

# SLOCAT Transport, Climate and Sustainability Global Status Report

3<sup>rd</sup> edition

**SLOCAT**  
Partnership on Sustainable,  
Low Carbon Transport



Global and regional stories of where we are  
and where we need to get to urgently



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**Efforts to achieve climate and sustainability goals are derailing in a world of accelerating interconnected crises**

Beyond the often devastating human toll, these events have had a substantial impact on transport globally. They have exacerbated ongoing challenges in the transport sector, increased uncertainty, and revealed vulnerabilities, resulting in a general downgrading of the urgency of climate and sustainability concerns.





**As the laggard  
among sectors,  
transport had the  
highest increase  
in global emissions**

# Combustion sector with the fastest CO<sub>2</sub> emissions growth

- **18% growth** from 2010 to 2019.
- Accounting for **22% of global fossil CO<sub>2</sub> emissions** in 2019.
- **Biggest drop in transport CO<sub>2</sub>** in history in **2020** due to pandemic.
- **Strongest rebound among all sectors in 2021.**

FIGURE 3. Changes in CO<sub>2</sub> emissions by sector, 2010-2021

SOURCE: See appendix 24 for this section.



## Why?

### Near-complete dependence on fossil fuels

- 96% of the energy demand in transport.

**Slow progress in the “hard-to-abate” sub-sectors** of long-distance road freight, aviation and shipping.

Increasing **energy demand** and **vehicle fleet**.

### Ever-increasing passenger vehicle sizes (SUVs)

- 20% more fuel than a medium-sized car.

**Older, more polluting vehicles** remain on the world’s roads.

- Nearly 2/3 of the main countries importing second hand vehicles lack regulations.



# Asia continues to spearhead emissions growth

With its blooming population and economy, Asia continued to record the highest emissions growth among regions.

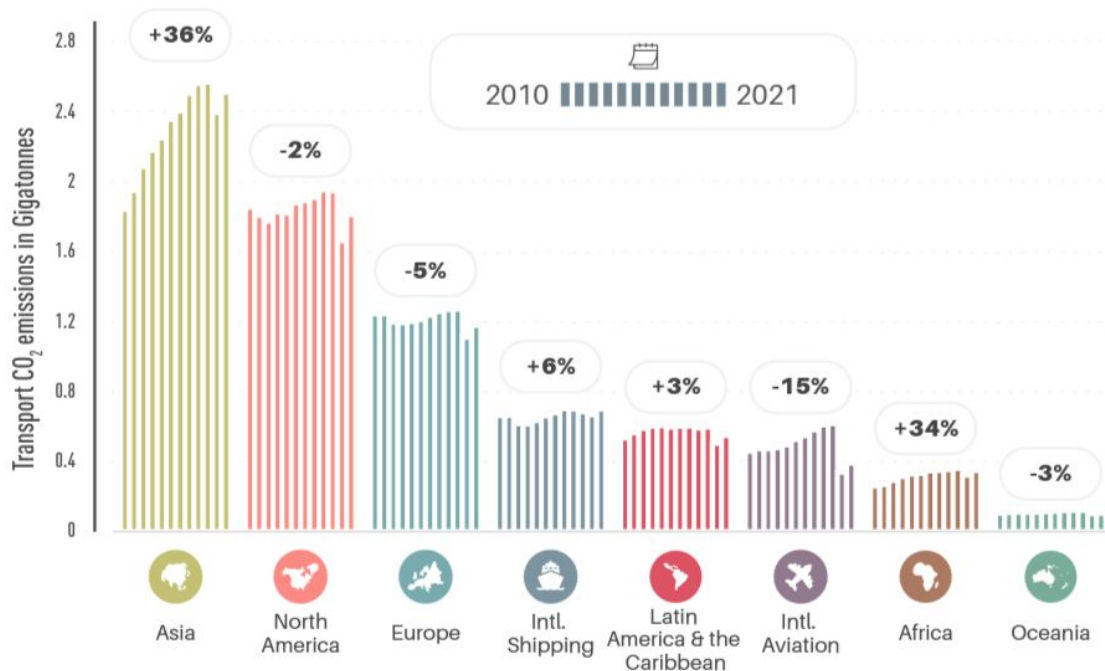
→ **36% growth** from 2010 to 2021.

