

Nepal

Green Roads Profile

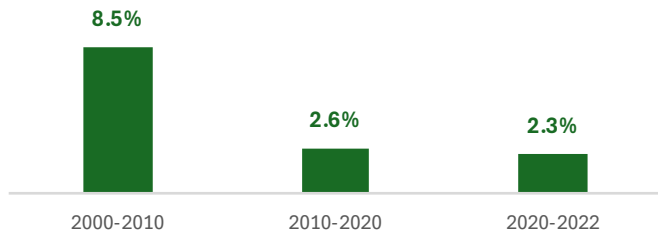
General

Road length (2022)
110,500 kilometers

Subregion
(1) **South Asia**

Income class
Low and lower middle income

Average annual growth rate of road length



Population (2024)
(1) **31.2 million**

Land area
143 thousand sqkm (2,3)

Urban population
22% (2)

Rural population
78% (2)

Gross domestic product (GDP PPP, 2022)
144.39 billion USD (3)

GDP per capita (PPP, 2022)
4,727 USD (2,3)

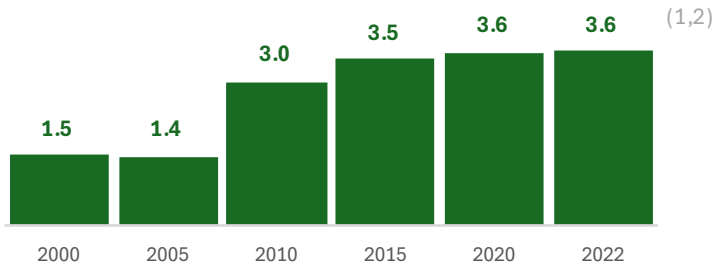
Nepal's road network is comprised of 3.2% motorways, highways, and primary roads and 96.8% secondary roads, local roads, and other roads

Further information on road length, pavement, and quality by road class is available in Appendix A

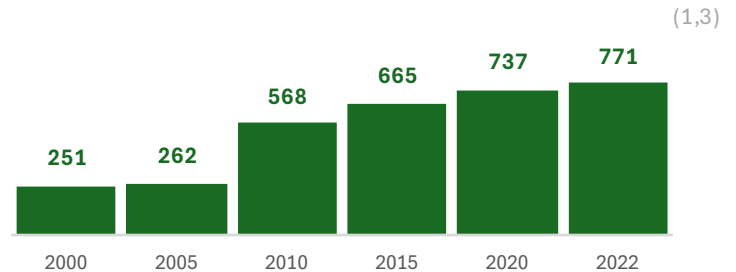
Road infrastructure availability (2022)
3.6 kilometers per thousand population

Road infrastructure density (2022)
(1,2) **771 meters per square kilometer** (1,3)

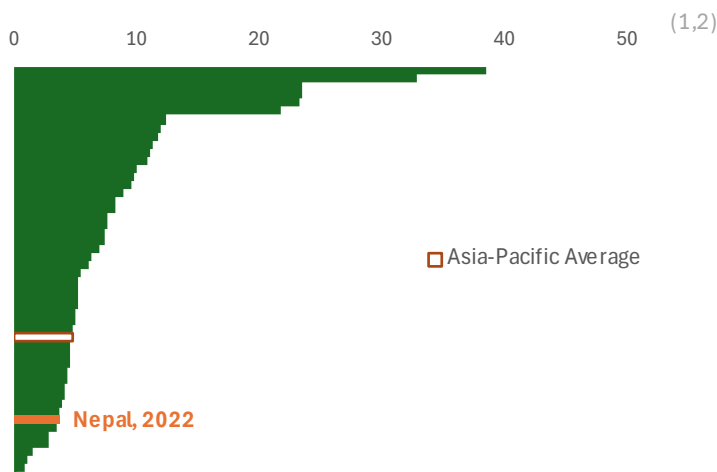
Road infrastructure availability trend, kilometers per thousand population



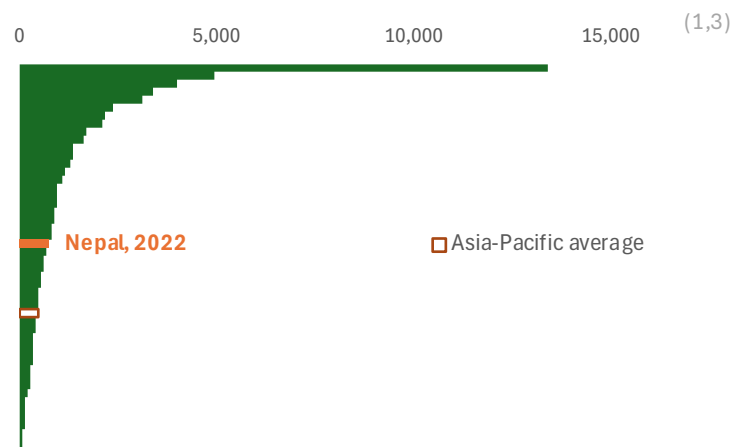
Road infrastructure density trend, meters per thousand population



