Asian Transport Outlook

Asian Transport Outlook: Translating Data into Insights, Policies, and Investments

Sudhir Gota,
Co-Team Lead
Asian Transport Outlook

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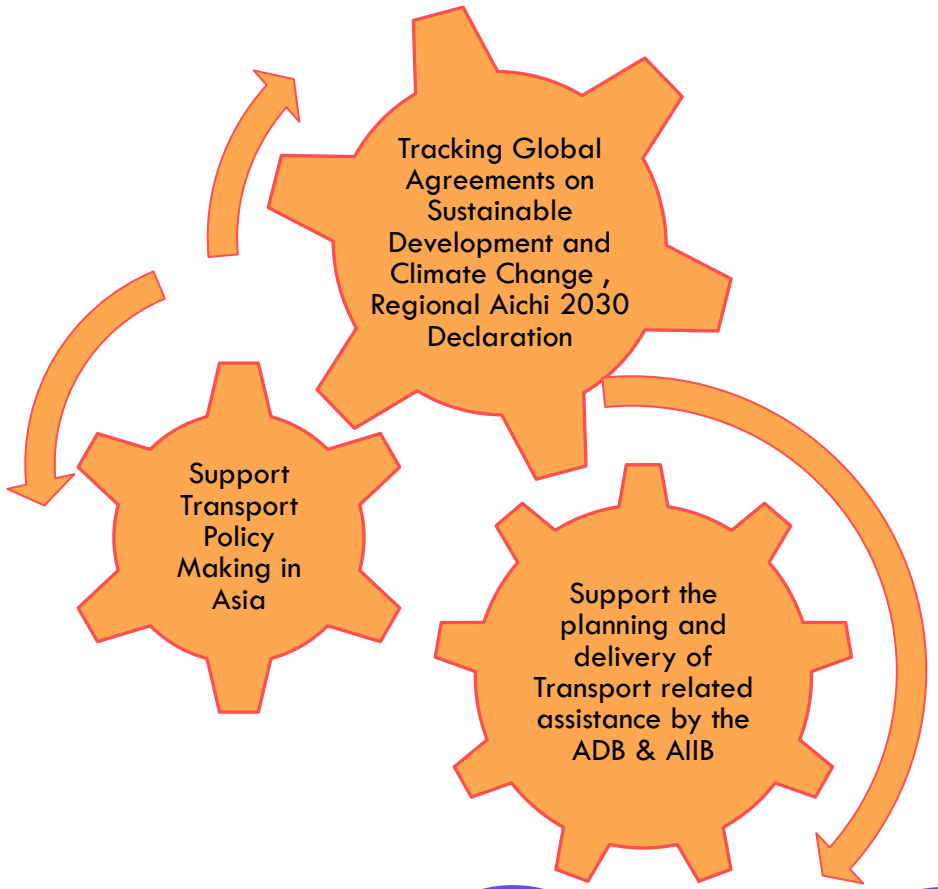
Asian Transport Outlook (ATO)

51 Economies (ADB Members + Russia and Iran)

460 Urban Centers (412 Asia-Pacific, 48 International)

46 Urban Centers with a detailed review * To be increased to 50



Brainstorming	Phase 1	Interim Phase	Phase 2	Phase 3	Phase 3.5
2019 – 2020	November 2020 – May 2021	June 2021 – October 2021	November 2021 – November 2022	March 2023 – November 2024	November 2024 – October 2025
				+AIIB	+AIIB

Asian Transport Outlook

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Why Innovative?

Multiple Sources for single indicator

Multiple Dimensions & Modes

Data and Policy

Historical & Outlook

Tracking Instrument for SDG/PA/Aichi Declaration

Incremental Approach

Partnerships

On-demand Research

2024-10-18

Update

Asian Development Bank (ADB) has Won the 2024 IRF Award for Environmental Stewardship for Asian Transport Outlook!

The Asian Development Bank (ADB) has won the prestigious IRF Awards 2024 - Environmental Stewardship category for the ADB-initiated Asian Transport Outlook (ATO)! The IRF Awards recognizes outstanding projects and initiatives that foster innovation, safety, and sustainability in the road transport sector.

Read More

Istanbul, Türkiye

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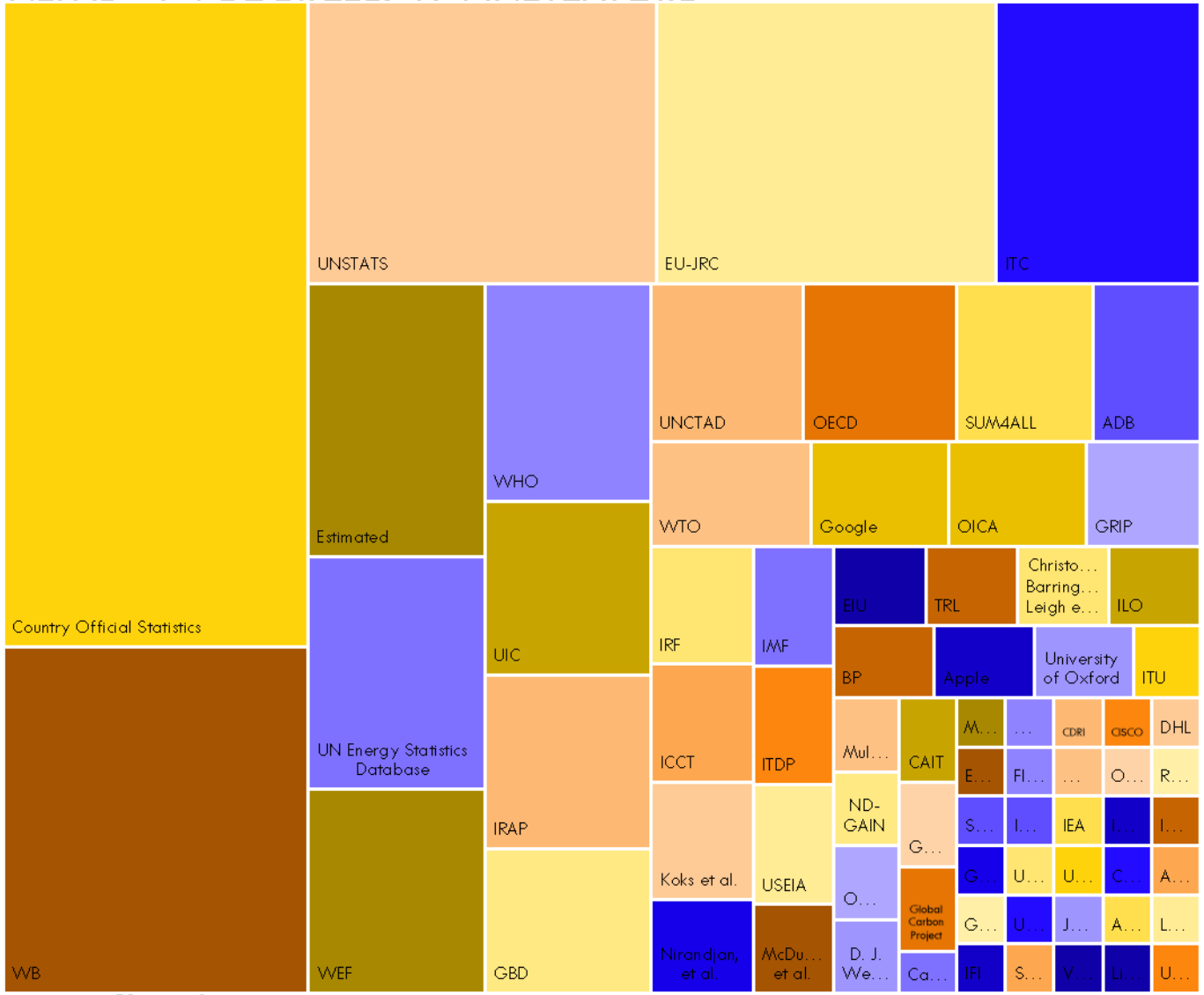
Why Innovative?

NEPAL – 74 SOURCES, 494 INDICATORS



Data Sharing/Validation
- IRF
- ITEM
- TDCI
- ADB Statistics

Policy
- UNCRD

Railways
- UNESCAP
- UIC

Roads
- ADB's Green Roads Toolkit
- IRF

Climate Change
- SLOCAT
- UNESCAP
- UK FCDO

Electric Vehicles
- ADB-GEF EV Platform
- UEMI

Road Safety
- APRSO

Freight
- UNCTAD
- Smart Freight Center

Climate Resilience
- Life Links Council

Air Pollution
- Clean Air Asia

Urban Data
- Mobilize Your City

Country Partners
- SOTEN
- Indonesia Transport Society (MTI)

Outlook

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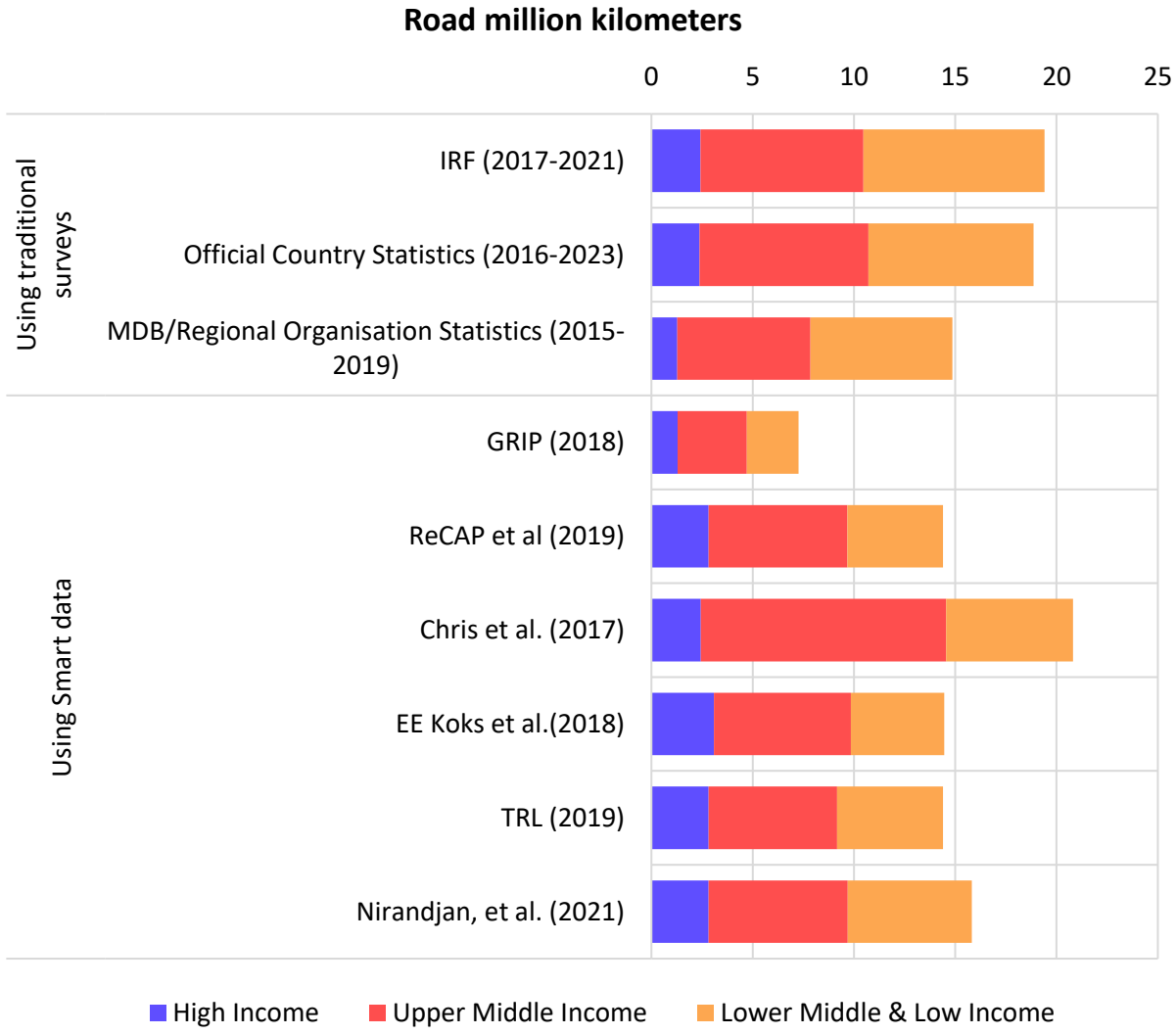
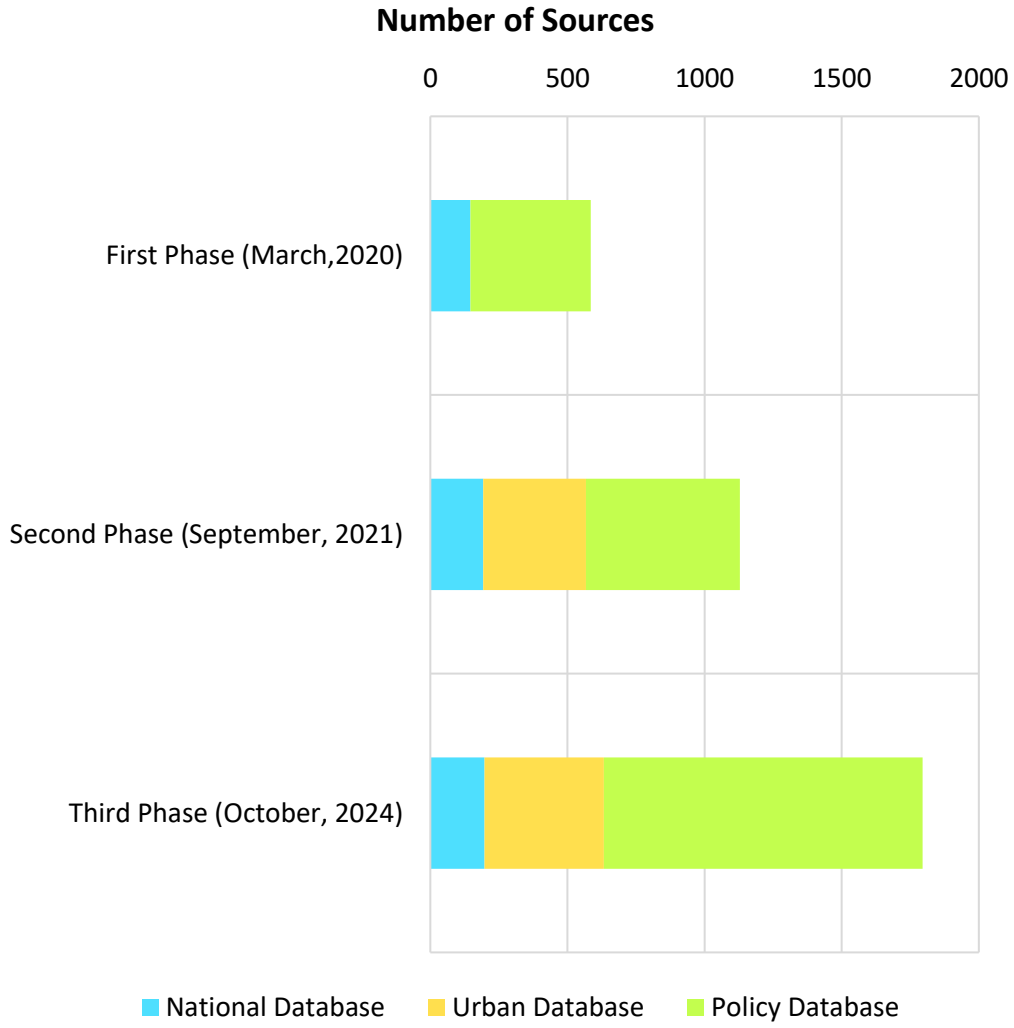
Connect Multiple Sources (traditional + new technologies)





