3.2

Sustainable Mobility Planning and Transport Demand Management

Key findings

Demand trends

- Traffic congestion increased in 57% of cities worldwide between 2018 and 2019, while only 15% of cities recorded reductions in congestion.
- The global average price of petrol rose 17% between 2017 and 2019, while the price of diesel rose 25%; however, fuel prices remained below market value in 53 countries in 2019, contributing to increased demand for motorised travel.
- Average parking prices increased 5% between 2017 and 2019 in cities with the highest parking fees worldwide.
- Teleworking can help reduce transport demand and congestion; however, this potential varies widely, with remote work available to only 13% of workers in developing countries based on a 2020 study.

Emission trends

- Deployment of low-emission zones has helped to greatly reduce emissions of carbon dioxide (CO_2) and nitrogen dioxide and has yielded measurable improvements in road safety and public health.
- Research on road pricing indicates that it has significant potential to reduce motorised travel demand, traffic congestion, and carbon emissions, but examples of implementation remain limited.

Policy measures

- During 2018-2020, cities around the world prioritised low-emission zones among strategies for transport demand management, whereas vehicle restrictions and congestion charging remained unchanged.
- More than two-thirds of sustainable urban mobility plans (SUMPs) were found in European cities in 2018, but SUMPs have expanded greatly in Africa and in Latin America and the Caribbean since then.
- "Complete streets" programmes are contributing to social inclusion and equity through specific sustainability-related parameters.
- Planning concepts that prioritise proximity (such as the "15-minute city") and land-use planning guidance are growing in prominence, supporting increased and more equitable access to economic and social needs in cities around the world.

Impacts of the COVID-19 pandemic

- Responses to the pandemic have encompassed a wide range of measures to enable social distancing, help people avoid unnecessary trips and spread out travel during periods of peak demand.
- COVID-19 caused major disruptions to both urban public transport and commercial real estate in 2020, creating uncertainty for investments in transit-oriented development in the near term.
- Automobile use and sales declined during the pandemic, creating the potential for changing patterns of motorised travel in the medium to long term.

Overview

As transport demand and emissions continue to rise worldwide, countries and cities have responded by using sustainable mobility planning and transport demand management to improve transport planning and to provide enhanced access to mobility options. Sustainable mobility planning is a broad strategy that helps to improve access to mobility while achieving other goals, such as reducing emissions and lowering traffic fatalities. Transport demand management refers to diverse transport and land-use planning tactics that result in more efficient use of transport and spatial resources.[1] Both approaches focus on ensuring access to opportunities, services and goods rather than simply trying to move vehicles.[2]

A number of frameworks exist to help implement these strategies. **Sustainable urban mobility plans** (**SUMPs**), for example are strategic frameworks designed at the local level to improve citizens' overall quality of life by addressing major challenges related to urban transport.[3] **National urban mobility policies and investment programmes** (**NUMPs**) refer to national strategic frameworks to enhance the capabilities of cities to fulfil their mobility needs in a sustainable way.[4]

Other valuable planning approaches include: **transit-oriented development**, which intends to integrate people, activities, buildings and public spaces in designed urban places; **low -and ultra-low emission zones**, which are areas where access for more-polluting vehicles is restricted; and **road pricing**, which refers to variable road tolls intended to reduce peak-period traffic volumes to optimal levels.[5] In this discussion, the term **"vehicle restrictions"** summarises measures put in place to limit the number of vehicles entering a city and/or measures limiting the ownership of private vehicles.

Demand trends

Traffic congestion increased in 57% of cities worldwide between 2018 and 2019, while only 15% of cities recorded reductions in congestion.[6] Worsening traffic congestion is estimated to cost local economies billions of dollars annually.[7] The main drivers of congestion are rapid urbanisation and the growth in car ownership in emerging economies, and the concentration of activities in economic development centres.[8][9]

- The world's top five most congested cities are: **Bengaluru**, India (requiring 71% extra travel time due to traffic); **Manila**, Philippines (71%); **Bogotá**, Colombia (68%); **Mumbai**, India (65%); and **Pune**, India (59%).[10]
- Europe's most congested cities are **Moscow**, Russia Federation (59%); **Istanbul**, Turkey (55%); and **Kiev**, Ukraine (53%).[11]
- The most congested USA cities are **Los Angeles** (42%), **New York** (37%) and **San Francisco** (36%).[12]
- **Cairo**, Egypt is the most congested city in Africa (40% extra travel time) followed by four cities in South Africa (Cape Town, Johannesburg, Pretoria and East London).13 Traffic in South African cities worsened 7% on average from 2018 to 2019.[14]

The global average price of petrol rose 17% between 2016 and 2018, while the price of diesel rose 25%; however, fuel prices remained below market value in 53 countries in 2019, contributing to increased demand for motorised travel.[15] While diesel is still cheaper than petrol globally (USD 1.07 versus USD 1.14 on average in 2018), diesel prices are rising more rapidly, due mainly to growing requirements for improved fuel quality.[16] United Nations Sustainable Development Goal 12 calls for phasing out inefficient fossil fuel subsidies, which can help reduce demand for travel in internal combustion vehicles.[17]

- In 2018, the highest average petrol price was reported in **Hong Kong** (USD 2.09 per litre), and the highest average diesel price was in **Norway** (USD 1.93 per litre).[18]
- The lowest average fuel prices were reported in **Venezuela**, where both petrol and diesel were virtually free of charge.[19]

