ADB

Technical Assistance Consultant's Report

Project Number: 55119-001
September 2023
TA-6763 REG: Accelerating Innovation in Transport - Asian Transport Outlook: Phase 3

Turning the Tide: Transport and SDGs in Asia

Prepared by Sudhir Gota, Cornie Huizenga, Mel Eden, Adwait Limaye, and Alvin Mejia
CESG

Asian Development Bank

ABBREVIATIONS

ADB	-	Asian Development Bank
AIIB	-	Asian Infrastructure Investment Bank
ATO	-	Asian Transport Outlook
BC	-	Black carbon
BRTS	-	Bus Rapid Transit System
CO2	-	Carbon dioxide
COP	-	Conference of Parties
COVID-19	-	Coronavirus disease 2019
EV	-	Electric vehicle
GDP	-	Gross domestic product
GHG	-	Greenhouse gas
ICT	-	Information and communication technology
IEA	-	International Energy Agency
ILO	-	International Labour Organization
IRAP	-	International Road Assessment Programme
ITF	-	International Transport Forum
NOx	-	Nitrogen oxides
OECD	-	Organisation for Economic Co-operation and Development
PM	-	Particulate matter
PPP	-	Public-private partnership
SDG	-	Sustainable Development Goals
SOx	-	Sulphur oxides
USD	-	United States Dollars
UN	-	United Nations
WHO	-	World Health Organisation

NOTE

(i) In this report, "$" refers to US dollars, unless otherwise stated.

CONTENTS

I. EXECUTIVE SUMMARY

The transport sector does not have its own SDG, but it is considered a critical enabler of sustainable development and integrated in various forms across multiple SDGs. Only targets 3.6, 9.1, and 11.2 directly address the transport sector. However, at least 9 of the 17 SDGs include one or more targets that significantly influence the transport sector. Transport is at the heart of the SDG discussions for at least three reasons. Firstly – transport generates compounding effects and enables social and economic development. It is both an outcome and contributor to achieving sustainable development. Secondly, outside factors greatly influence the transport sector; thirdly, transport is fast-growing.

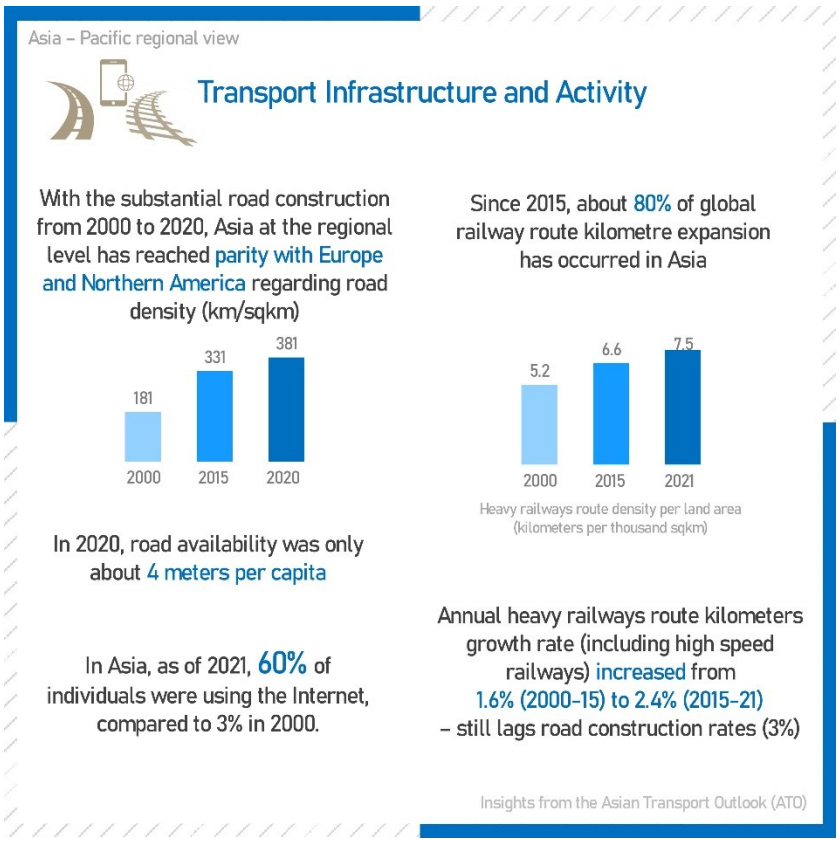
This second Asia-specific updated status report on the implementation of transport-related SDG targets brings together 30 indicators from official data sources (country statistics, United Nations, World Bank, International Energy Agency, etc.) and non-official data sources (reputed research, non-government organizations, and think tanks) for Asia and the Pacific region to review the implementation of transport-related SDG targets. The report provides a collective assessment of 51 economies of Asia and Pacific economies with other regions to provide further context for the trends observed in Asia. In addition, in several cases where relevant and feasible, the performance of the transport sector is compared vis-à-vis other sectors in Asia and Pacific economies. Where information is available, the report includes data from 2000 to 2021 or 2022, making it possible to start capturing the impact of the COVID-19 pandemic on the transport sector – and its subsequent revival. The report makes extensive use of data contained in the Asian Transport Outlook (ATO) initiative by the Asian Development Bank (ADB) and Asia Infrastructure Investment Bank (AIIB), which has built an extensive knowledge base on Transport in Asia and the Pacific.

A multi-dimensional assessment of Asia's transport sector contribution to SDGs across regions, sectors, and time provides a pessimistic outlook for achieving the relevant SDG targets by 2030. However, the silver lining is that since 2015, Asian countries have narrowed the SDG gap and not widened it. Overall, we find:

i. *Compared with the rest of the world combined, the progress in transport SDGs is marginally better in Asia and Pacific economies.*
ii. *Within Asia, the region's transport sector has outperformed other sectors combined.*
iii. *Overall, the good news is that the Asia and Pacific countries have narrowed the SDG gap and not widened it. The bad news is that the rate of progress is still too slow, and the existing gap is too broad. Surprisingly, the transport sector has only made minimal progress across goals and targets directly identified in the SDG process, i.e., road safety, infrastructure, and rural road and urban transit access, i.e., SDG 9.1, SDG 11.2 and SDG 3.6.*

SDG Status Assessment

SDG Goals/Targets		Transport Sector Objective	Assessment
Direct	SDG 3.6	Road Safety	
	SDG 9.1	Equitable Access	
	SDG11.2	Urban Public Transport	
Indirect	SDG 3.9, SDG 11.6	Air Pollution	
	SDG 7.2	Renewable Energy	
	SDG 7.3	Energy Efficiency	
	SDG 8.1	Economic Growth	
	SDG 8.5	Employment	
	SDG 9.c	Information and Communications Technology	
	SDG 1.5, SDG 11.5, SDG 13.1	Climate Resilience	
	SDG 12.c	Fossil-fuel Subsidies	
	SDG 13.a	Climate Finance	
	SDG 13.2, SDG 9.4	Climate Change, Resource-use Efficiency	
	SDG 17.17	PPPs	
Assessment Criteria			
• Good progress when compared across sectors, regions and from a historical perspective			
• Good momentum building on SDG goals. Progress has been made but is insufficient to meet the objectives of SDG goals. Countries need to redouble efforts on these goals.			
• Minimal progress or no progress. Urgent change is required in direction and/or speed of transition.			



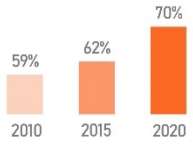
TARGET 9.1

DEVELOP SUSTAINABLE, RESILIENT AND INCLUSIVE INFRASTRUCTURES

9.1.1: Proportion of the rural population who live within 2 km of an all season road

Asia – Pacific regional view

Since the adoption of the SDGs, Asia has made considerable progress in paving roads by improving paved construction rates and maintenance standards

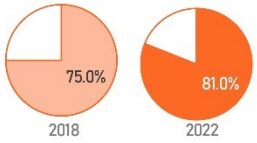


In 2022,

~408 mln

rural population lives more than 2 km from an all-season road

% of Asia and Pacific region's rural population that do have all-season access to the road network increased between 2018 and 2022



Insights from the Asian Transport Outlook (ATO)

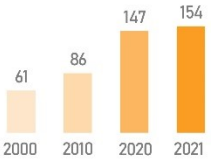
TARGET 11.2

AFFORDABLE AND SUSTAINABLE TRANSPORT SYSTEMS

by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Asia – Pacific regional view

Rapid public transport infrastructure in Asia and the Pacific region has increased faster over time. Number of cities increased from 61 in 2000 to 154 in 2021.

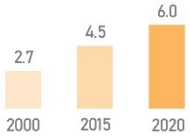


In 2021,

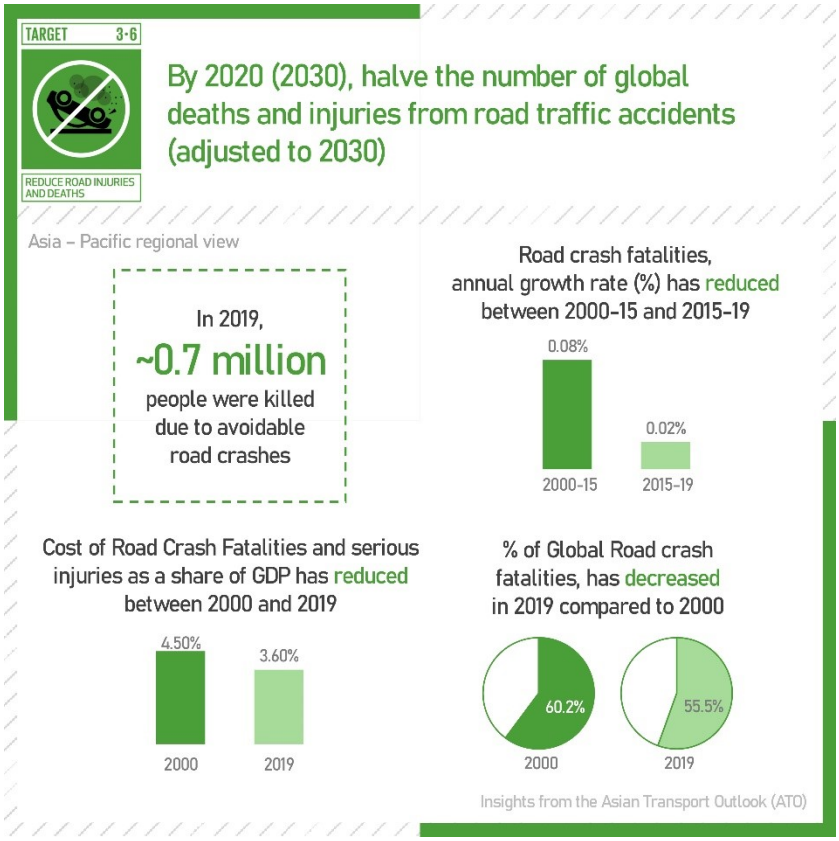
1.32 billion

urban residents lack efficient access to public transport

Urban rapid transit kilometers per million urban population increased from 2.7 in 2000 to 6.0 in 2020.



Insights from the Asian Transport Outlook (ATO)



The analysis of the transport-related SDG targets in Asia revealed an inherent tension between different categories of those targets – especially among economic and environmental dimensions. The world's transport-inaccessible population remains overwhelmingly concentrated in some parts of the world. Currently, most Asian countries, like other developing parts of the world, although catching up, still have comparatively lower transport infrastructure and services, as well as activity levels, than the developed world. Progressing towards attaining the infrastructure-related transport SDG target 9.1 and the associated rural and urban access-related indicators will likely further increase road-based transport activity. Increasing road-based passenger and freight transport activity will make it more challenging to realize several sustainability-related SDG targets related to air pollution, road safety, energy efficiency, and climate change. While transport sector challenges are interrelated, we find significant heterogeneity in transport sector performance along the three sustainability dimensions across sub-regions, urban and rural areas, and modes, resulting in uneven progress.

The significant deficiency in access-related goals and targets indicates that countries and development agencies cannot ignore the development of sustainable transport infrastructure and services. While climate change is increasingly dominating the development discussions, including in the transport sector, the priorities for many of the economies in Asia and the Pacific economies still focus on creating adequate transport infrastructure and services to support and facilitate growth in the economy and society.

II. INTRODUCTION

1. This consultant report was prepared under contract: TA-6763 REG: Accelerating Innovation in Transport - Asian Transport Outlook: Phase 3 (55119-001) with Asian Development Bank as well as Purchase Order No. CW39446 AIIB Support: Asian Transport Outlook Phase 3 for Asian Infrastructure Investment Bank.

2. At the halfway point of the 2030 Agenda for Sustainable Development, the world is still far off track to meet the most sustainable development goals (SDGs) by 2030. A preliminary UN assessment of the roughly 140 SDG-related targets for which data is available shows that only about 12% are on track; nearly half are moderately or severely off track. About 30% have seen no movement or regressed below the 2015 baseline (UN, 2023). Thus, at an economy-wide level, since 2015, instead of bridging the SDG gap, a majority of countries have widened the gap.

3. The transport sector does not have its own SDG, but the industry is considered a critical enabler of sustainable development and integrated in various forms across multiple SDGs. Only targets 3.6, 9.1, and 11.2 directly address the transport sector, transforming transport infrastructure and services. However, at least 9 of the 17 SDGs include one or more targets that significantly influence the transport sector. Transport is at the heart of the SDG discussions for at least three reasons. Firstly – transport generates compounding effects and enables social and economic development. It is both an outcome and contributor to achieving sustainable development. Secondly, outside factors greatly influence the transport sector; thirdly, transport is fast-growing.

4. Since 2015, little has been published on how different sectors perform across various regions in implementing transport-related SDG targets. One exception to this is the report on the "Status of Transport Related SDG Targets in Asia and the Pacific Region, which we are updating here. (ATO, 2022)" The report's first (2021) version consisted of trends from 2000 to 2015 and 2015 to 2019, i.e., before the COVID-19 pandemic. The analysis showed that about 75% of targets related directly or indirectly to the transport sector were off track.

5. This second Asia-specific updated status report on the implementation of transport related SDG targets brings together 30 indicators from official data sources (country statistics, United Nations, World Bank, International Energy Agency, etc.) and non-official data sources (reputed research, non-government organizations, and think tanks) for Asia and the Pacific to review the implementation of transport-related SDG targets. The report compares Asia with other regions to provide further context for the trends observed in Asia. In addition, in several cases where relevant and feasible, the performance of the transport sector is compared vis-à-vis other sectors. Where information is available, the report includes data from 2000 to 2021 or 2022, making it possible to start capturing the impact of the COVID-19 pandemic on the transport sector – and its subsequent revival. The report makes extensive use of data contained in the Asian Transport Outlook (ATO) initiative by the Asian Development Bank (ADB) and Asia Infrastructure Investment Bank (AIIB), which has built an extensive knowledge base on Transport in Asia and the Pacific.

Box 1: The Asian Transport Outlook (ATO)

The ATO (https://asiantransportoutlook.com/) initiative has three main objectives: (i) to support Asian governments in transport policy development and delivery; (ii) to help enable stakeholders to track the implementation of the Sustainable Development Goals, the Paris Agreement, and other relevant international agreements on sustainable development; and (iii) to support development agencies in the planning and delivery of transport sector programs and projects. The ATO is an open data resource consisting of institutionalized transport data and policy information collection, analysis, and documentation. The ATO collects, organizes, and shares data on the transport sector in 51 economies using about 450 indicators. It also documents these economies' institutional frameworks and policies.

The Asian Transport Outlook (ATO) initiative collects, collates, and organizes data from publicly available official, reputable, and peer-reviewed secondary sources, which may contain incomplete or inconsistent data. It is important to note that the ATO does not generate data. Moreover, while the ATO carries out quality control and assurance of whether the data are truthfully reflected in the ATO, the ATO does not make any warranties or representations as to the appropriateness, quality, accuracy, or completeness of the data in the ATO databases, and in the knowledge products that are produced from such. Users are encouraged to scrutinize, verify, interpret, and judge the data before utilizing them.

6. The report is divided into seven themes: (i) transport and the economy, (ii) Infrastructure and transport activity, (iii) urban transport, (iv) transport and energy, (v) climate change, (vi) air pollution and, (vii) road safety. Transport-related SDG targets and indicators are organized under these headings in Table 1. The official transport related SDG indicators are combined with or complemented by several additional ATO indicators to shape the review of the transport-related SDG targets. The scope of analysis, unless otherwise indicated, is the coverage of the ATO, which contains all developing and developed member countries of the ADB in Asia and the Pacific, as well as the Islamic Republic of Iran and the Russian Federation.

Table 1: SDG Targets, Indicators, and ATO Indicators Used to Describe the Status of Transport-Related SDGs[1]

Theme → / SDG Targets ↓	SDG Official Indicators	Transport Indicators Used to Describe Status of Transport-Related SDGs
Transport and the Economy		
• SDG 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least seven percent gross domestic product growth per	• Indicator 8.1.1: Annual growth rate of real GDP per capita • Indicator 8.5.1: Average hourly earnings of employees, by sex, age,	• Gross Value Added by Transport, Storage and Communications • Transport Sector Employment (+ Storage + Communications)

[1] Performance assessment using growth rates depends mainly on the choice of the base year. This assessment compares annual growth rates from 2000 to 2015 and 2015 to 2020/2021/2022. However, it is essential to note that growth rates alone do not depict the entire story. The transport sector may progress better in some indicators because they advance from a very low baseline. Progress may have slowed down in other sectors or indicators as they reach a critical mass. In the assessment, we utilise annual growth rates, absolute increase or decrease and trend analysis.

Theme → / SDG Targets ↓	SDG Official Indicators	Transport Indicators Used to Describe Status of Transport-Related SDGs
annum in the least developed countries • SDG 8.5 By 2030 achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value • SDG 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	occupation, and persons with disabilities • Indicator 8.5.2: Unemployment rate, by sex, age, and persons with disabilities • Indicator 17.17.1: Amount in United States dollars committed to public-private partnerships for infrastructure	• Female Workers in Transport • Gross Value Added per Employee in the Transport Sector (Labour Productivity in Transport) • Monthly Wages in the Transport Sector • Transport Sector Public-Private Partnerships Investments
Infrastructure and Transport Activity		
• SDG 9.1 Develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all • SDG 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the internet in the least developed countries by 2020	• Indicator 9.1.1: Proportion of the rural population who live within two km of an all-season road • Indicator 9.1.2: Passenger and freight volumes, by mode of transport • Indicator 9.c.1: Proportion of population covered by a mobile network, by technology	• Road Kilometers • Heavy Railway Transport Kilometers (including High-Speed Railways) • Passenger and Freight Volumes • Rural Population without Access • Share of Paved Roads • Population Covered by a Mobile Network, by Technology-2G, 3G, 4G • Percentage of Individuals Using the Internet
Urban Transport		
• SDG11.2 By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	• Indicator 11.2.1: Proportion of population that has convenient access to public transport, by sex, age, and persons with disabilities	• Share of the Population with Convenient Access to Public Transport • Rapid Transit Kilometres (Bus Rapid Transit, Metro, Light Rail Transit) • Bus Manufacturing, Trade and Registrations • Urban Transport Mode Share
Transport and Energy		

Theme → / SDG Targets ↓	SDG Official Indicators	Transport Indicators Used to Describe Status of Transport-Related SDGs
• SDG 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix • SDG 7.3 double the global rate of improvement in energy efficiency by 2030 • SDG 12.c - Rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimising the possible adverse impacts on their development in a manner that protects the poor and the affected communities	• Indicator 7.2.1: Renewable energy share in the total final energy consumption • Indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP • Indicator 12.c.1: Amount of fossil-fuel subsidies (production and consumption) per unit of GDP	• Transport Energy Consumption • Transport Energy Intensity • Transport Fossil Fuel Subsidies
Climate Change		
• SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries • SDG 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters • SDG 13.2 Integrate climate change measures into national policies, strategies, and planning	• Indicator 11.5.2: Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters • Indicator 13.2.2: Total greenhouse gas emissions per year • Indicator 13.2.1: Number of countries with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change	• Transport CO2 Emissions • Transport CO2 Intensity (with GDP) • Grid Emission Factor • Expected Annual Damage to Transport Surface Infrastructure • Climate Bonds

Theme → / SDG Targets ↓	SDG Official Indicators	Transport Indicators Used to Describe Status of Transport-Related SDGs
Air Pollution		
• SDG 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination • SDG 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	• Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution • Indicator 11.6.2: Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted)	• Road Transport PM_{10}, NO_x & SO_x Emissions • Deaths due to occupational exposure to diesel engine exhaust
Road Safety		
• SDG 3.6 By 2020 (2030), halve the number of global deaths and injuries from road traffic accidents	• Indicator 3.6.1: Death rate due to road traffic injuries	• Road Crash Fatalities • Cost of Fatalities and Injuries as Share of Gross Domestic Product • Share of Road Infrastructure with 3 Stars or Above

III. THEME 1: TRANSPORT AND THE ECONOMY

7. The transport sector is a crucial component of the economy and significantly impacts employment and economic growth. The transport sector plays an essential economic role by making economic activity possible. Nearly every facet of society relies on the transport sector, providing the physical network and the related services that enable people and freight movement. Yet, transport is also an essential industry and economic sector in its own right. Economy-related SDG targets where transport plays a significant role include:

- SDG 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7% gross domestic product growth per annum in the least developed countries;
- SDG 8.5 By 2030 achieve full and productive employment and decent work for all women and men, including young people and people with disabilities, and equal pay for work of equal value;
- SDG 17.17 Encourage and promote effective public, public-private, and civil society partnerships, building on the experience and resourcing strategies of partnerships.

A. Transport and Economy Indicators

1. Gross Value Added by Transport, Storage and Communications

8. In 2021, the transport, storage, and communications sector contributed $2.9 trillion to the gross domestic product (GDP) in Asia and the Pacific and about $8.3 trillion globally when measured in a value-added approach.

9. Between 2000 and 2015, the gross value added by the transport, storage, and communications sector increased by 6.8% annually. However, after adopting the SDGs, the transportation industry has grown slower over time (i.e., an annual growth of 6%) (Figure 1). The decrease is significant in Latin America, the Caribbean, Sub-Saharan Africa, Northern Africa, and Western Asia. In contrast, since adopting SDGs, the transport industry has grown faster in Europe and Northern America.

10. Within the transport sector, Asia's share in the global transport sector value added increased from 27% in 2000 to 32% in 2015. By 2021, this percentage had expanded to 35%, indicating Asia's comparatively higher transport activity and services growth than other regions.

11. In Asia, the share of the transport, storage, and communication sector in GDP in 2000, 2015 and 2021 was 8.4%, 7.8% and 7.9%, respectively. Thus, there was only a marginal change in the transport, storage, and communication sectors compared to other industries and sectors. In Asia, the “transport, storage, and communication” sector in terms of direct gross value added is comparable to the agriculture, hunting, forestry, and fishing industries (combined) and the construction industry but lower than other sectors such as mining, manufacturing, utilities etc. However, apart from directly impacting the economy, it indirectly contributes to economic development by facilitating the production of goods and services in other sectors and consumption.

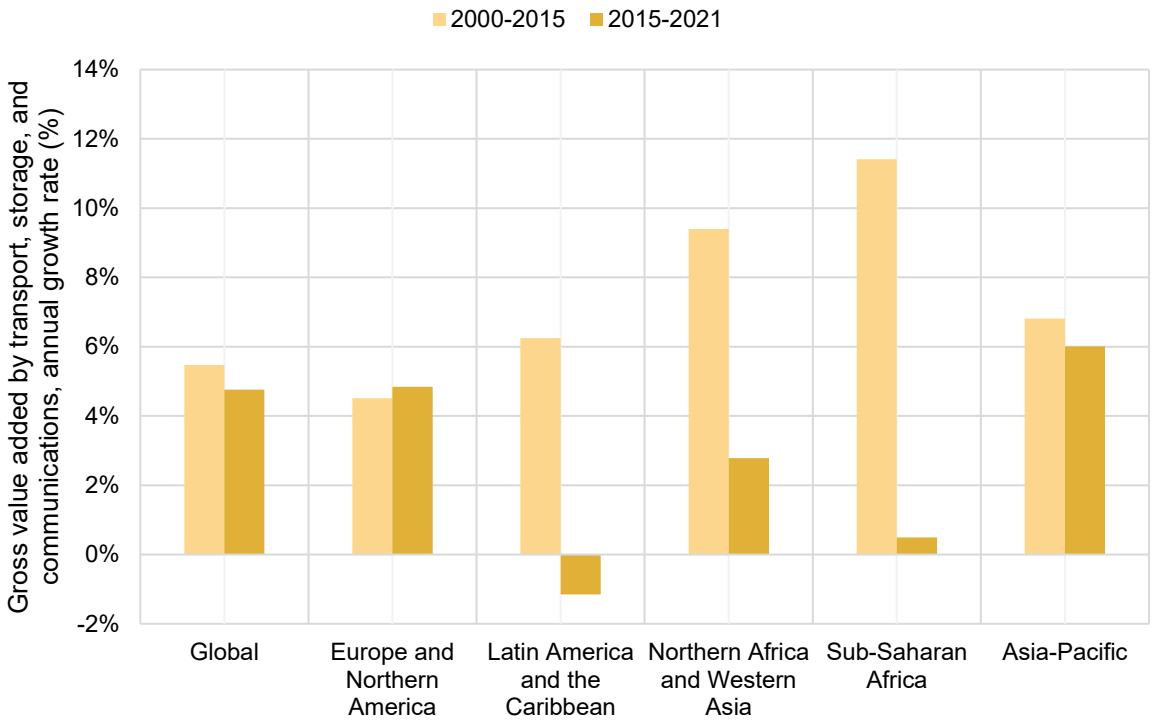


Figure 1: Annual Growth Rate of Gross Value Added by Transport, Storage, and Communications

Source: ATO National Database SEC-TIV-001 (UN Statistics Division 2023). (accessed June 2023).

2. Transport Sector Employment (including Storage and Communications)

12. Employment is one of the primary sources of income for households worldwide. The transport sector (including storage and communications) offers various jobs involving different skill sets. In 2021, in Asia, the transport sector employed more than 165 million people, accounting for about 8% of total employment in the region.

13. Transport-related employment continues to grow globally and in Asia and the Pacific, albeit slower in recent years (Figure 2). These employment estimates do not include informal workers in the transport sector, who have a significant share in employment but are often not counted. Since the SDGs' adoption, transport sector employment growth has declined by about half in the region. The bad news is that the transportation industry jobs in Asia are growing slower than in most regions. However, compared with other sectors, employment in the transport industry in Asia and the Pacific is growing faster than in other sectors across all regions (Figure 3).