Followed closely by **Africa**.

→ **34% growth** during that period.

**North America, Europe** and **Oceania** experienced emission reductions during that period.

Transport CO<sub>2</sub> emissions, by region and for international shipping and aviation, 2010-2021





# Freight plays an increasing role in transport CO<sub>2</sub> emissions

**Global demand for passenger transport grew 6% from 2018 to 2022.**

→ Two-thirds of passenger transport globally was in passenger cars.

**Global freight activity grew 7% from 2019 to 2022.**

→ **Road transport** accounted for **22% of global freight activity** in 2019.

**Road transport (passenger & freight) contributed more than three-quarters of transport CO<sub>2</sub> emissions** in 2019.

**Freight emissions keep growing from 40% in 2018 to 42% in 2019.**

→ **Projected to be 22% higher in 2050** than in 2015.

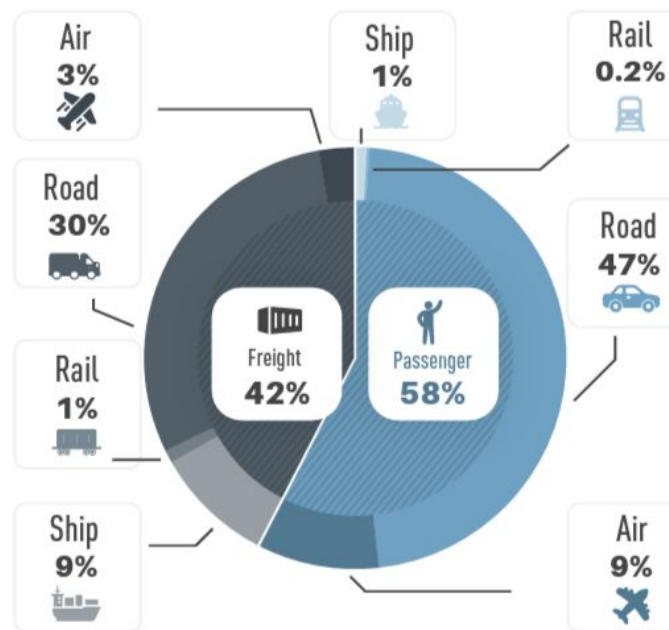
Rising demand - lack of scalable solutions - air freight - longer supply chains

**Shortening global supply chains is essential to decarbonise freight and reduce vulnerability:** Approx. 70% of international trade involved global value chains in 2021.

Supply shortages due to 2020/22 events showed the **fragility of global supply and logistics chains and their international dependencies:**

→ Global Supply Chain Pressure **Index at all-time high.**

Transport CO<sub>2</sub> emissions by activity and mode, 2019



Source: Shell (2020), The Energy Transformation Scenarios, <https://www.shell.com/energy-and-innovation/the-energy-future/scenarios/the-energy-transformation-scenarios.html> (accessed 20 August 2022)



# International aviation is still recovering from the pandemic hit, while shipping remains stable

**International aviation CO<sub>2</sub> emissions took a 45% hit in 2020, falling to pre-millennium levels.**

From **2020 to 2021, international aviation CO<sub>2</sub> emissions increased by 15%**, still remaining **37% below 2019**.

Despite the drastic pandemic impacts on global trade, **international shipping CO<sub>2</sub> emissions only fell by 2% in 2020. By 2021, they were higher than pre-pandemic levels.**

CO<sub>2</sub> emissions by international aviation and shipping in million tonnes from 2015 to 2021



The **International Civil Aviation Organization** aims to **achieve net zero carbon emissions by 2050**

→ This **remains aspirational and is insufficient** to meet the targets of the Paris Agreement.

The **IMO** raised its ambition to target a **70% emission reduction by 2040**.