Road infrastructure availability in Asia-Pacific, kilometers per thousand population



Road infrastructure density in Asia-Pacific, meters per square kilometer



Road vehicles (2023)

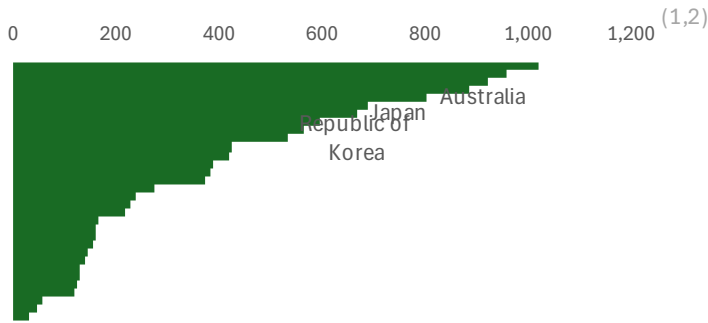
n.d.

Share of vehicles by type

Motorization rate (2023)

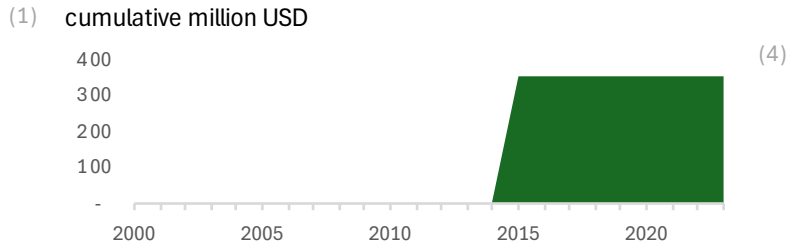
n.d.

Motorization rate in Asia-Pacific, vehicles per thousand population



Road vehicles include 2- and 3-wheelers, LDVs, buses and other informal public transport, trucks, and other unclassified types

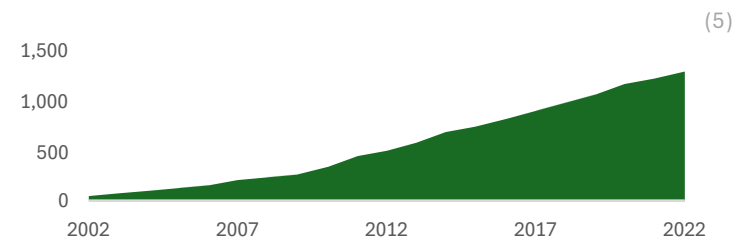
Public-private partnership investments in road sector, cumulative million USD



