



Slowing, Not Yet Falling: Transport Emissions in Asia and the Pacific

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A Primer for COP31

October 2026

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Slowing, Not Yet Falling: Transport Emissions in Asia and the Pacific. A Primer for COP31

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In this report, “\$” refers to United States dollars.

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Abbreviations

ATO – Asian Transport Observatory

CO₂ – carbon dioxide

COP31 – 31st session of the Conference of the Parties

CRS – Creditor Reporting System

EV – electric vehicle

GDP – gross domestic product

GHG – greenhouse gas

IEA – International Energy Agency

IIASA – International Institute for Applied Systems Analysis

JRC – Joint Research Centre

NDC – nationally determined contribution

OECD – Organisation for Economic Co-operation and Development

PRC – People's Republic of China

UIC – International Union of Railways



Photo: Shripad Tak / Unsplash

Executive Summary

The previous Asian Transport Observatory primer for the 30th session of the Conference of the Parties found that, across the region, aspiration outpaced action. This edition adds a year of data and an oil shock. The news is better than in the previous edition. Transport emissions in Asia and the Pacific are still rising, but the curve is bending.

Growth has slowed. Annual growth in the region's transport emissions fell from 4.1% during the 15 years to 2015 to 2.2% after the Paris Agreement. Before 2015, two-thirds of Asian economies recorded high or very high growth. Since 2015, the share has been about a third. East Asia leads: its annual growth dropped from 4.2% to 1.8%. Decoupling from economic growth is visible in high-income economies and is gathering pace elsewhere. Central and West Asia have eased only slightly, from 4.1% to 3.7%, so the gains are not yet shared.

Transport is not the fastest-growing part of Asia's emissions problem. It makes up 9.3% of the region's emissions, the lowest share in the world, against 26% in Europe and North America. The power sector is growing faster. Economic growth can continue without transport taking a larger slice of the carbon budget, which breaks with the historical pattern in developed regions.

The region's transport sector emitted 3 billion tons of greenhouse gases in 2025, 9% more than Europe and North America combined. Asia supplied nearly 87% of the global increase after the Paris Agreement and will account for at least half of the global increase in transport demand to 2050. The global outcome depends on what happens here, for better or worse.

Road transport produced about 88% of the sector's emissions in 2025, so road is where progress counts most. Electric vehicles took 53% of new car sales in the People's Republic of China, and other economies are catching up. The carbon saved depends on the grid. Transport has the lowest share of renewable energy of any end-use sector, about 6% of final consumption in 2023, which leaves plenty of room to grow. Biofuels are rising from a small base. Five economies account for about 90% of the region's biofuel emissions.

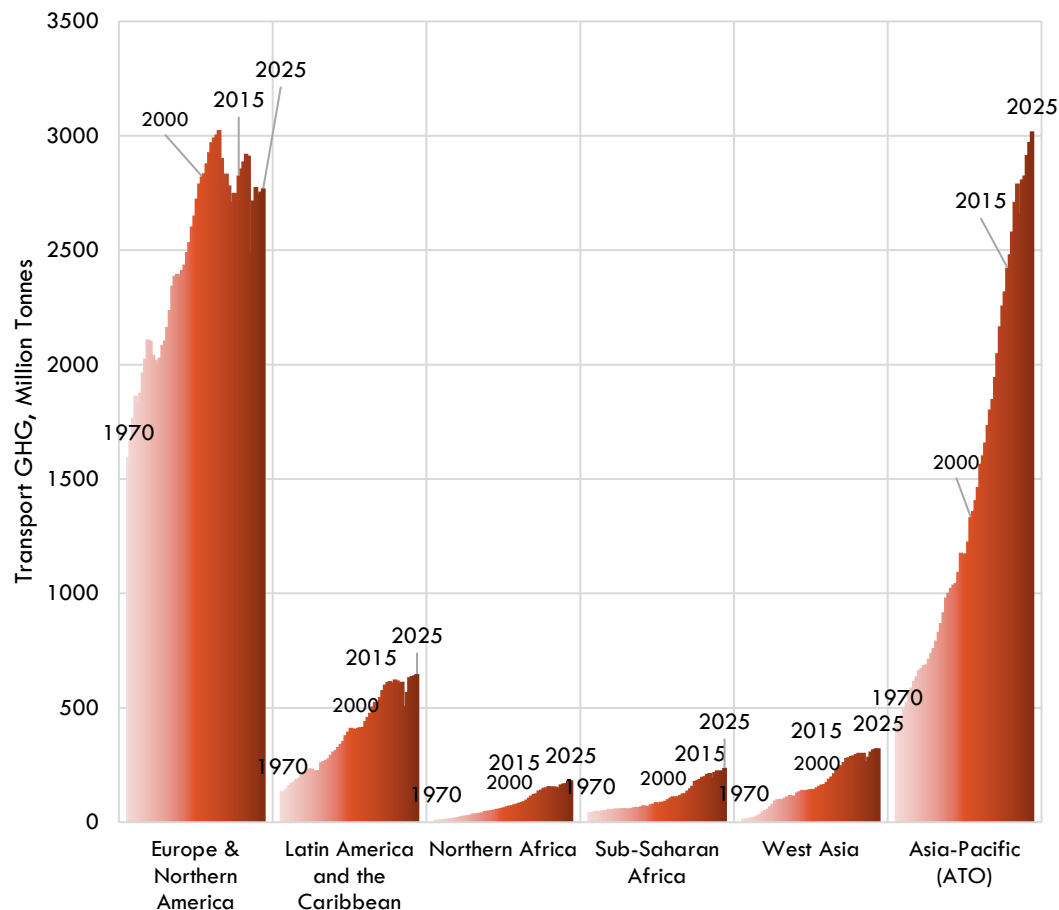
Other modes are mixed. Domestic shipping has partly decoupled, though the People's Republic of China produces nearly two-thirds of its emissions. Railway emissions grew 2.4% a year between 2015 and 2025, up from 0.7% between 2000 and 2015. Domestic aviation is only 0.6% of the region's emissions, but it is growing faster than any other major energy-consuming sector. Private vehicle use rose in 207 of the 224 cities sampled, and about 1.4 billion urban residents have no access to public transport. These gaps are also openings for public transport investment.

Policy gives more reason for optimism than the data. In 2015, less than 1% of the region's people lived in countries with ambitious long-term climate goals. By 2026, the share was 87%. The next step is turning that ambition into sector accountability. Only a few economies reviewed set quantified transport emission targets in their latest nationally determined contributions. Adaptation is largely absent from those pledges, although the region carries 65% of the expected annual damage to transport infrastructure worldwide. Finance is narrow. Broader targets, adaptation plans, and finance would build on what is already in place.

The oil shock that followed the outbreak of conflict in the Middle East in February 2026 has made transport decarbonization as much an energy security issue as a climate one. That may help. It may also tempt governments back to fossil fuel subsidies. Demand for passenger and freight transport could double or even quadruple by 2050, and current trends remain largely incompatible with the Paris Agreement. But the tools to bend the curve exist, and they are already working in parts of the region. Projections suggest transport greenhouse gas emissions could peak in the early 2030s if low-carbon efforts intensify. The task for the 31st session of the Conference of the Parties (COP31) is to turn broad pledges into sector targets, adaptation plans, and finance that reach beyond a few economies.

1 Asia Leads the World in Transport Emissions

Asia and the Pacific emitted 3 billion tons of transport greenhouse gases in 2025, 9% more than Europe and North America combined.



Asia and the Pacific drive global transport emissions. In 2025, domestic transport in the region emitted 3 billion tons of greenhouse gas (GHG), 9% more than Europe and North America combined. The trend matters more than the level. Since the Paris Agreement took effect, the region's transport emissions have grown by 2.2% a year, compared with 1% a year worldwide, and Asia has supplied nearly 87% of the global increase in the sector. Its share of world domestic transport GHG emissions was 37% in 2015. It was 42% in 2025. The 31st session of the Conference of the Parties (COP31) cannot close the transport decarbonization gap without Asia.

Asia's share of emissions looks very different from its volume. Transport makes up 9.3% of GHG emissions in Asia and the Pacific, against 26% in Europe and North America. That is the lowest share in the world, and it has barely moved since 2000.

Figure 1: Domestic Transport Greenhouse Gas Emissions, 2000–2025 (million tons)

Source: ATO analysis and visualization based on JRC and IEA (2026) and World Bank (2026).

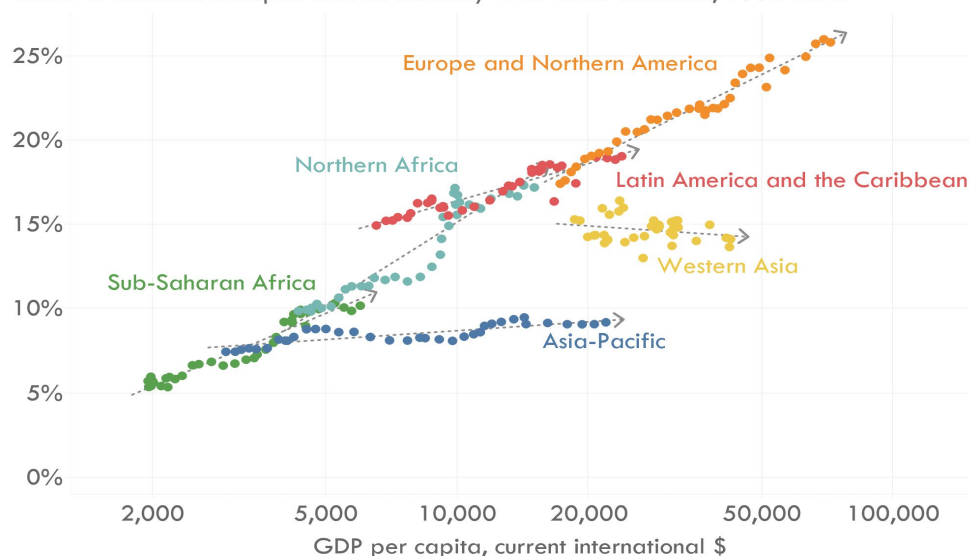
In Europe, North America, and sub-Saharan Africa, transport's share of GHG emissions has kept rising, faster than that of other sectors. The conventional view, drawn from developed regions, holds that transport takes a larger slice of the carbon budget as incomes rise (Gota et al. 2022). Figure 2 sets each region's transport share of GHG emissions against its gross domestic product (GDP) per capita.

In Asia, transport emissions are growing in absolute terms, but those from the rest of the economy, especially the power industry, are growing at least as fast. Since 2000, transport has grown more slowly than the power industry and industrial combustion and processes. Since the Paris Agreement took effect, transport has been the third-fastest-growing sector, behind the power industry and fuel exploitation (Figure 3). A sector's share holds steady when the sector grows as fast as the total, and it falls when other sectors grow

faster. Because other sectors have grown at least as fast, transport has not gained share in the regional total.

Economic growth can therefore continue without transport's share of emissions rising in step. This break with the historical norm points to a different path for low-carbon transport development. On that path, action to decarbonize transport keeps pace with action in other sectors rather than lagging behind. A low share does not mean a small problem. Transport emissions in the region are still rising, and a small share of a large, growing total is still a large number.

Share of domestic transport in total economy-wide GHG emissions, 1990-2025



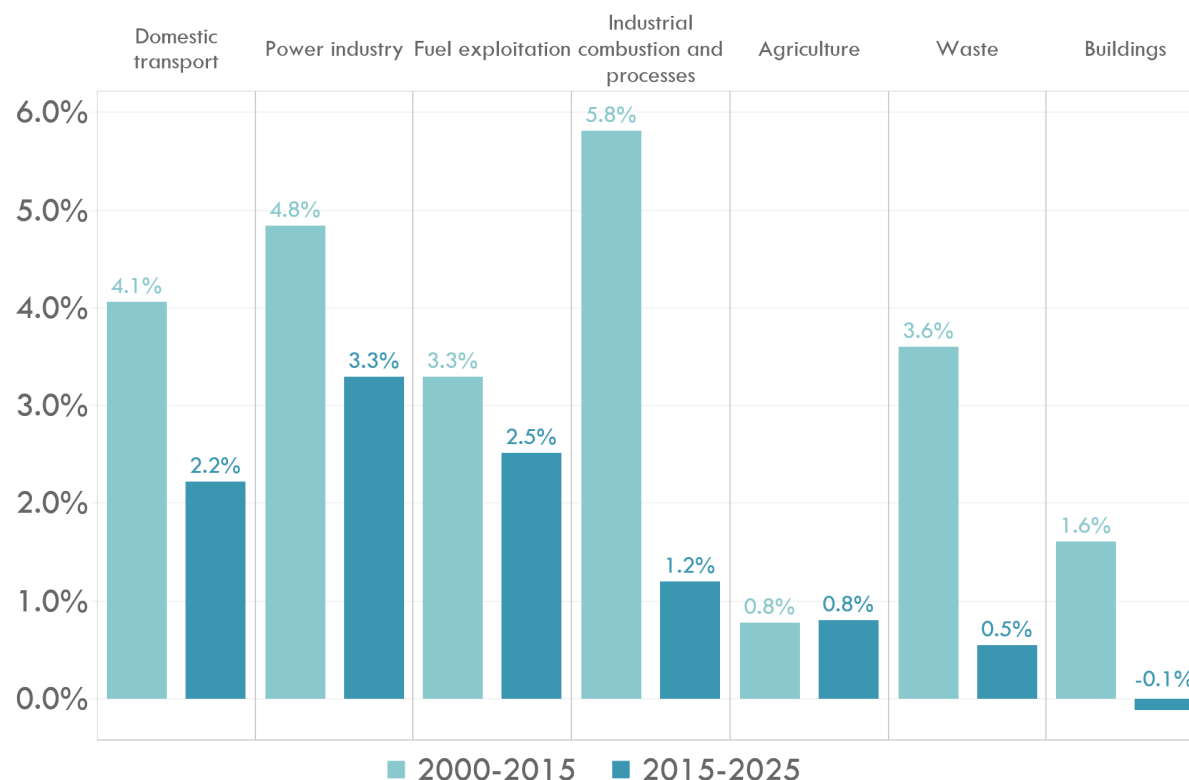
Includes fossil fuel and biofuel consumption. Other transportation is not included.

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Figure 2: Share of Domestic Transport in Economy-wide Greenhouse Gas Emissions and Gross Domestic Product per Capita

Source: ATO analysis and visualization based on JRC and IEA (2026) and World Bank (2026).

GHG emissions, average annual growth rate



Includes fossil fuel and biofuel consumption. Other transportation is not included under domestic transport.

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Figure 4 shows the transport share of Asia's GHG emissions by subregion from 1970 to 2025, excluding land use, land-use change, and forestry. Subregions differ. The Pacific typically records the highest transport share of domestic GHG emissions. Most small island states import almost all their fuel and rely on road and inter-island transport for domestic movement and trade access, so transport accounts for a larger share of a smaller economy.

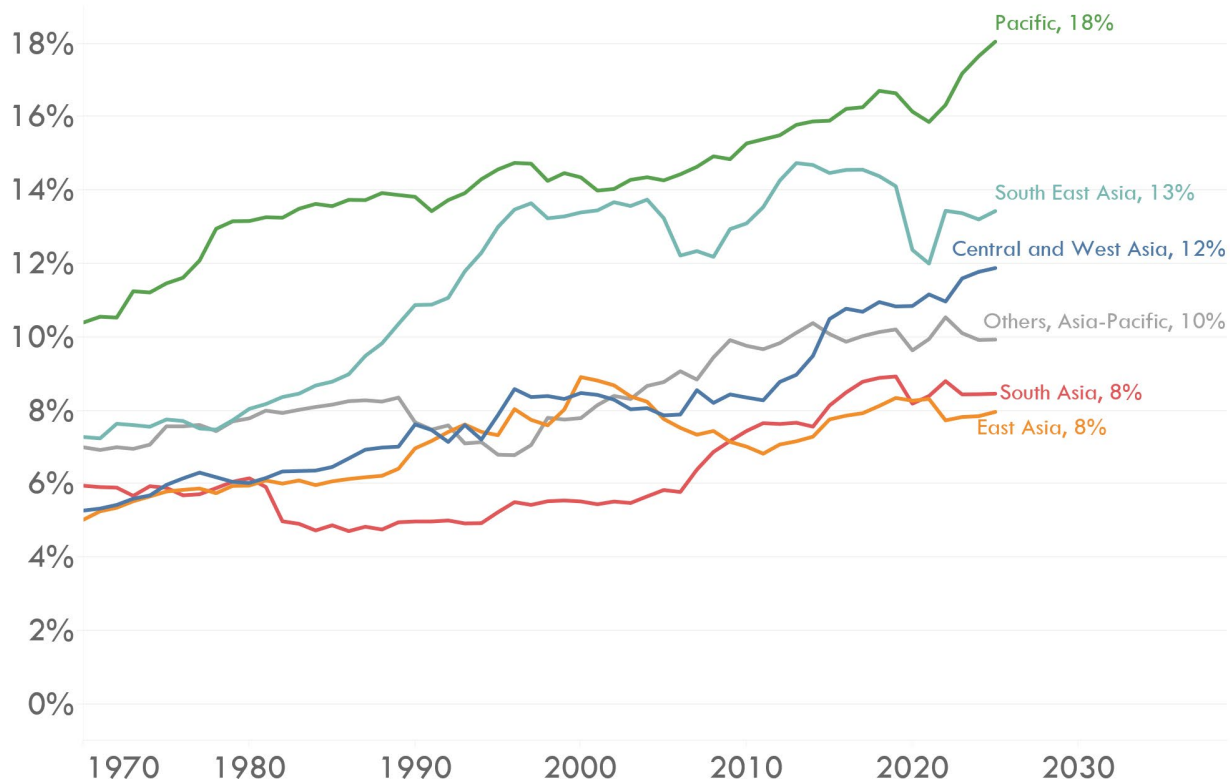


Photo: Elliot Andrews / Unsplash

Figure 3: Average Annual Growth in Economy-wide Greenhouse Gas Emissions by Sector, 2015–2025

Source: ATO visualization based on JRC and IEA (2026).

Share of domestic transport in total economy-wide GHG emissions, 1970-2025



Includes fossil fuel and biofuel consumption. Other transportation is not included.

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026



Photo: Vaibhav Gupta / Unsplash

Figure 4: Share of Domestic Transport in Economy-wide Greenhouse Gas Emissions (Asia)¹

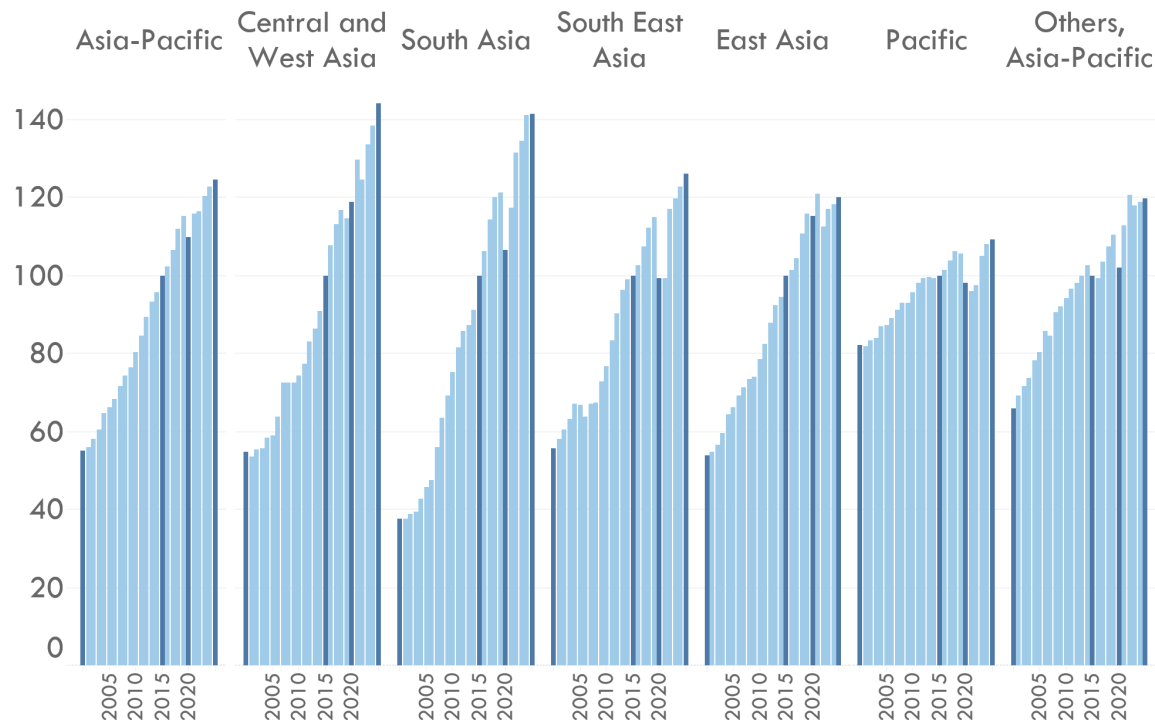
Source: ATO analysis and visualization based on JRC and IEA (2026).

¹ In this figure and later figures that use this regional grouping, "Others" refers to the Russian Federation.

2 Growth Is Slowing, but Unevenly

Growth has slowed, but unevenly. Gains in some economies have been swamped by growth in others.

Trend, assuming 2015 as base 100



Colored in darker shade are years 2000, 2015, 2020, and 2025
Includes fossil fuel and biofuel consumption

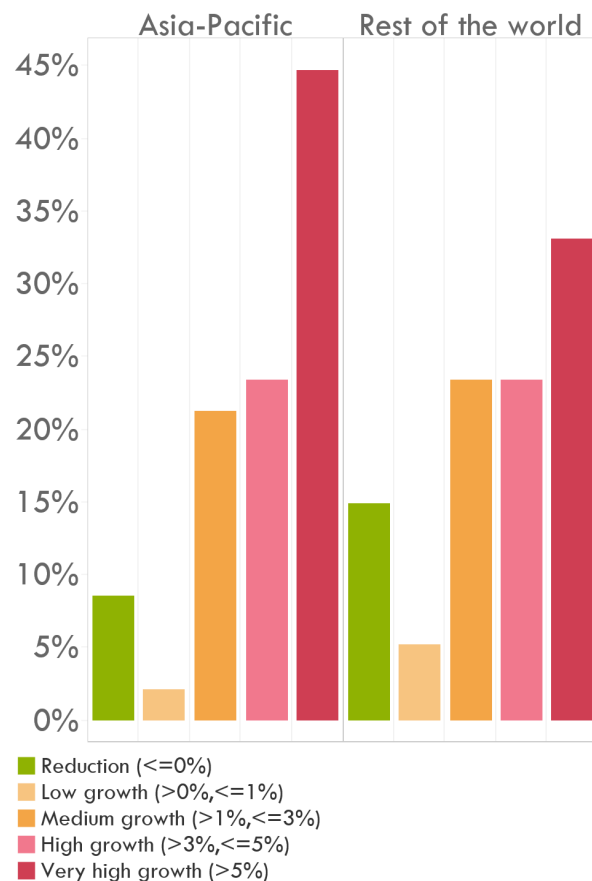
Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). *EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database* (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Emissions rose fast until 2018, leveled off briefly, then fell during the pandemic (Figure 5). By 2025, they had fully recovered and surpassed earlier peaks in every subregion. What changed is the pace, not the direction. Globally, annual growth in the sector's GHG emissions eased from 1.9% during 2000–2015 to 1% after the Paris Agreement. In Asia, the slowdown is sharper: annual growth fell from 4.1% to 2.2%. Even so, the region added 596 million tons of transport GHG emissions after 2015. Emissions are still climbing. They have simply lost some momentum.

Figure 5: Transport Greenhouse Gas Emissions Index, 2000–2025 (2015 = 100)

Source: ATO analysis and visualization based on JRC and IEA (2025).

Share of countries, by GHG emissions growth category, 2000-2015



Share of countries, by GHG emissions growth category, 2015-2025

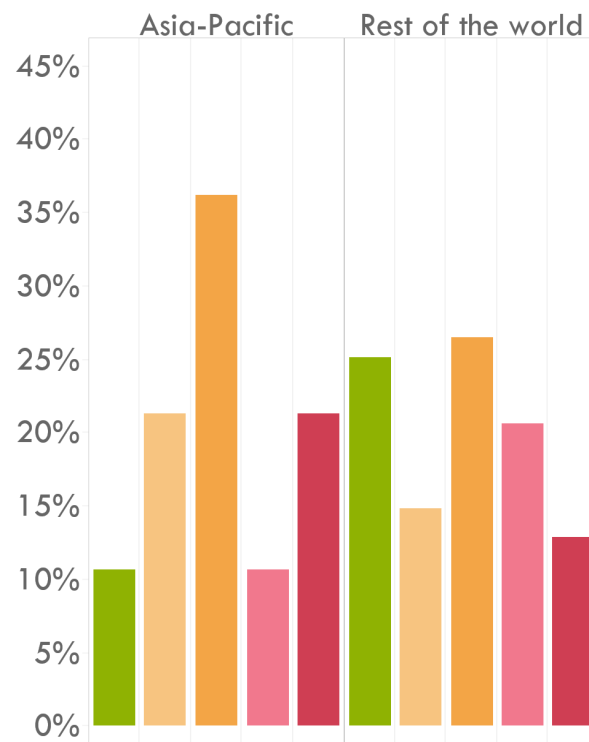


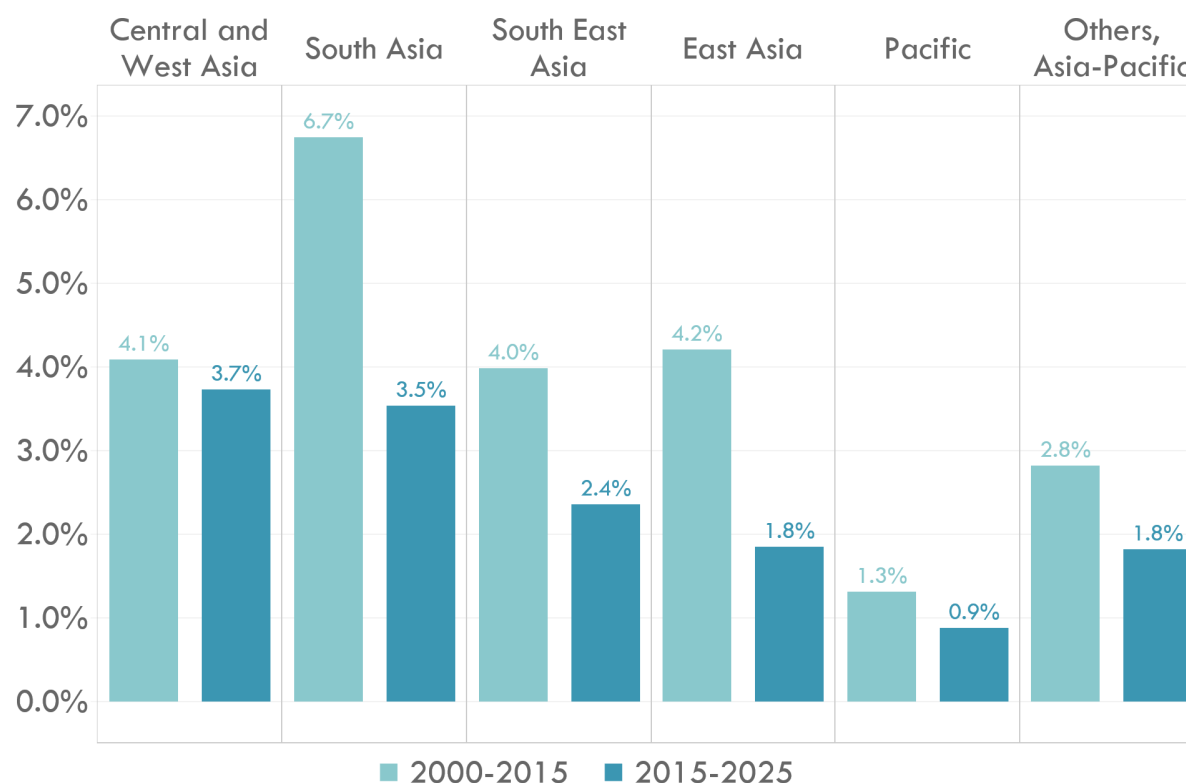
Figure 6 shows progress in the transport sector. From 2000 to 2015, two-thirds of Asian economies recorded high (3%–5%) or very high (above 5%) average annual growth in transport GHG emissions. Since the Paris Agreement took effect, that share has fallen to about a third of the economies. This is a significant, policy-driven course correction. Yet Asia still trails the rest of the world. Outside Asia, only one-third of countries show a similar high-growth profile.