Average parking prices increased 5% between 2017 and 2019 in cities with the highest parking fees worldwide.[20] A strong increase in parking prices occurred in Asian cities, whereas in North America parking fees remained stable or even fell.[21] The cities with the most expensive parking in 2019 included several cities in Australia as well as New York and London (*see Table 1*).[22]

Teleworking can help reduce transport demand and congestion; however, this potential varies widely, with remote work available to only 13% of workers in developing countries based on a 2020 study.[23] Working from home can be a significant lever for policy makers, although its overall potential for energy savings and climate benefits is uncertain.[24]

- In **Maryland** (USA), if only 5% of regular private car commuters switched to working from home, this would lead to a reduction in traffic congestion on major highways of 32% to 58%.[25]
- Research shows that remote work in **Canada** measurably reduces daily commute times, although morning peak trips are not affected because of school runs.[26]
- In **Germany**, 56% of workers are able to work from home, and in the **USA** the share is 26%, but in developing countries only 13% of workers can do so.[27]
- An estimated 26% to 29% of jobs in **Argentina** can be done remotely, while in **Uruguay** the proportion ranges from 20% to 34%, which could enhance travel reliability and improve air quality and noise levels.[28]

Table 1. Top 10 cities with the most expensive parking, 2017 and 2019

Average cost of parking (USD)

City	2017	2019	Change
Sydney	34.85	36.66	5%
New York	32.97	34.94	6%
Brisbane	26.67	27.53	3%
Melbourne	22.85	26.61	16%
London	20.78	23.19	12%
Chicago	20.8	20.08	-3%
Tokyo	15.89	19.35	22%
Boston	21.56	18.36	-15%
Washington, D.C.	14.85	15.56	5%
Hong Kong	13.62	14.91	9%
Average	**22.48**	**23.71**	**5%**

Note: Based on the average price for two hours of off-street parking, measured in USD using purchasing power parity.

Source: See endnote 22 for this section.

Emission trends

Deployment of low-emission zones (LEZs) has helped to greatly reduce emissions of CO_2 and nitrogen dioxide and has yielded measurable improvements in road safety and public health. Although LEZs have emerged mainly as a measure to tackle poor air quality in urban centres, several studies point to their benefits in reducing CO_2 emissions and improving health and social equity in cities.[29] To maximise their emission reduction potential, LEZs require effective enforcement systems and provision of public infrastructure for active, shared and zero-emission transport modes.[30]

- In the first half of 2019, the ultra-low-emission zone in **London**, UK resulted in an estimated 29% fewer nitrogen dioxide emissions, 31% fewer nitrogen oxide emissions and 4% fewer CO_2 emissions, as well as a 3-9% reduction in traffic and 65% fewer older vehicles in the zone.[31]
- The new LEZ in **Paris**, France aims to reduce nitrogen oxide levels 76-87% by 2024.[32]
- The LEZ in **Madrid**, Spain, first implemented in November 2018, led to a 38% decrease in nitrogen dioxide concentrations and to a 14% decrease in CO_2 emissions within the first month of its launch, making it one of Europe's most effective such policies.[33] The LEZ helps to avoid 3,000 premature deaths annually, and, on one road, the average speed of public buses increased 14%.[34]

Research on road pricing indicates that it has significant potential to reduce motorised travel demand, traffic congestion, and carbon emissions, but examples of implementation remain limited. Road pricing schemes increase the relative cost of private car trips compared to public transport and bike sharing. By reducing private car demand, road pricing also reduces congestion, helping to make public transport and active transport modes safer and more pleasant.[35] Road pricing has the potential to boost reductions in CO_2 emissions by supporting public transport, walking and cycling, traffic management and user subsidies.[36]

- Road pricing investments improve traffic flow and are highly cost effective, not only leading to reduced emissions but also providing a net benefit to society valued at EUR 70 (USD 84) per tonne of CO_2 reduced.[37]
- An analysis combining studies from **Austria**, **Italy**, **New Zealand**, **Singapore**, the **UK** and the **USA** shows potential for road pricing to reduce transport demand up to 20% (7% on average) depending on tolls.[38] The research supports evidence of road pricing contributing to a more than 10% reduction in CO_2.[39]
- A study on the potential impact of road pricing in **Bogotá**, Colombia; **Mexico City**, Mexico; and **Santiago**, Chile identified a 25-29% reduction in vehicle-kilometres travelled, less congestion and revenues of USD 100,000 to USD 600,000 per day (*see Figure 1*).[40]