Share of road in total public-private partnership investments



Official development assistance in road sector, cumulative million USD

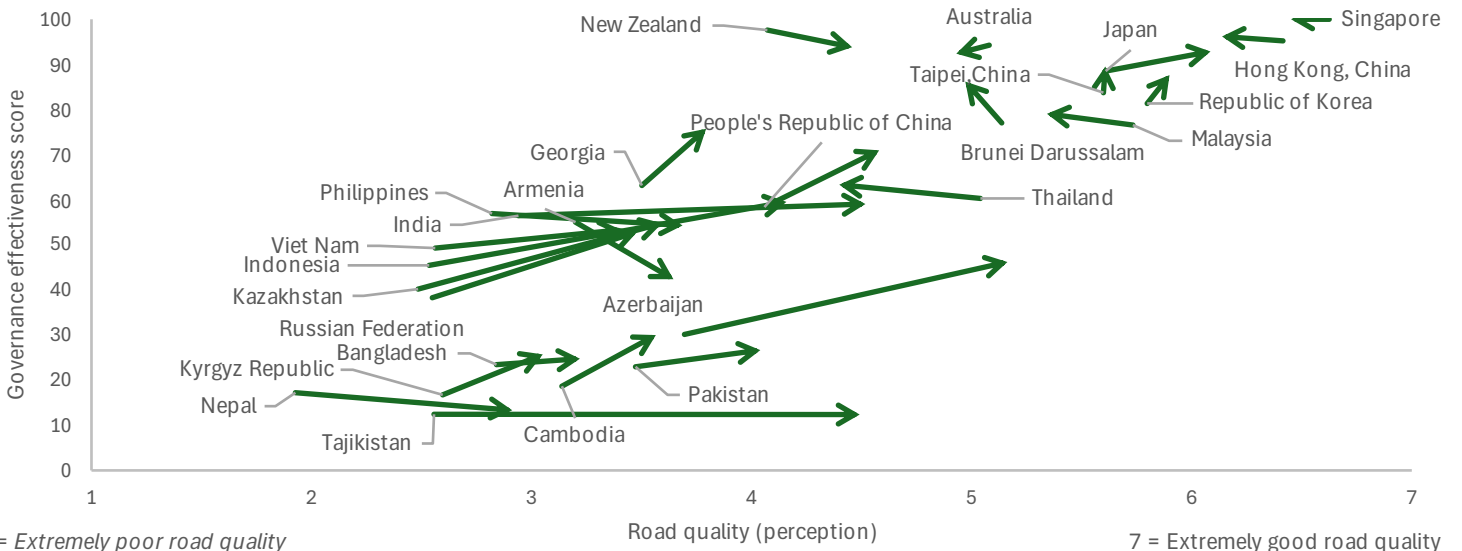


Share of road in total official development assistance



Road maintenance budget and deficit is available in Appendix B. Road user charging revenue information is available in Appendix C

Road quality (perception) vs. governance effectiveness score (2009-2019)



1 = Extremely poor road quality

7 = Extremely good road quality

Developed with the support of:



Quality of Life and Fostering Inclusive Growth

Rural access index (2023)
92%

(6)

Based on 2015 estimates, only 46% of the population could reach the nearest city in 30 minutes, another 20% could reach in 1 hour, and another 21% could reach only after 3 hours.

Rural population without access to all-season roads (2023)
1.88 million

(2,6)

Logistics performance index score (2023)

n.d.

(10)

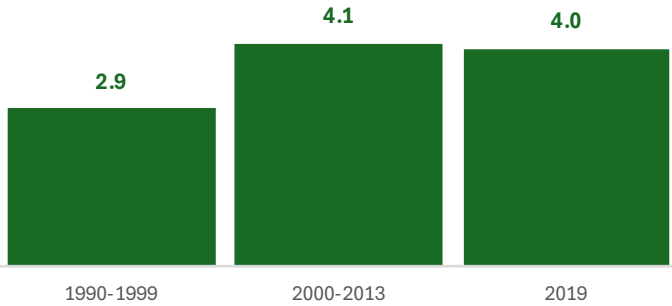
| Infrastructure score

National street network disconnectedness index

(7)

n.d.

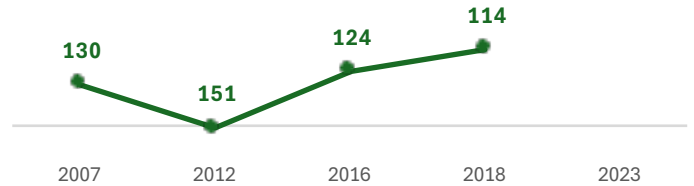
(10)



This indicator is a summary scalar measure for street-network sprawl describing connectivity of local street networks across the world

Logistics performance index ranking trend

(10)



Road crash fatalities (2019)
4.7 thousand deaths

(8)

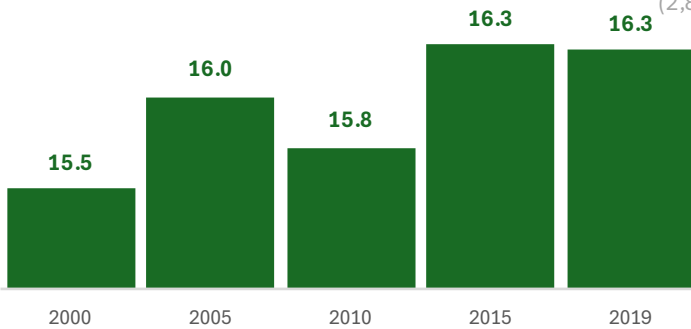
Road crash fatality rate per 100 thousand population

(2,8)

Percent of firms choosing transportation as their biggest obstacle - Manufacturing (2013)

3.3%

(11)



Asia-Pacific average is 15.7 fatalities per 100 thousand population

Percent of respondents answering high/very high - Level of Fees and Charges on Road transport (2018)