→ This places the sector **well within the carbon budget aligned with keeping global temperature rise below 2°C compared to pre-industrial levels, but is insufficient to keep global temperature rise within 1.5°C.**

Source: SLOCAT analysis based on Crippa, M. et al (2022), CO<sub>2</sub> emissions of all world countries - 2022 Report, doi:10.2760/730164, [https://edgar.jrc.ec.europa.eu/report\\_2022](https://edgar.jrc.ec.europa.eu/report_2022) (accessed 20 September 2022)

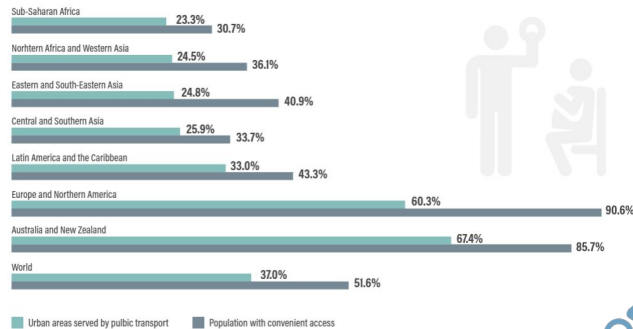




## Most of the world's population is lacking access to affordable, sustainable transport

**FIGURE 10.** Public transport coverage and share of the population with convenient access in urban areas, by region, 2022

Source: See endnote 77 for this section.



Only **32% African urban population** and **38% in Asia** has **convenient access to public transport** compared to the 56% global average.

→ In **Africa**, **95% of roads fail to meet an acceptable level of service.**

→ In some **African cities 95% of all motorised trips are in informal transport services.**

**Traffic crashes: Leading cause of death among 5-29 year-olds worldwide; 93% of them in LMICs.**

→ **No reduction in traffic deaths for a decade** despite targets.

→ Investment in **public transport** can reduce crashes by attracting private vehicle users.

**Transport expenditures often make up a high share of household budgets**, placing a burden on low-income users.

→ LAC reported the highest share of household spending on transport (17%) as of 2019.

**Land traffic contributes 5% of the mortality from PM<sub>2.5</sub> globally.**

→ 32% in North America.

Post-pandemic horizon: **Momentum for proximity planning**, recognition of **health benefits of active mobility**, policy responses to walking, and investments in cycle lanes & bike sharing.





## Despite increasing electric mobility and global renewables uptake, the transport sector continues to depend heavily on fossil fuels

Fossil fuels continued to account for **nearly all (96%) of energy used in transport in 2021** – a share that has **barely changed over the past decade**, due mainly to rising transport demand.



In **2021, the growth in transport energy consumption rebounded** (although it did not yet return to 2019 levels), showing that the **2020 decline was related to the pandemic and not to policy action.**



**Energy efficiency savings continued to be outweighed by rising transport emissions** due to the overall growth in transport demand and modal shift towards higher-emitting transport.

- **Better engines, hybrid powertrains and electric vehicles led to an 8.2% increase in energy efficiency of cars and vans** from 2015 to 2021.
- The **increased popularity of sport utility vehicles (SUVs) and trucks poses a huge challenge** to reducing transport energy consumption and emissions.



**Despite immense EVs growth, electricity demand in road transport is still low** → **EVs: around 1% of vehicles globally** in 2022 and 0.14% of total global electricity consumption in 2020. → **Renewable energy provides only around one-quarter of the power** supply for such vehicles.



**Russia's invasion of Ukraine led to fuel price spikes in transport, underscoring the need to decouple transport from fossil fuel dependency**

- Global cost inflation settled in the range between 5-10% towards the end of 2022



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**To align with a scenario of** keeping global temperature rise below **2°C** compared to pre-industrial levels, **transport energy consumption would need to peak between 2030 and 2035** and then decrease. A **1.5°C scenario** would require **earlier peaking and steeper reductions in energy use** from the sector.



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**Only about 1% of transport energy comes from electricity; only 1/3 of that is from renewable sources.**

**Biofuel blending mandates remain the most popular measure for increasing renewable energy in transport.**

- 56 countries and EU established obligation as of 2022.
- 6 countries mentioned biofuel blending in their updated Nationally Determined Contributions.



