1.3

Asia Regional Overview

Demographics

Population size:	Population growth:	Urban population share:	Urban population growth:	GDP per capita:	GDP growth:
4,609 million	+10%	51%	+26%	USD 6,505	+35%
(2020)	(2010-2020)	(2020)	(2010-2020)	(2019)	(2010-2019)

Sources: See endnote 1 for this section.

Key findings

Demand trends

- Asia's car ownership rate increased 87% from 2005 to 2015 (latest available data), more than three times the global average.
- Four of the world's five most congested cities in 2019 were in Asia (Bengaluru, Mumbai and Pune, India; and Manila, the Philippines), due to increased ownership of motorised two-, three- and four-wheeled passenger and freight vehicles.
- Asian countries are ramping up motor vehicle production and accounted for 95% of motorised and electric two-wheelers globally, while also increasing commitments to phase out internal combustion engines.
- Electric two- and three-wheelers are being scaled up rapidly in Asia, with annual e-bike sales in China alone increasing from nearly 12 million in 2010 to 16 million in 2020.
- Asia was the epicentre of dockless bike-sharing systems in 2019 and 2020, but Asian cities accounted for only 8% of e-scooter services worldwide in early 2020, far fewer than the United States (39%) and Europe (37%).
- Asia continued to dominate global maritime trade in 2019, accounting for more than 50% of global trade volume, more than 40% of goods loaded and more than 60% of goods unloaded.

Emission trends

- Transport CO_2 emissions in Asia grew 41% between 2010 and 2019, the highest growth among global regions.
- Two-thirds of Asian countries exceeded the global average for transport emissions growth (16%) between 2010 and 2019.
- Road freight transport increased more than 9% each in China and India from 2016 to 2017 (latest available data).

Policy measures

- Metro rail construction and expansion in Asian cities is outpacing other regions. The Asia-Pacific region continues to invest heavily in urban rail systems and in 2018 overtook Europe in the number of new light rail projects for the first time.
- China introduced up to half a million electric buses in its cities between 2015 and 2019, nearing scale, and the buses are also taking hold in neighbouring regions.
- Fuel economy improvements have progressed in China, India, Japan and Saudi Arabia. Average fuel economy improved at least 3% in major Asian countries (China, India, Indonesia, Japan, Malaysia, the Philippines and Thailand) in 2017 – more than twice the global average.
- Asian countries such as Indonesia, the Philippines and Singapore have introduced walking and cycling campaigns, policies and infrastructure improvements in an attempt to counteract the decline in walking and cycling in rapidly motorising countries and cities in the region.
- Asian countries are advancing policy measures on low carbon freight transport, including efforts in sustainable logistics, electric freight vehicles, eco-driving (i.e., driving techniques to maximise fuel efficiency) and freight exchange platforms.
- In Asia, most policies to increase the share of renewables in transport are related to biofuels, and most efforts to scale up electric vehicle uptake are not directly linked to the use of renewable energy.

Impacts of the COVID-19 pandemic

- Public transport impacts due to the COVID-19 pandemic were less drastic in Asia compared to other world regions, and some countries witnessed rapid recoveries in demand.
- Demand for shared mobility services in Asia was heavily impacted by the pandemic, resulting in reduced revenues and employment while triggering new strategies and innovation.

Overview

Asia accounts for most of the growth in global transport demand since 2000.[2] The region's transport CO_2 emissions also increased rapidly during this period, representing nearly 40% of the global total in 2019.[3] Yet **Asia** (led by **China**) also has witnessed some of the strongest emission mitigation responses, leading global growth in high-speed rail, urban public transport (especially metro and bus rapid transit), fuel economy standards and bike sharing. The share of paratransit (sometimes called "informal transport") is high in many cities, contributing to increased mobility but also greater congestion. Overall, Asia is poised to set the pace for new sustainable transport models that can be replicated across both developed and developing countries.

The needed investment in transport infrastructure to drive economic growth in Asia is an estimated USD 500 billion to USD 900 billion annually.[4] With the demand for private transport rising, finding a balance between economic growth and mobility has proven a challenge. Opportunities in the region are mainly focused on efforts to "*Improve*" vehicle technologies; however, economic growth strategies in Asia must also align with "*Avoid*" and "*Shift*" measures to prevent lock-in effects.

Demand trends

Transport demand has continued to rise in most of Asia in line with economic growth. While the COVID-19 crisis led overall demand for transport to plunge in many Asian countries in 2020, demand was more stable in countries that implemented early virus containment policies and that offered more sustainable transport options *(see Box 1)*.[5]