75.0%

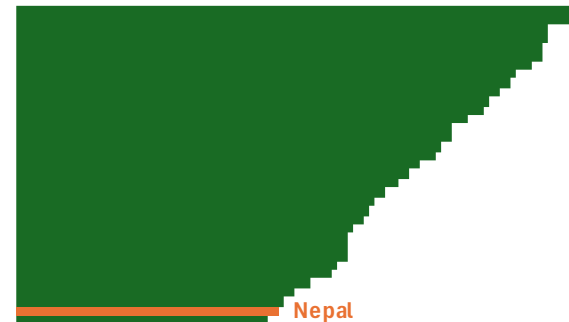
(11)

Level of fees and charges for less than full truck loads are considered

Mean speed in Asia-Pacific, kilometers per hour (2022)

(9)

0 20 40 60 80 100 120



Mean speed (2022)
50 kilometers per hour

(9)

Employment in transport sector (2022)

96.4 thousand employees

(12)

Share of transport sector in total employment (2022)

1.2%

(12)

Average annual growth rate of transport sector employment

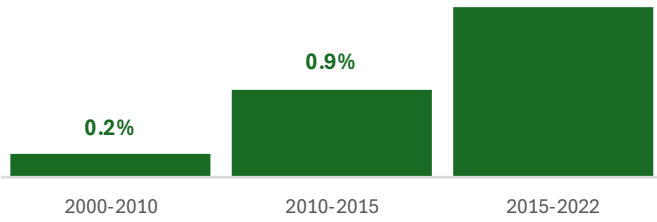
1.8%

(12)

Share of females in total transport sector employment (2022)

5.8%

(12)

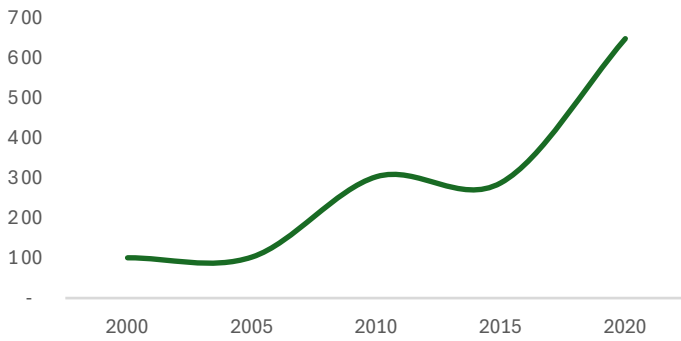


Decarbonization

Road transport energy consumption trend

Assuming 2000 value as base (100)

(13)

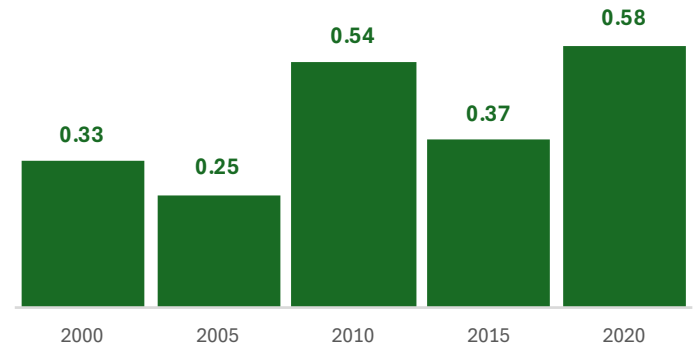


Between 2000-2010, Nepal's road transport energy consumption grew 11.7% annually. Between 2010-2020, road transport energy consumption grew 7.9% annually.

99% of Nepal's transport energy consumption is in the road sector.

Road transport energy intensity with GDP, TJ per USD (PPP)

(3,13)



Asia-Pacific average is 0.4 MJ per USD in 2020

Grid emission factor (2022)

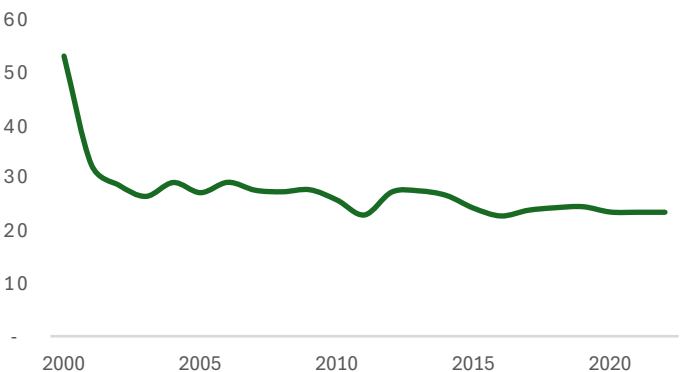
23.4 gCO₂ per kWh

(14)

