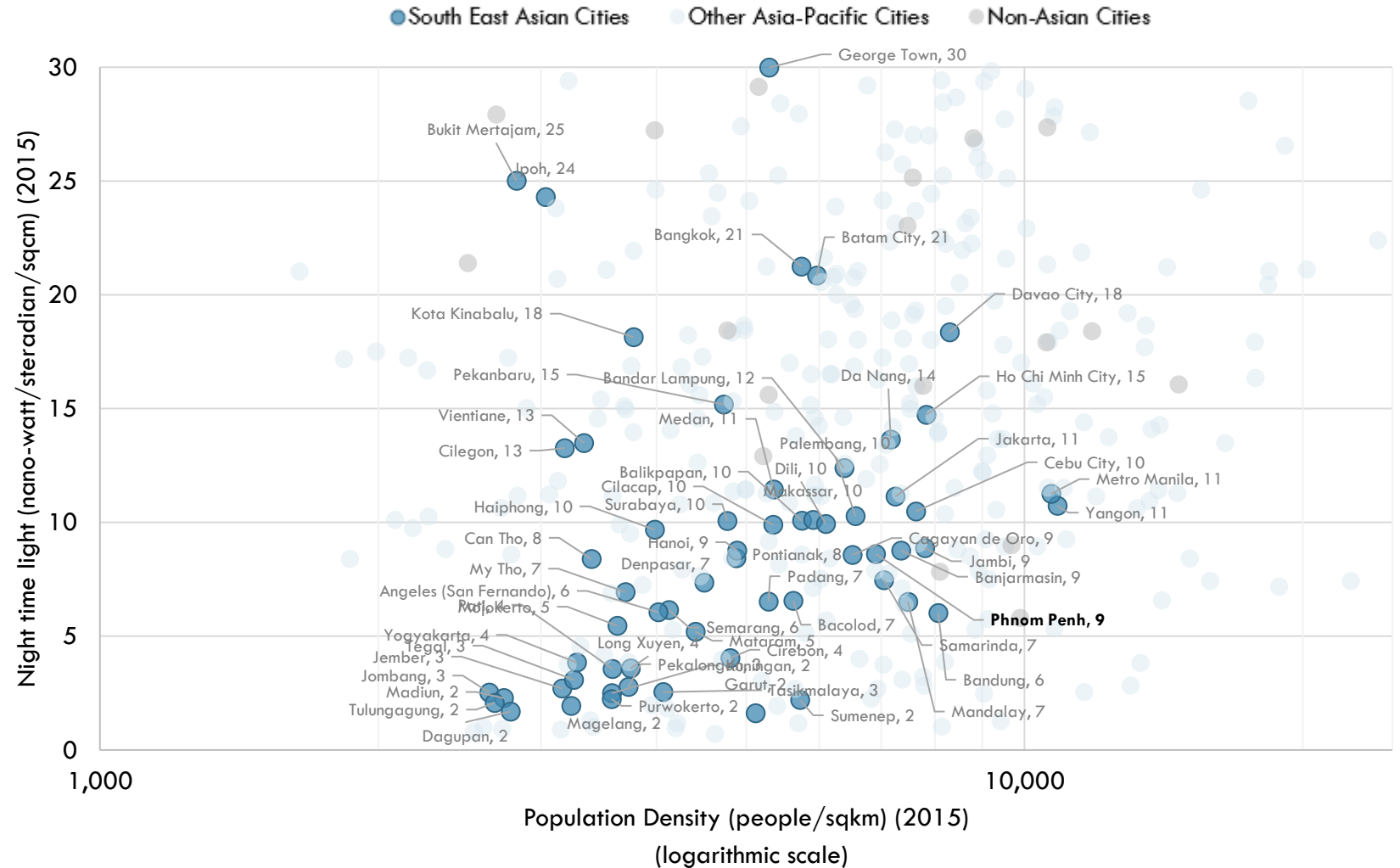
Mean block density

- Phnom Penh has 45 blocks per sq km—which is very lower than the average of 50 blocks per sqkm for South East Asian cities (from the sample). The variation of the density is between 147 blocks per sqkm in Batam City to as low as 14 in Tasikmalaya.
- Mean block density, which refers to the average number of blocks per square kilometer, is one of the key indicators of walkability. Denser block patterns typically translate to smaller block sizes, encouraging pedestrian movement with shorter distances and lower average traffic speeds.



Night time light analysis

- Night time light analysis indicates low urbanization concentration in Phnom Penh
- Nighttime light analysis is a technique that involves studying satellite imagery of Earth at night to analyze the patterns and intensity of artificial lights.
- It reflects the urbanization trends, potentials of transport hubs, traffic and movement patterns etc.

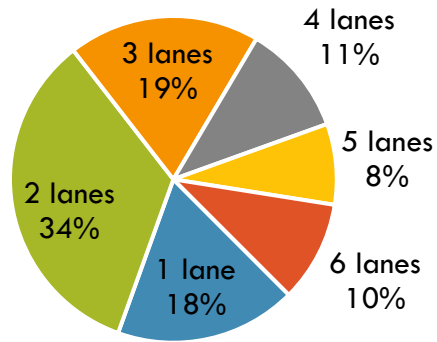




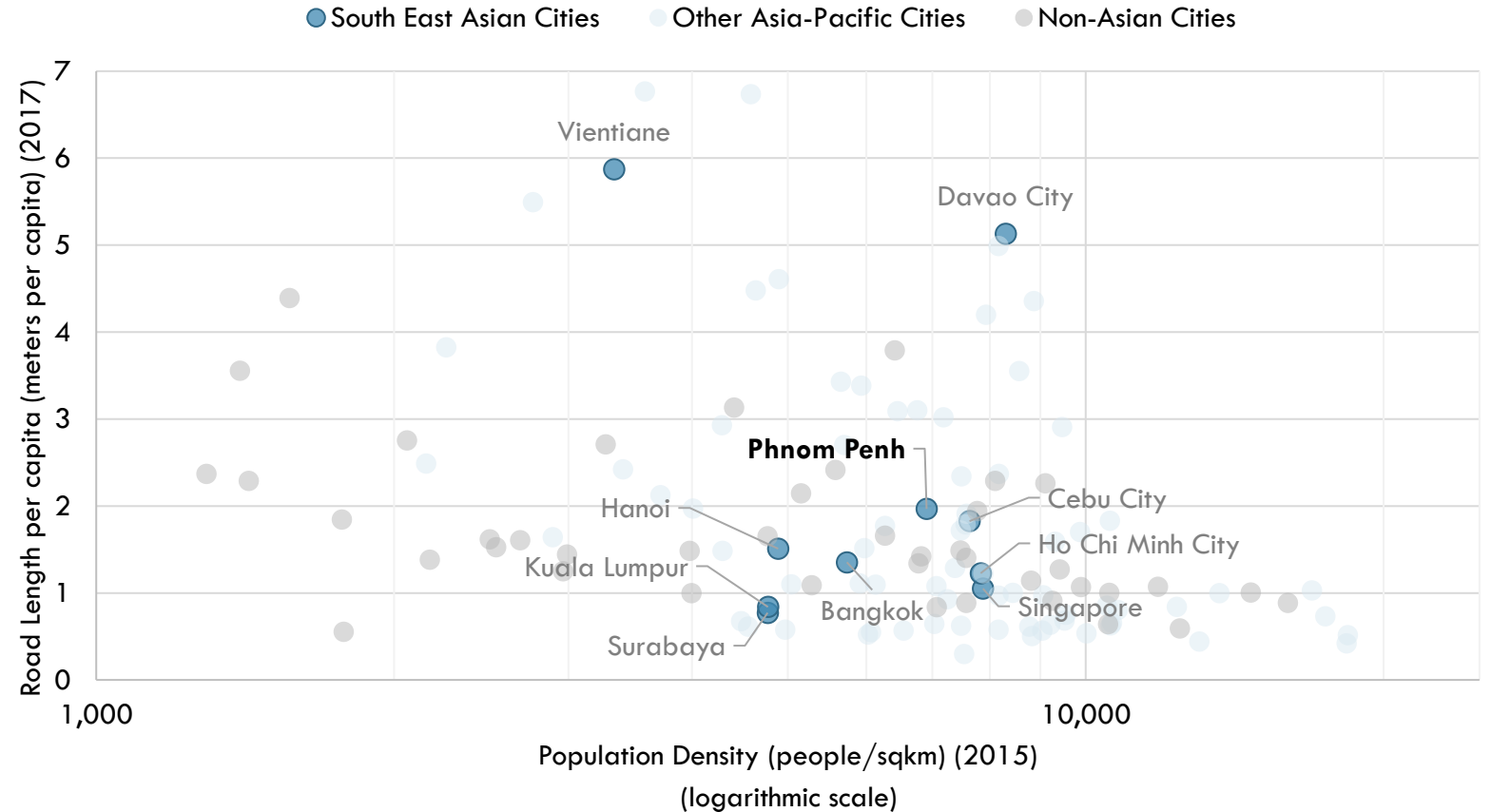
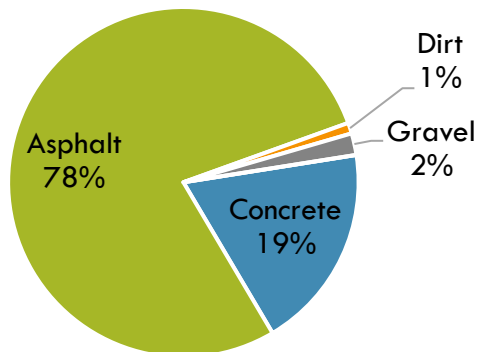
Transport infrastructure

Road infrastructure

Distribution of road network (district level) by number of lanes (2017) (STT)

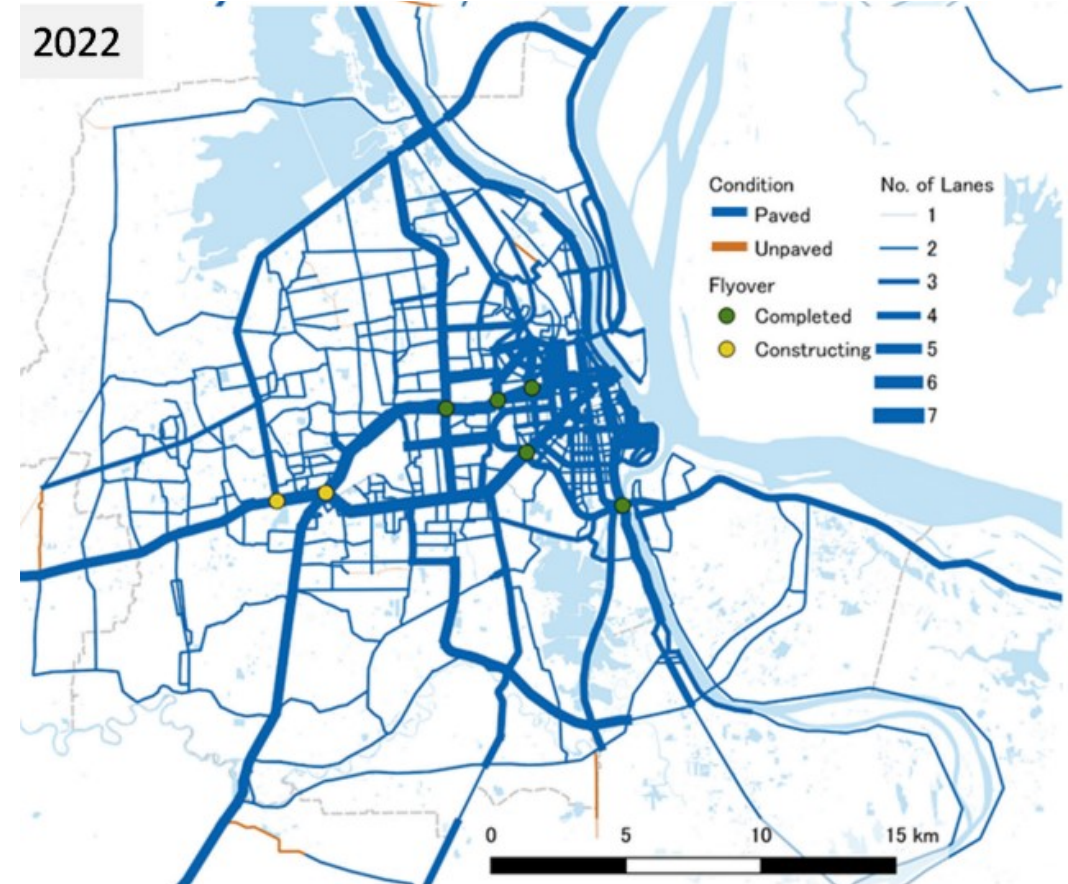
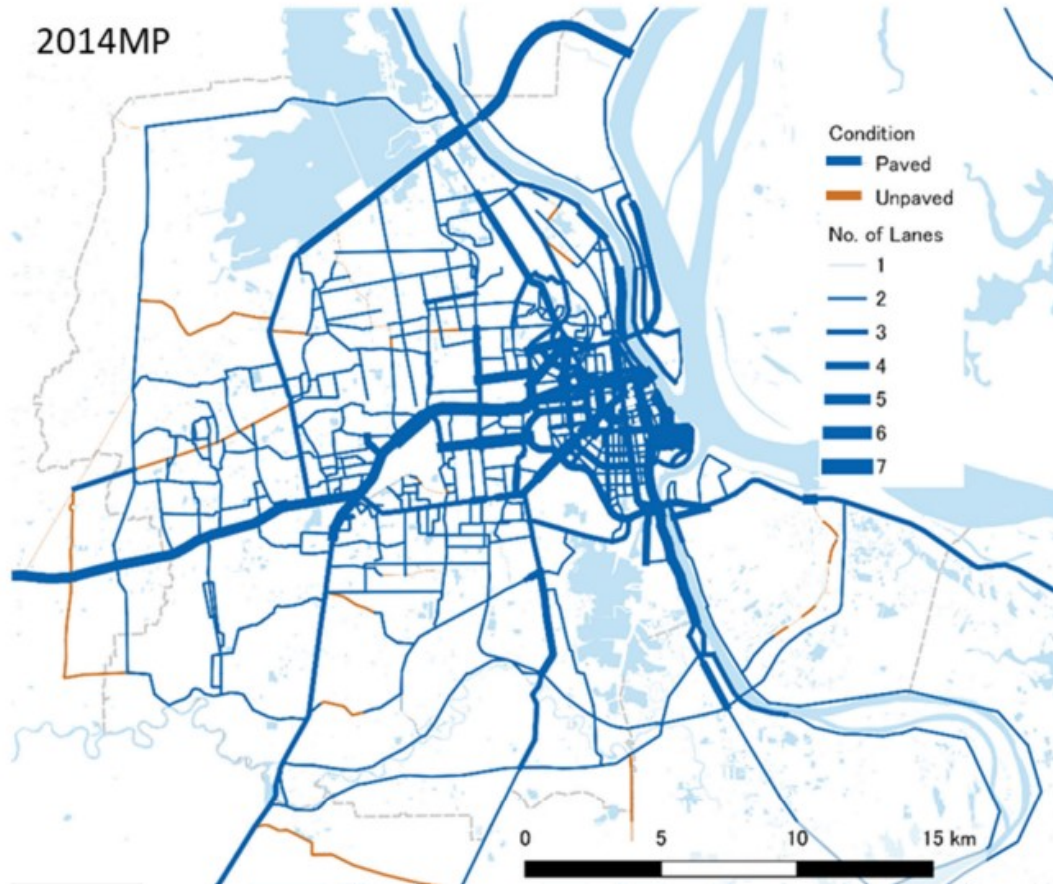


Distribution of road network (district level) by material (2017) (STT)



- Phnom Penh has 2m per capita of road infrastructure availability, higher than cities like Bangkok, Singapore, and Kuala Lumpur.

Changes in Number of Lanes and Road Conditions

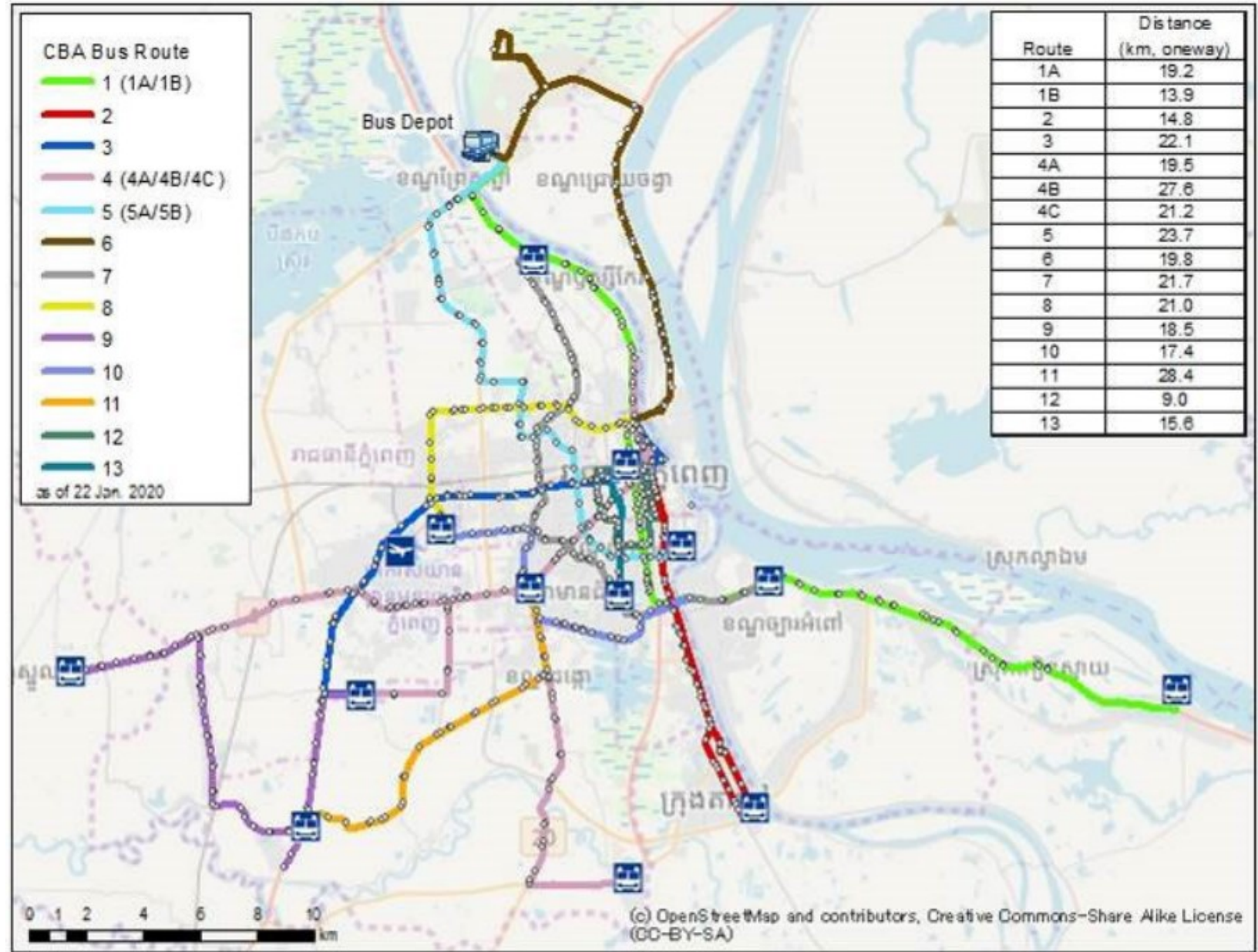


- “Compared to the time of PPUTMP, road condition has been continuously improved by widening and pavement especially in the suburban area. Compared to suburban area, the large-road capacity increase is limited in CBD area, because it is difficult to carry out large-scale widening within the CBD, which has already been developed with high density.” (https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

