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Low Emission Transport

Naresh Pradhan

Senior Transport Specialist

Division of Mitigation and Adaptation

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- 1. Context**
- 2. Paradigm shifting pathways**
- 3. Case studies**
- 4. Financing paradigm pathways**



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CONTEXT

Global context

Transportation emissions contribute approximately 24% of total GHG emission from fuel combustion (IEA, OECD)

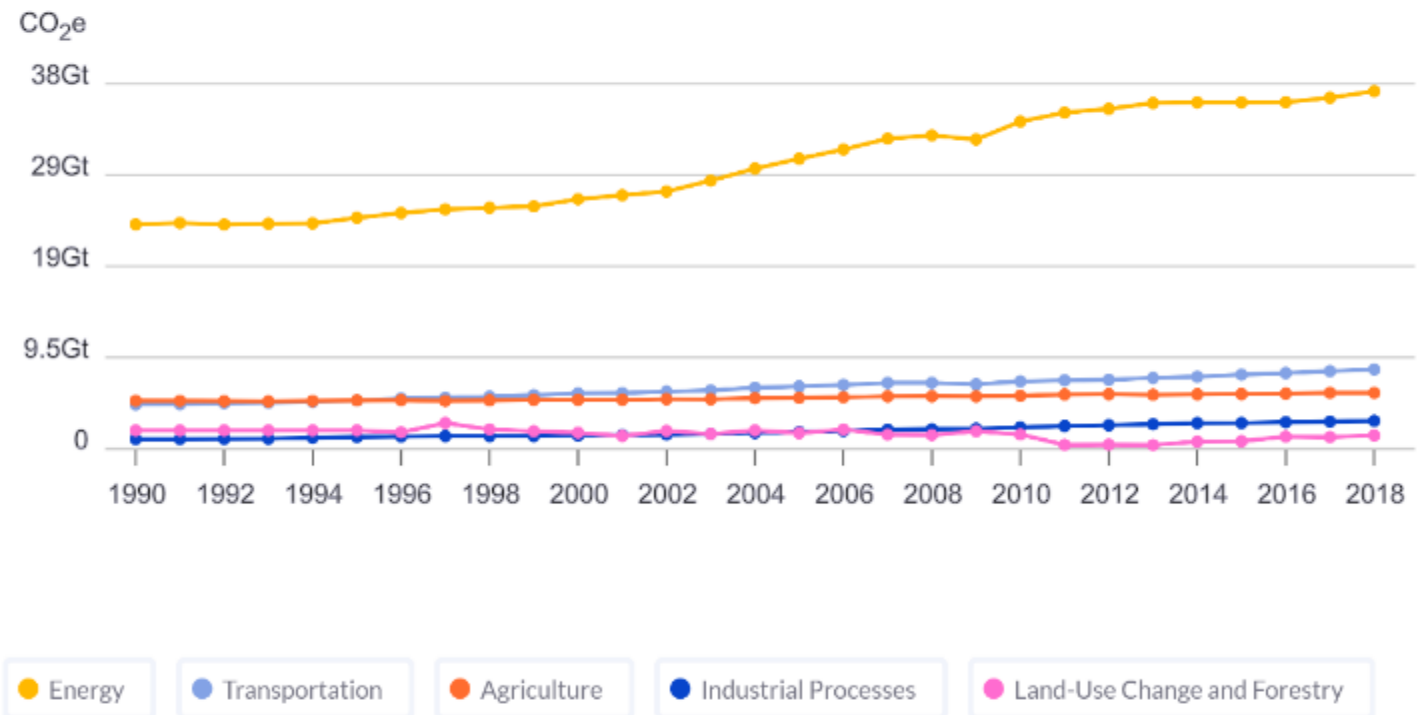
Annual emission may increase to 14 (~20) Gt by 2050 under BAU from current 8Gt (2019) (IPCC, Climate Watch).



Historical GHG emissions

CLIMATEWATCH

Data source: CAIT; Countries/Regions: World; Sectors/Subsectors: Agriculture, Energy, Industrial Processes, Land-Use Change and Forestry, Transportation; Gases: All GHG; Calculation: Total; Show data by Sectors.