Grid emission factors in Asia-Pacific, gCO₂ per kWh

(14)

Grid emission factor trend, gCO₂ per kWh

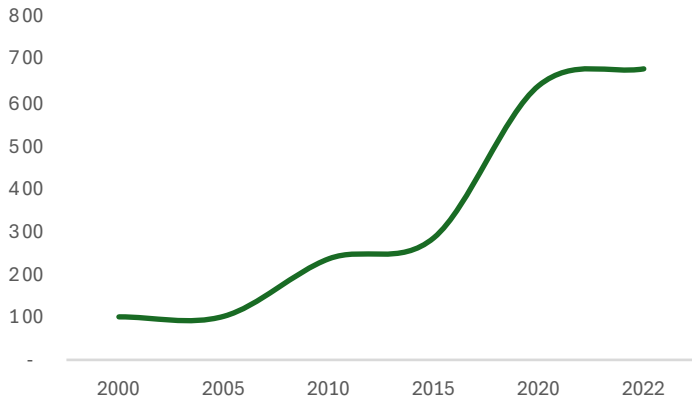


(14)

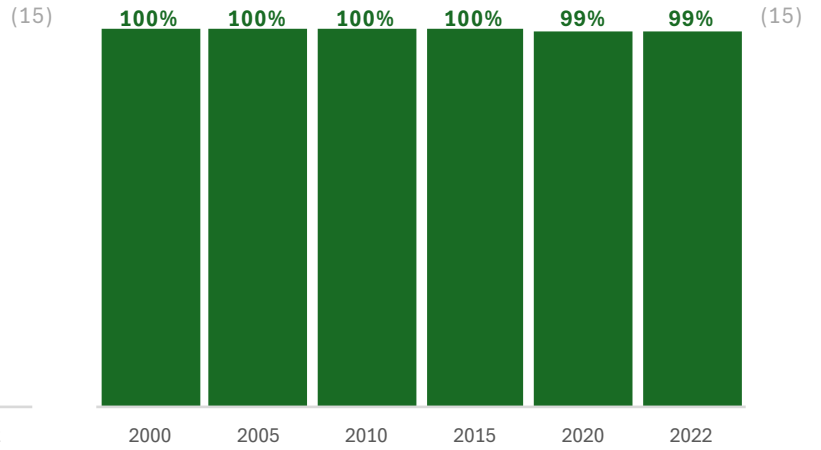


Road transport CO2 emissions trend

Assuming 2000 value as base (100)



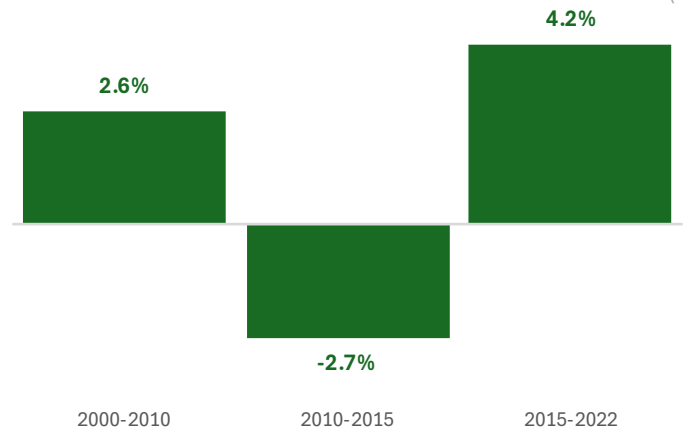
Share of road transport in total transport CO2 emissions



Between 2010-2019, Nepal's road transport fossil CO2 emissions was growing 10.0% annually. After the COVID-19 pandemic, road transport CO2 emissions was growing 3.0% annually.

Road transport CO2 emissions intensity with GDP trend

(3,15)



Transport fossil fuel subsidies, cumulative from 2010 to 2022

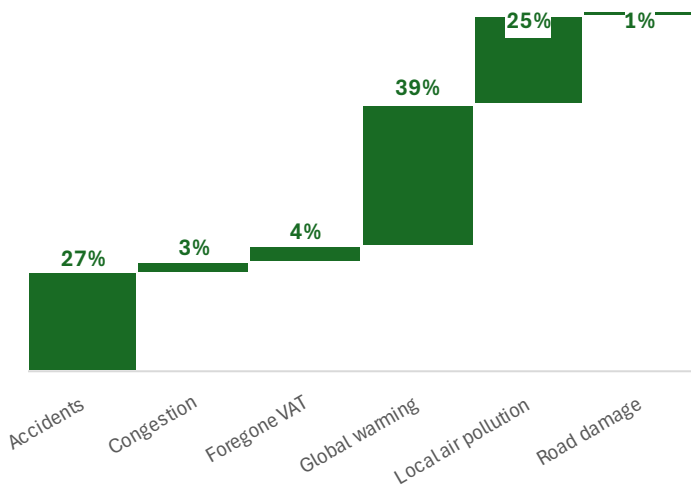
None

0.0% of Asia-Pacific total

(16)