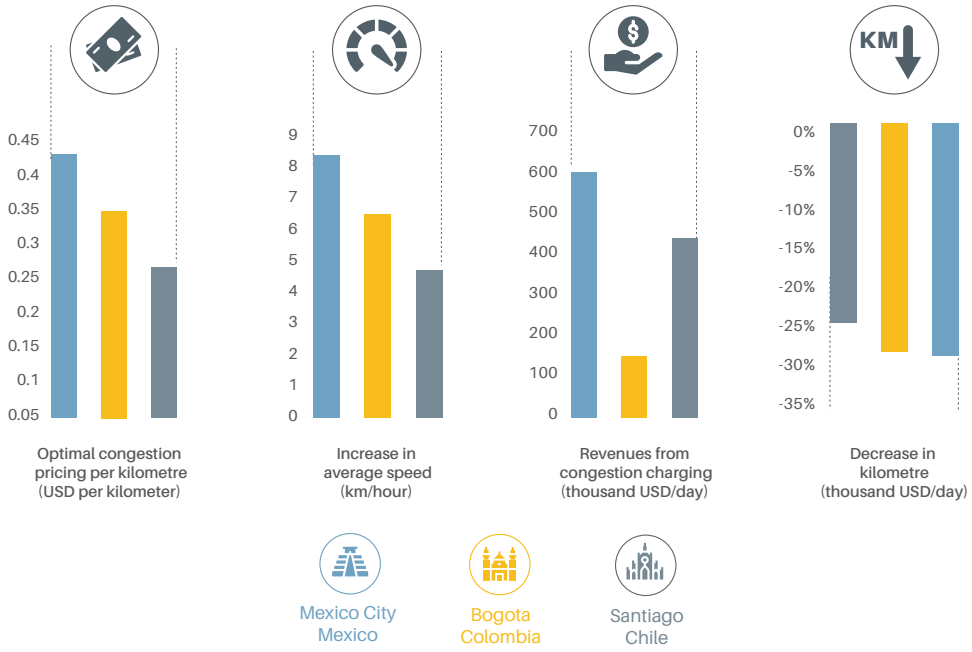
Policy Measures

During 2019 and 2020, cities around the world introduced targets and measures to scale up investments and facilities for public transport, walking and cycling, vehicle sharing services and electrification of bus rapid transit and light rail. Although policy makers have given greater attention to transport demand management in recent years, the implementation of specific policies, such as parking pricing, road pricing and comprehensive smart growth strategies, remains limited globally.

During 2018-2020, cities around the world prioritised LEZs among strategies for transport demand management, whereas vehicle restrictions and congestion charging remained unchanged. LEZs reduce transport-related emissions not only by banning polluting vehicles, but also by promoting walking and cycling and other transport demand management strategies (*see Figure 2*).[41] Demand from policy makers and citizens for improved urban air quality in 2020 in the wake of the COVID-19 pandemic has paved the way for additional LEZs (*see Box 1*).[42]

- Cities that implemented or updated their LEZ regulations in 2020 included: **Ghent**, Belgium; **Aalborg**, **Aarhus**, **Copenhagen**, **Frederiksberg** and **Odense** in Denmark; **Grenoble**, **Greater Lyon** and **Greater Paris** in France; **Aberdeen**, **Bath**, **Birmingham**, **Edinburgh**, **Leeds** and **Southampton** in the UK, and **Jakarta**, Indonesia.[43]
- Between 2018 and 2020, at least nine cities in China including **Beijing**, **Shanghai** and **Shenzhen** introduced LEZs focused on

Figure 1. Potential impacts of congestion charging in three cities in Latin America and the Caribbean



Source: See endnote 40 for this section.

freight vehicles; in these cities, access for deliveries is restricted to certain hours, and permits are prioritised for zero-emission commercial vehicles under 4.5 tonnes.[44]

- A multi-modal e-mobility hub is being implemented in the historical centre of **Quito**, Ecuador, accessible only by clean public transport vehicles, cyclists and pedestrians.[45]
- In Spain, a law drafted in 2020 calls for implementing LEZs in all urban areas with a population of more than 50,000, following the government's declaration of a "climate emergency".[46] **Barcelona**, which includes neighbouring communities in its LEZ, is a national leader and intends to reduce the number of cars in the city by 125,000 within three years and air pollution by 20% within four years.[47]

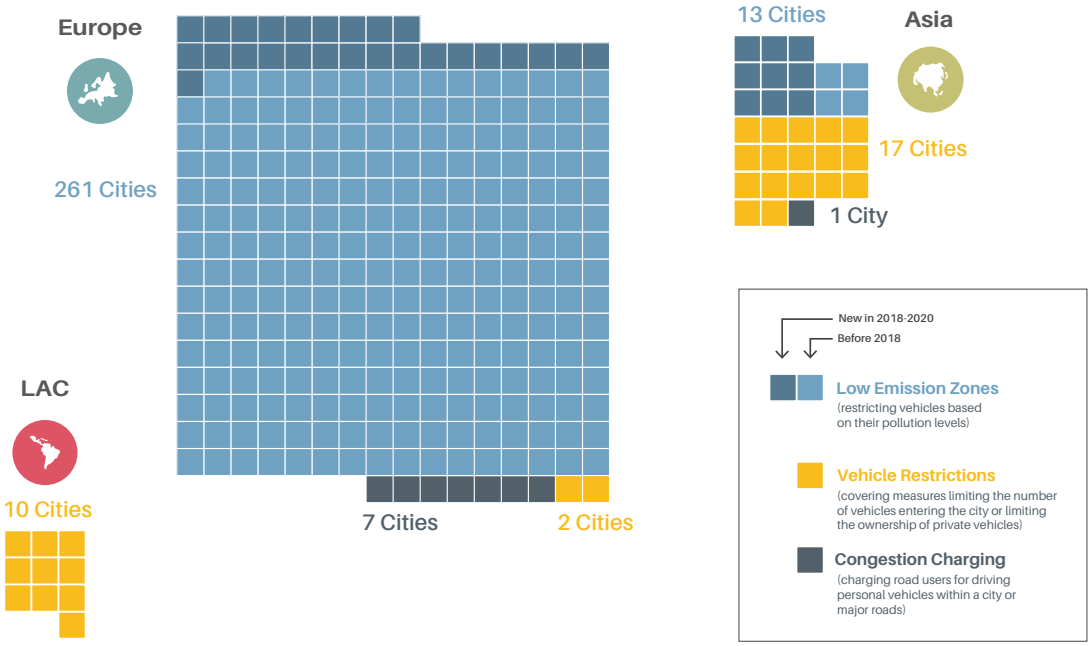
More than two-thirds of SUMPs were found in European cities in 2018, but SUMPs have expanded greatly in Africa and in Latin America and the Caribbean since then.[48] The share of SUMPs in European cities increased from around 63% in 2018 to 68% in 2020 (*see Figure 3*).[49] However, by 2020 many additional SUMPs were established in developing countries, including **Cameroon**, **Ecuador** and **Uganda**.[50]