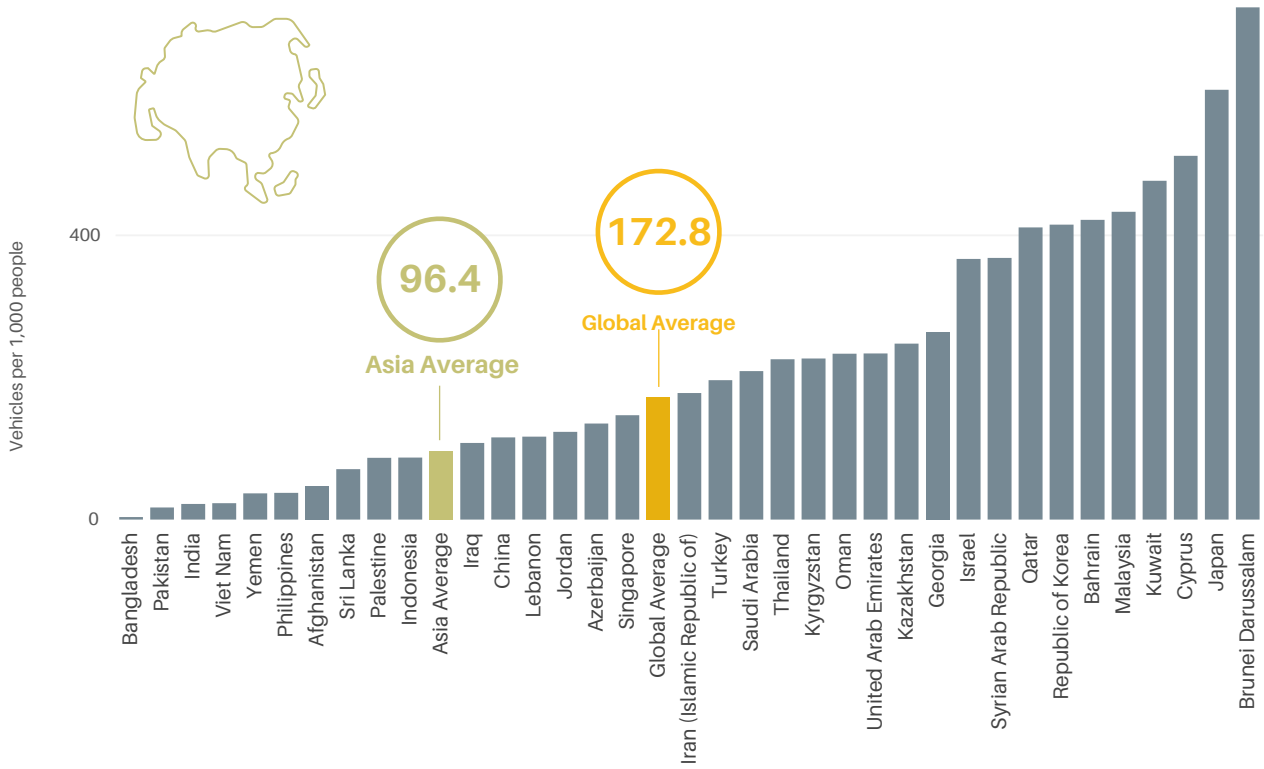
Asia's car ownership rate increased 87% from 2005 to 2015 (latest available data), more than three times the global average *(see Figures 1 and 2)*.[6] Imported used vehicles account for a high share of car ownership in Asian countries (including Bangladesh, Cambodia, Myanmar, Pakistan and Sri Lanka), contributing to declining air quality and increasing congestion. New passenger car sales in the region remained brisk from 2010 to 2019 (up 33%), while demand for new commercial vehicles declined.[7]

- **25% increase** in total new vehicle sales (2010-2019)
- **33% increase** in new passenger car sales (2010-2019)
- **Over 35 million** new passenger cars sold (2019)
- **1% decrease** in new commercial vehicle sales (2010-2019)
- **7.8 million** new commercial vehicles sold (2019)

Sources: See endnote 8 for this section.

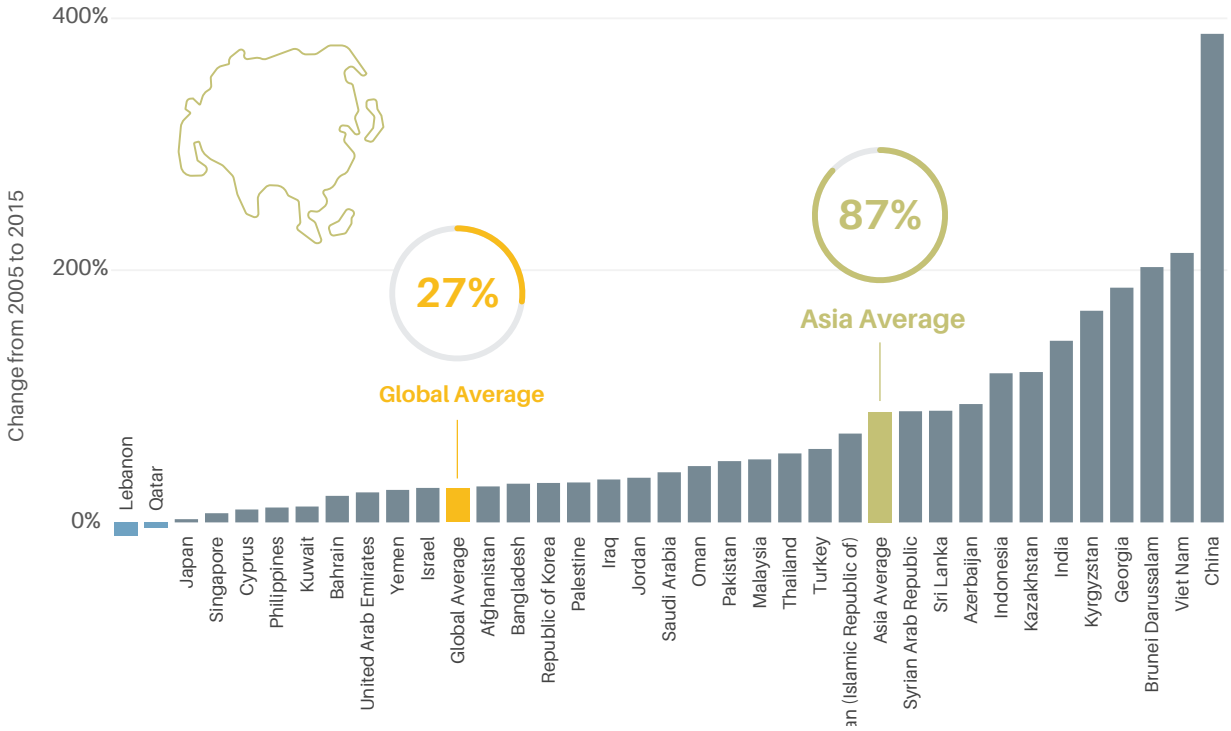
Four of the world's five most congested cities in 2019 were in Asia (Bengaluru, Mumbai and Pune, India; and Manila, the Philippines), due to increased ownership and use of two-, three- and four-wheeled passenger and freight vehicles.[9] Paratransit in Asia includes national services such as ankhot (Indonesia), jeepneys (Philippines) and si-lor (Thailand), which serve as feeders to public