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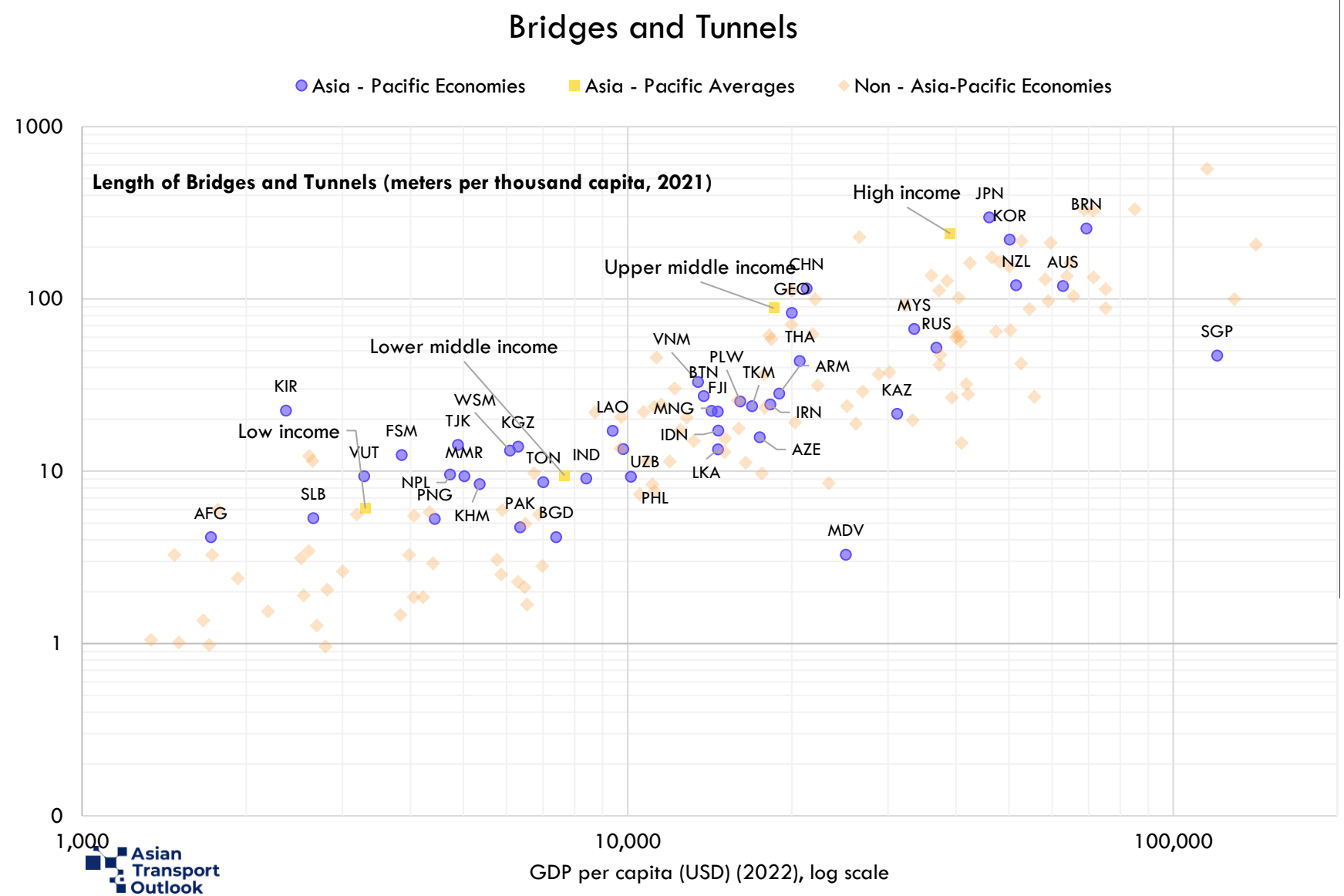
Primary + Secondary + High Quality Academic Papers



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journal homepage: www.elsevier.com/locate/jclepro

Mapping and modelling global mobility infrastructure stocks, material flows and their embodied greenhouse gas emissions

Dominik Wiedenhofer [a,*], André Baumgart [a,1], Sarah Matej [a,1], Doris Virág [a], Gerald Kalt [a], Maud Lanau [b,c], Danielle Densley Tingley [c], Zhiwei Liu [d], Jing Guo [e], Hiroki Tanikawa [d], Helmut Haberl [a]

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ARTICLE INFO

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Keywords:
Material and energy flow analysis (MEFA)
Socio-economic metabolism
Transport
Road
Rail

ABSTRACT

Roads and rail-based mobility infrastructures are the basis for mobility services and underpin several Sustainable Development Goals, but also induce material use and greenhouse gas emissions. To date, no stock-flow consistent study has assessed globally accumulated stocks of mobility infrastructures, associated material flows and emissions, and their spatial patterns.

We present global findings on material stocks for all roads, rail-based infrastructures, incl. tunnels and bridges, and model associated material flows and their embodied emissions for the year 2021. The stock-flow consistent model combines crowd-sourced Open Street Maps data with archetypical infrastructure designs, material compositions, assumptions on lifetimes and network growth rates, incl. uncertainty ranges. We derive spatially explicit, national-level stock estimates for 180 countries, map them at a resolution of 5 arcminutes, and derive material flows and their embodied emissions at the country-level.

We find that 314 [218–403] Gt of materials (41 [28–53] tons/cap) have accumulated in global mobility infrastructure, the majority in roads as aggregates and asphalt. Stocks are unequally distributed between countries, from averages of 23 [16–30] tons/cap in low income countries, to 130 [89–164] tons/cap in high income countries. Spatial inequality of per capita stocks per area differs by orders of magnitude, from 10^1-10^4 between rural, suburban, and dense urban areas. We find that 8 [4–16] Gt/year of material flows are due to expansion and maintenance, amounting to 6 [3–10] % of global resource extraction. These translate into 0.36 [0.19–0.69] Gt CO_2eq/year, or 1 [0.5–1.9] % of global GHG emissions in 2021.

Approximately two-thirds of these flows result from maintenance and replacement of stocks, indicating an important lock-in of resource use due to already existing infrastructure stocks. These findings support the crucial role of improving spatial planning, limiting stock expansion and (sub-)urbanization, to achieve more sustainable resource use and mitigate climate change.

European Research Council
Established by the European Commission

Universität für Bodenkultur Wien
Department für Wirtschafts- und Sozialwissenschaften
Social Ecology Vienna

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Transport Data + Policies

The **Asian Transport Outlook**

has developed policy trackers for

29 economies recording

~560 documents and

7000+ measures

Example - Nepal

Transport related **20** policy documents for Nepal	Year	Document Type
Motor Vehicles and Transport Management Act, 2049 (1993)	1993	Transport Laws/ Regulations
National Transport Policy	2001	National Transport Policy
Convention on the Rights of Persons with Disabilities 2006	2006	Secondary Source
National Energy Strategy of Nepal	2013	Other Transport-related Policy
National Sustainable Transport Strategy (NSTS) for Nepal (2015-2040)	2015	National Transport Policy
Nepal Civil Aviation Act, 2073	2017	Transport Subsector Policy
National Review of Sustainable Development Goals	2017	National Report to International/ Regional Processes
Global Status Report on Road Safety 2018	2018	Secondary Source
National Action Plan for Electric Mobility	2018	Transport Subsector Policy
Nepal Urban Road Standard- 2076	2019	Transport Laws/ Regulations
The Fifteenth Plan (Fiscal Year 2019/20 – 2023/24)	2020	National Development Policy
Second Nationally Determined Contribution	2020	Nationally Determined Contributions
Road Safety Opportunities and Challenges: Low- and Middle-Income Country Profiles	2020	Secondary Source
National Adaptation Plan (NAP) 2021 - 2050	2021	Other Transport-related Policy
Assessment of Electric Mobility Targets for Nepal's 2020 Nationally Determined Contributions (NDC)	2021	Transport Subsector Policy
59 UN Transport Agreements/ and Conventions Serviced by ECE	2021	Secondary Source
Nepal LTS	2021	Long-term Strategies
Nepal Road Safety Action Plan (2021-2030)	2022	Transport Subsector Policy
National Implementation Plan for Climate Change Mitigation and Adaptation (2080-2087)	2023	Other Transport-related Policy
Strategy and Initiatives for Electrification of Public Transportation in Nepal	n.d.	Transport Subsector Policy

Source: ATO national policy trackers developed in 2026

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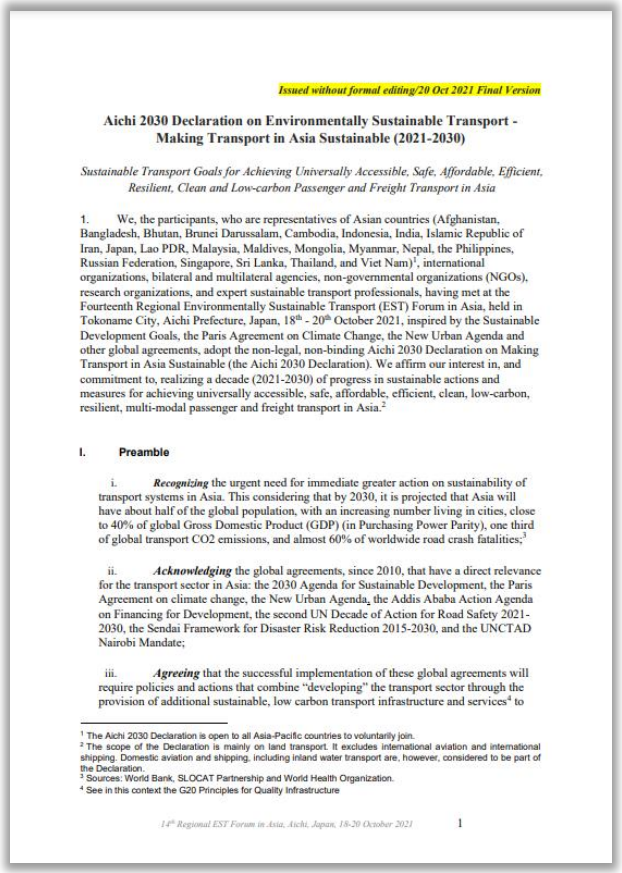
Aichi 2030 Declaration – Monitoring



Issued without formal editing/20 Oct 2021 Final Version

Aichi 2030 Declaration on Environmentally Sustainable Transport - Making Transport in Asia Sustainable (2021-2030)

Sustainable Transport Goals for Achieving Universally Accessible, Safe, Affordable, Efficient, Resilient, Clean and Low-carbon Passenger and Freight Transport in Asia

1. We, the participants, who are representatives of Asian countries (Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Indonesia, India, Islamic Republic of Iran, Japan, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, the Philippines, Russian Federation, Singapore, Sri Lanka, Thailand, and Viet Nam)[1], international organizations, bilateral and multilateral agencies, non-governmental organizations (NGOs), research organizations, and expert sustainable transport professionals, having met at the Fourteenth Regional Environmentally Sustainable Transport (EST) Forum in Asia, held in Tokoname City, Aichi Prefecture, Japan, 18th - 20th October 2021, inspired by the Sustainable Development Goals, the Paris Agreement on Climate Change, the New Urban Agenda and other global agreements, adopt the non-legal, non-binding Aichi 2030 Declaration on Making Transport in Asia Sustainable (the Aichi 2030 Declaration). We affirm our interest in, and commitment to, realizing a decade (2021-2030) of progress in sustainable actions and measures for achieving universally accessible, safe, affordable, efficient, clean, low-carbon, resilient, multi-modal passenger and freight transport in Asia.[2]

I. Preamble

i. ***Recognizing*** the urgent need for immediate greater action on sustainability of transport systems in Asia. This considering that by 2030, it is projected that Asia will have about half of the global population, with an increasing number living in cities, close to 40% of global Gross Domestic Product (GDP) (in Purchasing Power Parity), one third of global transport CO2 emissions, and almost 60% of worldwide road crash fatalities;[3]

ii. ***Acknowledging*** the global agreements, since 2010, that have a direct relevance for the transport sector in Asia: the 2030 Agenda for Sustainable Development, the Paris Agreement on climate change, the New Urban Agenda, the Addis Ababa Action Agenda on Financing for Development, the second UN Decade of Action for Road Safety 2021-2030, the Sendai Framework for Disaster Risk Reduction 2015-2030, and the UNCTAD Nairobi Mandate;

iii. ***Agreeing*** that the successful implementation of these global agreements will require policies and actions that combine "developing" the transport sector through the provision of additional sustainable, low carbon transport infrastructure and services[4] to

[1] The Aichi 2030 Declaration is open to all Asia-Pacific countries to voluntarily join.
[2] The scope of the Declaration is mainly on land transport. It excludes international aviation and international shipping. Domestic aviation and shipping, including inland water transport are, however, considered to be part of the Declaration.
[3] Sources: World Bank, SLOCAT Partnership and World Health Organization.
[4] See in this context the G20 Principles for Quality Infrastructure

14th Regional EST Forum in Asia, Aichi, Japan, 18-20 October 2021 1

Access the Declaration document here:
https://sdgs.un.org/sites/default/files/2021-10/UNCRD_14th%20EST_Aichi%202030%20Declaration-20%20Oct%202021-ADOPTED_0.pdf

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Asian Transport Outlook: A Catalyst for Sustainable Transport in Asia

Helpdesk on Transport Sector (Free*)

536

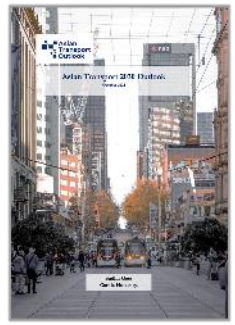
National indicators of which **45%** are Road related

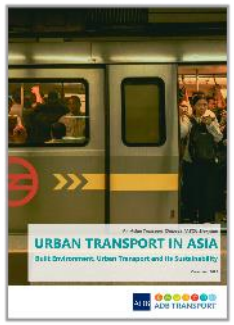
180

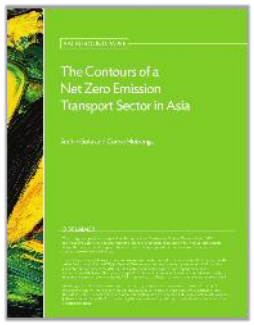
Urban indicators of which **30%** are Road related

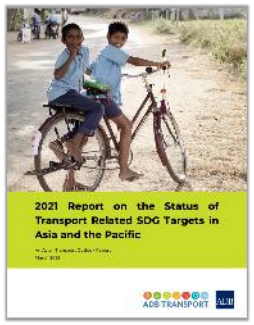
550

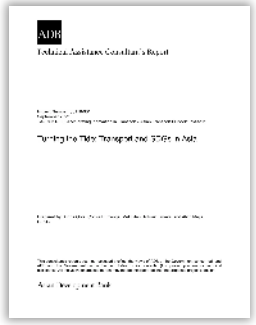
National Policy documents identified of which **80%** are Road related

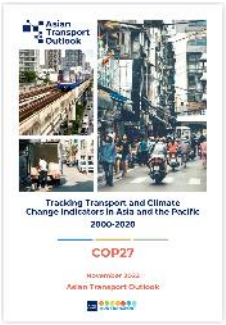


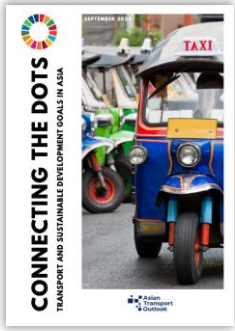


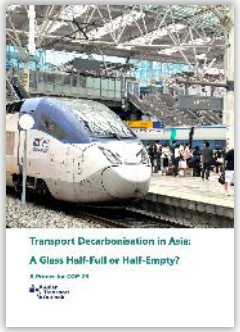


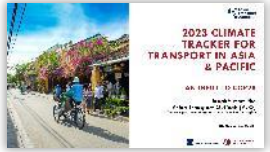




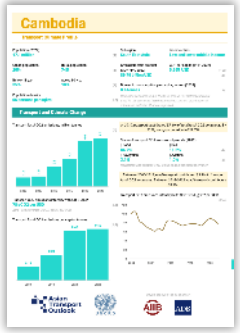








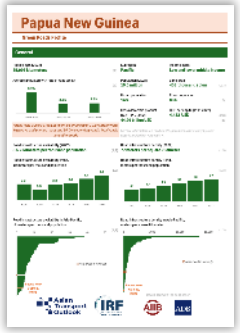
SDG Profiles
(39 countries)