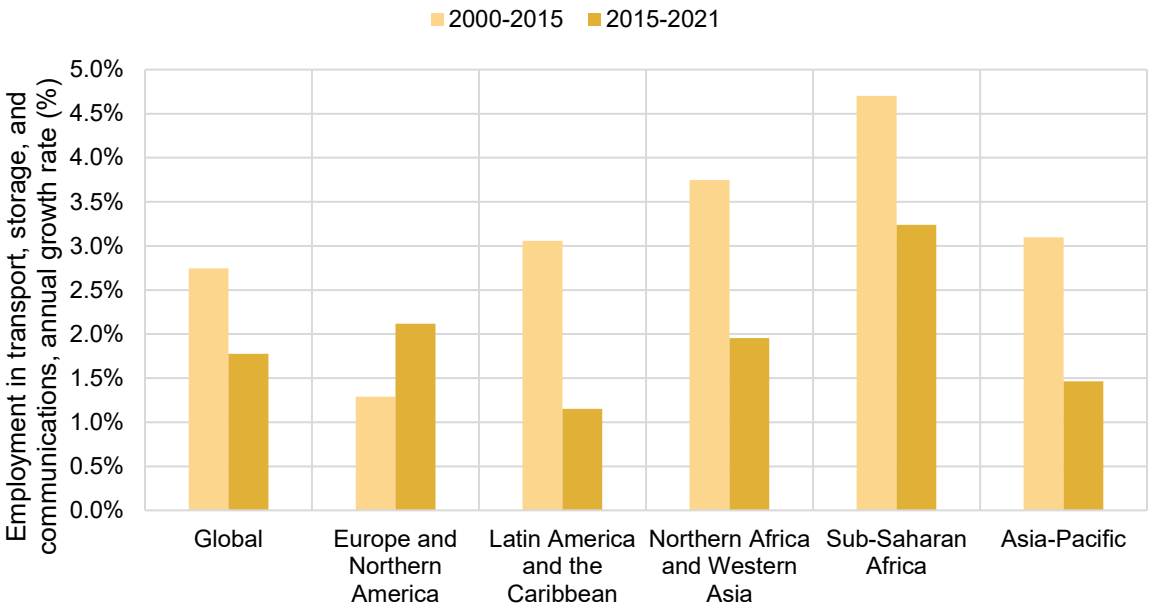


Figure 2: Annual Growth Rate of Employment in Transport, Storage, and Communications

Source: ATO National Database SEC-TRE-002 (ILO 2023). (accessed June 2023).

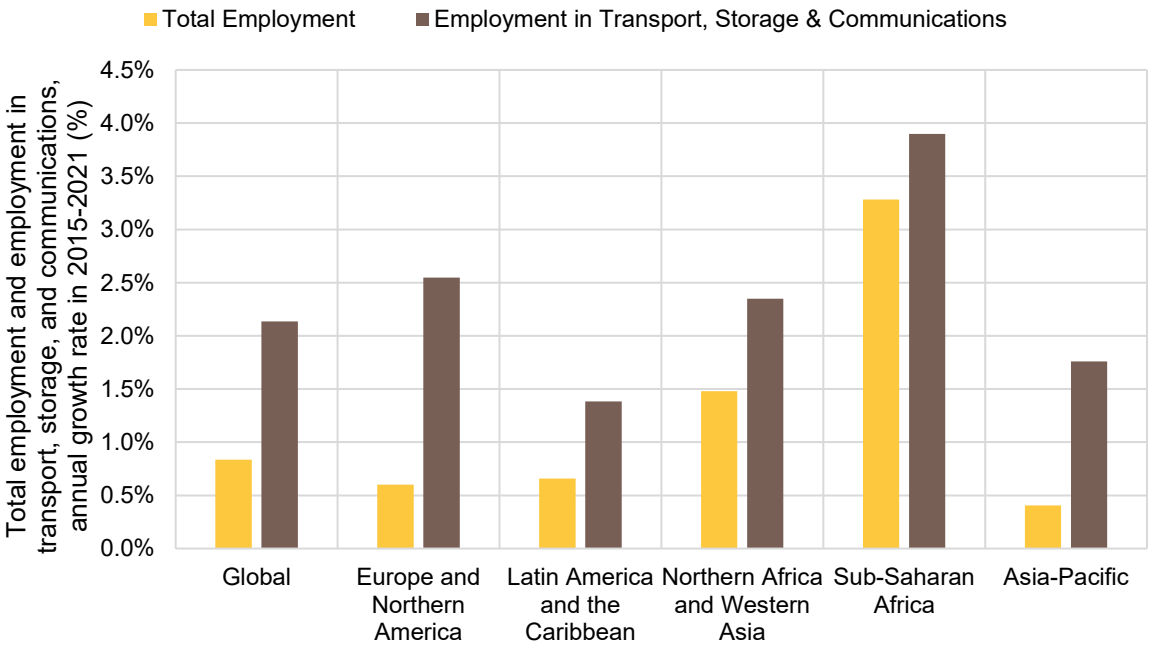


Figure 3: Annual Growth Rate of Total Employment and Employment in Transport, Storage, and Communication after 2015

Source: ATO National Database SEC-TRE-002 (ILO 2023). (accessed June 2023).

3. Female Workers in the Transport Sector

14. Data on the share of women employed in the transport sector remains very scarce. The limited information indicates that transport sector employment is highly gendered and unequal, especially in Asia and the Pacific. Of the total female workers in the formal sectors in Asia, transport constitutes only about 2.2%, indicating a significant gender disparity.

15. In 2021, female transport sector employment in Asia was only 13% of total transport employment, roughly half of the share in Europe and Northern America. Since adopting the SDGs, Globally and across Asia, there has been only a marginal change in transport female employment share (Figure 4).

Figure 4

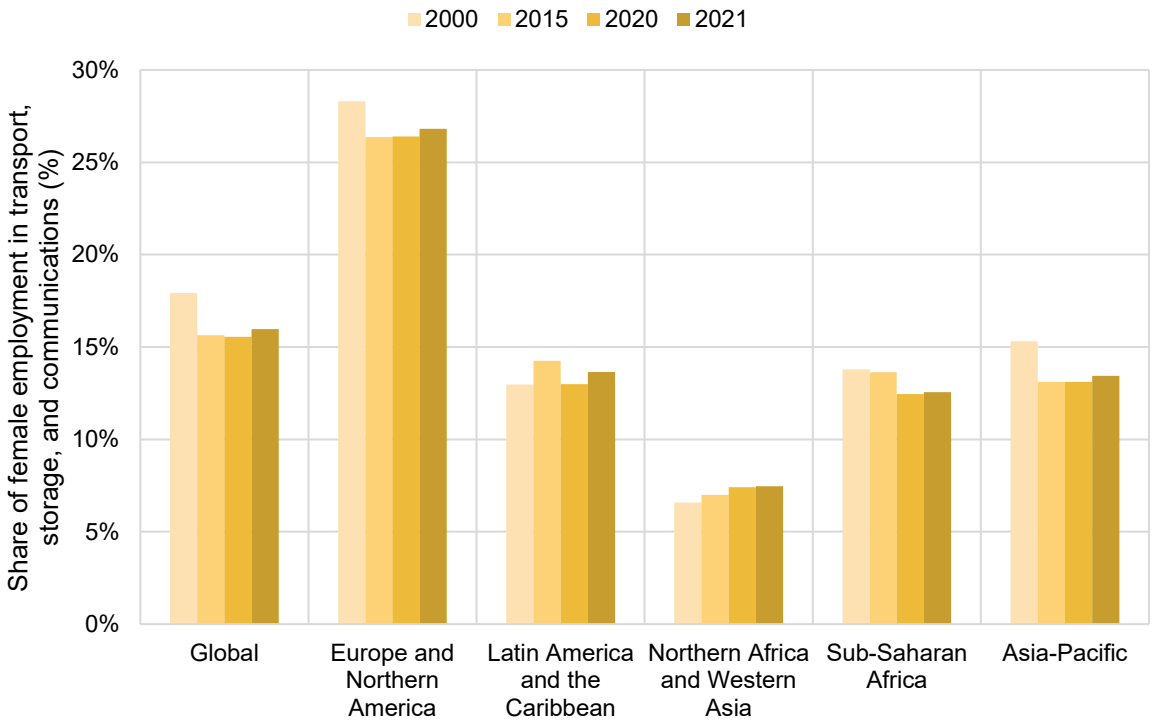


Figure 4: Share of Female Employment in Transport, Storage, and Communications

Source: ATO National Database SEC-TRE-014 (ILO 2023). (accessed June 2023).

16. Since adopting the SDGs, the growth of women's employment in the transport sector has declined marginally in Asia, i.e., 2% from 2000 to 2015 to 1.9% from 2015 to 2021. In contrast, the growth of women's employment in the transport sector in Europe and Northern America tripled in the same period (Figure 5).

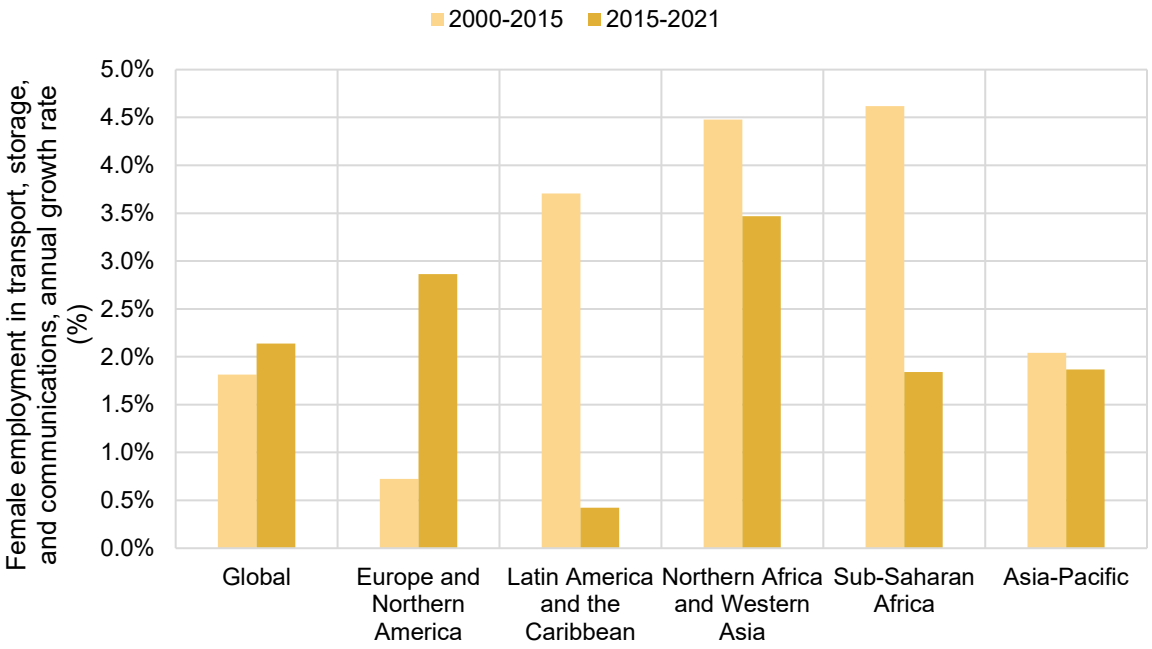


Figure 5: Annual Growth Rate of Female Employment in Transport, Storage, and Communications

Source: ATO National Database SEC-TRE-014 (ILO 2023). (accessed June 2023).

4. Gross Value Added per Employee in the Transport Sector (Labor Productivity in Transport)

17. This indicator measures labor productivity output per unit of labor input in the transport sector. In our assessment of productivity growth, the gross value added by the transport sector per employee is considered a proxy. In 2021, the average gross value added per employee in Asia's transport, storage, and communications sector was about $24,700, roughly four times lower than in Europe and Northern America. Since adopting the SDGs, transport sector "productivity" has improved in Asia and the Pacific, with an annual growth rate of 4.5%, from 3.6% during 2000–2015. In comparison, the transport sector "productivity" in Latin America, the Caribbean, and Sub-Saharan Africa decreased (Figure 6).

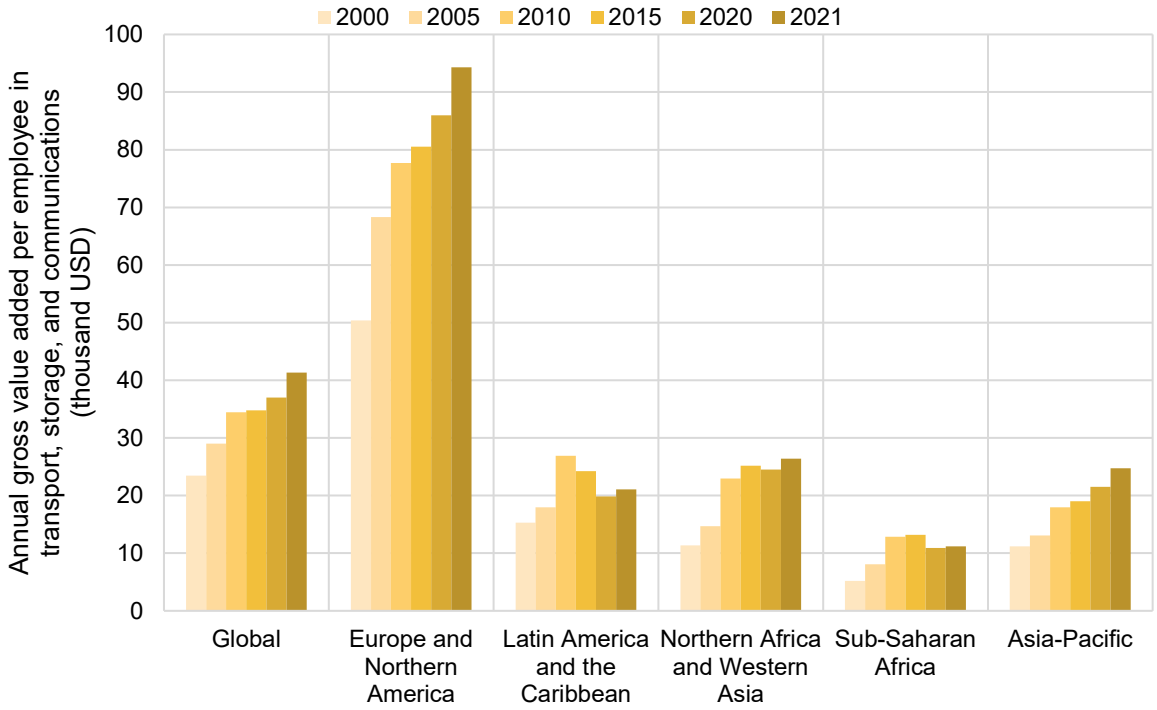


Figure 6. Annual Gross Value Added per Employee in Transport, Storage, and Communications

Source: ATO National Database SEC-TIV-001, SEC-TRE-002 (UN Statistics Division 2023, ILO 2023). (accessed June 2023).

18. However, the productivity improvement in the transport sector in 2015 - 2021 lags behind progress in other sectors (4.5% in transport compared to 5.3% in other sectors).

5. Monthly Wages in the Transport Sector (+ storage)

19. In 2021, in Asia, the monthly wages in the transport and storage sector were roughly half the global average and five times lower than in Europe and Northern America. Moreover, since 2015, wages have only marginally increased in Asia. In 2015 and 2021, the average salaries in the transport and storage sector in Asia and the Pacific region were about USD 880 and 910, respectively. By 2021, 83% of the economies in Asia have wages still below the global average. In contrast, transport sector wages have increased significantly in Europe and Northern America (USD 3,260 to 3,500) (Figure 7).

20. While female participation in the transport industry is low in Asia, there is almost no wage disparity. The wage disparity in 2015 was about USD 100. However, by 2021, it was only USD 36. In fact, in 34% of Asian economies, women are paid marginally more than men in the transport and storage industry.

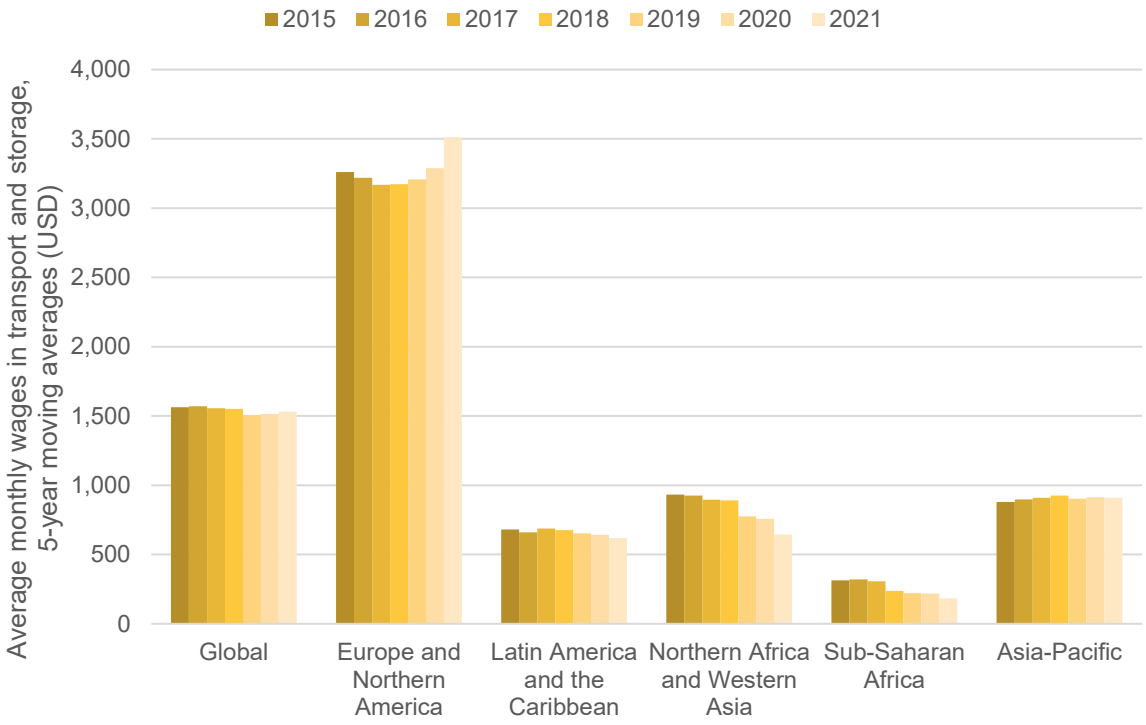


Figure 7: Average Monthly Wages in Transport and Storage

Source: ATO National Database SEC-SEG-017 (ILO 2023). (accessed June 2023).

6. Transport Sector Public-Private Partnerships Investments

21. Public-private partnerships (PPPs) are a critical enabling instrument for increasing private sector participation in transport infrastructure investment, delivery, and management. The transport sector in Asia is a consistent leader in PPP projects and investments. Between 2000 and 2022, close to 50% of global PPPs in the transport sector were in Asia (Figure 8). Further within Asia, since 2015, 57% of all PPP projects have been in the transport sector.

22. Before the SDGs, i.e., from 2000 to 2015, the transport sector in Asia attracted an average of about 12 billion USD worth of annual investments. Since 2015, the transport sector in Asia has been attracting about 27 billion USD in yearly average investment.

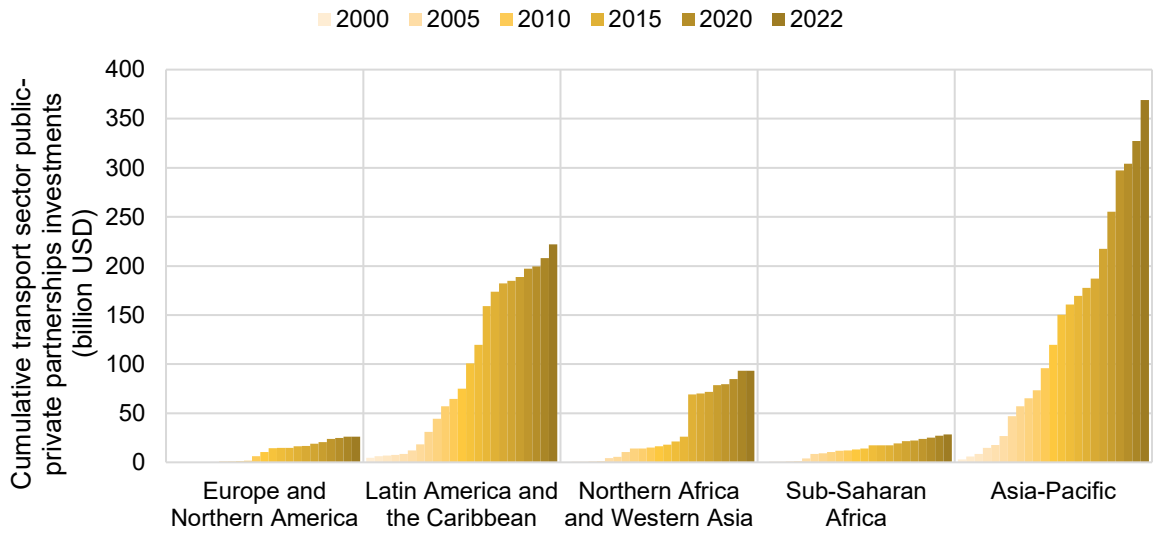


Figure 8: Transport Sector Public-Private Partnerships Investments

Source: ATO National Database SEC-TIV-013 (World Bank 2023). (accessed June 2023).

23. Over the past two decades, 62% of total PPP transport project investments in Asia have been in road projects, 19% in railways, 10% in Ports, and 9% in Airports (Figure 9). Since 2015, PPP investment growth in Asia in the port sector has been the least, while airports and roads have seen significant investments increase.

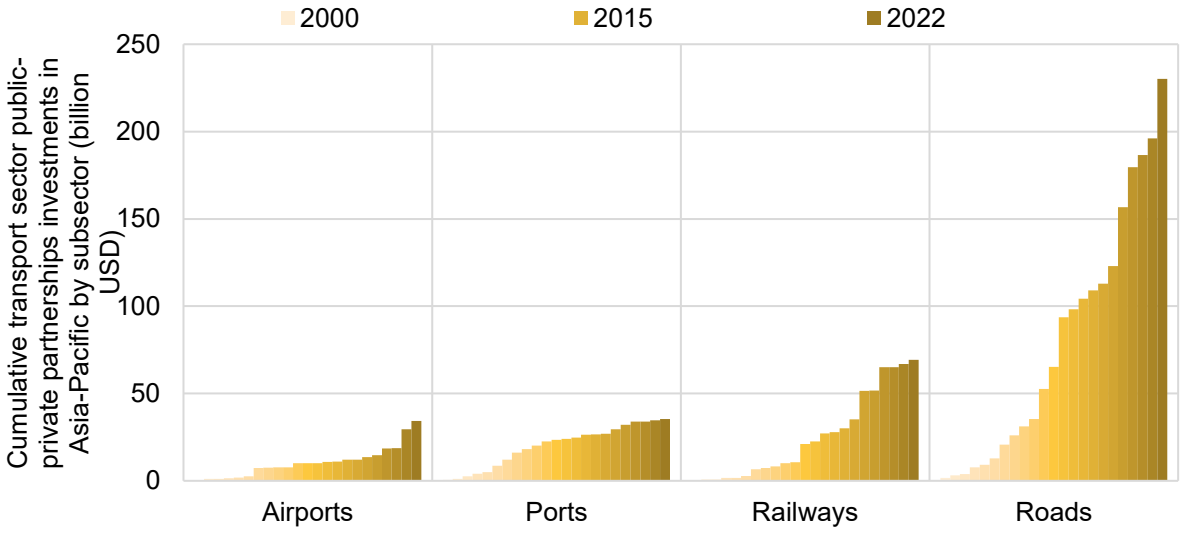


Figure 9. Transport Sector Public-Private Partnerships Investments in Asia-Pacific by Subsector

Source: ATO National Database SEC-TIV-013 (World Bank 2023). (accessed June 2023).

IV. THEME 2: TRANSPORT INFRASTRUCTURE AND ACTIVITY

24. Transport infrastructure and its use is a crucial enabler of economic and social development and is at the heart of efforts to meet the transport-related SDG targets. Thus, the 2030 Sustainable Development Agenda prioritizes infrastructure development. For the transport sector, this includes infrastructure for the movement of people and goods. Previous assessments of the status of transport infrastructure indicated that access to essential transport infrastructure and services remains a concern in many Asian countries (ATO(b), 2022).

25. The 2030 Sustainable Development Agenda considers passenger and freight volumes moved by the member states and regions to be a proxy of robust infrastructure development and economic growth. Digital infrastructure is essential, as it can partially replace physical travel.

26. Related SDG targets include:

- SDG 9.1 Develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
- SDG 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the internet in the least developed countries by 2020

27. Transport infrastructure and activity, especially in the road sector, is central to the tension between different SDG targets – especially among developmental (economic and social) and environmental dimensions. Road construction and subsequent mobility enhance urban and rural access, connectivity, and mobility, enabling economic and social development and reducing poverty. However, road transport demand is also associated with growing negative externalities of road crashes, air pollution, and climate change.

B. Transport Infrastructure Indicators

7. Road Transport Infrastructure

28. Across global regions, road infrastructure is disproportionately distributed, with the lowest access in low and lower-middle-income countries and regions. For example, Asia and the Pacific region, constituting about 58% and 47% of the global population and GDP, have access to only about 31% of global road infrastructure.

29. Road networks can be an economic and social development engine when designed effectively. Globally, the road infrastructure is the backbone of transport infrastructure, with most passenger transport and freight transport moved by road, and the role of road transport continues to grow.

30. The trends (In our analysis, due to a lack of data, we consider road kilometers and not lane kilometers, which could have been a better indicator of understanding the road infrastructure gap.) indicate that, with rising income levels and growing motorization, Asian economies continue to build roads faster over time. Between 2010 and 2015, 60% of the global increase in road kilometers occurred in Asia. Notwithstanding a slowdown in growth rates between 2015 and 2020 (Figure 10), Asia and the Pacific accounted for 87% of the worldwide rise in road kilometers.

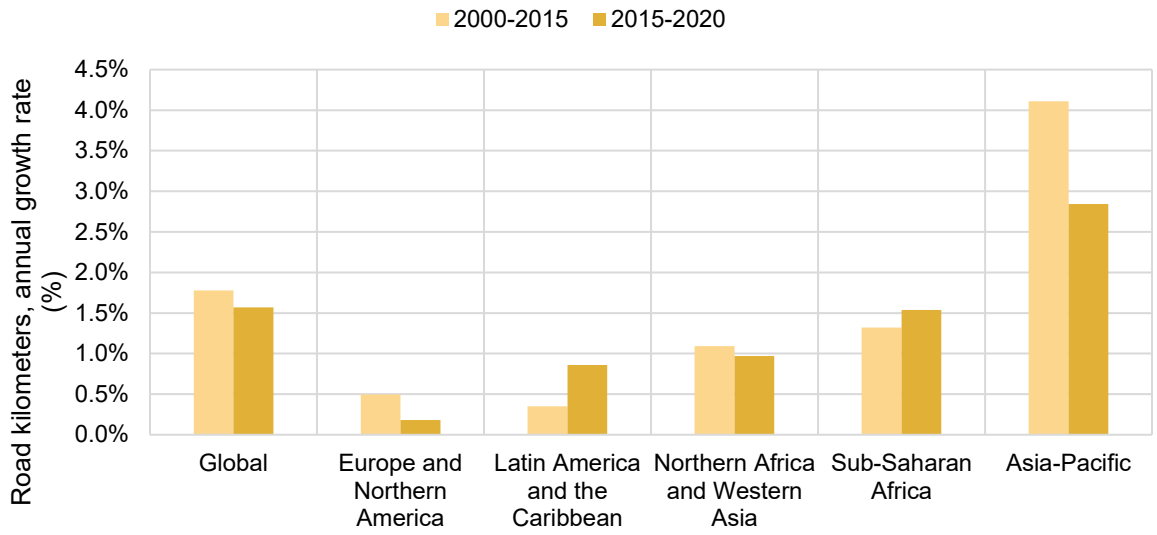


Figure 10. Annual Growth Rate of Road Kilometers

Source: ATO National Database INF-TTI-005 (IRF 2023). (accessed June 2023).