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**Policies to decarbonise transport need to ensure an equitable and just transition to more sustainable jobs.**

- The required renewables shift in transport will have negative employment effect in regions highly dependent on fossil fuels, however **globally, shifting to renewables in transport is expected to result in a net gain in jobs.**



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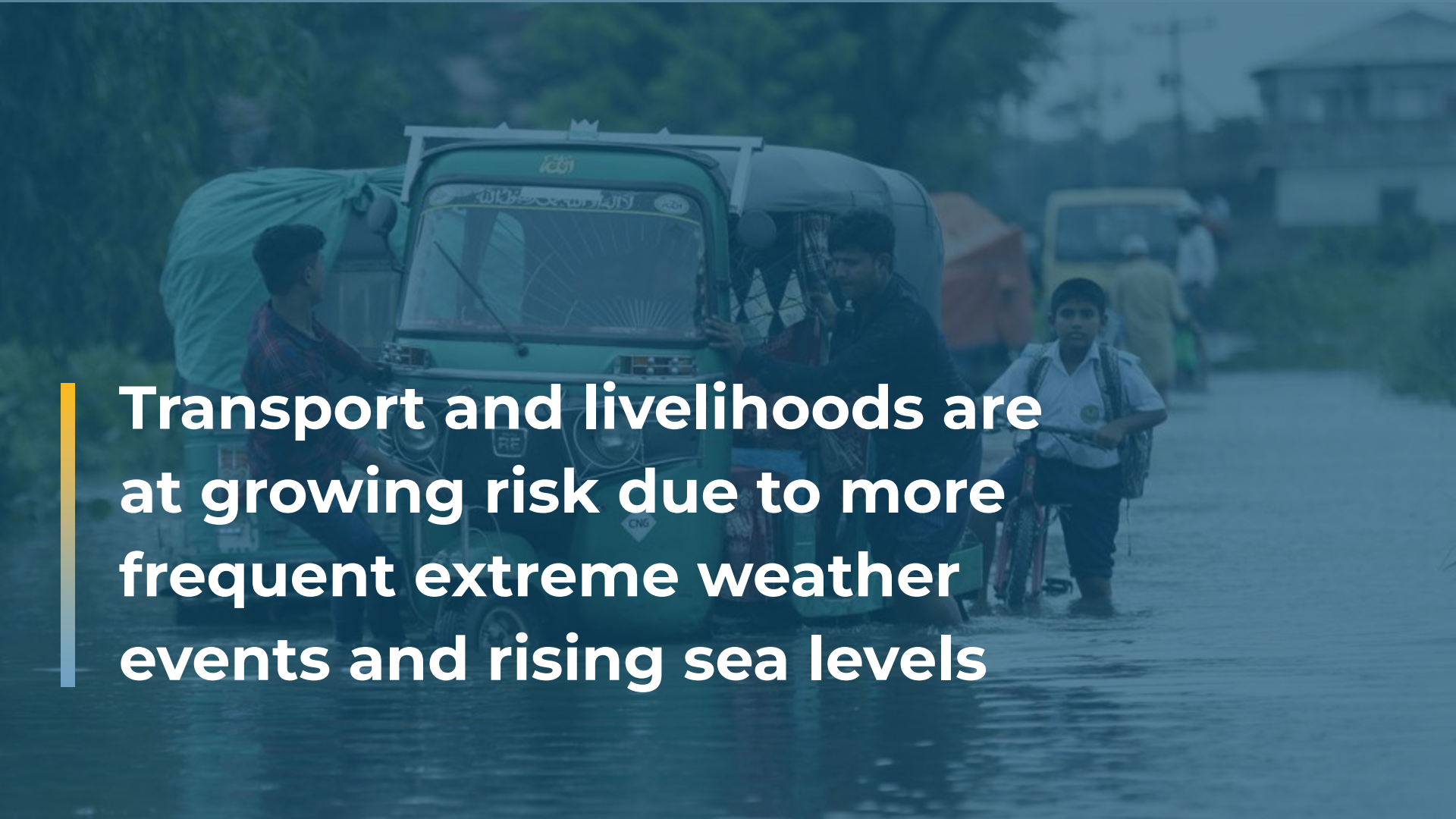
**Hydrogen can play a role whenever direct electrification is impossible.**



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**Fuel economy and GHG emissions standards for heavy-duty vehicles are critical for freight decarbonisation.**

- In 2022, 70% of trucks sold were covered by fuel economy or vehicle efficiency regulations, but only 7 countries or regions adopted such standards.