Bus network

- “The bus routes operated by City Bus Authority (CBA) started at 3 lines in 2015 with 54 second-hand Korean buses. Since then, the bus route has been steadily expanded to 5 routes in September 2017, 8 routes in November 2017, and 13 routes in October 2018. In September 2019, CBA decided to suspend the use of these routes, due to the high operation and maintenance cost of these Korean buses; CBA owns 181 buses as of April 2021. The end/start points of each bus route have bus terminals/parking, for a total of 14 bus terminals. On 2nd November 2021, the operation resumed on 4 routes (5 lines) (Line 1A, Line 2, Line 3 and Line 4A/4B).”
 (https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

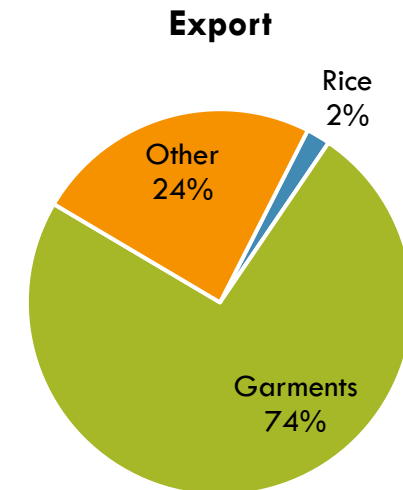
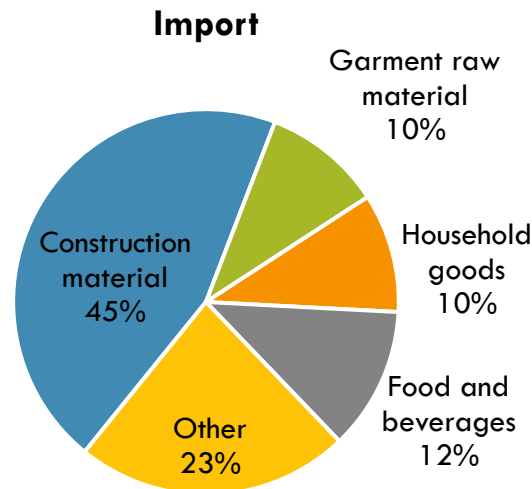
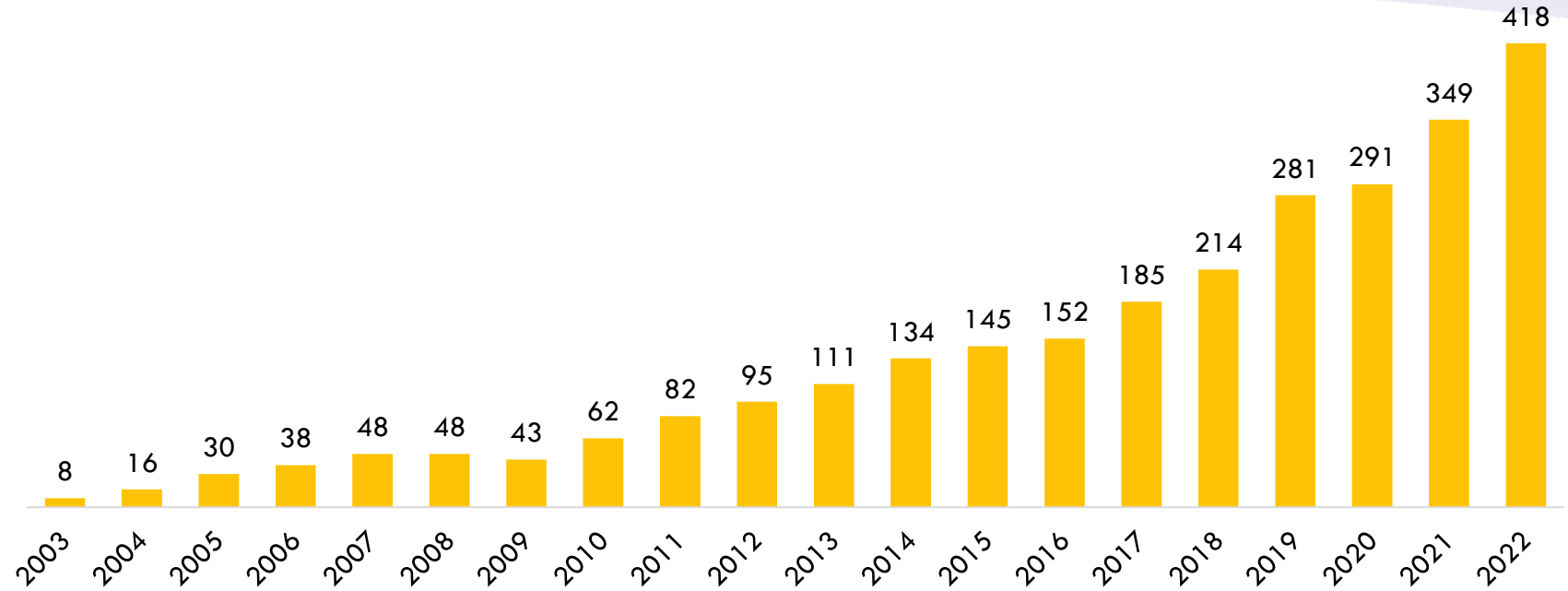
Bus Routes and Terminals



Source: JICA PiBO

Phnom Penh Port

- “Phnom Penh Port is the second largest port in Cambodia and the largest river port. The port was opened in 1905. Phnom Penh Autonomous Port (PPAP), a state-owned enterprise wholly owned by MEF, was established in 1998 as a management and operation entity. PPAP has been licensed by the governments to operate river ports exclusively in the following "Port Commercial Zone", and anyone who intends to develop a port in this area is required to consult with PPAP in advance.” (https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)
- Construction material is the dominant import commodity. Garment products shares 74 % of export commodity.

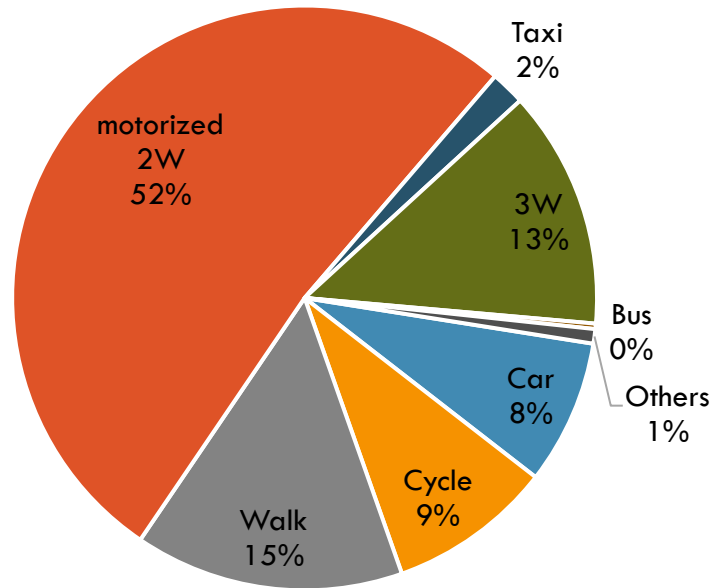




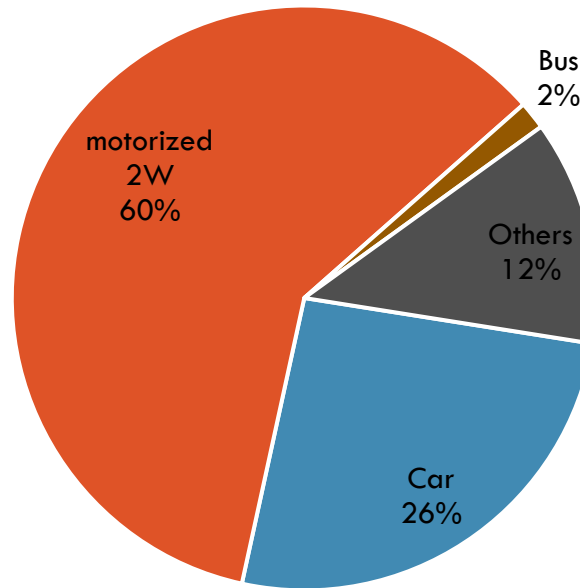
Transport dynamics, traffic characteristics

Modeshare by trips

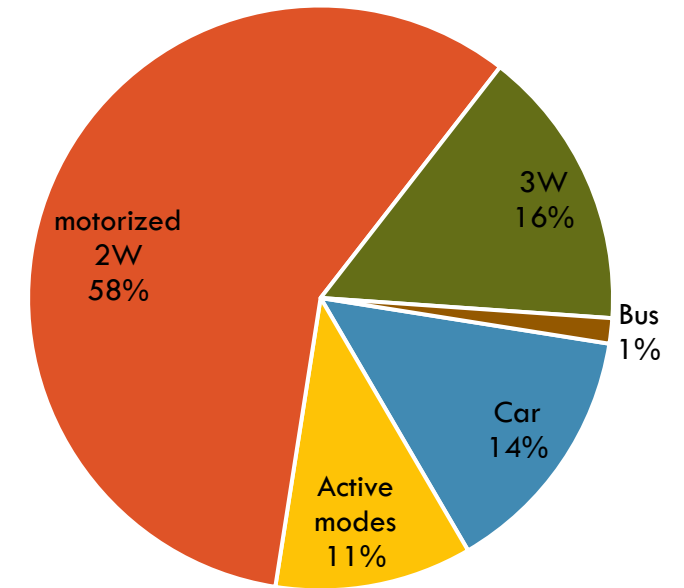
2012 (JICA)



2019 (UNESCAP)



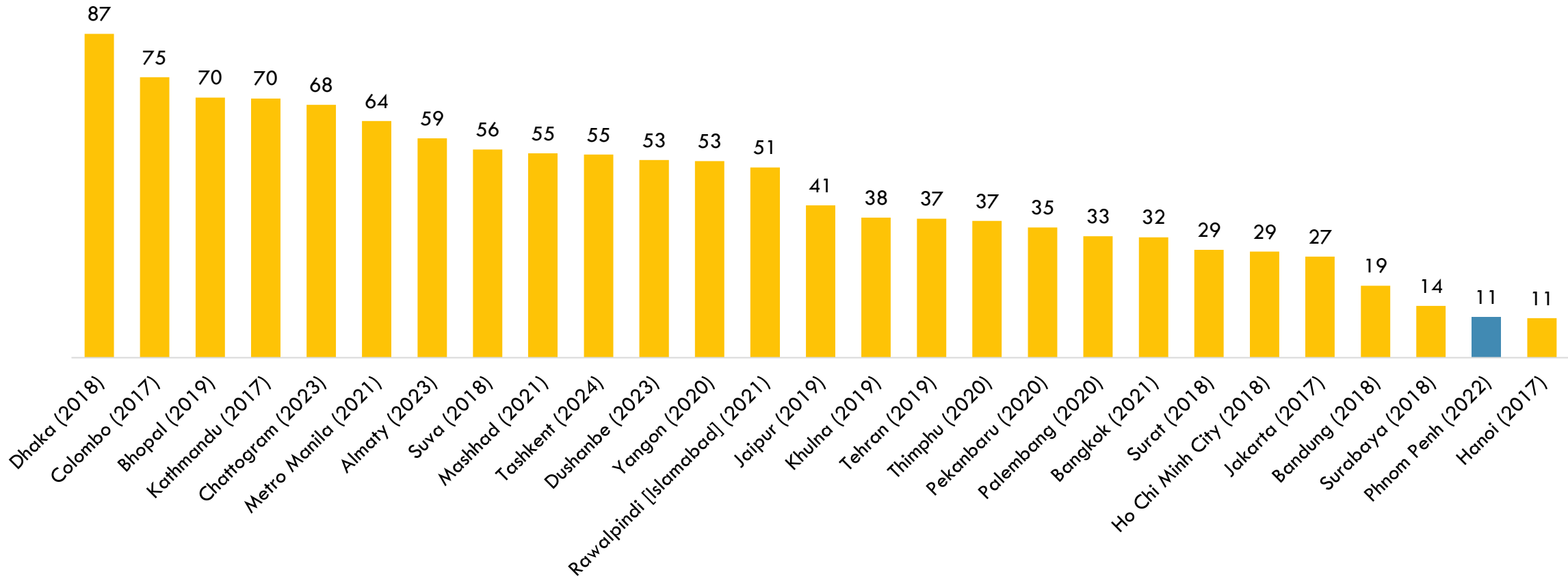
2022 (JICA)



- Assuming that the study methodologies for the 2012 and 2022 studies are the same, conducted by JICA, there is a notable difference in the active transport modeshare. It starkly reduced from 24% to 11% in 10 years.
- The modeshare is heavily dominated by 2 wheelers.

Modeshare by trips

Modal share of active and public transport in commuting (modeshare by trips)

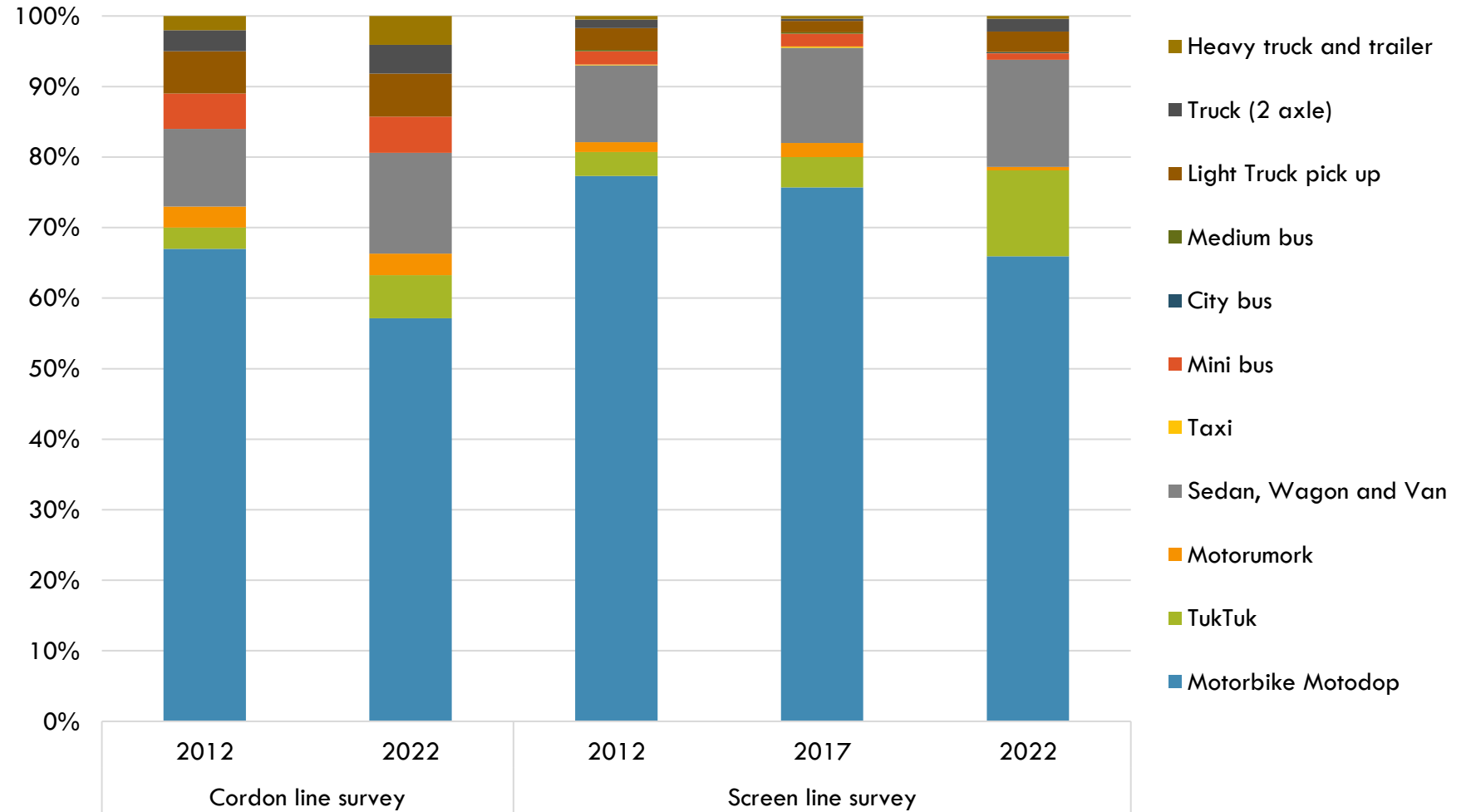


- UNESCAP data shows the combined mode share of active and public transport is as low as 11%