31. With the substantial road construction from 2000 to 2020, Asia at the regional level has reached parity with Europe and Northern America regarding road density (km/sqkm) (Figure 11). The density is significantly higher than the global road density (km/sqm) due to the lower estimates for Africa, Latin America, and Caribbean countries. However, in 2020, 50% of economies in Asia had lower road density level than the global average.

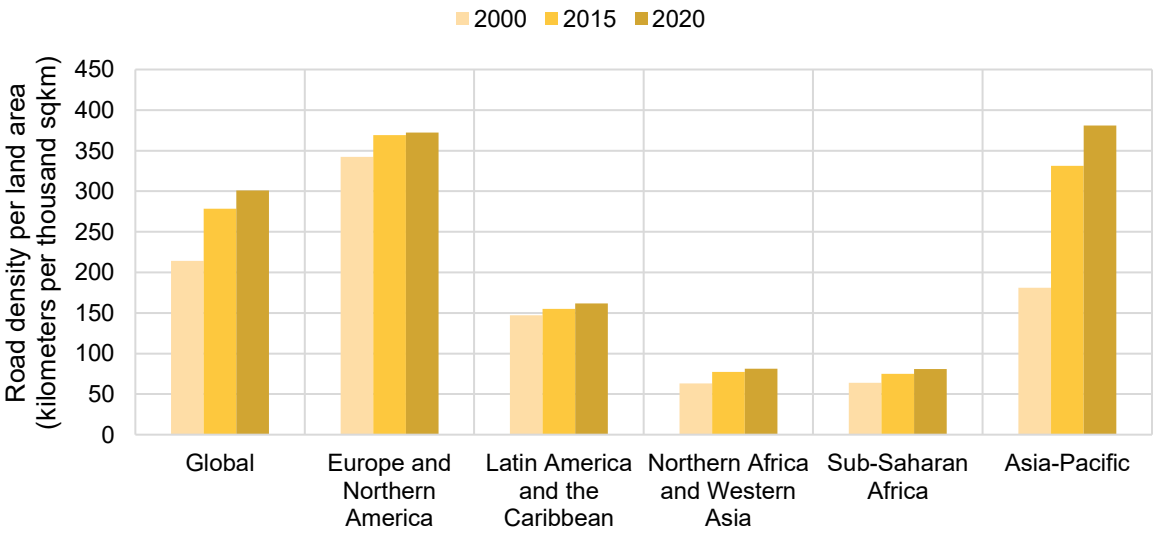


Figure 11. Road Density per Land Area

Source: ATO National Database INF-TTI-008 (IRF 2023). (accessed June 2023).
Note: sqkm = square kilometer

32. However, Asia and the Pacific fall short compared to per capita terms. In 2020, Asia and the Pacific region had road availability of about 4 meters per capita compared with 13 meters per capita in Europe and Northern America (Figure 12).

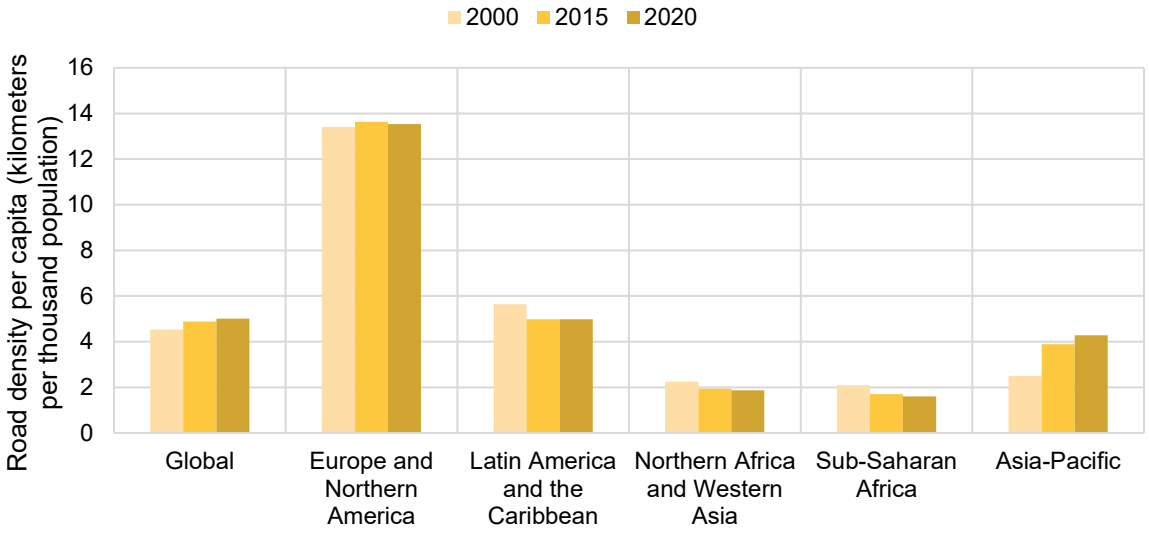


Figure 12. Road Density per Capita

Source: ATO National Database INF-TTI-009 (IRF 2023). (accessed June 2023).

33. While Asian economies continue to build road infrastructure faster over time, the pace of expansion is still slower than the growth in transport demand (see section 9), indicating a widening gap between road infrastructure and mobility. Between 2020 and 2030, Asia's population could increase by 300 million, and transport demand could grow at an annual rate of 2.7% for passenger and 5% for freight transport. Thus, the mobility and infrastructure gap could widen further as the roads increase at historical rates (ATO(b), 2022).

8. Heavy Railway Transport Infrastructure (including High-Speed Railways)

34. Since adopting the SDGs, heavy railways in Asia and the Pacific region have grown faster than the historical (pre-SDG) trend and across any other global region. (Figure 13) Since 2015, about 80% of global railway route kilometer expansion has occurred in Asia.

35. Since 2000, the road infrastructure has expanded by double the rate of railway infrastructure expansion in Asia. The average railway infrastructure investment in Asia and the Pacific as a share of GDP was estimated to be about 1% between 2000 and 2020 (regionally). On the other hand, the road sector infrastructure investment was about 1.5% of GDP (ATO(b), 2022). Since roads are less expensive to build and maintain per kilometer basis, road networks have become more prominent over time than railways. However, since adopting the SDGs, the railway construction pace has increased, but railways (2.4% growth) still lag road construction rates (3%).

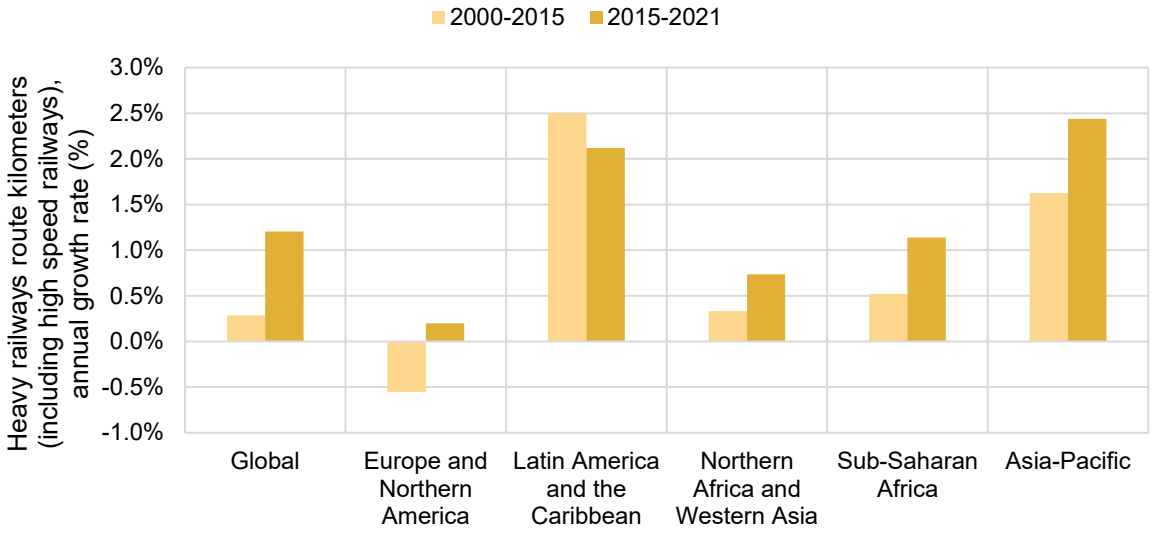


Figure 13. Annual Growth Rate of Heavy Railways Route Kilometers (Including High-Speed Railways)

Source: ATO National Database INF-TTI-019, INF-TTI-016 (UIC 2023). (accessed June 2023).

36. With the large railway construction in the decade 2010-2020 (In our analysis, due to a lack of data, we consider railway route kilometers and not track kilometers, which could have been a better indicator to understand the railway infrastructure gap), Asia and the Pacific at the regional level is closer to bridging the gap with the global average both for railway density and per-capita parameters (Figure 14, Figure 15). Yet, Asia still has substantial catching up with Europe and Northern America regarding per-capita and railway density requirements.

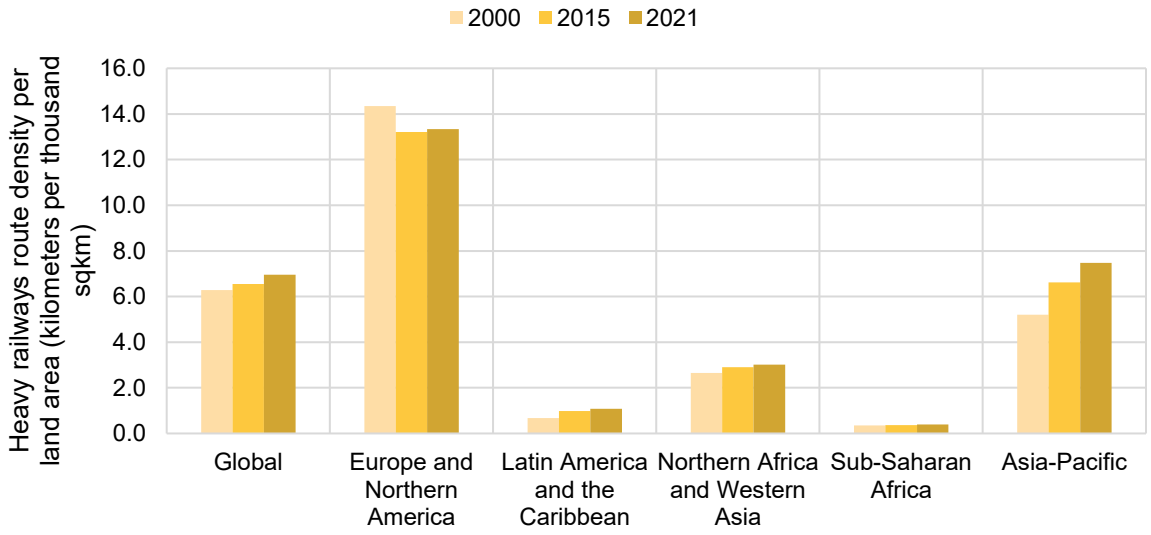


Figure 14. Heavy Railways Route Density per Land Area

Source: ATO National Database INF-TTI-017 (UIC 2023). (accessed June 2023).
Note: sqkm = square kilometer

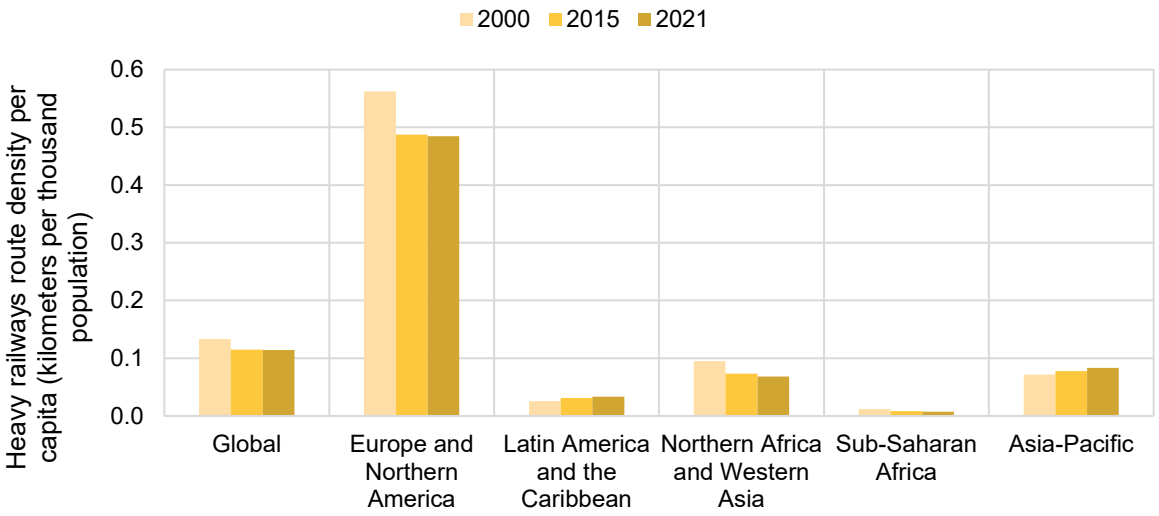


Figure 15. Heavy Railways Route Density per Capita

Source: ATO National Database INF-TTI-018 (UIC 2023). (accessed June 2023).

9. Passenger and freight volumes

37. The demand for passenger and inland freight transport is closely correlated with growth in population, economic activity, and trade. As income increases, ownership and use of private vehicles, and consumption of goods and services to meet social, economic, educational, and recreational needs, demand for transport of people and goods will significantly increase, particularly in low- and middle-income economies (Figure 16). From 2000 to 2020, passenger transport volumes (in passenger kilometers or pkm) and freight volume (in tonne-kilometers or TKM) have grown annually by 3.7% and 4.8% in Asia and the Pacific, outpacing infrastructure and population growth. However, the good news is that transport demand is growing slower than income (Figure 17, Figure 18).

38. Overall, the trends demonstrate that transport infrastructure and activity are relatively decoupling with economic growth. However, the bad news (ATO(b), 2022) is that the demand increase is higher than the improvements in energy efficiency and fuel decarbonization, thereby increasing the environmental transport-related externalities in Asia and the Pacific region.

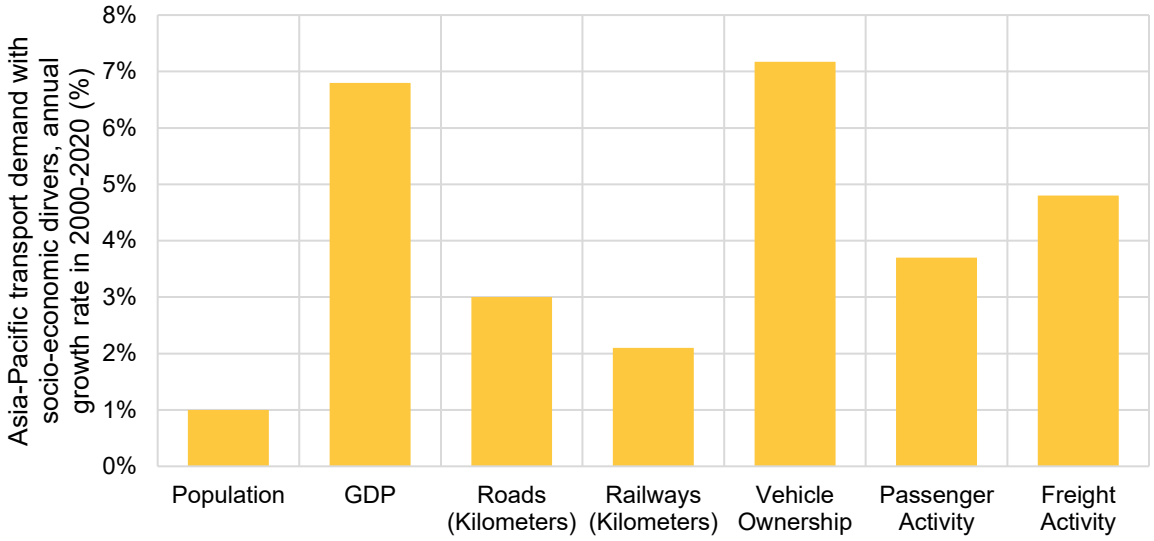


Figure 16. Annual Growth Rate of Asia-Pacific Transport Demand with Socio-Economic Drivers in 2000-2020

Source: ATO National Database SEC-DEV-001, SEC-SEG-001, INF-TTI-005, INF-TTI-016, INF-TTI-019, TAS-VEP-020 (UN DESA 2023, World Bank 2023, IRF 2023, UIC 2023, Country Official Statistics). (accessed June 2023).

39. Globally, not all populations and geographic regions contribute equally to global transport demand. The International Transport Forum has estimated that low- and middle-income economies have significantly lower demand on per-capita levels than high-income economies (ITF, 2023).

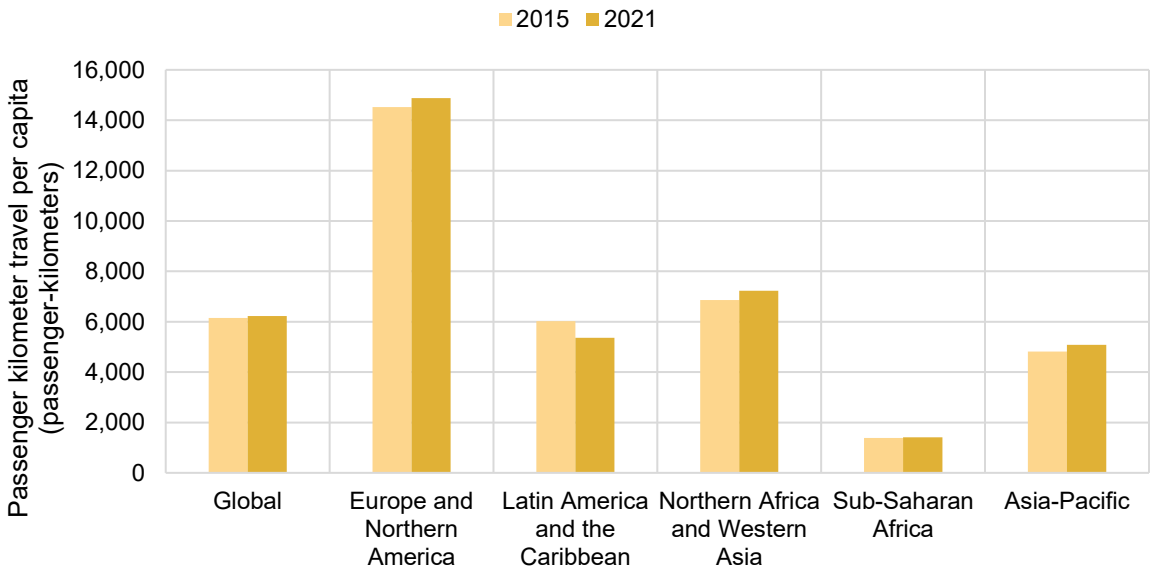


Figure 17. Passenger Kilometer Travel per Capita

Source: SDG Indicators Database (UN DESA 2023). (accessed June 2023).

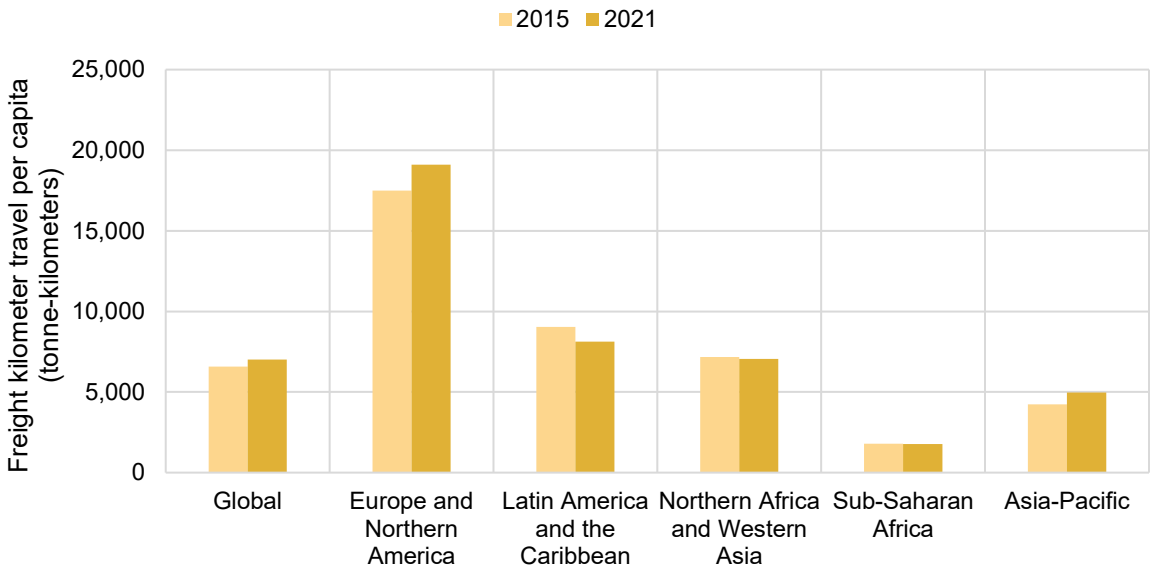


Figure 18. Freight Kilometer Travel per Capita

Source: SDG Indicators Database (UN DESA 2023). (accessed June 2023).

40. Since adopting the SDGs, In Asia, the demand for transport has grown significantly higher than the global pace, especially in the freight sector. The demand for passenger transport also continues to grow but only marginally higher than the worldwide pace (Figure 19).

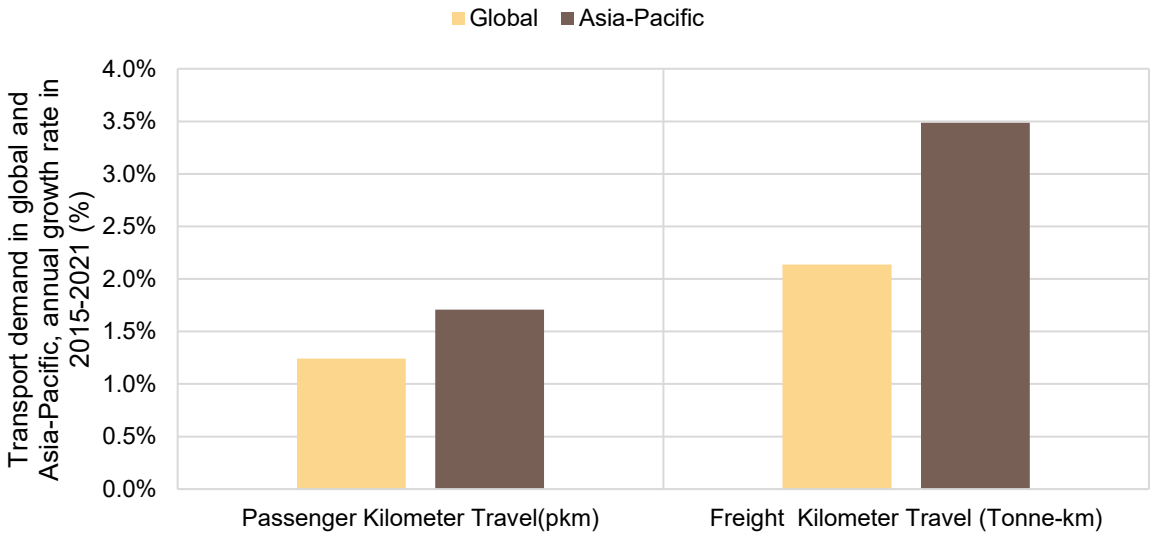


Figure 19. Annual Growth Rate of Transport Demand in Global and Asia-Pacific after 2015

Source: SDG Indicators Database (UN DESA 2023). (accessed June 2023).

10. Rural Population without Road Access in 2022

41. Good rural access positively impacts the rural economy and indirectly leads to greater food security and zero hunger. (SDG, Goal 2). Accessibility is critical, therefore, to eradicating poverty and promoting social development.

42. The Rural Access Index (RAI) measures the proportion of the rural population who live within 2 km of an all-season road. In 2006, the worldwide RAI was estimated at 68.3% based on household surveys (WOL, 2020), leaving a rural population of about one billion unconnected to a good-quality road network. In 2016, the World Bank, with the UK Department for International Development (DFID) and Research for Community Access Partnership (ReCAP), developed a geospatial methodology to measure rural access to be sustainable, consistent, simple, and operationally relevant. Using this methodology in 2018, ReCAP estimated that about 1.2 billion rural residents, about 30% of the world's rural population, did not have all-season access to road networks. In Asia and the Pacific, 25% of the rural population, i.e., 560 million, were believed to live more than 2 km from an all-season road.

43. In 2022, using the same methodology but with improved geospatial datasets, Sustainable Development Solutions Network's SDG Transformation Centre (SDSN, 2023) estimated that 22% of the world's rural population (745 million) and 19% of Asia and Pacific region's rural population do not have all-season access to the road network (i.e., 408 million) (Figure 20). It would be wrong to assume that access improvement to 152 million rural people from 2018 to 2022 is entirely due to infrastructure improvement, as data coverage in open street maps has also improved. Further, the 2022 and 2018 assessments are also inconsistent with values determined using household surveys in 2006. Thus, no historical comparisons can be made with this indicator.

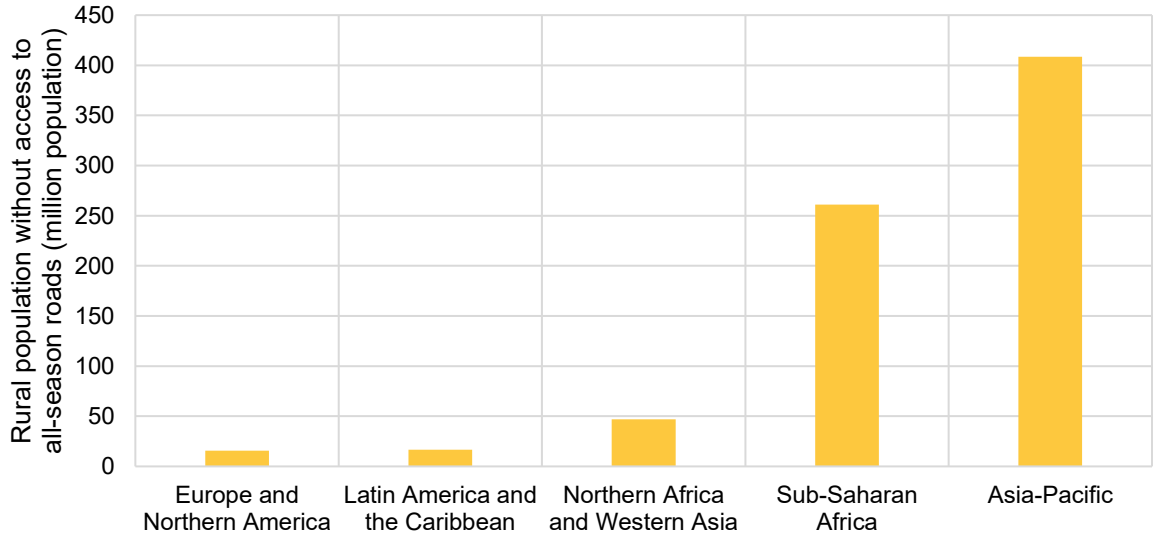


Figure 20: Rural Population without Access to All-Season Roads

Source: Sustainable Development Report 2023 (SDSN 2023). (accessed June 2023).