Averages hide a great deal. In a region this size, fast movers and slow ones often sit next to each other. East Asia is making strong progress: its annual emissions growth fell from 4.2% to 1.8% after the Paris Agreement. Central and West Asia are a different case. There, growth remains high and has barely eased, slipping only from 4.1% to 3.7%.

Figure 6: Share of Economies by Growth Category in Domestic Transport Greenhouse Gas Emissions

Source: ATO analysis and visualization based on JRC and IEA (2026).

Transport GHG emissions, average annual growth rate



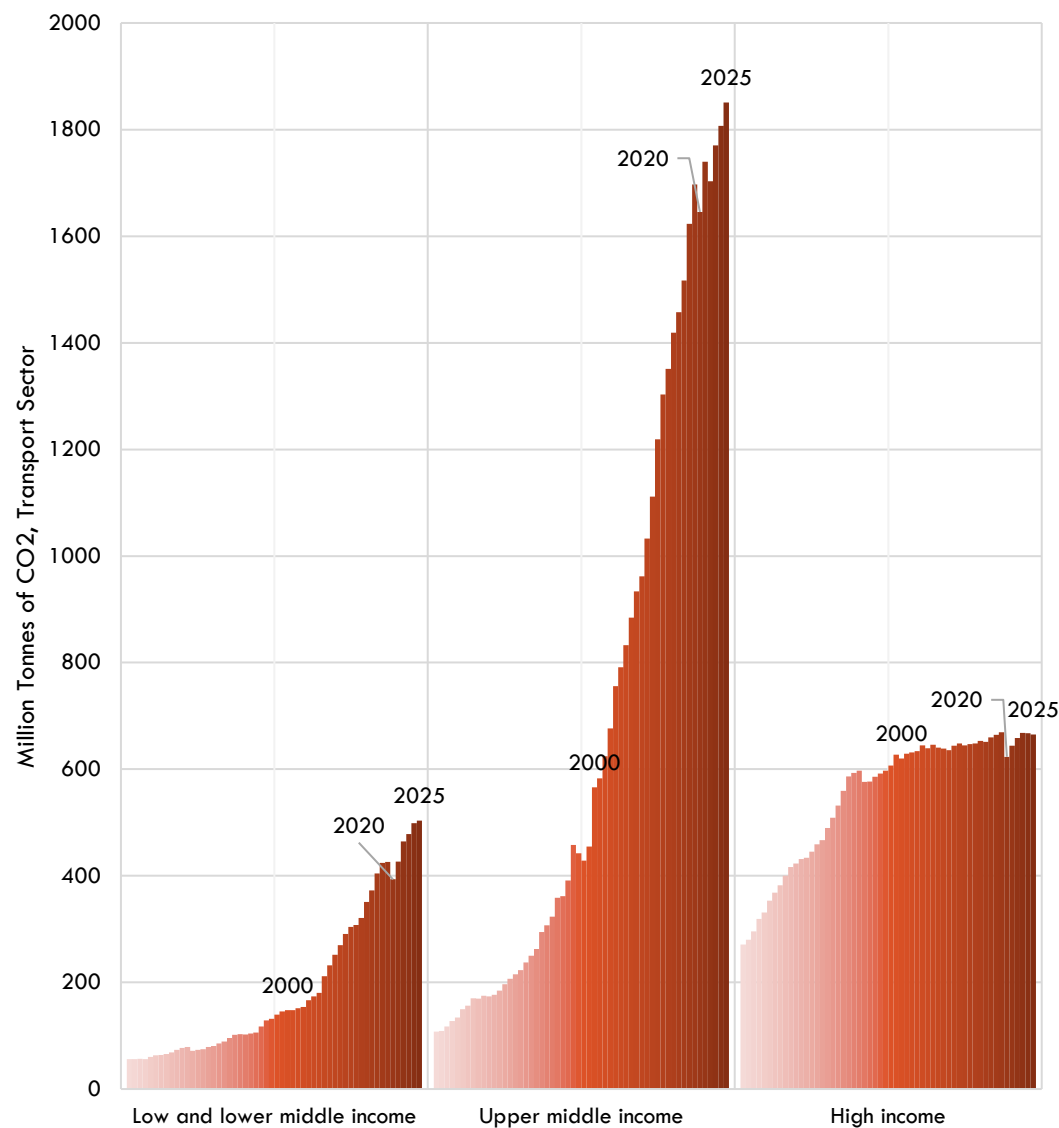
Includes fossil fuel and biofuel consumption. Other transportation is not included.

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

The split also runs along income lines. High-income economies in the region produced nearly half (46%) of transport emissions in 2000. By 2025, their share had fallen below a quarter (22%). The challenge is growing because of scale. Progress in one group has been swamped by growth elsewhere (Figure 8). The emissions burden has moved with economic weight. The upper-middle-income share of the transport sector's gross value added increased from 47% in 2000 to 62% in 2023. Its share of emissions rose from 42% to 61%. Some progress is real, and some is only relocated.

Figure 7: Domestic Transport Emissions, Average Annual Growth Rates Compared

Source: ATO analysis and visualization based on JRC and IEA (2025).

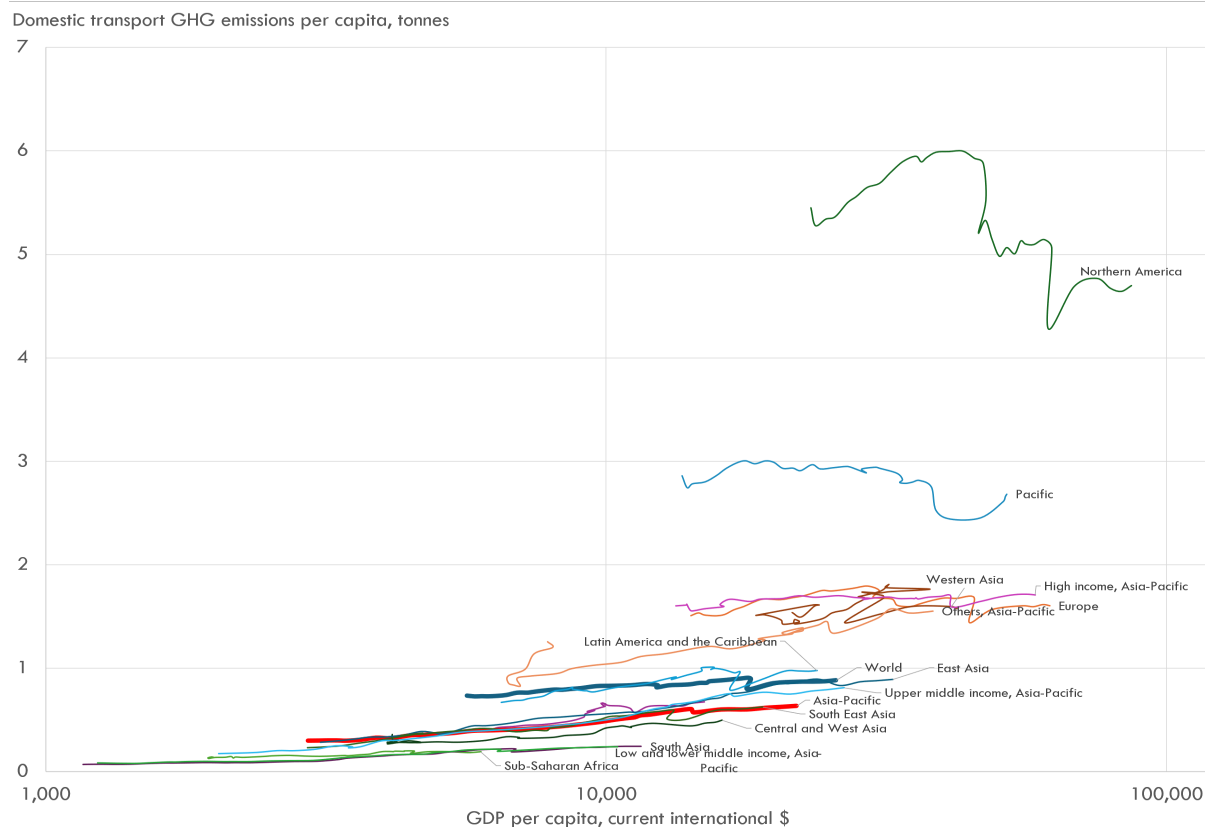


Prosperity also shapes the emissions pattern. Several charts in this report plot data against GDP per capita on the horizontal axis. This controls for the effect of income and of differing growth rates, and it brings out structural differences between countries.

Transport GHG emissions in landlocked countries and small island developing states grow faster than in other countries in Asia and the Pacific. Two-thirds of small island developing states are in the medium growth category (1%–3% average annual growth of transport GHG emissions), while half of landlocked economies are in the very high growth category (more than 5% a year). Limited freight alternatives and long supply lines leave these economies with few low-carbon substitutes for road and inter-island transport. That helps explain why their emissions curves still point up.

Figure 8: Transport Emissions, 1970–2025

Source: ATO analysis and visualization based on JRC and IEA (2025).



Since the Paris Agreement, Asian economies have had mixed success decoupling economic growth, measured as GDP, from transport emissions. Most high-income economies in the region have reached absolute decoupling: their transport emissions fall even as their economies grow. Many upper-middle-, lower-middle-, and low-income economies have reached only relative decoupling, where transport emissions grow more slowly than GDP but do not fall in absolute terms. That relative decoupling is gathering pace (Figure 9).



Photo: Yuya Uzu / Unsplash

Figure 9: Transport Greenhouse Gas Emissions per Capita and Gross Domestic Product per Capita, 2000–2025

Source: ATO analysis and visualization based on JRC and IEA (2026) and World Bank (2026).

Figure 10 shows how transport GHG emissions have changed across subregions and economies. Economies that stand out for the pace or direction of change (acceleration or deceleration) are labeled. Between 2000 and 2015, only about 9% of economies were decoupling absolutely, 67% were decoupling relatively, and 24% remained coupled with GDP growth. After the Paris Agreement took effect, the shares shifted: 11% decoupled absolutely, 73% relatively, and 16% remained coupled. Some economies slipped back, from absolute to relative decoupling or even to coupling. At the regional level, Asia and the Pacific, the low- and lower-middle-income group,

and the upper-middle-income group are moving toward slower emissions growth. High-income economies show marginal progress, but they still have the slowest transport GHG emissions growth of the past 2 decades. Growth in one place can cancel gains made in another. Scale, more than direction, explains why the regional picture looks so stubborn.

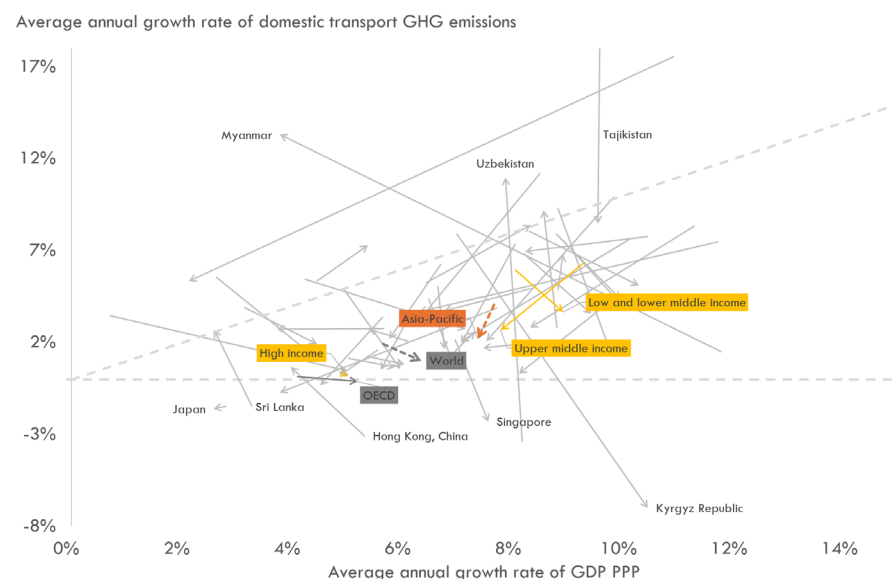


Figure 10: Average Annual Growth Rates of Transport Greenhouse Gas Emissions and Gross Domestic Product (Purchasing Power Parity)

Note: Each arrow shows the average annual growth rate (AAGR) for 2000–2015 and for 2015–2025. The arrowhead marks 2015–2025.

Source: ATO analysis and visualization based on JRC and IEA (2026) and World Bank (2026).

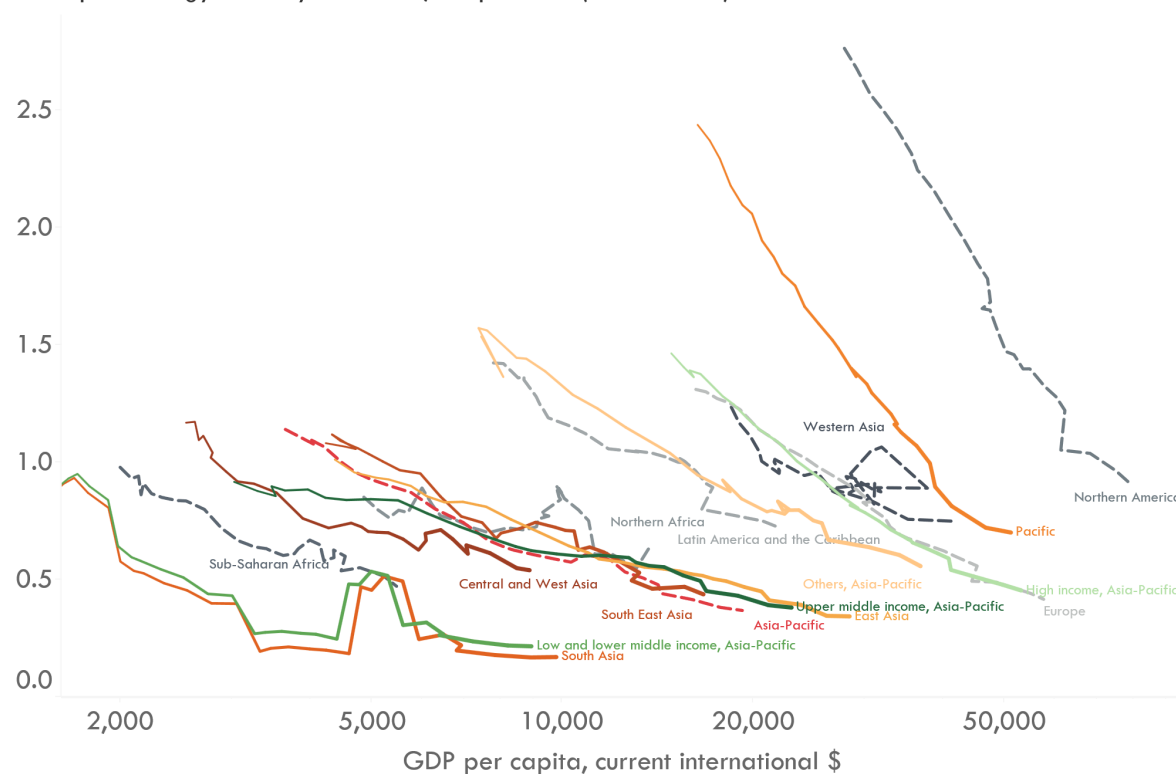


Photo: Ravigopal Kesari / Unsplash

3 Energy Intensity and Transition

Transport has the lowest share of renewable energy of any end-use sector: about 6% of its final energy in 2023, up from 4% in 2015.

Transport energy intensity with GDP, MJ per USD (1995-2023)



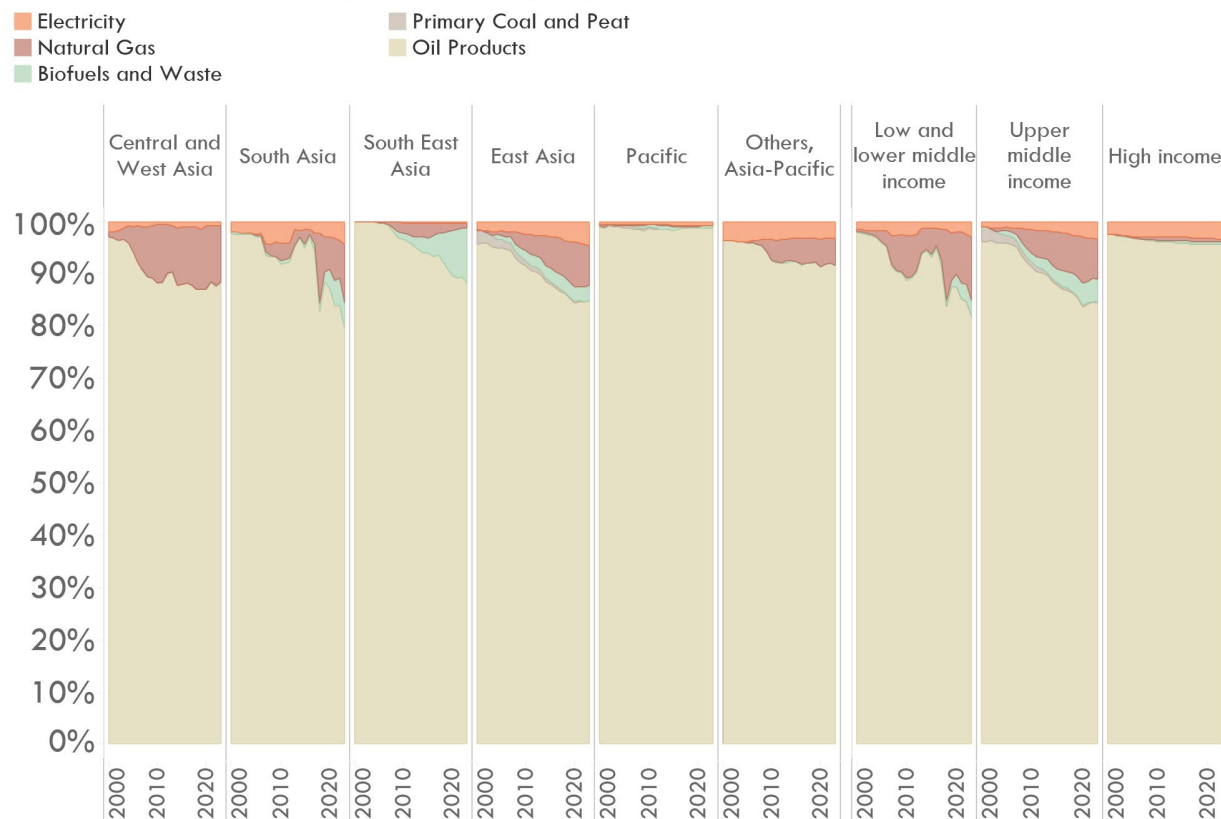
Pipeline transport and other transportation is not included

Source: ATO analysis and visualization based on UNDESA Statistics Division. (n.d.). *UNSD -- Energy Balance*. UNSTATS.
<https://unstats.un.org/unsd/energystats/dataPortal/>

Energy intensity in the transport sector is the ratio of the sector's energy consumption to GDP. It shows how much energy the sector uses per unit of economic output. Transport energy consumption grew more slowly than GDP, so energy intensity improved across all major regions, albeit from different bases and at different paces. By 2023, transport energy intensity was lowest in Asia and the Pacific, at 0.37 megajoules (MJ) per dollar of GDP, against a global average of 0.51 MJ. Other regions recorded 0.91 in North America, 0.42 in Europe, 0.48 in sub-Saharan Africa, 0.74 in Latin America and the Caribbean, and 0.63 in North Africa.

Figure 11: Transport Energy Intensity with Gross Domestic Product, 1995–2023

Share in transport energy consumption, % (2000-2023)



Pipeline transport and other transportation is not included

Source: ATO analysis and visualization based on UNDESA Statistics Division. (n.d.). *UNSD -- Energy Balance*. UNSTATS.
<https://unstats.un.org/unsd/energystats/dataPortal/>

Among end-use sectors, transport has the lowest share of renewable energy. Renewables supplied about 6% of its final energy consumption in 2023, up from 4% in 2015. Oil therefore still dominates. In 2025, emerging market and developing economies accounted for nearly all of the increase in world oil demand. More than half of that increase, 360,000 barrels a day, came from Asia and the Pacific.²



Photo: Tey Lovius / Unsplash

Figure 12: Transport Energy Consumption, Share by Source, 2000–2023

² <https://iea.blob.core.windows.net/assets/df903e1c-49c6-4757-8cbf-6fbcfe7611a0/GlobalEnergyReview2026.pdf>

In Asia, transport decarbonization is now as much an energy security agenda as a climate one. The oil shock that followed the outbreak of conflict in the Middle East in February 2026 has changed the terms of the debate. Road vehicles burn nearly half of the world's oil, which leaves transport exposed to price spikes and supply cuts. Countries have responded in contrasting ways. Several oil-importing economies in Southeast Asia offered tax breaks for electric vehicles and funded fleet electrification programs, while several Central Asian countries increased fossil fuel subsidies.³

The transport energy transition has several strands, and no single technology does the work alone. Battery electric vehicles are advancing fastest in cars, buses, and two- and three-wheelers (section 6). Biofuels are gaining ground in countries with energy security concerns, and in trucks, ships, and aircraft, which are harder to electrify. Railways are converting to electric traction line by line. Natural gas and hybrid drivetrains fill gaps that electrification and biofuels do not yet reach, especially in freight. Each pathway moves on its own timetable. Which strategy dominates over the next decade will shape how much oil Asia's transport sector still needs by 2035, and by how much its emissions curve bends.



Photo: Ather Energy / Unsplash

³ <https://www.elibrary.imf.org/view/journals/001/2025/270/article-A001-en.xml>

4 One Mode Dominates, Others Are Moving Faster

Road transport still produced about 88% of the region's transport emissions in 2025.

The regional totals hide differences between modes. Road transport still dominates. In 2025, it produced about 88% of transport GHG emissions in Asia (Figure 13). Domestic aviation (6.1%), inland waterways (4.1%), and railways (1.6%) contributed far less. The global shares are 90% for road, 6% for aviation, 2.5% for domestic shipping, and 1.5% for railways. Inland waterways matter more in Asia than elsewhere.

Road's share is just 1 percentage point above the 87% recorded in 2000. It is tempting to conclude that a quarter of a century has produced no real structural shift. That conclusion would be wrong. The modes are moving at different speeds, and in different directions.

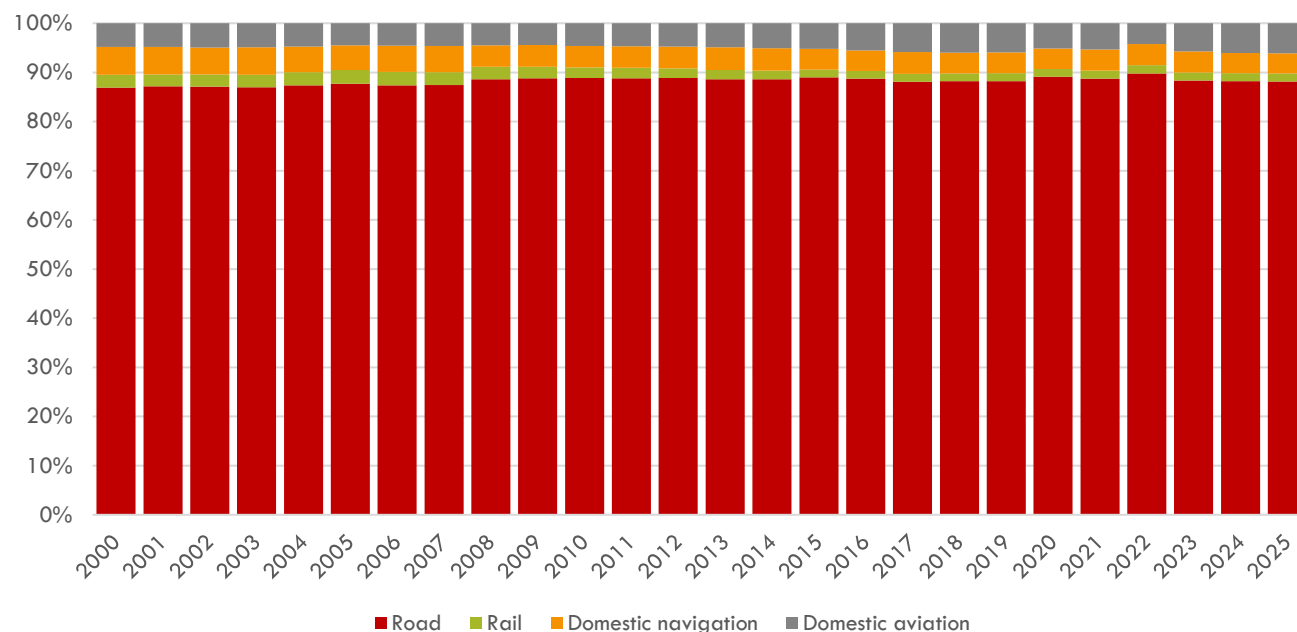


Figure 13: Share of Transport Greenhouse Gas Emissions by Mode

Source: ATO analysis and visualization based on JRC and IEA (2025).

Figure 14 shows how Asian economies are distributed by the average annual growth rate of emissions from each mode, for 2000–2015 and 2015–2025. Since the Paris Agreement, the modes have taken different paths. Road transport, long the main source of growth, shows a broad-based slowdown. More economies now see faster emissions growth from rail as traffic shifts to

it. Domestic aviation is the fastest-growing source of transport emissions. Emissions growth is slowing, and it is shifting between modes.

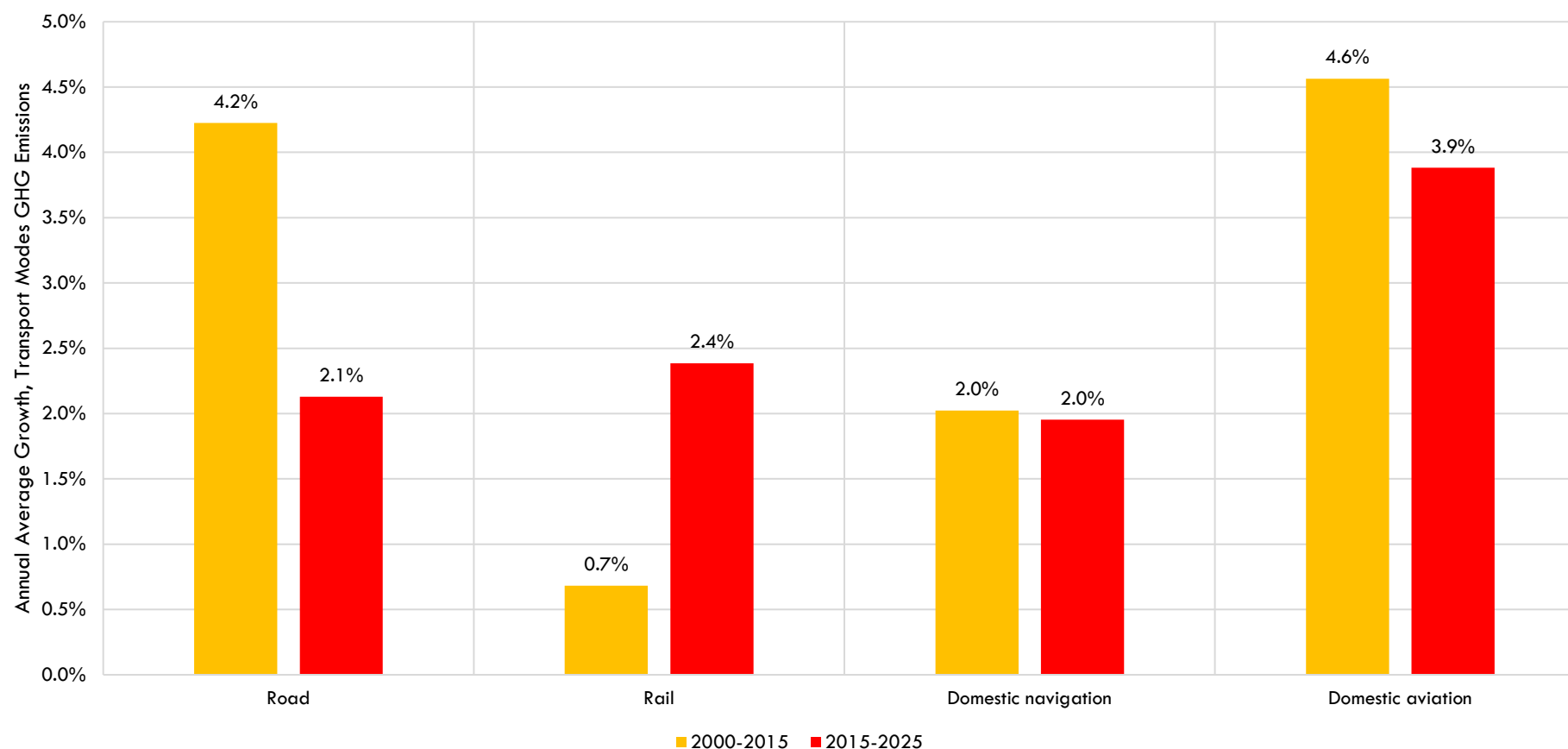


Figure 14: Average Annual Growth Rate in Greenhouse Gas Emissions by Mode, 2000–2015 and 2015–2025

Source: ATO analysis and visualization based on JRC and IEA (2025).