Recent policy targets in the area of transport demand management have encouraged investments in the development of SUMPs and mobility strategies focused on comprehensive mobility planning and modal share. As SUMPS and national urban mobility plans (NUMPs) continue to reach critical mass in the Global South, there is an opportunity for peer countries to emulate policies that offer key lessons for policy makers.

- In 2020, **Colombia** adopted a National Urban and Regional Transport Policy, a comprehensive framework to support local authorities in activities to reduce congestion, fatalities and harmful emissions from transport using the *Avoid-Shift-Improve* framework.[51]
- **Ethiopia**'s Non-Motorised Transport Strategy, released in 2020, sets modal share targets for 2029 that include: 80% of all motorised trips to be taken on public transport and paratransit (also called "informal transport"), 60% of all trips to be by walking and cycling, and women to constitute 50% of cyclists.[52]
- The 2020 SUMP for the Kisumu area of **Nairobi**, Kenya includes targets for keeping walking and cycling levels above 55% (with half of all cyclists to be female) and having public transport constitute 80% of motorised trips.[53]
- **Mexico City** approved a mobility strategy that includes 100% integration of public transport fares, bicycle infrastructure, efficiency improvements and more.[54]

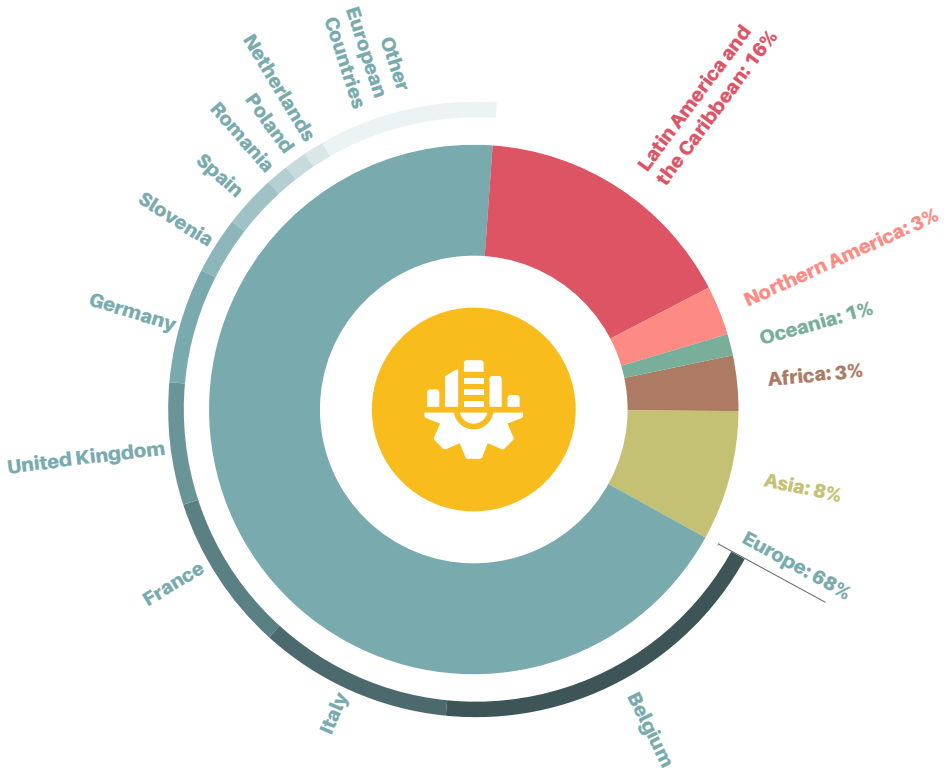
"Complete streets" programmes are contributing to social inclusion and equity through specific sustainability-related parameters. Complete streets are roads designed to safely accommodate diverse activities by people walking, cycling, driving and using public transport.[55] Complete streets can help to increase safe access for all users – particularly caretakers, children, the elderly and people with disabilities – and can be scaled up with minimal cost and time.[56]

Figure 2. Overview of transport demand measures in 2019 and 2020



Source: See endnote 41 for this section.