Vehicular composition

Vehicular composition

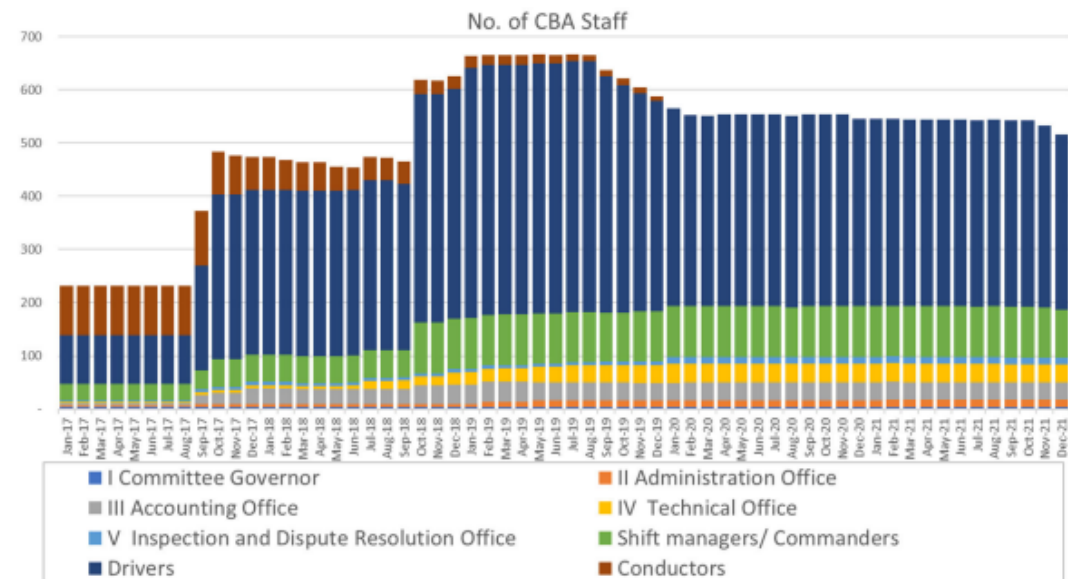
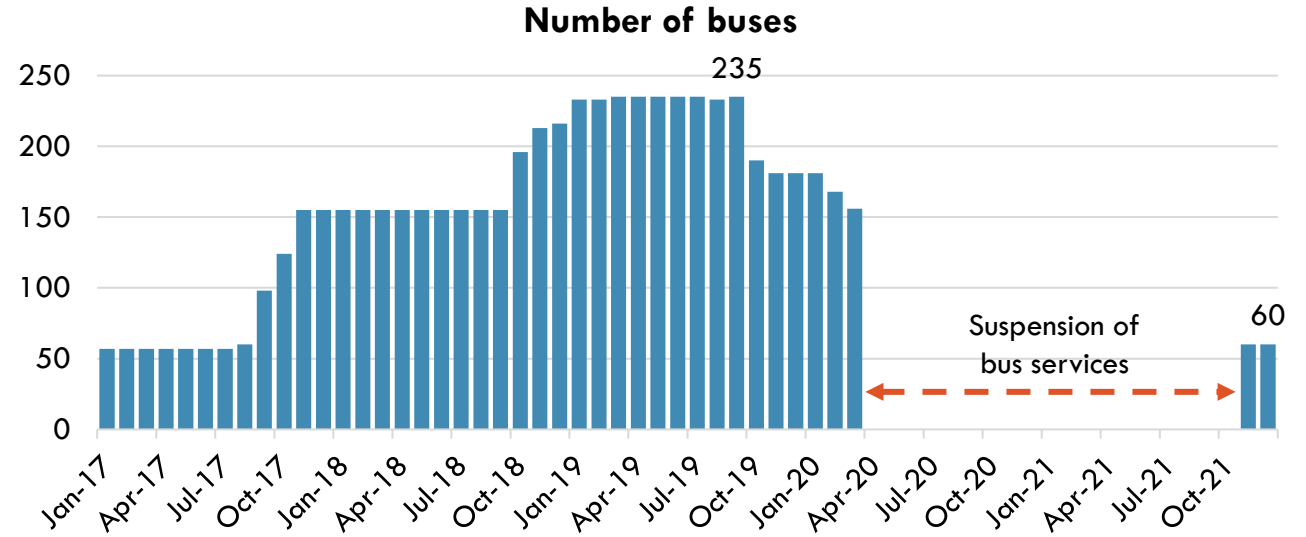
- Motorbike Motodop secures majority in all cases, and through the time series.
- Although it is seen that the share has been decreasing, while the shares of TukTuk and Trucks is increasing.



Operational bus fleet

Excerpts from JICA Report (Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

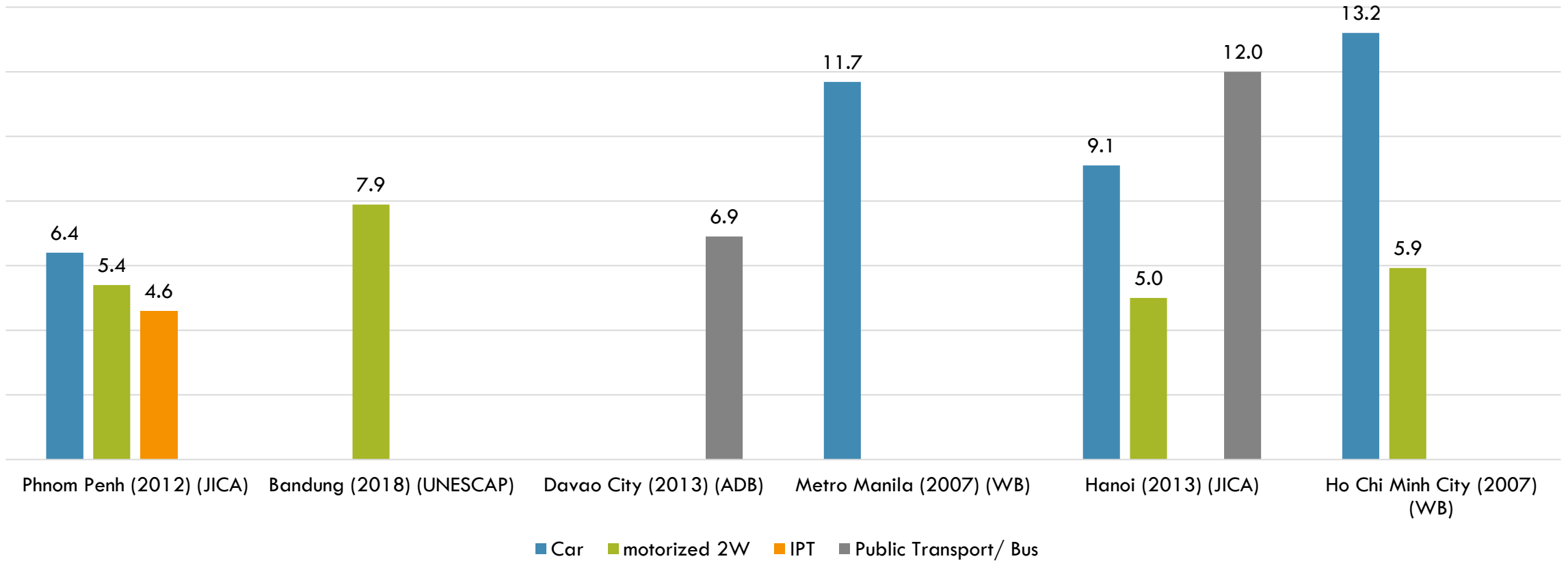
- The number of registered vehicles in Cambodia has increased by 11.3% during the last 5 years according to the Ministry of Public Works and Transport. The rise in private vehicle ownership, an increasing urban population and Phnom Penh’s car-centric urban design has resulted in longer commute times, increased CO2 emissions, decreased human productivity and higher rates of road accidents. By all accounts the congestion in Cambodia’s capital is only set to get worse. Public transit, including buses, has the potential to be a powerful tool for mitigating Phnom Penh’s traffic congestion problems. But because of the way the city’s bus system is designed, public transportation has not meaningfully contributed to traffic relief. (<https://cambojanews.com/op-ed-why-phnom-penhs-city-bus-struggles-to-gain-ridership/>)
- As of December 2021, the total number of employees of the City Bus Authority (CBA) is 516, including 329 bus drivers. Even after the bus operation was suspended in March 2020, the PPCA had been making the best effort to maintain to hire the drivers/staff in order for a smooth restoration of bus operation. As of December 2021, the daily ridership of these routes reached 2,700 passengers, which still has a large gap with the ridership of 16,000 passengers before the COVID-19 pandemic.



Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf

Average trip lengths

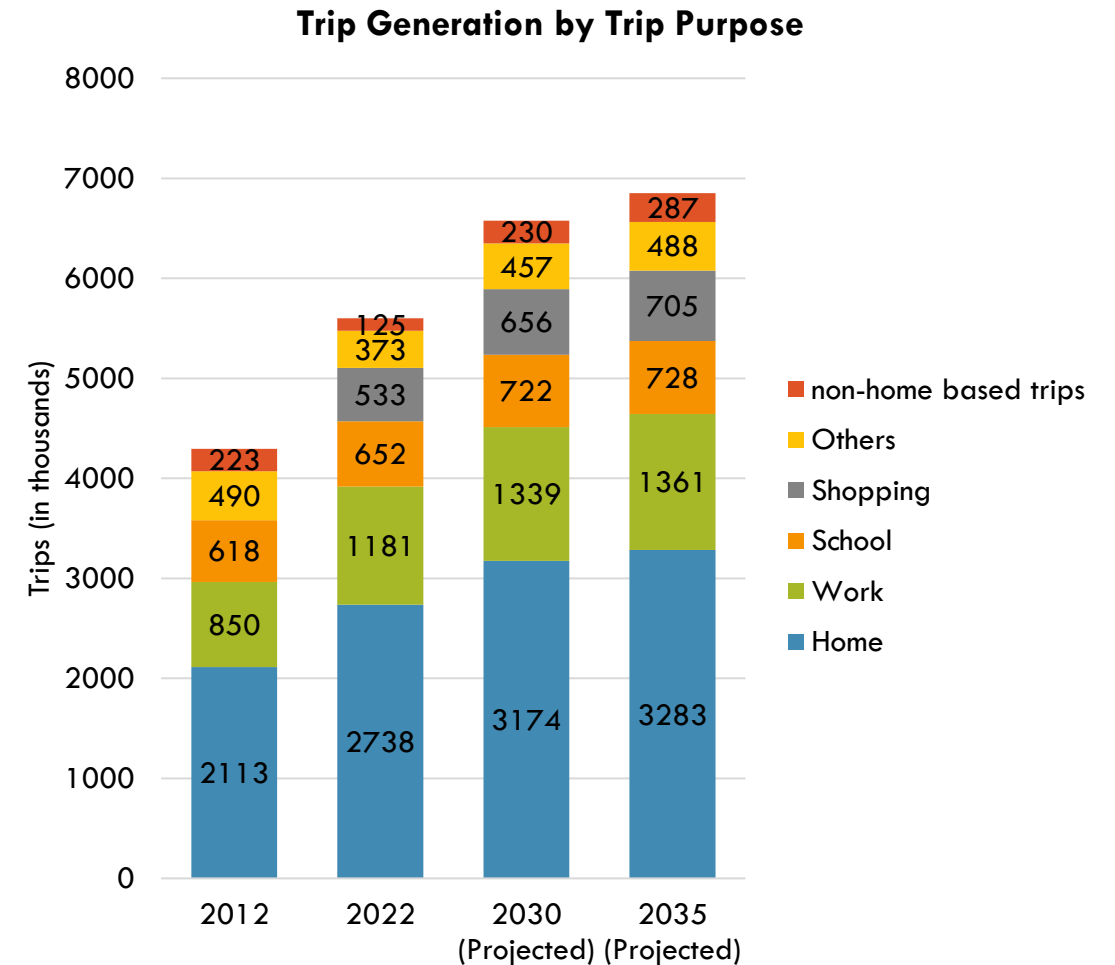
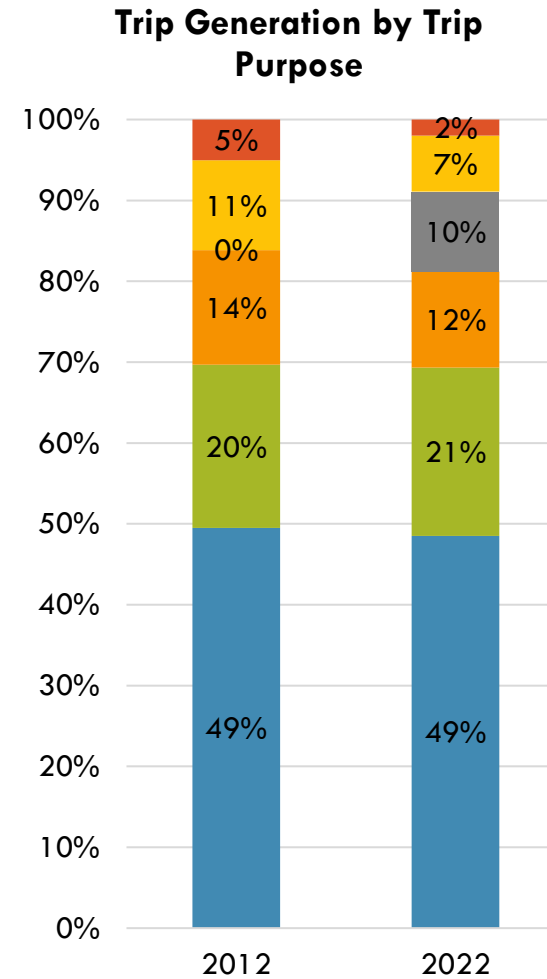
Average trip length (km)



- Phnom Penh records shorter average car trip lengths compared to major Southeast Asian cities

Trip Generation by Trip Purpose

- In 2012, the number of trips generated from Phnom Penh metropolitan area was about 4.3 million trips. It increased to about 5.6 million trips in 2022.
- “The trips were estimated by applying the trip frequency model to the population data by vehicle ownership type. It was estimated that the total number of trips increased 22% to 6.85 million trips in 2035 from 5.6 million trips in 2022. The estimated total number of trips in 2035 is comparable to the one estimated in Comprehensive Urban Transport Plan in Phnom Penh Capital City (PPUTMP).”
(https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)



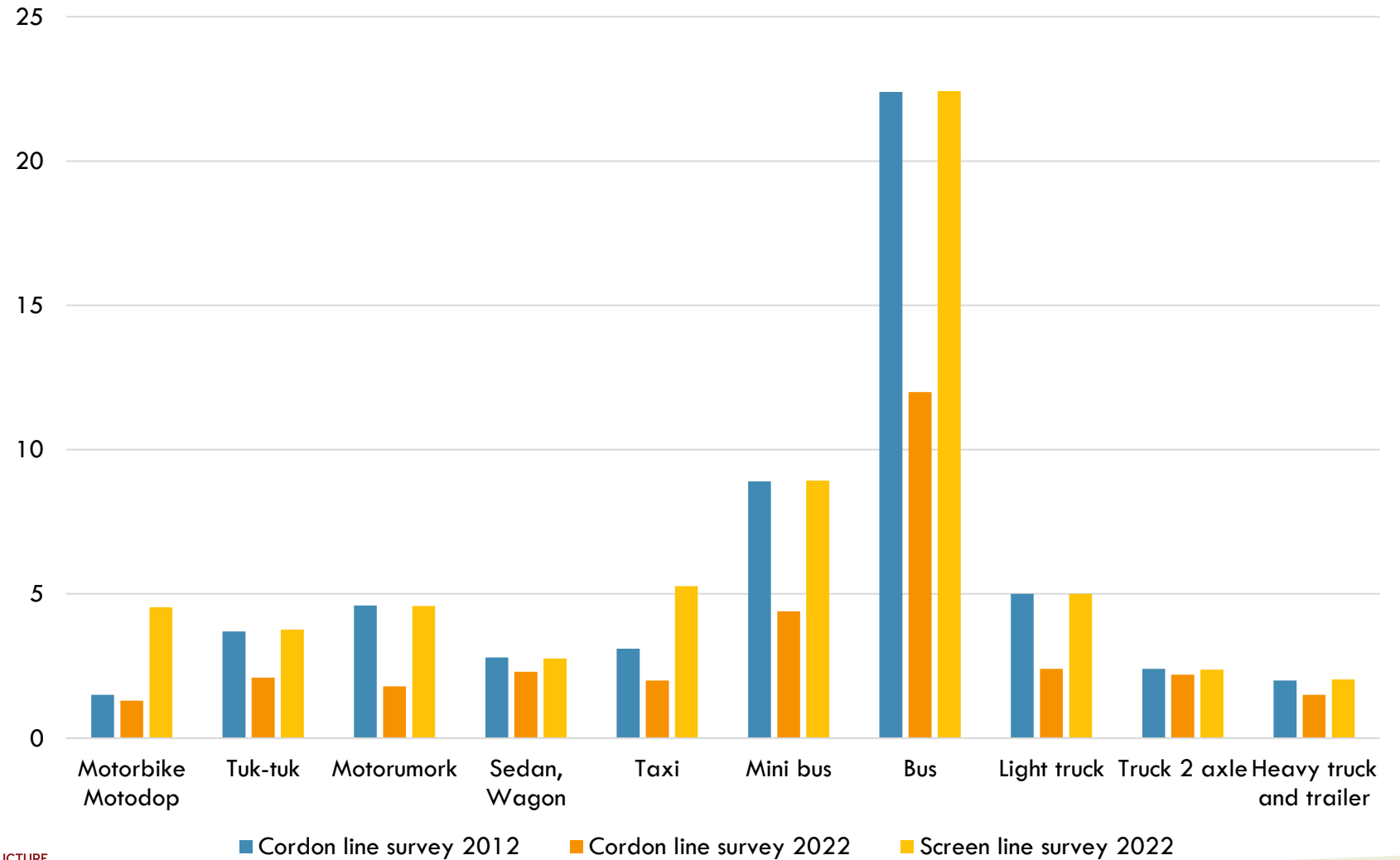
Note: In 2012, “Business Trip” in 2012 is categorized into Non-home based. “Private Trip” is categorized into office for comparison.

Source: JST and PPUTMP

Average Passenger Occupancy

- Cordon line survey - The average passenger occupancy by vehicle classification is shown in the chart on the left. These numbers include drivers. Compared to the results in 2012, average passenger occupancy has decreased in all vehicle types.
- The screen line survey numbers for majority of the vehicles is the same as the cordon line survey averages. Motorbikes and Taxis show high variation with a possible indication of the travel dynamics.