**Transport and livelihoods are at growing risk due to more frequent extreme weather events and rising sea levels**



**Natural hazards contribute to huge financial losses, leading to an estimated USD 15 billion annually in direct damage to transport systems worldwide.**

- USD 8 billion in LMICs.
- EU average 1998-2010: USD 2.7 billion annually.



**Access to transport services, in particular public and informal transport, is threatened.**

- **27% of road and rail assets** worldwide are exposed to at least one cyclone, earthquake or flooding hazard per year.



**A huge gap remains to bring adaptation finance to the necessary levels.**


- Estimated need in LMICs is 5 to 10 times greater than the current investment.

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**Monetary impacts of transport disruptions far exceed physical damages to assets:**

**USD 107 billion annual losses to businesses in LMICs**

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A blurred city street scene at dusk. On the left, there is a bus stop with a colorful striped bench. A bus is moving quickly on the right, creating motion blur. The background shows buildings and streetlights. The overall color palette is dominated by blues and teals, with a yellow and white vertical bar on the left side.

**Drastic action is urgently  
needed for the world  
to stand a chance of  
achieving its climate  
and sustainability goals**

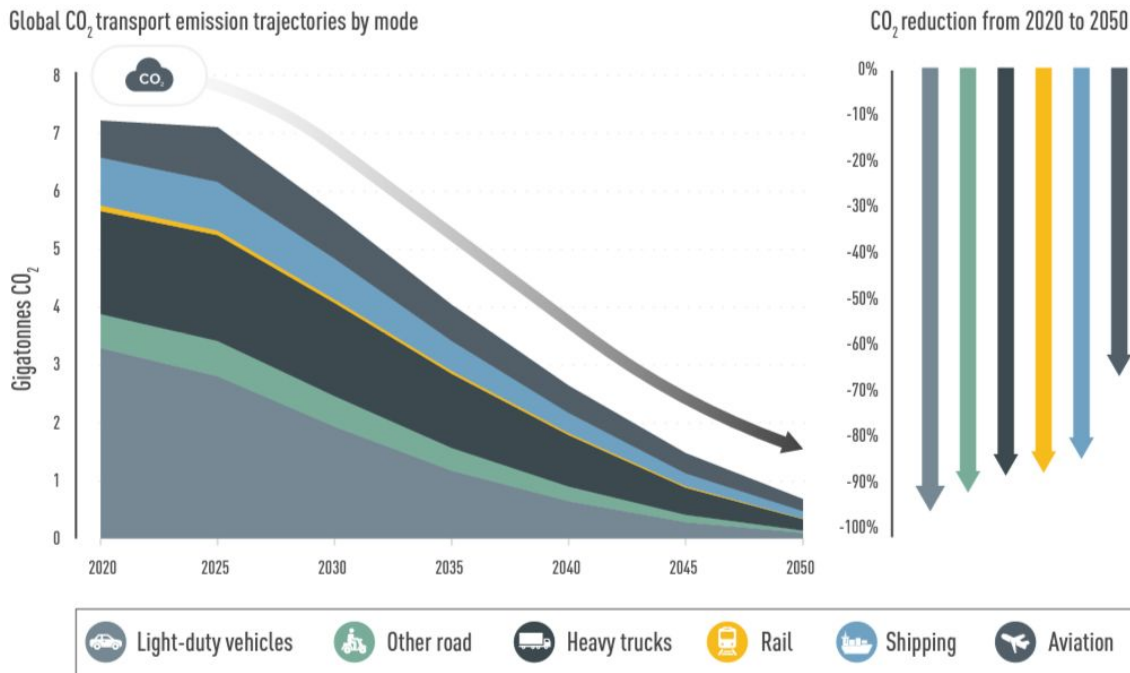


# Achieving transport pathways that limit global warming to below 1.5°C will require a 59% reduction in global transport CO<sub>2</sub> emissions by 2050

The **IEA net-zero emission scenario** will require a **90% reduction of CO<sub>2</sub> emissions from transport by 2050**, compared to 2020 levels.