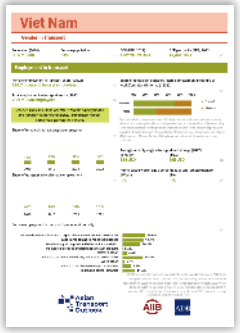
Transport Climate Profiles
(23 countries)

Road Safety Profiles
(24 countries)

E-mobility Profiles
(10 countries)



Green Roads Profiles
(23 countries)

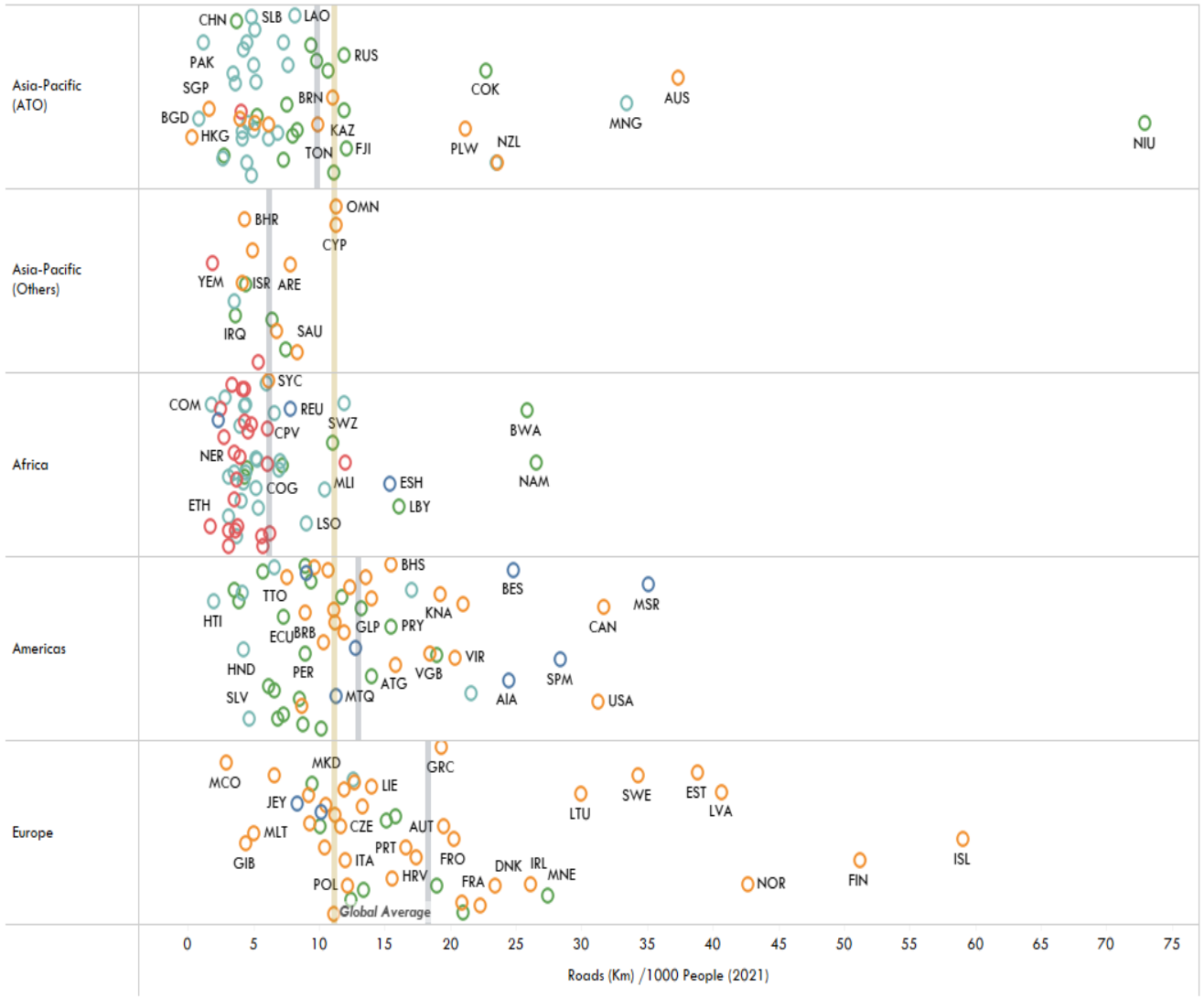


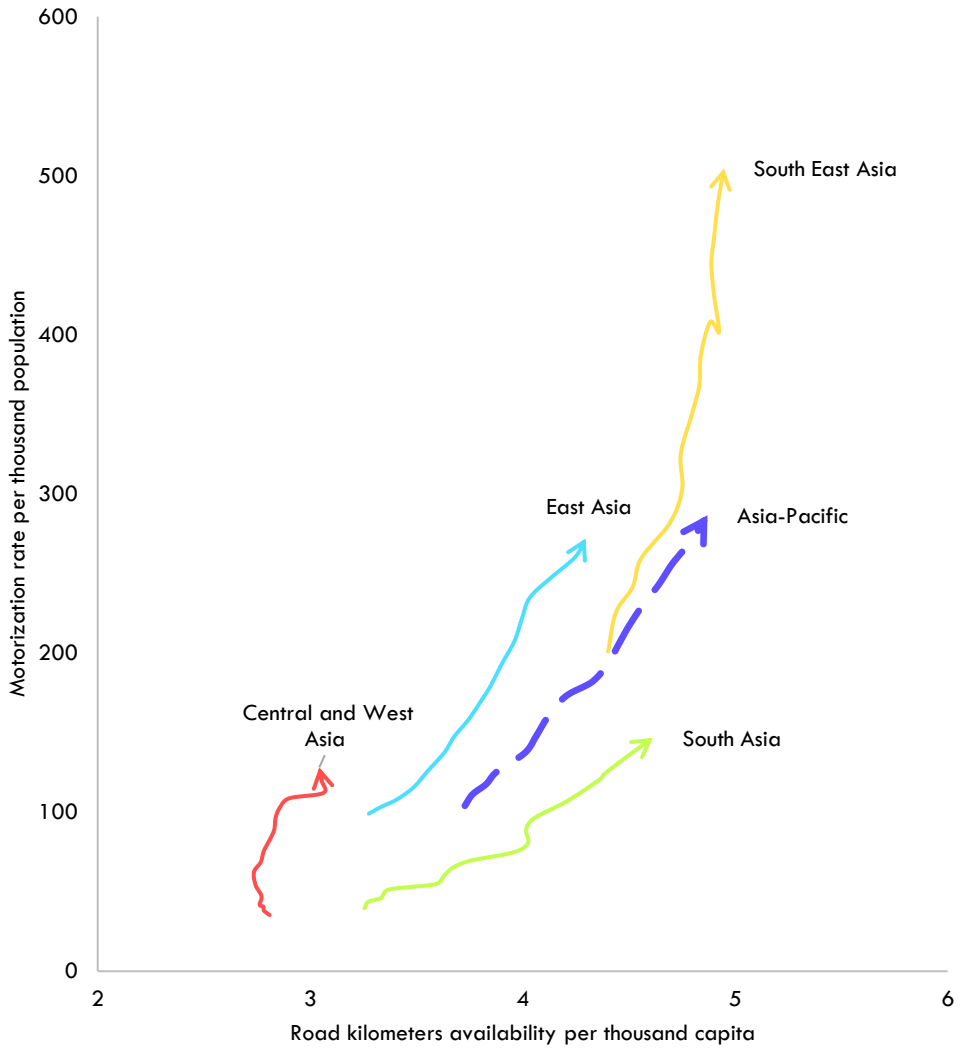
Gender Profiles
(20 countries)

Asian Transport Outlook

Translating Data into Insights, Policies, and Investments

Infrastructure Gap & Fast-Growing Motorization





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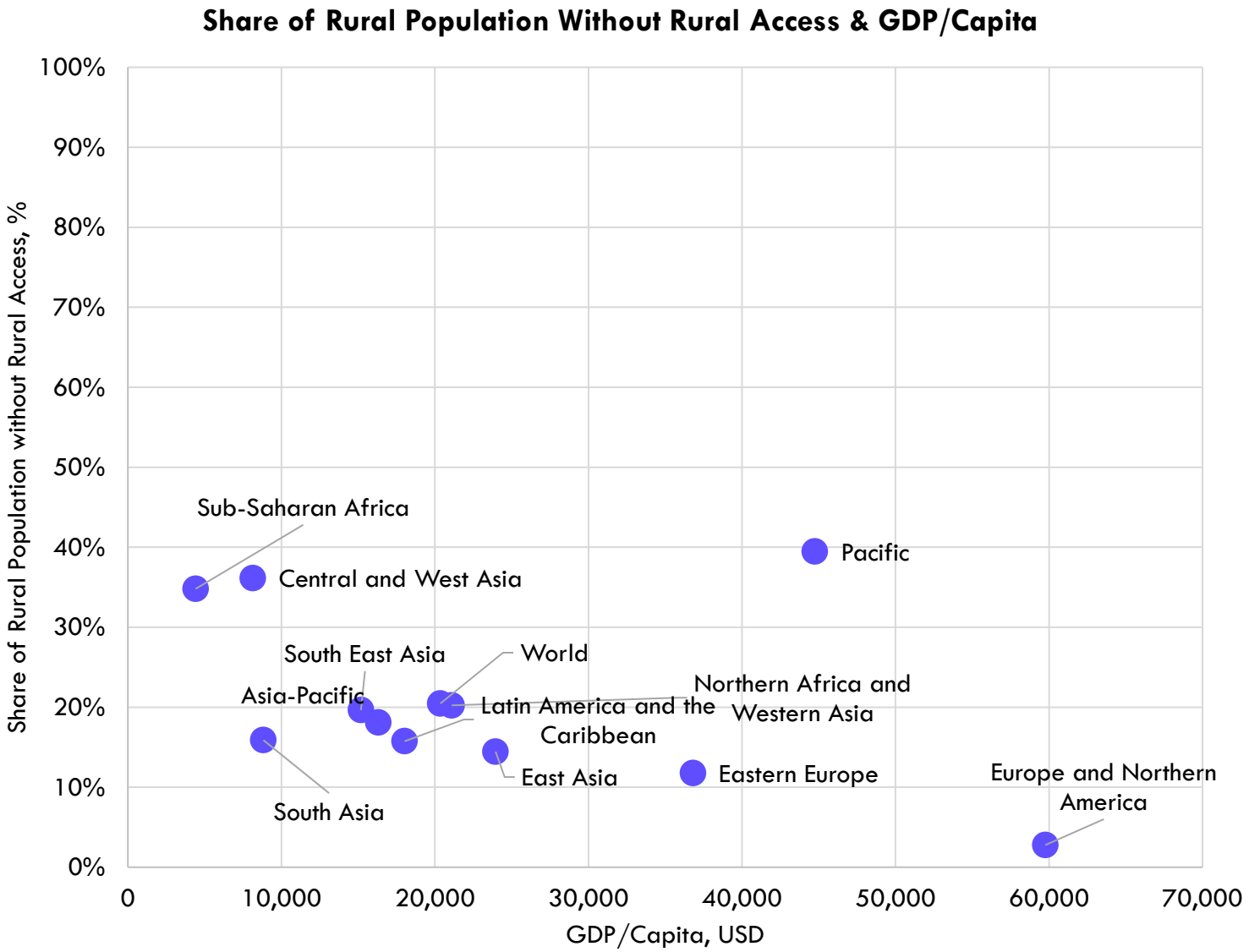
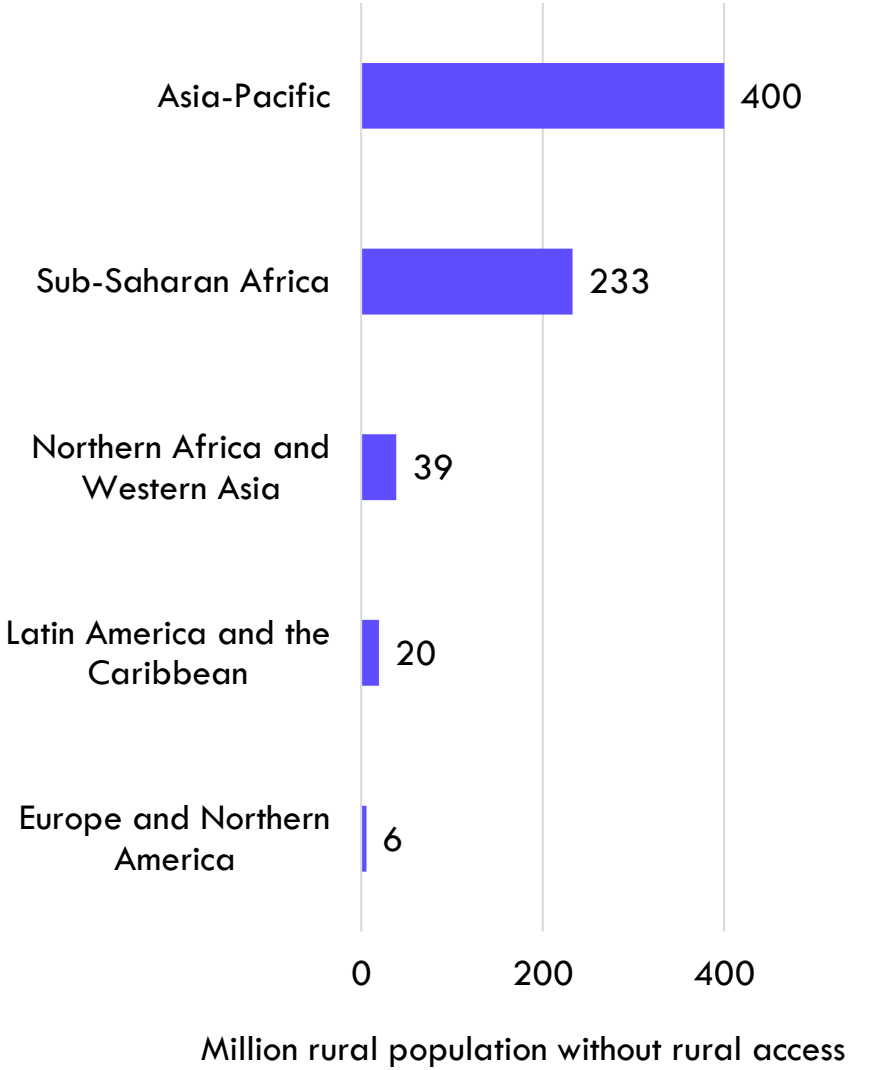
Connecting the Unconnected