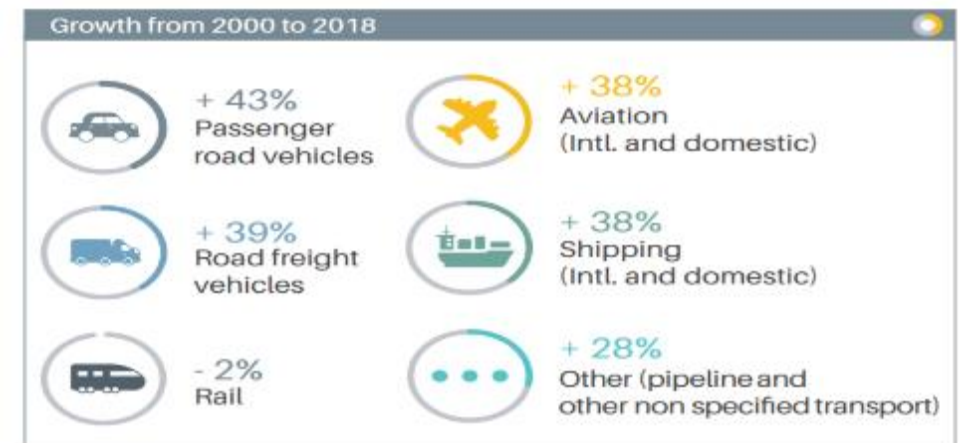
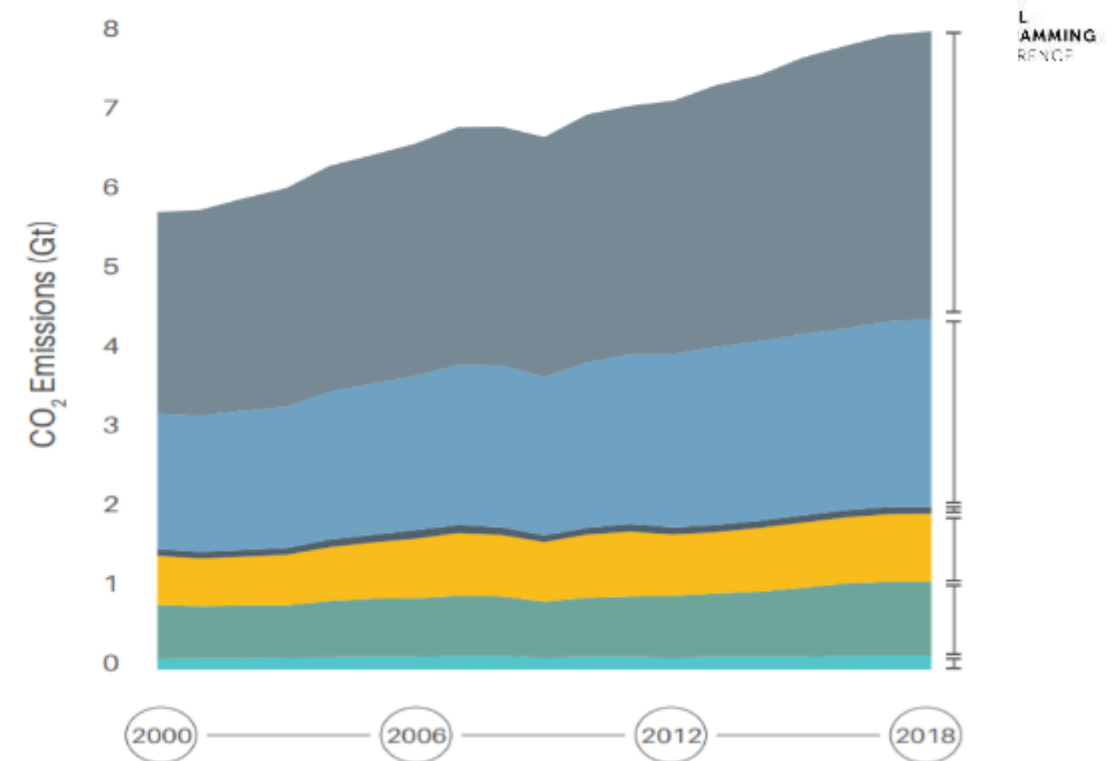


TRANSPORT CO₂ EMISSION TREND

- Most developed countries are the greatest emitter per capita.
- Significant increase in emission from road vehicles for both passengers and freight for the past two decades.
- Car ownership has gone up by 87% in Asia, 58% in LAC from 2005 to 2015 (SLOCAT, 2021)