Figure 3. Sustainable urban mobility plans in Europe versus other regions, 2020

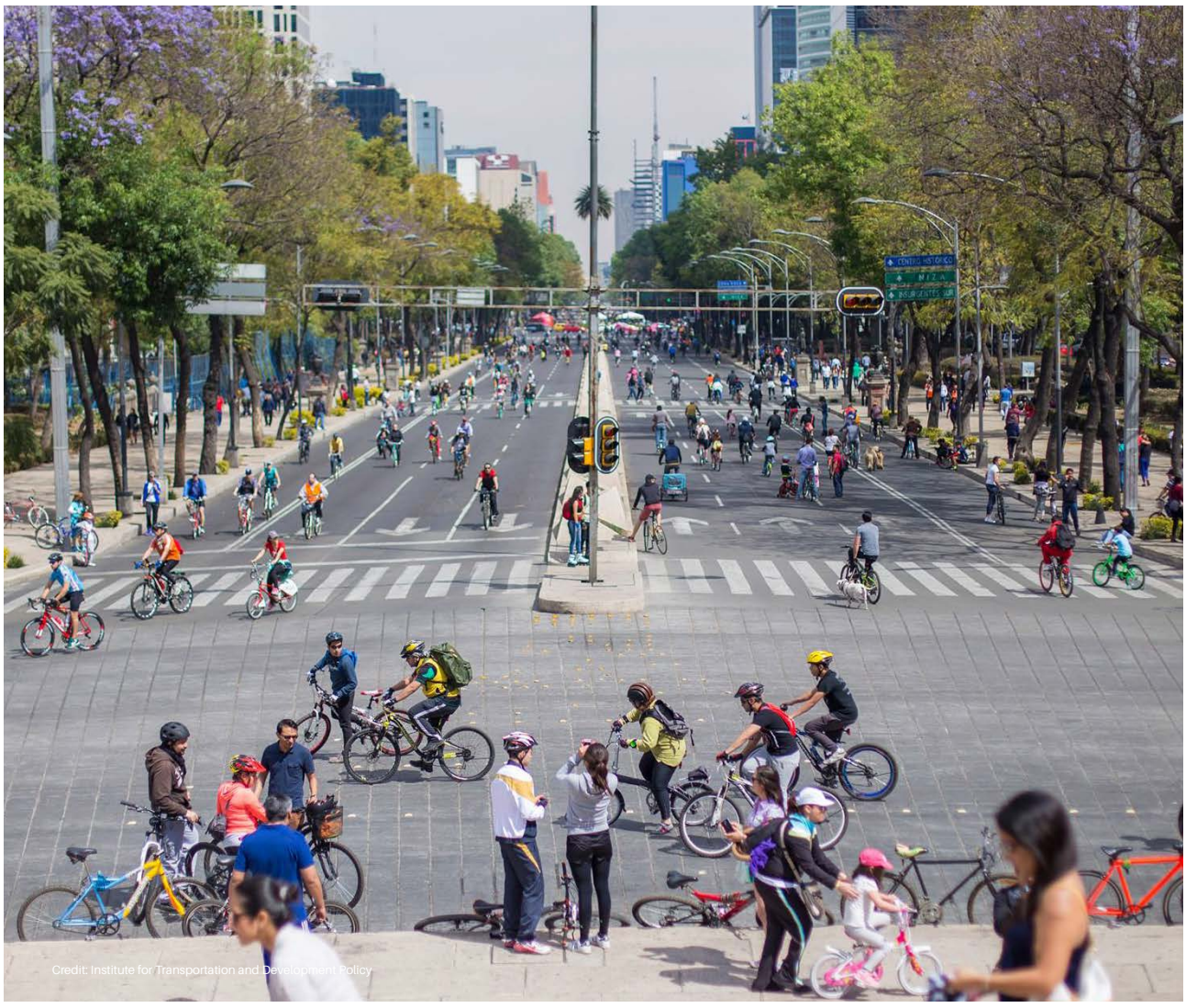


Source: See endnote 49 for this section.

- An ongoing complete streets programme in Brazil covers 19 cities, of which 5 (**Campinas, Juiz de Fora, Porto Alegre, Salvador** and **São Paulo**) had conducted pilot projects and 4 (Curitiba, Fortaleza, Niterói and São José dos Campos) were implementing projects as of the end of 2019, challenging the paradigm of urban design geared to motor vehicles.[57]
- By October 2020, 87 **Canadian** municipalities had adopted at least one form of complete streets policy, typically within transport master plans or other official planning documents.[58]
- Smart Growth America recorded more than 1,600 complete streets policies across 35 **USA** states through 2018, which encourage the implementation of walking, bicycling and public transport facilities with universal accessibility in every street improvement.[59]

Planning concepts that prioritise proximity (such as the "15-minute city") and land-use planning guidance are growing in prominence, supporting increased and more equitable access to economic and social needs in cities around the world. The "15-minute city" is an emerging urban planning paradigm in which all residents are able to meet their essential needs (for shopping, health care, green space, etc.) within a short walk or bicycle ride from their homes.[60]

- Among the cities incorporating variations of this concept into long-term urban and transport planning strategies are **Bogotá,** Colombia; **Glasgow,** Scotland (UK); **Milan,** Italy and **Portland,** Oregon (USA).[61]
- The Ministry for Planning in **Melbourne,** Australia launched a 20-Minute Neighbourhood Pilot Program in January 2018.[62]
- **Ottawa** became one of the first Canadian cities to explicitly include the 15-minute city concept in its Official Plan for 2021.[63]
- **Paris,** France set planning goals in 2020 to transform the city to a 15-minute city.[64]



Credit: Institute for Transportation and Development Policy

Box 1. Impact of the COVID-19 pandemic on sustainable mobility planning and transport demand management

Responses to COVID-19 have encompassed a wide range of measures to enable social distancing to help people avoid unnecessary trips and spread out travel during periods of peak demand. Due to lockdowns and travel restrictions, travel demand was reduced in 2020 while public transport served mainly essential trips. As summarised in Figure 4, responses to manage travel demand showed a significant preference for allocating road space from motorised travel to active transport modes.