Overall, the **carbon intensity of the energy used in transport, and of the fuels consumed, needs to be halved by 2050.**

Global transport CO<sub>2</sub> emission trajectories by mode required to achieve IEA net zero emissions scenario, 2020 to 2050



**Systemic transformations are urgently needed globally in how people and goods are transported**



### **Car-centric and fossil fuel-based models**

Those with invested interests in the car-centric system have **continued to profit from this focus**



### **People- and access-centred transport models**

Many **decision makers remain under-informed about the benefits** of developing transport systems sustainably

- ▶ Too often the inequitable, unhealthy and unsustainable **car-centric model is still the default**
- ▶ There is a **lack of “Avoid” and “Shift” strategies or optimised land-use planning** for healthier populations and economies
- ▶ LMICs have the opportunity to **avoid this lock-in to unsustainable models** and to **avoid the misperception that technological solutions alone are the silver bullet**
- ▶ **High-income countries must greatly increase their support to LMICs**



# At a minimum, to transform our transport and mobility systems, we know we need to:



Implement **integrated, inter-modal and multi-dimensional** approaches across passenger and freight transport



Put **walking, cycling and public transport** at the heart of passenger transport strategies, and end the unsustainable car-centric model



Increase **vehicle efficiency** and **reduce vehicle size and volume**



Expand the uptake of **electric vehicles beyond cars** and increase **charging infrastructure**



End **fossil fuel dependency** in transport and increase the uptake of **renewable energy**, with policies that support an **equitable and just transition**



**Scale up financing** for sustainable, low carbon transport solutions and redouble efforts on the **adaptation and resilience** of transport systems



**Repurpose funds currently going towards fossil fuels subsidies in transport** or other polluting activities



Fill the **capacity needs** to harness opportunities, ensuring a just transition and equitable access to transport, jobs and services



Improve **data and data literacy**



Mobilise **multi-stakeholder action and ambition**

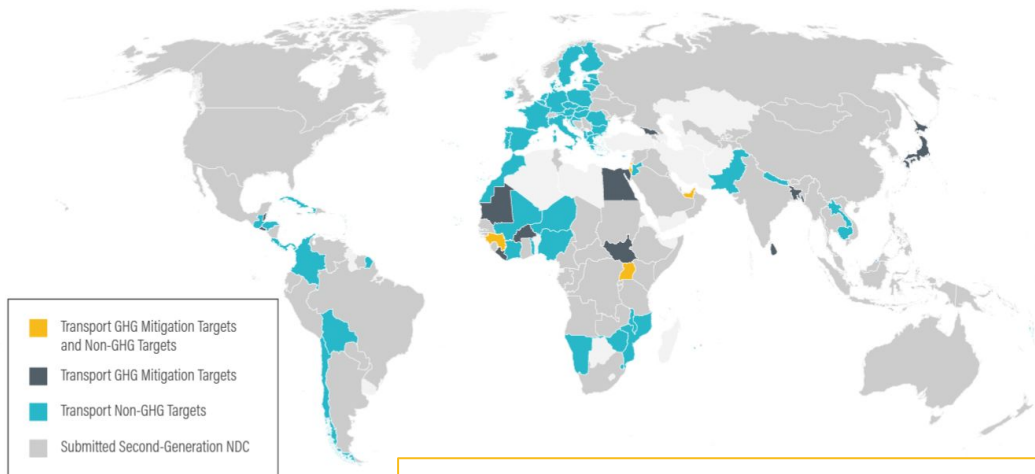
**Collective, active and electrified transport is key for a more equitable, accessible, healthy, green, sustainable and resilient transport future**



**Current policy support,  
actions, commitments  
and targets by  
stakeholders expose  
complacency**

## Without more ambitious policies towards structural and systemic transformation, transport emissions could grow as much as 50% by 2050