Figure 3. Transport CO₂ emissions by mode, 2000-2018

Source: SLOCAT 2021



DEVELOPING COUNTRY CONTEXT

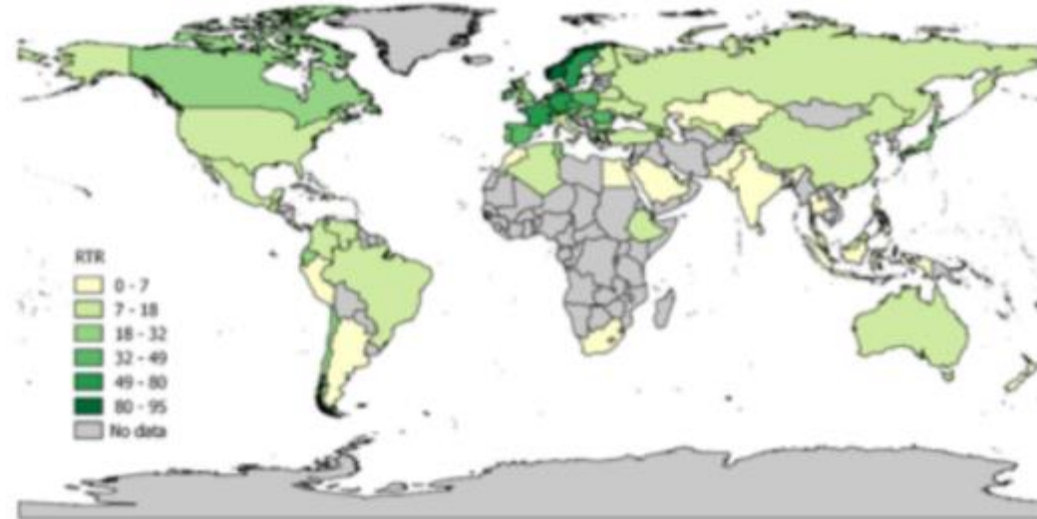


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- Critical for access to education, economic opportunities and health
 - ✓ Mobility gap: Developing country's RTR average is 4 when global average is 32 (SuM4all, 2019)

Map III.1: Global status of Rapid Transit to Resident Ratio (RTR)



Source: Institute for Transportation and Development Policy (ITDP).

Low emission, climate resilient transport enables SDGs



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Goal 3. Good health and well being

: reduce deaths and injuries from road traffic accidents, hazardous chemicals and air pollution and contamination

Goal 5. Gender equality

: women's full participation and equal opportunity for leadership in political, economic and public life

Goal 9. Industry, innovation and infrastructure

- resilient infrastructure to support economic development and human well-being
- upgrade infrastructure with greater adoption of clean and environmentally sound technologies

Goal 11. Sustainable cities and communities

: access to safe, affordable, accessible and sustainable (public) transport systems for all with special attention to the vulnerable