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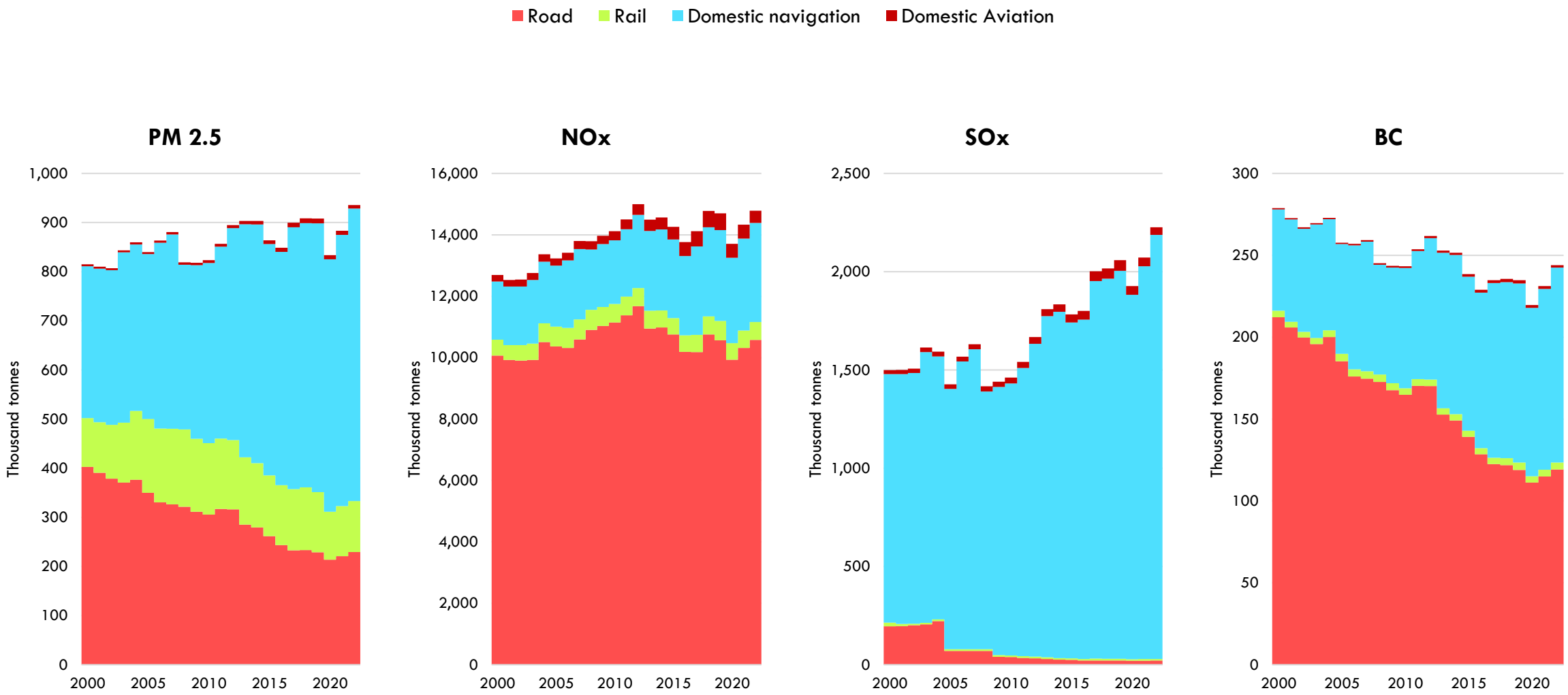
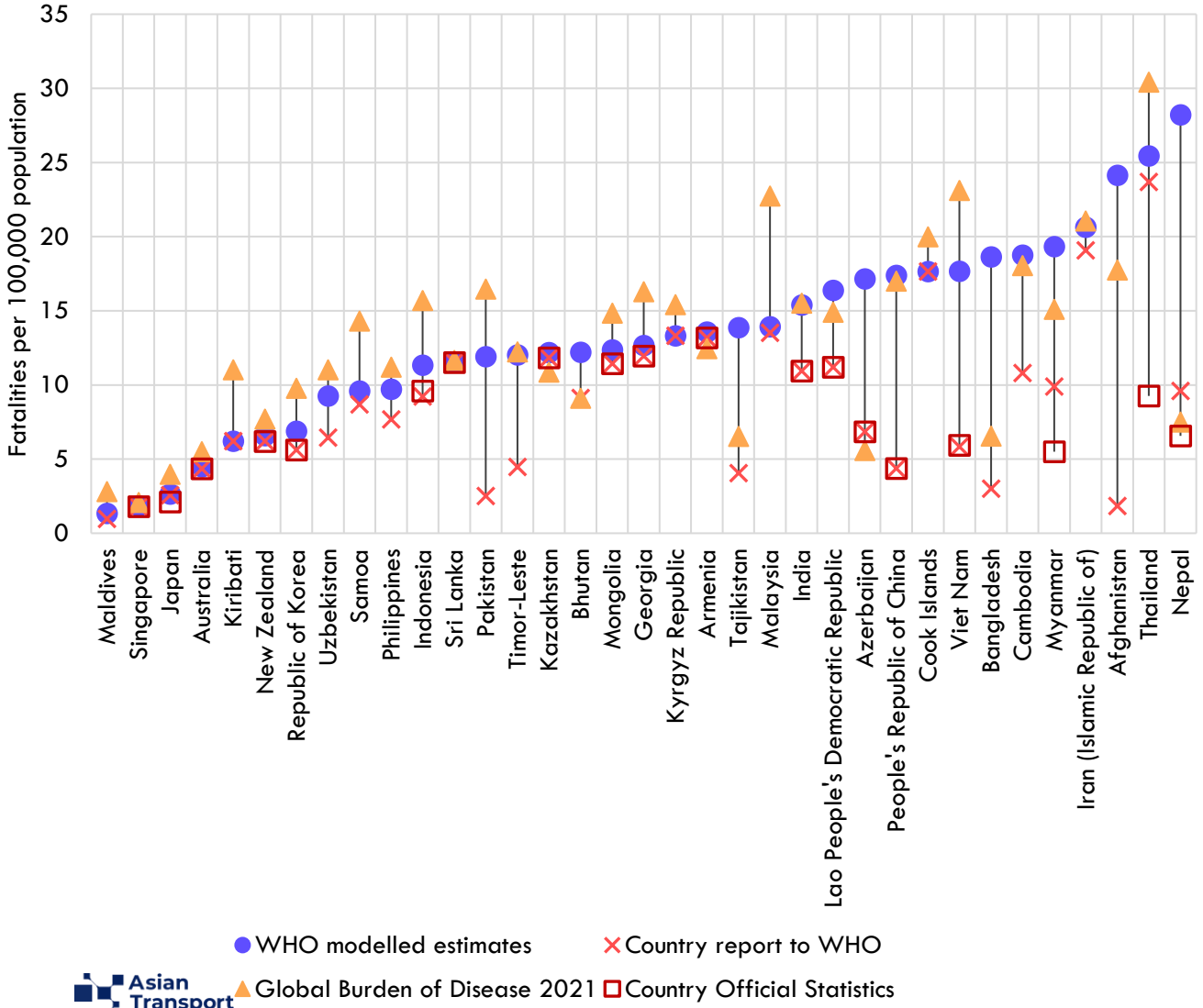
Transport is a Significant Source of Air Pollution

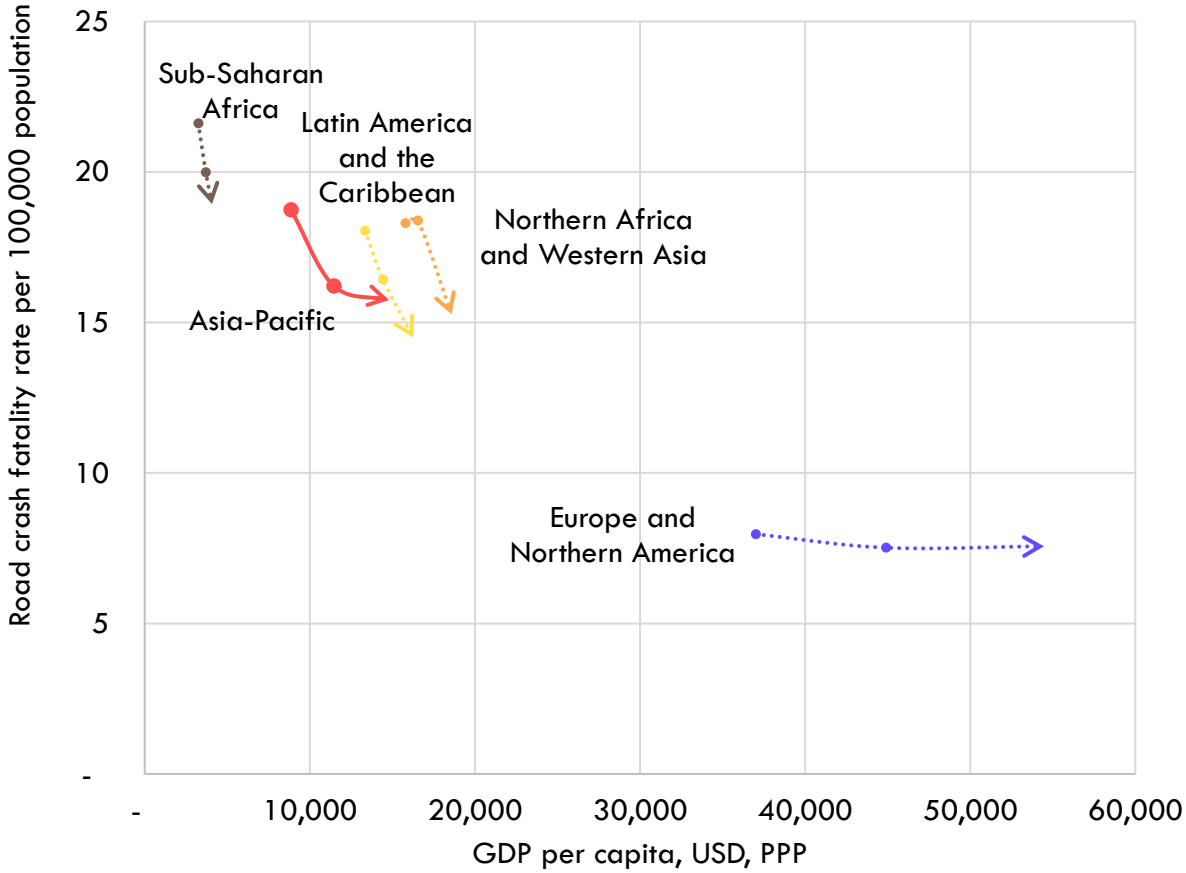


Can We Meet SDG Targets on Road Safety?

Road crash fatality rate in Asia by source, 2021



GDP per capita vs. road crash fatality rate (2010, 2016, 2021)



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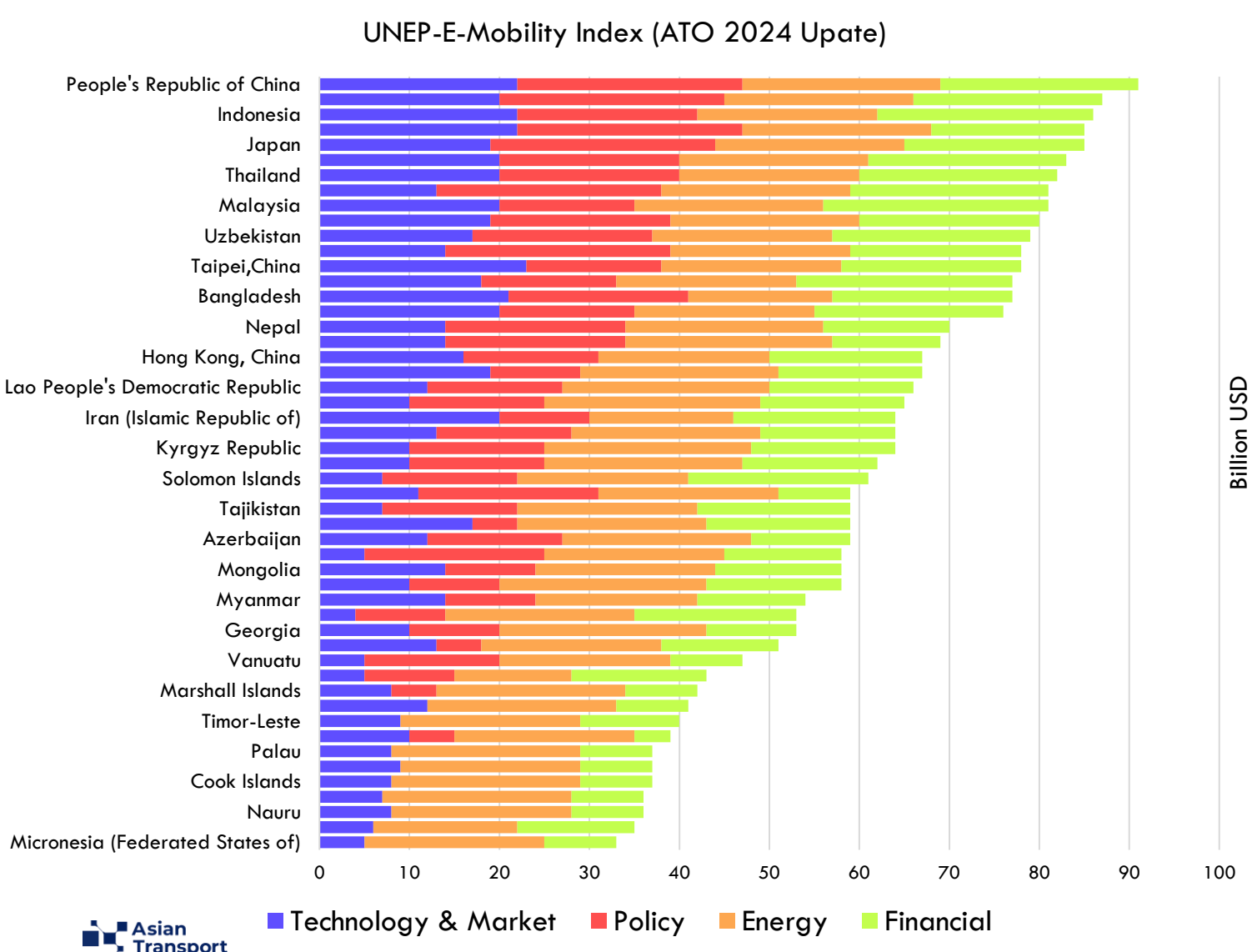
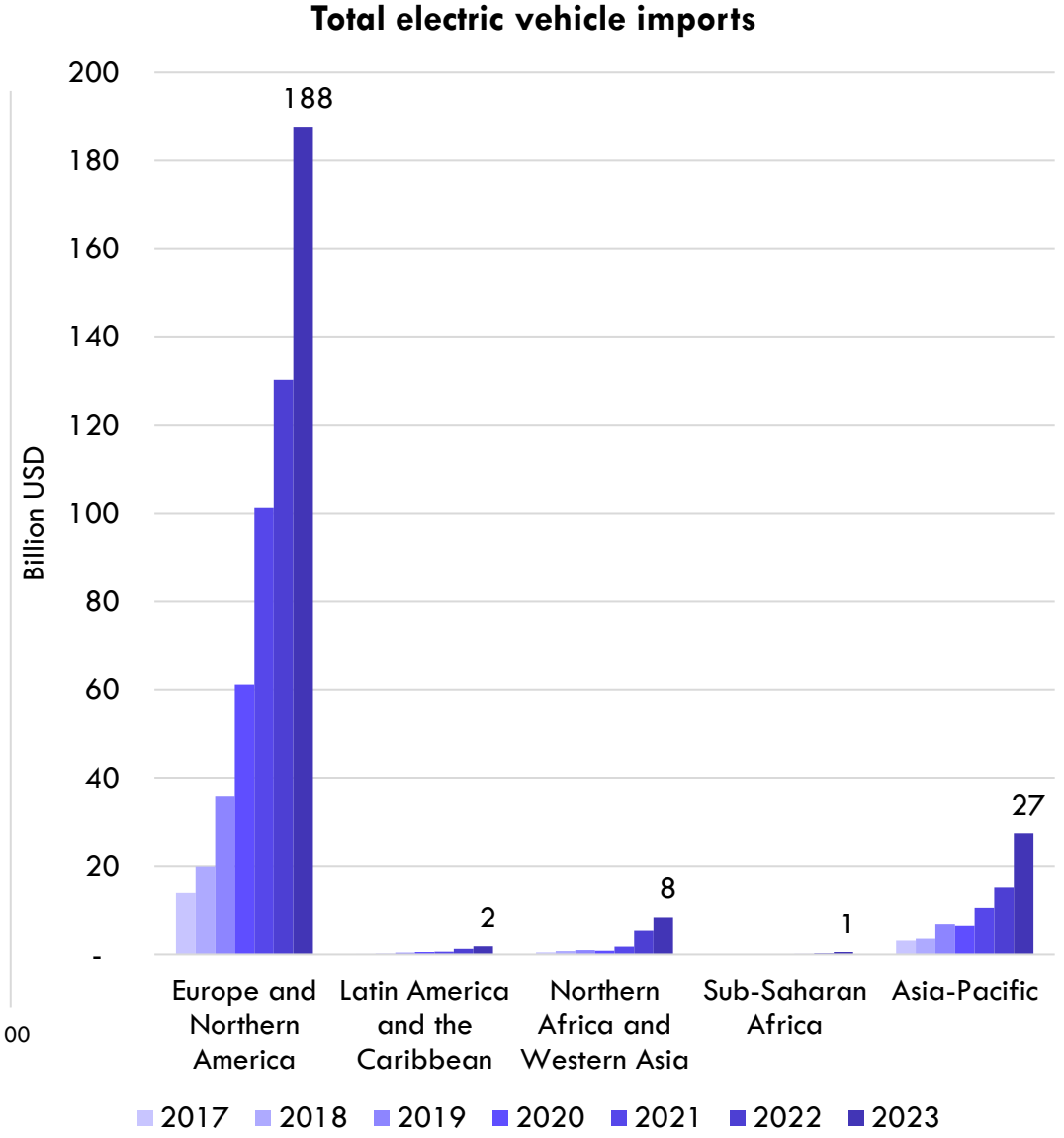
Asia's EV Surge: Near the Tipping Point