5 Road Transport: Slowing in the East, Still Rising Elsewhere

East Asia, led by the People's Republic of China, is driving the slowdown in road emissions.

Road transport comes first because it is the largest source. The story lies in the pace of growth. From 2000 to 2015, road GHG emissions grew by 4.2% a year. After the Paris Agreement, growth slowed to 2.1% a year (Figure 15). That is faster than the expansion of road infrastructure (1.9%) but far slower than growth in the vehicle fleet (6.7%).



Photo: Fadhila Nurhakim / Unsplash

East Asia, led by the People's Republic of China (PRC), is driving the slowdown in road transport GHG emissions. Mitigation measures are starting to pay off: in 2025, road transport GHG emissions were 2% below 2021 levels (Figure 16). Over the same period, reported GDP grew by 35%. Four things offset the growth in transport energy consumption and emissions. They

were rapid electrification of the country's road vehicle fleet, strong sales of natural gas and electric trucks, a modal shift to shipping, and rising high-speed rail ridership.

Road transport GHG emissions, average annual growth rate



Includes fossil fuel and biofuel consumption. Other transportation is not included.

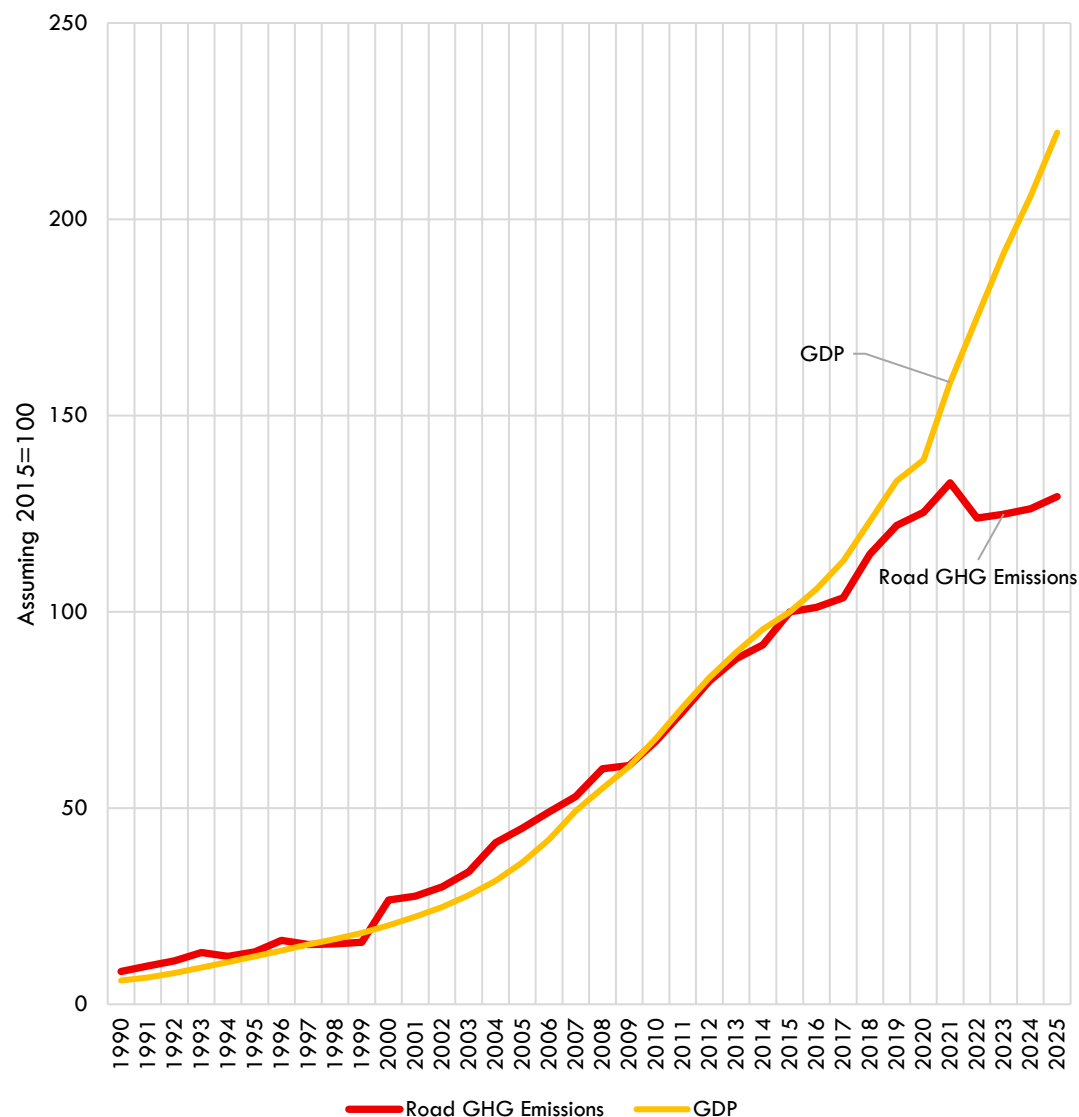
Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). *EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database* (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026



Photo: Afif Ramdhasuma / Unsplash

Figure 15: Average Annual Growth Rates of Road Transport Greenhouse Gas Emissions by Subregion, Region, and Income Group

Source: ATO analysis and visualization based on JRC and IEA (2025).



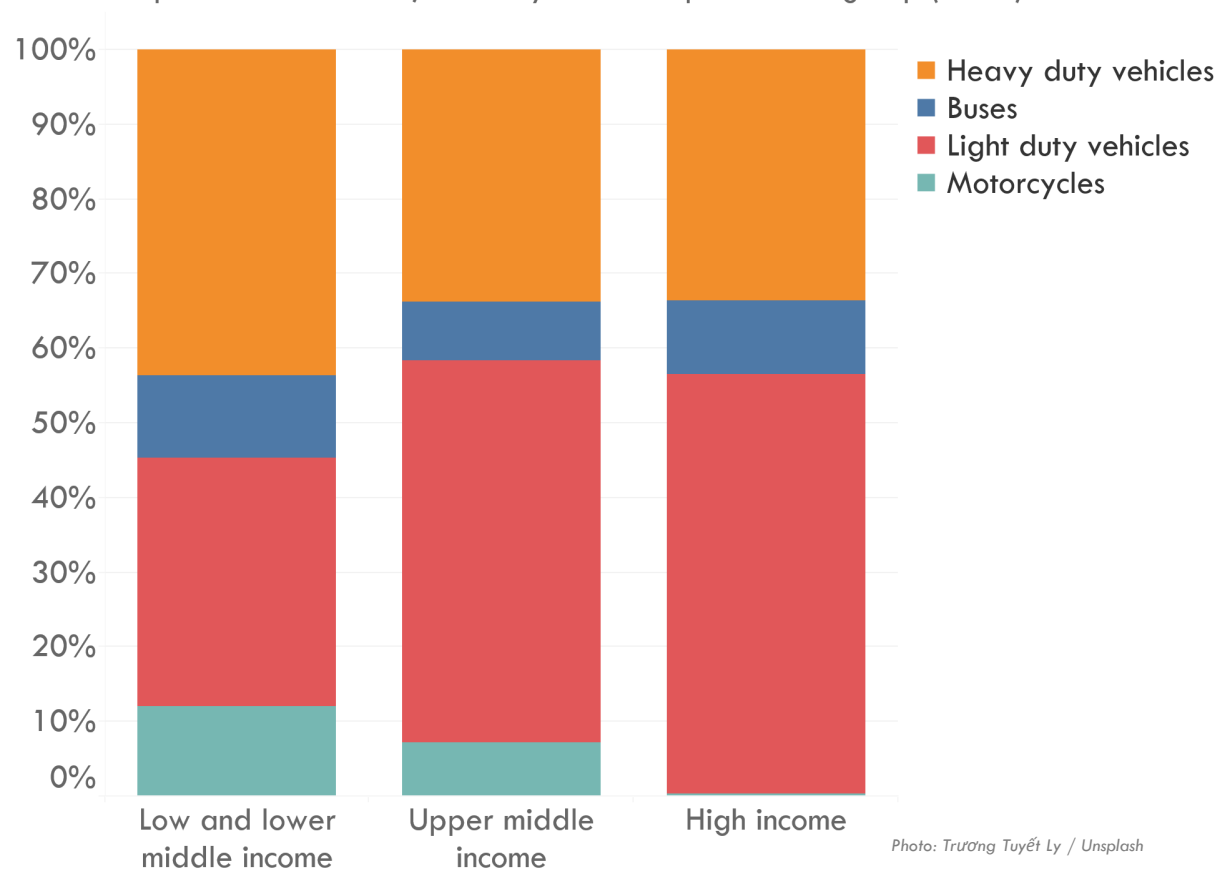
Elsewhere in the region, road GHG emissions have risen fastest since 2015 in Myanmar, Uzbekistan, Tajikistan, Nepal, and Kazakhstan. Road GHG emissions have fallen in absolute terms in the Kyrgyz Republic, Singapore, Japan, Sri Lanka, and the Solomon Islands.

Within road transport, the vehicle mode share shapes emissions, and it differs by income level. Light-duty vehicles, such as passenger cars, sport utility vehicles, and taxis, account for a large share of road CO₂ emissions everywhere (Figure 17). But that share varies: 55% in low- and lower-middle-income economies, 45% in upper-middle-income economies, and 41% in high-income economies. Two-wheelers, including motorcycles and scooters, differ even more sharply. They produce just 1% of road emissions in high-income economies, 4% in upper-middle-income economies, and 14% in low- and lower-middle-income economies.

Figure 16: Road Greenhouse Gas Emissions in the People's Republic of China (2000 = 100)

Source: ATO analysis and visualization based on JRC and IEA (2025).

Road transport CO2 emissions, share by submode per income group (2025)



Source: ATO analysis and visualization based on IIASA. (2025). GAINS - Greenhouse Gas and Air Pollution Interactions & Synergies . <https://gains.iiasa.ac.at/models/index.html>

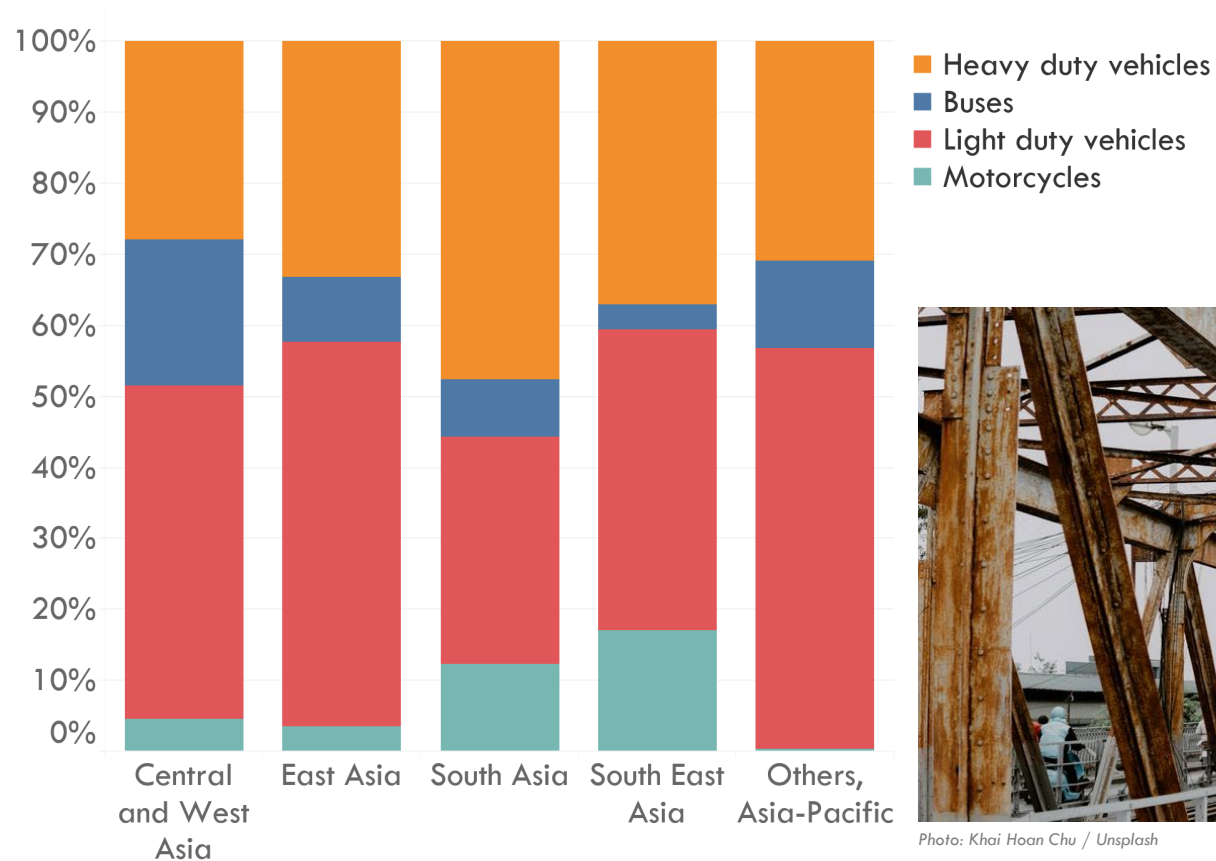
Figure 17: Share of Road Transport Carbon Dioxide Emissions by Submode and Economy Income Group

Source: ATO analysis and visualization based on IIASA (2025).

Submode shares by subregion show a similar pattern. Two-wheelers contribute a larger share of emissions in Southeast Asia and South Asia (Figure 18). Strategies must fit the ground reality. A policy for cars in Baku is not a policy for motorcycles in Dhaka.



Road transport CO2 emissions, share by submode per subregion (2025)



Growth rates vary as widely as the vehicle mix. Several lower-middle-income economies more than doubled their road transport GHG emissions from 2015 to 2025 (Figure 19). Economies with the largest shares of the region's road transport emissions have grown far more slowly since 2015.

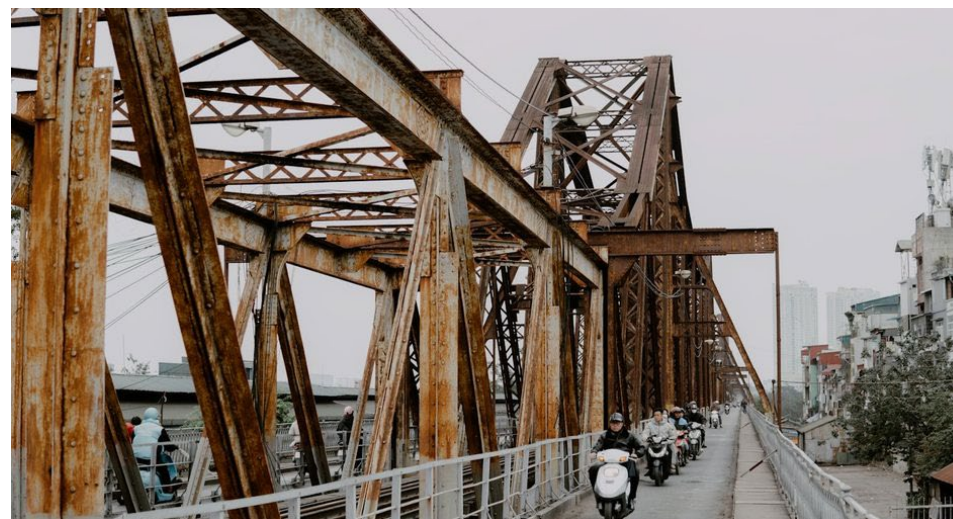


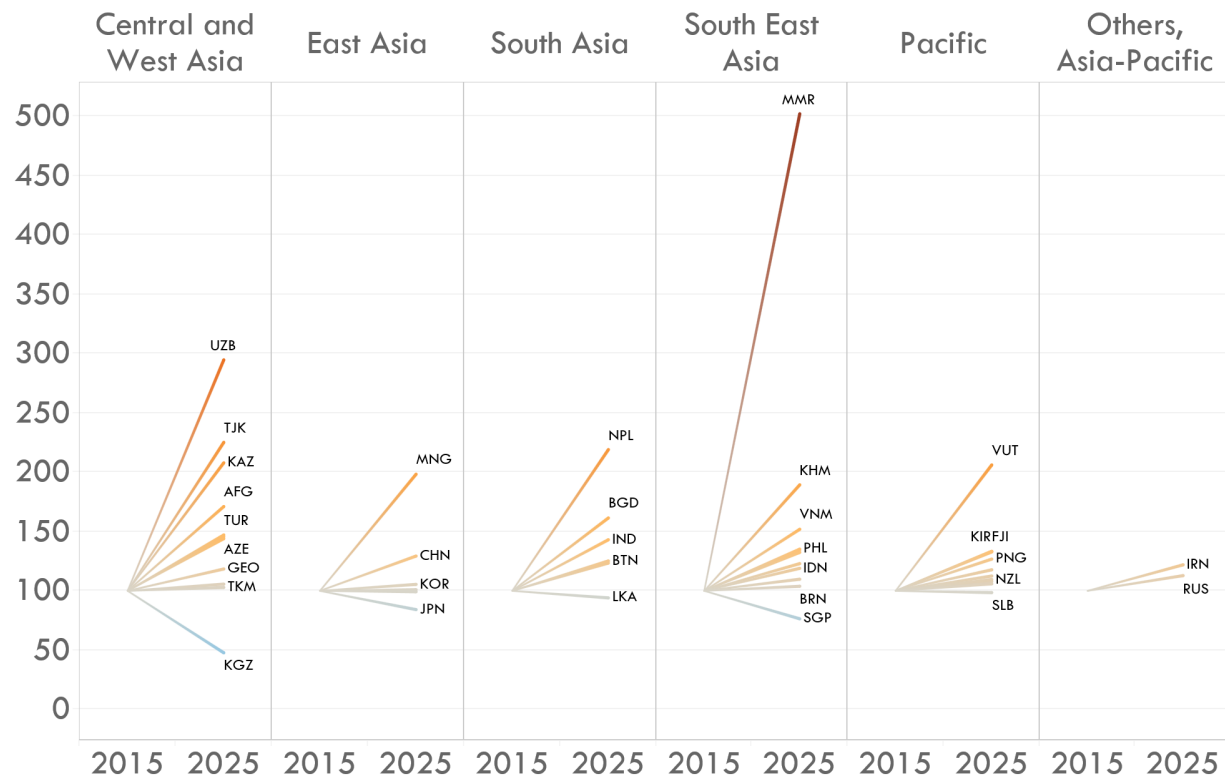
Photo: Khai Hoan Chu / Unsplash

Source: ATO analysis and visualization based on IIASA. (2025). GAINS - Greenhouse Gas and Air Pollution Interactions & Synergies . <https://gains.iiasa.ac.at/models/index.html>

Figure 18: Share of Road Transport Carbon Dioxide Emissions by Submode and Subregion

Source: ATO analysis and visualization based on IIASA (2025).

Road transport GHG emissions trend, assuming 2015 as base 100



Includes fossil fuel and biofuel consumption

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

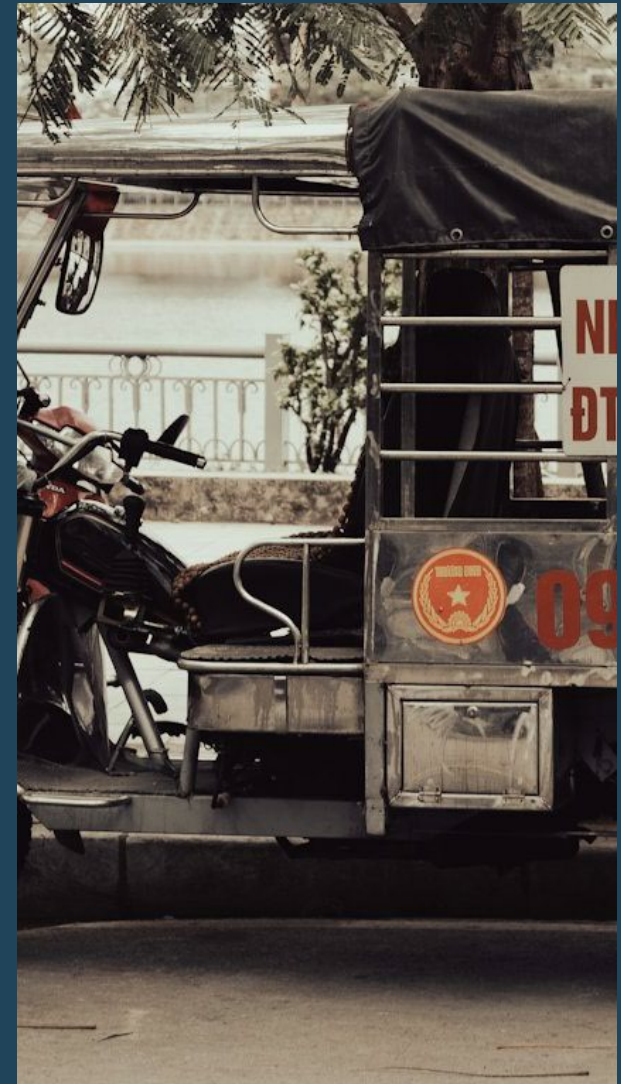


Photo: Bernd Dittrich / Unsplash

Figure 19: Road Transport Greenhouse Gas Emissions Trajectories, 2015 versus 2025

6 Electric Vehicles: Fast Adoption, Uneven Benefits

Electric vehicles took 53% of new car sales in the People's Republic of China. What they save depends on the grid that charges them.

Electrification is the main technology lever for road transport. Asia is often described as the leader in electric vehicle (EV) adoption, and the 2025 sales data support that view. The PRC accounted for six of every ten electric cars sold worldwide and about 60% of global electric bus sales. Southeast Asia's electric car sales more than doubled to more than 500,000, about one in five new cars in the subregion. Worldwide, electric car sales passed 20 million, up by more than 20%, or about one in four new cars. The details show an uneven picture.⁴

The PRC remains the outlier in scale, with EVs at 53% of new car sales. Other countries are catching up in share. Nepal recorded the highest share among economies in Asia and the Pacific, at 68%. Singapore and Viet Nam reached 40%, and the Lao People's Democratic Republic reached 36%. Thailand and Türkiye passed 20%, Australia and Indonesia reached 15%, and the Republic of Korea and the Philippines crossed 10%. India rose to 4% and Japan stayed near 3%. A high share in a small market does not deliver the same number of vehicles, or the same emissions effect, as the same share in a large one. It does show that adoption is spreading beyond the PRC.⁵

The 2026 energy crisis has tested that growth. It followed the outbreak of conflict in the Middle East. Road vehicles use nearly half of the world's oil, so fuel price spikes hit the sector directly, and hardest in oil-importing regions such as Southeast Asia. Global car sales fell by about 5% in the first half of 2026. More than 9 million electric cars were sold, about 1% fewer than in the first half of 2025, as sales in the PRC fell by almost 20%. Total car sales there fell by more than 20%, partly because the trade-in subsidy for the cheapest cars was cut. The EV share of car sales in the PRC still rose, to more than 60% in the second quarter of 2026 against less than 55% across 2025. Globally, EVs took 24% of sales, one percentage point more than in the

⁴ IEA. 2026. Global EV Outlook 2026. <https://www.iea.org/reports/global-ev-outlook-2026>

⁵ <https://www.iea.org/reports/global-energy-review-2026>

first half of 2025.⁶

Trade statistics also need careful reading. Total EV trade in Asia and the Pacific increased almost fifteenfold, from \$8.7 billion in 2017 to \$132.8 billion in 2025. Much of it consists of two- and three-wheelers, which make up about 90% of the world's electric fleet in these categories. They matter for mobility, but their low economic value can suppress the overall figure. Aggregate figures alone can make progress look better or worse than it is.

By 2025, 44% of countries in Asia and the Pacific had electric vehicles making up at least 10% of their total vehicle trade value. By vehicle type, electric models accounted for 18% of trade value for light-duty vehicles, 19% for two- and three-wheelers, 20% for buses, and 3% for goods vehicles.

To judge the impact, analysts must separate the flow of new sales from the stock of vehicles on the road. High sales are one thing. Turning over a fleet is another. Electric cars made up only about 5% of the global car stock in 2025, about 80 million vehicles. More than 95% of cars on the road were still conventional and will stay in use for years, if not decades. Slow turnover explains why an electric-car sales share of 53% in the PRC translated into a stock share of only about 14%. Only a handful of economies in Asia and the Pacific have reached a 5% electric-car stock share, often seen as the tipping point for market diffusion. These include Hong Kong, China; the PRC; Viet Nam; Singapore; and the Lao People's Democratic Republic. Rapid sales growth, set against slow fleet turnover, challenges decarbonization progress (Figures 20 and 21).