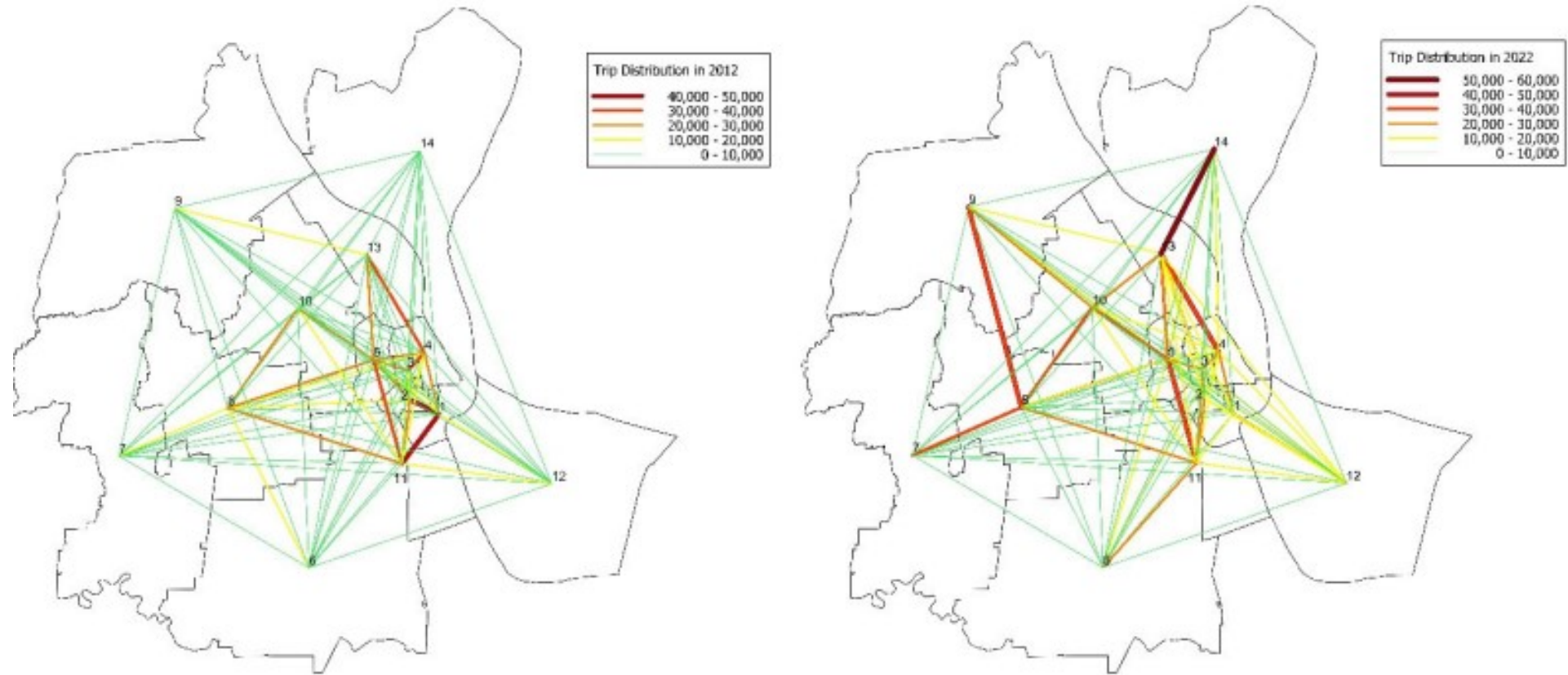
Average Passenger Occupancy



Trip Distribution

Comparison of trip distribution (left – 2012; right – 2022)

- “No major change was identified in trips within CBD. On the other hand, intra-CBD trips accounted for 29% of total trips made in entire Phnom Penh in 2012, the share decreased to 22% in 2022. The share of trips between suburban areas increased remarkably to 58% in 2022 from 50% in 2012.” (Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)



Source: JST and PPUTMP

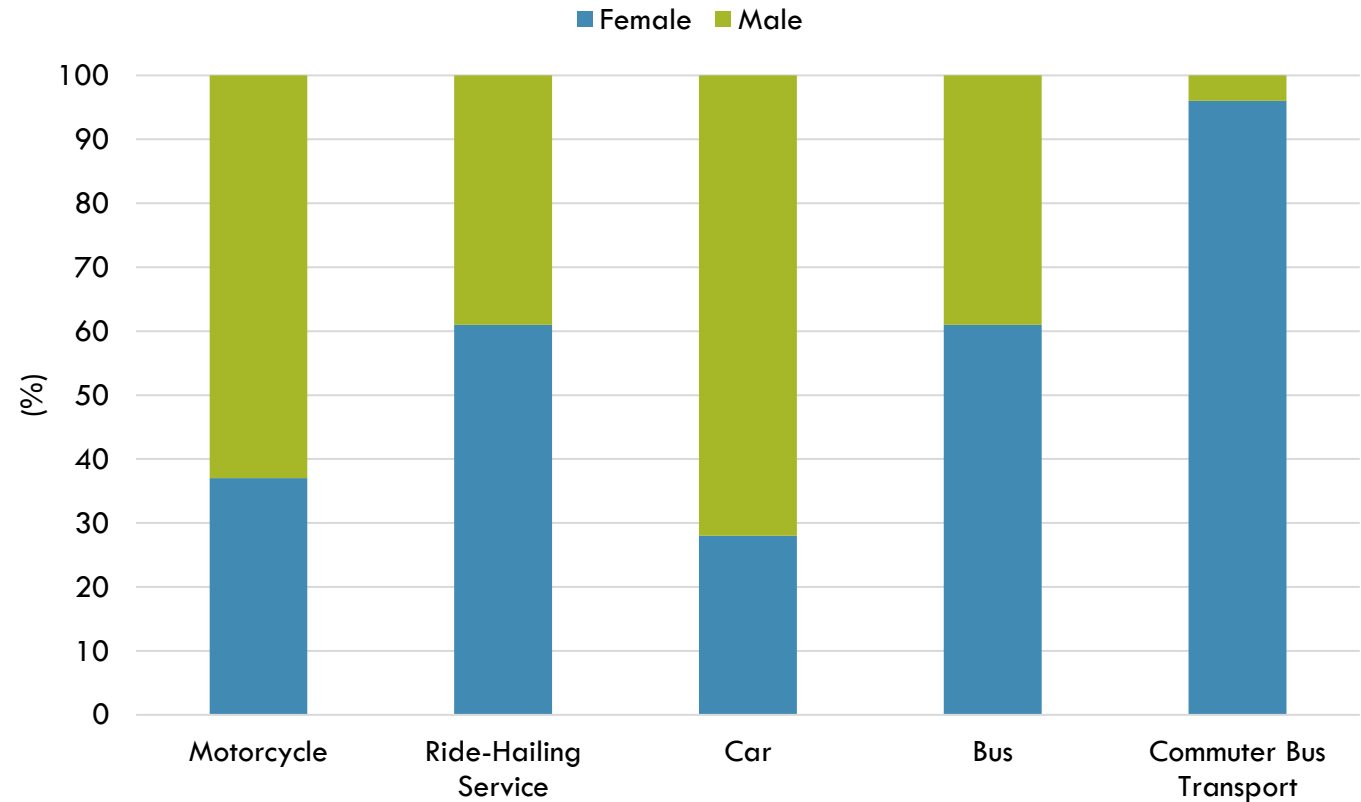
Transport characteristics by gender

Excerpts from JICA report

(https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

- The average trip rate for male are 2.75 trips/day. The rate for female is 2.65 trips/day.
- The trip rate for male is higher than female. Especially, the trip rate for home-to-work purpose for male is high. The share of male user of private mode such as Car and MC, motorcycle, is higher than female.
- Only 7.34% of female respondents hold a car driving license against 29.32% of male respondents hold a driving license.
- Only 6.5% of female are employed in “Transport and Communication and Driver” and 8.6% in “Engineer and Technician” category. Female tend to be employed in the service provide sector such as working in the shop or market, selling goods at home or working in the industrial sector.

Gender Distribution by Mode

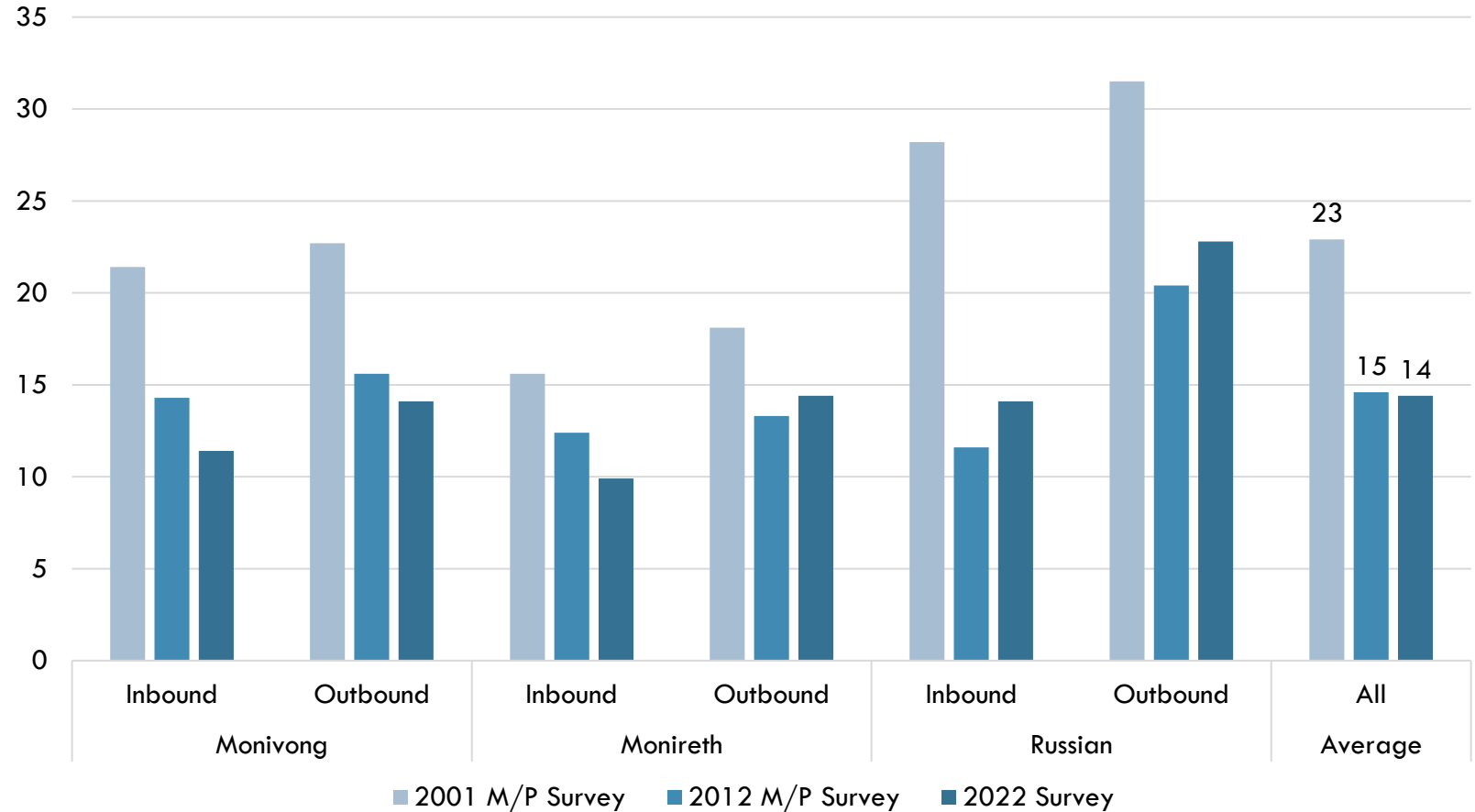


Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf

Average travel speeds

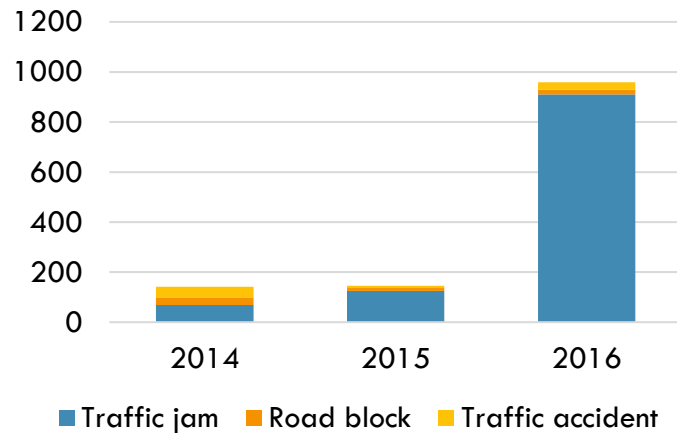
- According to the travel speed surveys in 2001, 2012 and 2022, the gradual decline with travel speed can be observed except for Russian Blvd.
- “The improvement on Russian Blvd is considered from the construction of two flyovers: Techno Sky Bridge and Seven Makara Sky Bridge.” (Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

Comparison of average travel speed (Morning Peak)



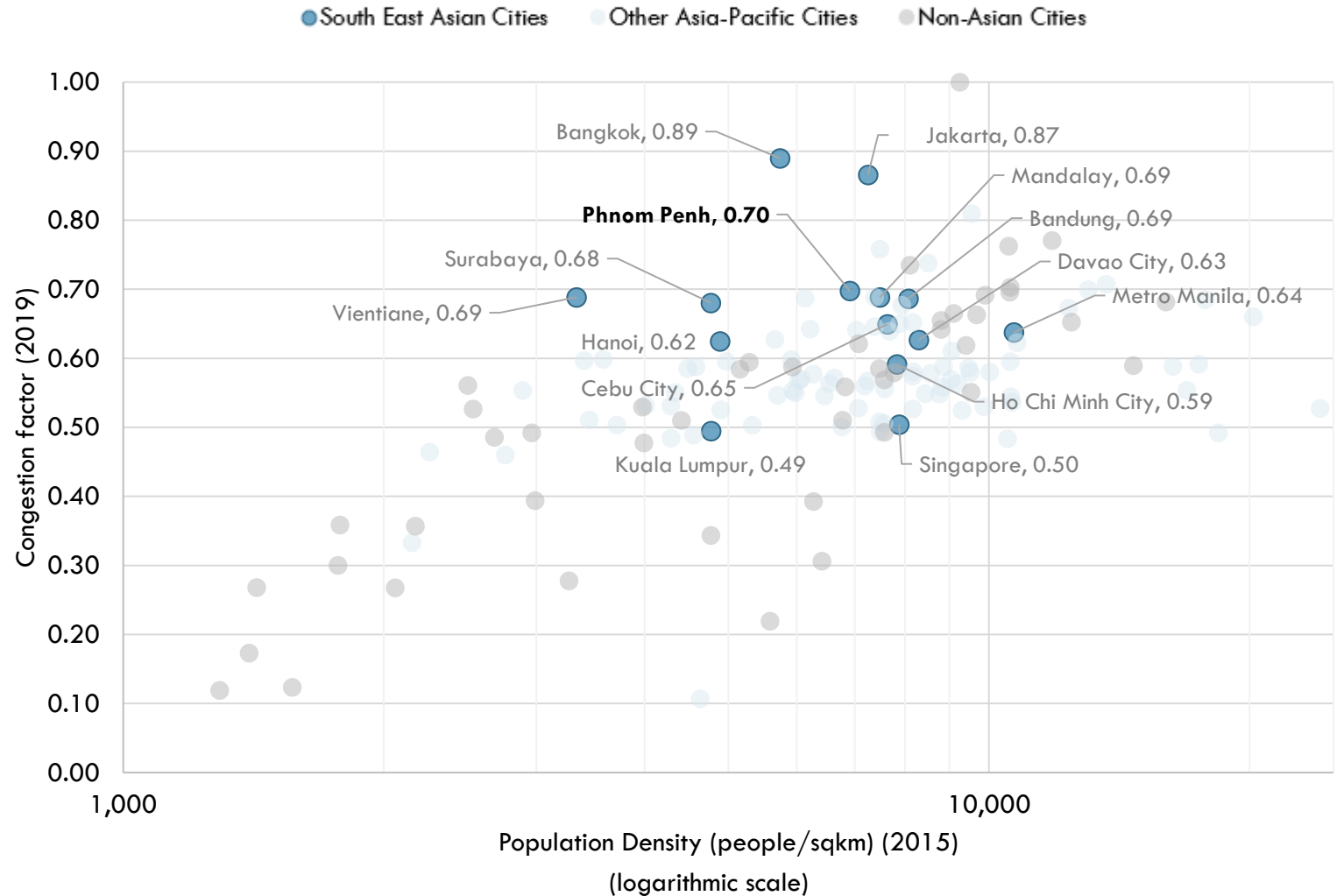
Congestion

Traffic flow and safety reports made to UVC



Source: <https://urbandatabase.khmerstudies.org/get-datas/317>

- Phnom Penh demonstrates high congestion factor
- The reporting of “traffic jam” interrupting traffic flow and decreasing safety, has been increasing annually.