Note: SDG 9.1.1. defines rural access as the proportion of the rural population who live within 2 km of an all-season road

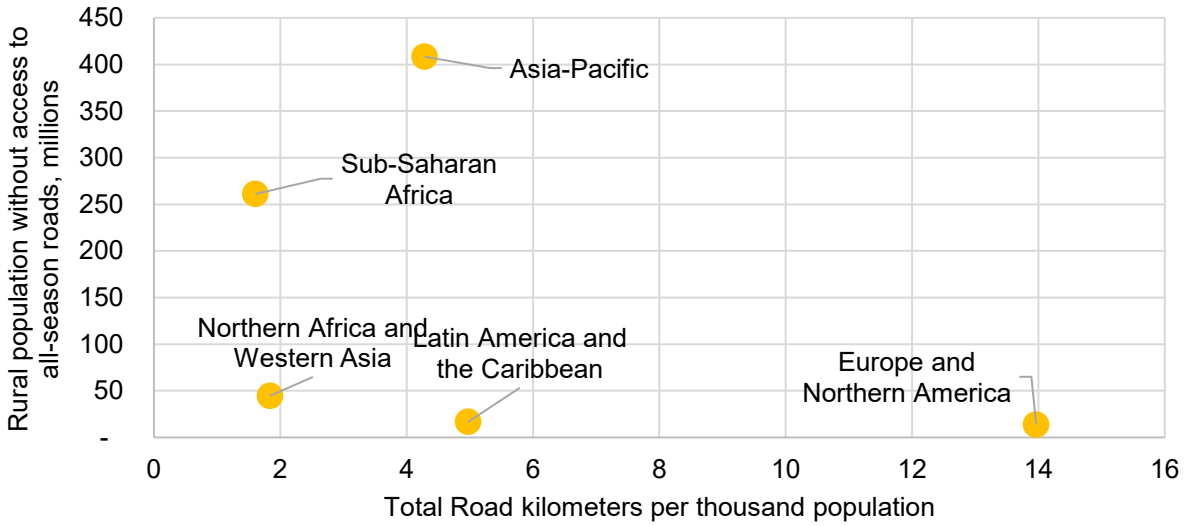


Figure 21: Rural Population without Access to All-Season Roads and Total Road Infrastructure

Source: Sustainable Development Report 2023 (SDSN 2023). (accessed June 2023), ATO National Database INF-TTI-005 (IRF 2023). (accessed June 2023).

11. Share of Paved Roads

44. Since measuring the historical progress in improving rural access using the official RAI indicator is challenging, we consider the share of paved roads as a percentage of all the country's roads, measured in length, as a proxy indicator. Paved roads are those surfaced with crushed stone (macadam) and hydrocarbon binder or bituminized agents, with concrete, or with cobblestones. Asia's share of paved roads increased from 59% in 2010 to 62% in 2015 and 70% in 2020 (Figure 22). Since adopting the SDGs, Asia has made considerable progress in paving roads by improving paved construction rates and maintenance standards.

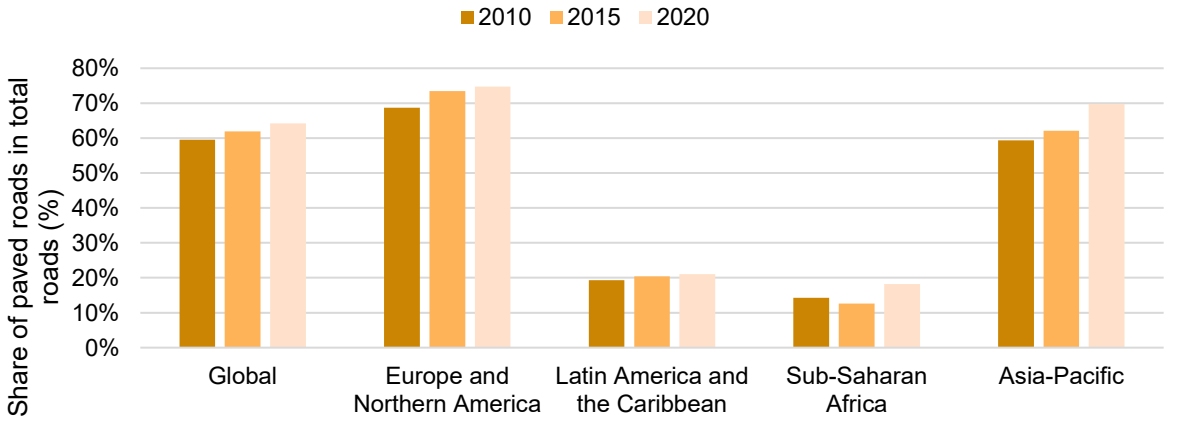


Figure 22: Share of Paved Roads in Total Roads

Source: ATO National Database INF-TTI-010 (IRF 2023). (accessed June 2023).

12. Population Covered by a Mobile Network, by Technology—2G, 3G, 4G

45. Access to ICT is covered by SDG Goal 9.c, which aims to "significantly increase access to ICT and strive to provide universal and affordable access to the internet in the least developed countries by 2020. Enhancing affordable digital connectivity is positively linked to achieving most of the 17 SDGs (ITU, Digital technologies to achieve the UN SDGs, 2021).

46. Since the adoption of the SDGs, the percentage of inhabitants living in the range of a mobile-cellular network has increased across all regions in Asia, mainly for 3G and 4G connectivity, thereby essentially bridging the “coverage gap” (Figure 23). Mobile broadband network predominantly covers urban areas worldwide, but specific gaps persist in rural areas (ITU, 2023) , i.e., 92% with 4G access in rural areas compared with 99% in urban areas.

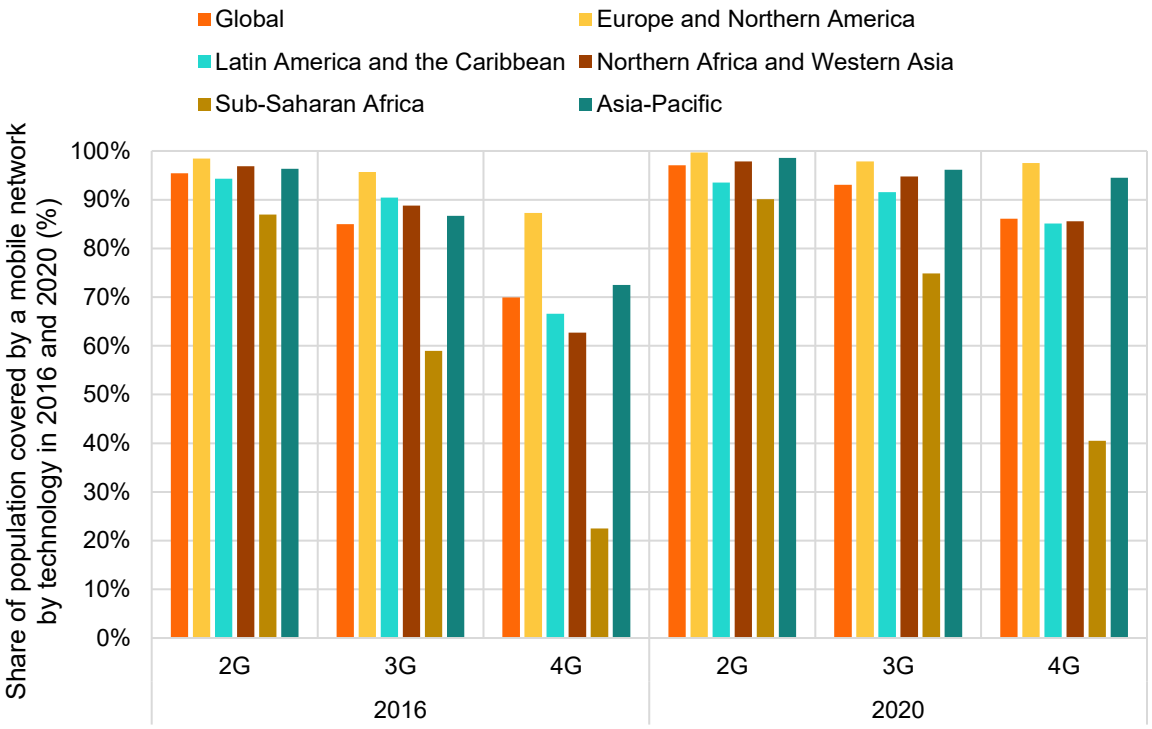


Figure 23: Share of Population Covered by a Mobile Network by Technology

Source: ATO National Database INF-ICT-010 (UN DESA 2023). (accessed June 2023).

13. Percentage of Individuals Using the Internet

47. In Asia, as of 2021, 60% of individuals were using the Internet, compared to 3% in 2000. This share in Europe and North America was 24% in 2000 and 89% in 2021. Since adopting the SDGs, the digital gap between developing and developed countries in terms of access to a mobile network has been rapidly bridged (Figure 24). However, notwithstanding rapid growth in internet use, the potential is still considerable to improve digital connectivity across low- and middle-income economies.

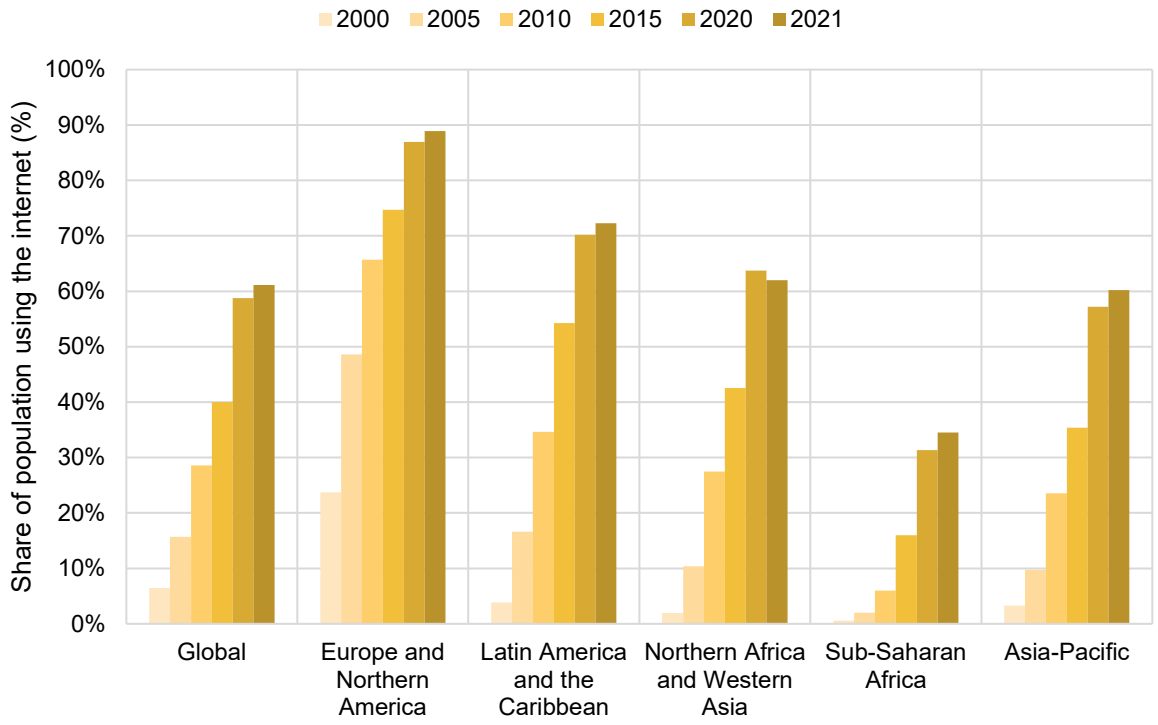


Figure 24: Share of Population Using the Internet

Source: ATO National Database INF-ICT-006 (ITU 2023). (accessed June 2023).

V. THEME 3: URBAN TRANSPORT

48. The urban population continues to grow globally, including in Asia, raising concerns about the cities' economic, social, and environmental sustainability. Cities are instruments for sustainable development, and transport is acknowledged as an essential component of urban development. Urban dwellers and the business sector depend on the availability of transport infrastructure and services to make cities function and prosper. With efficient and accessible urban transport, cities can become more productive, encouraging innovation and economic growth. This is reflected in the SDG target:

- SDG11.2 By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

C. Urban Transport Indicators

14. Share of the Population with Convenient Access to Public Transport

49. The progress towards achieving SDG Target 11.2, is measured as the share of the population within 500 meters of walking distance of low-capacity transport systems (buses and trams) and 1,000 meters distance to high-capacity systems (trains, subways, and ferries). Public transportation is a shared passenger transport service available to the public, such as buses, trolleys, trams, trains, subways, and ferries (UNSTATS, 2021). The official SDG definition neglects the high prevalence of informal transport systems in the access measurement due to a deficiency in regularity and safety.

50. Based on the data collected and reported by UN-Habitat, public transit is still underdeveloped in many of the developing cities of Asia and Africa, and there is still a significant dependence on informal transport systems. Convenient access to public transportation, as defined in the indicator for SDG target 11.2, is not yet enjoyed by all urban residents.

51. In Asia and the Pacific region, out of 10 urban residents, only about 4 have convenient access to urban public transit. For Asia, this means 1.32 billion urban residents lack such efficient access. In contrast, in Europe and Northern America, which account for 20% of the global urban population, only 4% of people are without urban public transport access (Figure 25).

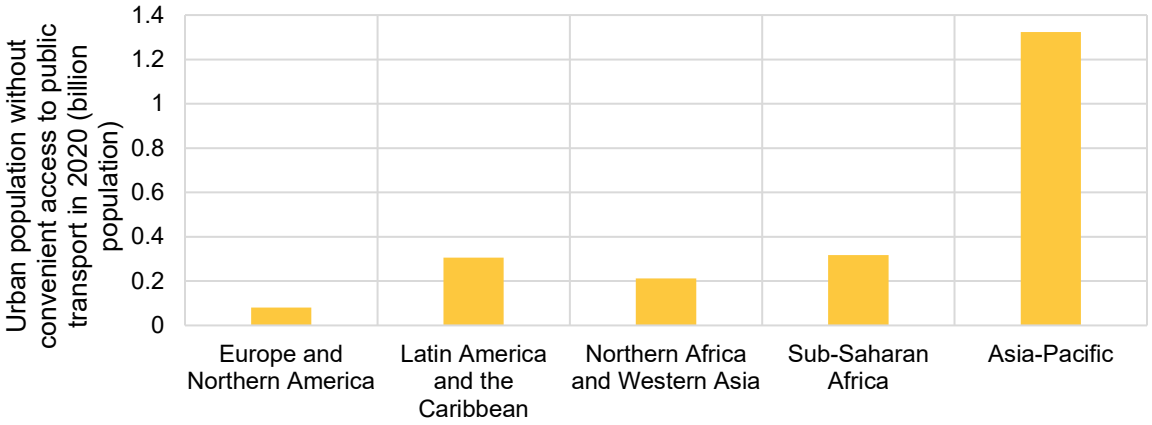


Figure 25: Urban Population without Convenient Access to Public Transport in 2020

Source: ATO Urban Database ACC-UDB-001 (UN DESA 2023). (accessed June 2023).

15. Rapid Transit Kilometres (Bus Rapid Transit, Metro, Light Rail Transit)

52. Rapid public transport infrastructure in Asia and the Pacific region has increased faster than in other regions. This growth was almost exclusively in urban rail infrastructure lines, while rapid bus transit system growth has stagnated. Rapid urban transit infrastructure in Asia mainly consists of metro systems with 82% share. BRTS and light rail transit constitute only a 12% and 6% share.

53. In 2015, 118 cities had a total rapid transit length of about 9,400 kilometers in Asia and the Pacific region. By 2021, due to massive rapid transit investments in Asia and the Pacific region, 154 cities had a total network size of 15,800 kilometers (Figure 26). The progress in rapid transit development in the Asia Pacific is more extensive than in other regions.

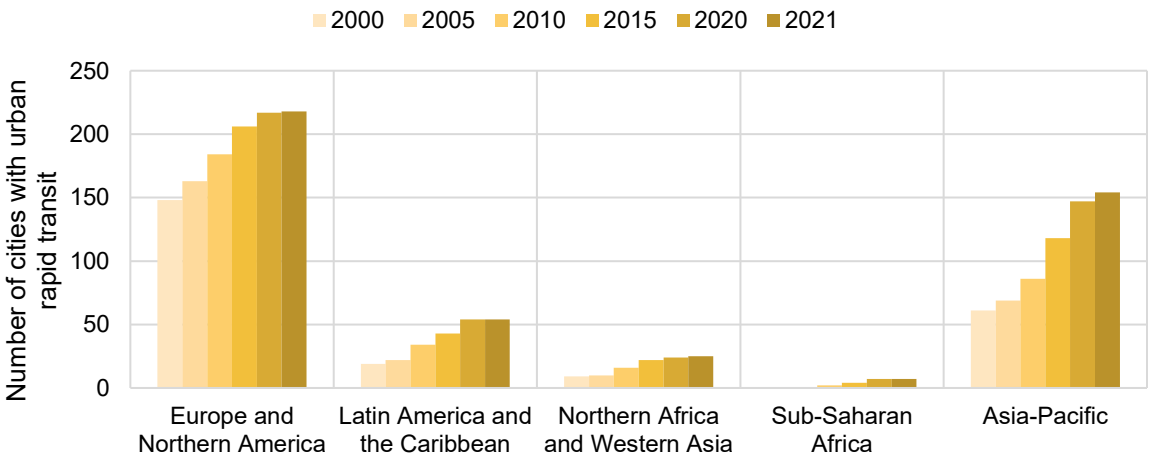


Figure 26: Number of Cities with Urban Rapid Transit

Source: Rapid Transit Database (ITDP 2023). (accessed June 2023).
Note: Urban rapid transit includes light rail, metro, and bus rapid transit

54. With the large urban rapid transit construction in the decade 2010-2020, Asia and the Pacific at the regional level have bridged the gap with the global average in per-capita levels (Figure 27). Yet, Asia still has substantial catching up to do with Europe and Northern America in terms of per-capita access to rapid urban transit. The urban public transport access gap can be narrowed by extending dedicated fast public transit infrastructure with a dense network of urban bus services (Figure 28).

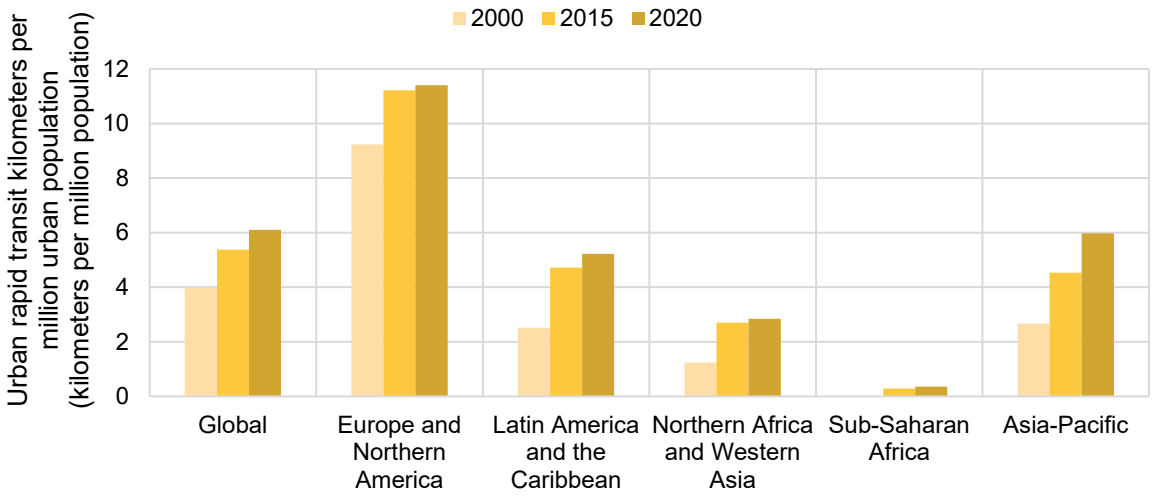


Figure 27: Urban Rapid Transit Kilometers per Million Urban Population

Source: ATO National Database INF-UTI-001, INF-UTI-002, INF-UTI-003 (ITDP 2023). (accessed June 2023).
Note: Urban rapid transit includes light rail, metro, and bus rapid transit

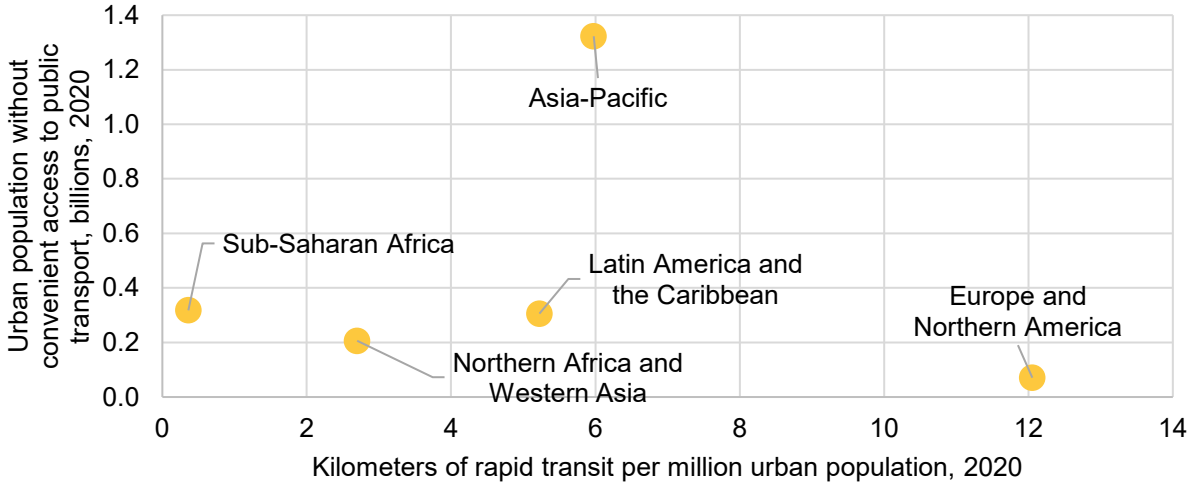


Figure 28: Lack of Urban Public Transport Access

Source: ATO National Database INF-UTI-001, INF-UTI-002, INF-UTI-003 (ITDP 2023). (accessed June 2023).
Note: Urban rapid transit includes light rail, metro, and bus rapid transit

16. Bus Manufacturing, Trade and Registrations

55. Regarding access to public transit, bus manufacturing, import, and registrations are relevant proxy indicators. Since adopting the SDGs, the demand for buses has shrunk in part due to the disruptions brought about by the COVID-19 pandemic. By 2022, bus production had not yet recovered and still was about 30% lower than the 2015 range in Asia (Figure 29). Yet, Asia added about 265 million persons to the urban population over this timespan.

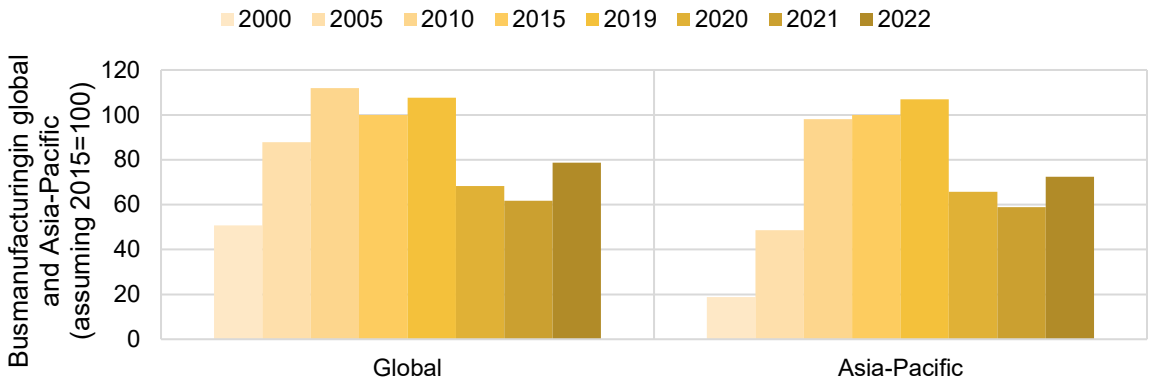


Figure 29: Bus Manufacturing in Global and Asia-Pacific

Source: ATO National Database INF-VMF-007 (OICA 2023). (accessed June 2023).

56. The global import of used and new buses declined from USD 15.5 billion in 2015 to USD 13.7 billion in 2022 (Figure 30). While the worldwide trade of buses has picked up mainly in Europe and Northern America, the imports in the Asia Pacific region have shrunk by close to 1 billion USD from 2015 to 2022.

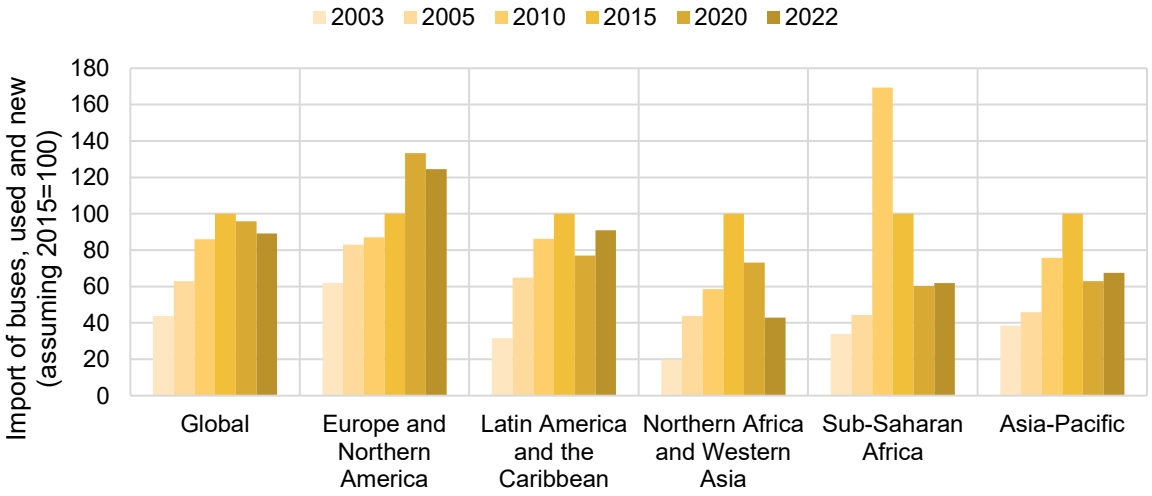


Figure 30: Import of Buses, Used and New

Source: Trade Map (ITC 2023). (accessed June 2023).

57. Finally, in terms of bus and other mass transit vehicle registrations, overall, data indicate that bus registration in Asia and the Pacific region has marginally declined in upper-middle-income countries, showing a marginal increase in high-income countries and a substantial increase in low and lower-middle-income countries (Figure 31).