Photo: Bernd Dittrich / Unsplash

⁶ <https://www.iea.org/reports/electric-car-markets-in-a-time-of-uncertainty>

EV Stock Share in Total - Cars (% of Electric Cars in Total Car Stock)

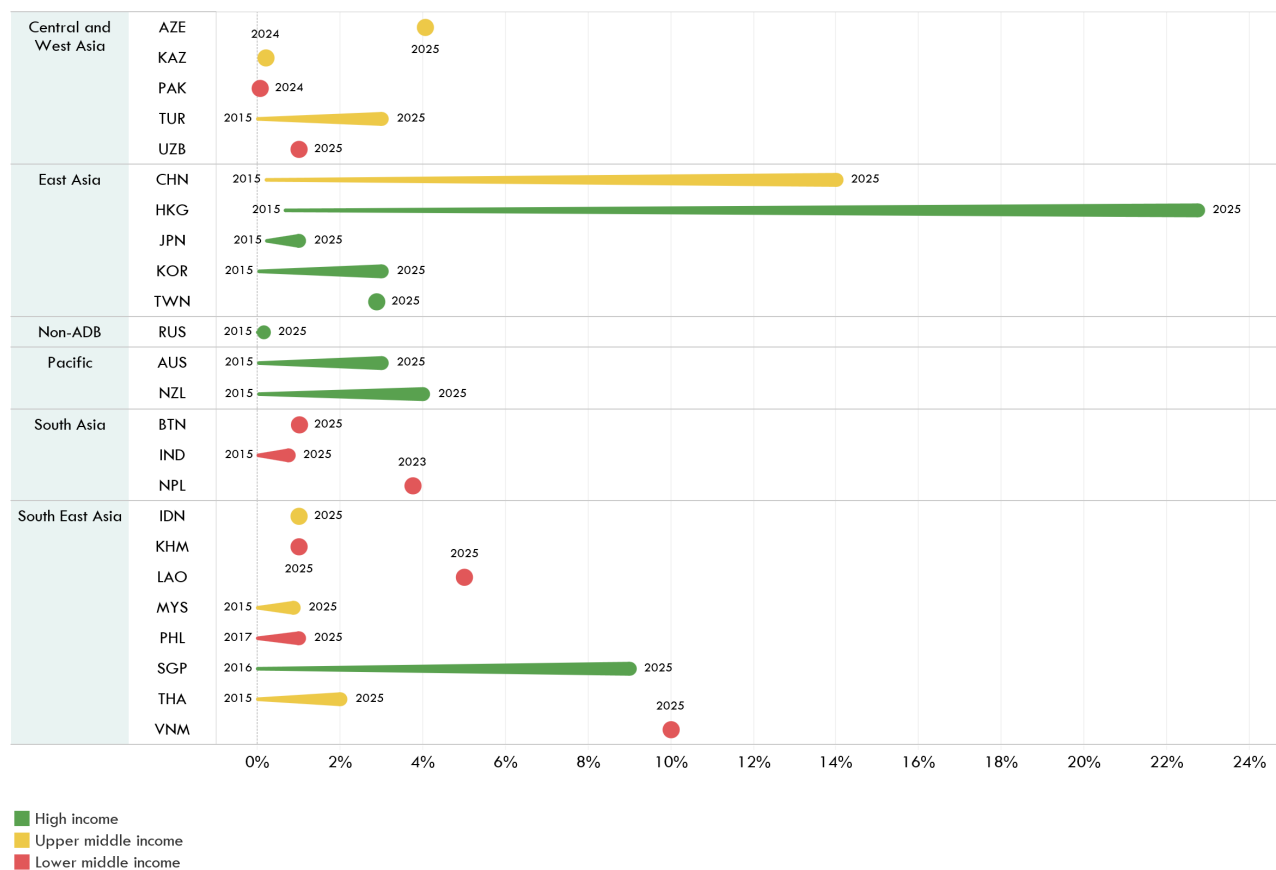


Figure 20: Historical Electric Vehicle Stock Share

Source: ATO analysis and visualization based on IEA (2025a) and vehicle registration estimates.

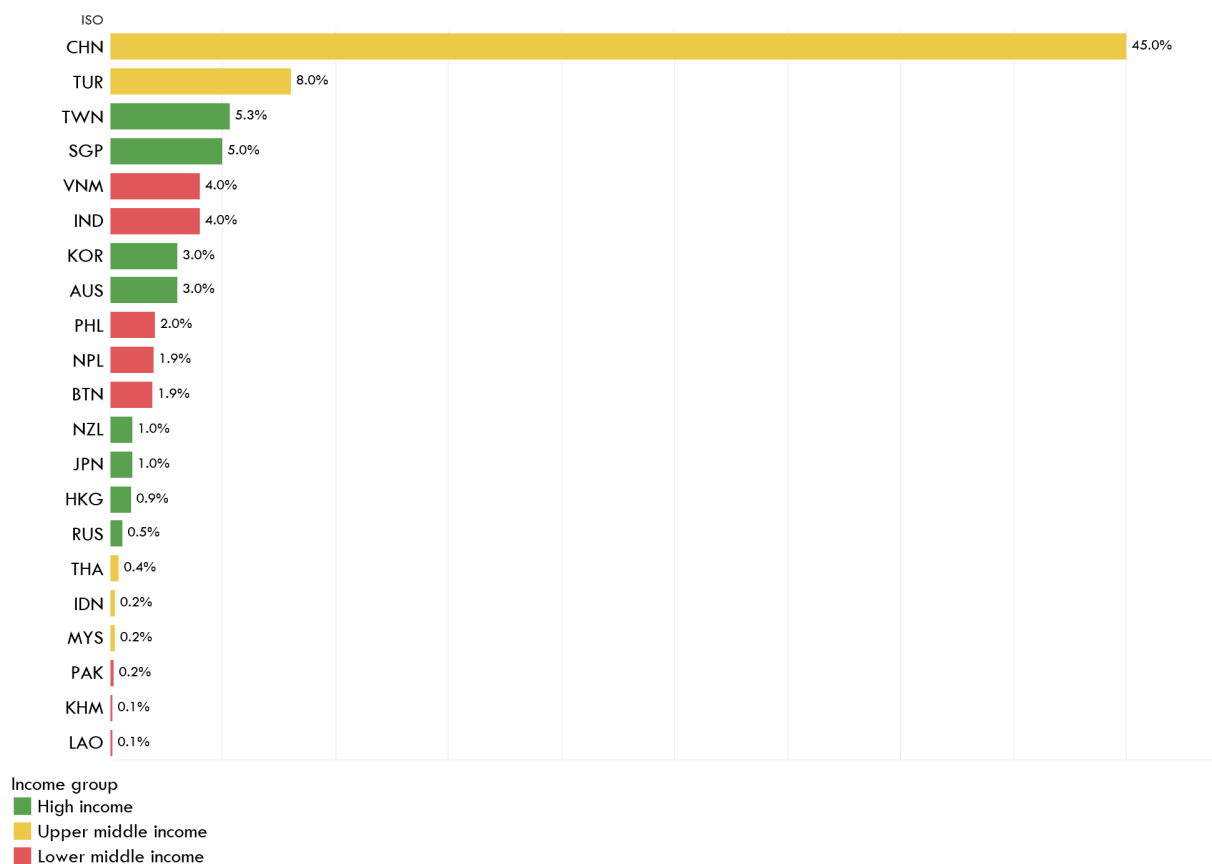
Cars are only part of the transition. Electric two- and three-wheelers were the most electrified road segment in 2025, accounting for about 10% of vehicles in use and 15% of new sales. The PRC, Türkiye, India, and Viet Nam together made up 95% of global electric two- and three-wheeler sales, with EVs reaching 45% of the PRC's stock. Electric buses are also concentrated: the PRC accounted for about 60% of global sales, and 31% of its bus stock is electric. India became the world's third-largest electric bus market. Vans and trucks remain much less advanced. This divide between modes matters because a car-focused view can understate progress where motorcycles, three-wheelers, and buses carry a large share of passenger activity.⁷

The scale of what comes next turns vehicle electrification into an infrastructure challenge. ATO projections suggest that the EV stock in low- and middle-income economies in Asia and the Pacific could rise from about 144 million in 2025 to 689 million by 2035.⁸ That is an increase from about 10% to 37% of the vehicle fleet. It would need about 500 million additional charging points. Meeting this demand could require about \$900 billion in charging infrastructure, plus \$314 billion in maintenance over 2025–2035. These estimates exclude wider grid upgrades, which are a separate cost.

⁷ <https://asiantransportobservatory.org/analytical-outputs/ato-cop30-climate-tracker/>

⁸ <https://asiantransportobservatory.org/analytical-outputs/asia-lmic-transport-outlook-investment-needs/>

EV Stock Share in Total - 2&3 Wheelers (% of Electric 2&3 Wheelers in Total Stock)



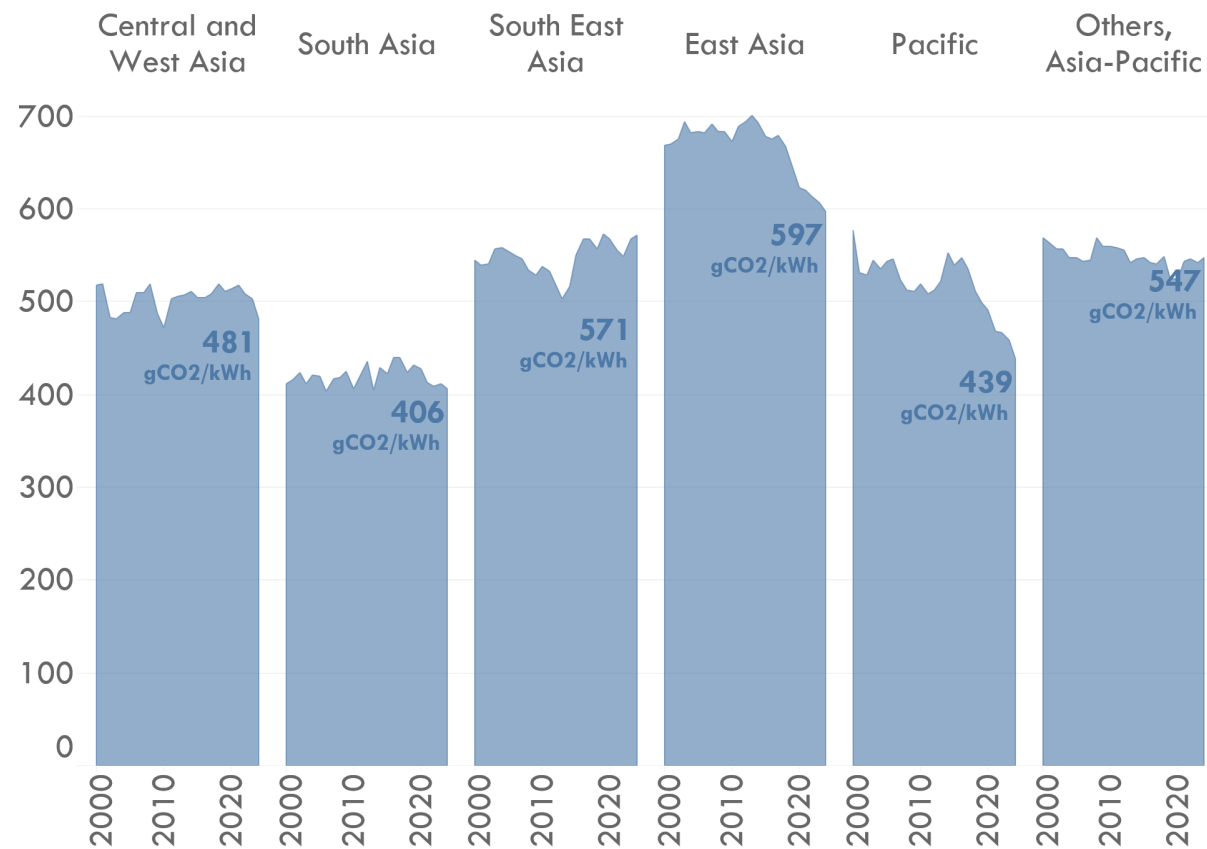
The emissions benefit of electric vehicles depends as much on the electricity grid as on vehicle uptake. Analysis of 2025 data across Asia and the Pacific shows that grid emission factors⁹ vary widely, from 24 to 1,000 grams of carbon dioxide per kilowatt-hour (gCO₂/kWh). Similar levels of vehicle electrification can therefore lead to very different emissions outcomes. Pairing grid emission factors with EV stock data shows encouraging movement: EV stock shares increased across the economies, while grid emission factors generally declined. As EV fleets expand, continued grid decarbonization will decide how much of that growth turns into deeper emissions reductions.

Figure 21: Electric Vehicle Stock Share by Economy

Source: ATO analysis and visualization based on IEA (2025a) and vehicle registration estimates.

⁹ <https://ember-energy.org/data/yearly-electricity-data/>

Grid emission factor, gCO₂ per kWh



Source: ATO analysis and visualization based on Ember. (2025). *Yearly Electricity Data*.
<https://ember-energy.org/data/yearly-electricity-data>



Photo: Leonie Clough / Unsplash

Figure 22: Grid Emission Factor by Subregion

Source: ATO analysis and visualization based on Ember (2025).

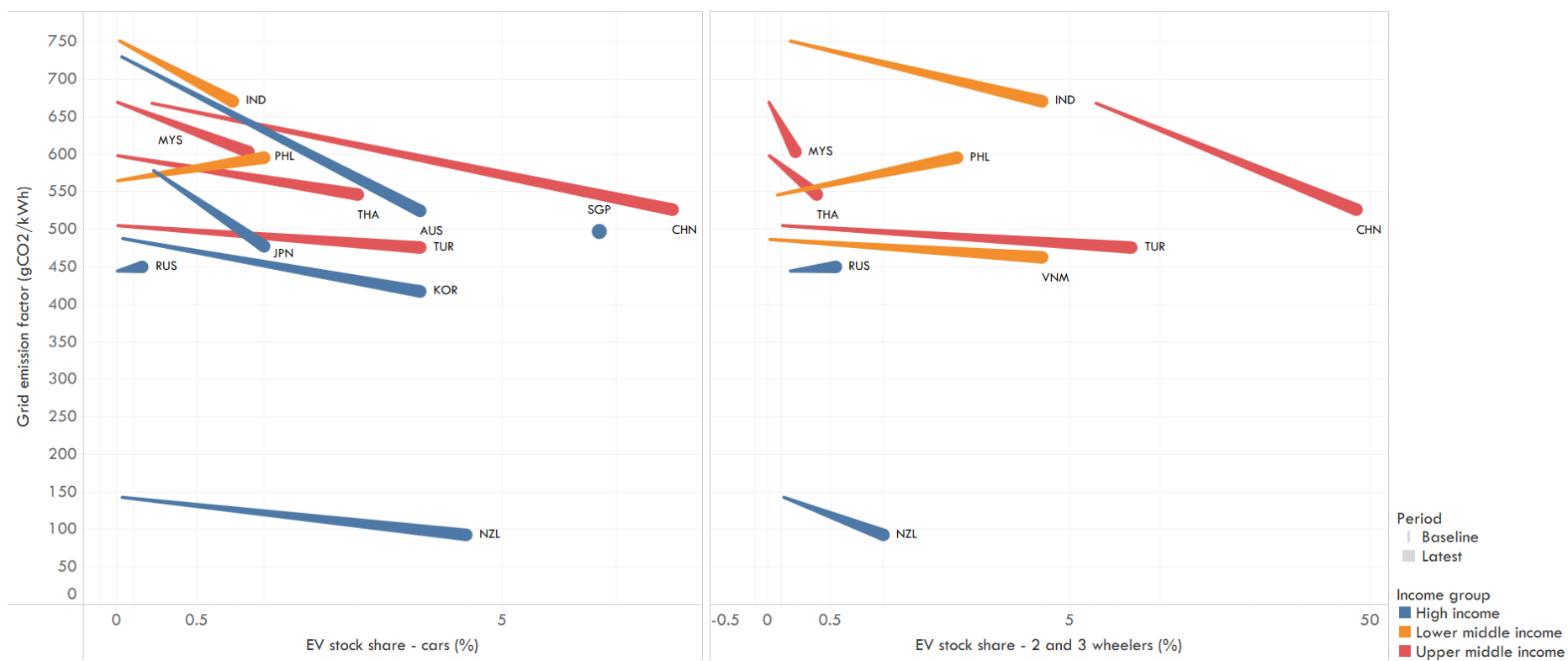


Figure 23: Electric Vehicle Stock Share and Grid Emission Factor by Economy

Source: ATO analysis and visualization based on Ember (2025) and vehicle registration estimates.

7 Biofuels: Fast Growth, Few Economies

Biofuels work with today's fleet. They are growing fast, from a small base, in a handful of economies.

Biofuels offer a second route, one that works with the existing fleet. Bioenergy for transport takes many forms: bioethanol, biodiesel, biomethane, and advanced fuels such as hydrogenated vegetable oil. They can power today's combustion vehicles with few technical changes. They are also among the few viable low-carbon options for heavy-duty trucks, ships, and aircraft, which are otherwise hard to decarbonize.



Photo: Ngoc Nguyen Phuong / Unsplash

Global demand has never been higher. Biofuels' share of total liquid fuel demand in transport was about 4% in 2024. The 4% predates the energy shock from the conflict in the Middle East. In Asia and the Pacific, use of these fuels has risen sharply since the crisis, yet much of the potential is untapped. Energy security remains a main driver of biofuel use in transport. Raising the share of biofuels also depends on policies that secure sustainable feedstock without competing with food supplies.

Biofuels' share of the region's transport CO₂ emissions has grown since 2015. Total transport GHG emissions rose by 2.2% a year over that period, while biofuel-related transport CO₂ emissions rose by 14.4% a year. Asia and the Pacific saw the fastest increase in biofuel-related transport CO₂ emissions of any region. Asia's share of global transport biofuel CO₂ emissions rose from less than 1% in 2000 to 8% in 2015 and 19% in 2025.

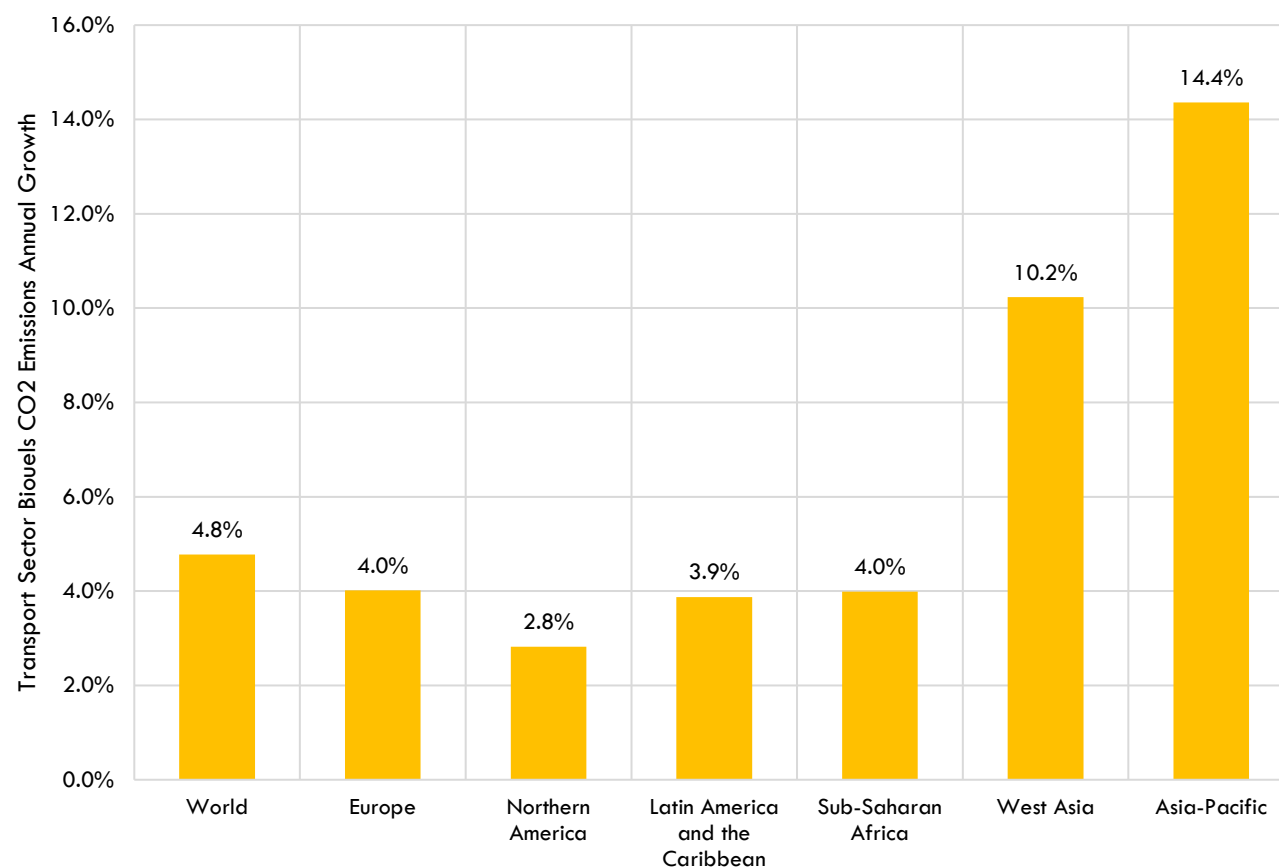


Photo: Huynh Linh / Unsplash

Figure 24: Transport Biofuel Carbon Dioxide Emissions, Average Annual Growth, 2015–2025

Source: ATO analysis and visualization based on JRC and IEA (2025).

Biofuel use is growing fastest in low- and lower-middle-income economies. Since 2015, annual growth in biofuel CO₂ emissions has been 28% in low- and lower-middle-income economies, 13% in upper-middle-income economies, and about 3% in high-income economies. Road transport generates more than 99% of the transport CO₂ emissions from biofuels.

Biofuel consumption in Asia is highly concentrated. Five economies (Indonesia, India, the PRC, Thailand, and Malaysia) account for close to 90% of the region's transport biofuel CO₂ emissions. Within this group, growth has been rapid. Since 2015, emissions from transport biofuels have grown by 33% a year in Indonesia and by 28% a year in India.

Policy can make a large difference. In India, biofuel support policies raised the use of renewable energy in transport ninefold between 2013 and 2023.¹⁰ By 2025, growth in India's oil demand had slowed to just 0.6%,

even as the economy grew strongly. The main reason was the rapid rise in biofuel use in road transport.¹¹ India's ethanol consumption grew from less than 2 billion liters a year when the National Policy on Biofuels began in 2018 to more than 11 billion liters a year by 2025.¹²

Fast growth in biofuels masks slow progress overall. Transport lags far behind other sectors in diversifying its energy mix. It uses just 7% of global bioenergy supply, while more than 80% goes to heating. Within Asia, transport's share of biofuel emissions is smaller, at 1.9%. Globally it is about 4.4%.

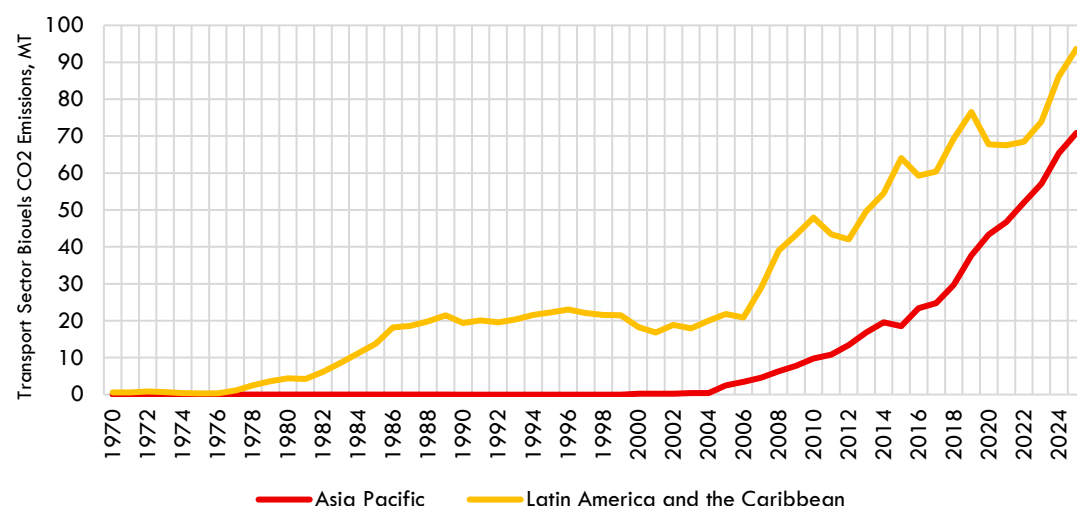


Figure 25: Transport Biofuel Carbon Dioxide Emissions by Region (million tons)

Source: ATO analysis and visualization based on JRC and IEA (2025).

¹⁰ <https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2026>

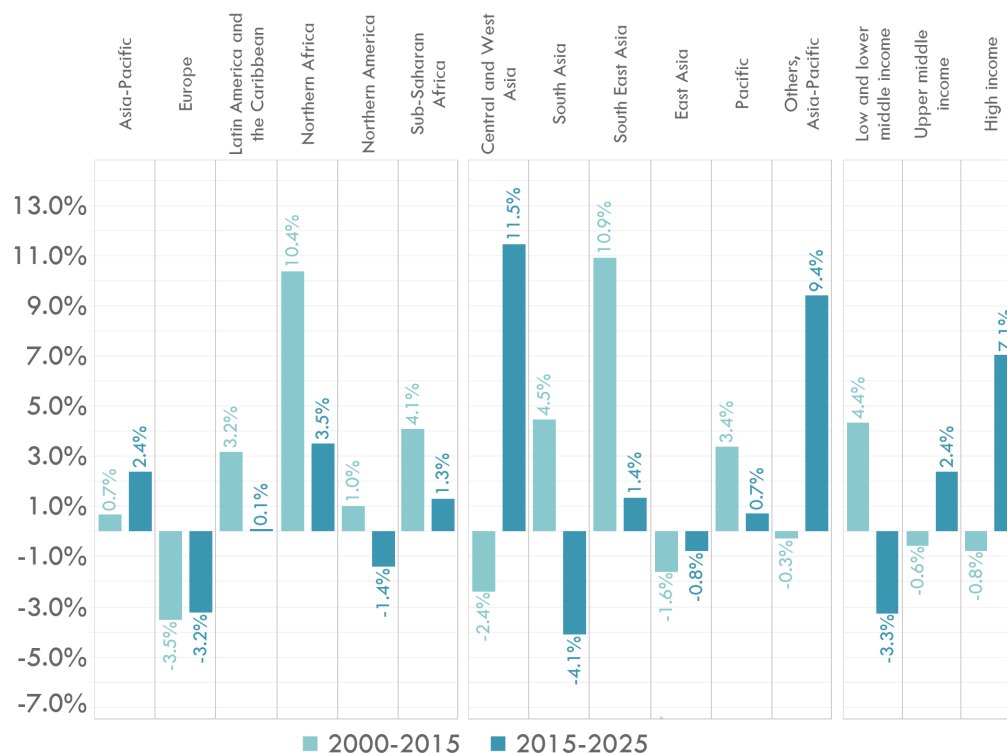
¹¹ <https://www.iea.org/reports/global-energy-review-2026>

¹² <https://iea.blob.core.windows.net/assets/a2f2c534-e865-4648-b405-f5a224e1df6e/IndiaBioenergyMarketReport.pdf>

8 Railways: Expanding Fast, Emissions Rising

Railways are expanding at a historic pace. Their emissions grew 2.4% a year during 2015–2025, against 0.7% during 2000–2015.

Rail transport GHG emissions, average annual growth rate



Includes fossil fuel and biofuel consumption

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Railways in Asia are expanding at a historic pace. From 2000 to 2024, the network grew by 234,000 kilometers (high-speed rail accounted for a quarter of the growth). The pace of construction more than doubled after 2010. This reflects a major shift in policy and investment toward a mode usually associated with lower emissions. Despite all that investment, the sector's GHG emissions still increased.

Domestic railway GHG emissions in Asia grew by only 0.7% a year during 2000–2015, then jumped to 2.4% a year during 2015–2025. Electrification and other decarbonization measures shape how that growth plays out. Since 2015, railway emissions have grown fastest in the Russian Federation and in Central and West Asia. Emissions have fallen in South Asia and East Asia since 2015, which matters because those two subregions hold 57% of the railway network.

Figure 26: Railway Greenhouse Gas Emissions by Subregion

Source: ATO analysis and visualization based on JRC and IEA (2025).

A few countries account for most railway CO₂ emissions in Asia. The Russian Federation, the PRC, India, Kazakhstan, and Australia together account for 79% (Figure 27). The paths of the PRC and India are particularly informative. Since 2008, heavy-rail infrastructure in the PRC has doubled while railway CO₂ emissions have fallen by 56%. In India, railway infrastructure grew by 10% while railway CO₂ emissions fell by 32%. This demonstrates absolute decoupling.