Figure 1 Car ownership rates per 1,000 people in Asia, 2015



Source: See endnote 6 for this section.

Figure 2. Growth in car ownership in Asia, 2005-2015



Source: See endnote 6 for this section.

transport systems. The paratransit share is high in many Asian cities (e.g., Dhaka 54%, Jakarta 50%, Khulna 58%), contributing to increased mobility but also rising congestion.[10]

- Passenger transport demand in China: up 27% during 2010-2019, to 3,534,920 million passenger-kilometres[11]
- Freight transport demand in China: up 49% during 2010-2019, to 13,998,760 million tonne-kilometres[12]

Asian countries are ramping up motor vehicle production and accounted for 95% of motorised and electric two-wheelers globally, while also increasing commitments to phase out internal combustion engines.[13] The region dominates the market for electric passenger cars and buses. As countries like **China**, **India** and the **Republic of Korea** increase vehicle manufacturing, there are opportunities to replace polluting internal combustion engines with more efficient, regionally produced low carbon vehicles.

- In 2019, the **Republic of Korea** announced a goal to produce 6.2 million hydrogen cars by 2040.[14] The country aims to shift all commercial vehicles, including trucks and construction machinery, to fuel cells by 2035 and to have 2,000 hydrogen fuel cell electric buses by 2022.[15]
- Hainan Province, **China** announced in 2019 that it will ban sales of diesel and petrol cars by 2030.[16]
- Hong Kong, **China** announced plans in 2019 to phase out internal combustion engine vehicles and to go fully electric over the next 20 years.[17]
- Several Asian auto manufacturers plan to phase out production of cars with internal combustion engines, including two of **China**'s five biggest automakers (Changan Automobile and the BAIC Group) by 2025.[18] The Korean automaker Hyundai halted development of diesel engines in 2020.[19]
- In 2020, **Singapore** announced that it would phase out petrol and diesel vehicles by 2040.[20]

Electric two- and three-wheelers are being scaled up rapidly in Asia, with annual e-bike sales in China alone increasing from nearly 12 million in 2010 to 16 million in 2020.[21] Middle and low-income countries in Asia have the world's highest density of two- and three-wheelers, both in absolute terms and as a fraction of the overall fleet.[22] Implementing policies to ensure that these vehicles are powered by renewable electricity can reduce global greenhouse gas emissions and improve local air quality.

- In 2020, Delhi Metro Rail Corporation in **India** added electric rickshaw services to 12 more metro stations, bringing the total to more than 1,000 e-rickshaws at 29 stations.[23]
- Solar rickshaws in **India** debuted on the IIT-Delhi campus in 2019, followed by an expansion of more than 1.5 million solar rickshaws throughout New Delhi in 2020.[24]
- Bicycle exports from **Chinese Taipei** included 410,000 electric bicycles in 2020, up 21% from 2019.[25]
- In **Vietnam**, the transition to electric two-wheelers was found to have the highest potential to reduce transport CO_2 emissions by 2030.[26] One local producer was able to increase production from 50,000 units in 2019 to 112,000 in 2020.[27]

Asia was the epicentre of dockless bike-sharing systems in 2019 and 2020, but Asian cities accounted for only 8% of e-scooter services worldwide in early 2020, far fewer than the United States (39%) and Europe (37%).[28] This could be attributed to the lack of a cohesive regulatory framework for introducing and integrating e-scooter services into existing public transport systems.

- China's initial boom in dockless bike sharing crashed in 2019, with more than 40 private companies competing for limited urban space.[29] Cities including Hangzhou and Shanghai later created local guidelines aimed at reducing theft, vandalism and disposal of shared bicycles.[30]
- Life-cycle emissions of shared bikes in China are significant, with an estimated two years of use required to achieve net carbon savings.[31]

Asia continued to dominate global maritime trade in 2019, accounting for more than 50% of global trade volume, more than 40% of goods loaded and more than 60% of goods unloaded.[32] Trade tensions between China and the United States greatly affected maritime trade patterns in 2019, contributing to increased maritime activity in Vietnam and to smaller increases in Cambodia, Indonesia, Malaysia, the Philippines, Singapore and Thailand.[33]

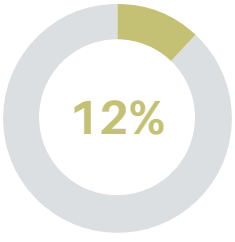
- In 2019, Asia remained home to 16 of the world's top 20 container ports.[34]
- Intraregional (within Asia) and South-South trade accounted for around 40% of total container-based trade in 2019.[35]

Emission trends

Transport CO_2 emissions in Asia grew 41% between 2010 and 2019, the highest growth among global regions.[36] Asia is the largest regional contributor to transport CO_2 emissions, as strong population growth has led to increased demand for passenger and freight transport, and because of limited progress in decoupling economic growth from growth in transport emissions. Per capita transport CO_2 emissions in 2019 in Asia are close to the global average *(see Figure 3)*.[37]