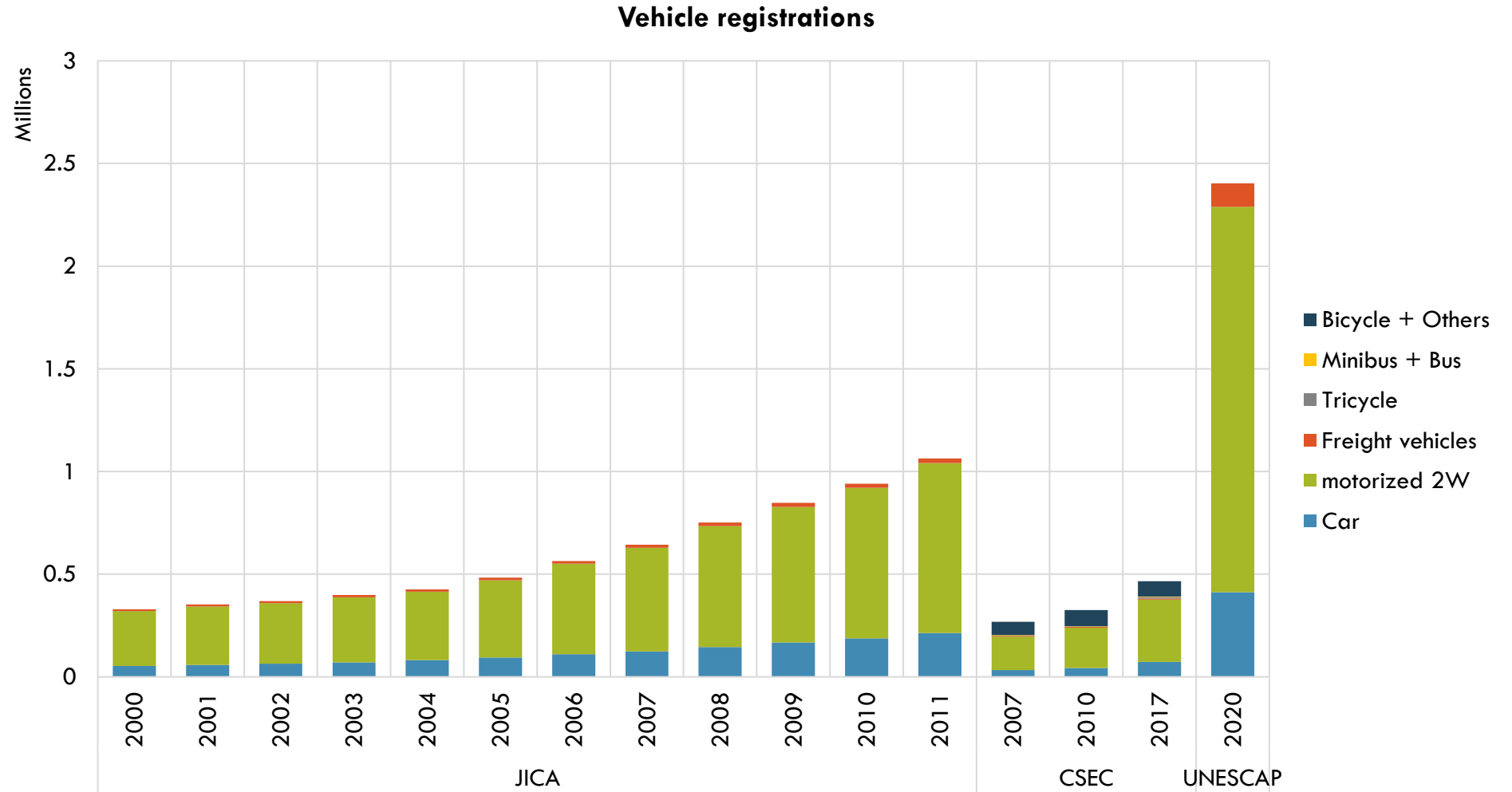
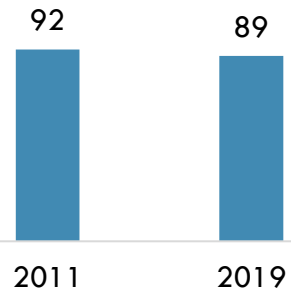


Vehicle registrations and ownership

Vehicle registrations

- Motorized 2-wheeler registrations are rising, while overall motor vehicle ownership has slightly declined over the last decade

Household Motor vehicle ownership (JICA) (%)



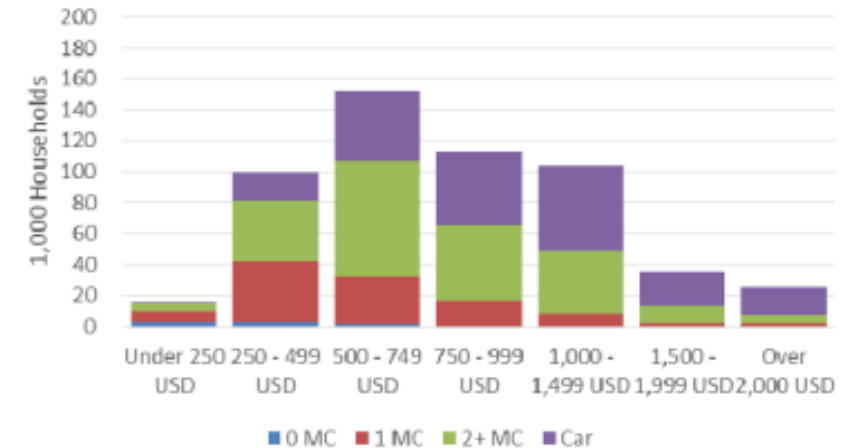
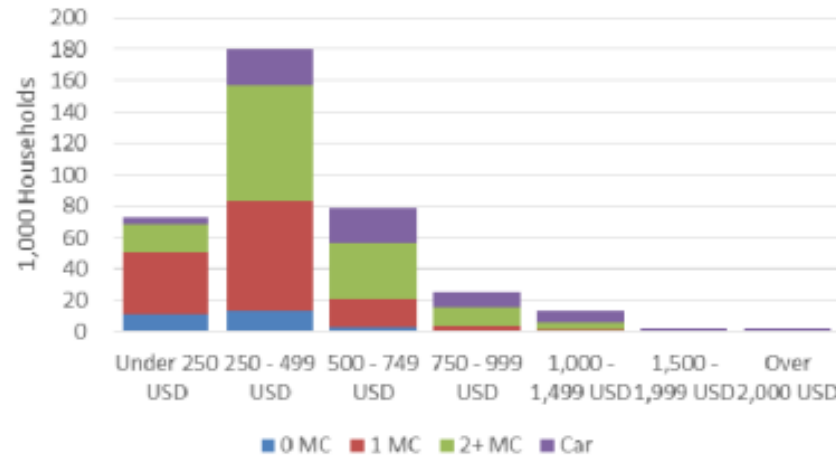
Number of households by income group and vehicle ownership type

Comparison of number of households by income group and vehicle ownership type (left – 2012; right – 2022)

Excerpts from JICA report

(https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

- Car ownership rate has increased due to the income growth as mentioned above. In particular, the number of households with car with a household income of USD 500/month or more increased.
- In 2012, 8% of households did not have any motorcycles, but the share decreased to 1% in 2022. Similarly, households owning one motorbike (1 MC) decreased from 35% in 2012 to 19% in 2022.
- On the other hand, households with two or more motorcycles (2+MC) increased from 39% in 2012 to 41% in 2022. The share of car ownership households (Car) increased from 18% in 2012 to 38% in 2022.



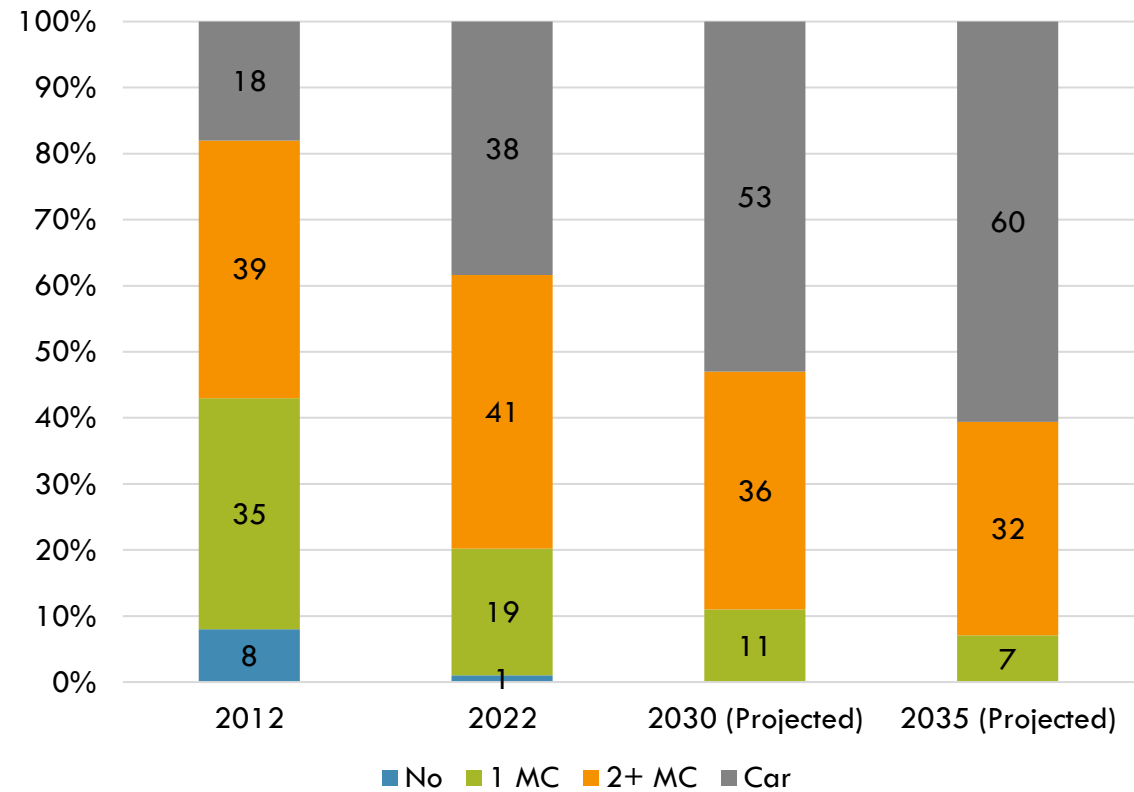
Note: “0 MC” represents households with no motorcycles. “1 MC” represents households with one motorcycle. “2+MC” represents households with two or more motorcycles. “Car” represents households with cars. Households that own both motorcycles and cars are classified as car-owning households.

Source: JST

Projected vehicle ownerships

- The projections were made by applying the vehicle ownership model to the future population data. It is projected that the vehicle ownership rate will increase to 53% in 2030 and 60% in 2035 from the current rate of 38% as household income increases. This is faster pace than projected in PPUTMP. In general, the increase of middle to high class income households and their vehicle ownership rate were observed.

Household vehicle ownership (%) (JST)

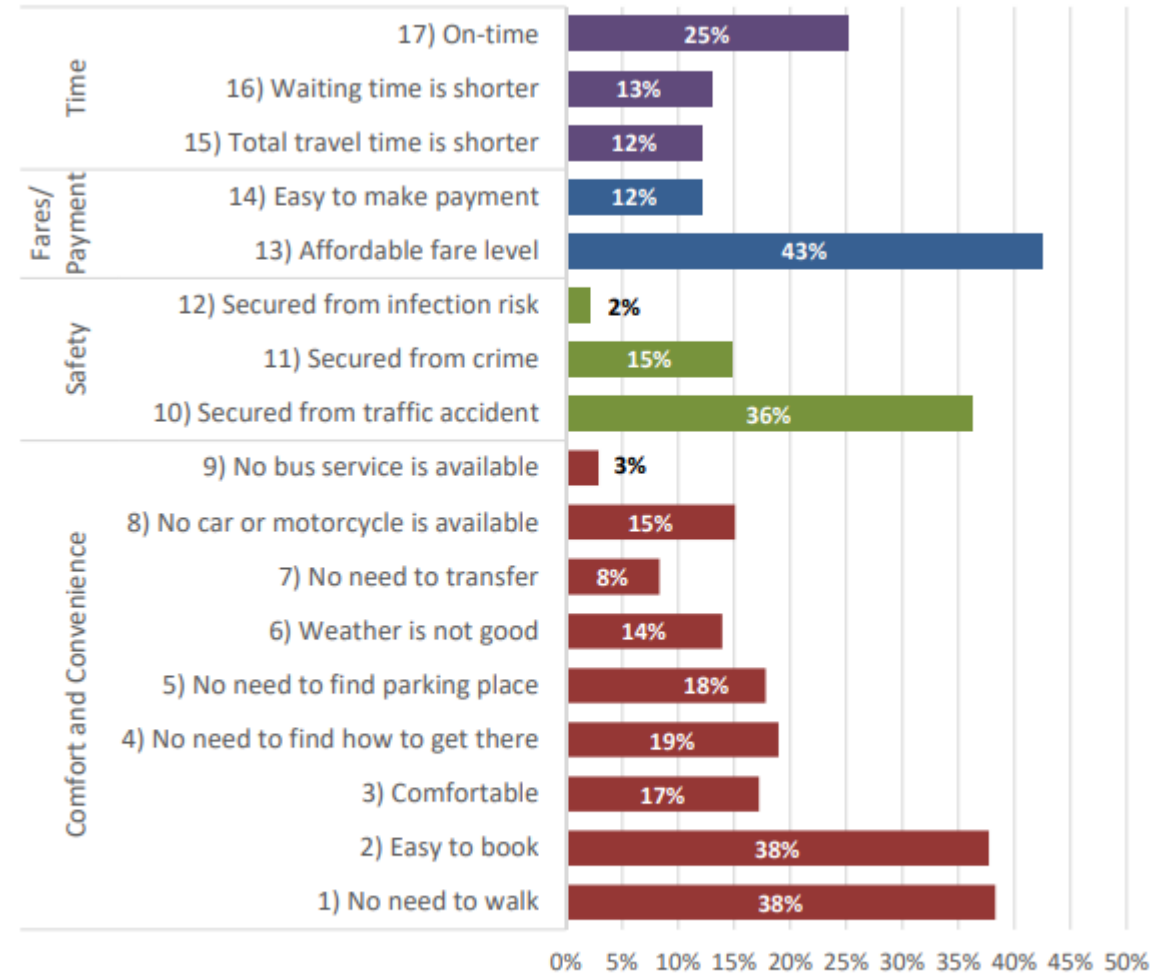




Transport services - Public Surveys

Ride- hailing services

Major reasons for using ride-hailing services (RHS users)



- RHS users answered “affordable fare level”, "no need to walk" and "easy to book" as the main reasons for using RHS.

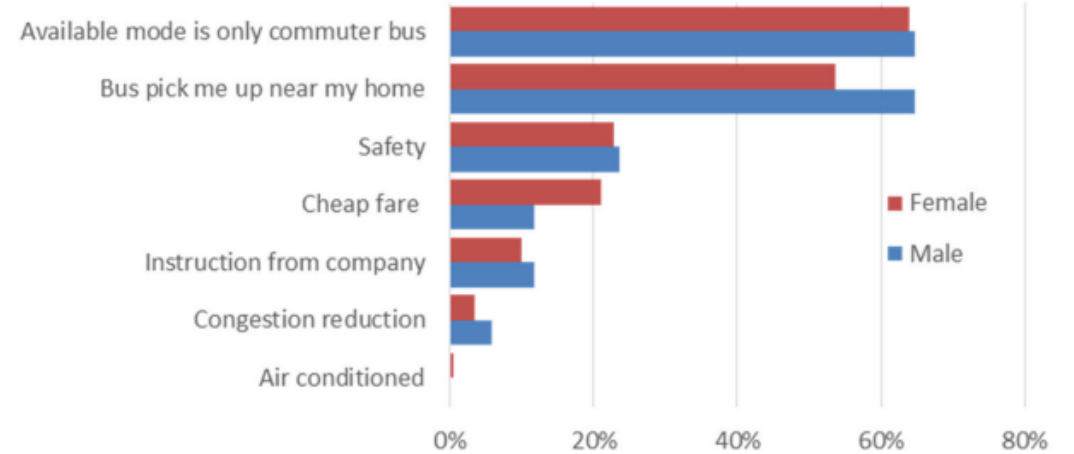
Note: Multiple answers are allowed. Therefore, total percentage of share exceeds 100%.

Source: JST

Commuter bus

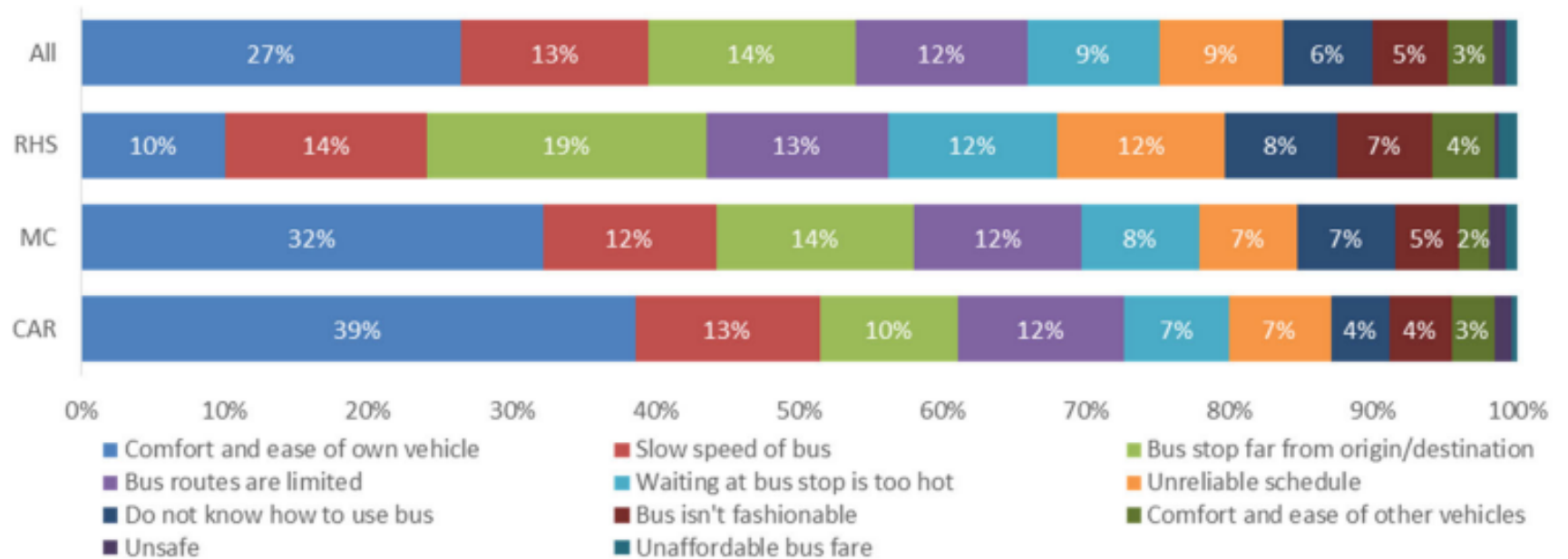
- The major two reasons which about 60% of the respondents answered were “Available mode is only commuter bus” and “Bus pick me up near my home”. Considering 96% of the commuter bus passengers are female and most of the commuter buses are pickup or truck without a seat.
- Car users, motorcycle users and RHS users were interviewed about the reasons for not using City Bus. The major reasons are “Comfort and ease of own vehicle” both in Car users (39%) and MC users (32%), followed by “Slow speed of bus”, “Bus stop far from origin/destination”, and “Bus routes are limited”. On the other hand, the major reasons for RHS users are “Bus stop far from origin/destination” raised by 19% of RHS users.