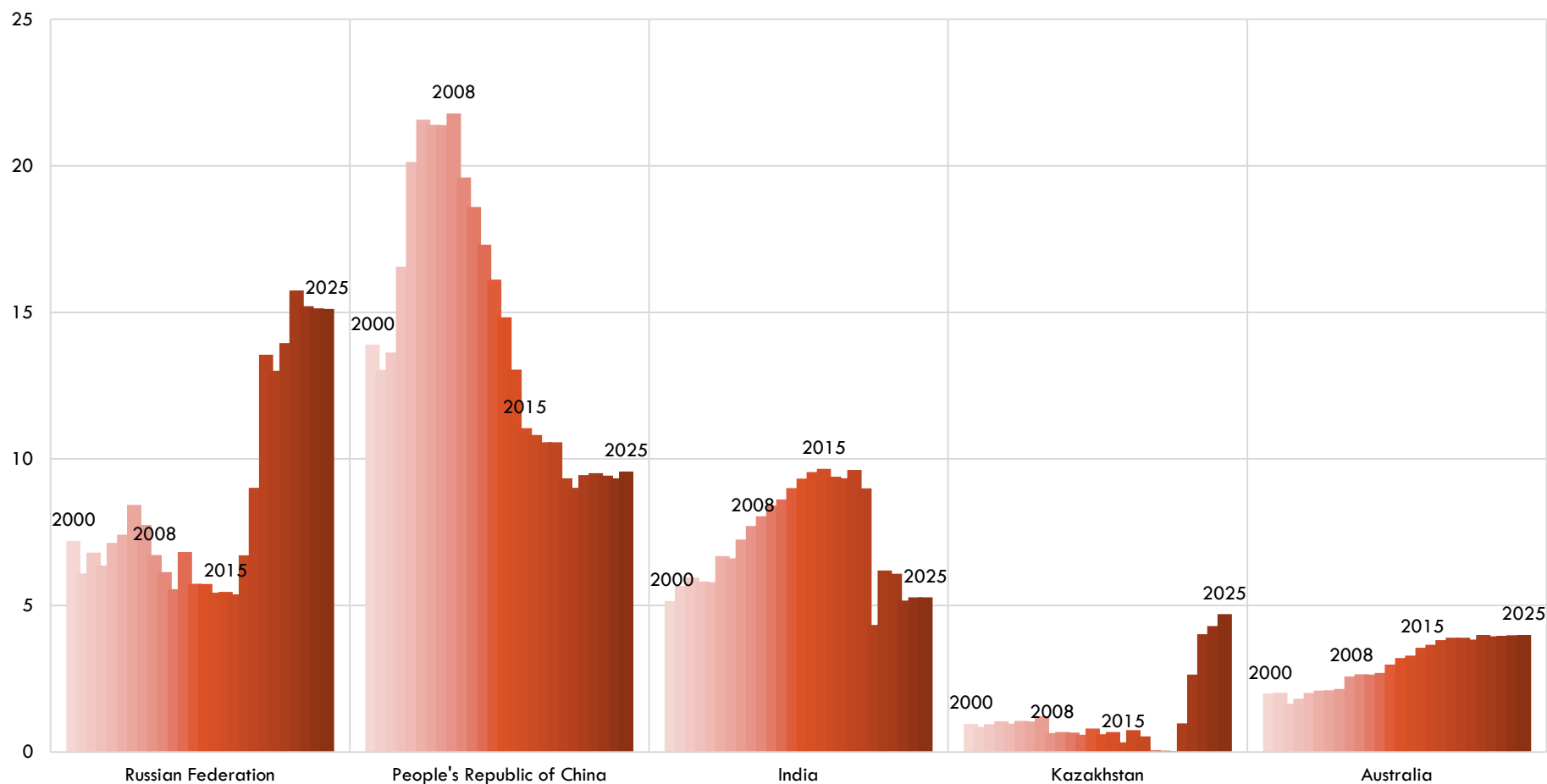
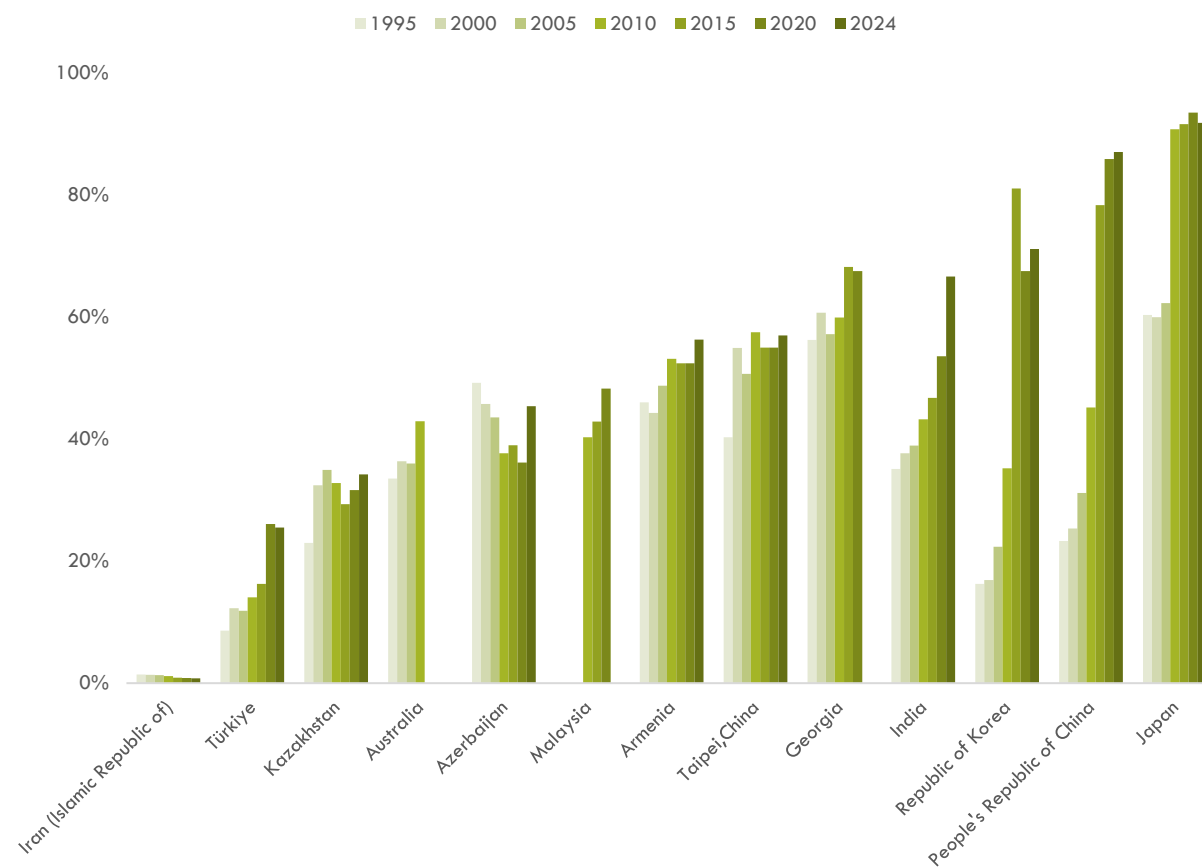


Figure 27: Railway Greenhouse Gas Emissions (million tons) Source: ATO analysis and visualization based on JRC and IEA (2025).

Share of electrified locomotives and multiple units



Rail modernization in Asia and the Pacific has brought large gains in energy efficiency. The sector's energy intensity, a measure of energy used per unit of economic output, fell from 64 MJ per \$1,000 of GDP in 2000 to 17 in 2023. This improvement is linked to a shift toward electrification in a few major economies. In 2023, 56% of tracks were electrified, up from 34% in 2000. Between 2000 and 2023, electricity's share of the sector's final energy consumption rose from 28% to 59%. The same holds for rolling stock: electrified units make up a growing share of the fleet (Figure 28).

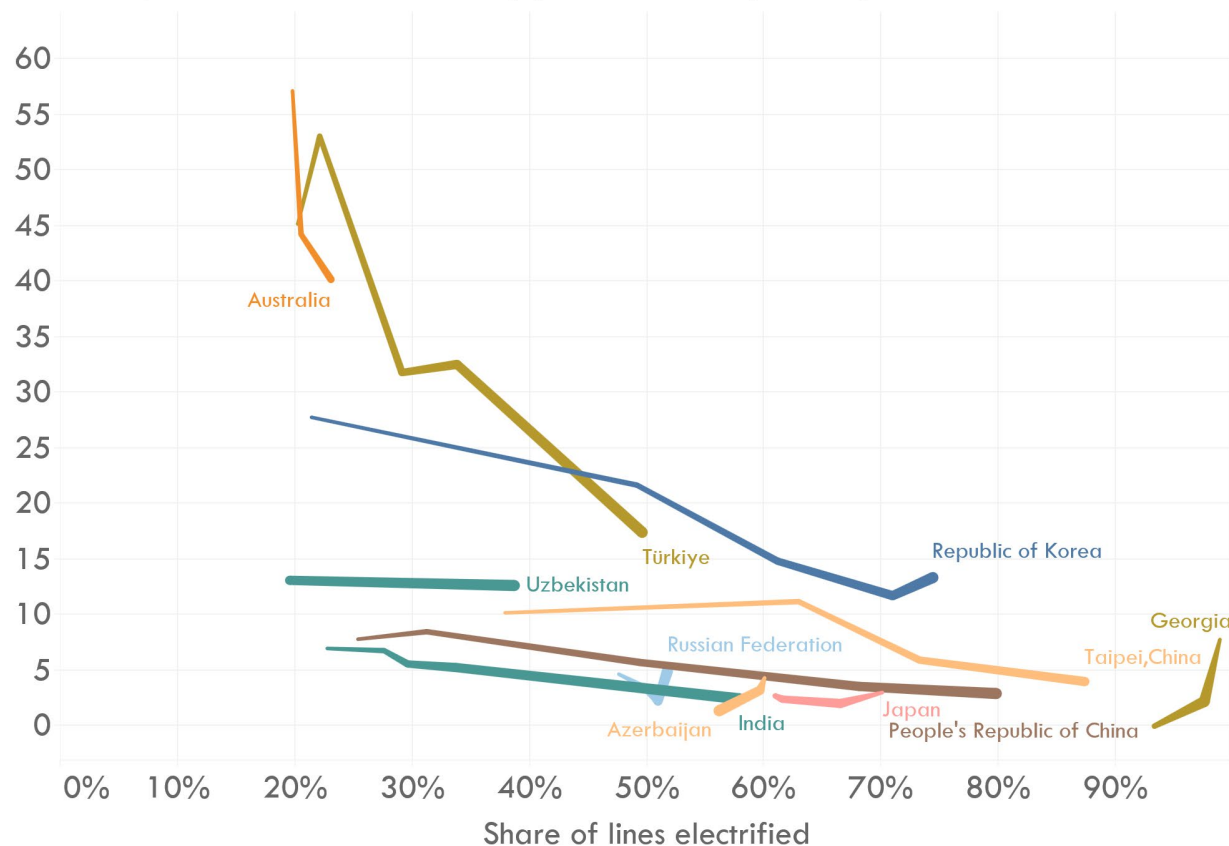


Photo: Fikri Rasyid / Unsplash

Figure 28: Share of Electrified Locomotives and Multiple Units

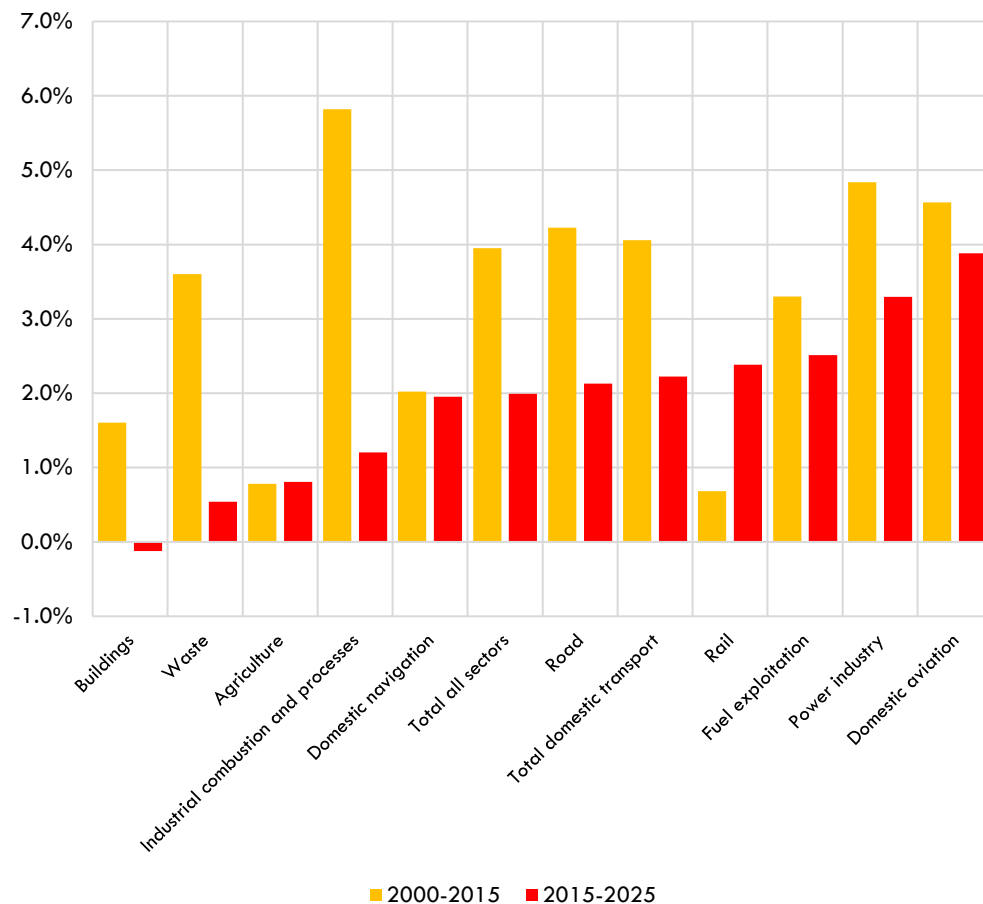
Source: ATO analysis and visualization based on JRC and IEA (2025) and UIC (2025).

Rail transport GHG emissions intensity per million transport unit, tonnes



9 Domestic Aviation: Small Share, Fastest Growth

Domestic aviation is only 0.6% of the region's emissions. No other major energy-consuming sector has seen its emissions rise as fast.



At first glance, domestic aviation looks minor: just 0.6% of Asia's total GHG emissions. That figure hides an unusually persistent problem. Aviation emissions have resisted policy. Annual growth was 4.6% during 2000–2015 and has slowed only slightly since, to 3.9%. No other transport mode is growing as fast.

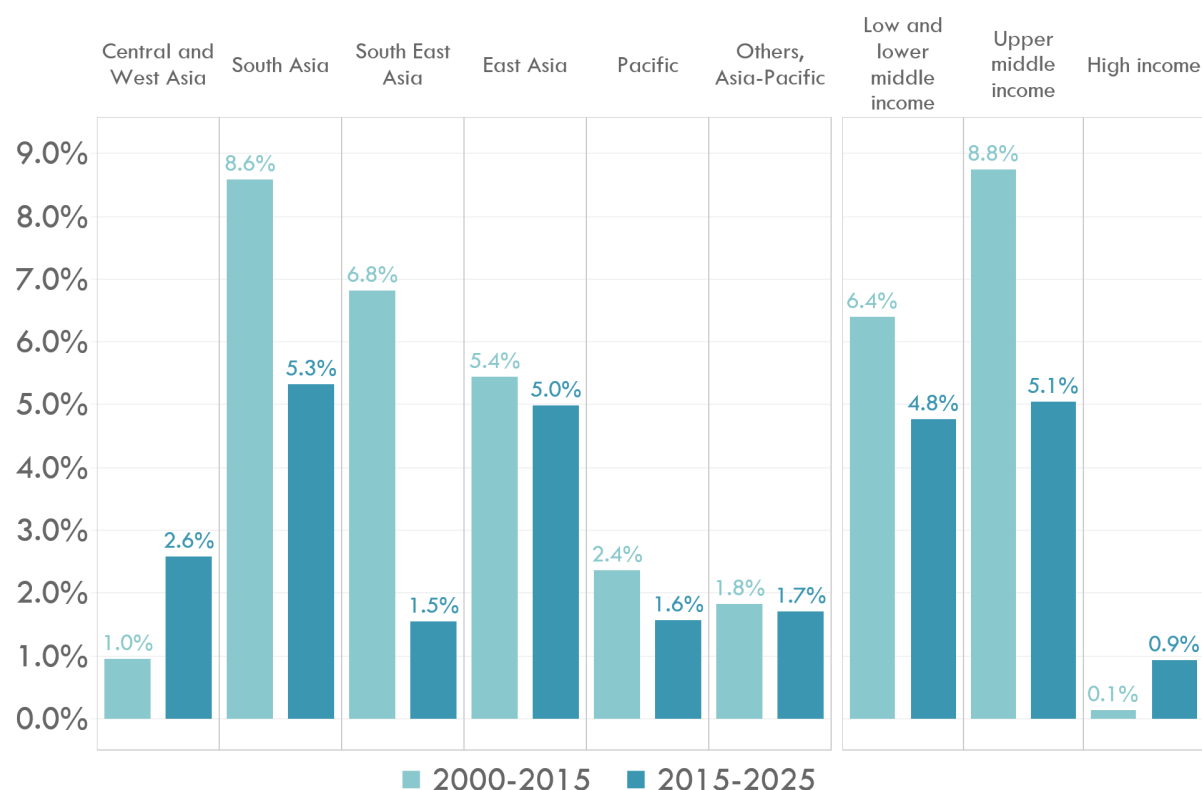
Across the whole economy, no other major energy-consuming sector has seen emissions rise as fast since 2015.

Air travel in Asia and the Pacific has increased only marginally, from an average of 0.9 trips per year in both 2019 and 2024 to 0.95 in 2025. The propensity to fly is projected to more than double, to 2.3 trips a year, by 2045. That would match the 2025 average for Europe (2.3) but stay below the 3.4 for North America.

Figure 30: Greenhouse Gas Emissions Growth in Asia

Source: ATO analysis and visualization based on JRC and IEA (2025).

Domestic aviation GHG emissions, average annual growth rate



Includes fossil fuel and biofuel consumption.

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Demand recovered quickly after the pandemic. In 2025, emissions reached nearly 184 million tons of GHG, 35% higher than their pandemic low. The global balance has shifted. Asia's share of worldwide domestic aviation emissions more than doubled in a generation, from 20% in 2000 to about 44% in 2025. East Asia and South Asia drive most of the growth. Overall growth has changed little since 2015, but the subregional picture has changed. Emissions growth has slowed markedly in South Asia and Southeast Asia and has intensified in Central and West Asia.

Since 2015, domestic aviation emissions have followed very different paths across economies in Asia and the Pacific. The developing economies of Central and West Asia stand out (Figure 32).

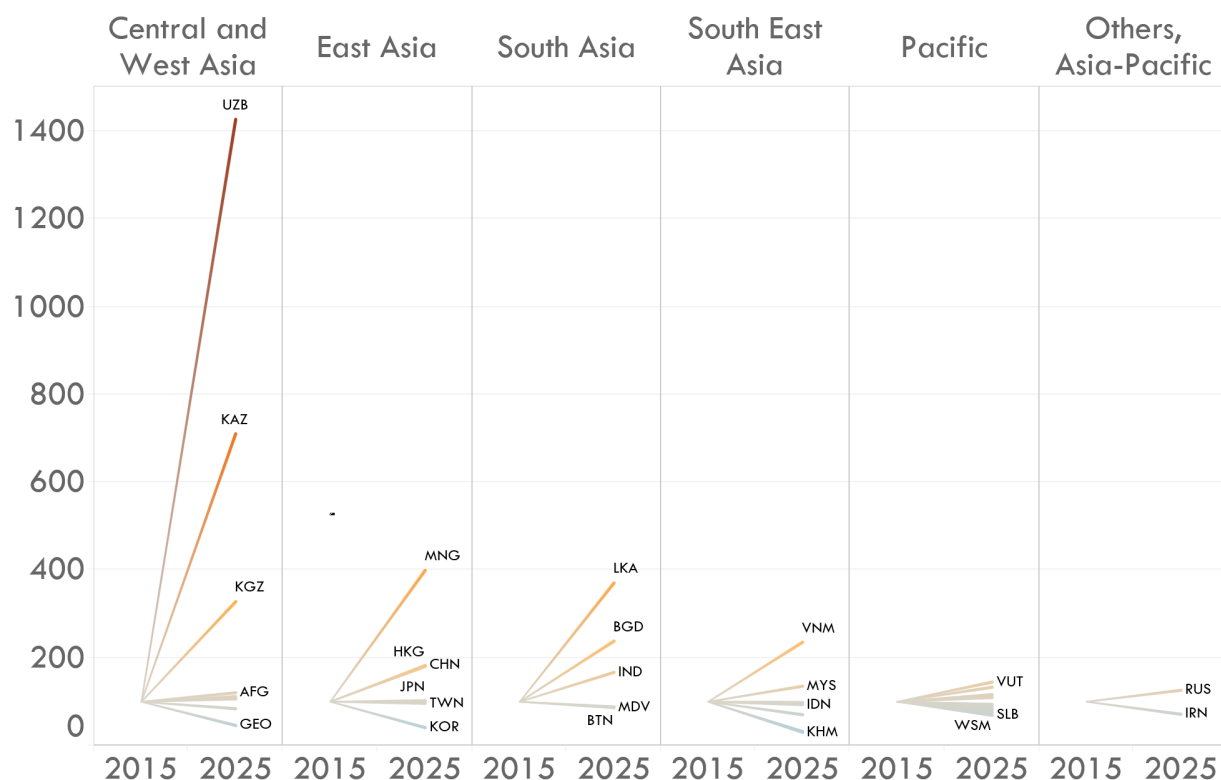


Photo: Hai Nguyen / Unsplash

Figure 31: Domestic Aviation Greenhouse Gas Emissions by Subregion and Income Group

Source: ATO analysis and visualization based on JRC and IEA (2025).

Domestic aviation GHG emissions trend, assuming 2015 as base 100



Includes fossil fuel and biofuel consumption

Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026



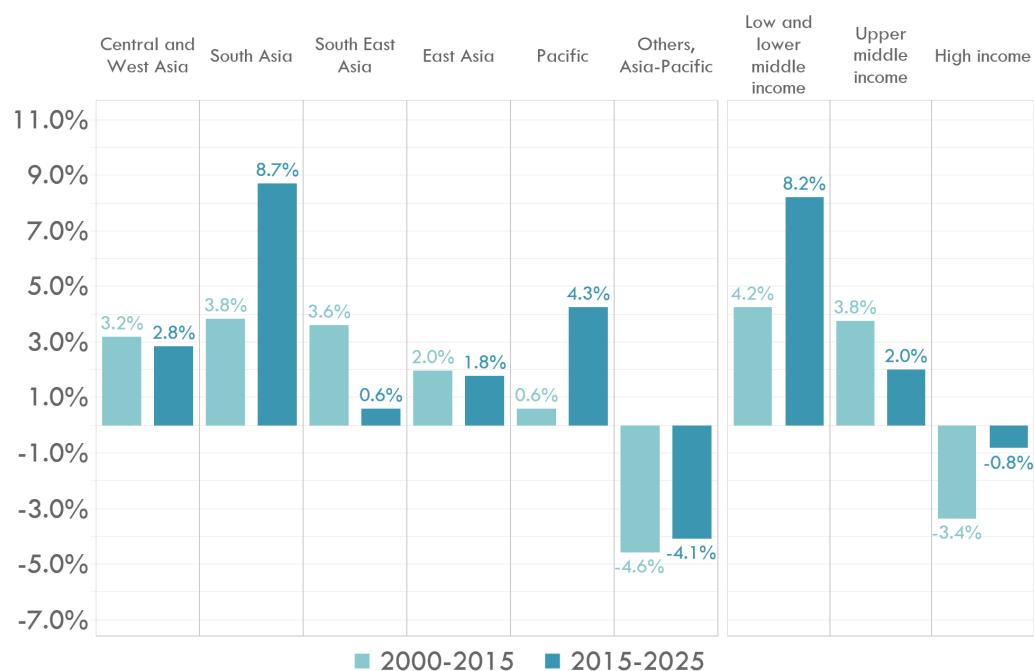
Photo: Johnson Hung / Unsplash

Figure 32: Domestic Aviation Greenhouse Gas Emissions Trajectories, 2015–2025

10 Domestic Shipping: Partial Decoupling, Heavy Concentration

Domestic shipping emissions grew about 2% a year, slower than the economy but faster than the population. One country produces nearly two-thirds of them.

Domestic navigation GHG emissions, average annual growth rate



Includes fossil fuel and biofuel consumption.

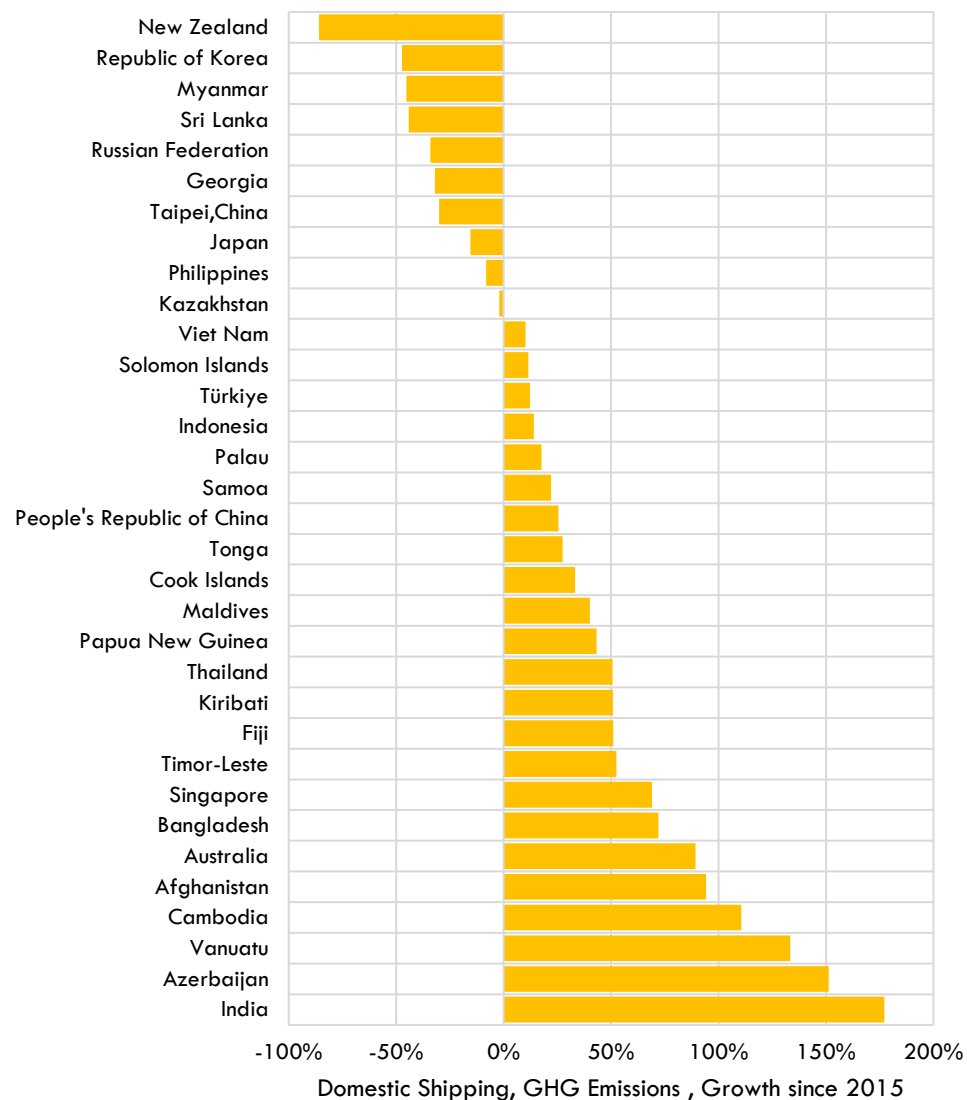
Source: ATO analysis and visualization based on European Commission, J. R. C. (JRC) & International Energy Agency (IEA). (2026). EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (Version EDGAR_2026_GHG) [Dataset]. European Commission, JRC. https://edgar.jrc.ec.europa.eu/report_2026

Asia's inland and coastal shipping shows partial decoupling. GHG emissions from domestic shipping rose from 102 million tons in 2015 to 124 million tons in 2025. At about 2% a year, growth stayed well below the region's GDP growth, though above population growth.

Emissions are highly concentrated. The PRC produces nearly two-thirds of domestic shipping GHG emissions. Since the Paris Agreement took effect, GHG emissions from inland and coastal shipping in Asia have grown sharply in two subregions: annual growth rates have doubled in South Asia and increased sixfold in the Pacific (Figure 33).