Implicit fossil fuel subsidies due to externalities

(17)



Data includes all sectors and all fuel types

Climate Resilience and Disaster Preparedness

Expected annual damages to road and rail infrastructure due to hazards (2019)

16.34 million USD

(18)

National road vulnerability index ranking (2023)

153rd out of 208 countries

(20)

Share of road in total transport infrastructure in multihazard average annual loss to transport infrastructure (2023)

95.8%

(19)

Share of population in low elevated coastal zones (2018)

0.0%

(21)

Pollution, Water and Land Management, Preserving Biodiversity, and Sustainable Materials

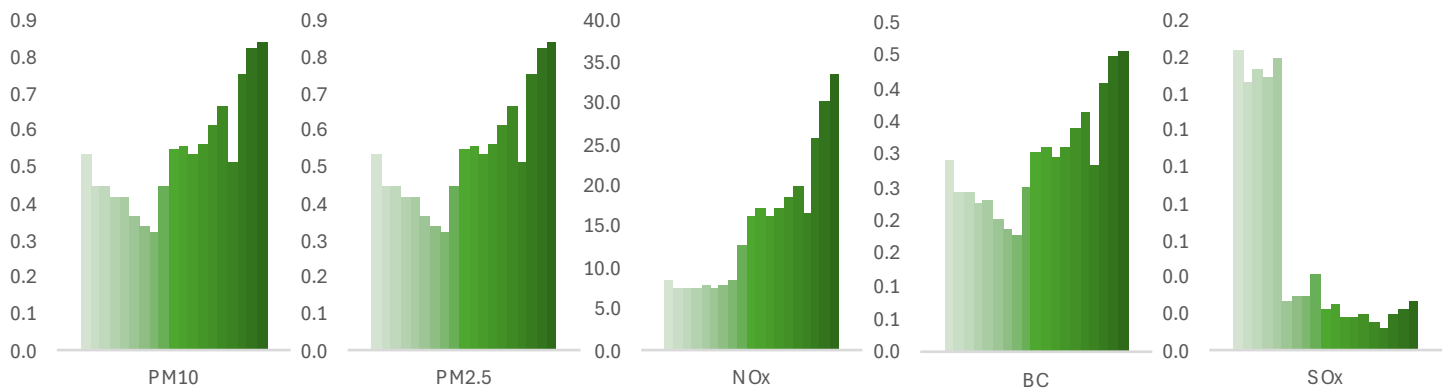
Paved roads (2006)

45%

(1)

Road transport air pollutant emissions, thousand tonnes (2000-2018)

(15)



In 2022, road transport contributed 58.6%, re-suspended dust contributed 41.4% in transport PM10 emissions. In total, road transport contributed about 8.2% in total PM10 emissions in Nepal.

Deaths due to occupational exposure to diesel engine exhaust

| 2000-2010

158 deaths

| 2011-2018

201 deaths

(22)

Terrestrial and marine protected areas (2022)

23.6%

(3)

(% of total territorial area)

Terrestrial protected areas

23.6%

(13)

(% of total land area)

Marine protected areas

n.d.

(3)

(% of territorial waters)

Share of biofuels in road transport energy consumption (2020)

n.d.

Domestic consumption per capita, tonnes (2024)

| Nepal

6.9 tonnes

| Asia-Pacific

13.8 tonnes

(23)

Forest area (2021)

41.6%

(3)

(% of land area)

Domestic consumption is the total amount of materials directly used in the economy (used domestic extraction plus imports), minus the materials that are exported.