Regional CO_2 emissions

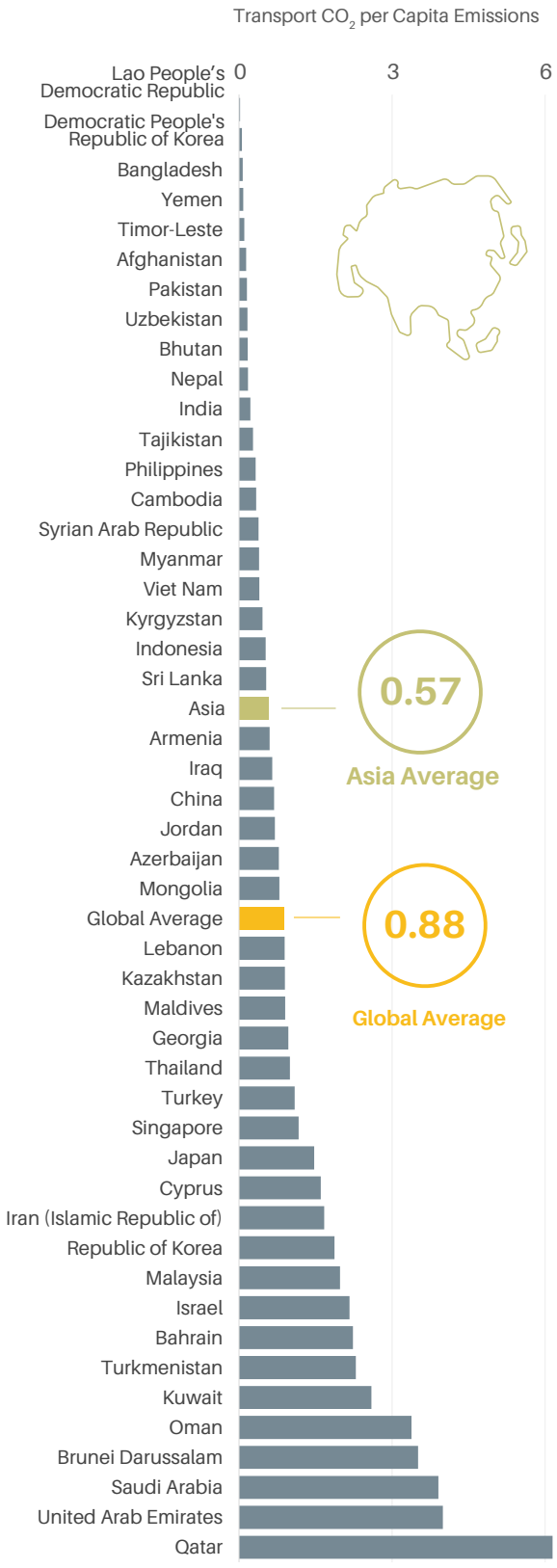
- Total transport CO_2 emissions (2019): **2,606 million tonnes**
- Share of global transport CO_2 emissions (2019): **38%**
- Per capita transport CO_2 emissions (2019): **0.57 tonnes**
- Transport CO_2 emissions per USD 10,000 GDP (2019): **0.88 tonnes**



Transport share of regional CO_2 emissions

Sources: See endnote 38 for this section.

Figure 3. Per capita transport CO_2 emissions in Asia, 2019



Source: See endnote 37 for this section.

Two-thirds of Asian countries exceeded the global average for transport emissions growth (16%) between 2010 and 2019 *(see Figure 4)*.[39] Only 20% of Asian countries reduced their transport CO_2 emissions during this period (in some cases due to political conflicts).[40]

Road freight transport increased more than 9% each in China and India from 2016 to 2017 (latest available data).[41] Road freight transport produces higher emissions than rail, aviation and maritime transport combined.[42] CO_2 emissions from freight transport in Asia are projected to grow more than 300% from 2010 to 2050.[43]