- Research in **Australia** suggests a 10-15% improvement in metropolitan transport networks in 2020 as remote work during the pandemic led to reduced road traffic congestion and less crowding on public transport.
- **France** and the **Netherlands** encouraged people to spread out their travel to avoid peak hours, and in Montevideo, **Uruguay** a time-extended ticket was launched to allow people to wait for less-crowded services.
- Cities such as **Rio de Janeiro**, Brazil; **Dublin**, Ireland; **Lagos**, Nigeria; **Lima**, Peru; and **Madrid**, Spain limited the seating in public transport to avoid crowding, while some other cities, such as **Dubai**, United Arab Emirates, increased frequency.[65]
- Demand from policy makers and citizens for improved urban air quality in the wake of the pandemic has strengthened calls for LEZs, with **London** poised to expand its ultra-low-emission zone in October 2021.

COVID-19 caused major disruptions to both urban public transport and commercial real estate in 2020, creating uncertainty for investments in transit-oriented development in the near term. Ridership on public transport dropped sharply in many urban areas, and commercial real estate values fell 29% globally in the first half of 2020. This has led to uncertainty about the long-term effects of the pandemic in the transport sector.

USA cities including **Akron**, **Detroit**, **Philadelphia** and **San Jose** have created flexible urban spaces for social activities, with positive ripple effects on local economies (i.e., more visitors and higher revenue).

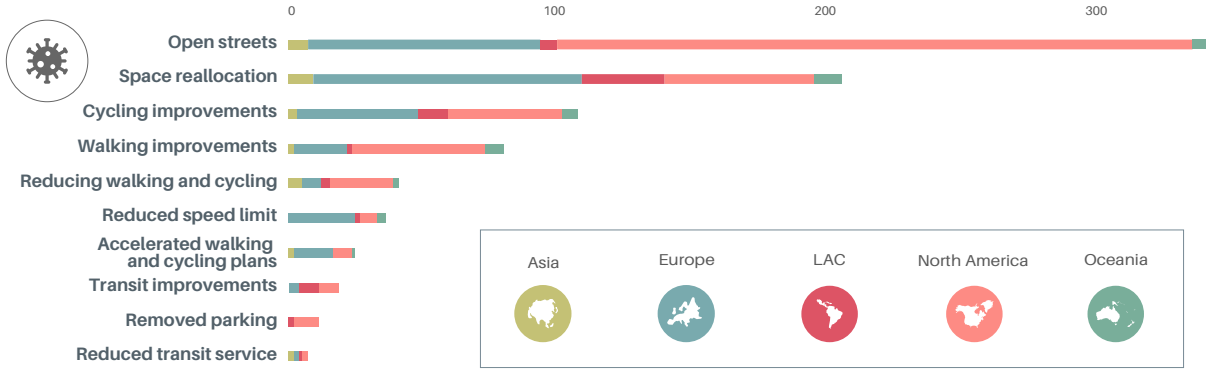
- **Calgary**, Canada redistributed public space for social distancing through "pop-up patios" as one element of the city's pandemic response.
- A **USA** study found that the increase in remote work and the shrinking of office space could boost interest in residential and commercial real estate in smaller cities.
- Market players in the transit-oriented development space expressed confidence that projects would result in few changes to planning processes, regardless of the evolution of the pandemic and lockdowns.

Automobile use and sales declined during the pandemic, creating the potential for changing patterns of motorised travel in the medium to long term. Global sales of new vehicles dropped to 77 million in 2020, down 14.5% from 2019; overall, new passenger car sales fell by 10 million, and commercial vehicle sales by 2.3 million.

- Congestion decreased in 93% of cities worldwide (and increased in just 3% of cities) between 2019 and 2020.
- **Peru** adopted a nationwide provision to limit the use of private cars during the state of emergency, making public transport and authorised taxis the only modes available for long-distance travelling.
- Other countries also imposed bans on driving to control the spread of the virus, although **Georgia** created exemptions for freight and delivery vehicles.
- In **Europe** and the **USA**, new vehicle sales are not expected to return to pre-pandemic levels before 2023. In contrast, **China** is expected to reach 30 million new vehicles sold by 2025.

Source: See endnote 42 for this section.