Policy Measures

Policy document	Year	Road-related measures
National Sustainable Transport Strategy (NSTS) for Nepal (2015-2040)	2015	Active transport infrastructure expansion, General infrastructure improvements, Vehicle inspection and maintenance, Climate-resilient design standards, Design standards for sidewalks and bicycle paths, Technical standards for road infrastructure, Technologies on transport asset management, Transport infrastructure resilience, General transport asset management, Reference to finance mechanisms within country, Measures to improve rural-urban connectivity, Road infrastructure expansion, Adaptation transport laws, regulations and programmes, Road-side checks on overloading, Audits/ star rating for existing roads for road safety
National Transport Policy	2001	General infrastructure improvements, Vehicle inspection and maintenance, Transport asset management information system, Transport asset condition assessment, Routine transport asset maintenance, Surface treatment resurfacing, General transport asset management, General transport finance, Reference to finance mechanisms within country, Measures to improve rural-urban connectivity, Road infrastructure expansion, National speed law, Passenger and freight load limits, Road-side checks on overloading
Nepal Road Safety Action Plan (2021-2030)	2022	Active transport infrastructure expansion, General infrastructure improvements, Vehicle inspection and maintenance, Routine transport asset maintenance, Road charging and tolls, Reference to finance mechanisms within country, Accreditation of road inspection and auditing agencies, National road safety strategy, National speed law, Passenger and freight load limits, Road-side checks on overloading, Audits/ star rating for existing roads for road safety
National Adaptation Plan (NAP) 2021 - 2050	2021	Adaptation-related education and training, Adaptation transport laws, regulations and programmes, General adaptation measures
Global Status Report on Road Safety 2018	2018	Design standards for sidewalks and bicycle paths, National road safety strategy, National speed law, Audits/ star rating for existing roads for road safety, Audits/ star rating required for new road infrastructure for road safety
Assessment of Electric Mobility Targets for Nepal's 2020 Nationally Determined Contributions (NDC)	2021	Vehicle taxes, General transport finance, Reference to finance mechanisms within country
National Energy Strategy of Nepal	2013	Fuel tax
The Fifteenth Plan (Fiscal Year 2019/20 - 2023/24)	2020	General infrastructure improvements, Vehicle inspection and maintenance, Climate-resilient design standards, Technical standards for road infrastructure, Transport asset condition assessment, Routine transport asset maintenance, General transport asset management, Road charging and tolls, Vehicle taxes, General transport finance, Investment required for specific projects, Road infrastructure expansion, Development of road plan/ policy, Development of transport plan/ policy, National road safety strategy
National Action Plan for Electric Mobility	2018	General infrastructure improvements, General transport finance, Reference to finance mechanisms within country, Development of transport plan/ policy
Nepal LTS	2021	General infrastructure improvements
Motor Vehicles and Transport Management Act, 2049 (1993)	1993	Passenger and freight load limits, Road-side checks on overloading
Road Safety Opportunities and Challenges: Low- and Middle-Income Country Profiles	2020	Vehicle inspection and maintenance, Implementation of vertical deflections on roads
Nepal Urban Road Standard- 2076	2019	Technical standards for road infrastructure

Policy Targets

Policy document	Target year	Road-related targets
The Fifteenth Plan (Fiscal Year 2019/20 – 2023/24)	2024	<p>Families with access to transportation within the distance of 30 minutes = 95 (baseline = 82 (2018/19))</p> <p>Transportation, storage and communication Gross Domestic Product and sector-wise value addition target (In 10 million rupees) = 37,122 (baseline 2018/19 = 22,135)</p>
The Fifteenth Plan (Fiscal Year 2019/20 – 2023/24)	2024	<p>Economic growth rate and sector-wise value addition target = 10.8% (baseline 2018/19 = 5.9%)</p> <p>Sector-wise contribution to the gross domestic product = 7.7% (baseline 2018/19 = 7.2%)</p> <p>Incremental capital-output ratio and total investment (At the constant prices of FY 2018/19) (In 10 million rupees) = 45740</p> <p>Road density = 0.74 km/sqkm (baseline = 0.55 (2018/19))</p> <p>National and provincial highways (up to 2 lanes) (*Only blacktopped roads) = 20,200 km (baseline = 7,794 (2018/19))</p>
The Fifteenth Plan (Fiscal Year 2019/20 – 2023/24)	2024	<p>National highways (above 2 lanes, including fast tracks) = 1174 km (baseline = 96 (2018/19))</p> <p>Railways = 348 km (baseline = 42 (2018/19))</p>