Figure 33: Average Annual Growth Rates of Domestic Navigation Emissions by Subregion and Income Group

Source: ATO analysis and visualization based on JRC and IEA (2025).



Since 2015, several economies have seen a significant increase in domestic shipping emissions as freight shifted to water (Figure 34).¹³ By contrast, several East Asian economies passed their peak in domestic navigation emissions in the 1990s or early 2000s. Japan's emissions peaked in 1997 and had fallen to less than half of that level by 2024. The Republic of Korea peaked in 1993 and has since cut emissions by more than 95%, based on the latest estimates. Taipei, China peaked in 2001, and its emissions have fallen by about 80%.

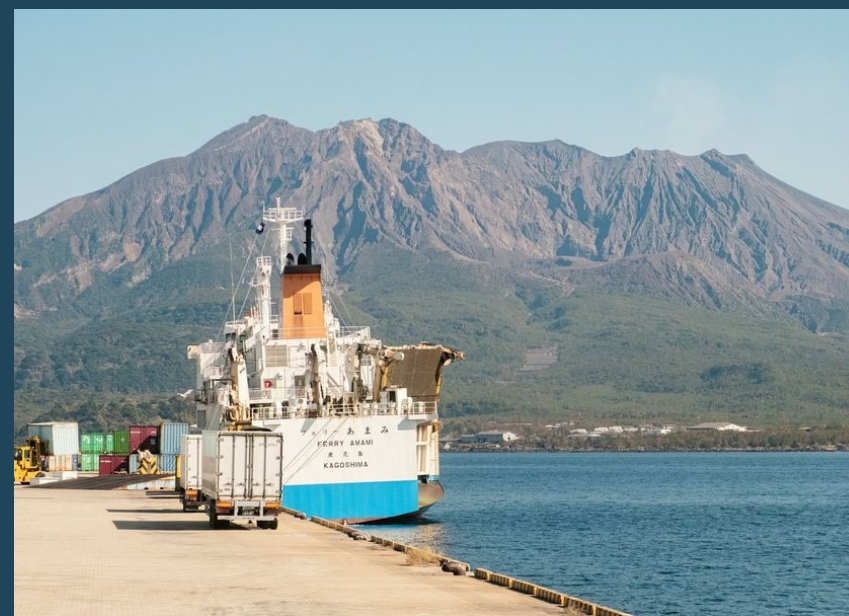


Photo: Tuan P. / Unsplash

Figure 34: Domestic Navigation Greenhouse Gas Emissions, Change Since 2015

Source: ATO analysis and visualization based on JRC and IEA (2025).

¹³ <https://asiantransportobservatory.org/analytical-outputs/maritime-transport-2025/>

11

Cities: Private Vehicles Gain Ground

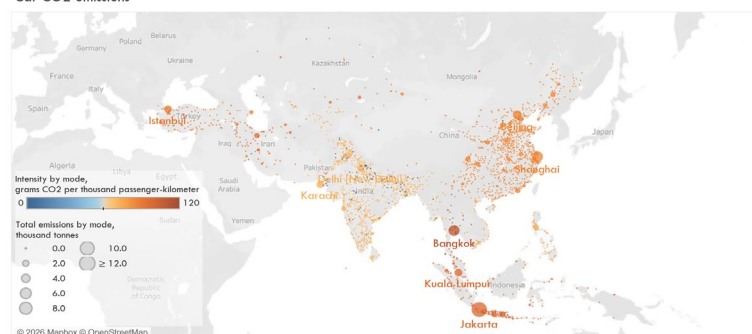
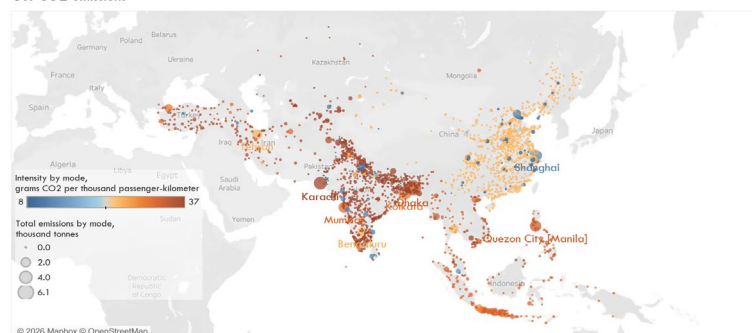
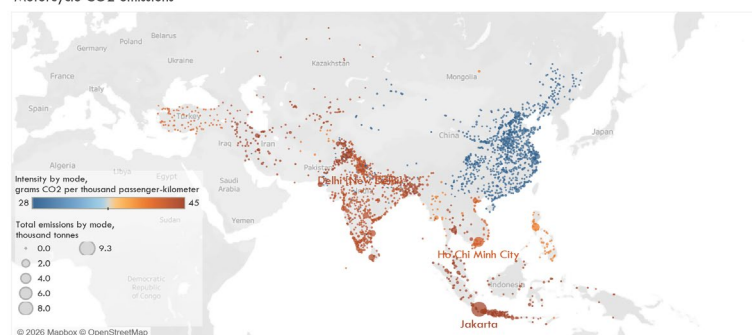
Asia holds about 59% of the world's urban population. Private vehicle mode share increased in 92% of the cities sampled.

Asia and the Pacific holds about 59% of the world's urban population. By 2050, the region's cities will add another 350 million people. In 2015, Asia and the Pacific had 21 megacities, meaning cities of more than 10 million people. By 2035, there will be 22. Submegacities, with 5 to 10 million people, are multiplying faster, from 22 in 2015 to 32 in 2035. Existing cities keep growing as well. The 21 megacities of 2015 are set to add 22% to their population by 2035. The 22 submegacities of 2015 will add 14%. Megacities are expected to grow denser.

Access to public transport is also low. Data cover 3,215 urban centers in Asia and the Pacific, and the simple average access rate across these centers is 26%. Counting people instead of cities gives a more pessimistic picture: weighted by urban population, about 1.4 billion residents in Asia have no access. Under the definition used for the Sustainable Development Goals, a person has access if they live within 500 meters of a low-capacity service or within 1 kilometer of a mass transit station.



Photo: allPhoto Bangkok / Unsplash

Car CO₂ emissionsBus CO₂ emissionsMotorcycle CO₂ emissions

From 2018 to 2023, mode shares shifted in nearly the same way across Asian cities. The sample includes 224 cities outside the PRC with comparable data. In 205 of them (92%), walking and cycling combined lost share. Walking drove the loss. It fell in 216 cities, even as cycling rose in 169. Depending on mode and city, shifts ranged from a fall of about 31% to a gain of 35%.

Public transport gained share in 77 cities and stayed flat in 26. Private vehicle use rose in 207 cities. Even where public transport grew, active travel was not spared. In 71 of those 77 cities, walking and cycling together still lost share. Private motorized share fell in only 11. Short trips are moving onto vehicles. In 2023, the simple average across the 224 cities was 14.1% for walking and cycling, 3.3% for public transport, and 82.6% for private modes.

In 2025, across the top 50 global cities with the highest urban passenger transport emissions, 29 are in Asia and the Pacific. The region accounts for about two-thirds of global urban passenger transport emissions. Within Asia, emissions intensity ranges from 8 to 37 grams per thousand passenger-kilometers for buses and 28 to 45 grams for motorcycles, and it reaches 54 to 110 grams for passenger cars. Intensity also varies widely across subregions.

For the outlook to 2035, the World Bank tracks urban transport emissions through its Passenger Transport Emissions Pathways model. The model covers urban areas with more than 100,000 people. That is 3,809 areas across 116 low- and middle-income countries. Asia accounts for 2,564 of them. The PRC alone has 1,134, or 44% of them.

Figure 35: Urban Passenger Transport Carbon Dioxide Emissions by City and Mode

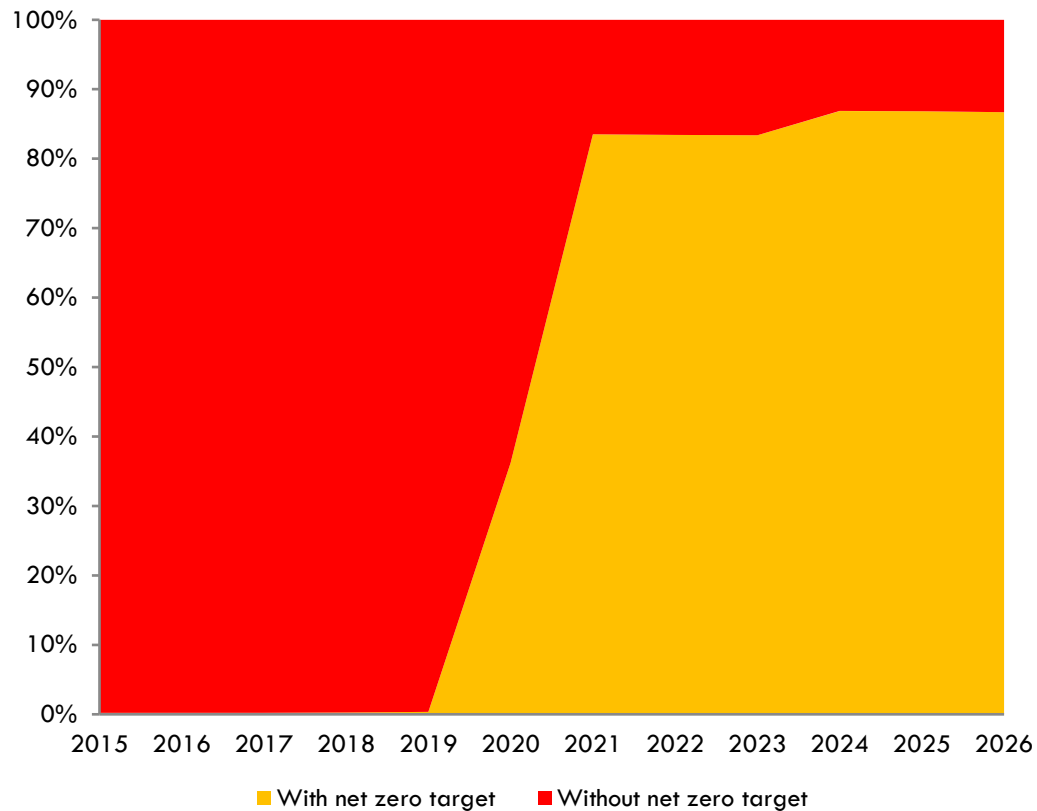
Under a business-as-usual scenario, urban passenger transport in these Asian areas emitted 294 million tons of CO₂ in 2020. By 2035, that could reach 371 million tons, a rise of about 26%. The PRC's weight in the sample shapes this trend. In the PRC's cities, emissions fall by 6%. In the region's other urban areas, they climb by 43%.



Photo: Mighty Commander / Unsplash

12 Policy and Ambition: Broad Pledges, Thin Transport Targets

Net-zero commitments now cover most of the region's people. Quantified transport targets in national climate pledges remain rare.

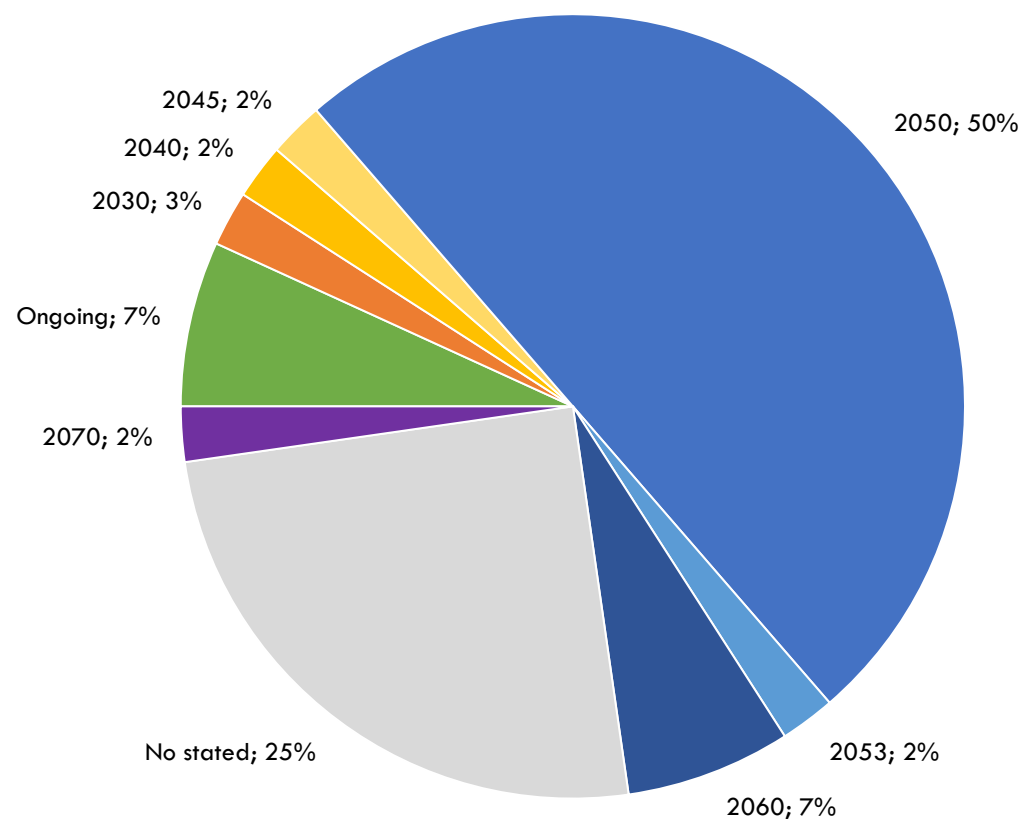


Policy offers more reason for optimism than the emissions data. In 2015, less than 1% of the region's population lived in countries with ambitious long-term official climate goals. By 2026, the share was 87%. Political will has shifted almost completely.

Every economy in East Asia and South Asia is now covered, as is nearly all of the Pacific's population. Southeast Asia has made substantial progress: commitments reach 75% of its people. Central and West Asia lags, at 25%. Southeast Asia and Central and West Asia together hold 85% of the regional population still outside such commitments. That is where ambition falls short.

Figure 36: Share of Population in Asian Countries with Net-Zero Targets

Source: ATO analysis and visualization based on the ATO National Policy Tracker.



The economy-level count agrees. As of September 2026, 33 of the 44 economies whose policies were analyzed in detail had a verified economy-wide net-zero or carbon-neutrality goal, aspiration, or achieved status. Half of the 44, or 22 economies, point to 2050.

Transport is where ambition in nationally determined contributions (NDCs) reduces. The latest NDCs of all 44 economies now include climate-related transport targets or policies within their economy-wide targets. Together these economies hold 90.2% of the region's population. Inclusion is not specificity.

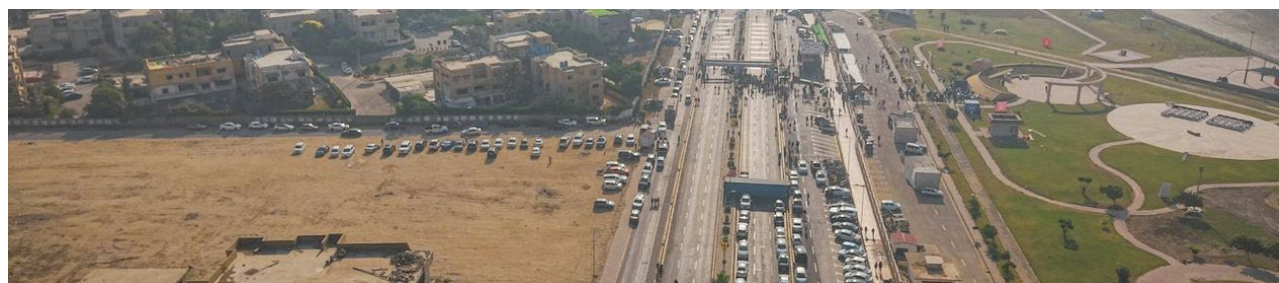


Photo: Tahamie Farooqui / Unsplash

Figure 37: Distribution of Economies by Formal Net-Zero Target

Source: ATO analysis and visualization based on the ATO National Policy Tracker.

Only 11 economies explicitly address the management of transport GHG emissions, covering 36% of the population. Only nine set quantified transport GHG reduction targets, covering just 4.5%. In the NDCs, national aspiration has not become sector accountability. Stated intent and measurable progress remain far apart.

Outside the NDCs, the transport policy record has grown fast. The number of reviewed policy and related documents rose from 369 in 2015 to 761 in 2020, and to 1,327 by September 2026. Externality-focused documents grew from 133 to 569 and are now the largest category. Climate leads within this group. Climate-focused documents rose from 60 in 2015 to 346 in 2026, or from 45% to 61% of all externality-focused documents.

By mode, road infrastructure and operations are the biggest focus, with 70 documents by 2015, 114 by 2020, and 177 by 2026 (Figure 38). Multimodal coverage rose from 23 to 55 and then to 110. Shipping and inland water transport rose from 43 to 57 and then 81. Aviation climbed

from 13 to 24 and then 58. Coverage is growing, and so is the range of themes.

The NDCs tell only part of the story. A thin NDC does not mean a sector without climate ambition. Of the 44 economies, 21 (48%) have set direct transport emission targets, and 40 (91%) have proposed indirect targets in transport policy documents. In 2026, NDCs account for 10% of the identified transport policies, up from 1.3% in 2015. Other documents hold the remaining 90% (Figure 39). Judging progress by NDCs alone is misleading. An NDC may signal the destination and the high-level intent. The roadmap is written elsewhere, often outside the focus of international climate negotiations.

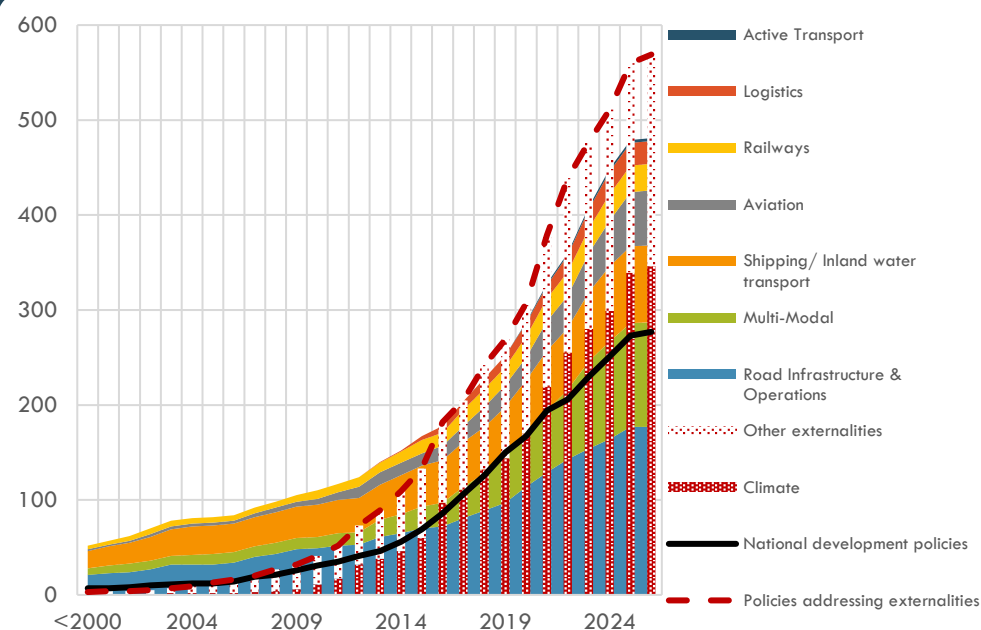


Photo: Viktor SOLOMONIK / Unsplash

Figure 38: Distribution of Transport Policy and Related Documents by Focus Area

Source: ATO analysis and visualization based on the ATO National Policy Tracker and secondary sources.

Institutions explain part of this. NDCs are a first step. They set national goals, but delivery needs many institutions and stakeholders. Environment ministries normally own the NDCs. Transport ministries own sector policy. Without coordination between agencies, the two tracks do not meet. Broader transport plans show that many countries have begun to align sector plans with NDC goals. Progress is gradual and uneven.

Targets by mode add context. Road dominates both in NDCs and in other documents, with 46% and 56% of modal target references. Rail, shipping, and aviation together make up 54% of the modal references in NDCs, against 44% outside them.

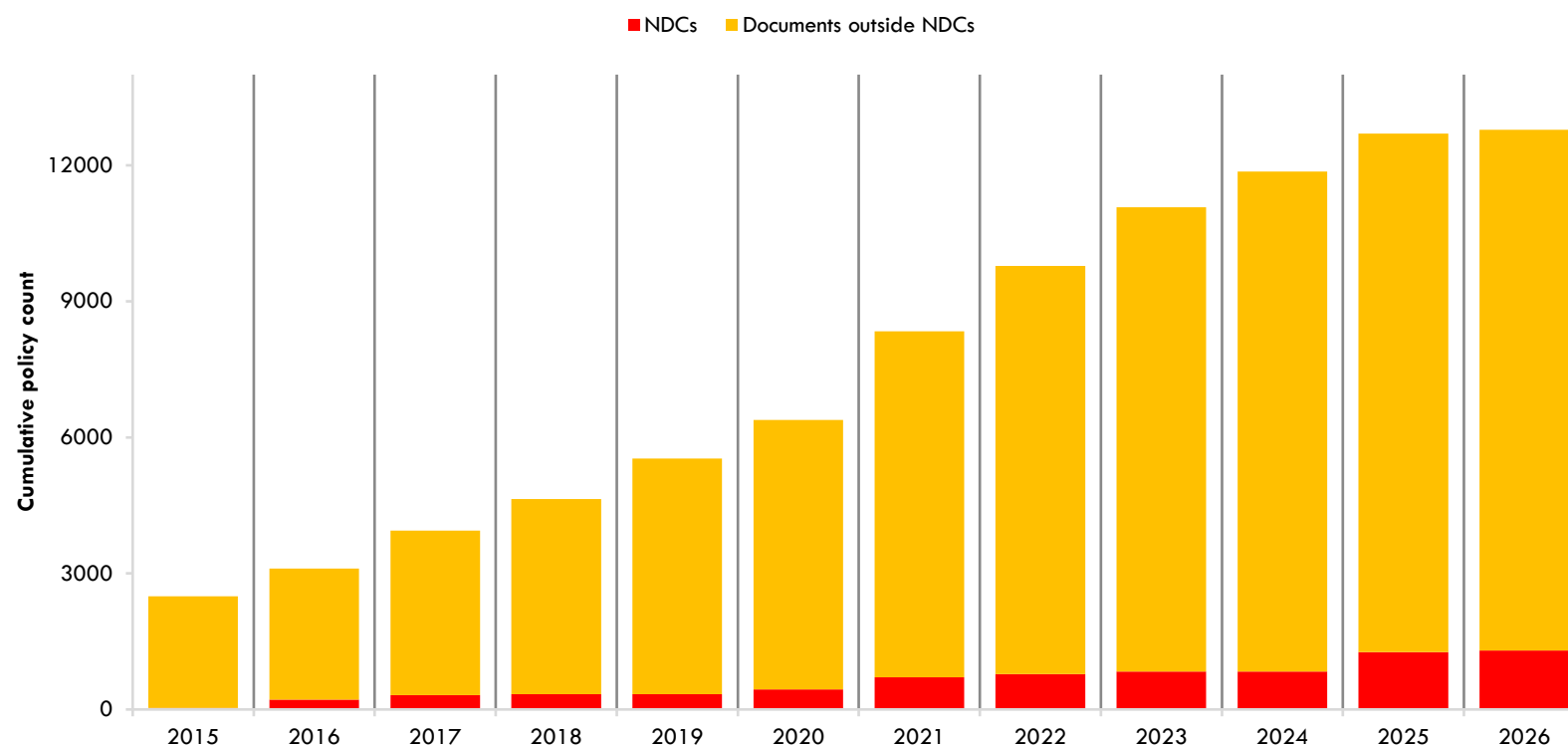


Figure 39: Cumulative Count of Transport-Specific Climate Measures by Document Source¹⁴

Source: ATO visualization based on the ATO National Policy Tracker.

¹⁴ The count of transport-specific climate measures is derived from the predefined list of policy measure types in the ATO National Policy Tracker. Each count is the number of unique instances recorded per document for each measure type.

NDCs and other policy documents also stress different things. Among the latest NDCs of the 44 economies, e-mobility appears in 28 economies, renewable energy in 23, and vehicle efficiency in 18. Outside the NDCs, the same themes appear in documents from 42, 39, and 40 economies. The gap is wider for public transport improvement: 42 economies cover it outside the

NDCs, only 13 within them. For active transport infrastructure the counts are 35 and 8. Electrification and renewable energy are common ground. Most of the detail needed to deliver the transition sits outside the NDCs.

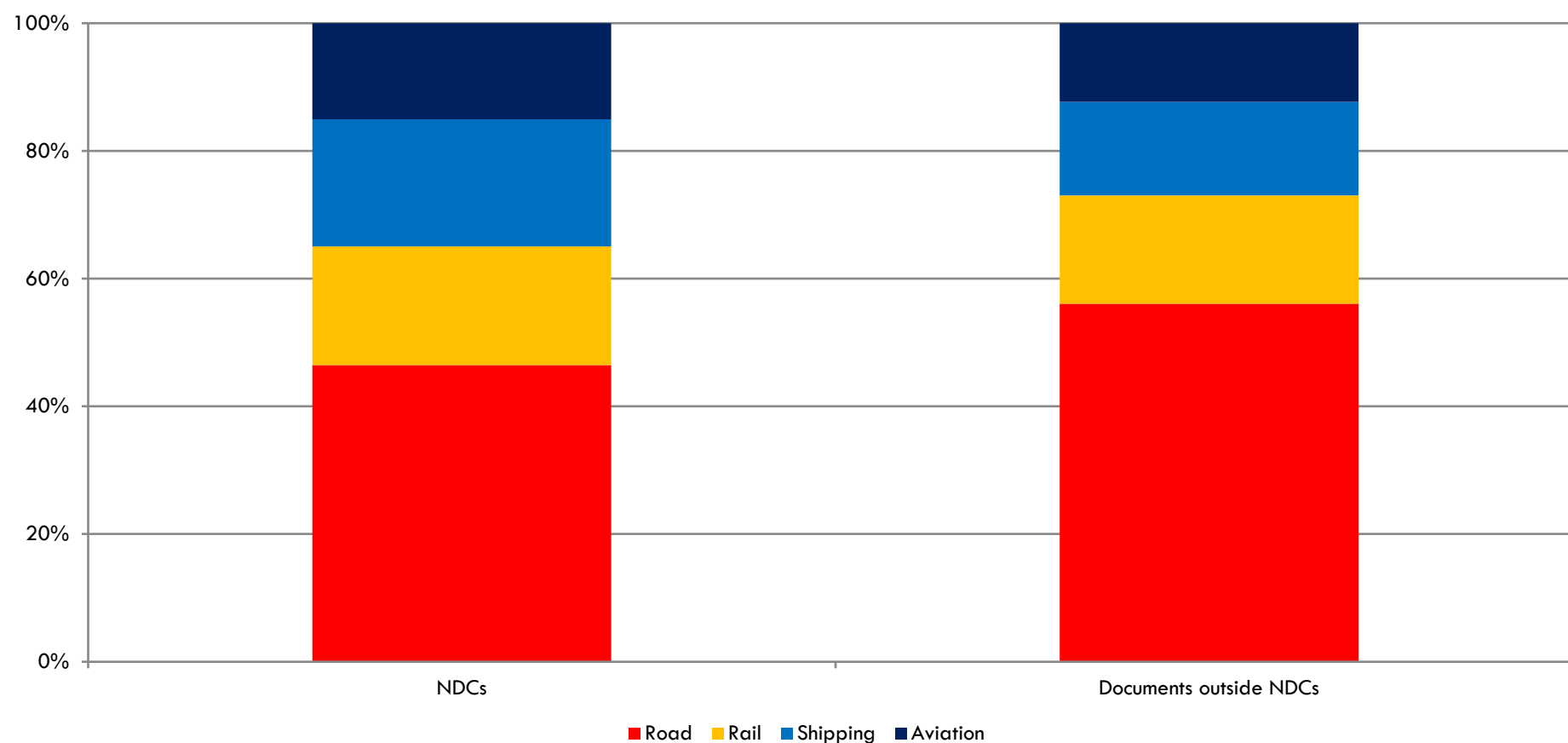


Figure 40: Modal Distribution of Targets

Source: ATO analysis and visualization based on the ATO National Policy Tracker.