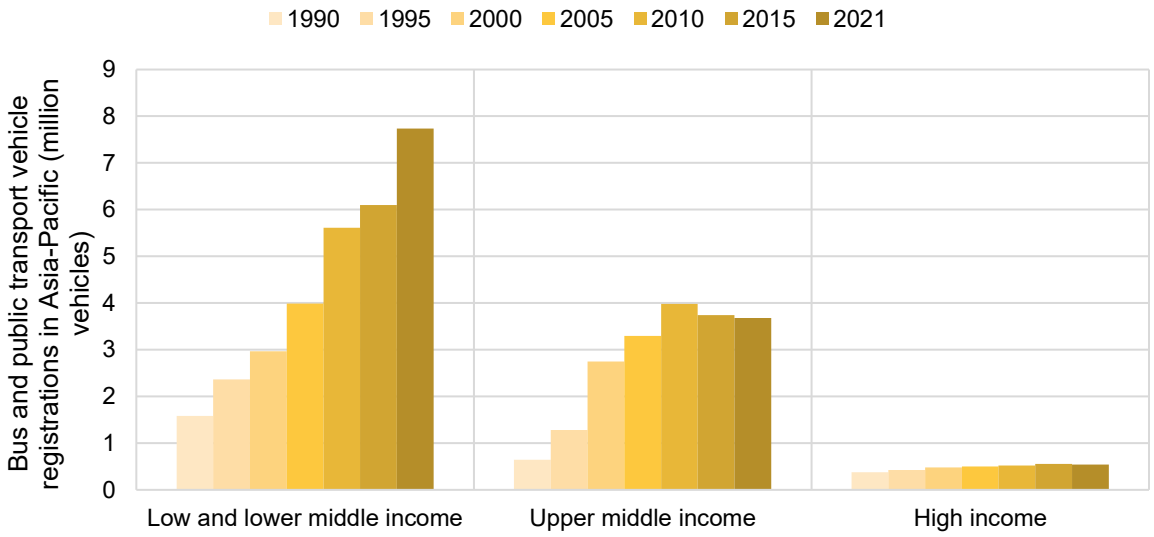


Figure 31 Bus and Public Transport Vehicle Registrations in Asia-Pacific

Source: ATO National Database TAS-VEP-018 (Country Official Statistics). (accessed June 2023).

17. Urban Transport Mode Share

58. The passenger activity modal share reflects total urban passenger activity by different modes of urban transport: i.e., active mobility (walking, cycling), public transit (bus, rail), intermediate public transit, and shared mobility (shared auto-rickshaws, private autos, taxis/cabs, shared bikes) and private transport (two-wheelers and cars).

59. In 2015 Asia, the urban travel mode share favored personal motorized mobility (two-wheelers and cars) followed by formal and informal public transit with shared mobility. By 2020, due to restrictions imposed to control COVID-19, mobility shifted significantly to private modes from public transit and shared mobility. However, by 2022, estimations by the ITF indicate that transit mode shares had entirely recovered (Figure 32). Since adopting SDGs, despite the reduction in bus ownership levels, the public transport and active mobility mode share has marginally increased. The massive urban rapid transit construction in Asia has arrested the passenger modal shift towards private transport.

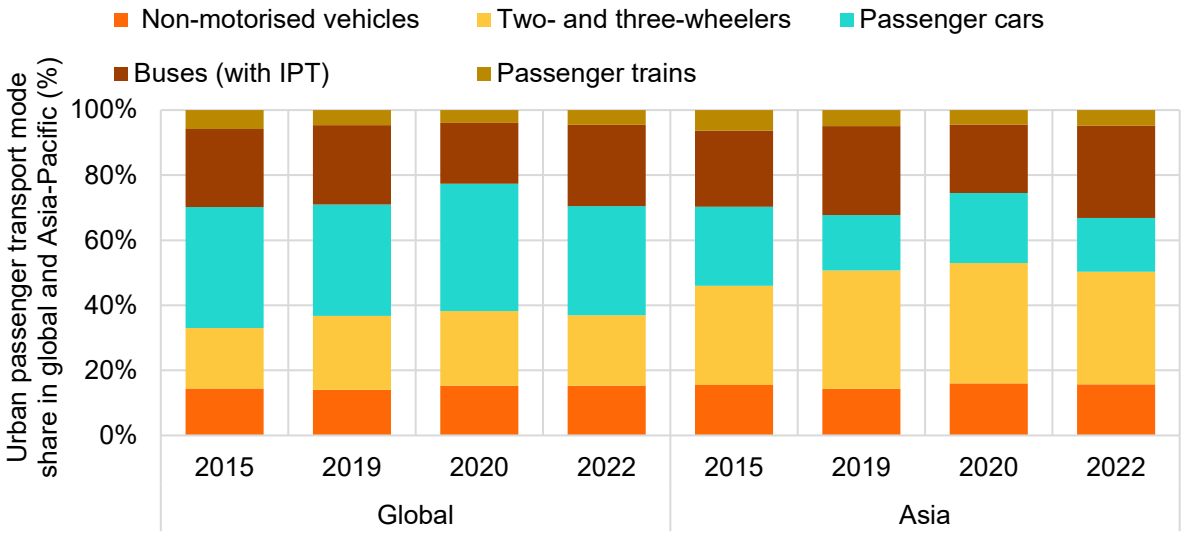


Figure 32: Urban Passenger Transport Mode Share

Source: ITF Transport Outlook 2021 (ITF 2021), ITF Transport Outlook 2023 (ITF 2023). (accessed June 2023).

60. Efficient freight movement is indispensable for sustainable urban development and is essential for economic vitality and poverty alleviation. Urban freight constitutes about 15% of total domestic freight activity in tonne-kilometers in Asia. Many cities have started addressing the challenges of urban freight. For example, since adopting the SDGs, the non-motorized vehicle activity mode share in urban freight has begun to show up across all regions. However, non-motorized urban freight in Asia constitutes only about 0.3% of total urban freight activity. Close to 89% of freight activity is by medium and heavy-duty trucks (Figure 33).

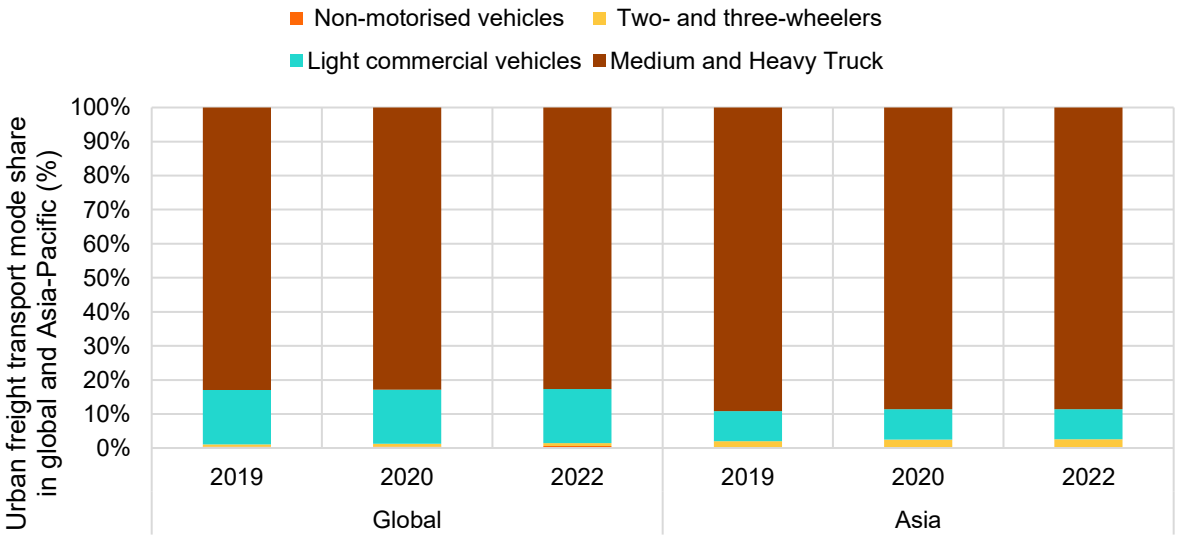


Figure 33: Urban Freight Transport Mode Share in Global and Asia-Pacific

Source: ITF Transport Outlook 2023 (ITF 2023). (accessed June 2023).

VI. THEME 4: TRANSPORT AND ENERGY

61. Transport relevant components of the dedicated energy SDG focus on the source of energy, the amount of renewables in the sectoral energy mix, and the energy efficiency. The SDGs also propose using energy intensity, i.e., the ratio between the gross energy consumption and GDP, as a proxy for energy efficiency. Transport and energy-related SDG targets include:

- SDG 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- SDG 7.3 Double the global rate of improvement in energy efficiency by 2030
- SDG 12.c Rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimising the possible adverse impacts on their development in a manner that protects the poor and the affected communities

D. Transport and energy-related Indicators

18. Transport Energy Consumption

62. In 2022, the transport sector constituted about 21% and 28% of the Asian and global primary energy consumption (DNV, 2022). From 2000 to 2015, the Transport sector energy demand in Asia and the Pacific region grew with one of the highest intensity and magnitude compared to other sectors and regions (at an annual rate of 1.4%). However, since adopting SDGs, transport energy consumption has grown at an annual pace of 0.3% in Asia and the Pacific region between 2015 and 2019. Further, in 2020, the transport sector energy consumption was reduced by nearly 14% (IEA, 2022) from 2019 levels due to COVID-19 related mobility restrictions and lockdowns (Figure 34).

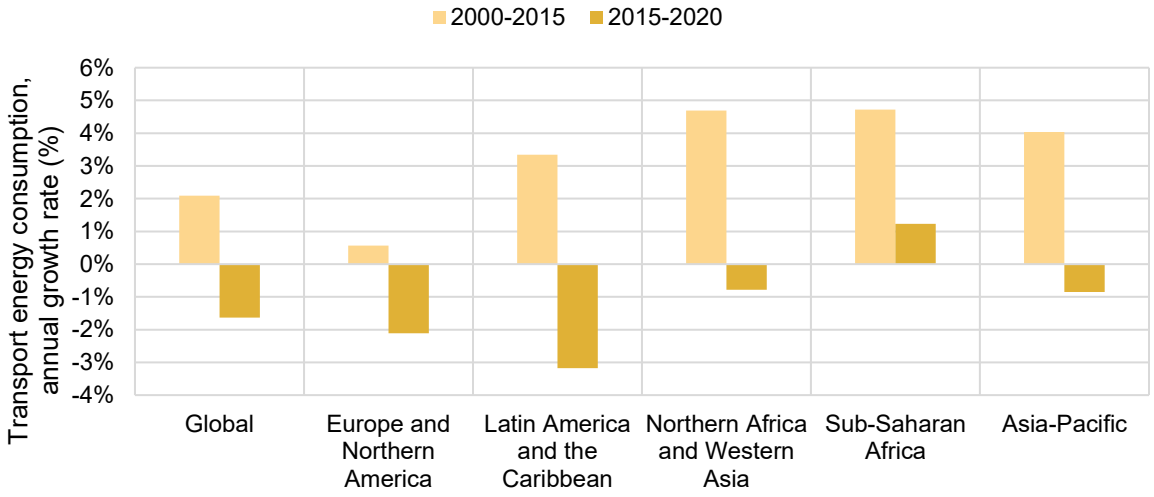


Figure 34: Annual Growth Rate of Transport Energy Consumption

Source: ATO National Database CLC-VRE-001 (UN Statistics Division 2023). (accessed June 2023).

63. The transport sector remains the least diversified energy consumption sector globally and in Asia. The transport sector still relies heavily on fossil fuels, with oil products constituting 91% and 87% of the sector's final energy globally and in Asia, respectively (IEA, n.d.).

64. In 2000, 2015, and 2020, the share of renewable energy in the Asian transport sector was 0.5%, 1.6%, and 3.4%, respectively. Thus, since adopting the SDGs, the renewable share in the transport sector has nearly doubled (from 1.7% in 2015 to 3% in 2020) (Figure 35, Figure 36). However, these trends vary considerably between Asia's subregions and countries.

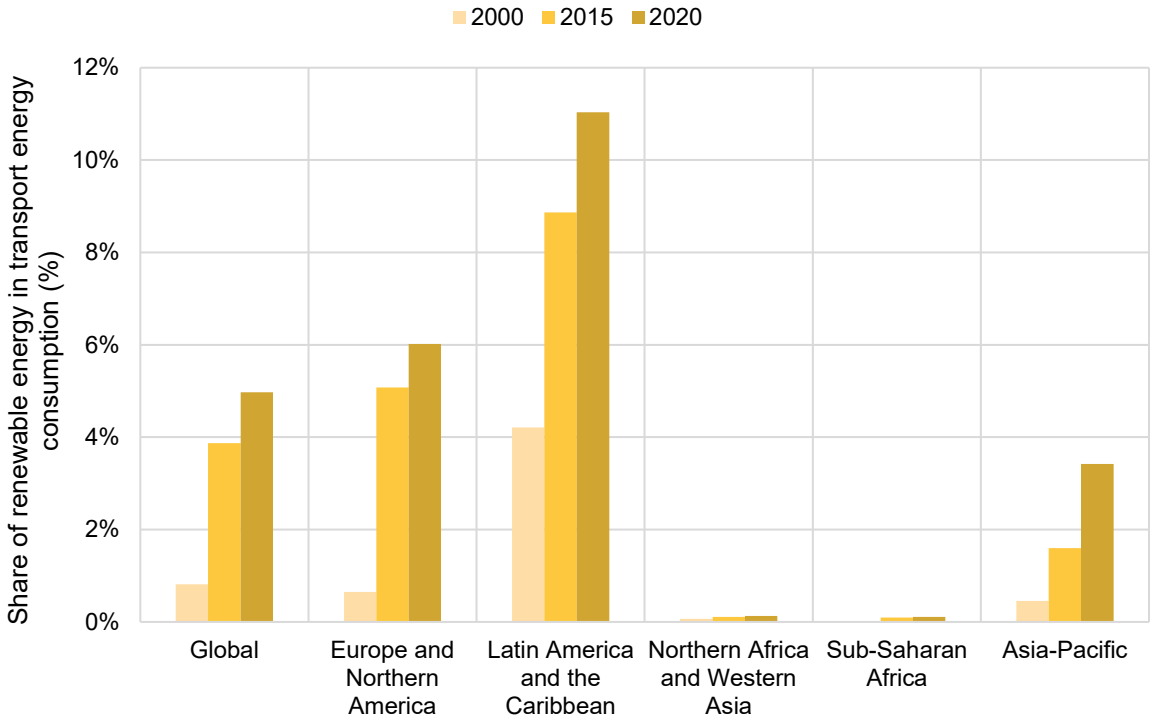


Figure 35: Share of Renewable Energy in Transport Energy Consumption

Source: ATO National Database CLC-VRE-016 (ESMAP 2023). (accessed June 2023).

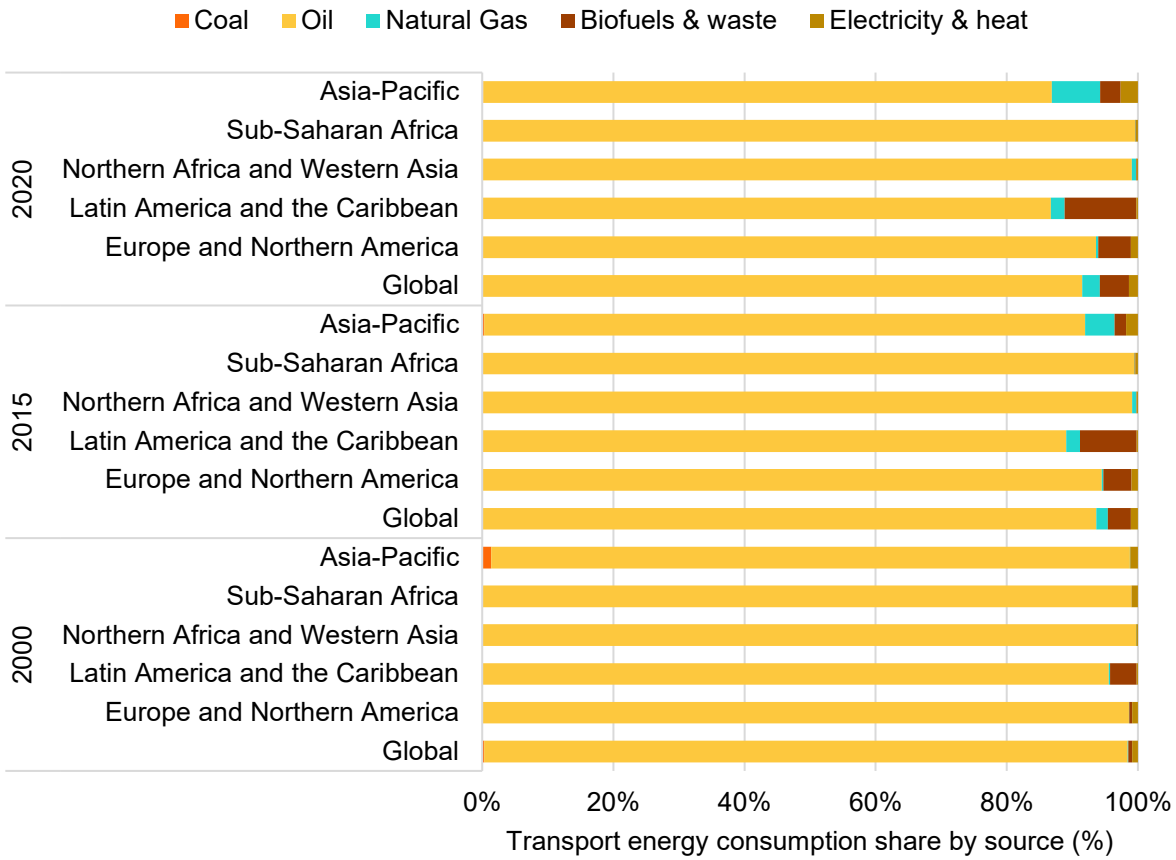


Figure 36: Transport Energy Consumption Share by Source

Source: ATO National Database CLC-VRE-081, CLC-VRE-026, CLC-VRE-027, CLC-VRE-028 (UN Statistics Division 2023). (accessed June 2023).

65. The road transport sector accounts for most of the transport energy consumption. In Asia, among modes, roads, railways, aviation, and waterways are responsible for 83%, 3%, 7%, and 6% of energy consumption, respectively. Projections reveal that significant growth in transportation energy use is projected to occur in the developing non-OECD economies, especially in the road transport sector. However, a growing share will be from electricity.

66. Railways have made the most progress in terms of energy transition. Globally, the passenger rail segment is already significantly more electrified than freight. Close to 74% of all passenger-kilometer activity and 48% of cargo tonne-kilometer activity are in electric trains. In terms of tracks, railway electrification has increased from 34% of tracks in 2000 to 56% of tracks in 2020. With predominant electrified tracks, nearly 60% of railway energy consumption is electricity (Figure 37).

67. Three-fourths of the Asian railway tracks exist in three countries – the People's Republic of China, India, and the Russian Federation.

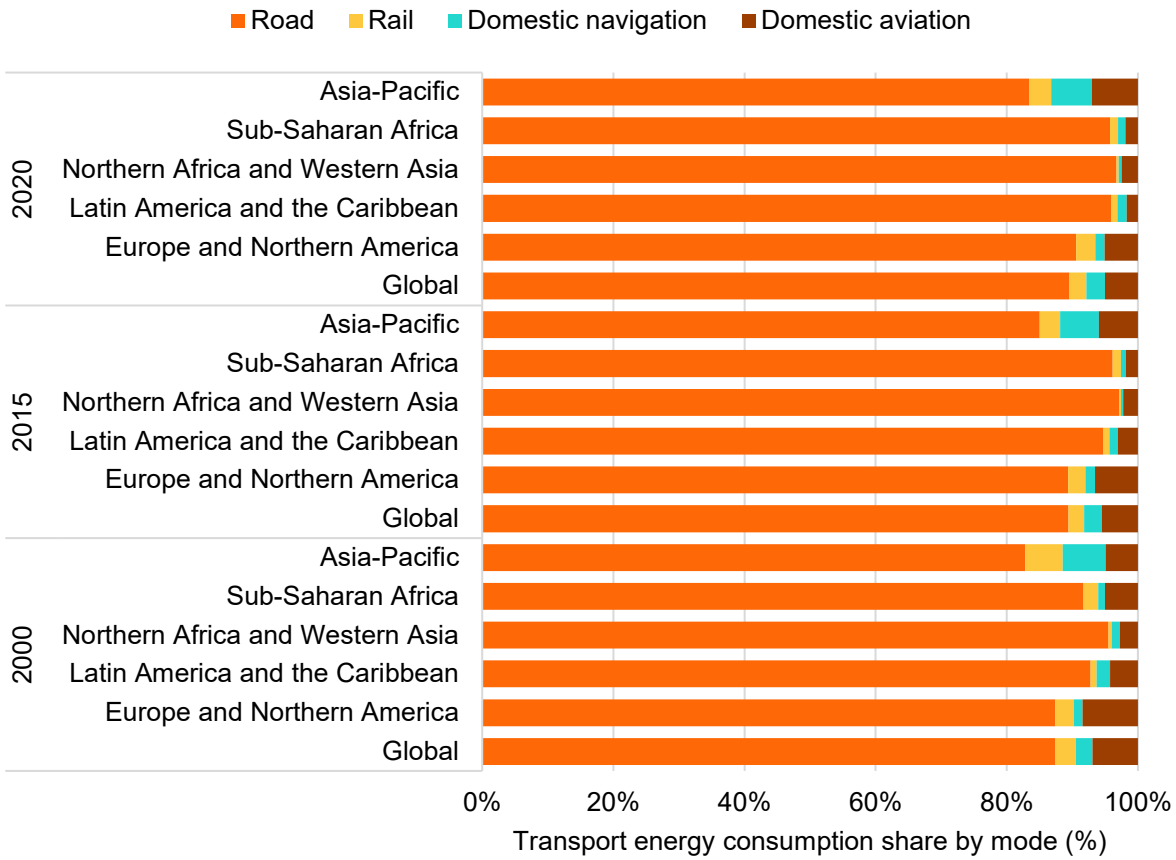


Figure 37: Transport Energy Consumption by Mode

Source: ATO National Database CLC-VRE-001 (UN Statistics Division 2023). (accessed June 2023).

19. Transport Energy Intensity

68. Transport sector energy intensity is measured as transport final energy consumption per unit of gross global domestic product. Reducing energy intensity in transport can reduce the environmental externalities of transport while enhancing the economic and social benefits. Since 2000, the transport sector energy intensity (transport energy consumption per unit of GDP) globally and in Asia has reduced by about 3.8% annually (Figure 38). Further, transport sector energy intensity in Asian economies continues to be lower than in other regions, mainly due to the predominant use of public transit and two and three-wheelers.

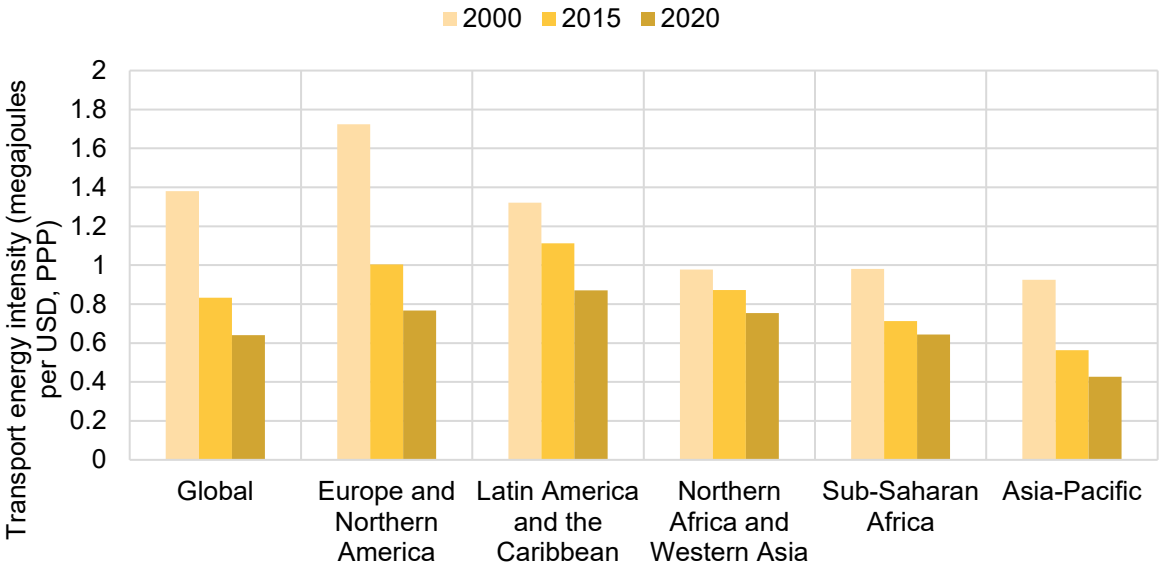


Figure 38: Transport Energy Intensity

Source: ATO National Database CLC-VRE-001 (UN Statistics Division 2023). (accessed June 2023).

69. Among modes, the road sector has the highest energy intensity globally, while the railways sector has the lowest energy intensity. Since 2000, the railways have had the highest energy intensity reduction. However, since 2015, this improvement rate has been reduced. Data post-COVID recovery might throw better insights into energy consumption and intensity trends.

70. Since adopting the SDGs, Asia's transport sector energy intensity improvement is the highest among sectors and regions, with an annual reduction of 5.4%. In contrast, the transport sector improved at a yearly rate of 5.2%. All the other sectors in Asia combined improved at an annual rate of 3.1%.

71. These trends were impacted by COVID restrictions in 2020. Based on the energy consumption data for 2021 and 2022, it will become clear if the transport energy efficiency improvement in Asia will stagnate or continue.

20. Transport Fossil Fuel Subsidies

72. Over the past decade, the countries have increasingly recognized fossil fuel subsidies' negative economic, environmental, and social consequences. Within the transport sector, fossil fuel subsidies encourage excessive energy consumption, disincentivize investments in transport renewable energy and energy efficiency, and aggravate the vulnerability to volatile international energy prices. From 2010 to 2015, the total fossil fuel subsidies in the global transport sector were USD 1,151 billion. However, since adopting the SDGs, from 2016 to 2021, the entire fossil fuel subsidy in transport was reduced by nearly half, i.e., USD 532 billion (sensitive to crude oil price fluctuations). Similarly, in Asia and the Pacific region, the cumulative fossil fuel subsidies in the transport sector were reduced from USD 587 billion to USD 252 billion over the same period (Figure 39). This reduction was higher when compared to other regions. Thus, Asia's global transport fossil fuel subsidy share declined from 55% in 2014 to 40% in 2021. Within Asia, policymakers have found better success in reducing fossil fuel subsidies in the transport sector when compared to the other sectors. The transport sector's share in total fossil fuel subsidies in Asia declined from 29% in 2014 to 11% in 2021.