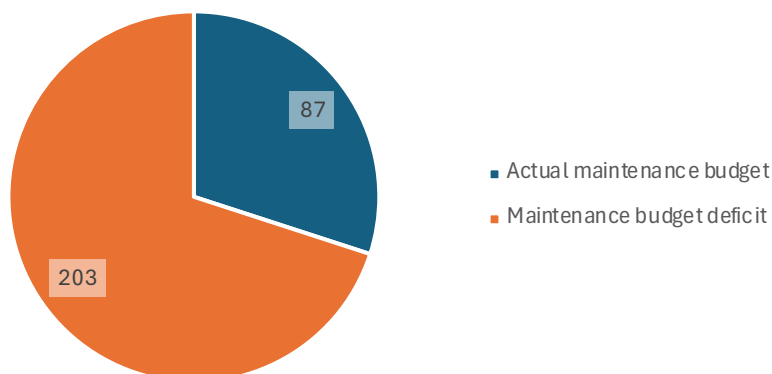
Appendix

A. Road length, pavement ratio, and quality by road class

Road class	Length	Paved	Quality			
			Good	Fair	Poor	Very Poor
National highway	3,507	92%				
Feeder road	8,008	42%				
Mid-hill road	1,231	21%				
Postal road	702	22%				

Definitions and sources are available in "Asian Development Bank, 2024. The Future of Road User Charging in Developing Asia and the Pacific: Road Maintenance Financing and Cost Recovery Options"

B. Maintenance needs and budget, million USD



C. Road user charge revenues

Road user charge	Revenue (million USD)
Fuel tax	42.4
Vehicle registration tax	365.5
Tolls	2.0
Vehicle customs duty	185.4
Vehicle excise duty	149.7

Notes



(*) Policy measures and targets were extracted from policy documents as listed in the ATO National Transport Policies Database

<https://bit.ly/ATOpolicyrepository>

References

- (1) Country Official Statistics
- (2) UN Population Database (2022), <https://population.un.org/wpp/>
- (3) World Bank (2022), <https://data.worldbank.org/>
- (4) PPI Database (World Bank, 2023), <https://ppi.worldbank.org/en/ppi>
- (5) Organisation for Economic Co-operation and Development (OECD) (2022), <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1#>
- (6) Socioeconomic Data and Applications Center (CIESIN, 2023), <https://sedac.ciesin.columbia.edu/data/set/sdgi-9-1-1-rai-2023>
- (7) Millard-Ball, et al (2019), <https://sprawlmap.org/#globe>
- (8) Global Health Observatory (WHO, 2019), <https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/road-traffic-mortality>
- (9) Moszoro & Soto (IMF, 2022), <https://www.imf.org/en/Publications/WP/Issues/2022/05/20/Road-Quality-and-Mean-Speed-Score-518200>
- (10) Global Competitiveness Report (WEF, 2019), https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
- (11) Enterprise Surveys (WB, 2019), <https://datacatalog.worldbank.org/dataset/enterprise-surveys>
- (12) International Labor Organization (ILO, 2023), <https://ilostat.ilo.org/data/bulk/>
- (13) UN Energy Statistics (2021), <https://unstats.un.org/unsd/energystats/dataPortal/>
- (14) Ember (2023), <https://ember-climate.org/data-catalogue/yearly-electricity-data/>
- (15) Emissions Database for Global Atmospheric Research (EC, 2023), <https://edgar.jrc.ec.europa.eu/>
- (16) Fossil Fuels Consumption Subsidies 2022 (IEA, 2022), <https://www.iea.org/reports/fossil-fuels-consumption-subsidies-2022>
- (17) Climate Change Dashboard (IMF, 2024), <https://climatedata.imf.org/pages/access-data>
- (18) Koks, et al. (2019), <https://www.nature.com/articles/s41467-019-10442-3>
- (19) Coalition for Disaster Resilient Infrastructure (CDRI, 2023), <https://giri.unepgrid.ch/facts-figures/building-infrastructures>
- (20) Koks, et al. (2023), <https://iopscience.iop.org/article/10.1088/2634-4505/acd1aa>
- (21) Environmental Vulnerability Indicators (UN, 2018), <https://www.un.org/development/desa/dpad/least-developed-country-category/evi-indicators-ldc.html>
- (22) Global Health Data Exchange (GBD, 2019), <https://vizhub.healthdata.org/gbd-results/>
- (23) Global Materials Flow Database (UNEP, 2023), <https://www.resourcepanel.org/global-material-flows-database>

Disclaimer

This profile was developed by Asian Transport Outlook in support of TA-6756 Improving Infrastructure Sustainability Through Better Asset Management – Developing a Green Roads Toolkit and Guidance for ADB Projects. The ATO is an initiative developed under TA-6763 REG: Accelerating Innovation in Transport - Asian Transport Outlook: Phase 3 (55119-001) of the Asian Development Bank (ADB) and is also being supported by the Asian Infrastructure Investment Bank (AIIB) through Purchase Order No. CW39446 AIIB Support: Asian Transport Outlook Phase 3.

The ATO project collects, collates, and organizes data from publicly available official, as well as 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.