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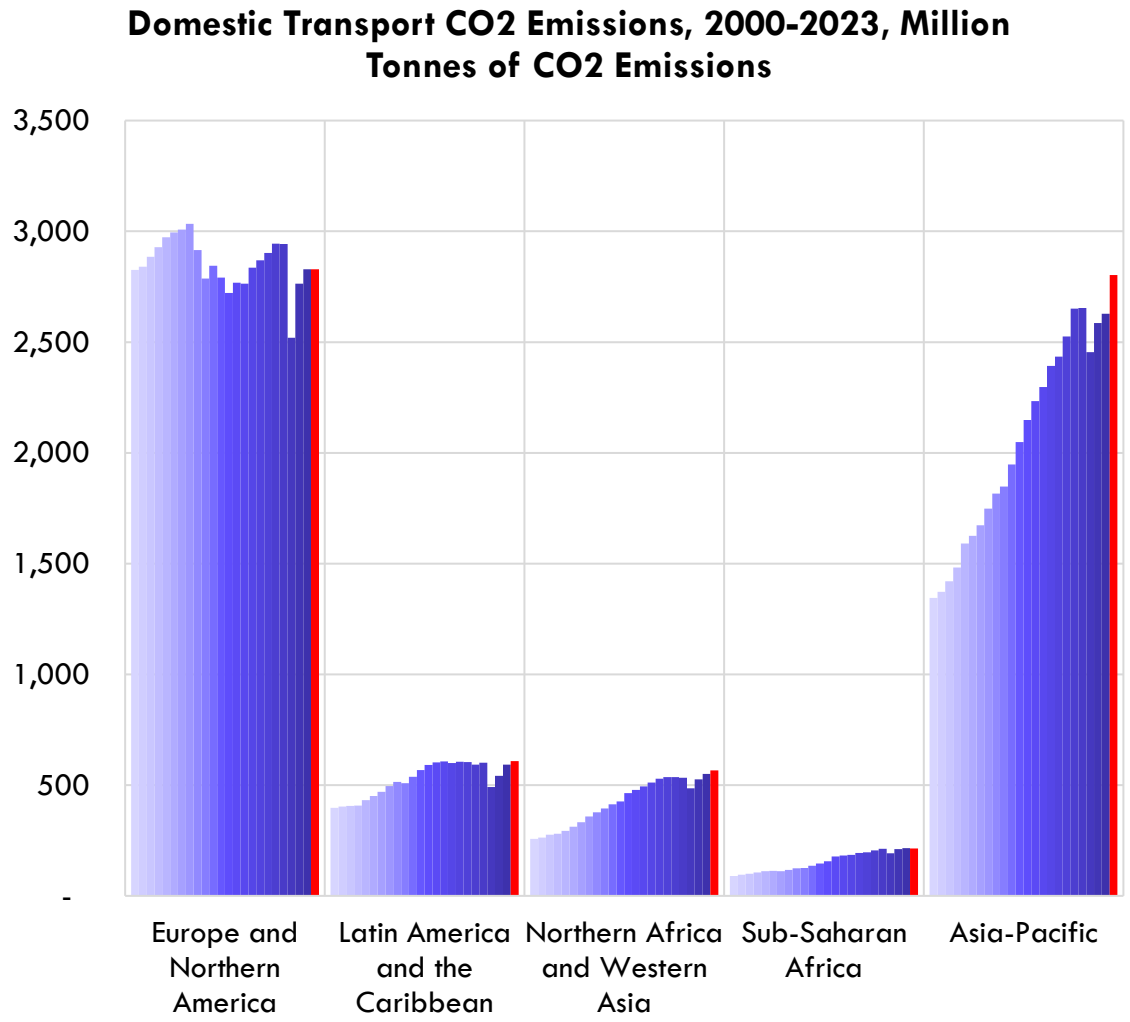
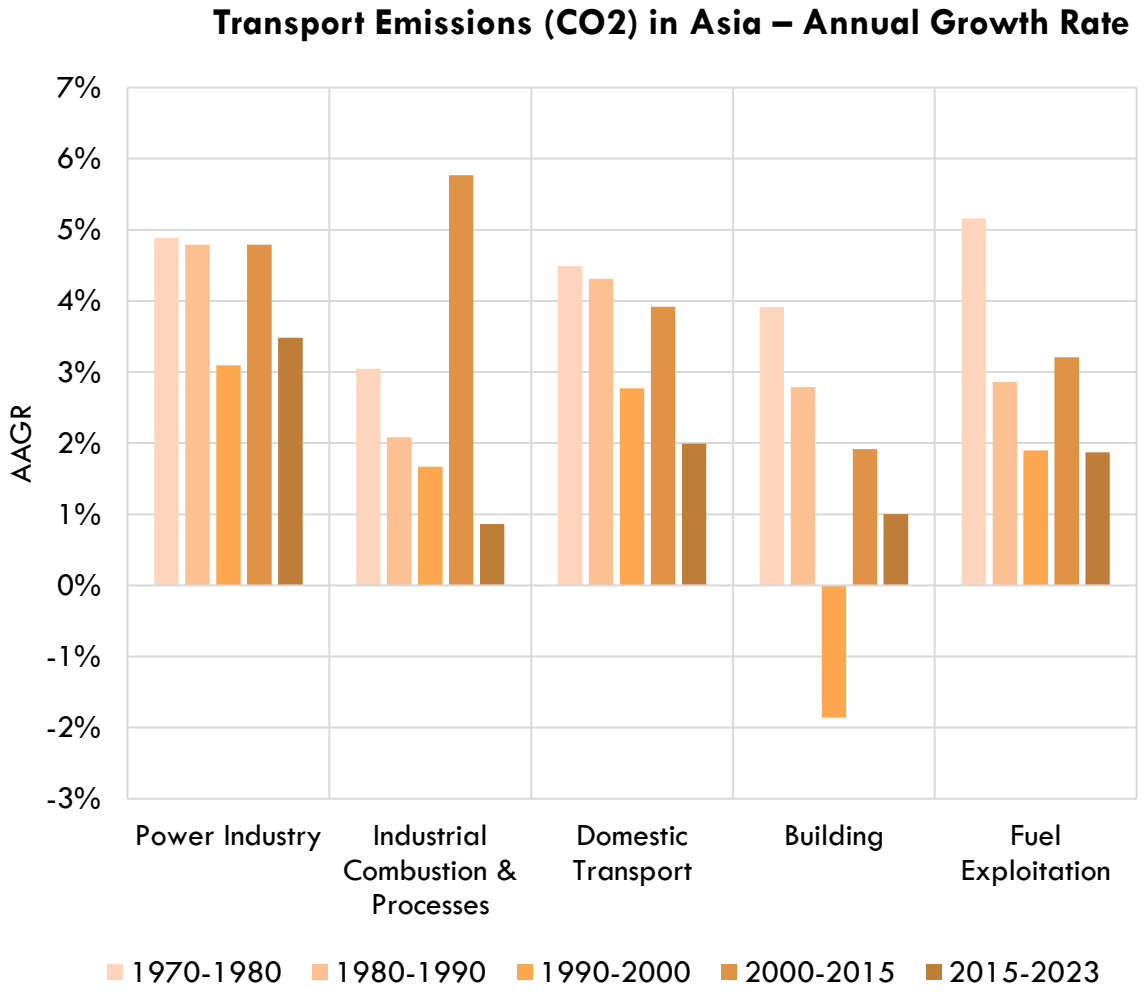
Alarming Rise in Asia-Pacific Transport Carbon Emissions





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Road share in Transport CO2 Emissions ~ 89% (varies from 72% to 100%)

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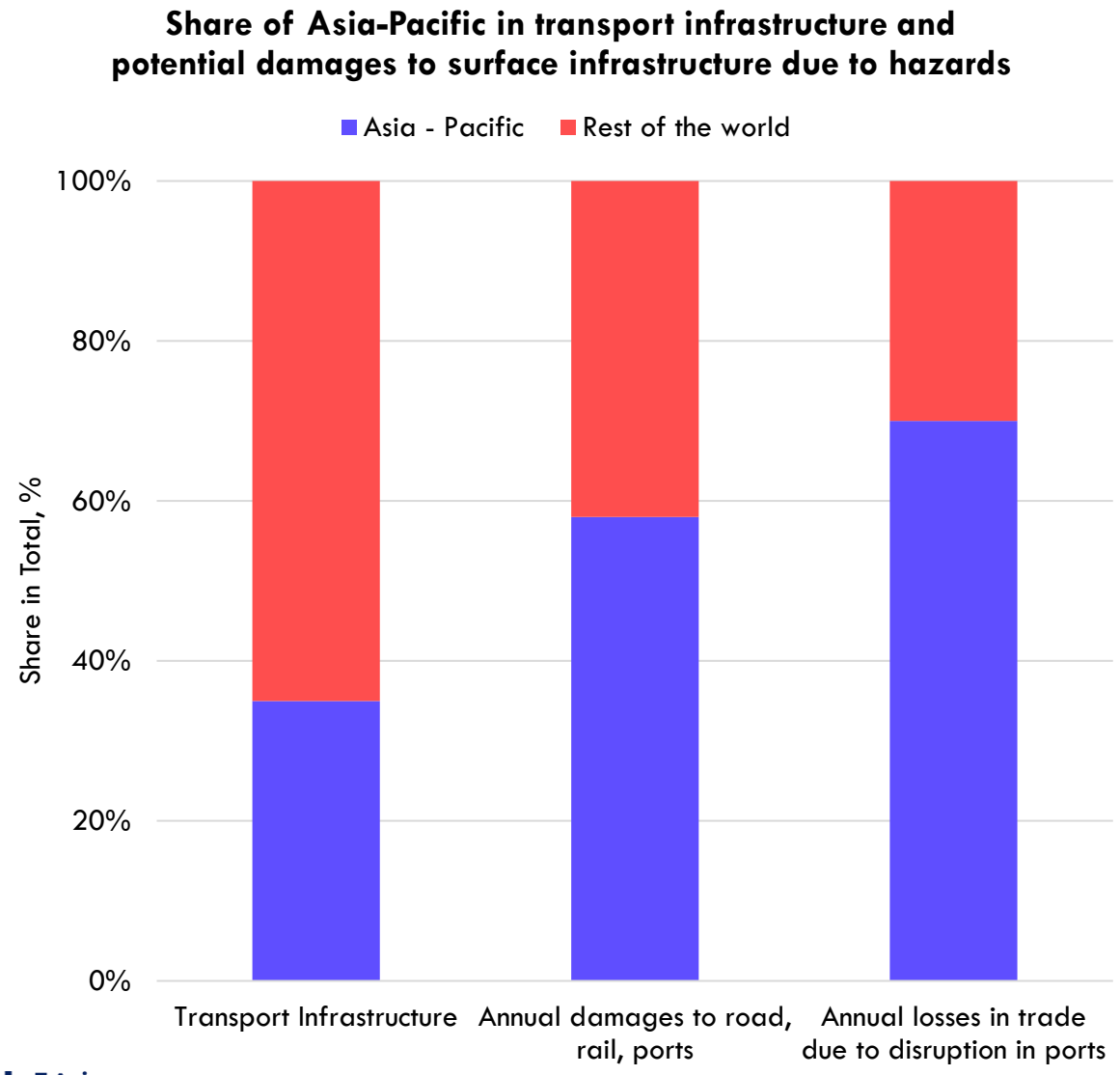
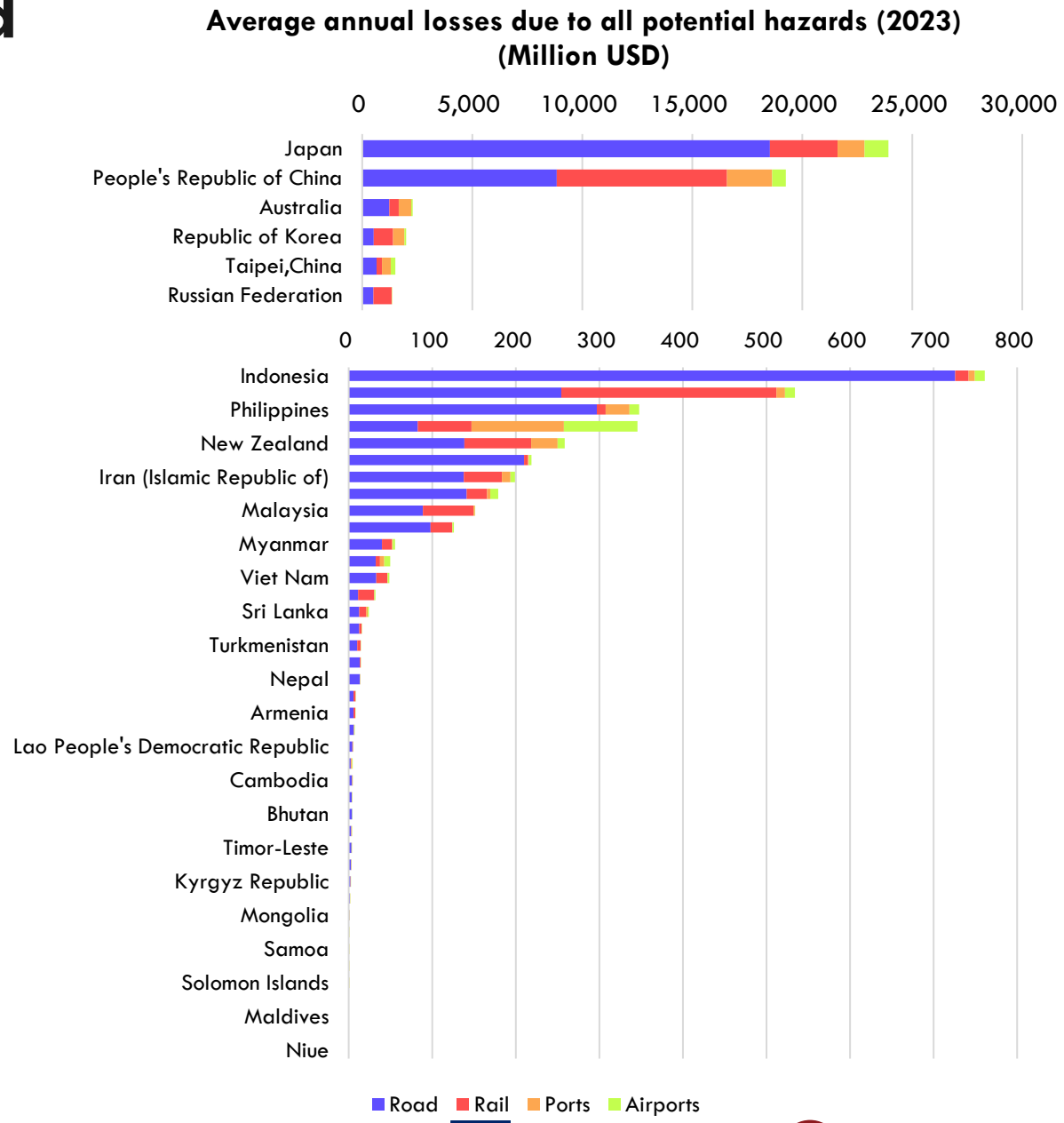
Adapting to a Changing World - From Choice to Necessity



Source: Kokos Et al.