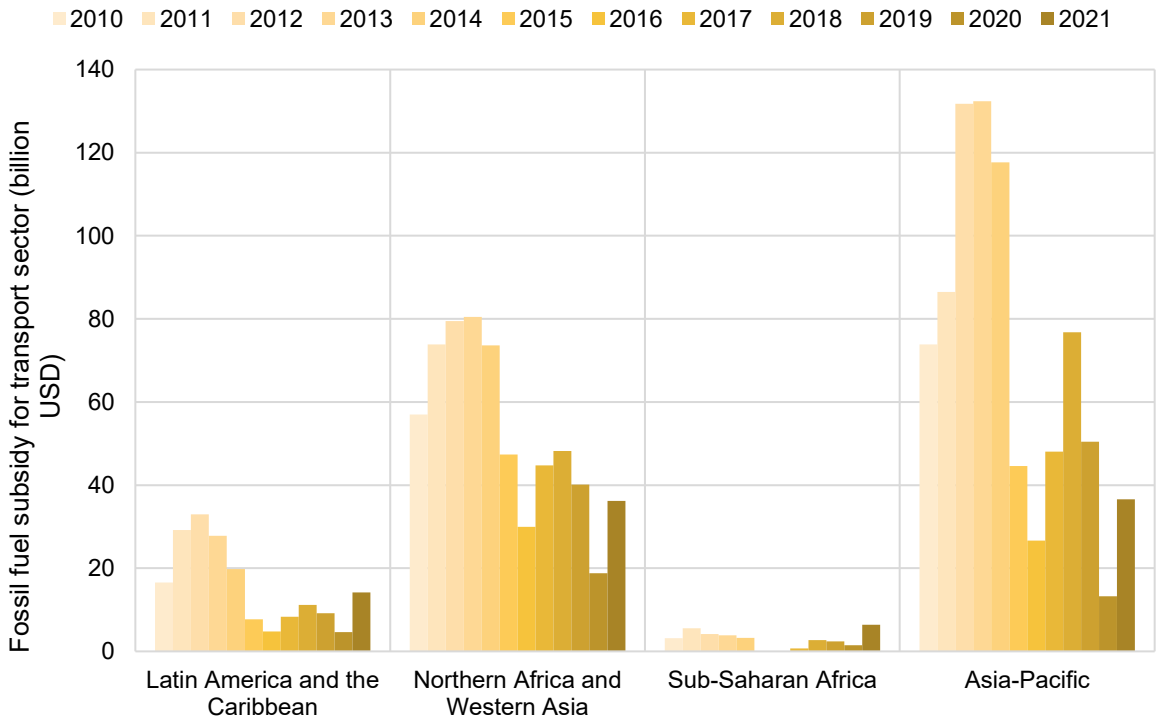


Figure 39: Fossil Fuel Subsidy for Transport Sector

Source: Fossil Fuel Subsidies (IEA 2023).

VII. THEME 5: TRANSPORT AND CLIMATE CHANGE

73. The Climate change-related SDG focuses on adaptation to climate change and mitigating climate change. There is a direct link between the climate SDG and the Paris Agreement on Climate Change, which calls on countries to reduce emissions to limit temperature increases to well below 2°C and pursue efforts to limit it to 1.5°C. Emissions from the transport sector are a vital contributor to climate change and continue to grow in Asia. Transport and climate change SDG-related targets include:

- SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
- SDG 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters.
- SDG 13.2 Integrate climate change measures into national policies, strategies and planning Transport and Climate Change Indicators.

E. Transport and Climate Change Indicators

21. Transport CO2 Emissions

74. In 2021, the transport share in total fossil fuel CO2 emissions was about 17% globally and 11% in Asia. Within the transport sector, since the adoption of SDGs in 2015, Asia has added the highest magnitude of transport CO2 emissions, with an annual increase of about 1.2%. In contrast, transport CO2 emissions decreased in Latin America, the Caribbean region (-1.4% annually), Europe and Northern America (-0.7% annually) (Figure 40).

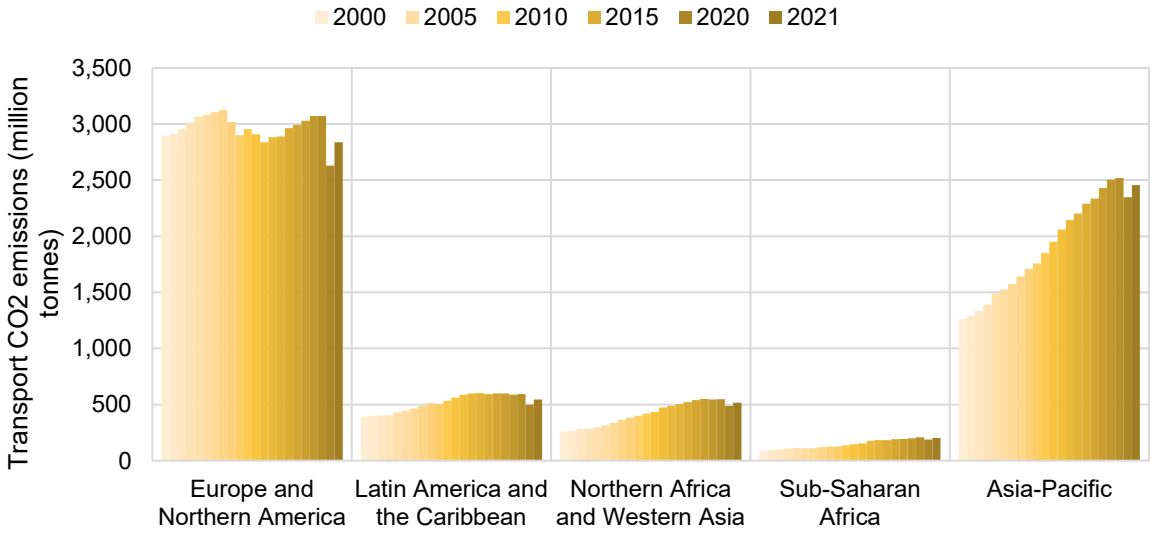


Figure 40: Transport CO2 Emissions

Source: ATO National Database CLC-VRE-045 (EDGAR 2023). (accessed June 2023).

75. Across sectors, since the adoption of the SDGs, transport CO2 emissions have grown slower than total fossil CO2 emissions both globally and across Asia. However, these trends vary considerably between Asia's subregions, countries, and modes (Figure 41, Figure 42).

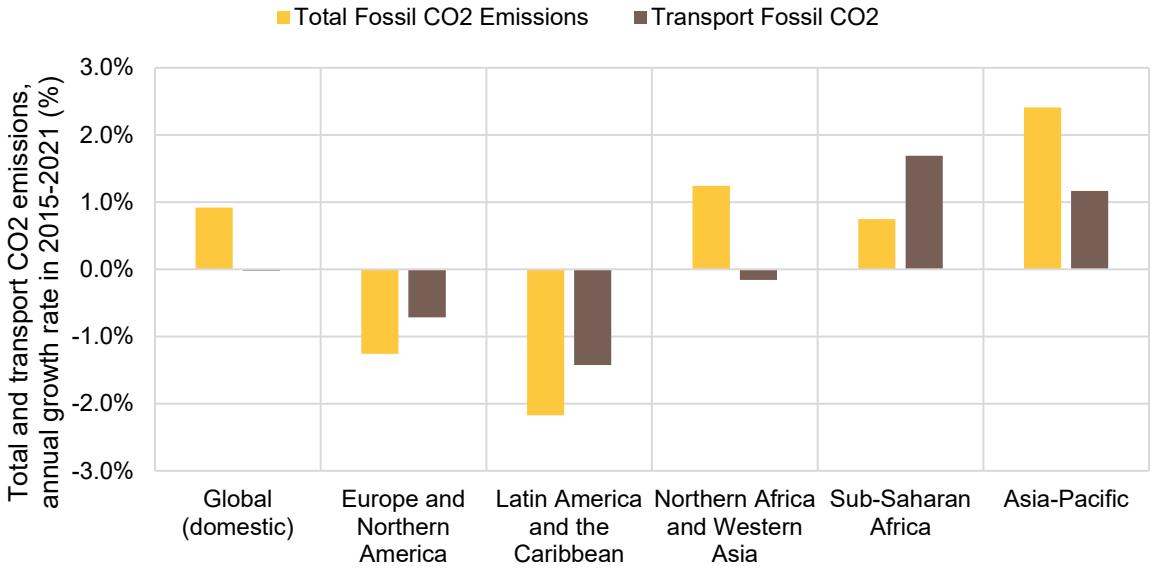


Figure 41: Annual Growth Rate of Total and Transport CO2 Emissions over 2015-2021

Source: ATO National Database CLC-VRE-048, CLC-VRE-045 (EDGAR 2023). (accessed June 2023).

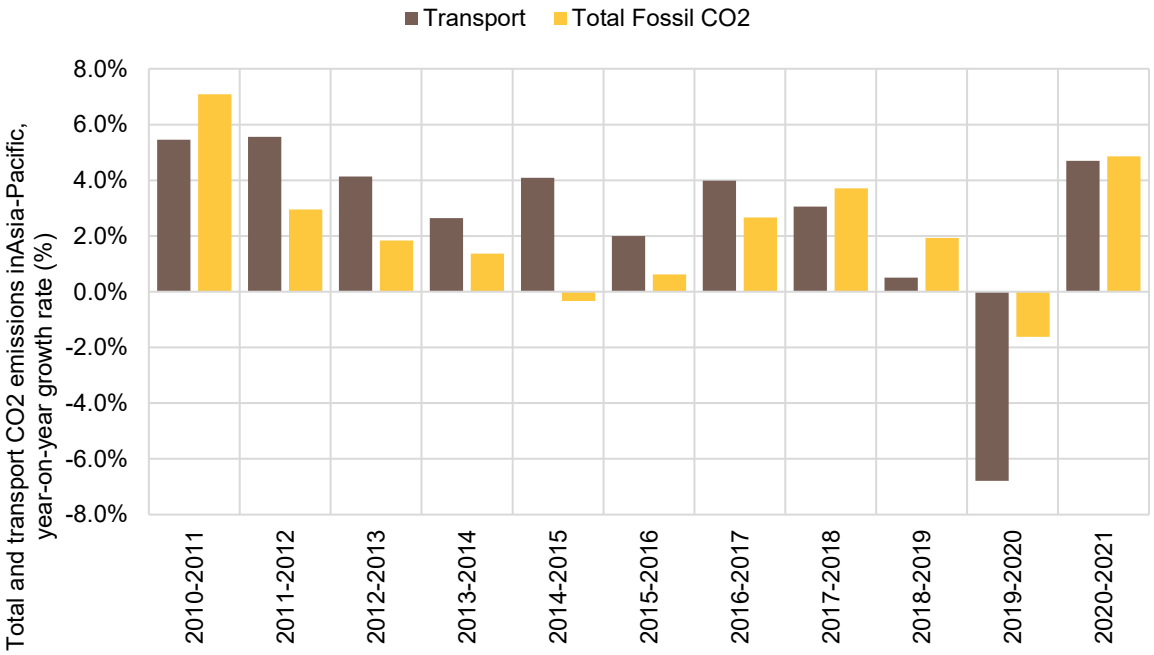


Figure 42: Year-on-Year Growth Rate of Total and Transport CO2 Emissions in Asia-Pacific

Source: ATO National Database CLC-VRE-048, CLC-VRE-045 (EDGAR 2023). (accessed June 2023).

76. CO2 emissions in the Asian transport sector are predominantly from the road transport sector, with about 88.8% in 2021. Asian railways, domestic navigation, and domestic aviation shares were 1.5%, 4.9%, and 4.7%, respectively. Since 2000, transport emissions have grown with the highest intensity in the road subsector (3.1% annual growth) and with the lowest intensity in railways (1.1% yearly growth).

22. Transport CO2 Intensity (with GDP)

77. Since 2000, global transport CO2 emissions have increased slower than GDP (relative decoupling), indicating greater energy resource-use efficiency, often resulting from adopting clean and environmentally sound technologies or behavioral change. Since adopting the SDGs, the relative decoupling of transport CO2 emissions with GDP has intensified in all global regions. In fact, between 2015 and 2021, while the GDP has expanded, transport CO2 emissions have reduced in Europe and North America, Latin America, and Caribbean countries, indicating a clear trend of absolute decoupling (Figure 43). Based on the transport CO2 emissions data for 2022 and 2023, it will become clear if the transport carbon intensity improvement in Asia will stagnate or continue.

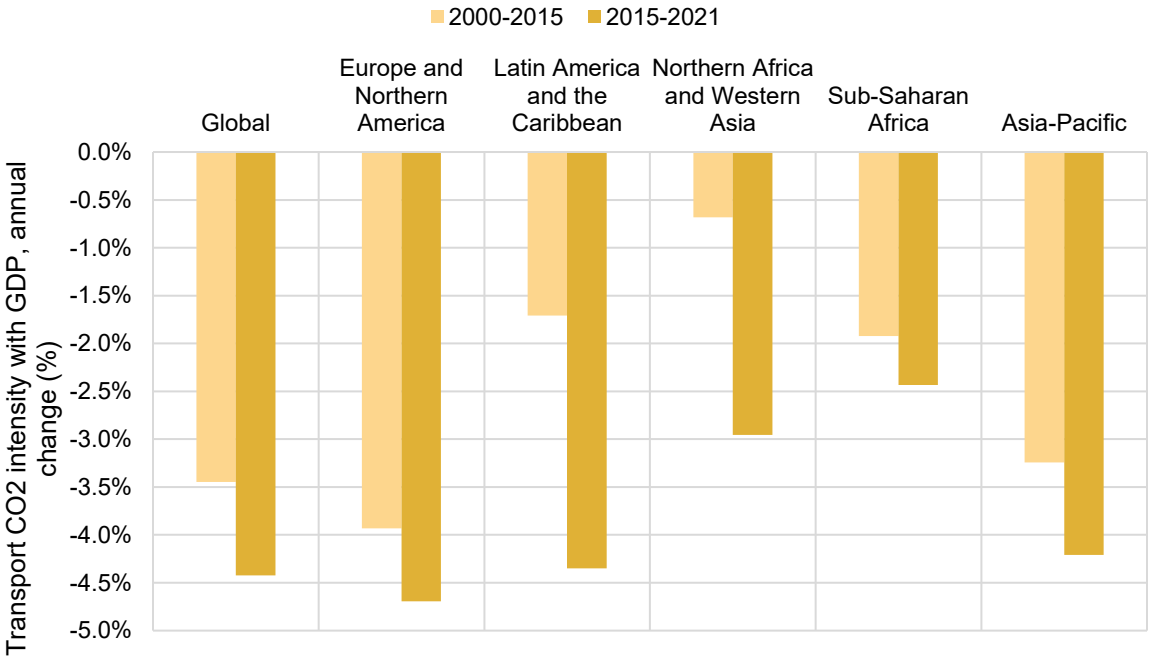


Figure 43: Annual Change of Transport CO2 Intensity with GDP

Source: ATO National Database CLC-VRE-045 (EDGAR 2023). (accessed June 2023).

23. Grid Emission Factor

78. Since 2015, electricity consumption in transport has increased in Asia at an annual rate of 6.7%, i.e., about double the rate of global increase. Electric vehicles have no direct tailpipe emissions, and thus, the upstream emissions caused by electricity generation become critical in determining the climate impact of using electric vehicles. Fossil fuels dominate the fuel mix for electricity production in Asian economies, resulting in the region having the highest intensity of grid emission factor, i.e., a measure of CO2 emissions intensity per unit of electricity generation in the grid system (gCO2/kWh). From 2000 to 2015, the grid emission factor in Asia increased at an annual rate of 0.4%. However, since adopting the SDGs, the grid emission factor has reduced yearly to 1.1%, matching the global improvement pace (Figure 44). The speed of emission intensity reduction should intensify in the future with an increased renewable share in electricity generation.

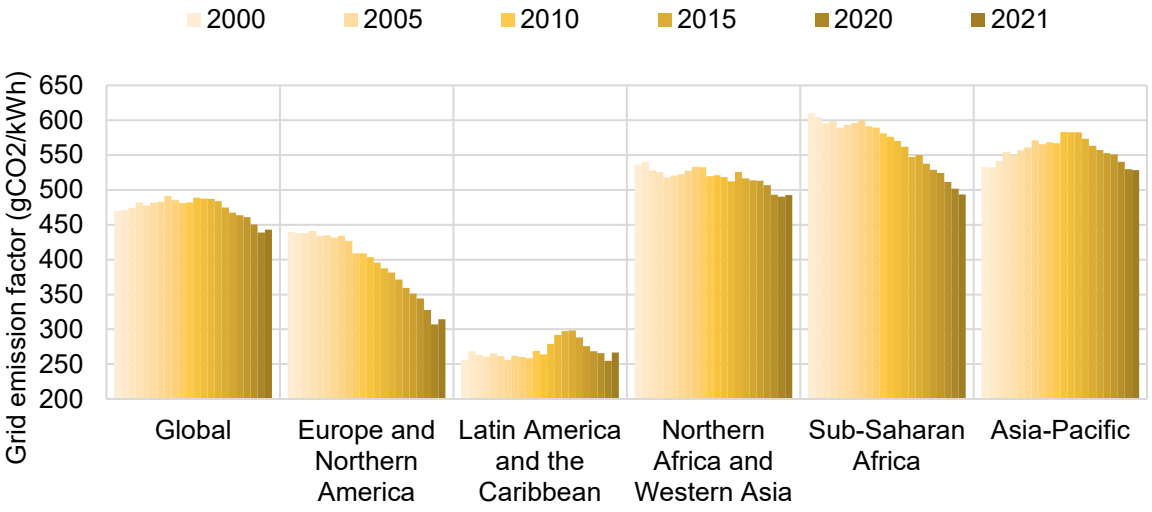


Figure 44: Grid Emission Factor

Source: ATO National Database INF-AFP-003 (Ember 2023). (accessed June 2023).
Note: gCO2 = grams CO2, kWh = kilowatt hour

24. Potential Annual Damage to Surface Transport Infrastructure

79. Population growth, urbanization, and infrastructure development will affect future climate change-related vulnerability and exposure, especially in developing countries. One of the SDG indicators (Indicator 11.5.2) relevant for the transport sector is "Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters." Current estimations capture global exposure, and risk of road, railway, and port assets with maritime trade flows at risk (i.e., trade risk) to the most frequently recorded and potentially costliest disasters: tropical cyclones (wind speed only), earthquakes, surface flooding, river flooding, and coastal flooding.

80. The global expected annual median damage due to direct damage to transport assets (roads, railways, and ports) could be USD 20 billion, of which about 60% could occur in Asia (Figure 45).

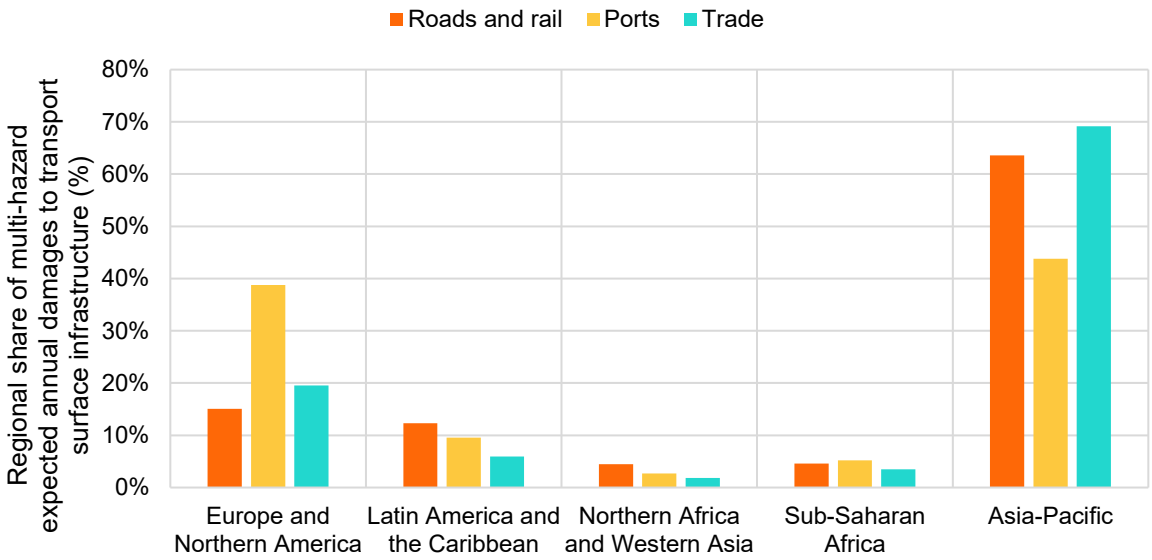


Figure 45: Regional Share of Multi-Hazard Expected Annual Damages to Transport Surface Infrastructure

Source: ATO National Database CLC-CVT-002, CLC-CVT-007 (Koks, et al. 2019, Verschuur, et al. 2023). (accessed June 2023).

81. Considering that Asian economies typically invest 1% to 3% of GDP in transport infrastructure, annual damages to transport infrastructure in Asia of 0.04% of GDP is significant. Further, the damages considered are direct and do not quantify the indirect impact (Figure 46). Estimates indicate that, for example, damage to ports could result in an additional indirect risk of USD 3.1 billion of global trade every year, with trade risk as a fraction of total trade being exceptionally high in Small Island Developing States.

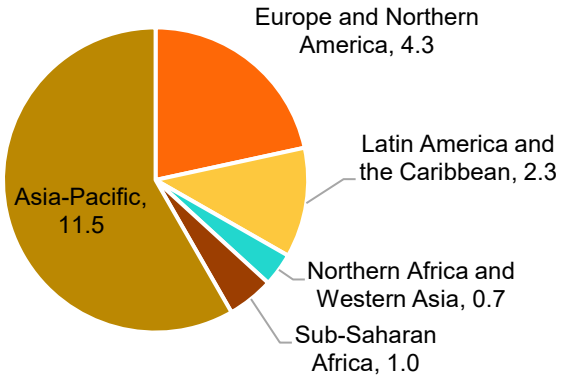


Figure 46: Multi-Hazard Expected Annual Damages to Transport Surface Infrastructure in Billion USD

Source: ATO National Database CLC-CVT-002, CLC-CVT-007 (Koks, et al. 2019, Verschuur, et al. 2023). (accessed June 2023).

25. Climate Bonds

82. Trends indicate that debt instruments or financing arrangements certified under the Climate Bonds Standard (CBI, 2023) are growing in depth and magnitude, inducing higher investments in climate mitigation projects. In 2015, about USD 3.6 billion of climate bonds were issued in the transport sector in Asia. By 2022, it had grown to USD 133 billion. Since adopting the SDGs, In Asia, debt issuance volumes in transport have evolved in sync with other sectors, i.e., from 22% share in 2015 to 24% share in 2022. Over the same period – Asian transport share in global transport increased from 14% to 35%, indicating a higher interest in Asia when compared to other regions (Figure 47).

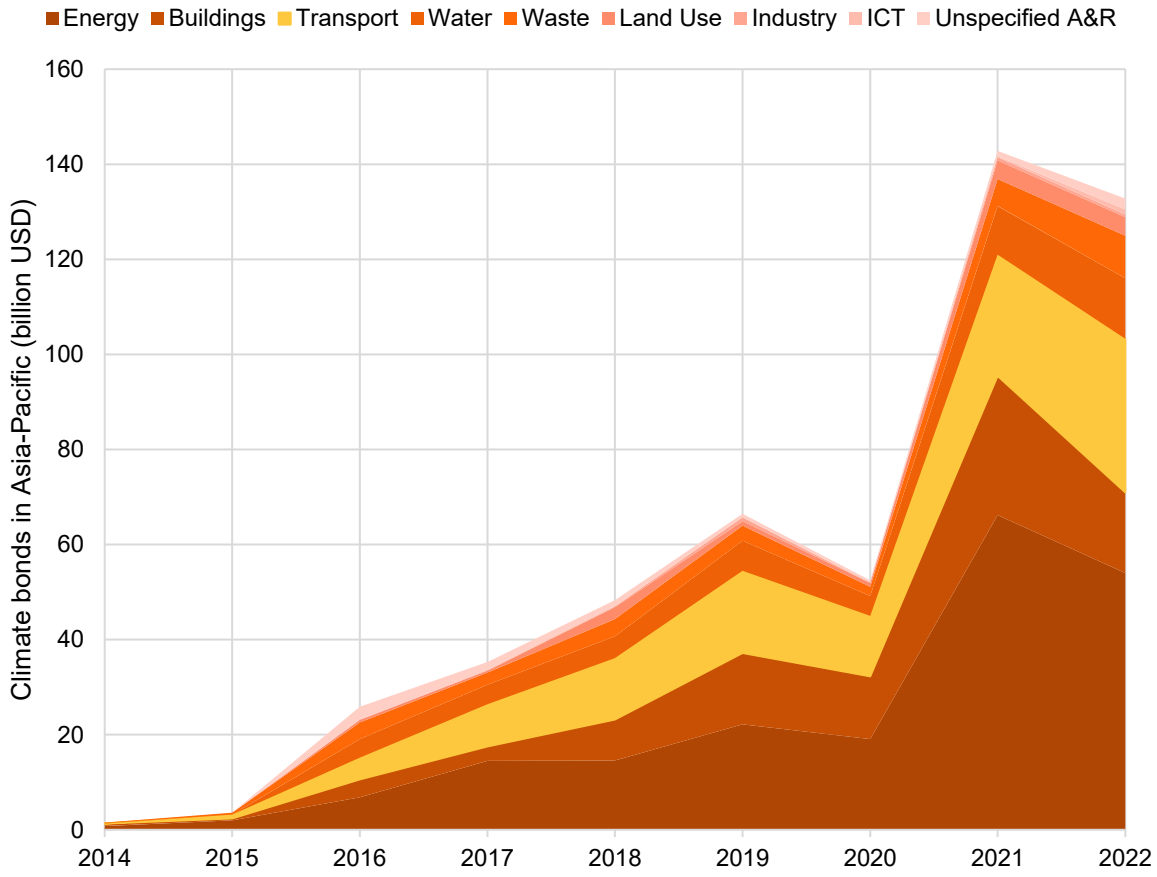


Figure 47: Climate Bonds in Asia-Pacific

Source: Climate Bonds Standard (Climate Bonds 2023). (accessed June 2023).

VIII. THEME 6: AIR POLLUTION

83. The transport sector significantly contributes to outdoor air pollution and associated health impacts. Research indicates that reductions in emissions from fossil-fuel combustion in the transport sector would yield the most significant health benefits. As the transport sector is moving increasingly towards electrification, reducing air pollution from coal-fired power plants is also relevant to the transport sector. Given that these sources are also significant drivers of climate change, reducing air pollution from these sources will also benefit mitigating climate change.

84. Transport operations emit a complex mixture of air pollutants (particulate matter (PM), nitrogen oxides (NOx), volatile organic compounds (VOCs)), many of which are harmful to health. Evidence from several epidemiological studies has demonstrated that exposure to mobile air pollution is linked to acute respiratory infections, cerebrovascular diseases (stroke), ischaemic heart diseases, chronic obstructive pulmonary disease, and lung cancer.