Reasons for using commuter bus



Note: Multiple answers are allowed (up to 2 reasons)
Source: JST

Major reasons not to use city bus



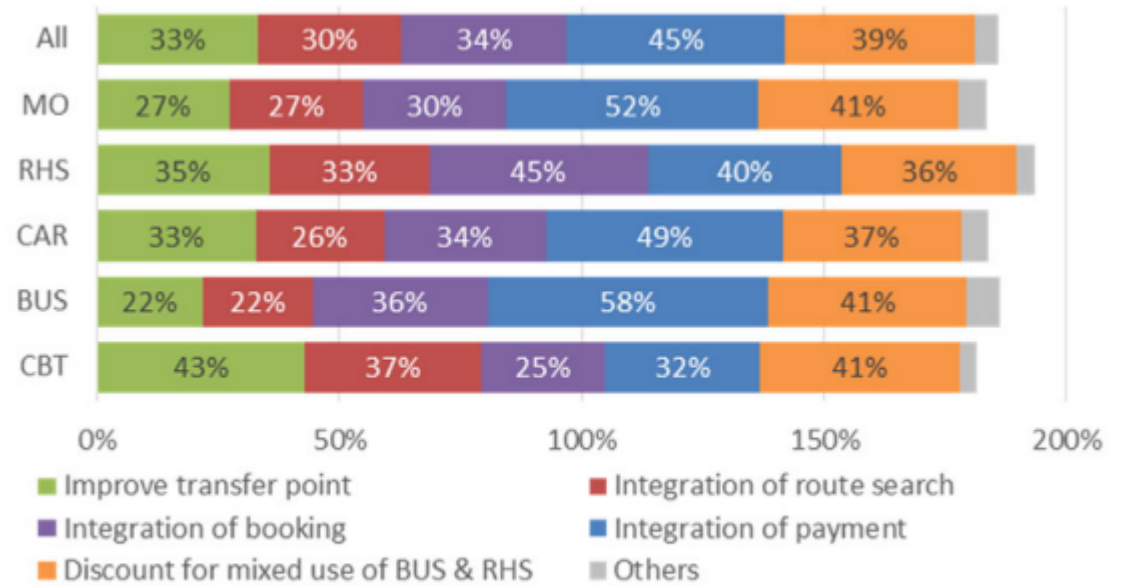
Source: JST

Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf

Integration of city bus and RHS

- In the interview survey, integration of City Bus and RHS was proposed as a possible solution to improve the public transport service. Also, the important measures to realize the integration was asked to the respondents. In general, measures related to payment attracts the largest votes such as “Integration of payment” at 45% and “Discount for mixed use of BUS & RHS” at 39%”. Additionally, other measures were also regarded as important measures e.g. “Integration of booking” at 34%, “Improve transfer point” at 33%, and “Integration of route search” at 30%.

Important measures to realize the integration of city bus and RHS

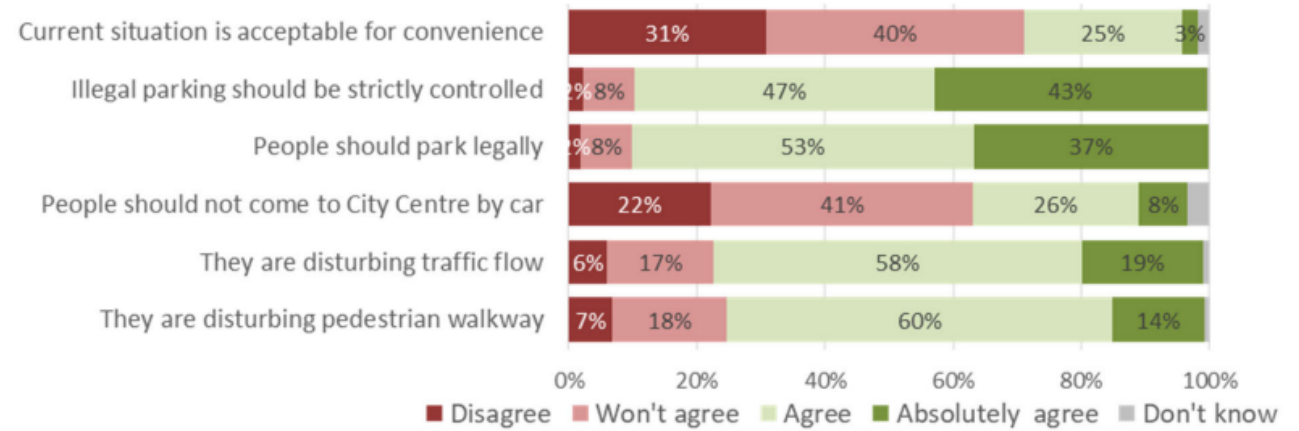


Note: Multiple answers allowed up to 2 choices are allowed. Therefore, total percentage of share exceeds 100%.

Source: JST

Parking

Opinion on illegal roadside parking



Source: JST

- “71% of respondents disagree or won't agree to “current situation is acceptable for convenience” and about 90% of respondents are agreed with “illegal parking should be strictly controlled”. In contrast, 63% of respondents disagree or won't agree with “people should not come to city centre by car”. The respondents consider the current situation is harmful for both traffic flow and pedestrian environment. However, they won't agree with forcing car users to give up on coming to city centre by car. These results indicate that they want more legal parking space and strict control of illegal parking.” (Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)
- “The bottom figure shows the opinion of car users on the strict enforcement for illegal parking in CBD. 66% of respondents answered that they would continue using car for traveling to CBD. In addition, 65% of all respondents, 98% of respondents who answered to continue using car, answered that they would continue using their own cars and use nearby parking facilities with fee. More than half of the users who answered that they would not use private cars in case of strict enforcement cited high parking fees and lack of parking lots.” (Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf)

Behaviour change in case of strict enforcement for illegal parking



Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf

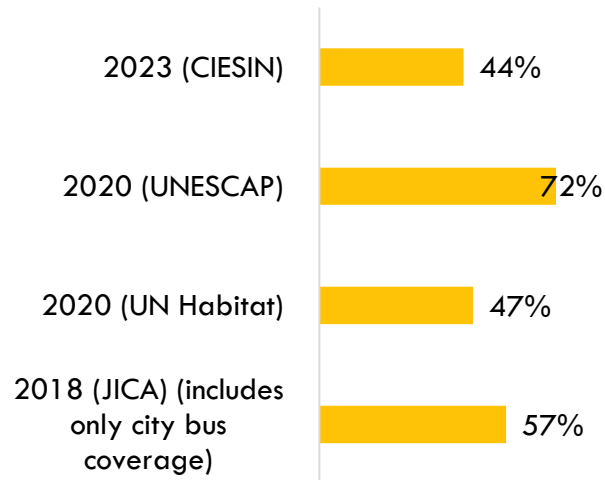


Access

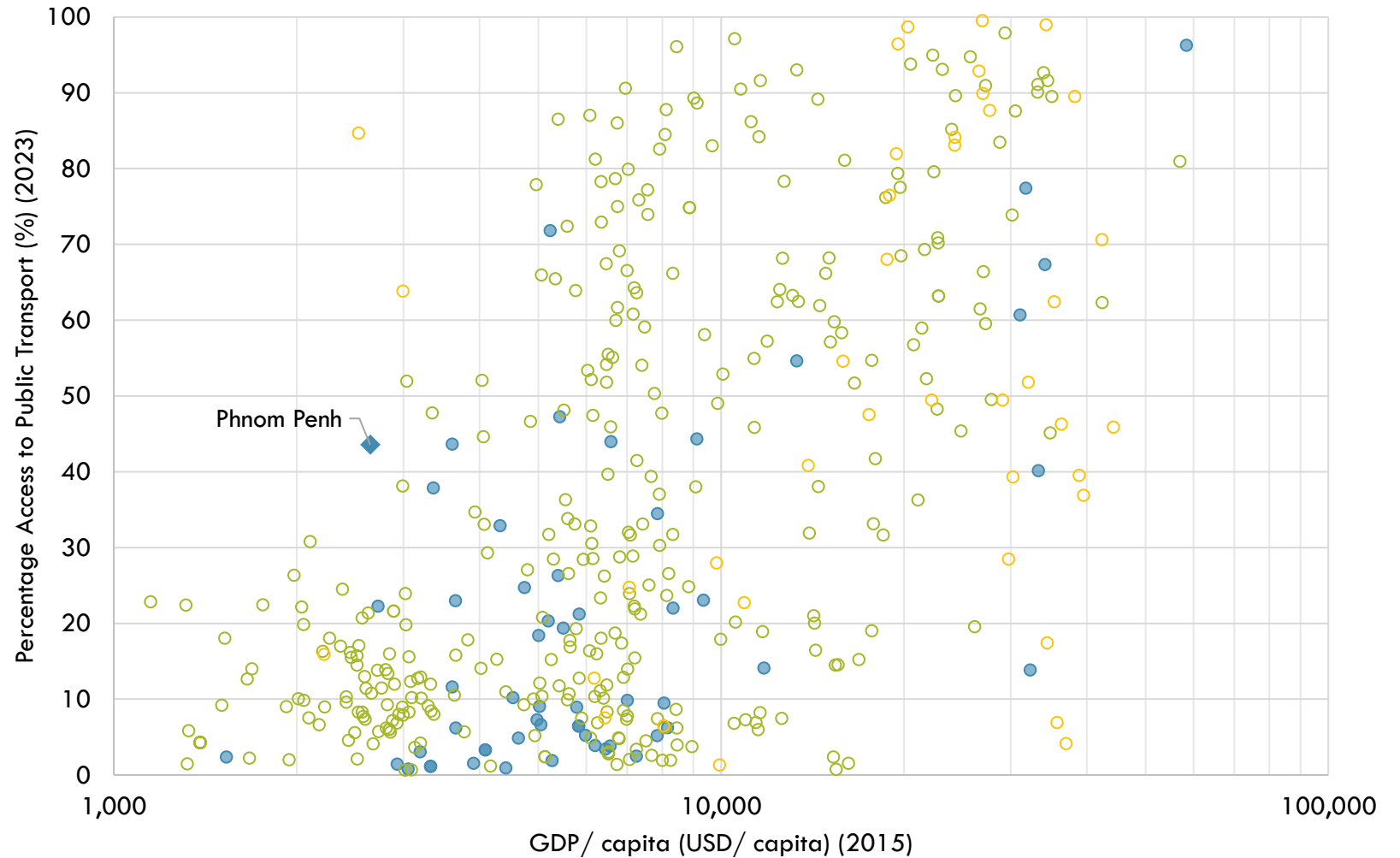
Access to public transport

● South East Asian cities ○ Other Asia-Pacific Cities ○ Non-Asian Cities

Percentage Access to Public Transport

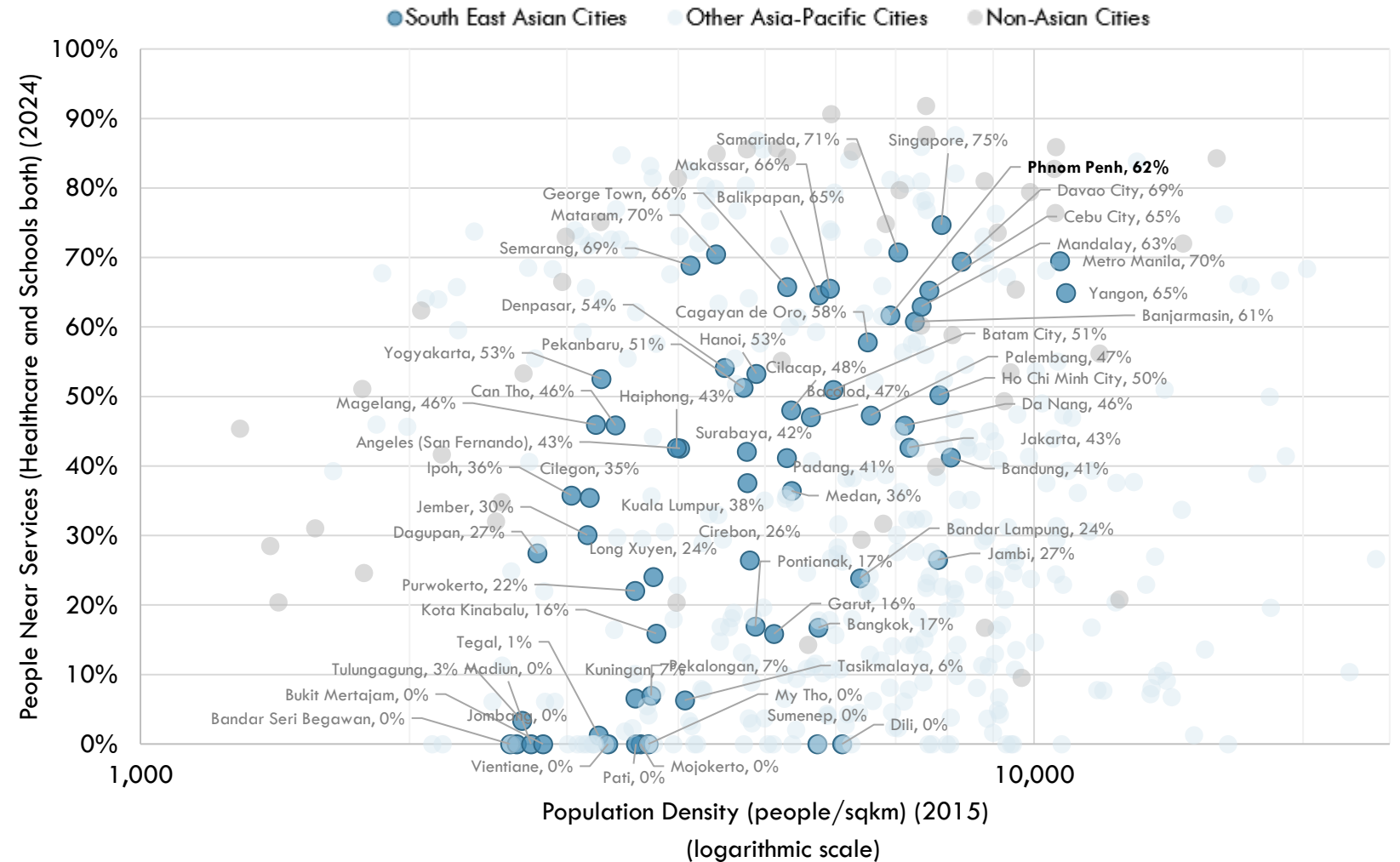


- Phnom Penh outperforms similar GDP per capita cities in urban access, yet remains low at 44%



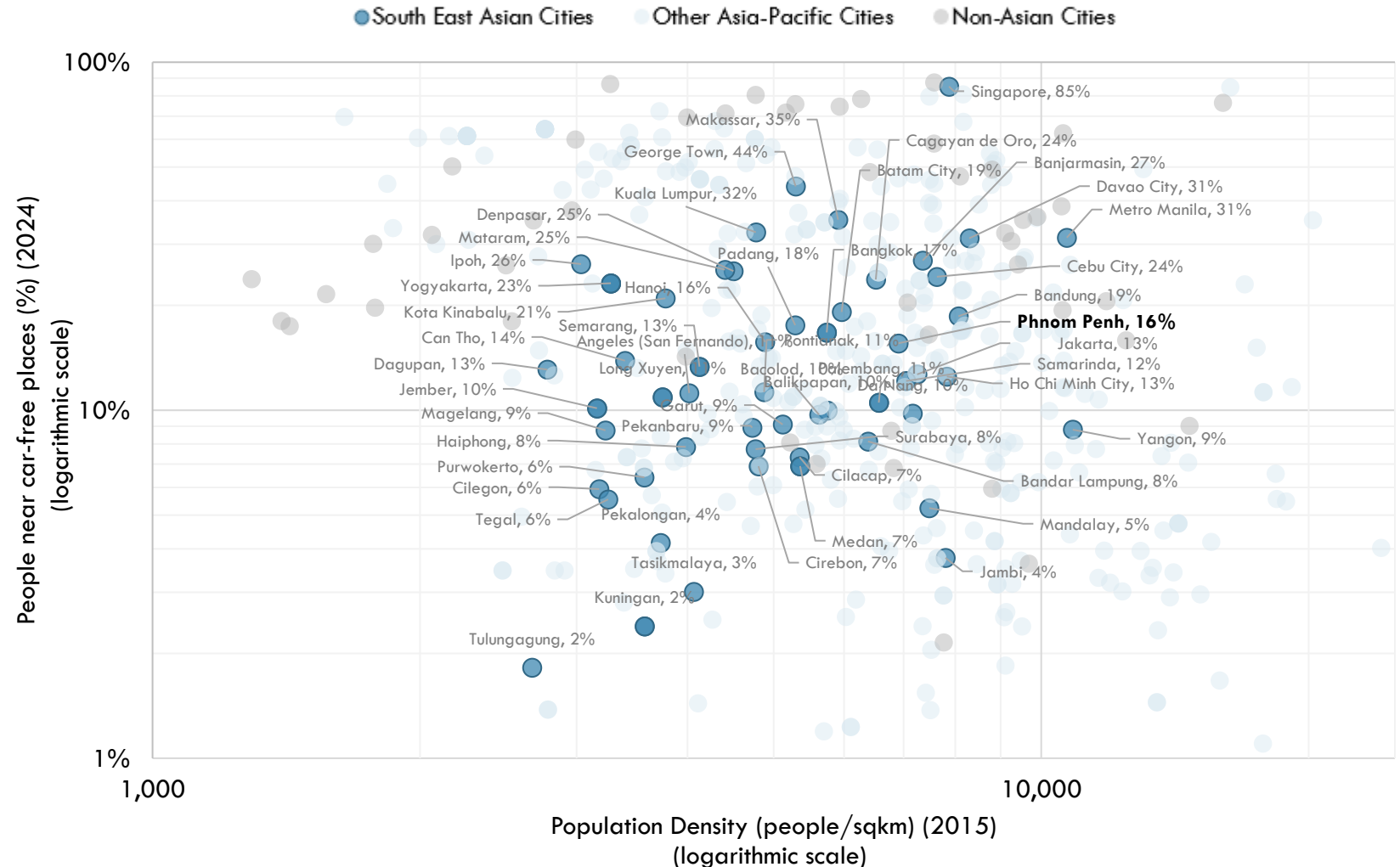
Access to healthcare and educational services

- People Near Services measures the percentage of an area's population living within walking distance (1km) of some form of both healthcare and education services. Proximity is the first requirement for walkability. In a city where people live within a 15-minute walk of their daily needs, they will be able to live without a car.
- Phnom Penh has a decent access to services at 62%, while the Cambodia stands at only 9.3% of the population with access to healthcare services within 10 mins.