Policy measures

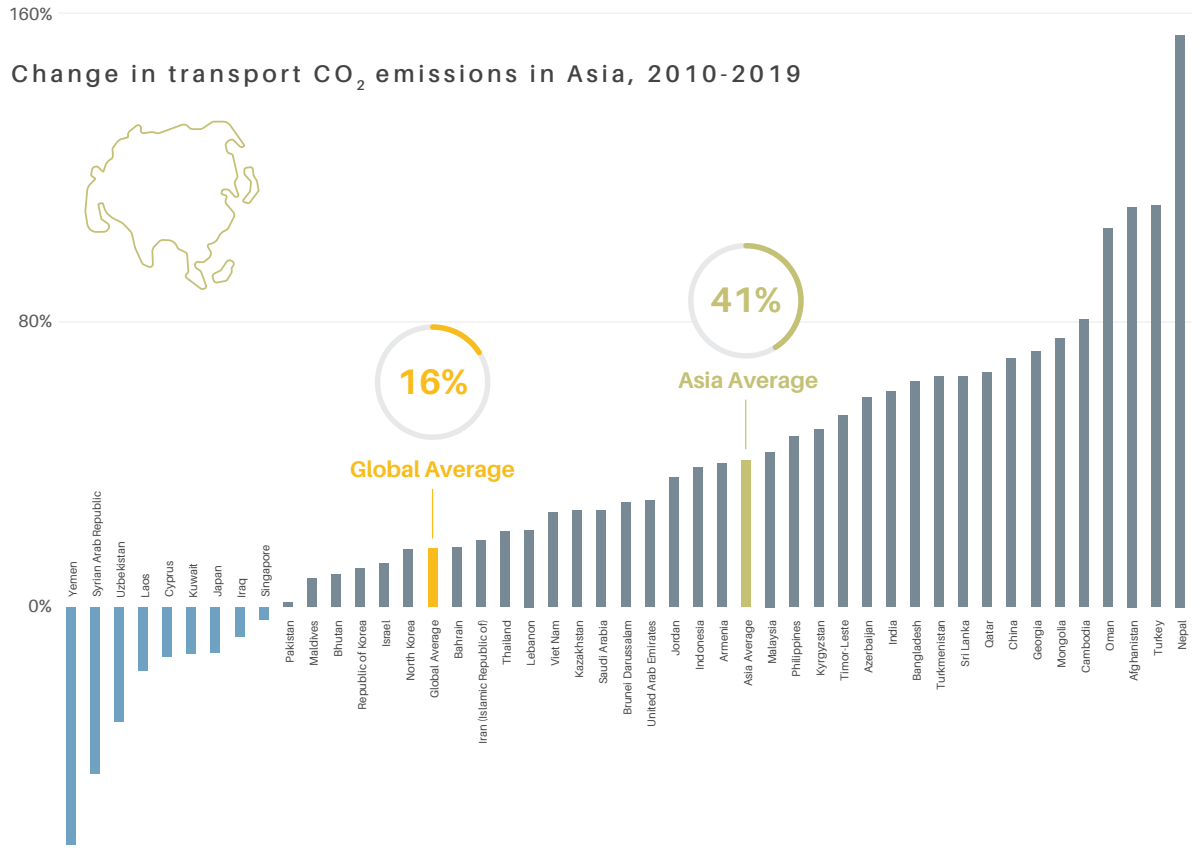
Sustainable transport policy measures continued to expand in Asia, offering best practices in electric mobility, shared mobility, urban rail and renewable energy. Densely populated Asian cities have significant potential to expand sustainable mobility planning, including walking and cycling facilities, and more countries in the region are developing policy frameworks supporting low carbon urban mobility.

Metro rail construction and expansion in Asian cities is outpacing other regions.[44] **The Asia-Pacific region continues to invest heavily in urban rail systems and in 2018 overtook Europe in the number of new light rail projects for the first time.**[45] Major metropolitan areas launched and extended light and heavy rail systems, a key opportunity to reduce transport emissions. However, little action was recorded on bus rapid transit systems in the region during 2019 and 2020, with only one new system opening (in Peshawar, Pakistan). Other examples of rail construction and expansion in Asian cities include the following:

- In 2019, cities in **China** expanded their subway systems by a combined 877 kilometres from the previous year, for a total length of 6,172 kilometres.[46]
- The first metro line in **Pakistan** opened in **Lahore** in October 2020, aiming to serve 250,000 passengers daily along its 27-kilometre route.[47]
- The first subway system in **Jakarta, Indonesia** entered operation in 2019, with the opening of a metro line in March 2019 and a light rail line in December.[48]
- **Nagpur, India** opened its first subway line in March 2019, followed by second line in January 2020.[49] **Doha, Qatar** introduced three subway lines in 2019 with a total length of 76 kilometres.[50]
- The urban rail network in **Bangkok, Thailand** was expanded in 2018 with a 13-kilometre southern extension of the elevated BTS with nine new stations, followed in 2019 by a 10-kilometre northern extension and an extension of the blue line, completing the loop around the city and enabling capacity of 500,000 passengers per day.[51]

China introduced up to half a million electric buses in its cities between 2015 and 2019, nearing scale, and the buses are also taking hold in neighbouring regions.[52] As local governments

Figure 4. Change in transport CO_2 emissions in Asia, 2010-2019



Source: See endnote 39 for this section.

across Asia replace older buses with new electric versions, there is an opportunity for formalised public transport systems to provide both cleaner and more equitable access. Tendering and contracting of public transport services to acquire electric vehicles could also include stipulations to make vehicles safer for riders and pedestrians and more accessible for persons with disabilities.

- In **China**, subsidies for electric vehicles (also called "new energy vehicles") were extended in 2020 through the end of 2022.[53]
- In **Singapore**, 60 electric buses began operating as part of a trial in early 2020 and are expected to reduce around 7,840 tonnes of CO_2 annually, equivalent to the emissions of 1,700 passenger cars.[54]

Fuel economy improvements have progressed in China, India, Japan and Saudi Arabia. Average fuel economy improved at least 3% in major Asian countries (China, India, Indonesia, Japan, Malaysia, the Philippines and Thailand) in 2017 – more than twice the global average.[55]

- The **ASEAN** Fuel Economy Roadmap 2018-2025, released in 2019, contains a target to reduce the average fuel consumption of new light-duty vehicles sold in the Association of Southeast Asian Nations (ASEAN) region by 26% between 2015 and 2025, reaching 5.3 litres of petrol equivalent per 100 kilometres by 2025.[56]
- In 2018, the **Bangladesh** Road Transport Authority initiated efforts to improve the fuel economy of light-duty vehicles. Between 2005 and 2017, the country's average fuel economy improved 23% (from 8.98 litres per 100 kilometres to 6.9 litres), and transport CO_2 emissions fell 24%.[57]
- **Malaysia** aims to reduce carbon emissions by improving the overall fuel consumption of vehicles to 5.3 litres per 100 kilometres, in line with the ASEAN Fuel Economy Roadmap.[58]
- A new fuel economy labelling guideline in the **Philippines'** Energy Standards and Labeling Program was to be implemented on a voluntary basis for one to two years starting in 2019.[59]
- **Vietnam** began regulating newly assembled and imported four-wheel vehicles to Euro 4 emission standards in 2018 and is targeting the higher Euro 5 standards from 2022.[60]