Goal 13. Climate action

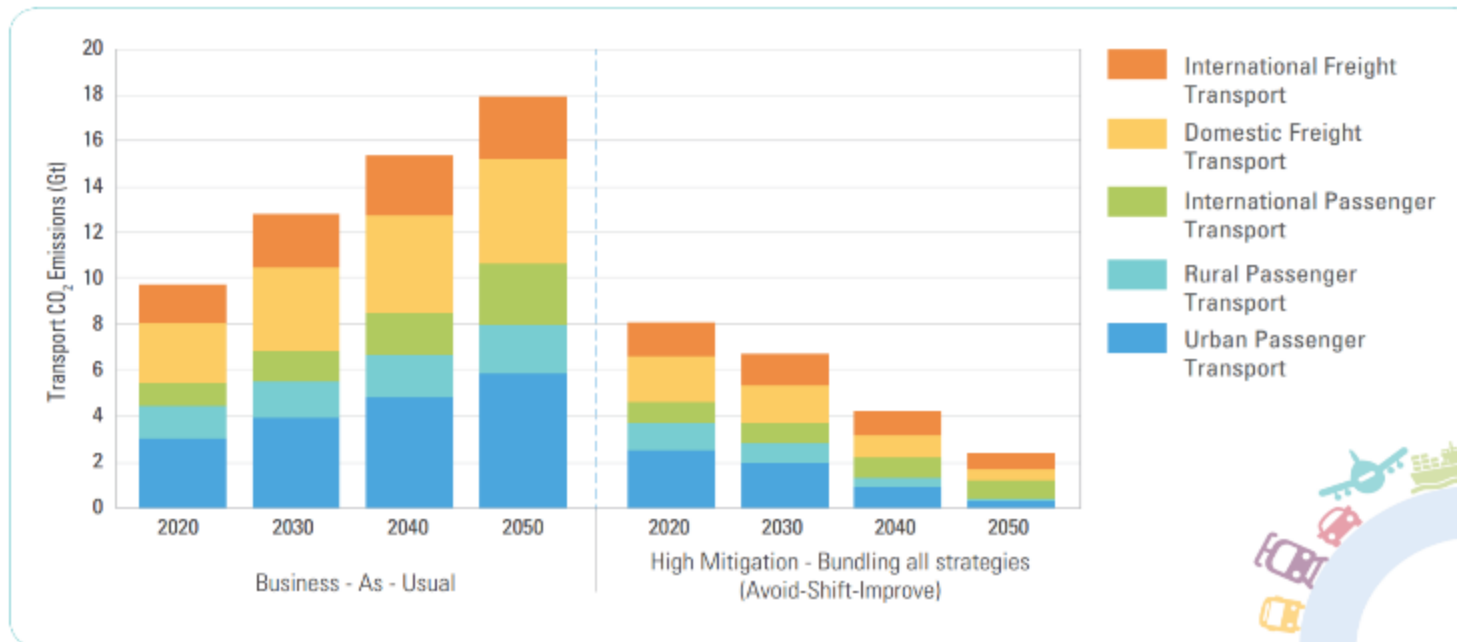
: climate adaptation and mitigation

EMISSIONS AND FINANCING GAP



- Travel demand for **passenger/ freight** to double by 2050 from 2015, requiring additional 25 million kilometers of new paved lanes and 335,000 kilometers of rail from 2010 levels (IEA)
- Transport CO₂ emissions need to drop from 8Gt to 2-3Gt by 2050 to keep the temperature rise below 1.5 °C (SLOCAT, SuM4all)
- Financing gap estimated USD 2-3 trillion per year by 2050 for 1.5 °C scenario (IEA, ITDP, OECD)

Figure 24: Transport Mitigation Potential across Sub-sectors (2020 to 2050)³⁵⁶





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TRANSPORT SECTOR GUIDE

AVOID, SHIFT, IMPROVE

PARADIGM SHIFTING PATHWAYS



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4-Pronged approach to paradigm shift

01

Transformati
onal
planning



02

Catalysing
innovation



03

Mobilising
finance



04

Knowledge
management
to align
finance and
development



Paradigm Shifting Pathways



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Pathway 1. Accelerating the shift to low emissions public transport

- Innovations in business and financial models for creating highly efficient public transport systems as backbones for mobility
- Integration of modern, climate-safe non-motorized transport and micro-mobility solutions with public transport
- Policies and economic nudges that accelerate the modal shift away from low density vehicles ownership to low emissions, climate resilient rapid, high density public transport.

Pathway 2. Rapidly electrifying transport system

- Electrification of the transport system throughout the entire value chain
- Policy and business model innovations to catalyze systemic electrification (vehicles, chargers, grid interface infrastructure and depot infrastructure) coupled with linkage to renewable energy power generation

Pathway 3. Supporting scale up of new generation zero-emission fuels

- Catalytic actions to scale-up of innovative fuel technology that link renewable energy and new non-carbon fuel production (such as hydrogen and second generation zero-emissions biofuels)
- Full value chain development from decentralized electricity-zero emission fuels production, storage and distribution of such new generation fuels
- Policy and business model innovations in well-to-vehicle zero emissions solutions

General Barriers to financing paradigm shifting pathways



High policy risks: Lack of long-term political support coupled with underdeveloped policy and regulatory framework for low emission transport



High institutional risks: Insufficient institutional capacity to plan, develop, and implement a long-term strategy in low emission transport



High technology risks: Low emissions transport systems perceived as greater technology risk due to the limited long-term on-the-ground experience, business models



High revenue risks: User behaviour and predictability of use introduce a high degree of uncertainty on revenue stream and have direct impact on return on investment