Access to car-free places

- Less than a fifth people in Phnom Penh live near a car-free place
- People Near Car-Free Places measures the percentage of an area's population living immediately near (within 100m of) a car-free (vehicle – free) place. This includes parks, squares, car-free streets, recreation grounds, sports fields, and forests.
- Car-free public spaces become integral components of pedestrian infrastructure. By eliminating vehicle traffic, they create safe and often more direct walking routes

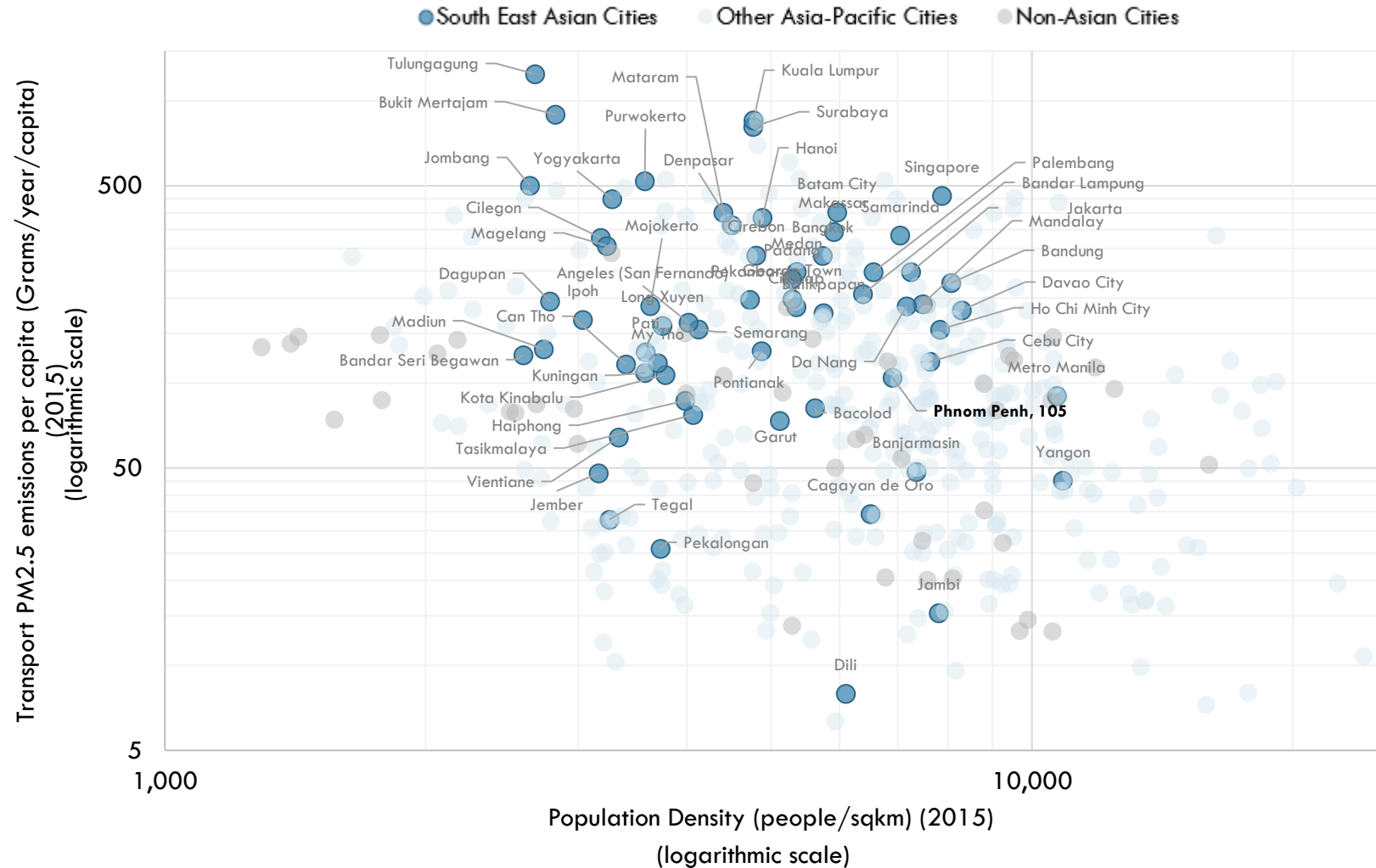




Transport externalities

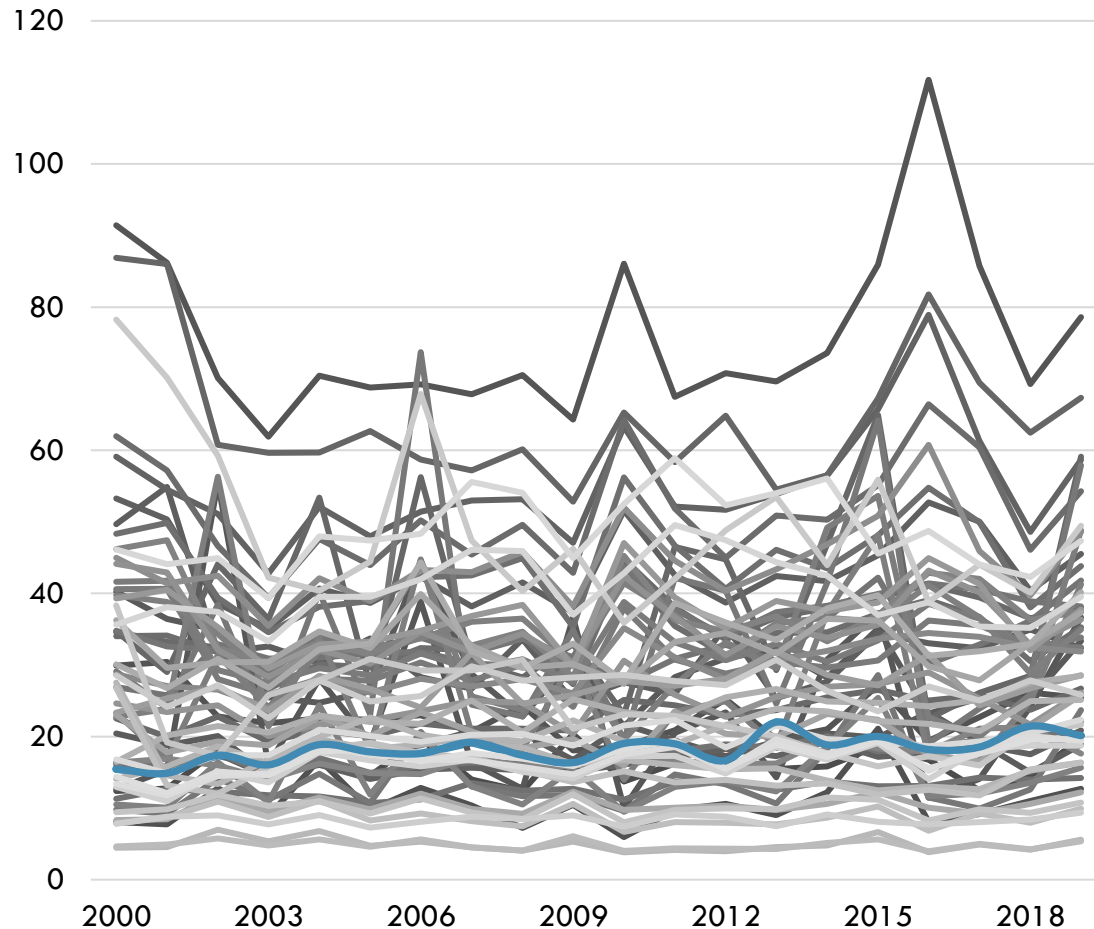
Transport PM2.5 emissions per capita

- Phnom Penh is estimated to emit 105 grams of transport PM2.5 emissions per year per capita. This is lower than the average of the sample South East Asian cities of 242 grams/ year/ capita. Cambodia average transport PM2.5 emissions for the year 2018 are estimated to be 289 grams/ year/ capita (EDGAR). Since the sources for the city and country level emission estimations is different, their study methodologies can't be compared directly.

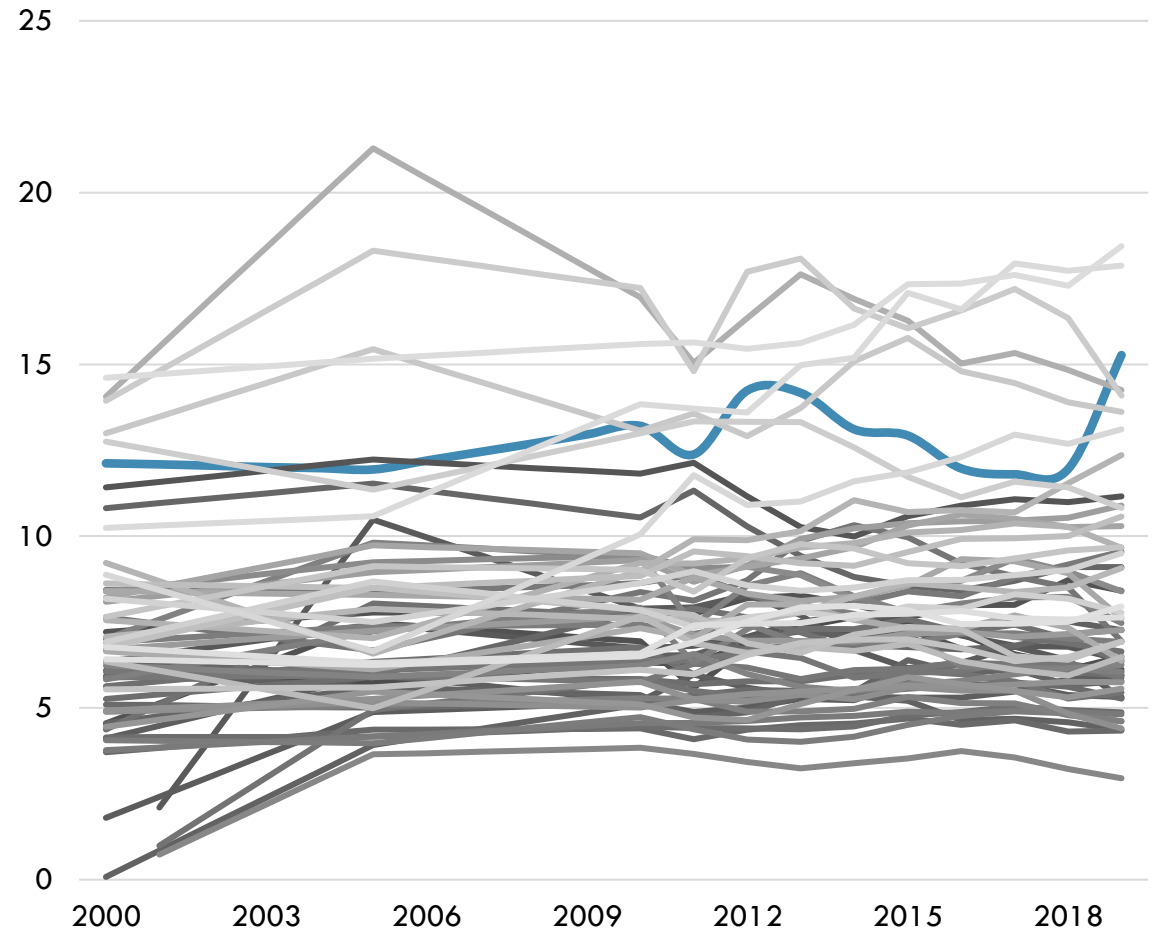


Economy wide air pollutant emissions – South East Asian cities

Annual Average PM2.5 (Economy wide) ($\mu\text{g}/\text{cum}$)
(Urban AQ) (2000 - 2019)



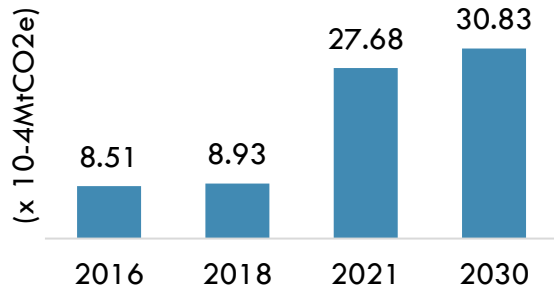
Annual Average NO2 (Economy wide) ($\mu\text{g}/\text{cum}$) (Urban
AQ) (2000 - 2019)



— Phnom Penh

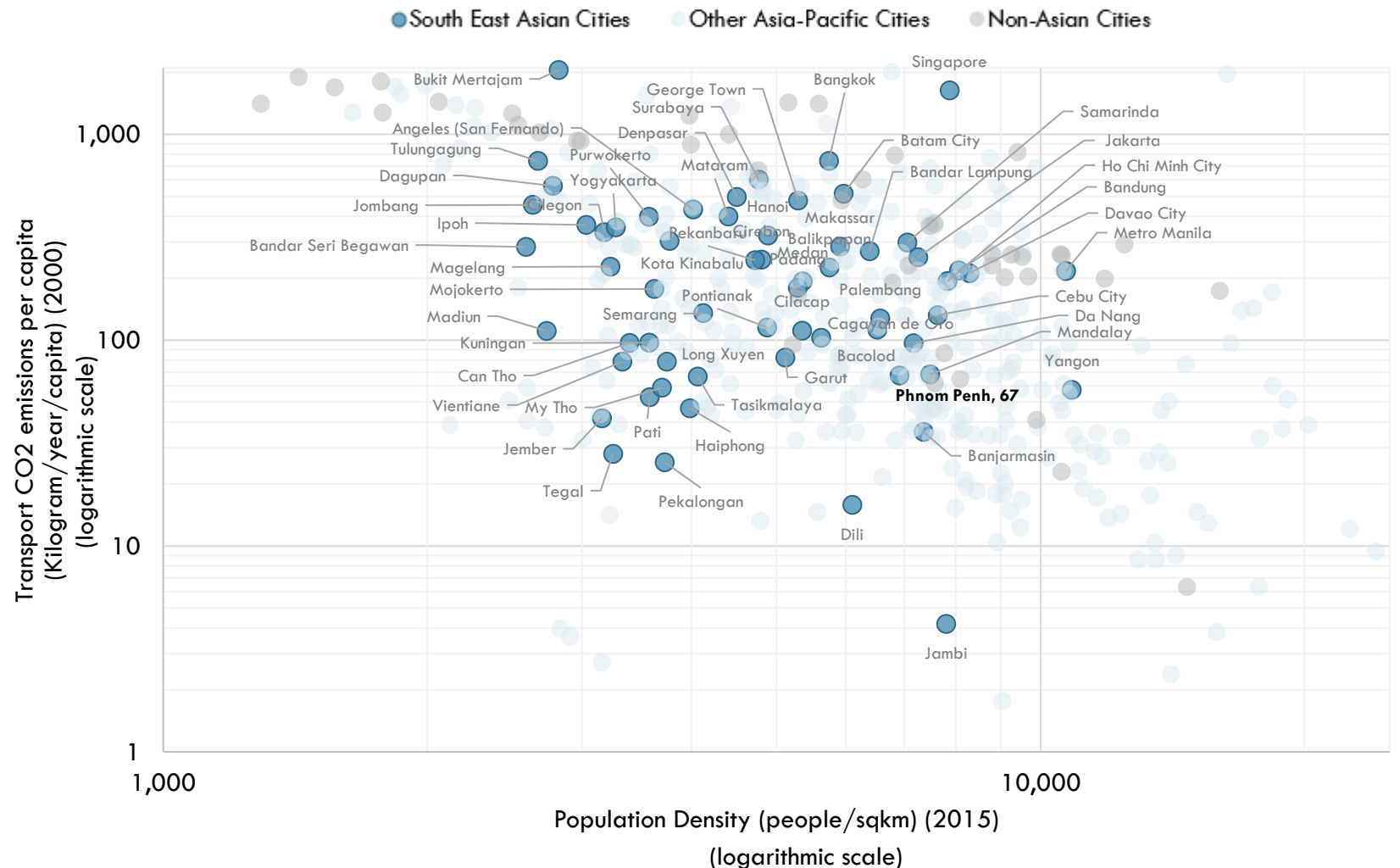
Transport CO2 emissions per capita

Transport CO2 emissions - Baseline projections



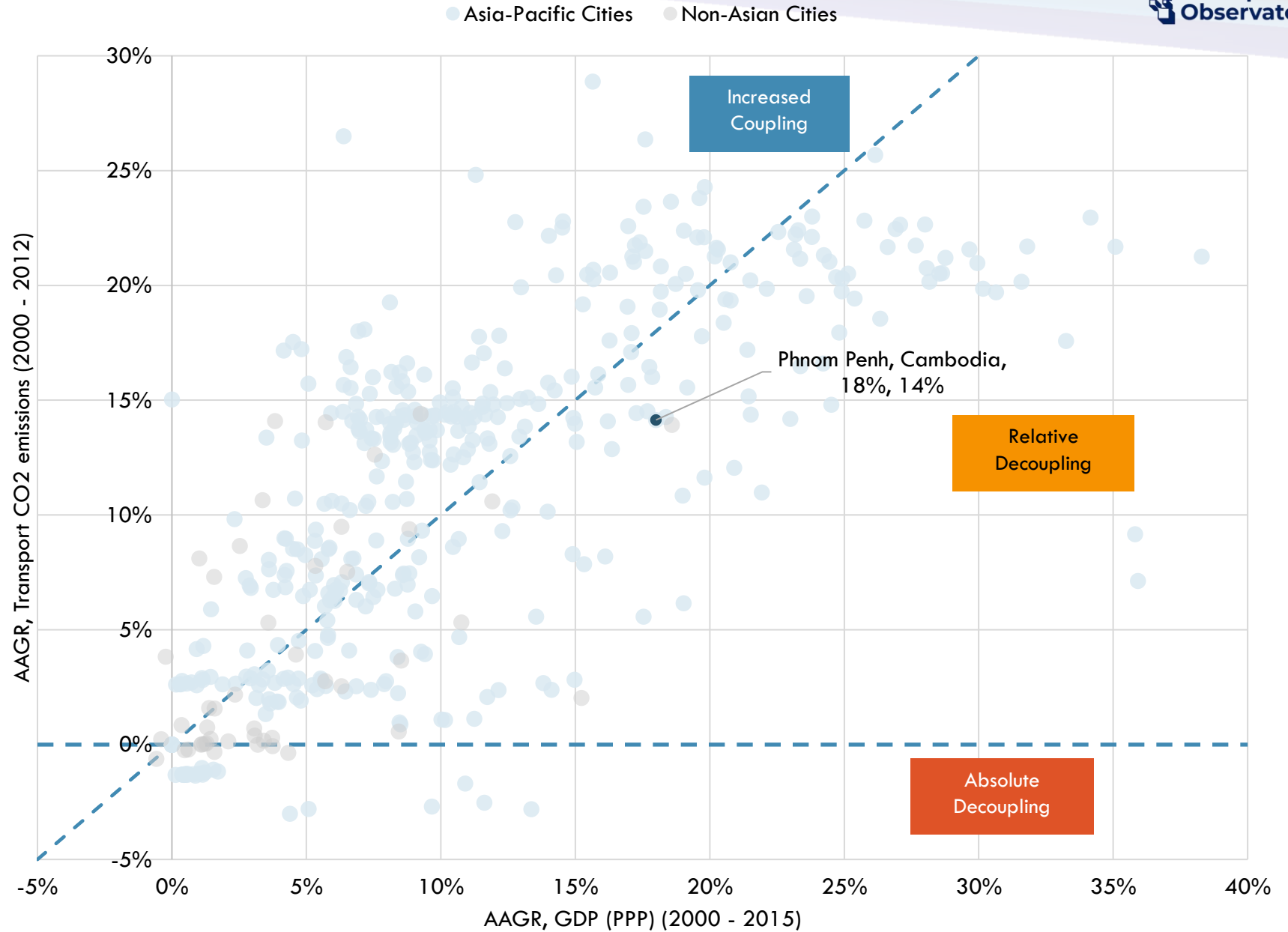
Source: https://climateactiontransparency.org/wp-content/uploads/2022/11/20220518_CMB_MRV_DEL5_MRV_framework_for_Transport_sector_in_Cambodia_Financial-3-1-1.pdf

- Phnom Penh is estimated to emit 67 kgs of transport CO2 emissions per year per capita. This is lower than the average of the sample South East Asian cities of 278 kgs/year/capita. Cambodia average transport CO2 emissions for the year 2000 and 2019 are estimated to be 110 and 390 kgs/year/capita respectively (CAIT). Since the sources for the city and country level emission estimations is different, their study methodologies can't be compared directly.