Asian countries such as Indonesia, the Philippines and Singapore have introduced walking and cycling campaigns, policies and infrastructure improvements in an attempt to counteract the decline in walking and cycling in rapidly motorising countries and cities in the region. In **Beijing**, China, cycling's share of transport fell from 39% in 2000 to 17% in 2010, and similar declines have occurred in many Chinese cities.[61]

- A guidebook for reallocating rights-of-way to prioritise walking and cycling in Indian cities was released in 2020, with case studies from **Coimbatore**, **Mumbai**, **Ranchi**, **Rohtak** and **Udaipur**.[62]
- In 2019, **Jakarta**, Indonesia built 63 kilometres of dedicated bike lanes to encourage active commuting and reduce congestion.[63] In September 2020, the Ministry of Transport in **Indonesia** published a regulation for cyclist safety that mandated every city and regency to provide cycling facilities, such as bike lanes and bike parking; by December, **Jakarta** was among several cities with newly painted bike lanes.[64] Until 2020, there had been no regulation to improve cycling conditions in Indonesia, and the new regulation was foundational for the development of cycling policies across the country.[65]
- A National Bicycle Act introduced in the **Philippines** in 2019 mandated the development of policies, infrastructure and facilities to integrate bicycles into the public transport system.[66] The country's Urban Mobility Plan, approved in 2020, outlines investments in non-motorised transport infrastructure.[67]
- **Singapore** announced in 2020 that it would double the length of its cycling paths to 800 kilometres by 2023.[68]

Asian countries are advancing policy measures on low carbon freight transport, including efforts in sustainable logistics, electric freight vehicles, eco-driving (i.e., driving techniques to maximise fuel efficiency) and freight exchange platforms.[69] Rising shares of road freight in Asian countries present a challenge for efforts to reduce transport emissions.

- In 2019, **China** introduced zero- or low-emission zones for freight vehicles in at least 10 cities, resulting in strong uptake of electric freight vehicles.[70]
- INGKA Group, an IKEA franchisee that provides last-mile delivery services, achieved 100% electric home delivery in **Shanghai** in 2019, a year ahead of its 2020 target.[71]
- In 2020, **Clean Air Asia** concluded a five-year eco-driving programme in **Indonesia**, with private sector companies and other stakeholders seeking to reduce freight emissions.[72]

In Asia, most policies to increase the share of renewables in transport are related to biofuels, and most efforts to scale up electric vehicle uptake are not directly linked to the use of renewable energy. Nine Asian countries produce transport biofuels, and **China**, **Indonesia**, **Thailand** and **India** rank among the world's top producers.[73] Biofuel production in the region increased more than 25% between 2017 and 2018, to 12 million tonnes.[74] Electrification of vehicles coupled with renewable energy can help reduce transport emissions, and pilots are under way to integrate hydrogen, solar and geothermal resources.

- **Indonesia** trialled 30% biodiesel blending – the most ambition target in the region – in 2019 and was aiming for 40% blending in 2020.[75]
- Under a hydrogen pilot project in Foshan, **China**, 70 hydrogen buses were in operation by the end of 2018.[76]
- Vehicle-to-grid integration pilots using solar energy in **China** included Hanergy Glory Solar Technology's test to run an electric vehicle for 30 consecutive days solely on solar power, without plug-in charging.[77]
- In 2019, an urban rail network in **Tokyo, Japan** was converted to being powered entirely by geothermal power and hydropower.[78]

Box 1. Impacts of the COVID-19 pandemic on transport in Asia

Major COVID-19 impacts:

- 59% decrease in trips to public transport stations (at lowest point in 2020 versus January 2020 average)
- 27% to 53% decline in freight transport activity (below 2019 levels)
- 71% decline in international aviation activity (to and from Asia; below 2019 levels)
- 37% decline in domestic aviation activity (below 2019 levels)

Following the onset of the COVID-19 pandemic, transport emissions in Asia dropped along with the decline in transport demand.

Public transport impacts due to the COVID-19 pandemic were less drastic in Asia compared to other world regions, and some countries witnessed rapid recoveries in demand. By late May 2020, the number of people accessing public transport stations in **Mongolia**, the **Republic of Korea** and **Vietnam** had returned to pre-COVID-19 levels of January 2020 (following sharp declines in April). Rail freight flows along the Trans-Asian Railway network avoided major restrictions during the pandemic in 2020.

Demand for shared mobility services in Asia was heavily impacted by the pandemic, resulting in reduced revenues and employment while triggering new strategies and innovation. The Indian ride-hailing company **Ola** saw a 95% drop in revenue in April and May 2020 and fired 1,400 employees to cut costs, while shifting resources to research and development. In December 2020, Indonesia-based **Gojek**, a platform providing transport, logistics and food delivery services, began a collaboration with the Asian Development Bank to research the impacts of COVID-19 and digitalisation on micro, small and medium-sized enterprises.

Source: See endnote 5 for this section.