PATHWAY 1

Accelerating the shift to low emissions public transport



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Barriers



Strong culture around single-occupancy vehicles and subsidization of cars/roads



Limited or poor quality existing public transport infrastructure/options



Limited understanding /experience of integrated public transport, NMT, and TOD

Potential High impact Actions



Integrated Planning and Programming	Catalyzing Innovation	Mobilizing Large Scale Finance	Knowledge Management
Prioritization of TOD planning with electrified public transport, powered by RE	Policy innovations to encourage shift to walking, cycling, and public transport; and low-emissions /carbon-free materials for NMT and public transport infrastructure	Syndication support for mobilizing public and private finance for BRT, LRT, MRT or financing support to cover minimum revenue and other risk guarantees	Standards and specifications for emissions that encourage high occupancy public transit, walking, and cycling over private vehicles
Public transit integration with NMT (protected bike lane networks, bikeshare systems, charging infrastructure, complete streets)	Intelligent transport solutions (big data analytics) for end-to-end integration and, real-time-performance services	Credit enhancement and guarantees for municipal bonds	Institutional capacity development (workshops, trainings, exchanges, community of practice groups) to align financing with low emissions transport development
National decarbonization roadmap and central platform for public transport	Traffic demand management (TDM) solutions, such as electronic road pricing, and low emission zones (LEZs) and Zero Emission Areas (ZEAs)	Innovative financial models and/or public-private financing with public investment in non-revenue bearing infrastructure (e.g. PPPs, pay-as-you-use/go/save, vehicle leasing, and others)	
Multimodal public transport integration planning, including fare and payment integration with ticketing and smart card fare systems, technical integration (IT systems), and physical integration with multimodal transit hubs	Repurpose street space for walking, cycling, and public transport; and parking spaces for other uses (affordable housing, medical clinics, etc.)	Support equity and green finance facilities which can multiply finance available	

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PATHWAY 2

Rapidly electrifying transport system

Barriers



Dependence on
energy sector &
electricity pricing
volatility



Charging
infrastructure
and supply
chain deficit



Technology
maturity and
performance of
BEVs



High upfront
costs and
technology shift
risks

POTENTIAL HIGH IMPACT ACTIONS



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Integrated Planning and programming

Catalyzing Innovation

Mobilizing Large Scale Finance

Knowledge Management

Supportive transition strategies and policies, such as integrated grid-to-transport pricing, preferential access, carbon pricing, and purchase incentives

Integrated planning for electric public transit pilots with plan for full fleet scale up, including vehicles, depots, and charging infrastructure

Procurement policies and programs for commercial electric vehicles

Greening of charging infrastructure with integrated RE

National decarbonization roadmap and central platform for unified vision

Business models innovations in charging and storage as services

Innovations for energy storage and vehicle-to-grid-to-depot service models

Utility-operator partnership models for end-to-end electrification

Prioritization of charging infrastructure to enable electric transit uptake, including buses, paratransit vehicles, and other high travel modes

New cost-effective business models for charging infrastructure and smart grid adjustment measures

Leasing based PPP solutions (batteries, buses, operations) for stock changeover to electrification of transport system

Syndication support for vehicle-to-depot electrification

Anchor investments in local supply chain for BEVs including products and services

Integrating new stakeholders into funding/financing through equity investments for financial leasing options

Support options to bring in OEMs into the financing picture, such as through deferred payments or vendor finance schemes

Institutional capacity development for aligning financial system

Supporting community of practice groups, or platforms to share lessons learned and best practices

Electric grid analysis for electric public transit capacity (C40, 2020)

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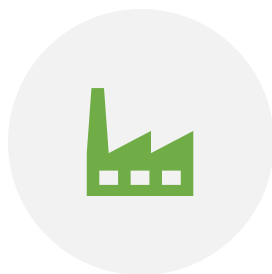
PATHWAY 3

Supporting scale up of new zero-emission fuels

BARRIERS



Infrastructure deficit
and need for
restructuring



Under-developed
supply chains



Concerns of
competition with
food supply/
demand for new
generation biofuels



Concerns with
environmental
effects of new
low emission
fuel systems

POTENTIAL HIGH IMPACT ACTIONS



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Integrated Planning and programming	Catalyzing Innovation	Mobilizing Large Scale Finance	Knowledge Management
Cradle-to-grave planning approach for new generation zero-emission fuel adoption that meet climate and sustainable development goals	Integrated decentralized RE for green hydrogen production and new generation storage solutions	Pay-as-you-save/use models for green hydrogen, storage or next gen zero carbon fuels	Supporting additional research for risk reduction
National decarbonization platform for unified vision	Pilots to enable scale-up and diffusion of new /innovative technologies, business models and infrastructure solutions	Integrating new generation platforms for integrated funding/financing	Institutional capacity development for embedding lessons of climate consideration in financial systems
	Utilization of local resources for biofuel generation, particularly those removed from food supply competition (in other words, cattle manure as a derivative versus corn as direct competition)	Financial de-risking, first loss capital and/or low interest financing for diffusion of new high impact technologies /business models	Facilities, community of practice groups, or platforms for feedback loops from lessons learned and best practices



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Low emissions transport: one of eight GCF outcome areas

Reduced Emissions from:



Energy generation and access



Transport



Buildings, cities, industries and appliances



Forests and land use

Increased Resilience of:



Livelihoods of people and communities



Health, food and water security



Infrastructure and the built environment



Ecosystems and ecosystem services



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Thank you

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