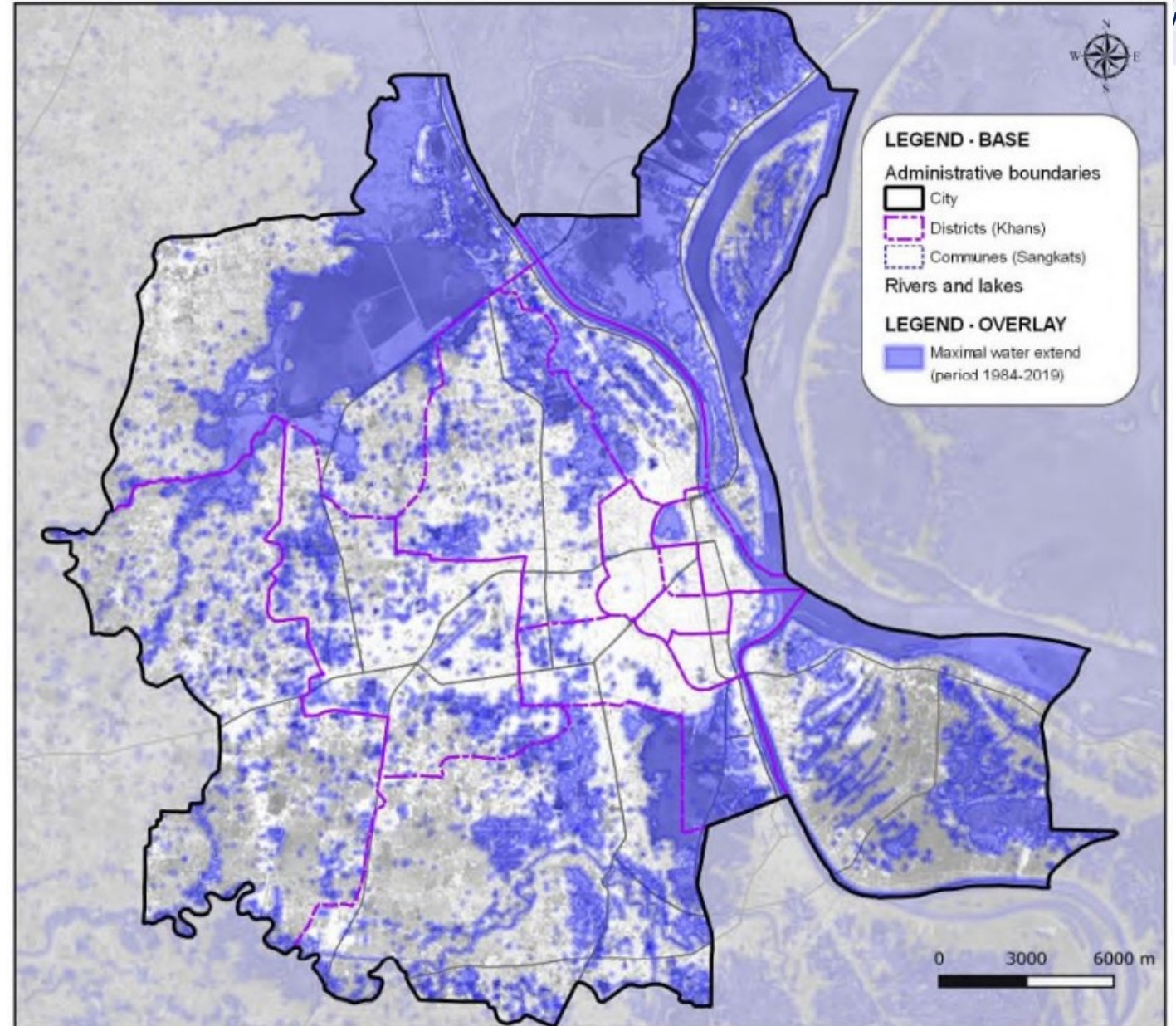
Coupling of Transport CO2 emissions with GDP

- Phnom Penh exhibits relative decoupling of Transport CO2 emissions with GDP whereas, Cambodia in the period between 2015 and 2022 exhibited increased coupling.



Flood prone area mapping

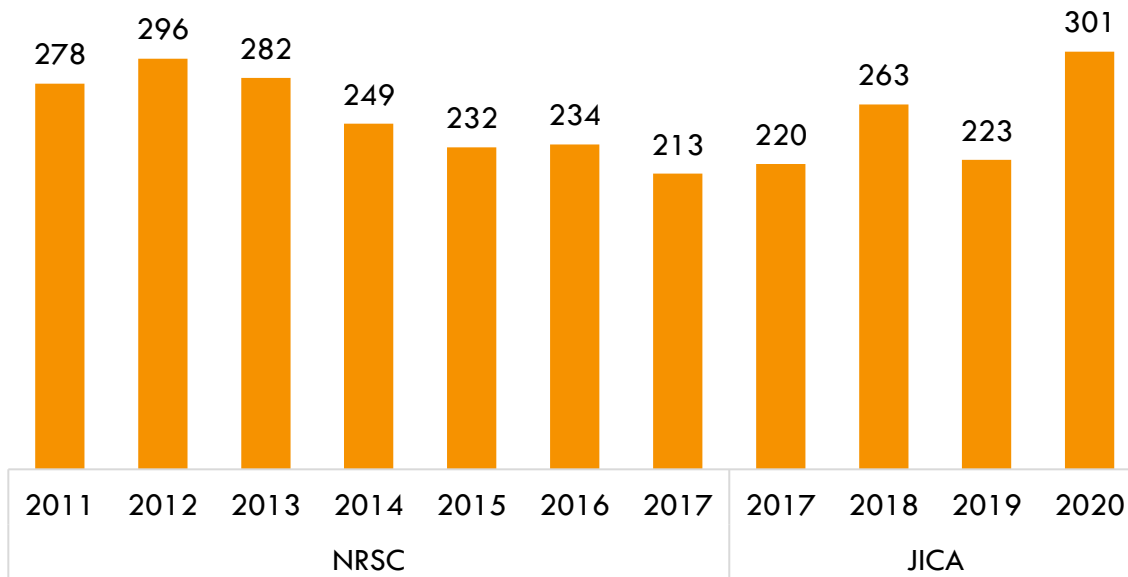
- Controlling floods has been a major concern for Phnom Penh City and the citizens have been struggling with chronic floods which happen even with small rainfall and in turn deteriorate traffic conditions such as road closure and traffic jams due to flooding. Furthermore, wetlands in Phnom Penh, which generally mitigates flood damage by storing water, have been destroyed for land development and it makes the capital more vulnerable to such disasters. In addition to flooding, the damp temperature which stays high all year round as shown in Figure 2.3.2 affects people's trip behaviours such as avoiding walking and use of public transport due to the difficulty for accessing to bus stops.



Source: https://openjicareport.jica.go.jp/pdf/12371746_01.pdf

Road crash fatalities

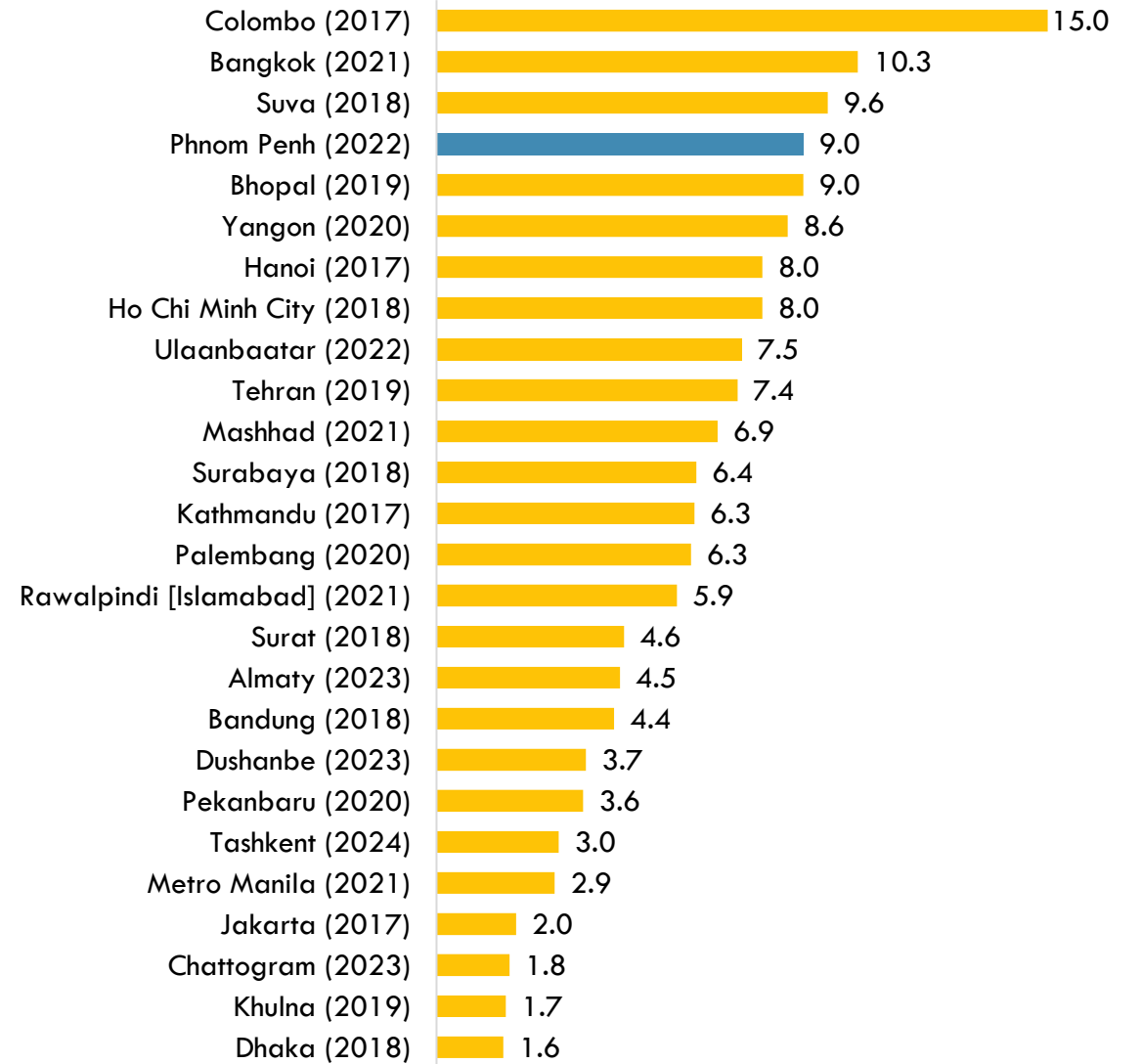
Number of Road Traffic Deaths



Perception of road safety crossing by the residents (2017) (STT) (%)



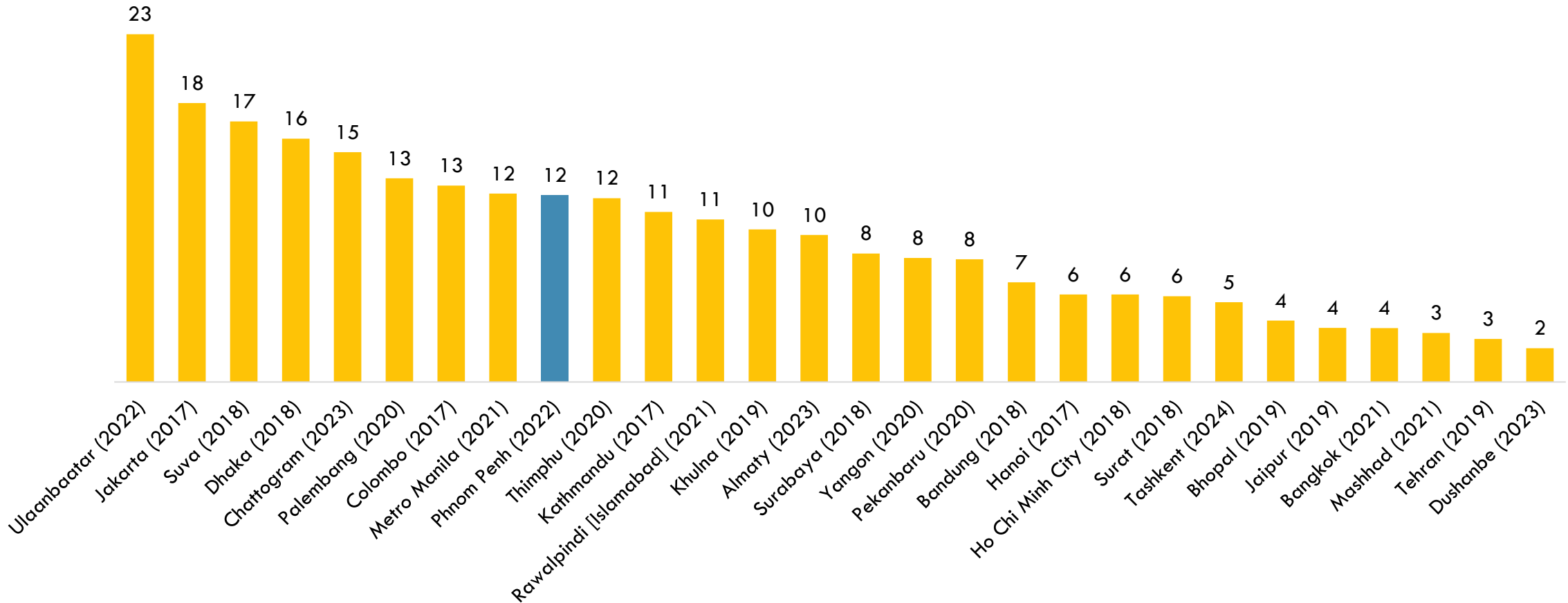
Traffic fatalities per 100,000 inhabitants (Number) (UNESCAP)



- Road crash fatalities have been rising in recent years and records about 9 deaths per 100,000 inhabitants as of 2022.

Travel costs as part of income (%)

Travel costs as part of income (%)



- Phnom Penh's transport costs account for about 12% of monthly income

Section 2: Phnom Penh city – Policy overview

Phnom Penh transport relevant policy documents

- The Asian Transport Outlook (ATO) project has established a comprehensive methodology for tracking and analyzing transport-related policy measures and targets across the Asia Pacific region. Central to this methodology is the development of detailed policy trackers. These trackers meticulously document transport-relevant policy measures and targets specific to each country. The documentation process involves a thorough review of various policy documents, including Nationally Determined Contributions (NDCs), Long-Term Strategies (LTSs), national transport policies, and a variety of secondary reports. This exhaustive collection ensures that the policy trackers encompass a holistic view of each country's transport policy landscape.
- Each recorded measure or target within the policy trackers is categorized based on multiple criteria. These include the mode of transport (e.g., road, rail, air, maritime), the category of the policy, the policy framework under which the measure or target falls, and the Avoid-Shift-Improve (ASI). Furthermore, the measures are analyzed across different sectors, ensuring a multi-dimensional perspective on transport policies and their impacts.
- The structured documentation in the policy trackers facilitates detailed analysis. By categorizing each policy measure and target comprehensively, the ATO project can conduct nuanced analyses that reveal patterns, gaps, and opportunities within and across countries in the Asia Pacific region. This analytical process is systematically recorded and presented in subsequent slides.

Document Name	Year Published
Phnom Penh Sustainable City Plan 2018-2030	2018
Sub-decree on Phnom Penh Land Use Master Plan 2035	2015
Urban Development in Phnom Penh	2017
Data Collection Survey on Urban Transport in Phnom Penh - Part 2	2023
Comprehensive Urban Transport Plan in Phnom Penh Capital City (PPUTMP) - Part 2	2014

Policy measures exhibit diversity

Access restriction by corridor/ road	Coordinate planning across government agencies	Cycling/ Bike Lanes	Development density or intensiveness	Development of active transport plan/ policy	Development of other transport-related plan/ policy
Disaster monitoring and risk assessment for transport infrastructure	Enhanced bus networks	Express lanes / public transport priority	Freight Intermodality measures	General capacity building	General data repositories and data collection
General education and behavior change	General Emission reduction	General e-mobility	General enforcement	General freight and logistics	General Institutional/ governance
General IPT/ paratransit measures	General land use	General Parking administration	General parking measures	General Passenger urban access improvement	General public transport
General Public transport administration	General road safety	General transport finance	General transport planning	General transport relevant zoning	Integrated ticketing
Management Authority general	Passenger Transit hub	Peak time traffic management	Public awareness campaigns	Public Private Partnership (PPP)	Public transit expansion
Public transport information	Public transport pricing	Road geometry improvement	Road infrastructure expansion	Stakeholder involvement	Technical standards for general transport infrastructure
Technical standards for road infrastructure	Traffic flow improvement	Traffic signaling	Vehicle air pollution emission standards	Walking measures	

Access restriction by corridor/ road
 Shared parking space, cargo handling spaces and regulation the time of vehicle inflow will be developed based on the plan. (Data Collection Survey on Urban Transport in Phnom Penh - Part 2)

E-mobility
 A system of inducements to encourage the use of low-emission vehicles in place (i.e. those with better emissions performance standards in terms of gCO₂/km or similar, hybrid or electrical vehicles). (Phnom Penh Sustainable City Plan 2018-2030)

Freight Intermodality measures
 Considering the land use plan and the development plan for the ring roads, truck terminals will be developed at the logistics-hubs. (Data Collection Survey on Urban Transport in Phnom Penh - Part 2)

General Transport Finance
 Increase investments in priority infrastructure sectors: urban transport (Urban Development in Phnom Penh)

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“ATO translates data into insights, policies, and investments”

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