Figure 4. Responses to manage travel demand during the COVID-19 pandemic, by region, 2020



Initiatives supporting sustainable mobility planning and transport demand management

- **C40's TOD (Transit-Oriented Development) Network** supports cities' efforts to deliver compact, walkable, mixed-use communities centred around high-quality public transport. Participating cities are actively sharing knowledge in four priority areas: financing, social equity, public engagement and active mobility.[66]
- **CIVITAS, Eltis** and other actors released their *SUMP Guidelines 2.0* in 2019 after a one-year consultation process, updating the original guidelines from 2013.[67] CIVITAS is a network for cities dedicated to cleaner and better transport, and Eltis is Europe's main urban mobility observatory, facilitating the exchange of information, knowledge and experience on sustainable urban mobility.
- The **Global Designing Cities Initiative (CGCI)** is a programme of the National Association of City Transportation Officials supporting city practitioners on mobility projects in major North American cities. CGCI focuses on empowering local officials and communities to become change makers. Its *Global Street Design Guide* offers technical details about complete streets design and supports practitioners worldwide in redefining the role of streets.[68]
- The **Institute for Transportation and Development Policy (ITDP)**, in its *TOD Standard 3.0* of June 2017, outlines eight core principles of urban design and spatial planning, each supported by specific performance objectives and easily measurable indicators or metrics[69] In 2018, ITDP released *Pedestrians First: Tools for a Walkable City* to facilitate the understanding and measurement of features that promote walkability in urban environments around the world at multiple levels.[70]
- The **MobiliseYourCity Partnership** assists beneficiary partners in preparing NUMPs and SUMPs. Along with support and consultation at early stages, the partnership provides guidance in budgeting and financial planning, such as the development of financial mechanisms and the initiation of funding to secure implementation.[71]
- The **Transformative Urban Mobility Initiative (TUMI)** aims to change mobility for the benefit of both people and the environment with a view to the future. The organisation supports policy makers in implementing transformative transport pilot projects based on innovation, knowledge and investment with the objective of sharing knowledge on modern mobility concepts among planners.[72]

Key indicators

	2017*	2019/2020*	% change
Policy Indicators			
Congestion charging zones (# of zones worldwide)	17	17	0
Low-emission zones (# of cities worldwide)	251	274	9%
Vehicle restrictions (# of cities worldwide)	28	28	0%
Sustainable urban mobility plans (SUMPs) (# of plans)	1,588	1,686	6%
Market Development Indicators			
Diesel fuel prices (average US cents/litre)	87.2 (2016)	105.6 (2018)	21%
Super petrol fuel prices (average US cents/litre)	97.1 (2016)	113.3 (2018)	17%

(*) Data are for the indicated year unless noted otherwise.

Source: See endnote 73 for this section.

In Practice: Additional Policy Measures

Policy targets set

General targets for comprehensive mobility planning

Malaysia introduced a National Transport Policy (2019-2030) that includes actions such as prioritising public transport, accelerating low carbon initiatives and enforcing compliance with international environmental standards.[74]

Mexico City, Mexico introduced a 2019-2020 Mobility Strategy focused on integration measures (such as a uniform fare across all public transport), cycling infrastructure and improving vehicle efficiency.[75]

Modal share targets

In 2018, **San Francisco**, USA set a target for 58% of travel to occur via sustainable transport modes (cycling and public transport) by 2019 and 80% by 2030 (*see Figure 5*).[76] The city has implemented wide-ranging transport demand management measures (such as mixed-use projects, parking management, active transport and delivery optimisations) in an effort to shift to more sustainable options and to outweigh the influence of increasingly popular ride-hailing services.[77]

Zambia launched a Non-Motorised Strategy in April 2019 that has similar targets and implementation time frames as the 2020 SUMP in **Kisumu**, Kenya.[78]

Policy measures adopted

National urban mobility plans (NUMPs)

In 2020, the government of **Nepal** approved the #AirQuality Management Action Plan of Kathmandu Valley, aiming to develop integrated bus transport systems.[79]

Singapore released in 2019 its Land Transport Master Plan 2040, while maintaining its cap on the growth of commercial vehicles and a zero-growth policy for other types of cars.[80]

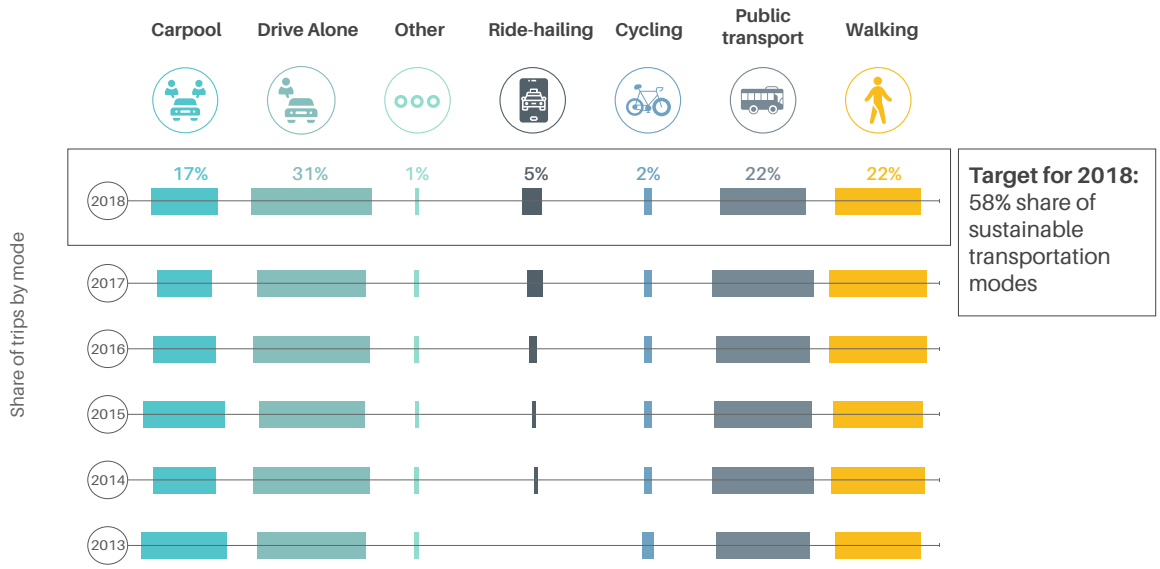
South Africa launched a Green Transport Strategy in 2018 that fosters alternative fuels and efficient-technology vehicles, new fuel economy standards, a modal shift to rail and public transport, biogas and e-charging stations, a review of the levy on CO_2 emissions and limits on the circulation of trucks in urban hubs.[81]