85. Air pollution-related SDG-related targets include:

- SDG 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- SDG 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

F. Air Pollution and Transport Indicators

26. Road Transport PM 10, NOx & SOx Emissions

86. In 2018, Asia and the Pacific contributed 33%, 41%, and 19% of road transport-related PM10, NOx and SOx emissions. In Asia, from 1990 to 2000, air pollutant emissions from the Asia Pacific Road transport sector, especially in Eastern and Southeast Asia, grew substantially and faster than the other economic sectors. However, since 2000, the implementation of road transport-related regulatory standards has reduced transport air pollutant emissions globally despite the rapid expansion of motor vehicle fleets in Asia and the Pacific region. Between 2000 and 2015, road transport PM10 and NOx emissions increased annually -3% and 0% respectively. Since adopting the SDGs, between 2015 and 2018, the PM and NOx emissions have grown at -5% and -1%, contributing to the highest magnitude of transport air pollution reductions among regions (Figure 48).

87. However, these regional trends vary considerably between Asia's subregions, countries, and even within countries. The shift towards Euro IV and above standards explains the main difference in the magnitude of reductions in PM10 and NOx emissions. As of January 1 2023, 9 countries have already adopted Euro-4 equivalent or higher vehicle emissions standards in Asia and the Pacific region. However, information on emission trends is modeled only until 2018. The impact of recent regulatory changes post-SDGs is not documented.

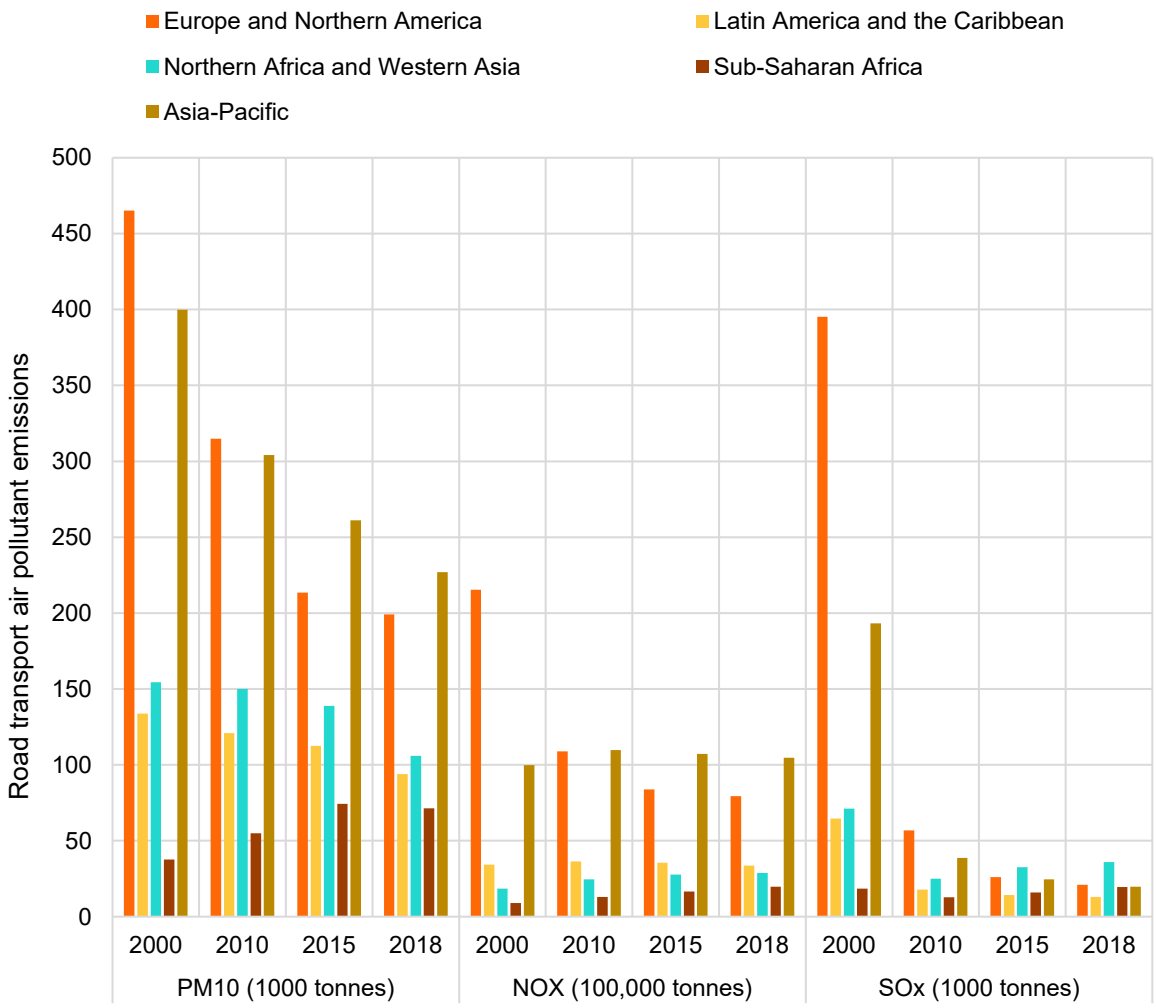


Figure 48 Road Transport Air Pollutant Emissions

Source: ATO National Database APH-VAP-001, APH-VAP-006, APH-VAP-016 (EDGAR 2022). (accessed June 2023).

88. Since 2000, Road transport air pollutant emission reduction in Asia and the Pacific region has outpaced other sectors (Figure 49).

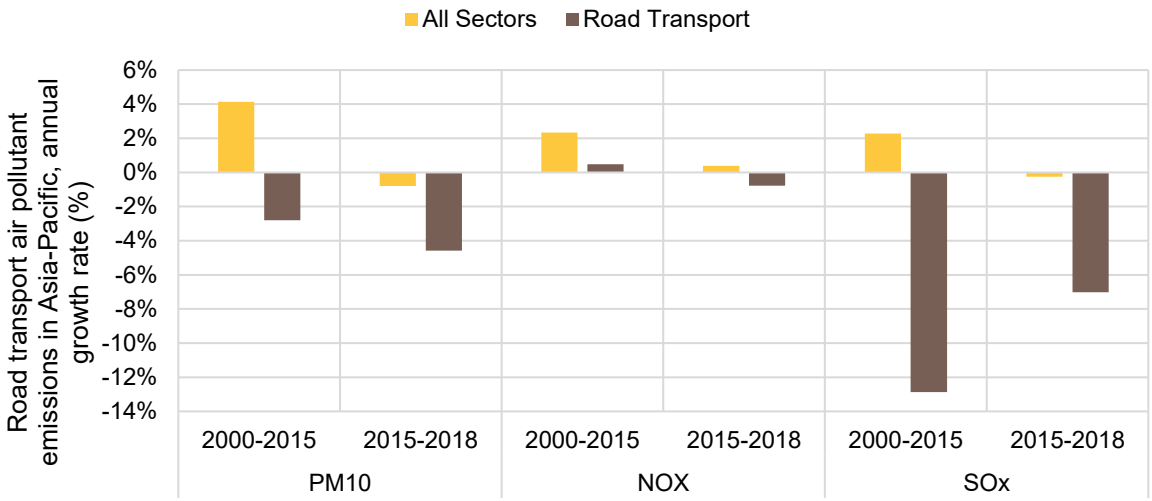


Figure 49 Annual Growth of Road Transport Air Pollutant Emissions

Source: ATO National Database APH-VAP-001, APH-VAP-006, APH-VAP-016 (EDGAR 2022). (accessed June 2023).
Note: PM = particulate matter, NOx = nitrogen oxides, SOx = sulphur oxides

27. Transport Air Pollution Health Impact

89. The economies in the Asia and Pacific region, which accounted for 34% of transport fine particulate matter (PM2.5) emissions in 2019, contributed up to 73% of the transport sector global disease burden associated with PM2.5 mainly due to high population density and exposure rates (Figure 50).

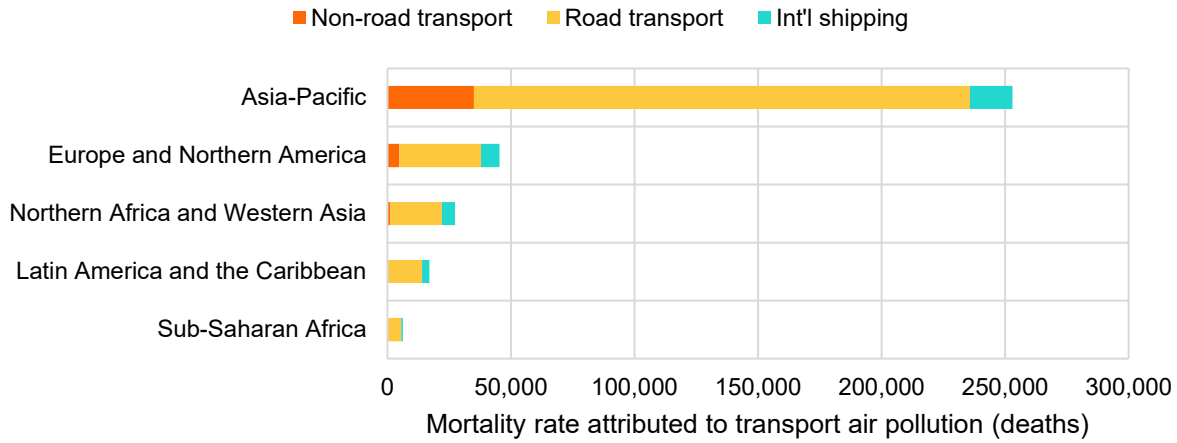


Figure 50: Mortality Rate Attributed to Transport Air Pollution

Source: ATO National Database APH-HAT-002 (McDuffie, et al. 2021) (accessed June 2023).

90. Road diesel vehicles cause a disproportionate share of road transport-related fine particulate matter (PM2.5) and ground-level ozone deaths.

91. Diesel vehicles account for 72% of the road disease burden associated with PM2.5 and ground-level ozone pollution in Asia and the Pacific (Figure 51). High exposure to diesel exhaust fumes is expected in the bus industry, trucking, heavy vehicle repair, mining, and railroads. The number of deaths due to occupational exposure to diesel engine exhaust continues to increase in most parts of Asia, also since the adoption of the SDGs. While there is expanded regulation in some parts of Asia Pacific, the impact of these, often recent regulatory changes, is poorly documented.

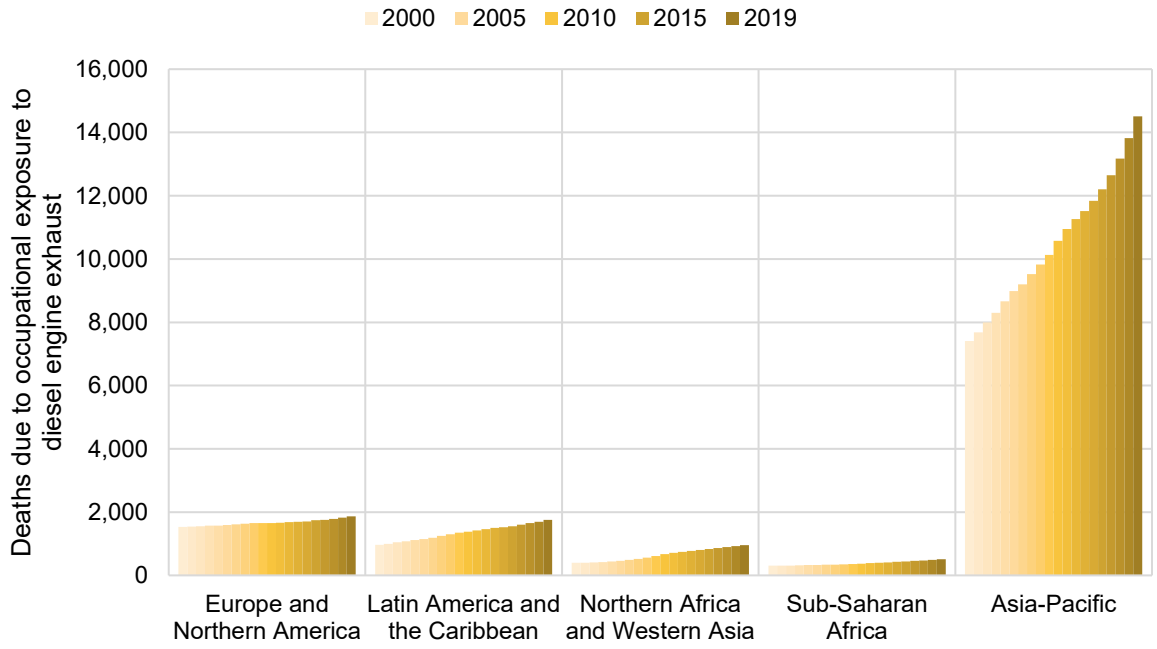


Figure 51: Deaths due to Occupational Exposure to Diesel Engine Exhaust

Source: ATO National Database APH-HAT-001 (GBD 2019). (accessed June 2023).

IX. THEME 7: ROAD SAFETY

92. The SDGs consider road safety a prerequisite to ensure healthy lives, promote well-being, and make cities inclusive, safe, resilient, and sustainable. The road safety landscape varies significantly among countries and regions. However, the emerging pattern reveals growing traffic crash fatalities in developing countries while reducing in upper-middle and high-income economies. Globally, road traffic crashes killed more than 1.27 million people in 2019 (WHO, 2021), the last year for which comparative global data are available (WHO, 2023). Over 90% of these fatalities occurred in low- and middle-income countries. The road safety-related SDG related target is:

- SDG 3.6- By 2020 (2030), halve the number of global deaths and injuries from road traffic accidents (adjusted to 2030)

G. Road safety Indicators

28. Road Crash Fatalities

93. Between 2000 and 2015, road traffic crash deaths increased annually by 0.4% globally and 0.1% in Asia and the Pacific region. They declined annually at a 2.8% rate in Europe and Northern America. However, since adopting the SDGs, up to 2019, global road traffic crash deaths have increased by 0.7% annually, stabilized in Asia and the Pacific, and declined by 2.1% annually in Europe and Northern America region.

94. Since adopting the SDGs, road crash share in total deaths in the Asia Pacific has decreased marginally from 2.4% in 2015 to 2.2% in 2019, indicating marginal improvement in road safety (Figure 52). However, in 2019, Asia and the Pacific contributed the largest share of global traffic crash fatalities, i.e., 56% of total traffic crash fatalities: around 0.7 million people killed due to avoidable road crashes.

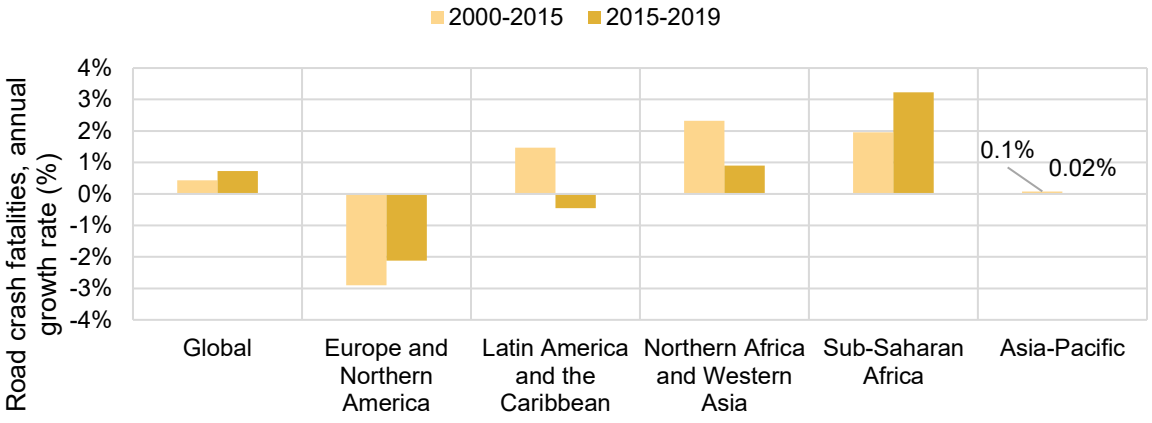


Figure 52: Annual Growth Rate of Road Crash Fatalities

Source: ATO National Database RSA-RSI-001 (WHO 2019). (accessed June 2023).

29. Cost of Fatalities and Injuries as Share of Gross Domestic Product

95. Road crashes are among the ten leading causes of death worldwide. Road traffic injury is also a leading cause of death for children and young adults aged 5–29.

96. The Asian transport outlook considers the methodology developed by IRAP to estimate the historical trend of the economic impact of road crash fatalities (IRAP, 2021). In 2019, deaths and serious injuries were estimated to cause economic damage of 4.2 trillion (USD, PPP) to the world economy and about 2.2 trillion (USD, PPP) in Asia (Figure 53). Depending on the region, these economic impacts amount to 4%–8% of annual GDP (Figure 54). The burden of road fatalities and injuries and their impacts is substantial and disproportionately distributed across countries and world regions.

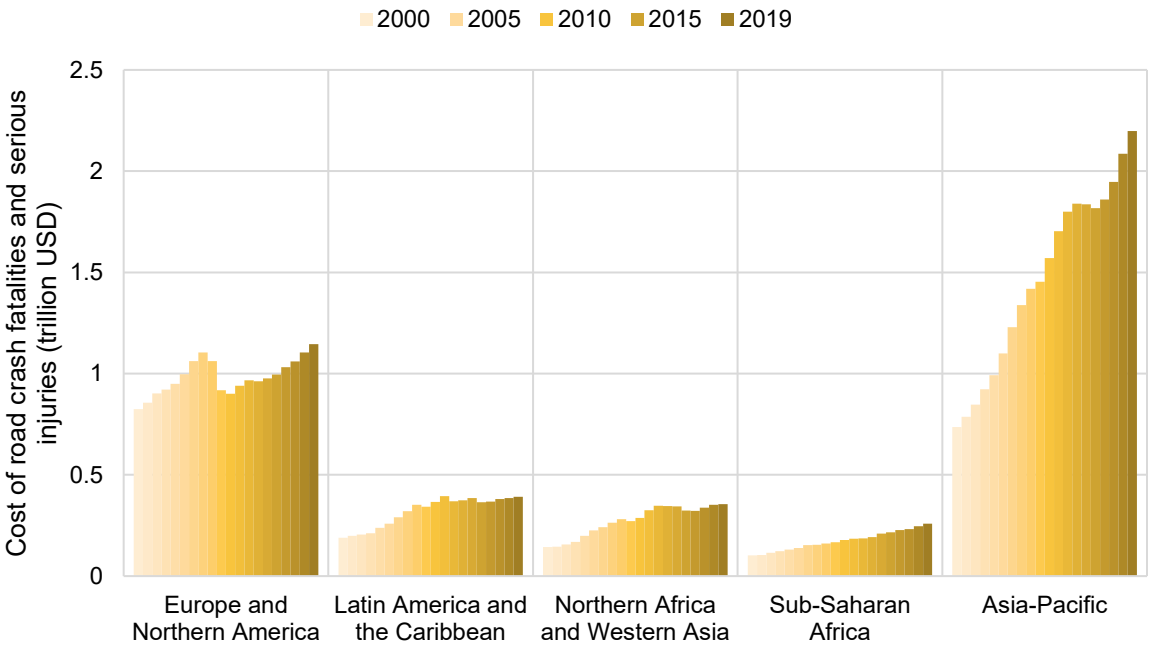


Figure 53: Cost of Road Crash Fatalities and Serious Injuries

Source: ATO National Database RSA-RSI-012 (World Bank 2019), IRAP. (accessed June 2023).

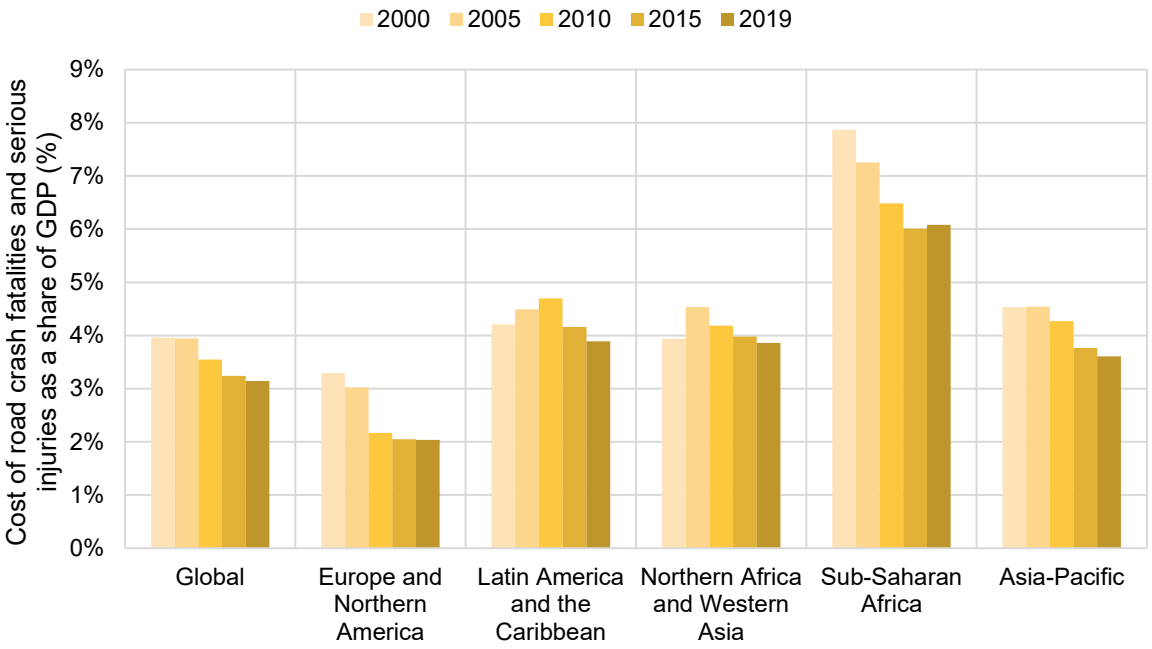


Figure 54: Cost of Road Crash Fatalities and Serious Injuries as a Share of GDP

Source: ATO National Database RSA-RSI-012 (World Bank 2019), IRAP. (accessed June 2023).

30. Share of Road Infrastructure with 3 Stars or Above

97. Star ratings by the International Road Assessment Programme (1-star being the least safe while 5-star rated as the safest) (IRAP(b), 2021), derived using road inspection surveys, provide a simple measure of the level of safety offered by a road infrastructure design for vehicle occupants, motorcyclists, bicyclists, and pedestrians. The International Road Assessment Programme considers improving the world's roads to at least a 3-star or better standard essential for achieving the SDGs.

98. Based on a survey of 185,000 kilometers of roads in Asia and the Pacific, i.e., about 1.2% of the total road network, most existing road network infrastructure elevates the crash risks. The current share of 3-star and above infrastructure of the surveyed roads is only about 13%, 19%, 28%, and 42% for pedestrians, bicyclists, motorcyclists, and vehicle occupants (Figure 55).

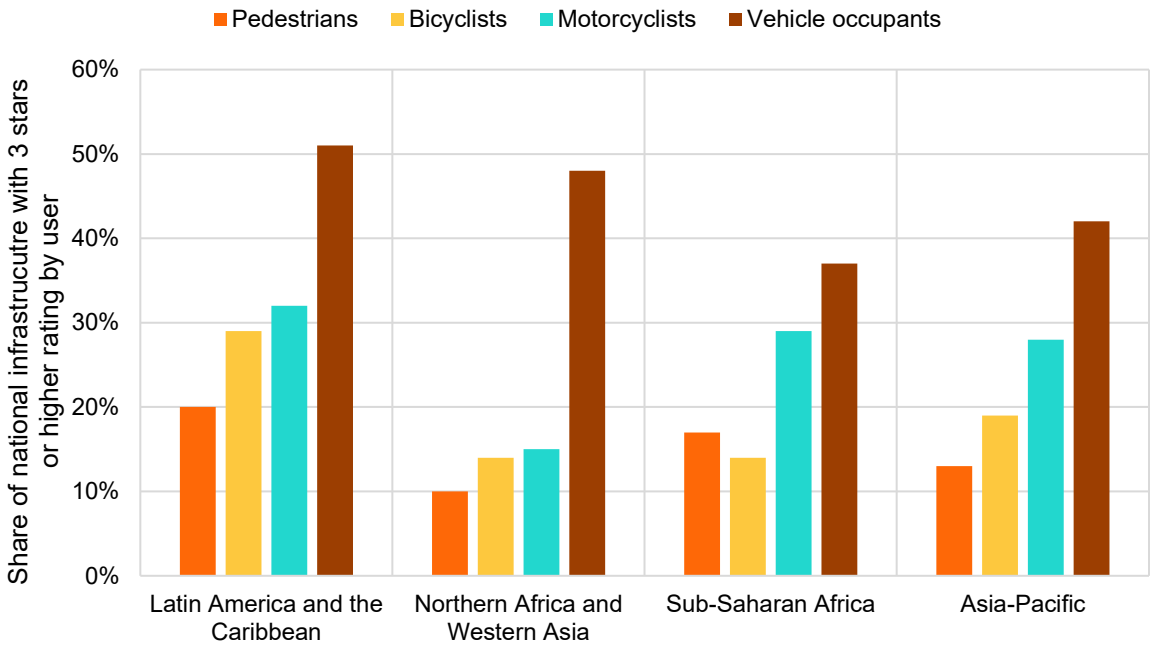


Figure 55: Share of National Infrastructure with 3 Stars or Higher Rating by User

Source: ATO National Database RSA-SRI-009, RSA-SRI-010, RSA-SRI-011, RSA-SRI-012, (IRAP 2023). (accessed June 2023).

X. CONCLUSION

99. SDGs incorporate different sectors in different manners. Some sectors, like energy, have a dedicated SDG, while others, like transport, have weak sectoral underpinning. Assessing progress on SDG targets related to transportation poses challenges due to the inherent vagueness and absence of quantified objectives. Many transport-relevant SDG targets utilize phrases such as "increase substantially" or "double the share," which lack specificity and hinder meaningful measurement. Also, the targets or indicators do not reflect countries' different national contexts and starting points.

100. A multi-dimensional assessment of Asia's transport sector contribution to SDGs across regions, sectors, and time provides a pessimistic outlook for achieving the relevant SDG targets by 2030. However, the silver lining is that since 2015, Asian countries have narrowed the SDG gap and not widened it, as summarised below:

H. Transport Progress in Asia Compared with Other Regions[2]

101. Since adopting SDGs, for 27 aggregated or disaggregated indicators where the comparison with other regions (combined) was possible, Asia and the Pacific seemed to have faired better in 60% of the indicators than other regions (Figure 56).

102. However, it is essential to note that in most of these indicators, Asia and the Pacific region making better progress may be due to a very low baseline, and progress may have slowed down in some parameters as they gain critical mass or move closer to the targets. Overall, Asia is catching up on the disparity of transport infrastructure (roads, railways, urban rapid transit systems), but the gap in externalities and its economic implications remains significant (Figure 57, Figure 58).