In Practice: Additional Policy Responses

Avoid measures

Sustainable mobility planning and transport demand management

- One of nine key tasks in **China's** 2019 Long-Term Transport Development Plan is to promote green, low carbon, resource- and energy-efficient, low-polluting and eco-friendly transport systems.[79]
- **Malaysia's** National Transport Policy 2019-2030 includes actions on green transport, such as prioritising public transport networks in urban structures and accelerating the implementation of low carbon mobility initiatives.[80]
- In 2019, after extensive public consultation, **Singapore** released its Land Transport Master Plan 2040, which includes the goal of a 45-minute city with 20-minute towns and 100% zero-emission buses and taxis by 2040.[81]
- National strategies to accelerate sustainable mobility were implemented in **Turkey**, aimed at higher fuel efficiency, introducing more transport services and reducing private vehicles in cities.[82]

Shift measures

Public transport

- In **China**, recent additions to bus rapid transit systems included a 13-kilometre line in Fuzhou (Jiangxi Province), a 38-kilometre line in Tengzhou (Shandong Province) and a 35-kilometre line in Yongzhou (Hunan Province) in 2019, as well as extensions in Nanchang and Shanghai.[83]
- The only new bus rapid transit system in Asia in 2020 opened in **Peshawar, Pakistan** with 32 stops, allowing a ridership of 500,000 people.[84]
- **TransJakarta**, the bus rapid transit system in Jakarta, Indonesia, set an ambitious target in 2019 to shift to a 100% zero-emission fleet by 2030.[85]

Shared mobility services

- In 2019, motorcycle taxis were allowed to legally operate in the **Philippines** for the first time.[86] In an attempt to regulate the industry, the number of such taxis was restricted in Metro Manila and Cebu to 45,000 riders, divided equally among three operators.[87]
- Uber began using boats to alleviate road congestion on roads in Mumbai, **India** and partnered with the e-mobility start-up SUN Mobility to deploy electric three-wheelers in selected Indian cities in 2019.[88]
- In early 2020, Grab introduced 20 electric cars to its ride-hailing fleet in Jakarta, **Indonesia**.[89]

Improve measures

Vehicle emissions

- **Bangladesh** announced plans to introduce Euro 6 emission standards in 2025.[90]
- In 2018, the government of **Indonesia** introduced the Euro 4 standard for all vehicles that have two or more wheels.[91]
- In **Malaysia**, tentatively, the Euro 4 standard took effect for new models after 1 April 2020, and for existing models after 1 October 2020.[92]
- In 2019, **Turkey** adopted legislation to improve energy efficiency in the transport sector through the implementation of vehicle efficiency and environmentally friendly alternative fuels.[93]
- **Sarawak**, Malaysia started using hydrogen-fuelled buses in 2020.[94]
- **JR East Group**, a major passenger railway company in Japan, committed in May 2020 to achieving net-zero CO_2 emissions by 2051.[95]
- **Indian Railways** is on track to be 100% electrified by the end of 2022 and has committed to being carbon neutral by 2030.[96]
- **India's** National Electric Mobility Mission Plan has the ambitious target of achieving 7 million hybrid and electric vehicles from 2020 onwards, and in 2019 the government implemented the Faster Adoption and Manufacturing of Electric Vehicles in India (FAME) Phase II scheme, allocating USD 1.4 billion in rebates over three years to reduce the purchase price of hybrid and electric vehicles.[97] The scheme also targets 2,700 electric vehicle charging stations in cities above 4 million inhabitants as well as fast and ultra-fast charging stations along major highways.[98]
- In 2019, a decree in **Indonesia** outlined government support for efforts to build an industry around the production and purchasing of electric vehicles.[99]

Annex: Methodological Note

Data usage

Time period for data:
The report strives to utilise the most recent publicly available data and information just prior to the time of publication (as of 31 May 2021). The figures in the report were developed between September and December 2020 using the most recent data available.

Secondary data:
SLOCAT relies on secondary data and information collected and provided by SLOCAT partners and other entities and does not make use of any internal modelling tools.

Data on sustainable mobility: A call to action

The report benefits directly from data collected by a wide range of stakeholders working in different areas of transport.

Data are important for providing a comprehensive picture of the status of sustainable, low carbon transport and are essential for both policy and investment decision making. In these times of change, it is critical to upgrade data and policy collection and interpretation capacities to better understand progress and the hurdles that must be addressed.

The data limitations mentioned below are not new. Obtaining regular, reliable and public data across regions and transport modes remains an outstanding issue. When an increasing number of stakeholders are collecting data and policy information, more and better open-access data and capacity building efforts for data interpretation are supported by many multi-stakeholder partnerships in the sustainable, low carbon movement.

If you share our passion for open-access data and knowledge towards greater impact on policy and investment decision making worldwide and/or would like to contribute data or knowledge to our collective efforts on this report, **please reach out to the research team in the SLOCAT Secretariat at tcc-gsr@slocatpartnership.org**.

Specific data used in this report

Data on emissions

The data in this edition of the report point to the direct carbon emissions from transport activity; they do not cover the indirect emissions and land-use impacts associated with certain modes of transport. The report primarily utilises CO_2 emission data compiled in the Emissions Database for Global Atmospheric Research (EDGAR) from the Joint Research Centre of the European Commission, as this represents the most recent, comprehensive dataset on transport CO_2 emissions. However, this global dataset does not convey in full detail the unique situations of individual countries.

EDGAR provides estimates for fossil CO_2 emissions from all anthropogenic activities with the exception of land use, land-use change, forestry and the large-scale burning of biomass. The main activities covered are CO_2 emissions emitted by the power sector (i.e., power and heat genertion plants), by other industrial combustion (i.e., combustion for industrial manufacturing and fuel production) and by buildings and other activities such as industrial process emissions, agricultural soils and waste. Transport activities covered within EDGAR include road transport, non-road transport, domestic aviation, and inland waterways on a country level, as well as international aviation and shipping.[1]

For the world, regions and countries, the CO_2 emission data (provided by EDGAR) span through 2019. In a few places in the report, CO_2 data for 2020 are shown to illustrate the impact of the COVID-19 pandemic; however, these data are based on a different methodology than the EDGAR dataset and should not be compared directly with the data from previous years.