Turkey adopted legislation in 2019 aimed at improving energy efficiency in the transport sector by incentivising alternative fuels, improving transport infrastructure and reducing vehicle use in city centres.[82]

Sustainable mobility plans at the local level supported by national and regional policies

The **EU**, through its Sustainable and Smart Mobility Strategy towards zero-pollution transport, encourages city governments in EU Member States to put in place their own SUMPs by 2030.[83]

Figure 5. Transport in San Francisco by modal share, 2013-2018



Source: See endnote 76 for this section.

Cameroon, with the support of MobiliseYourCity, advanced its NUMP, which is helping to guide the urban mobility plans in Doula and Yaoundé.[84]

Estonia was preparing a new national transport plan for the 2021-2030 time frame, and SUMP processes were under way in the cities of Kohtla-Järve/Jõhvi, Narva, Pärnu, Tallinn and Tartu.[85]

In **Italy**, an estimated EUR 58 million (USD 70 million) has been dedicated to developing SUMPs and related projects since 2019.[86] The country also launched its Sustainable Urban Mobility Incentive Program, providing EUR 15 million (USD 18 million) to develop cycling infrastructure, shared mobility and mobility management activities to municipalities with more than 50,000 inhabitants.[87] By October 2020, **Italy** had 44 approved SUMPs, 40 adopted SUMPs and 96 SUMPs in development.[88]

Additional cities that advanced or completed sustainable mobility plans in 2019 and 2020 included **Feira de Santana**, Brazil; **Doula** and **Yaoundé**, Cameroon; **San José's four districts** in Costa Rica; **Ambato** and **Cuenca**, Ecuador; **Madeira**, Portugal; **Belgrade**, **Šabac**, **Pirot** and **Valjevo** in Serbia; **Greater Kampala**, Uganda; **Antofagasta**, Chile; and the western Balkan capitals of **Tirana**, Albania; **Sarajevo**, Bosnia and Herzegovina; and **Podgorica**, Montenegro.[89]

Transit-oriented development

The presence of public transit makes it possible to develop urban areas around this infrastructure, guaranteeing residents access to a variety of transport options. Bogotá, **Colombia** included transit-oriented development principles in the planning of its first metro line and gave the new managing agency a mandate to advance land value capture mechanisms around its stations.[90]

When **Quito**, Ecuador built its first metro line in 2018, it put in place a regulation to encourage real estate development around mass transport.[91]

In conjunction with the construction of its new underground light rail line, **Guadalajara**, Mexico advanced an ambitious urban renovation project, the Paseo del Alcalde, that features more dense, diverse and well-connected urban development as part of a low-emission development programme.[92]

Nairobi, Kenya announced plans in 2019 to build a multi-modal urban development project focused on expanding rail infrastructure, to take place over 20 years at an estimated cost of KES 29.7 billion (USD 257 million).[93]

Speed reductions

The **Netherlands** lowered the driving speed on highways to 100 kilometres per hour in March 2020 to reduce greenhouse gas emissions from vehicles and to free up the emission budget for housing construction.[94] In October 2020, the country set a new speed limit for built-up areas at 30 kilometres per hour.[95]

Spain announced that it would reduce its speed limit in cities to 30 kilometres per hour in an effort to halve the number of traffic-related deaths and injuries by 2030.[96]

Congestion charging and road tolls

An electronic toll system was introduced on national highways in **India** in December 2019.[97]

New York City, USA approved congestion charging in 2019 after several years of discussion in the state legislature.[98] A surcharge is already in place for on-hire vehicles and licensed taxis, but full implementation has been delayed and is expected by 2022.[99] The collected funds will support the Metropolitan Transportation Authority's capital programme.

Proposals for congestion charging exist in **São Paulo**, Brazil; **Beijing**, China; and **San Francisco**, USA, but final decisions are pending before implementation can occur.[100]

Parking management

In 2017, **Mexico City** became the first large city worldwide to eliminate parking minimums (regulations requiring a certain number of parking spaces per building), and Edmonton, **Canada** also decided to eliminate parking minimums in 2020.[101]

In 2019, **Amsterdam**, the Netherlands began progressively removing 10,000 parking spaces within the city.[102]

Warsaw, Poland has tightened parking regulations by implementing paid zones for on-street parking and increasing both parking fees and fines.[103]

Off-peak deliveries

Many major metropolitan areas support off-hour deliveries – freight deliveries made outside of regular business hours – with the goal of reducing the pollution and congestion associated with daytime deliveries. Recent examples include **Brussels**, Belgium; **São Paulo**, Brazil; **Bogotá**, Colombia; **London**, UK; and **New York City**, USA.[104]

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.

Endnotes

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