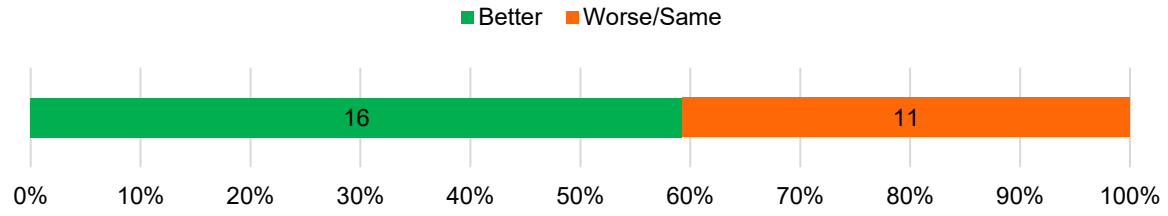


Figure 56: Comparing Asia-Pacific with other regions (combined)

Source: Authors

[2] Other regions are considered after removing the Asia from global

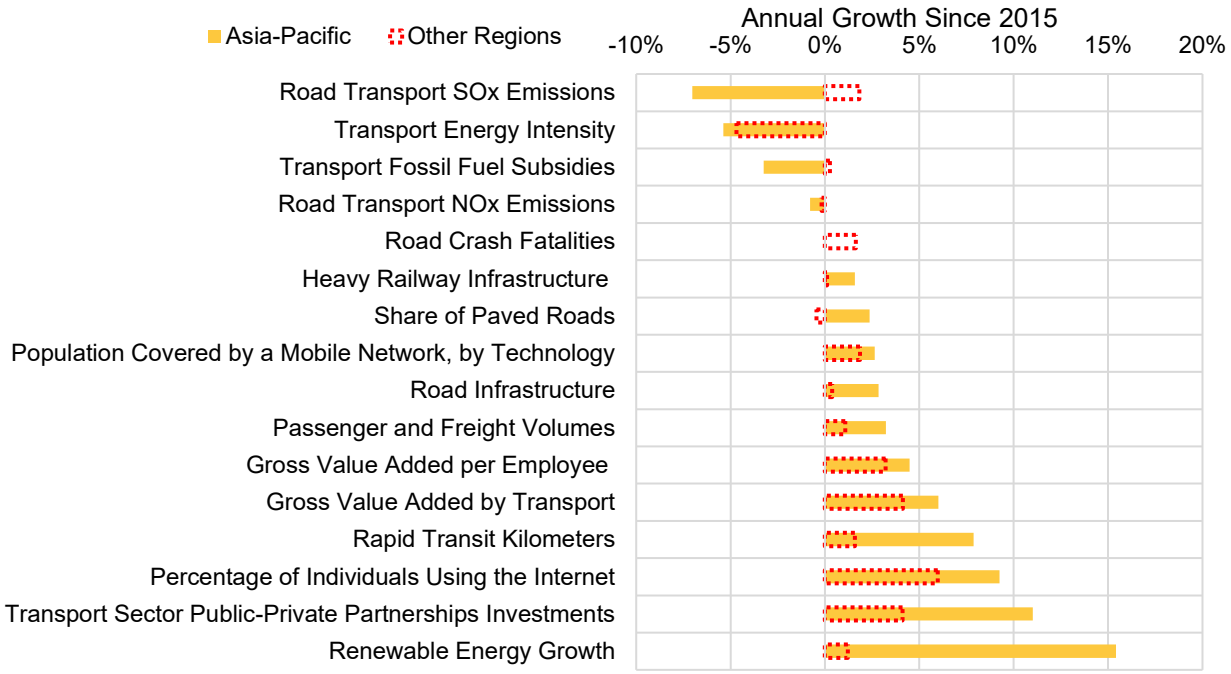


Figure 57: Indicators where Asia-Pacific progress is better than other regions (combined)

Source: Authors

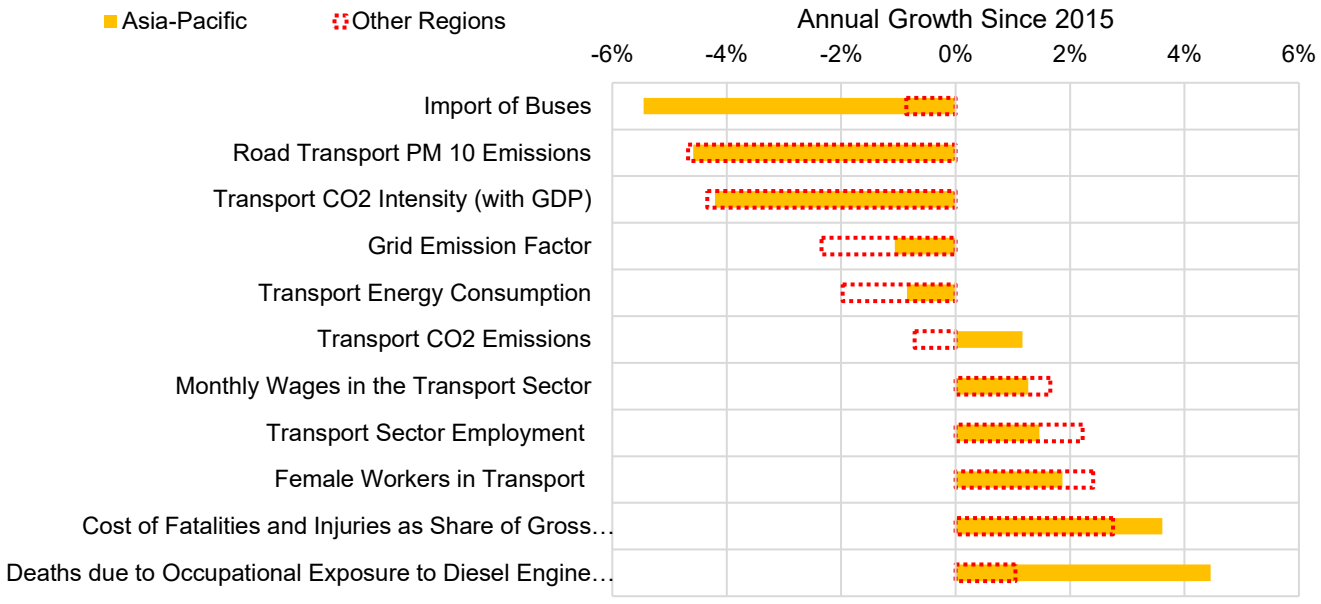


Figure 58: Indicators where Asia-Pacific progress is worse or the same as other regions (combined)

Source: Authors

I. Transport Progress Comparison with Other Sectors[3] in Asia

103. Since adopting the SDGs, out of 16 indicators where the comparison with other sectors (combined) was possible within Asia, the region's transport sector performed better than the other sectors in 88% of the indicators (Figure 59). However, it is also essential to note that the transport sector may progress better in some indicators because they advance from a very low baseline. Progress may have slowed down in other sectors or indicators as they reach a critical mass. While we did not investigate in detail which specific sector outperforms other sectors across different SDG goals, one could generalize based on the evidence that the transport sector is not the most difficult or the worst-performing sector in Asia and the Pacific region but rather a sector that shows potential for transformation. (Figure 60, Figure 61).

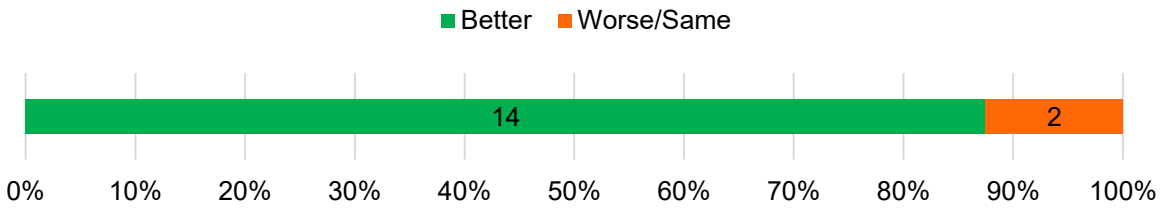


Figure 59: Comparing Transport Sector Progress with Other Sectors in Asia and the Pacific
Source: Authors

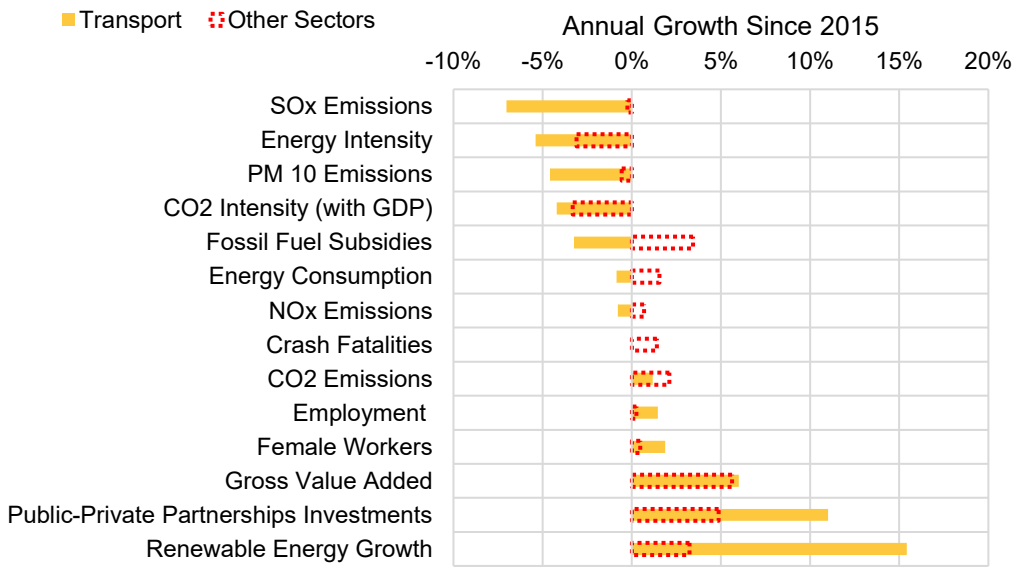


Figure 60: Indicators where transport is outperforming other sectors in Asia and the Pacific (combined)
Source: Authors

[3] Other sectors are considered after removing transport from the economywide estimates for Asia

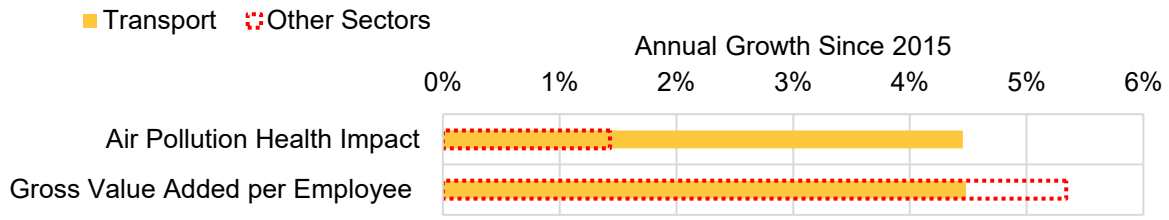


Figure 61: Indicators where transport is underperforming other sectors within Asia and the Pacific

Source: Authors

J. Historical Progress in the Transport Sector in Asia and the Pacific

104. Considering the historical trends in the transport sector in Asia, transport is improving slowly. When we compare the historical trends for 27 indicators - where comparison over time is possible - between the periods before and after the adoption of the SDGs, the data indicates that the transport sector is making good progress in 19% of the indicators, essentially being on track towards contributing to the SDGs. (Figure 62). Further, progress has been made slowly for 62% of the indicators. However, minimal progress has been achieved for the other 19% of indicators. Overall, the good news is that the Asia and Pacific countries have narrowed the SDG gap and not widened it. The bad news is that the rate of progress is still too slow, and the existing gap is too broad. (Figure 63).

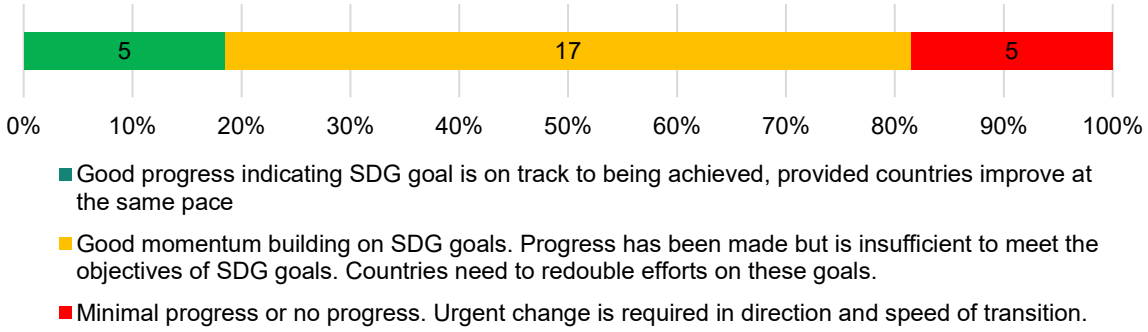


Figure 62: Historical Progress in Improvement of Transport SDG Indicators

Source: Authors

Figure 63: Status of indicators comparing with Pre- and Post- SDGs

Note : Indicator Years (Pre-SDG, Post-SDG) Road Crash Fatalities (2000-2015, 2015-2019), Cost of Fatalities and Injuries as Share of Gross Domestic Product (2010, 2019), Road Transport PM 10 Emissions (2000-2015, 2015-2018), Road Transport NOx Emissions (2000-2015, 2015-2018), Road Transport SOx Emissions (2000-2015, 2015-2018), Deaths due to occupational exposure to diesel engine exhaust (2010-2015, 2015-2019), Transport Energy Consumption (2000-2015, 2015-2020), Renewable Energy Growth (2000-2015, 2015-2020), Transport Energy Intensity (2000-2015, 2015-2020), Gross Value Added by Transport (2000-2015, 2015-2021), Gross Value Added per Employee (2000-2015, 2015-2021), Transport Sector Employment (2000-2015, 2015-2021), Female Workers in Transport (2000-2015, 2015-2021), Monthly Wages in the Transport Sector (2012-2015, 2015-2021), Road Infrastructure (2000-2015, 2015-2020), Heavy Railway Infrastructure (2000-2015, 2015-2021), Passenger and freight volumes (2010-2015, 2015-2021), Share of Paved Roads (2008-2015, 2015-2020), Population Covered by a Mobile Network, by Technology (2012-2014, 2016-2020), Percentage of Individuals Using the Internet (2000-2015, 2015-2021), Rapid Transit Kilometers (2000-2015, 2015-2020), Import of Buses (2003-2015, 2015-2022), Transport Fossil Fuel Subsidies (2010-2015, 2015-2021), Transport CO2 Emissions (2000-2015, 2015-2021), Transport CO2 Intensity (with GDP) (2000-2015, 2015-2021), Grid Emission Factor (2000-2015, 2015-2021), Transport Sector Public-Private Partnerships Investments (2000-2015, 2015-2022)

Source: Authors

105. The transport SDG nexus could be viewed in terms of direct and indirect impact. Overall, our assessment (Table 2) shows that the transport sector in Asia is not delivering change at the speed and scale required by the SDGs. Early efforts after the SDGs were adopted have produced some favorable trends; however, significant work remains for most of the transport-related SDG targets:

- Good progress on SDG goals related to energy efficiency, renewable energy, information and communications technology, fossil-fuel subsidies, and PPP projects.
- Limited and initial momentum building on SDG goals related to air pollution, road safety, climate change, climate finance, climate resilience, resource-use efficiency, urban public transport, rural access, and economic growth. Economies now need to redouble efforts on these goals.
- Minimal progress or regression on SDG goals related to transport sector employment.
- Surprisingly, the transport sector has only made limited progress across goals and targets directly identified in the SDG process i.e. road safety, infrastructure and rural road and urban transit access, i.e., SDG 9.1, SDG 11.2 and SDG 3.6.

Table 2: SDG Status Assessment

SDG Goals/Targets		Transport Sector Objective	Assessment
Direct	SDG 3.6	Road Safety	
	SDG 9.1	Equitable Access	
	SDG11.2	Urban Public Transport	
Indirect	SDG 3.9, SDG 11.6	Air Pollution	
	SDG 7.2	Renewable Energy	
	SDG 7.3	Energy Efficiency	
	SDG 8.1	Economic Growth	
	SDG 8.5	Employment	
	SDG 9.c	Information and Communications Technology	
	SDG 1.5, SDG 11.5, SDG 13.1	Climate Resilience	
	SDG 12.c	Fossil-fuel Subsidies	
	SDG 13.a	Climate Finance	
	SDG 13.2, SDG 9.4	Climate Change, Resource-use Efficiency	
	SDG 17.17	PPPs	
Assessment Criteria			
• Good progress when compared across sectors, regions and from a historical perspective			
• Good momentum building on SDG goals. Progress has been made but is insufficient to meet the objectives of SDG goals. Countries need to redouble efforts on these goals.			
• Minimal progress or no progress. Urgent change is required in direction and/or speed of transition.			

106. Since 2020, the world economy has faced severe and mutually reinforcing shocks. Although the complete impact of the shocks is yet to be fully quantified, the data from 2020 to 2022 on a limited number of indicators are beginning to reveal the effects of recent policies and investments. Some trends also establish that matching the right policies with investments can yield a transformational outcome, i.e., marginal reductions in energy intensity, carbon intensity,

air pollutant emissions, road crash fatalities, and transport productivity despite rapid growth in mobility, indicating that transport externalities could decouple with economic and demand growth even in developing regions. There is a substantial SDG gap, and continued efforts, collaborations, investments, and innovative approaches are necessary to accelerate progress. However, Asian Transport Outlook reference projections (ATO(b), 2022) suggest fully achieving all transport-related SDG targets in the remaining seven years will be difficult.

107. The analysis of the transport-related SDG targets in Asia revealed an inherent tension between different categories of those targets – especially among economic and environmental dimensions. The world's transport-inaccessible population remains overwhelmingly concentrated in some parts of the world. Currently, most Asian countries, like other developing parts of the world, although catching up, still have comparatively lower transport infrastructure and services, as well as activity levels, than the developed world. Progressing towards attaining the infrastructure-related transport SDG target 9.1 and the associated rural and urban access-related indicators will likely further increase road-based transport activity. Increasing road-based passenger and freight transport activity will make it more challenging to realize several sustainability-related SDG targets related to air pollution, road safety, energy efficiency, and climate change.

108. While transport sector challenges are interrelated, we find significant heterogeneity in transport sector performance along the three sustainability dimensions across sub-regions, urban and rural areas, and modes, resulting in uneven progress.

109. The significant deficiency in access-related goals and targets indicates that countries and development agencies cannot ignore the development of sustainable transport infrastructure and services. While climate change is increasingly dominating the development discussions, including in the transport sector, the priorities for many of the economies in Asia and the Pacific economies still focus on creating adequate transport infrastructure and services to support and facilitate growth in the economy and society.

110. Our assessment is incomplete due to persistent challenges in securing timely and consistent data across 30 indicators – across regions, economies, time, series, and sectors. We found significant data gaps in geographic coverage, timeliness, and disaggregation.

111. The choice of indicators used in this assessment does not represent prioritizing indicators or targets since all goals and targets are equally important. Although the regional figures presented here are a convenient way to track progress, the situation of individual countries and geographical areas within a country may vary significantly from regional averages. We have developed 50 economy profiles on transport-related SDG progress to make a start by describing progress at the national level.

112. Despite the region's slow progress, there are reasons to be optimistic about individual country achievements. There are areas where some economies and modes have made quicker progress. We will update the profiles in 2024 with better data and information on transport sector policies.

XI. REFERENCES

ATO. (2022). *2021 Report on the Status of Transport Related SDG Targets in Asia and the Pacific Region.* Retrieved from https://asiantransportoutlook.com/analytical-outputs/sdg-report/

ATO(b). (2022). *Asian Transport 2030 Outlook.* Retrieved from https://asiantransportoutlook.com/analytical-outputs/asian-transport-2030-outlook/

CBI. (2023). *Climate Bonds Standard Version 4.0: Entity, Asset, Use of Proceeds and Sustainability-Linked Debt Instrument Certification*. Retrieved from https://www.climatebonds.net/climate-bonds-standard-v4

DNV. (2022). *ENERGY TRANSITION OUTLOOK 2022*. Retrieved from https://www.dnv.com/energy-transition-outlook/download.html

IEA. (2022). *Energy consumption in transport by fuel in the Net Zero Scenario, 2000-2030*. Retrieved from https://www.iea.org/data-and-statistics/charts/energy-consumption-in-transport-by-fuel-in-the-net-zero-scenario-2000-2030

IEA. (n.d.). *Transport*. Retrieved from https://www.iea.org/energy-system/transport#content

IRAP. (2021). *Investing for impact*. Retrieved from https://irap.org/safety-insights/investing-for-impact/

IRAP(b). (2021). *Star Ratings*. Retrieved from https://irap.org/rap-tools/infrastructure-ratings/star-ratings/#:~:text=iRAP%20Star%20Ratings%20are%20used,motorcyclists%2C%20bicyclists%2C%20and%20pedestrians

ITF. (2023). *ITF Transport Outlook 2023.* Retrieved from https://www.itf-oecd.org/itf-transport-outlook-2023

ITU. (2021). *Digital technologies to achieve the UN SDGs*. Retrieved from https://www.itu.int/en/mediacentre/backgrounders/Pages/icts-to-achieve-the-united-nations-sustainable-development-goals.aspx

ITU. (2023). *Mobile network coverage*. Retrieved from https://www.itu.int/itu-d/reports/statistics/2022/11/24/ff22-mobile-network-coverage/

SDSN. (2023). *SDG 9 Indicator*. Retrieved from https://dashboards.sdgindex.org/map/indicators/rural-population-with-access-to-all-season-roads/values

UN. (2023). *Progress towards the Sustainable Development Goals: Towards a Rescue Plan for People and Planet.* Retrieved from https://hlpf.un.org/sites/default/files/2023-04/SDG%20Progress%20Report%20Special%20Edition.pdf

UNSTATS. (2021). *SDG indicator metadata*. Retrieved from https://unstats.un.org/sdgs/metadata/files/Metadata-11-02-01.pdf

WHO. (2021). *Global Health Observatory data repository*. Retrieved from https://apps.who.int/gho/data/view.main.RoadTrafficDeathREG?lang=en

WHO. (2023). *Advisory Board for the Global Status Report on Road Safety 2023*. Retrieved from https://www.who.int/publications/m/item/advisory-board-for-the-global-status-report-on-road-safety-2023

WOL. (2020). *Measuring rural access for SDG 9.1.1.* Retrieved from https://onlinelibrary.wiley.com/doi/full/10.1111/tgis.12721

APPENDIX 1: REGIONAL GROUPING OF COUNTRIES

Europe and Northern America	Latin America and the Caribbean	Northern Africa and Western Asia	Sub-Saharan Africa	Asia-Pacific
Åland Islands	Anguilla	Algeria	Angola	Afghanistan
Albania	Antigua and Barbuda	Bahrain	Benin	Armenia
Andorra	Argentina	Cyprus	Botswana	Australia
Austria	Aruba	Egypt	British Indian Ocean Territory	Azerbaijan
Belarus	Bahamas	Iraq	Burkina Faso	Bangladesh
Belgium	Barbados	Israel	Burundi	Bhutan
Bermuda	Belize	Jordan	Cabo Verde	Brunei Darussalam
Bosnia and Herzegovina	Bolivia (Plurinational State of)	Kuwait	Cameroon	Cambodia
Bulgaria	Bonaire, Sint Eustatius and Saba	Lebanon	Central African Republic	People's Republic of China
Canada	Bouvet Island	Libya	Chad	Cook Islands
Croatia	Brazil	Morocco	Comoros	Fiji
Czechia	British Virgin Islands	Oman	Congo	Georgia
Denmark	Cayman Islands	Qatar	Côte d'Ivoire	Hong Kong, China
Estonia	Chile	Saudi Arabia	Democratic Republic of the Congo	India
Faroe Islands	Colombia	State of Palestine	Djibouti	Indonesia
Finland	Costa Rica	Sudan	Equatorial Guinea	Iran (Islamic Republic of)
France	Cuba	Syrian Arab Republic	Eritrea	Japan
Germany	Curaçao	Tunisia	Eswatini	Kazakhstan
Gibraltar	Dominica	Turkey	Ethiopia	Kiribati
Greece	Dominican Republic	United Arab Emirates	French Southern Territories	Kyrgyz Republic
Greenland	Ecuador	Western Sahara	Gabon	Lao People's Democratic Republic
Guernsey	El Salvador	Yemen	Gambia	Malaysia
Holy See	Falkland Islands (Malvinas)		Ghana	Maldives

Europe and Northern America	Latin America and the Caribbean	Northern Africa and Western Asia	Sub-Saharan Africa	Asia-Pacific
Hungary	French Guiana		Guinea	Marshall Islands
Iceland	Grenada		Guinea-Bissau	Micronesia (Federated States of)
Ireland	Guadeloupe		Kenya	Mongolia
Isle of Man	Guatemala		Lesotho	Myanmar
Italy	Guyana		Liberia	Nauru
Jersey	Haiti		Madagascar	Nepal
Latvia	Honduras		Malawi	New Zealand
Liechtenstein	Jamaica		Mali	Niue
Lithuania	Martinique		Mauritania	Pakistan
Luxembourg	Mexico		Mauritius	Palau
Malta	Montserrat		Mayotte	Papua New Guinea
Monaco	Nicaragua		Mozambique	Philippines
Montenegro	Panama		Namibia	Republic of Korea
Netherlands	Paraguay		Niger	Russian Federation
North Macedonia	Peru		Nigeria	Samoa
Norway	Puerto Rico		Réunion	Singapore
Poland	Saint Barthélemy		Rwanda	Solomon Islands
Portugal	Saint Kitts and Nevis		Saint Helena	Sri Lanka
Republic of Moldova	Saint Lucia		Sao Tome and Principe	Taipei,China
Romania	Saint Martin (French Part)		Senegal	Tajikistan
Saint Pierre and Miquelon	Saint Vincent and the Grenadines		Seychelles	Thailand
San Marino	Sint Maarten (Dutch part)		Sierra Leone	Timor-Leste
Sark	South Georgia and the South Sandwich Islands		Somalia	Tonga
Serbia	Suriname		South Africa	Turkmenistan

Europe and Northern America	Latin America and the Caribbean	Northern Africa and Western Asia	Sub-Saharan Africa	Asia-Pacific
Slovakia	Trinidad and Tobago		South Sudan	Tuvalu
Slovenia	Turks and Caicos Islands		Togo	Uzbekistan
Spain	United States Virgin Islands		Uganda	Vanuatu
Svalbard and Jan Mayen Islands	Uruguay		United Republic of Tanzania	Viet Nam
Sweden	Venezuela (Bolivarian Republic of)		Zambia	
Switzerland			Zimbabwe	
Ukraine				
United Kingdom of Great Britain and Northern Ireland				
United States of America				

APPENDIX 2: INCOME LEVEL GROUPING OF COUNTRIES

Low and lower middle income	Upper middle income	High income
Afghanistan	Armenia	Australia
Bangladesh	Azerbaijan	Brunei Darussalam
Bhutan	People's Republic of China	Hong Kong, China
Cambodia	Cook Islands	Japan
India	Fiji	Nauru
Indonesia	Georgia	New Zealand
Iran (Islamic Republic of)	Kazakhstan	Palau
Kiribati	Malaysia	Republic of Korea
Kyrgyz Republic	Maldives	Singapore
Lao People's Democratic Republic	Marshall Islands	Taipei,China
Micronesia (Federated States of)	Niue	
Mongolia	Russian Federation	
Myanmar	Thailand	
Nepal	Tonga	
Pakistan	Turkmenistan	
Papua New Guinea	Tuvalu	
Philippines		
Samoa		
Solomon Islands		
Sri Lanka		
Tajikistan		
Timor-Leste		
Uzbekistan		
Vanuatu		
Viet Nam		

Appendix 2 71