Source: CDRI

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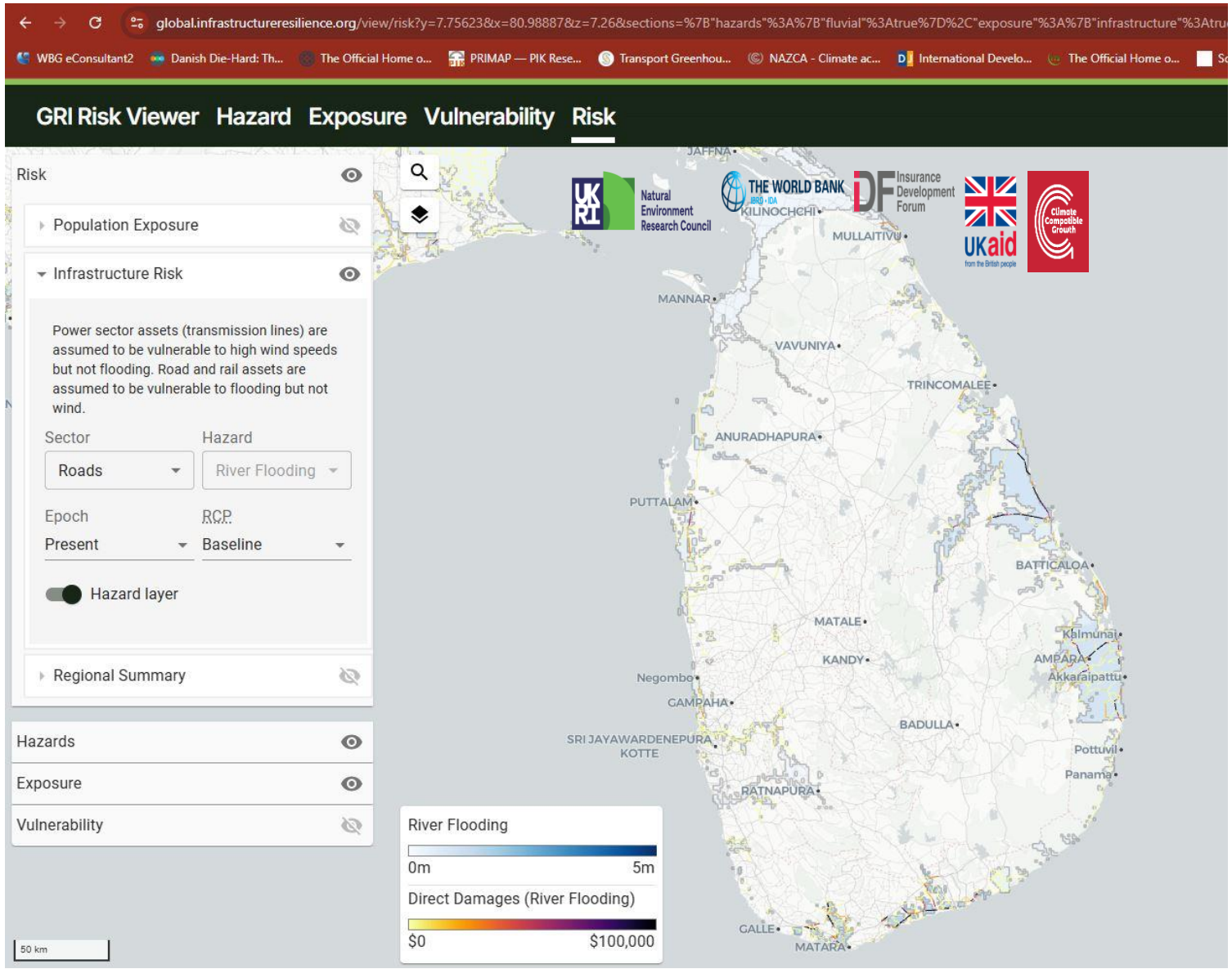
Adapting to a Changing World - From Choice to Necessity