NDC priorities have matured. Compared with the earliest available NDCs, the latest give far more attention to e-mobility, charging infrastructure, renewable energy, and the management of transport GHG emissions. Vehicle efficiency, biofuels, and modal shift now appear in more economies

than before. The latest submissions are also more varied. They span technology, infrastructure, and system-level change.

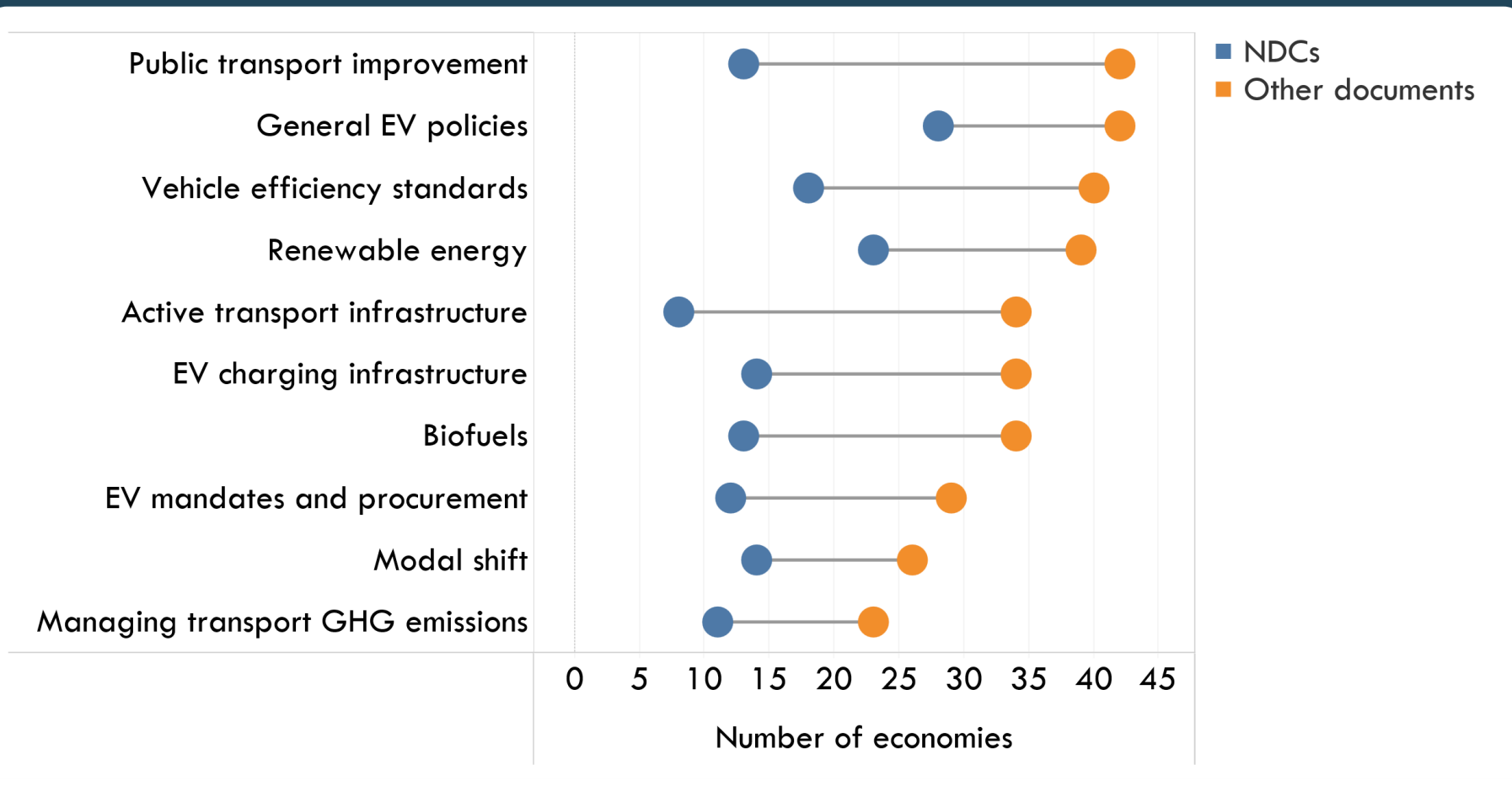
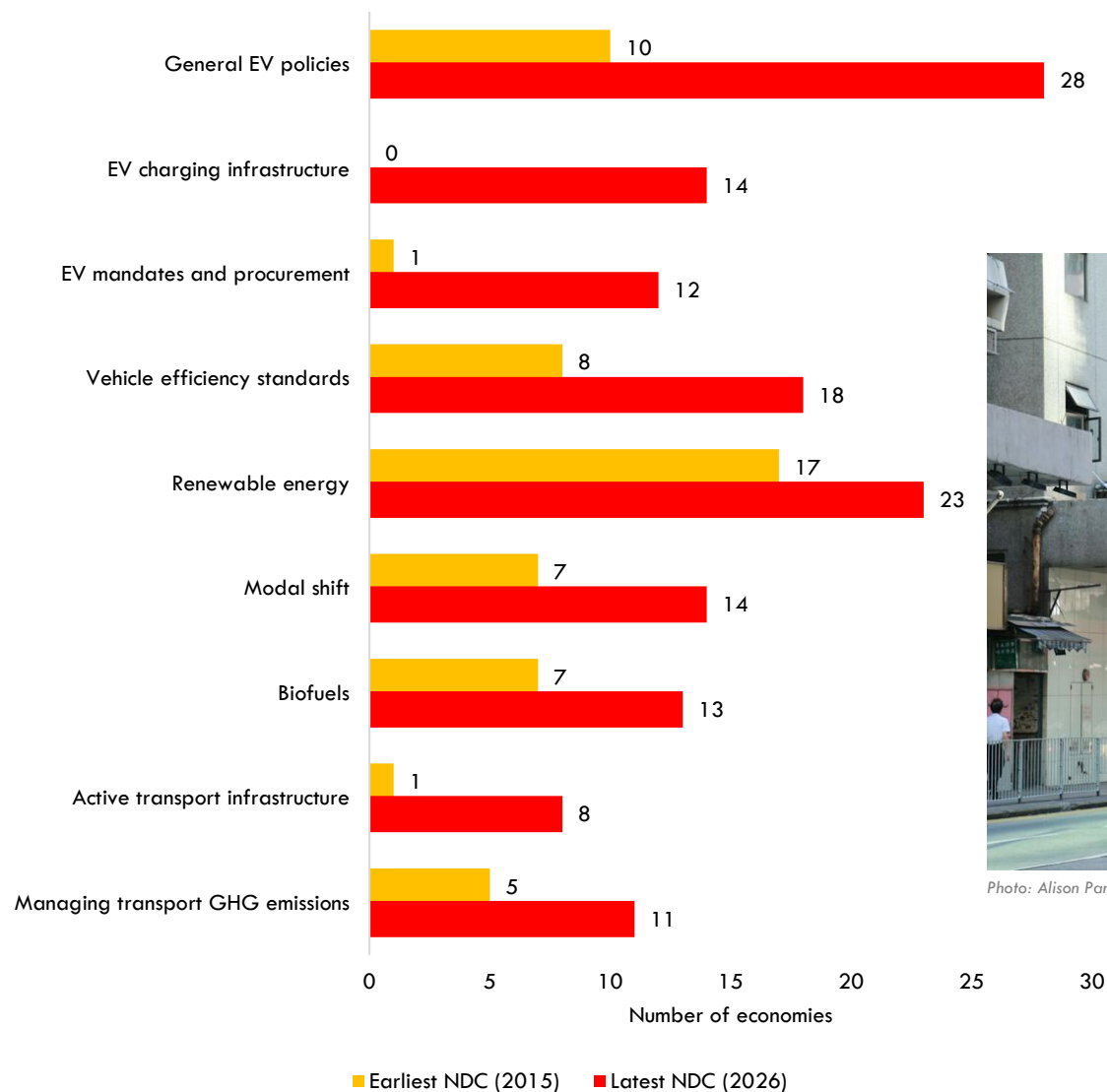


Figure 41: Economies Covering Transport Decarbonization Themes in Nationally Determined Contributions and Other Policy Documents

Source: ATO analysis and visualization based on the ATO National Policy Tracker.



Targets now reach every major mode. Across the 44 economies, road coverage rose from 16 economies in 2015 to 42 in 2026. Rail rose from 7 to 29, shipping from 6 to 31, and aviation from 8 to 34. Road is still the most widely covered mode.



Photo: Alison Pang / Unsplash

Figure 42: Evolution of Transport Decarbonization Themes in Nationally Determined Contributions

Source: ATO analysis and visualization based on the ATO National Policy Tracker.

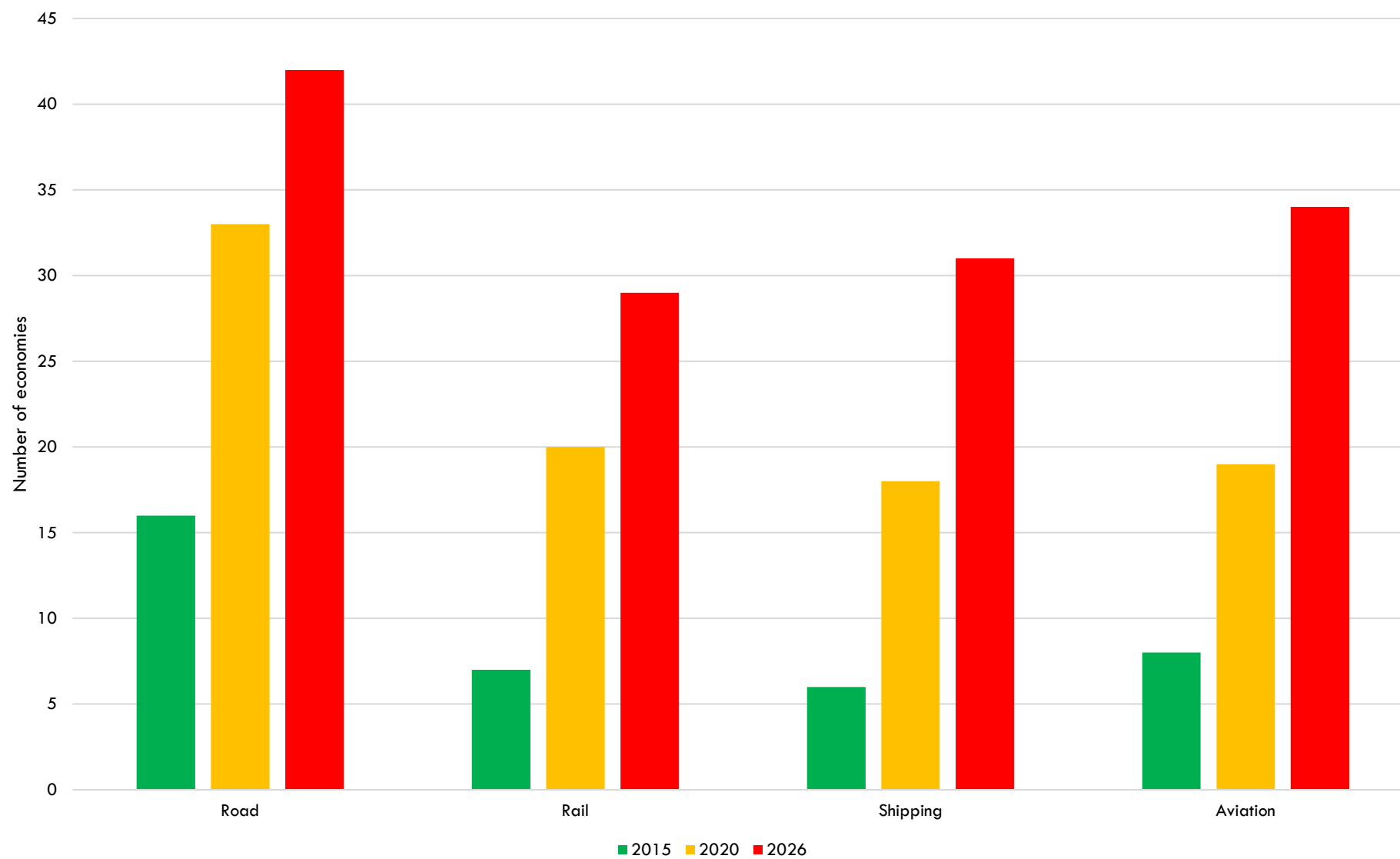


Figure 43: Presence of Climate-Related Targets by Mode

Source: ATO analysis and visualization based on the ATO National Policy Tracker.

13 Climate Adaptation: Where the Risk Is Highest, the Pledges Are Thinnest

Most of the region's transport adaptation work sits in policy documents. Its climate pledges say little about it.

Asia and the Pacific must also adapt. The region accounts for 65% of the expected annual direct physical damage to transport infrastructure worldwide from climate and other hazards (Koks et al. 2023). This amounts to an estimated \$8.5 billion a year. Low- and middle-income countries bear three-quarters of the estimated damage (CDRI n.d.). Roads account for 61% of the direct costs. Verschuur et al. (2023) estimate that natural hazards at

ports, including tropical cyclones, earthquakes, river flooding, pluvial flooding, and coastal flooding, put about \$60 billion of global trade at risk. Asian countries carry 70% of this risk.

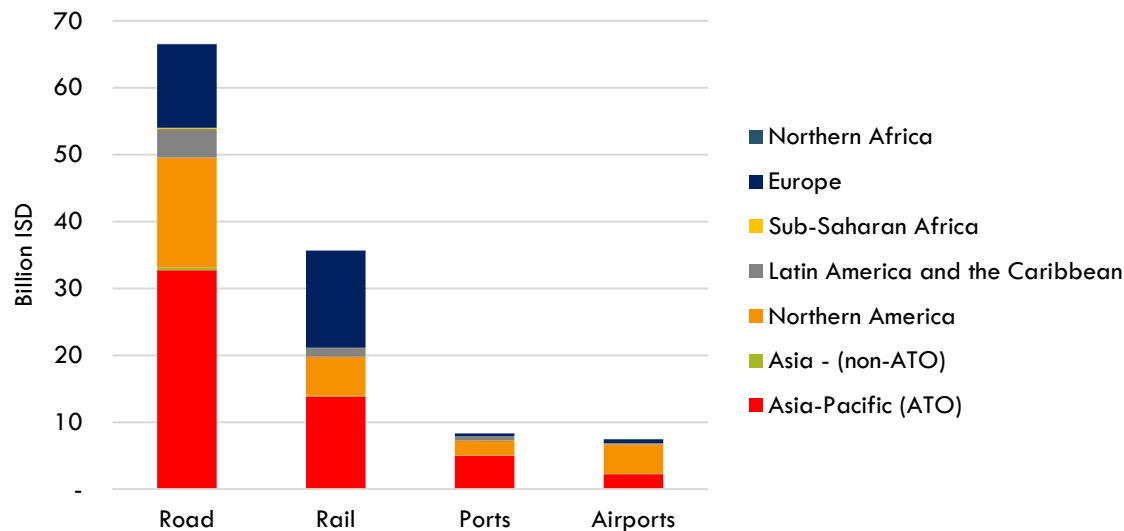


Photo: Iqro Rinaldi / Unsplash

Figure 44: Average Annual Financial Losses from Environmental Hazards (\$ billion)

Source: (ATO, 2025).

Across the 44 economies reviewed, transport adaptation and resilience are much more visible in policy documents outside the NDCs. Transport adaptation, emergency, disaster, or recovery plans, policy measures, and strategies appear in only 6 of the latest NDCs but in other documents from 31 economies.

Resilient transport infrastructure appears in 8 of the latest NDCs, against 31 economies outside them, while climate-risk infrastructure modification appears in 4 against 25.

Other adaptation priorities show the same divide. Reducing future exposures appears in only 2 of the latest NDCs, but in other documents from 21 economies. General transport resilience measures appear in 2 of the latest NDCs against 20 economies outside them, while preparedness and rapid recovery appear in just 1 of the latest NDCs against 14 economies elsewhere

in the policy record.

Adaptation is present in the wider policy record. The NDCs barely reflect it.

Between 2015 and 2026, more of the 44 economies adopted increasingly specific resilience measures (Figure 45). Adaptation, emergency, disaster, or recovery planning expanded from 12 economies in 2015 to 34 in 2026. Resilient transport infrastructure grew from 7 to 33 economies, early-warning systems from 14 to 30, and climate-informed design standards from 8 to 26. Enabling systems remain less widespread: by 2026, asset-management funding strategies appeared in 16 economies and information systems in 13.

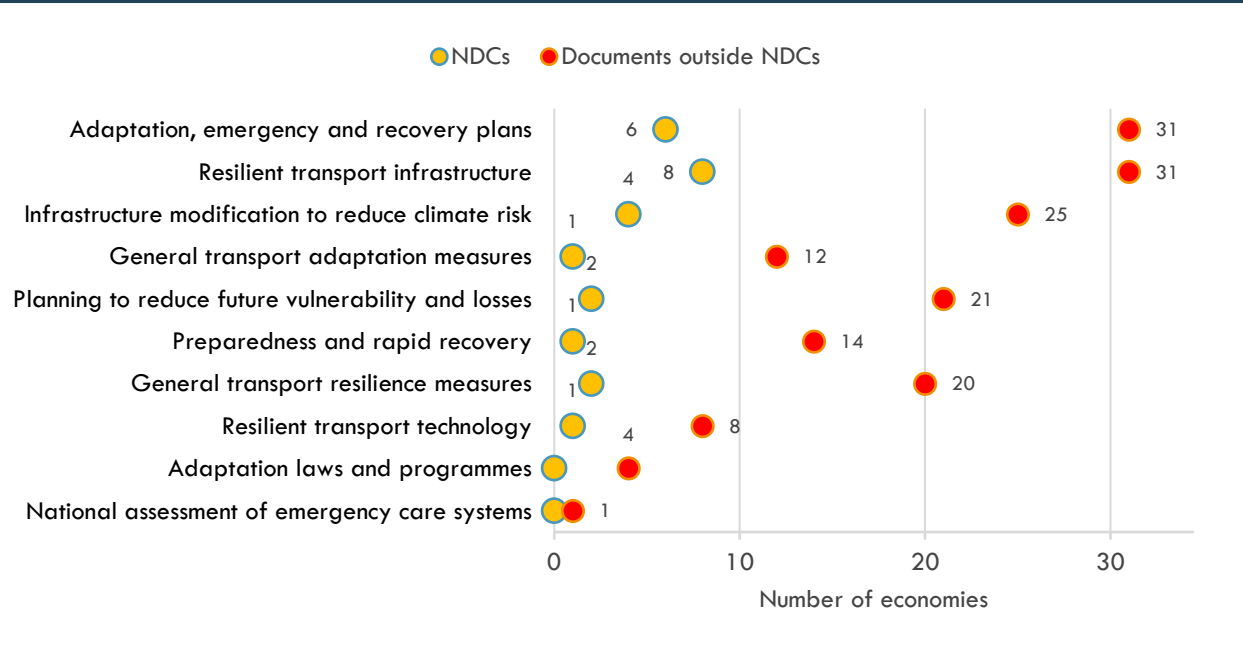


Figure 45: Number of Economies with Climate Adaptation and Resilience Policy Measures

Source: ATO visualization based on the ATO National Policy Tracker.

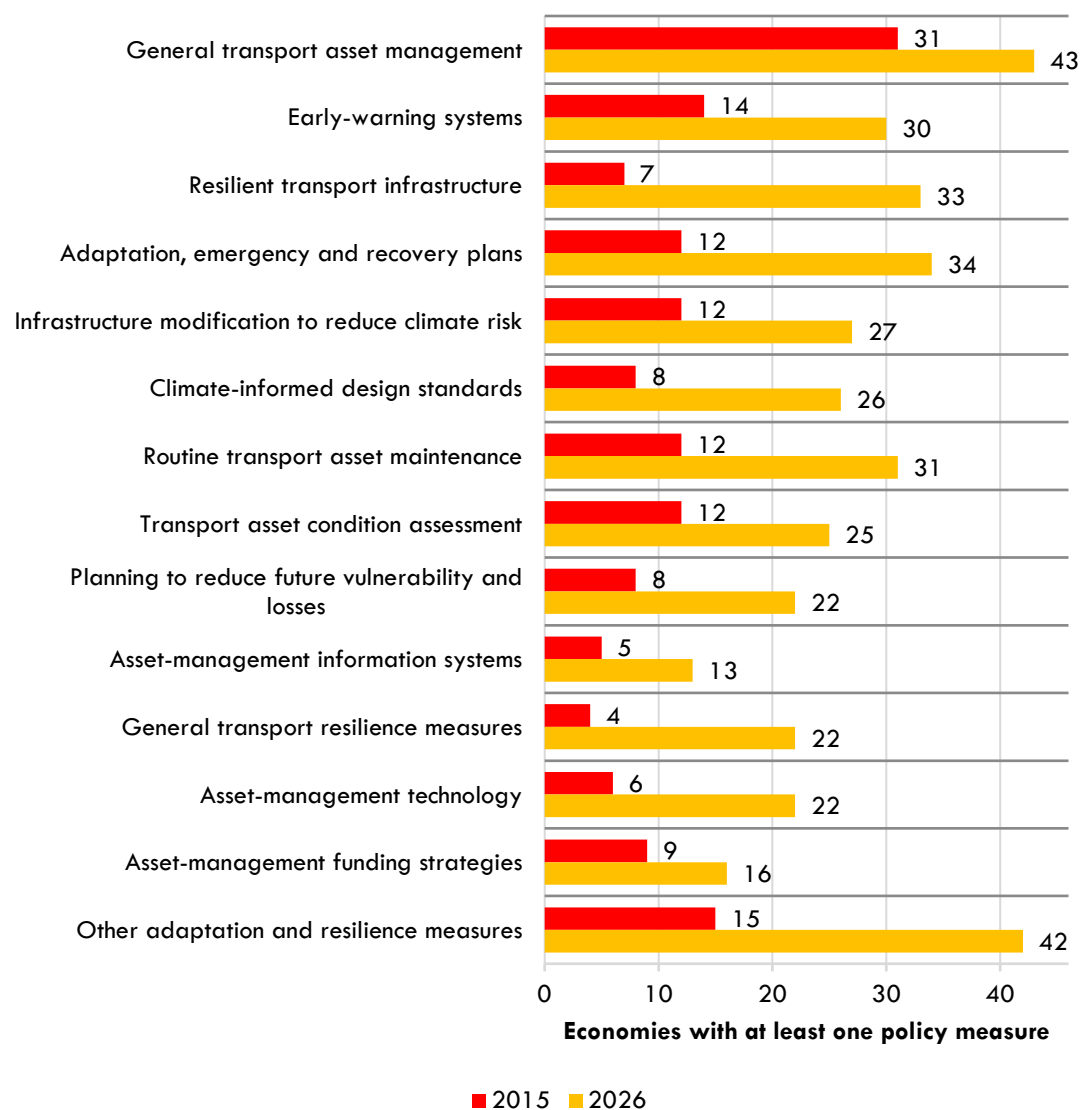


Photo: firman fatthul / Unsplash

Figure 46: Distribution of Adaptation Policy Measures in Countries in Asia and the Pacific by Type

Source: ATO visualization based on the ATO National Policy Tracker.

14 Finance Is Moving, but Narrowly

Finance for low-carbon, resilient transport has grown to 55% of commitments. Rail took 51% of it, and five economies received 72%.

The ATO Transport Development Finance Explorer holds 77,571 transaction lines from the Creditor Reporting System (CRS) of the Organisation for Economic Co-operation and Development (OECD) for 1973 to 2024. Together they record \$473 billion of transport commitments from 66 finance sources to 50 recipients in Asia and the Pacific.¹⁵



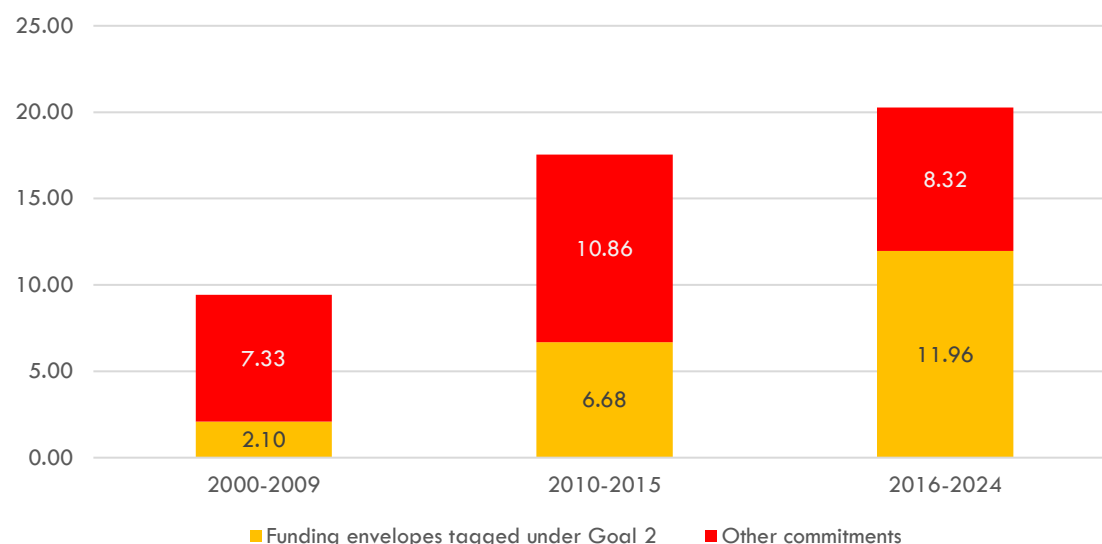
Photo: Ngân Nguyễn Văn / Unsplash

¹⁵ All values in this section are commitments in constant 2024 dollars unless stated otherwise. Annual figures are five-year averages.

Average annual commitments to transport in Asia and the Pacific rose from \$9.2 billion in 2000–2009 to \$14.6 billion in 2010–2015. By 2016–2024, they had reached \$19 billion. The growth is real, but it has flattened in recent years, and it looks small next to what the region needs to invest.¹⁶ Whether current financing levels and priorities can support growing transport and climate ambitions is an open question.

Annual commitments linked to Goal 2 of the United Nations Decade of Sustainable Transport rose from \$2.1 billion in 2000–2009 to \$6.7 billion in 2010–2015 and \$11.96 billion in 2016–2024. Goal 2's share rose from 22% to 38% and then 56% over those periods (Figure 47). Climate and environmental objectives now touch more than half of the region's portfolio. The comparison needs care. A project can carry several goal tags, so the shares do not add to 100%.

Goal 2 finance remains concentrated in a small group of economies. India,



¹⁶ <https://asiantransportobservatory.org/analytical-outputs/asia-transport-infrastructure-investment-needs/>

the Philippines, the PRC, Bangladesh, and Viet Nam accounted for 70% of commitments in 2000–2009, 71% in 2010–2015, and 72% in 2016–2024 (Figure 48). While concentration has remained high, its composition has shifted. India remains the largest recipient, while the Philippines and Bangladesh have gained prominence as the PRC and Viet Nam account for smaller shares.