The latest CO_2 emission data for individual transport modes are for 2018 and have been compiled only at the global level. For passenger and freight transport, the data on global CO_2 emissions are for 2017, as this is the latest year with robust data. Data on passenger activity (passenger-kilometres) and freight activity (tonne-kilometres) – provided mainly in the country fact sheets – are based on the latest available year, as indicated in the report analysis.

Information on greenhouse gas emissions – provided in CO_2 equivalent (CO_{2eq}) – include not only CO_2 but also methane, nitrous oxide, and industrial gases such as hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.[2] These data are less up-to-date. As of 31 May 2021, data on greenhouse gas emissions were not readily available for the period 2019-2020. In some cases, additional data sources were used to provide detailed information about other climate pollutants besides CO_2.

All data on CO_2 and other greenhouse gas emissions, as well as CO_{2eq}, are provided in metric tonnes.

Data on car ownership

Information on car ownership rates is based on a global dataset from the International Organization of Motor Vehicle Manufacturers (OICA), with the latest release (as of 31 May 2021) dating from 2015.[3] Although newer information is available for some individual countries, using these data would hinder accurate global comparisons. Data on passenger and commercial vehicle sales were available only up to 2019.

Policy landscape data

The policy-related information presented in this report is not intended to be comprehensive. The data for the policy landscape indicators provided in Section 3 were gathered through desk research unless otherwise indicated. Barriers to accessing such information include language and limited availability of information through online media (e.g., websites, press releases and news articles).

Data in country fact sheets

Information in the fact sheets is based on desk research and on contributions from the national focal points. The data were collected to the best of the authors' knowledge and based on data availability, and thus may not be complete or show the most recent status. When no information was available for a given indicator, the term "Not available" is used.

Data gaps

Major data gaps exist in areas where there is no globally accepted data collection methodology. For example, the mapping of cycling and walking infrastructure is not currently done in all regions. Also, the modal share can be surveyed through different methods, leading to inconsistencies in available data. In addition, data on paratransit (informal transport), a predominant form of transport in many parts of the world, are largely lacking. This results in an incomplete picture of the impact of transport on climate change and sustainable development.

Methodological approach

Countries and regions

The report follows the M49 Standard of the United Nations Statistics Division.[4] In total, 196 countries have official United Nations membership and are also party to the United Nations Framework Convention on Climate Change. The available data have been put in a common structure for the United Nations member countries, regions and income groups to enable a consistent assessment. Income groups are based on the World Bank's classification of 2019.[5]

Economic calculations

The per capita and gross domestic product (GDP) calculations are based on the United Nations World Population Prospects 2019 and on World Bank GDP data using constant 2010 USD.[6]

Spatial and temporal scales

The geographic scale (global, national, city-level, etc.) as well as time scale (annual, monthly, daily) used in this report depends largely on the available dataset, as noted in the relevant figures and text. The detailed data forming the basis of the calculations and analysis are provided in the SLOCAT Transport Knowledge Base.[7]

Criteria for selection

The report covers policies, targets, emission reductions (achieved or envisioned) and market measures. To merit inclusion in the analysis, the policies, projects and trends must have been announced or completed between 2018 and 2020. Significant developments from January through May 2021 were included when deemed relevant, with the understanding that the next edition of the *Transport and Climate Change Global Status Report* will cover a period starting in 2021.

Pre- and post-COVID-19 pandemic trends

The year 2020 was pivotal for the world, and the COVID-19 pandemic has had substantial impacts on many of the transport trends monitored in this report. This edition attempts to differentiate between long-term trends and impacts due to the pandemic. To the extent possible, the analysis notes "pre-pandemic" (up to the end of 2019 or latest by February 2020) and "during pandemic" trends (starting in March 2020 until the end of 2020), as in some cases the pandemic led to reversals in long-term trends, at least for a specific period of time. In each section, a box describes the impacts that the pandemic has had on specific regions and sub-sectors.

Assembling the report

Global Strategy Team

This edition of the report was guided by a global strategy team consisting of 20 experts in the field who provided inputs over the span of six meetings between September 2019 and October 2020. Additionally, small group consultations were organised in February 2021, following the peer review process.

Authors and contributors

The report was collaboratively drafted by 22 authors and contributors from 16 organisations, led by the SLOCAT Secretariat. This includes additions and high-level inputs from the copy editor and from the special advisor who also co-authored the Executive Summary. Authors researched and compiled relevant facts and figures for the five sections of the report, including the Focus Features, with supporting review and inputs from several other organisations.

Peer review: A peer review process was carried out from 18 December 2020 to 20 January 2021 with 1,700 comments received from 74 reviewers. Each comment was individually reviewed by the SLOCAT Secretariat and considered in finalising the report.

National focal points: The report benefited from the contributions of voluntary national focal points, or experts from various regions and countries who have been essential to overcome language and information barriers. A public call for participation to provide information on policies and data resulted in several hundred initial registrations. Out of these registrations, 78 national focal points provided inputs through a first survey from 24 January to 3 February 2020; and through a second survey (focused on the country fact sheets) from 6 to 30 August 2020. All national focal points that contributed to the surveys are listed in the Acknowledgements.

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Annex: Methodological Note

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