thomas-fred Consolidate damage curves and rehab costs

Preview | Code | Blame | 16 lines (16 loc) · 679 Bytes

```
# Sources:
# World Bank. Road Costs Knowledge System (ROCKS) v2.3
# US Federal Highways Agency, Bridge Replacement Unit Costs 2020, https://www.fhwa.dot.gov/bridge/nbi/sd2020.cfm#c
# Koks et al 2019, A global multi-hazard risk analysis of road and railway infrastructure assets
# Asian Development Bank, Asian Transport Outlook, https://asiantransportoutlook.com/costdata/
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"road_motorway",2289717.82
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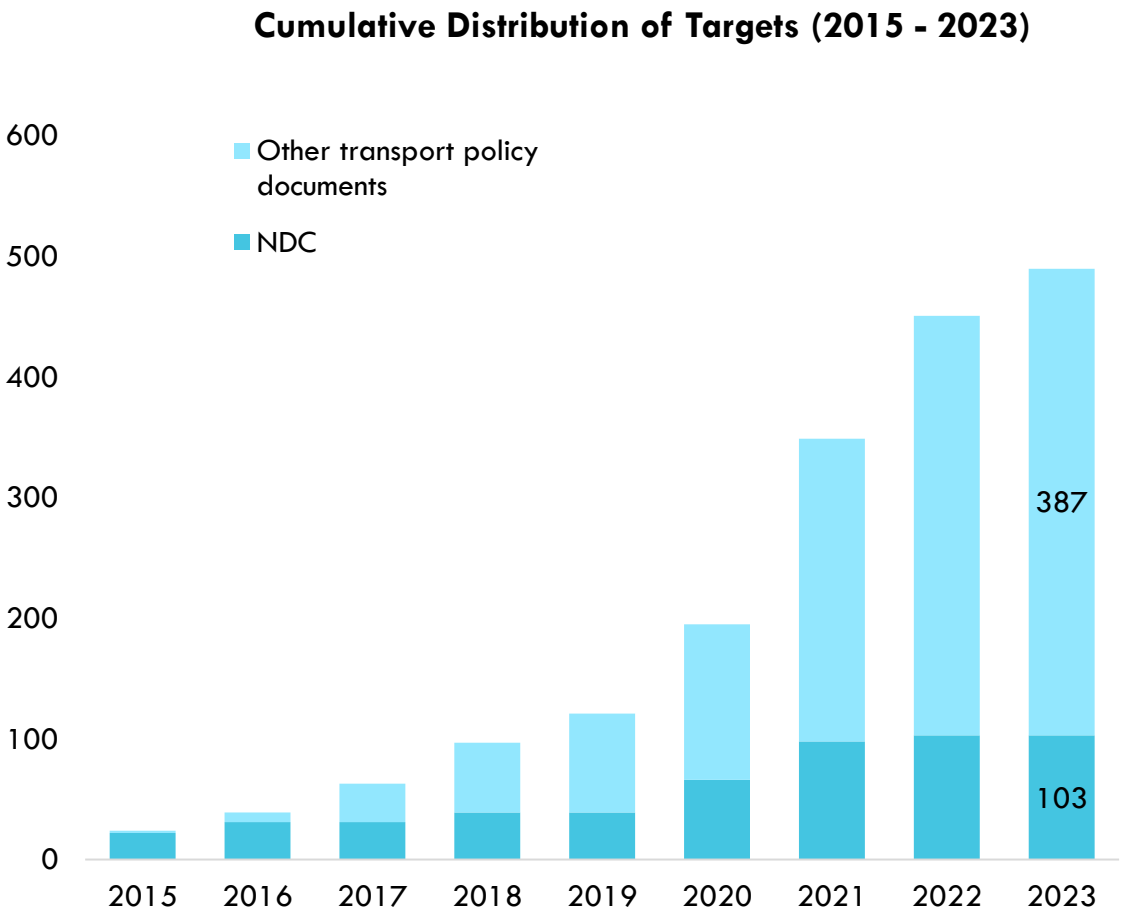
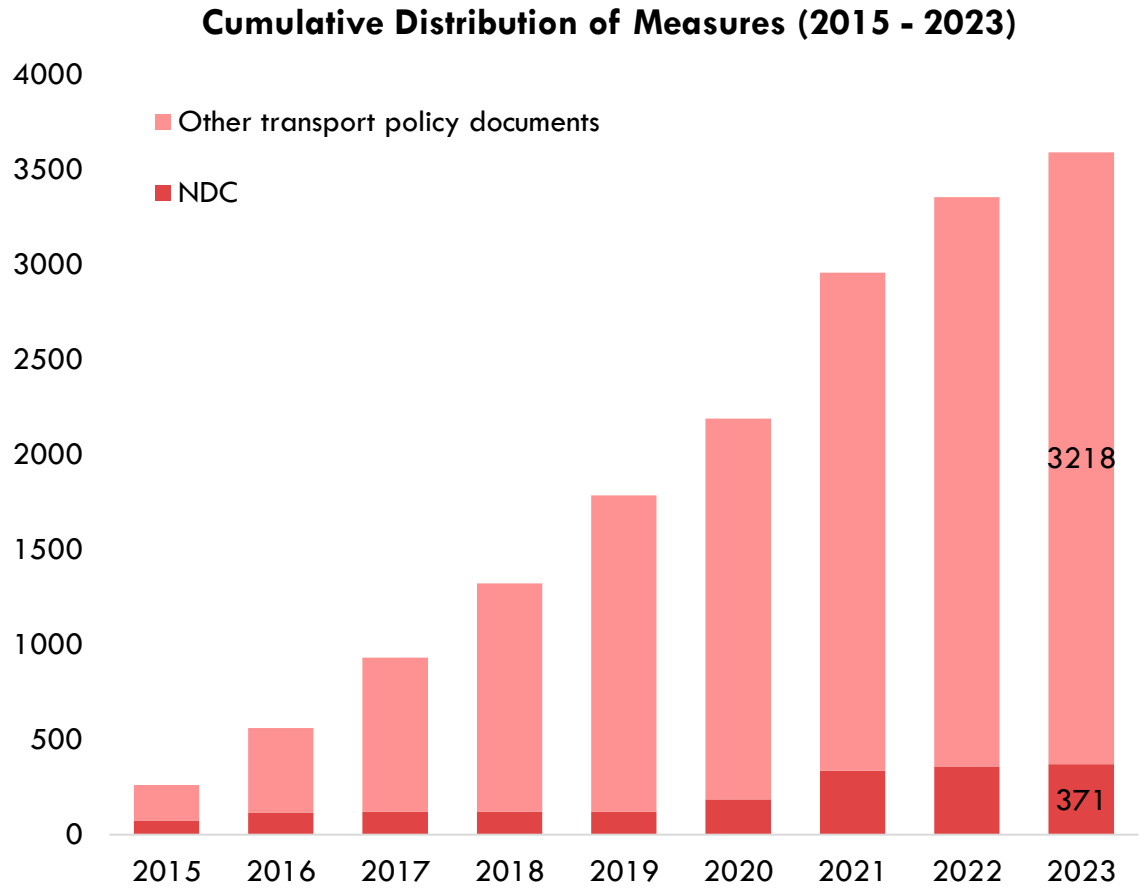
NDC's: The Need for Paradigm Shift





"Emerging economies need more detailed and ambitious transport-related commitments in their NDCs"

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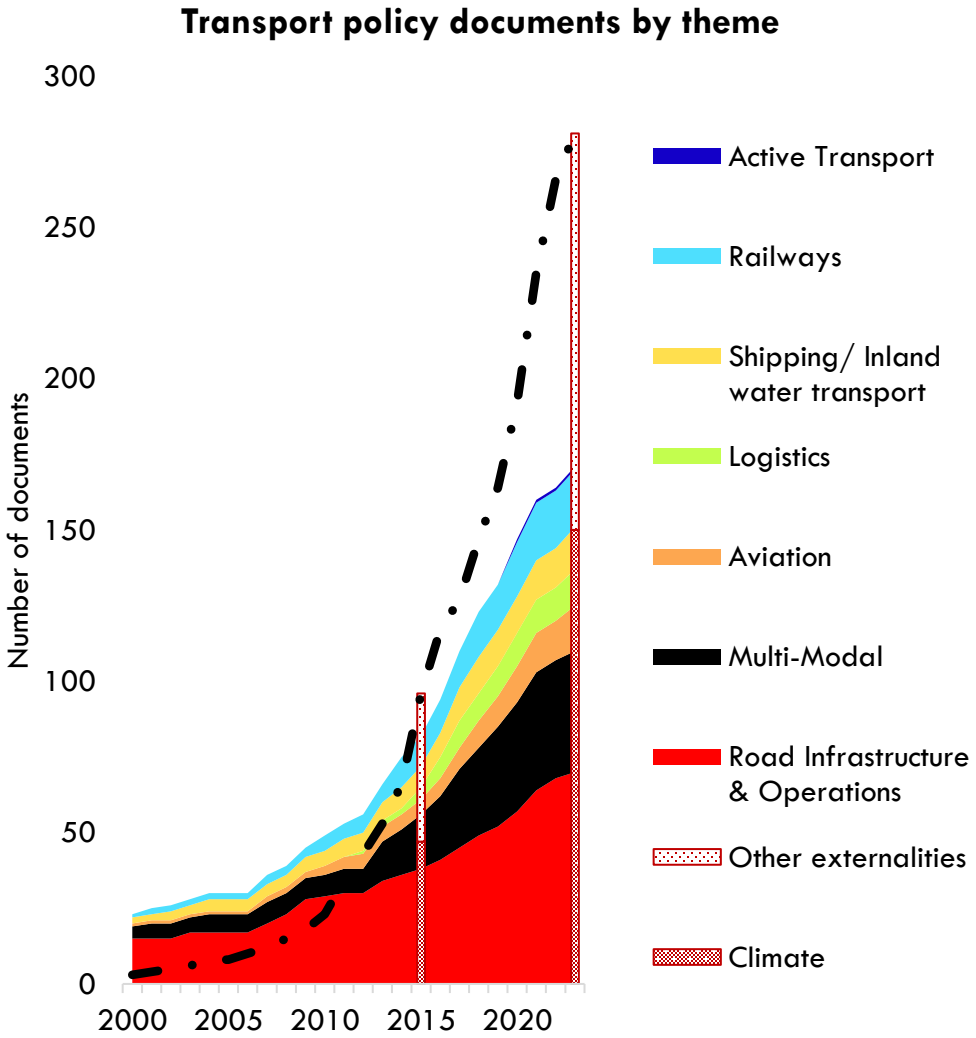
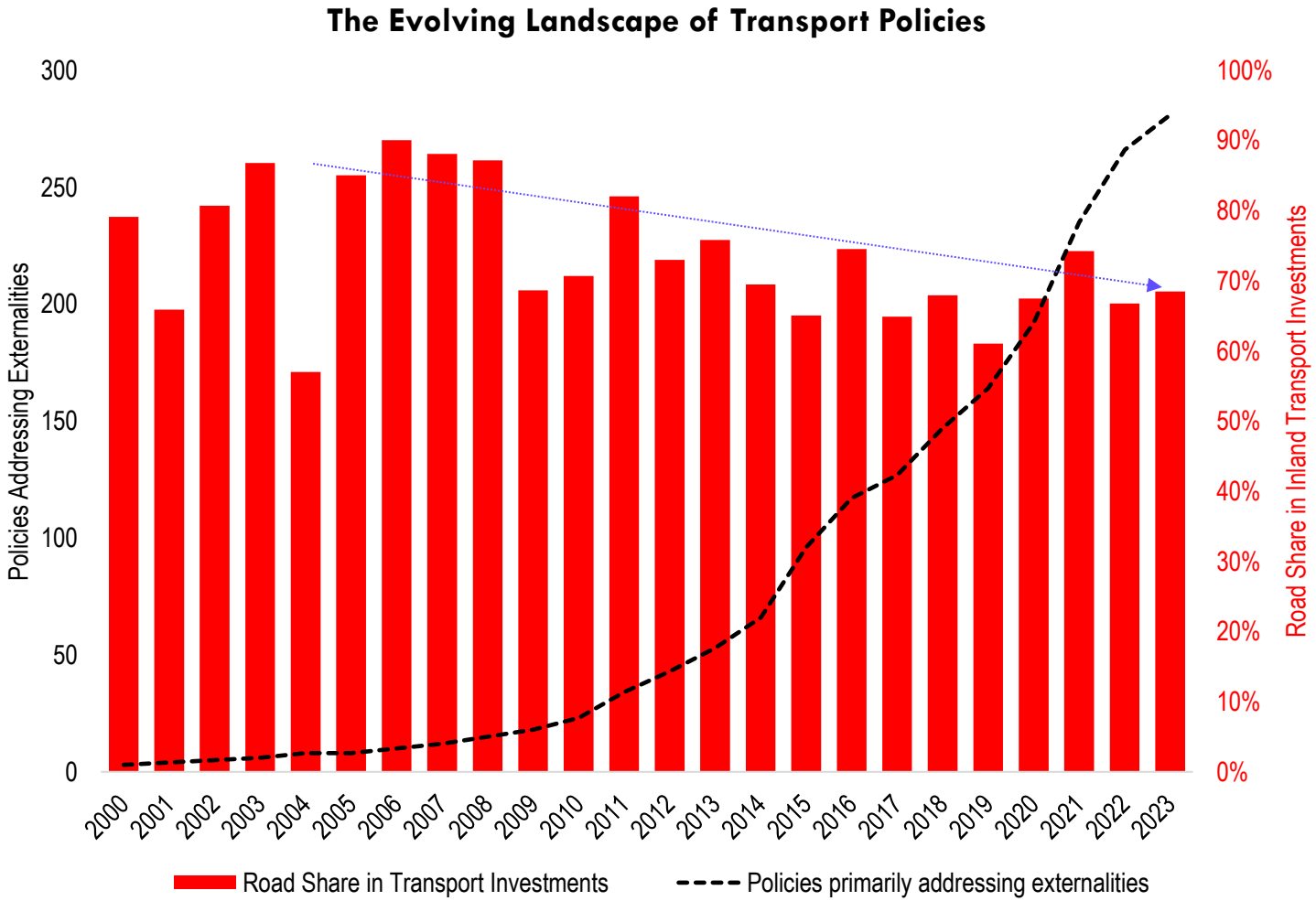
The Evolving Landscape of Transport Policies





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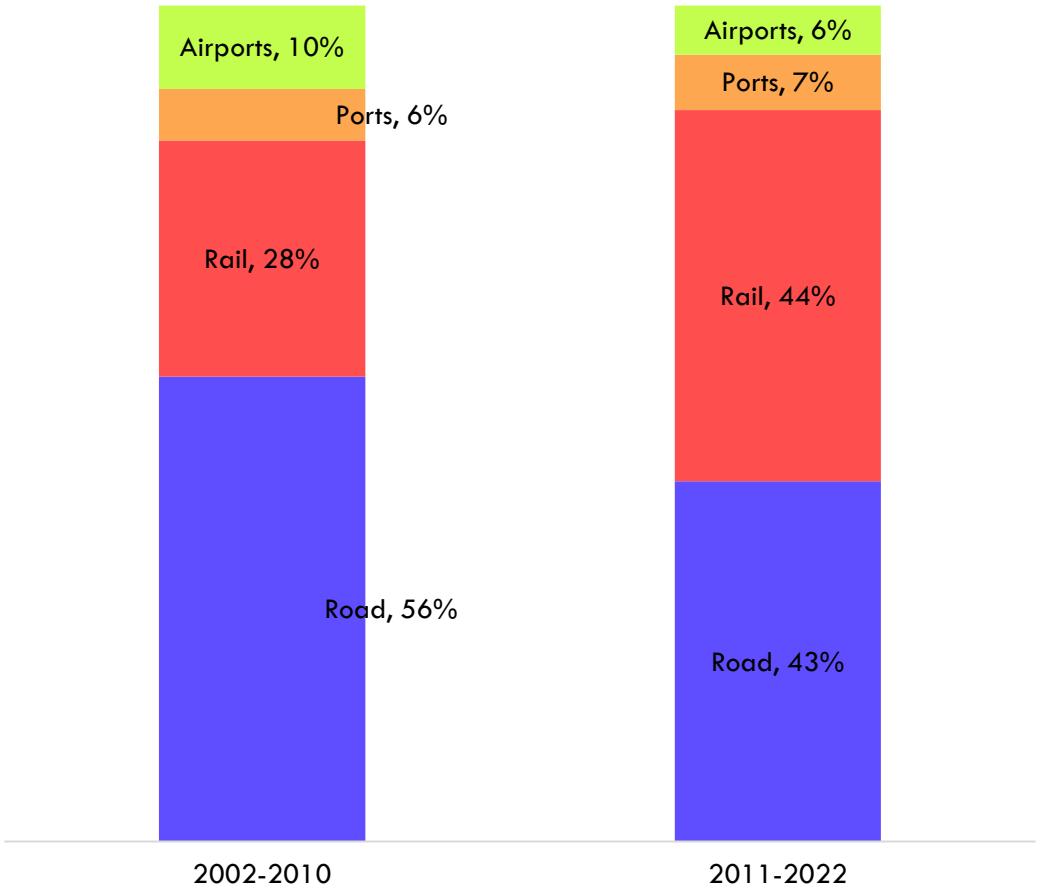
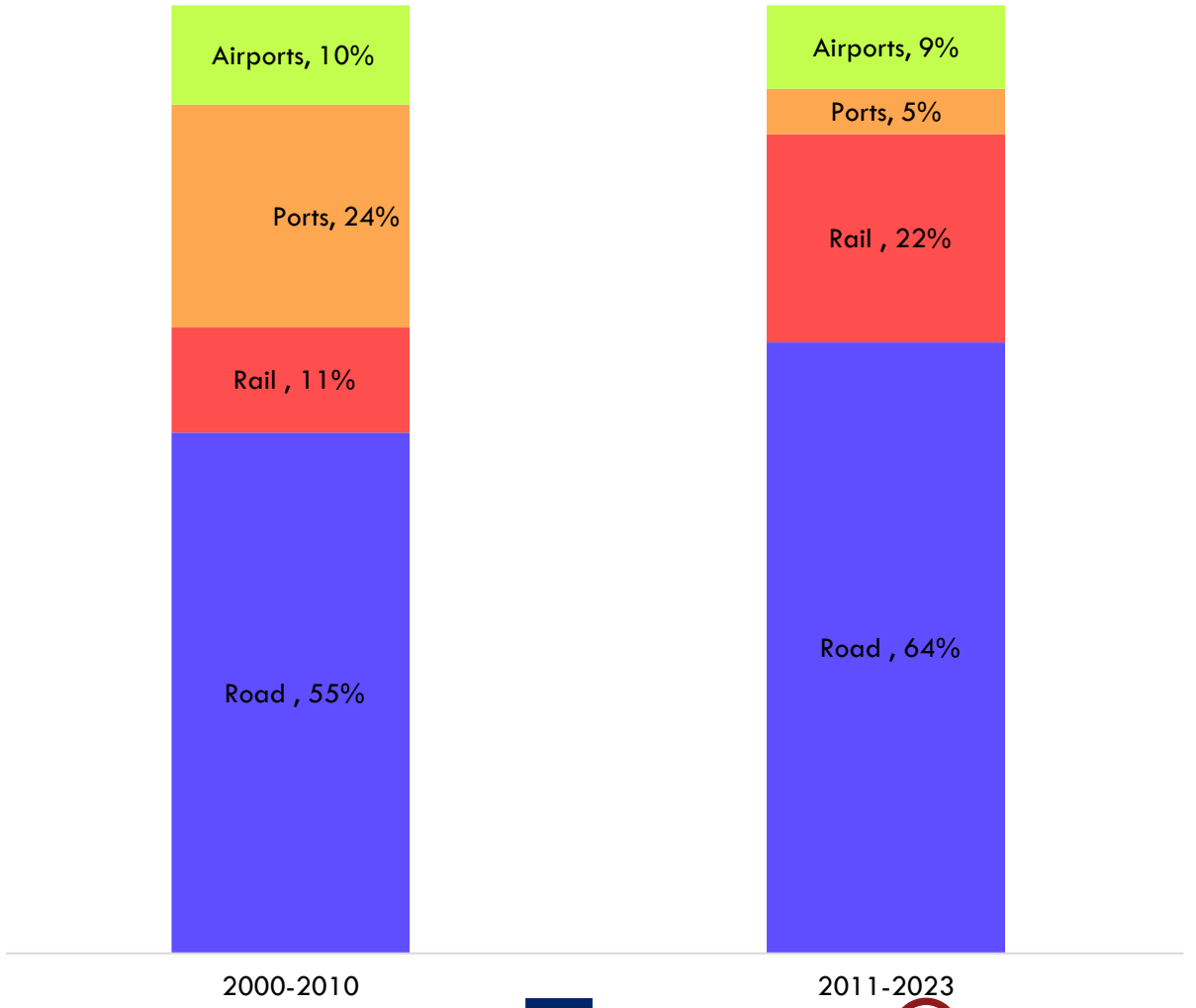
The Need for Investments

Official development assistance in the transport sector



Public-private partnership investments in the transport sector



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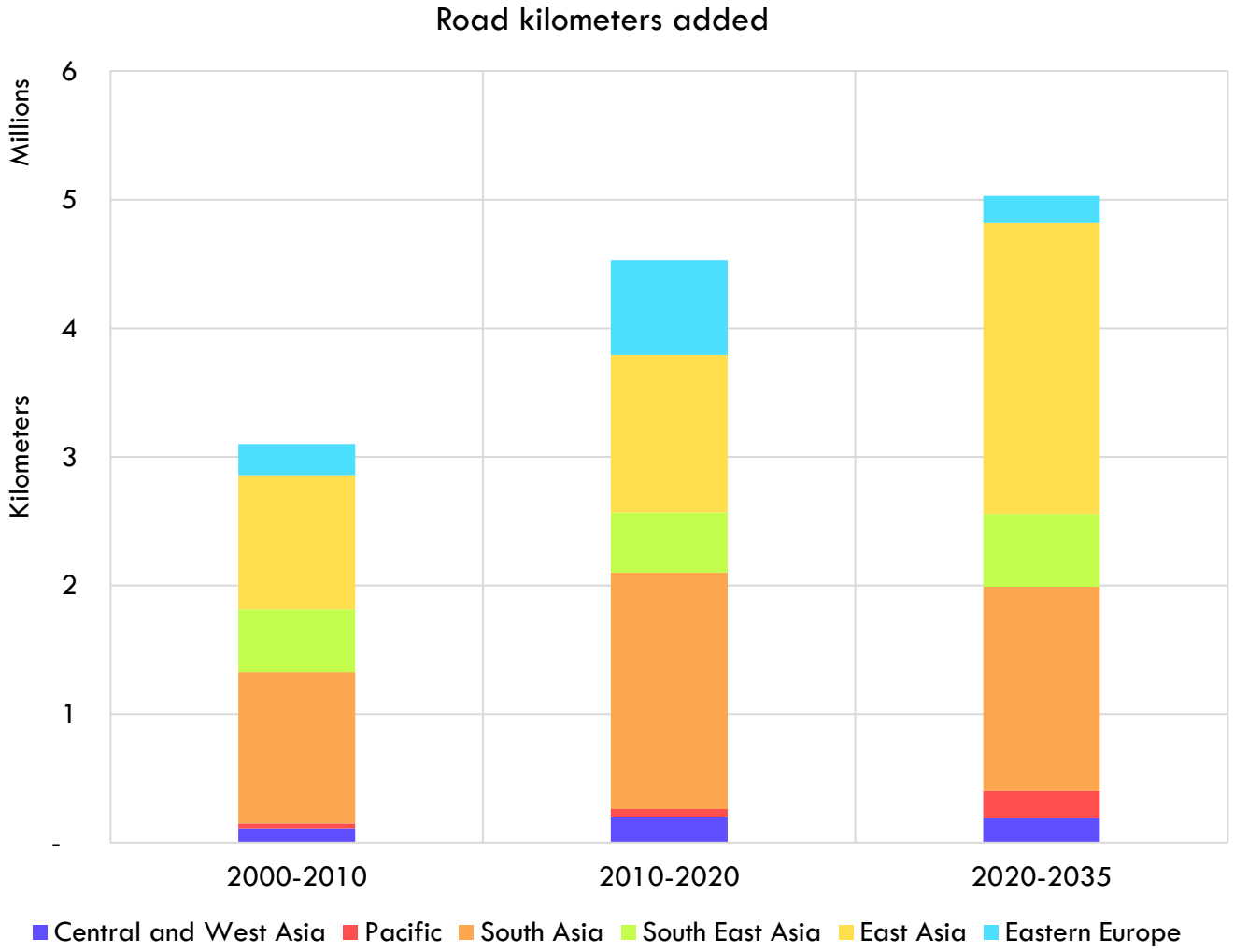
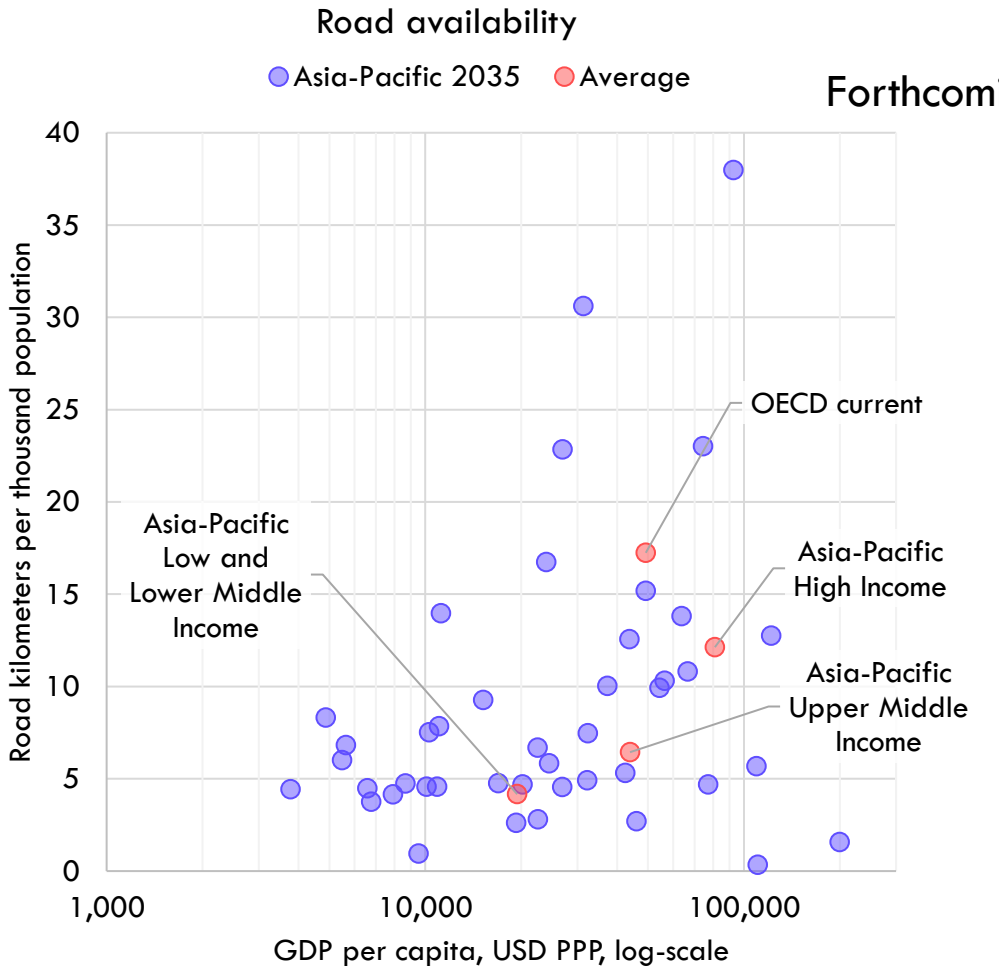
Outlook - Road Infrastructure in 2035





Forthcoming!

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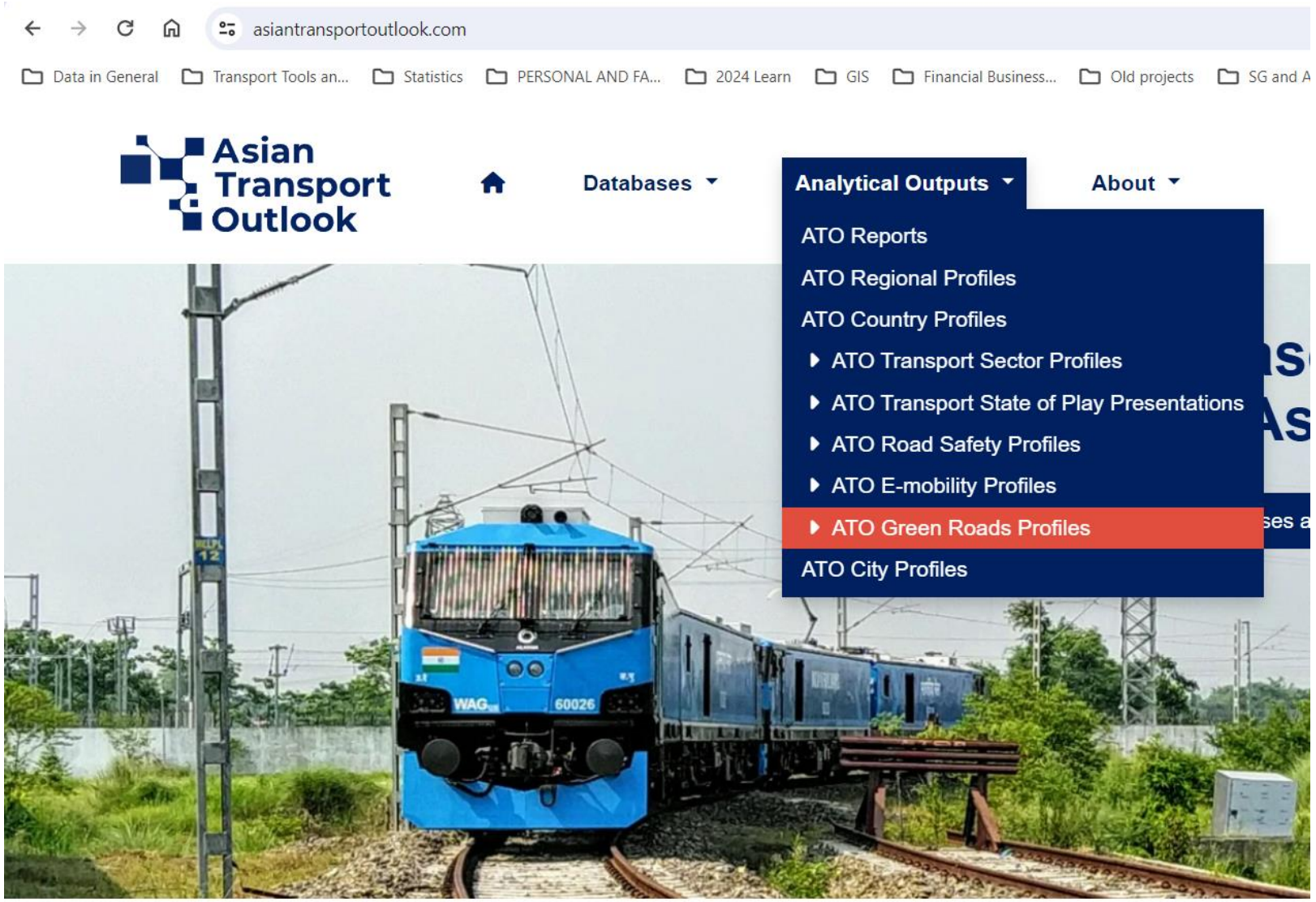

Green Roads Profile – Connecting Data and Policies

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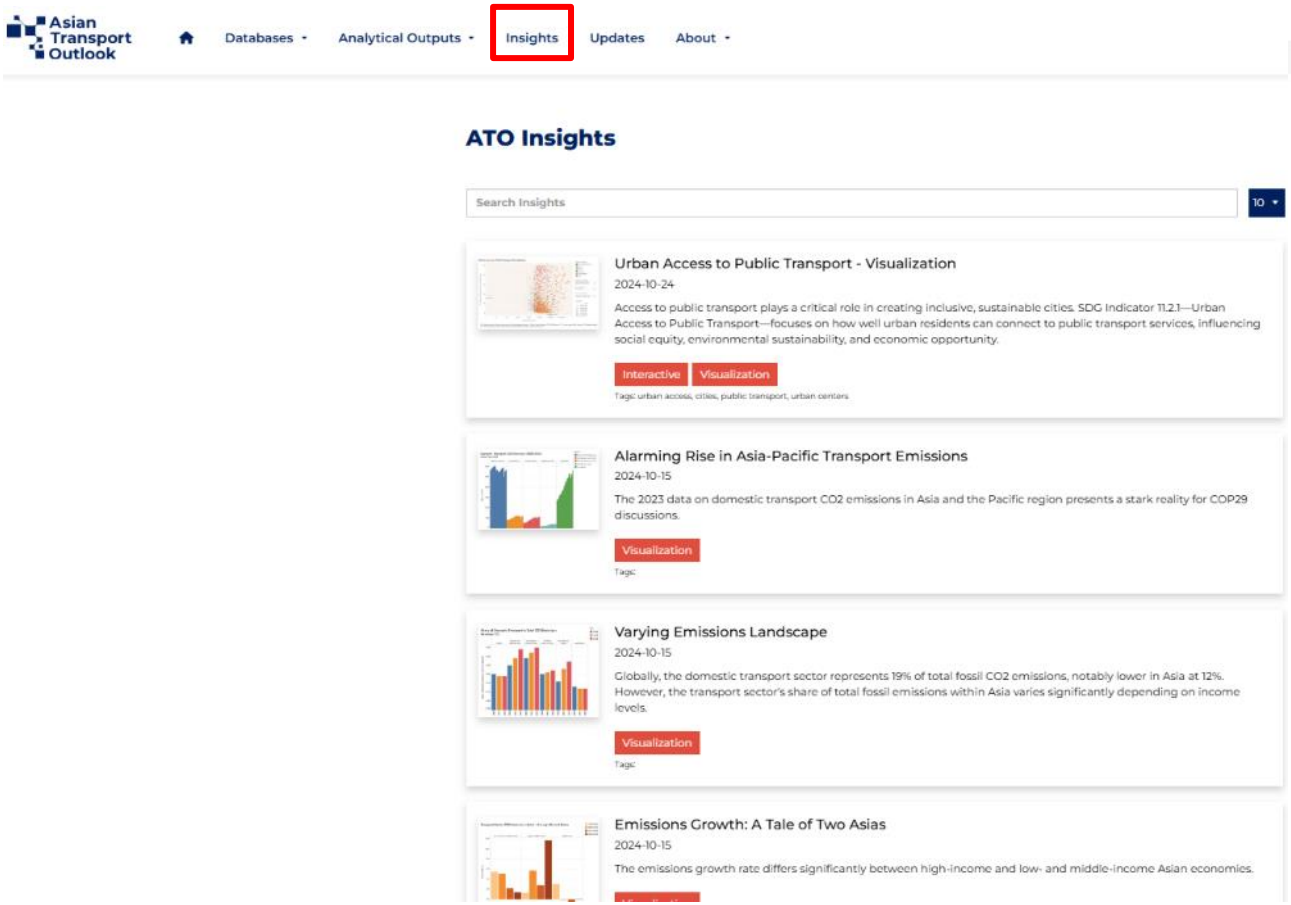
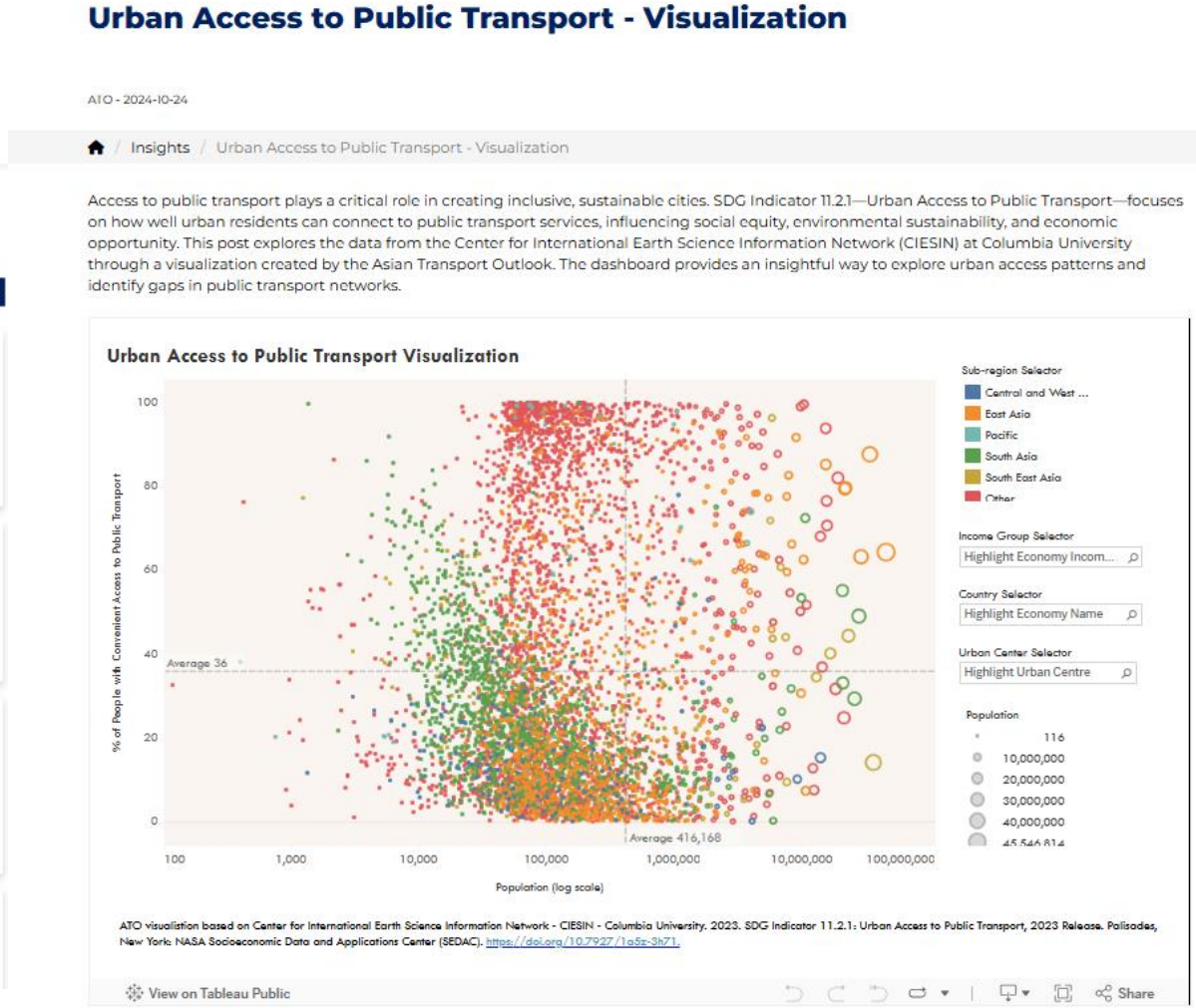
Transport Climate Profile - Indonesia

Define roles and accountabilities across agencies	Design standards for sidewalks and bicycle paths	Development of other transport-related plan/ policy	Emissions trading and carbon pricing	Energy efficient vehicle purchase incentives	Fuel quality	General aviation improvements	General capacity building	General education and behavior change	General e-mobility	General freight and logistics improvements
General infrastructure improvements	General land use	General parking measures	General public transport	General rail improvement	General shipping improvement	General transport asset management	General transport institutional reform	Intelligent transport systems (ITS)	Involvement of subnational government for transport activities	Local production, services, contracting etc.