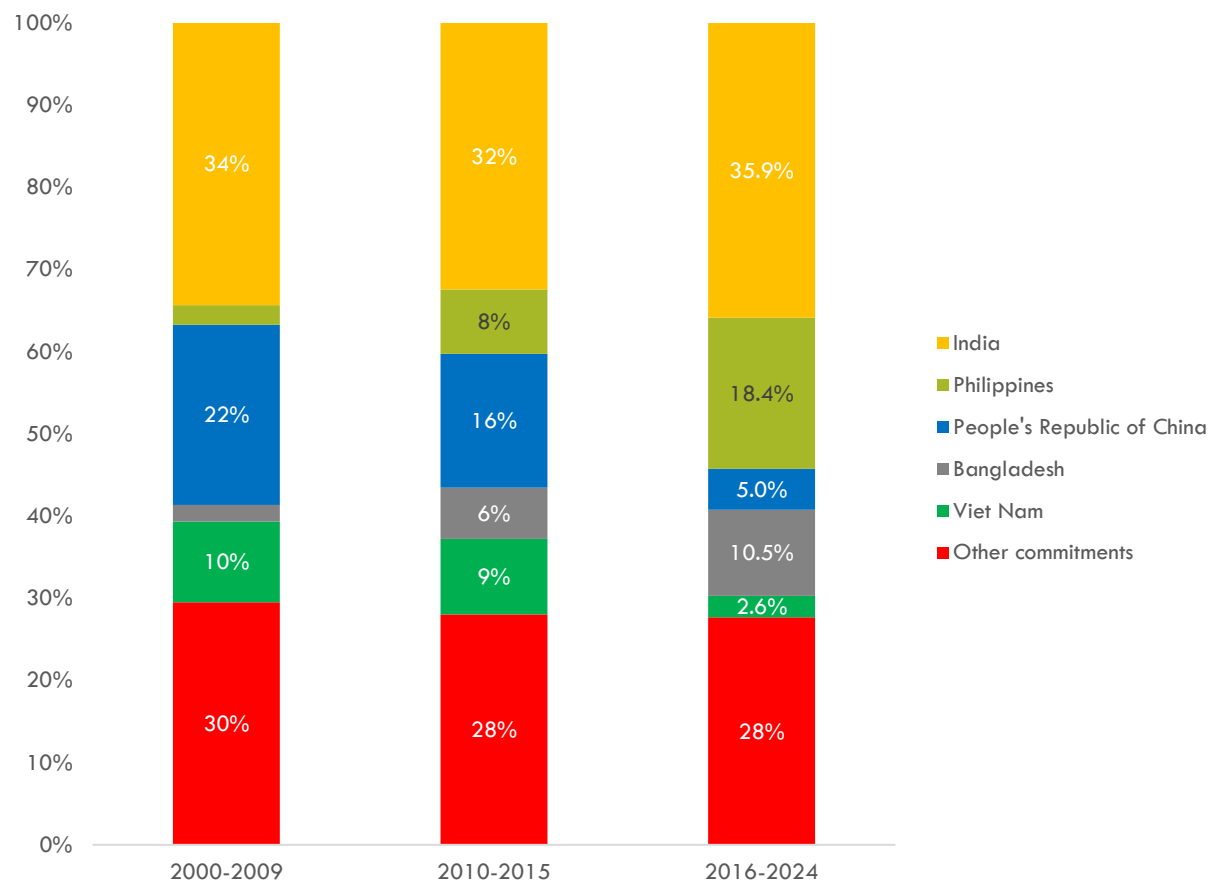
The base is narrow at the other end too. Forty-two economies received Goal 2 finance in 2020–2024, a total of \$57 billion, but more than 90% of it went to only 10 economies. The Pacific, home to many small island states with high exposure to climate risk, received \$1.5 billion, or 2.6% of the total.



Photo: Nhung Le / Unsplash

Figure 47: Commitments Associated with Goal 2 of the United Nations Decade of Sustainable Transport

Source: ATO analysis and visualization based on OECD CRS.



Mode matters too. Rail consistently received the largest share of Goal 2 commitments, accounting for 50% in 2000–2009, 51% in 2010–2015, and 50% in 2016–2024. Road followed with 36%, 30%, and 34% over the same periods. In 2015–2024, other transport (mainly urban and multimodal projects) accounted for 10%, while water received 3% and aviation 2%. The distribution across modes has changed little. The OECD marks a project for climate mitigation when mitigation is a significant or principal objective. Commitments with a mitigation objective averaged \$0.8 billion in 2000–2009, \$2.6 billion in 2010–2015, and \$5.7 billion in 2016–2024. Adaptation is smaller but growing faster, rising from \$0.4 billion a year in 2010–2015 to \$1.4 billion in 2016–2024.

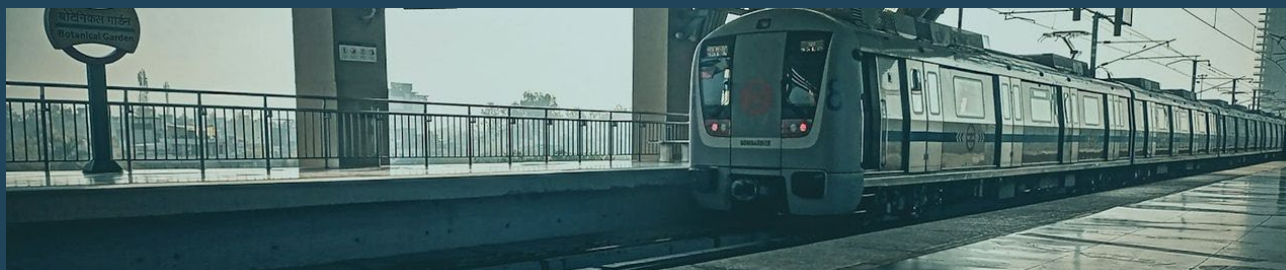


Photo: Shivansh Singh / Unsplash

Figure 48: Goal 2 Commitments by Recipient Economy

Source: ATO analysis and visualization based on OECD CRS.

Development finance in Asia should be judged by what it enables, not only by its size. Finance is moving toward low-carbon transport, and faster than total volumes. That is good news. Three weaknesses stand out. Money is concentrated in a few economies and providers. It is tied largely to rail loans. It barely reaches the economies that need grants most.

Diversifying the recipients and the mix of instruments is essential to decarbonizing transport. Transport decarbonization instruments also deliver significant co-benefits, such as improved air quality, better public health, lower energy costs, secure access to energy and infrastructure, and enhanced equity.



Photo: Edwin Petrus / Unsplash

15 Outlook: Can Emissions Peak Before 2030?

Emissions growth has slowed. The evidence does not yet show a peak before 2030.

Several Asian countries have agreed to an aspirational, non-binding goal in the Aichi 2030 Declaration¹⁷: to peak transport CO₂ emissions, begin reducing them, and move toward decarbonizing the transport sector by 2050 or shortly after.

The science sets a clear benchmark. In pathways that limit warming to 1.5°C (with a better than 50% chance by 2100) with no or limited overshoot, global GHG emissions fall by 43% by 2030 and 84% by 2050, both relative to 2019 levels.¹⁸ The ranges are wide: 34%–60% for 2030 and 73%–98% for 2050. The direction is not in doubt. The Intergovernmental Panel on Climate Change assigns high confidence to this finding. Global emissions must peak now and then fall steeply. Asia's transport emissions are still rising. The gap between that trend and a 43% cut by 2030 is the decarbonization challenge. Japan is a good example of decoupling. Its emissions fell while its economy kept growing (Figure 49). By 2025 they were 10% below 2019 levels. That is well short of the 43% cut needed by 2030.

Projections made before the Paris Agreement showed transport GHG

emissions in Asia rising above 7 billion tons by 2050, driven mainly by low- and middle-income countries. The ATO reference scenario, developed in 2021, points to a less severe outcome. From 2015 to 2025, transport GHG emissions per unit of GDP fell by 4.8% a year. That points to a gradual decoupling of transport emissions from economic growth. If this trend continues (i.e., the same intensity reduction), transport emissions could peak in the early 2030s and reach 2025 levels by 2035. If the decoupling intensifies, transport GHG emissions could peak before 2030. The tools to bend the curve exist. Even so, the current pathway remains largely incompatible with scenarios that meet the Paris Agreement's climate goals.

¹⁷ <https://www.env.go.jp/content/900518111.pdf>

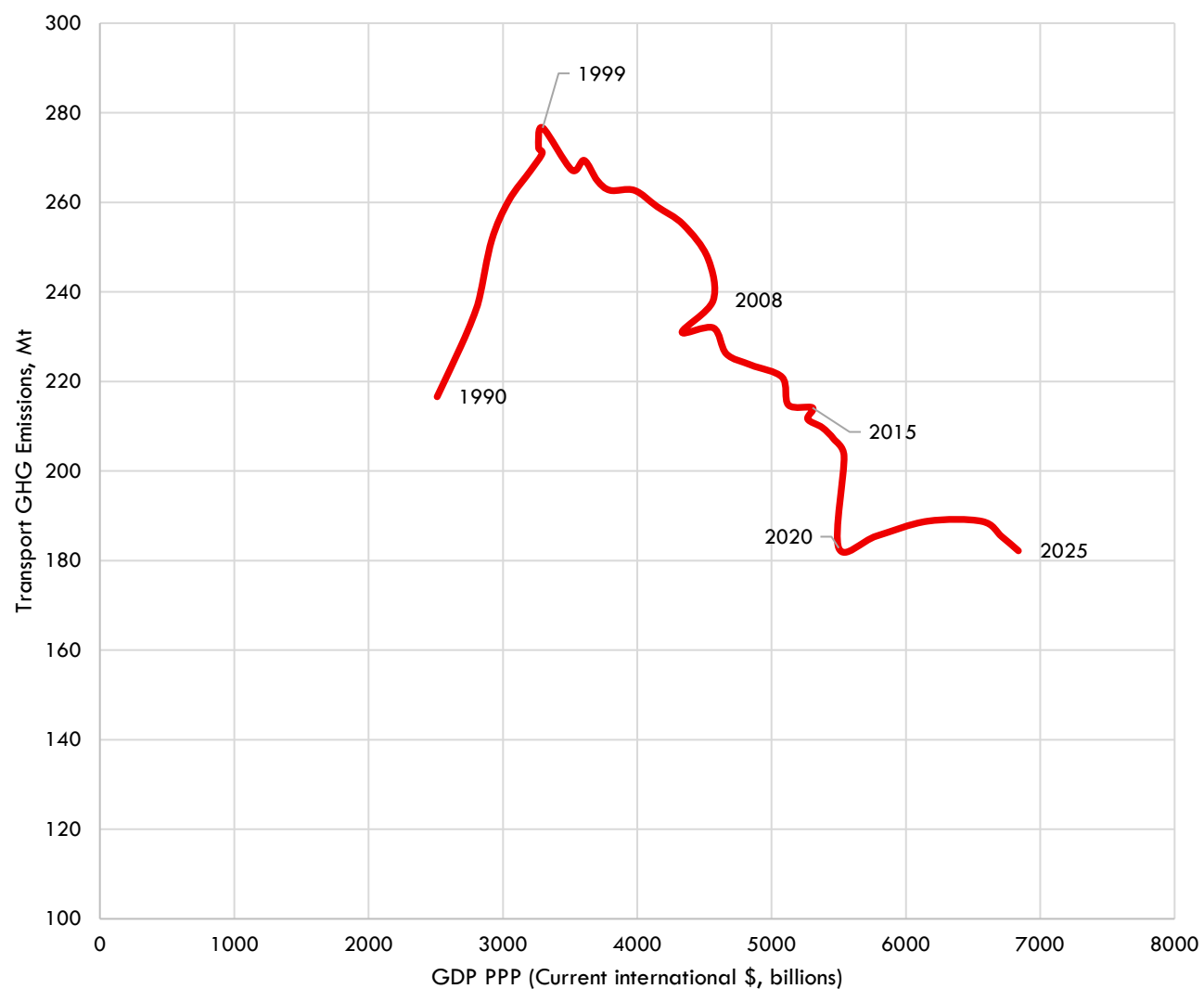


Figure 49: Transport Greenhouse Gas Emissions in Japan, Historical Estimates and Projections (million tons)

Source: ATO analysis and visualization based on JRC and IEA (2025).

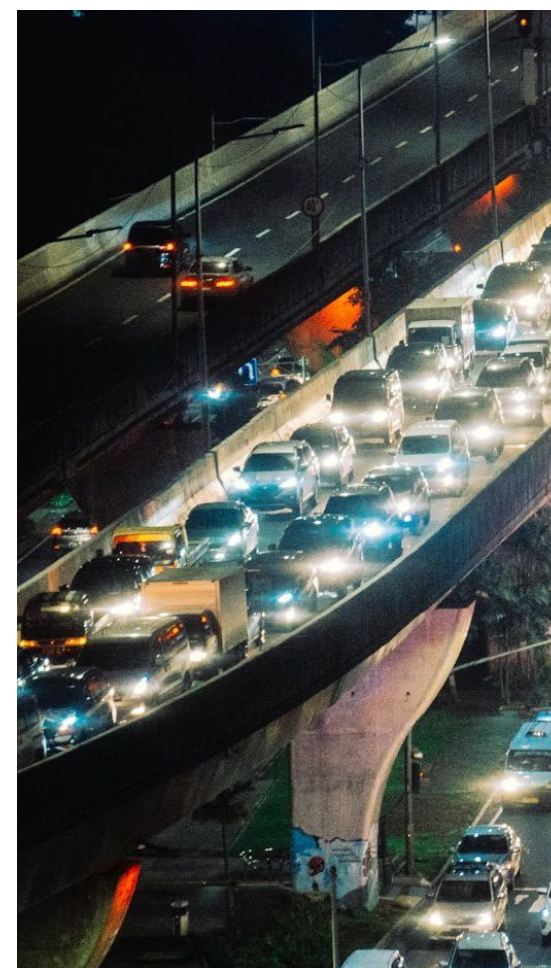
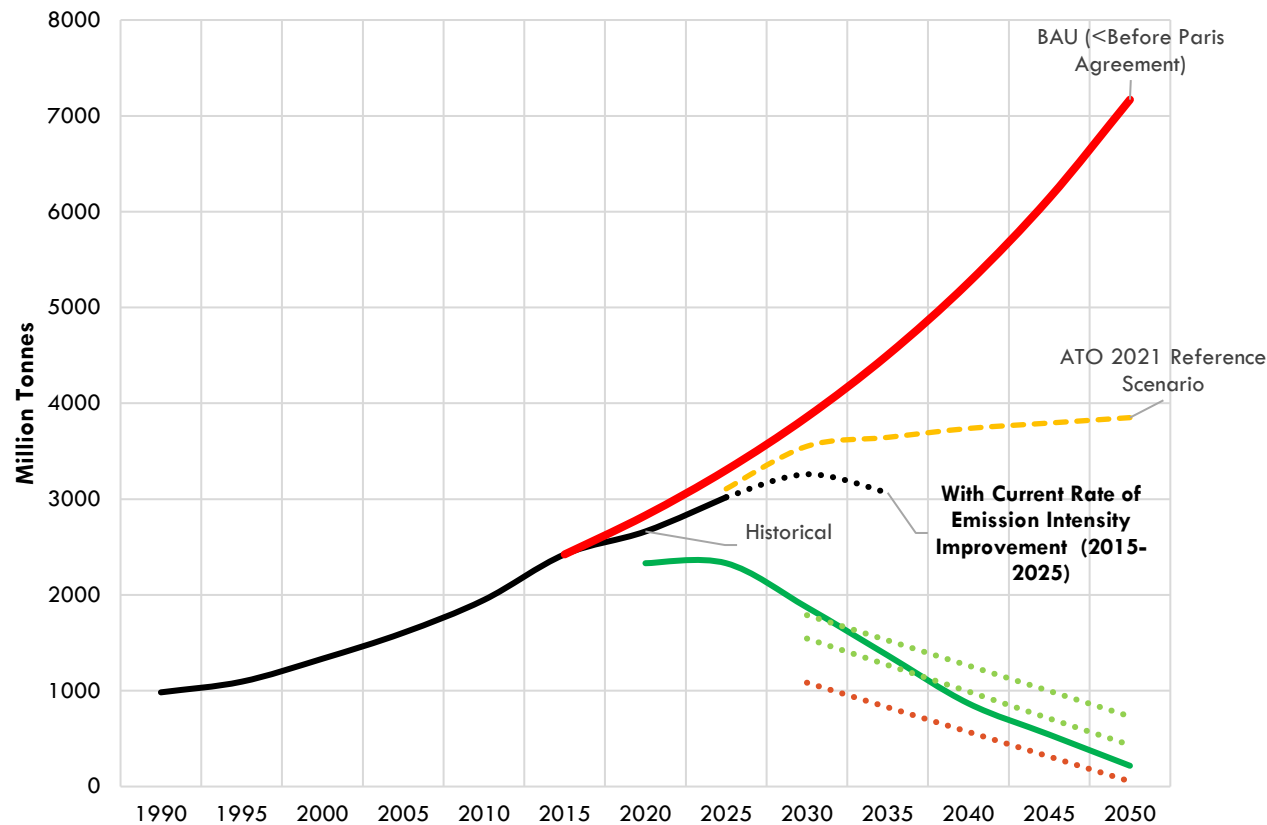


Photo: Marcel R / Unsplash

The regional trajectory hides large differences between subregions. In Central and West Asia, transport GHG emissions could be 83% above 2015 levels by 2035, with no peak in sight. South Asia and Southeast Asia could peak around 2031. Even then, emissions would stay more than 40% above 2015 levels. East Asia could peak before 2030. The Pacific could fall below its 2015 level by 2035. Subregions are decoupling transport emissions from growth at very different speeds. If intensity keeps falling at the same rate, the gap to the Paris Agreement trajectory will not narrow.

Rising demand compounds the problem. Under current trends and policies, global passenger and freight transport demand could double or even quadruple from 2020 to 2050, faster than population and infrastructure. On this path, Asia alone could account for about half of the global increase in transport demand.¹⁹



¹⁹ <https://www.itf-oecd.org/itf-transport-outlook-2023>



Photo: Polina Kneis / Unsplash

Figure 50: Transport Greenhouse Gas Emissions in Asia, Historical Estimates and Projections (million tonnes)

Source: Updated from Gota and Huizenga (2022).

Transport GHG emissions, CO₂eq (indexed, 2015=1)

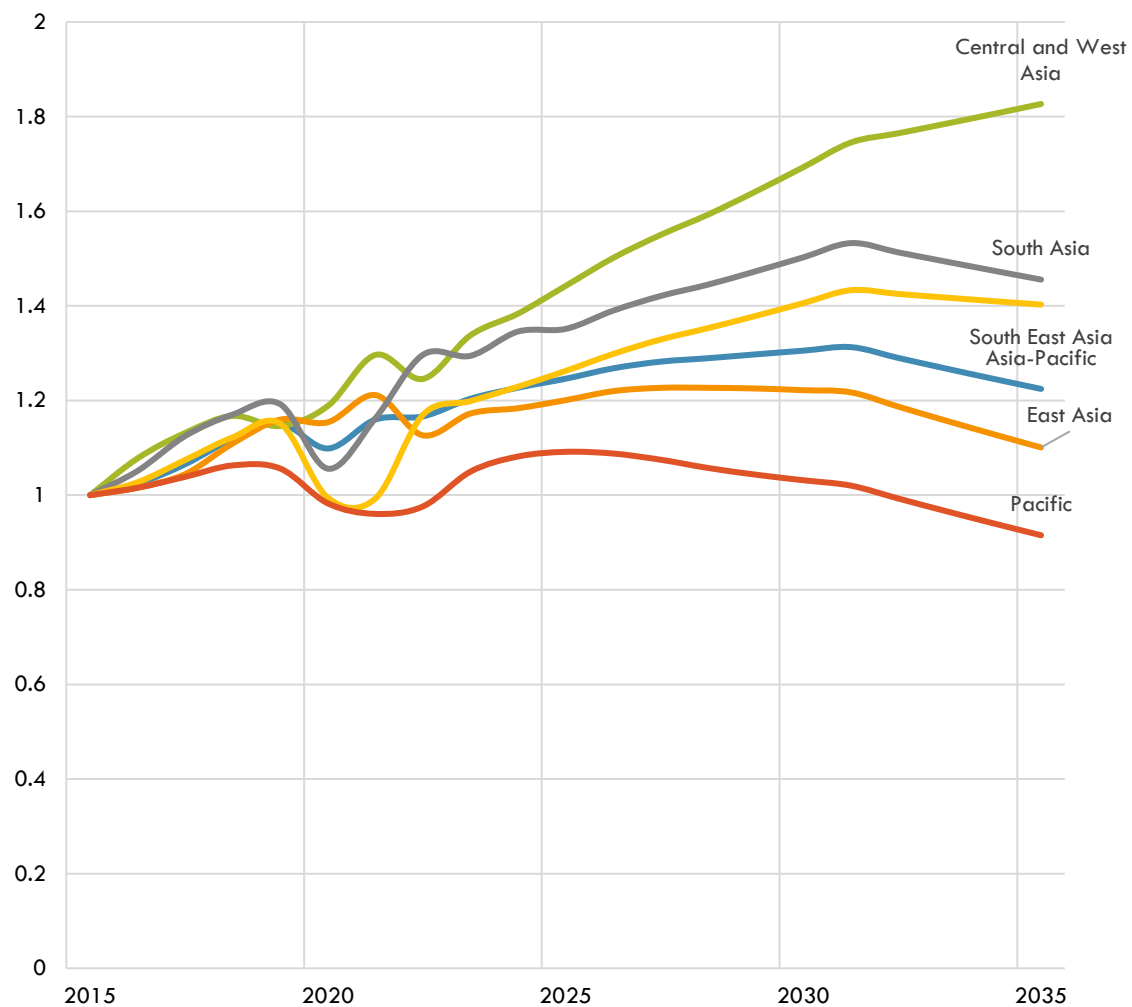


Photo: Tahamie Farooqui / Unsplash

Figure 51: Transport Greenhouse Gas Emissions in Asia, Historical Estimates and Projections

Source: Updated from Gota and Huizenga (2022).

16 Conclusions: Priorities for COP31

Asia can decarbonize its transport sector. The question is whether it can do so at the pace and scale a 1.5°C pathway requires.

The evidence is clear, though not conclusive. Emissions grew fast in the early 2000s, then slowed, and policy explains much of the change. Decoupling once looked out of reach. It is now visible in high-income economies, and it is picking up pace elsewhere. Electric vehicles and electrified railways show that the transition is possible, and that it has already started. The harder cases are stalling. Progress is uneven and concentrated in a few leading economies. A billion legacy vehicles will keep emitting for decades, even with aggressive sales of new technology. The pace of decarbonization in aviation and shipping is slow.

The gap between policy and practice has widened. Long-term emission commitments now cover most of the region's people, but quantified transport targets remain rare. The transport roadmap is still being written outside the formal climate pledges. Adaptation sits in the wider policy record and is barely visible in the NDCs. Development finance is moving toward low-carbon transport faster than total volumes, yet it is concentrated in a few economies and largely tied to rail loans.

The outlook adds pressure. Transport demand could double or even quadruple between 2020 and 2050, and Asia alone could account for about half of the global increase. The Intergovernmental Panel on Climate Change finds that global emissions must fall 43% from 2019 levels by 2030 in pathways that limit warming to 1.5°C. Asia's transport emissions are still

rising. The gap between the two is the challenge. Projections suggest transport GHG emissions could peak in the early 2030s if low-carbon efforts intensify.

Three things follow for COP31. First, sector-specific, quantified transport targets should sit alongside economy-wide pledges, so that progress can be measured. Second, adaptation needs to enter transport planning and the next round of pledges. Third, finance should reach a wider set of economies and instruments, including grants for those that need them most. Delay will cost more than a managed transition.

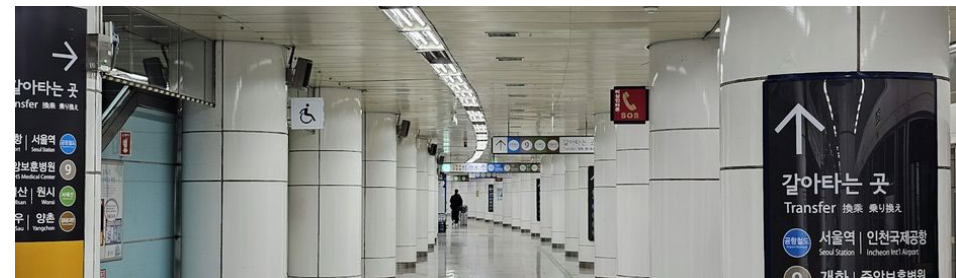


Photo: KS KYUNG / Unsplash

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Photo: Harsh Mangalam / Unsplash

Annex I. Net-Zero Targets by Economy

Target/Status	Economies
Achieved	Bhutan; Niue; Vanuatu
2030	Maldives
2040	Cook Islands
2045	Nepal
2050	Armenia, Bangladesh; Brunei Darussalam; Cambodia; Fiji; Georgia; Kyrgyz Republic; Lao People's Democratic Republic; Malaysia; Marshall Islands; Micronesia (Federated States of); Mongolia; Nauru; Palau; Papua New Guinea; Singapore; Solomon Islands; Sri Lanka; Thailand; Tonga; Tuvalu; Viet Nam
2053	Türkiye
2060	Indonesia; Kazakhstan; People's Republic of China
2070	India
No stated	Afghanistan; Azerbaijan; Kiribati; Myanmar; Pakistan; Philippines; Samoa; Tajikistan; Timor-Leste; Turkmenistan; Uzbekistan

Annex II. Nationally Determined Contributions and Implementation Plans Considered

Country	First gen.	Second gen.	Third gen.	Implementation plan
Afghanistan	2016			
Armenia	2017, 2021		2025	
Azerbaijan	2017, 2023		2025	
Bangladesh	2016, 2021		2025	2018
Bhutan	2017	2021	2025	
Brunei Darussalam	2015, 2020		2025	
Cambodia	2017, 2020		2025	
Cook Islands	2016			
Fiji	2016, 2020		2025	2017
Georgia	2017, 2021		2026	
India	2016, 2022		2026	
Indonesia	2016, 2021, 2022	2025		
Kazakhstan	2016, 2023		2025	
Kiribati	2016, 2023			2021, 2022
Kyrgyz Republic	2020, 2021		2025	

Annex II (continued)

Country	First gen.	Second gen.	Third gen.	Implementation plan
Lao People's Democratic Republic	2016, 2021			
Malaysia	2016, 2021		2025	
Maldives	2016, 2020		2025	
Marshall Islands	2016	2018, 2020	2025	
Micronesia (Federated States of)	2015, 2022		2025	
Mongolia	2016, 2020		2025	
Myanmar	2017, 2021			
Nauru	2016, 2021		2025	
Nepal	2016	2020	2025	2023
Niue	2016		2025	
Pakistan	2016, 2021		2025	
Palau	2015		2025	
Papua New Guinea	2016, 2020			
People's Republic of China	2016, 2021		2025	
Philippines	2015, 2021		2026	2024

Annex II (continued)

Country	First gen.	Second gen.	Third gen.	Implementation plan
Samoa	2016	2021	2025	
Singapore	2016, 2020	2022, 2025		
Solomon Islands	2015, 2021		2025	
Sri Lanka	2016, 2021		2025	n.d.
Tajikistan	2017, 2021			
Thailand	2016, 2020	2022, 2025		
Timor-Leste	2017, 2022		2026	
Tonga	2016	2020	2025	
Türkiye	2021, 2023	2025		
Turkmenistan	2016, 2023			
Tuvalu	2016, 2022		2025	
Uzbekistan	2018, 2021		2025	
Vanuatu	2015, 2022		2025	2021
Viet Nam	2016, 2020, 2022			

Annex III. ATO Economies and Subregion

Economy	Subregion
Afghanistan	Central and West Asia
Armenia	
Azerbaijan	
Georgia	
Kazakhstan	
Kyrgyz Republic	
Pakistan	
Tajikistan	
Turkmenistan	
Uzbekistan	
Türkiye	
People's Republic of China	East Asia
Japan	
Mongolia	
Republic of Korea	
Hong Kong, China	
Taipei, China	Pacific
Australia	
Cook Islands	
Fiji	
Kiribati	
Marshall Islands	
Micronesia (Federated States of)	
Niue	
Nauru	
New Zealand	

Economy	Subregion
Palau	Pacific
Papua New Guinea	
Samoa	
Solomon Islands	
Tonga	
Tuvalu	
Vanuatu	South Asia
Bangladesh	
Bhutan	
India	
Maldives	
Nepal	South East Asia
Sri Lanka	
Brunei Darussalam	
Cambodia	
Indonesia	
Lao People's Democratic Republic	
Malaysia	
Myanmar	
Philippines	
Singapore	
Thailand	Non-ADB
Timor-Leste	
Viet Nam	
Iran (Islamic Republic of)	
Russian Federation	

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