Logistics hub	LPG/ CNG/ LNG	Rail infrastructure expansion	Reference to finance mechanisms within country	Reporting, transparency, feedback mechanism	Road infrastructure expansion	Stakeholder Involvement	Economy-wide emissions target	Technical standards for general transport infrastructure	Technology and knowledge transfer	Traffic management
Transport law	Urban passenger rail infrastructure improvement	Vehicle efficiency standards	Vehicle import inspections	Vehicle inspection and maintenance	Vehicle labelling	Vehicle restrictions (import, age, access, sale, taxation)	Vehicle scrappage scheme	Vehicle taxes	Accreditation of vehicle inspection centers	Biofuels
BRT	Data modelling improvements	Development of climate change/ low carbon plan/ policy	Development of national development plan/ policy	Ecodriving	EV charging infrastructure	EV manufacturing	Fiscal incentives for EVs and components	Fossil fuel subsidy elimination	Freight rail infrastructure improvement	Fuel tax
General alternative fuels	General economic instruments	General innovations and digitalization	General transport demand management	General transport finance	High-speed rail (HSR)	Hydrogen	Intermodality measures	Investment required for specific projects	Port electrification	Port infrastructure improvements
Programs to reduce emissions in logistics	Public transit integration	Reduction of transport/ logistics costs	Renewable energy	Road charging and tolls	Road-side vehicle technical checks	Ship efficiency improvements	Technical standards for rail infrastructure	Technologies on transport asset management	Transit-oriented development (TOD)	Transport asset condition assessment
Travel time improvement	Vehicle air pollution emission standards	Vehicle manufacturing	Ban of ICE sales	Accreditation of driver training agencies	Air traffic management	Aircraft fleet renovation	Jet fuel policies	Local authorities have the power to modify national speed limits	Low-emission vehicle zones	Express lanes/ public transport priority

Translating Data into Insights, Policies, and Investments





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"ATO translates data into insights, policies, and investments"

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