Transport targets, by type, in second-generation NDCs



Few Voluntary National Reviews of the Sustainable Development Goals present long-term targets or concrete policy measures

Current **NDCs will still contribute to average global temperature rise of 2.8°C by 2100**

There remains a lack of **comprehensive and balanced policy action** with a **disproportionate focus on “Improve” measures**

→ Public transport-focused development and mixed land use can reduce GHG emissions 23-26% by 2050, according to IPCC’s AR6

As of 2022, **just over 3% of cities worldwide had a low-emission zone** in place or planned; only **10% had a sustainable urban mobility plan (SUMP)**

→ However, LEZs in Europe grew 40% between 2019 and 2022; are projected to grow another 58% by 2025

→ By mid-2021, several dozen cities had implemented or planned Zero Emission Zones (ZEZs), mostly in Europe, China and India

A wider **electrification agenda is needed** that goes **beyond e-cars to address 2 & 3 wheelers, public transport and freight** and that is aligned with the **energy transition towards renewables**



# Emerging climate leadership from businesses, though greater ambition and deeper commitment are needed



Approx. **100 companies** contributed **71% of global GHG emissions** from 1998 to 2015



**Emerging innovations in hard-to-decarbonise sub-sectors:**

Zero emission trucks, ships and planes; low-carbon fuels; batteries technology



**Gap remains between ambition and climate transition planning** - Lack of action and funding



Many transport companies **under-perform on social aspects of climate and sustainability**



Involvement of wide **range of businesses** needed:  
**Original transport manufacturers, public & freight transport service providers, companies that use transport**

## 4 A's of Climate Leadership by the *We Mean Business Coalition*



### Ambition

Commit to net zero and set science-based targets in line with Paris Agreement goals and a just transition



### Action

Take concrete action across the business value chain and involve employees, suppliers, and customers



### Advocacy

Speak up to secure wider change through ambitious government policy and aligned trade associations



### Accountability

Disclose emissions, progress against targets and plans, risk management, policy engagement, and governance



**Scaling up investment  
and financing and  
repurposing subsidies:  
The way forward**

**Tracked climate finance averaged USD 585 billion annually (2019 - 2020).**

- ▶ Less than a quarter of the estimated amount required to achieve global goals.
- ▶ Only a **small share cover transport decarbonisation** projects.

**The far-reaching economic effects of global crises have further threatened to hinder investments** for low-carbon pathways, particularly in LMICs.

**International finance and investments from development financial institutions for transport increased from USD 136 billion (2017-2018) to USD 169 billion (2019-2020), but still far short of what is needed.**

- ▶ Shipping industry decarbonisation alone would cost USD 1.9 trillion.

Achieving net zero CO<sub>2</sub> emissions in the aviation sector by 2050 would cost at least USD 5 trillion.

Keeping global temperature rise within 1.5°C by 2050 through road transport efficiency would cost USD 3 trillion.

**There is a need to reassess funding priorities and mobilising large-scale private investment towards more sustainability objectives.**

**Repurposing the funds that go into fossil fuel subsidies towards more sustainable, low-carbon transport models is a must.**


- ▶ Fossil fuel subsidies have continued to grow, rising 27% in 2021 to USD 227 billion.
- ▶ Countries' expenditures on subsidising fossil fuel consumption are six times greater than the amount pledged in commitments under the Paris Agreement, according to the World Bank.

**Increased resources for transport adaptation and resilience will be particularly crucial.**

**Adequate integrated action and investments are still missing.**

- ▶ Only 8% of the Green Climate Fund was invested in transport, with an even smaller share invested in adaptation for transport.





The transformation of transport systems will not happen overnight, but the end result will be worth it

What are we waiting for?

A **drastic shift from the status quo is necessary** to achieve a systemic transformation of transport and mobility. These changes will come with **society-wide positive impacts**

**Very few of the transport challenges being highlighted today are new**

**Much has been learned along the way**

- ▶ Marginal and incremental progress, small policy adjustments, low-ambition targets are not enough
- ▶ We have seen some stakeholders do whatever they can to deliberately withhold progress, even at the risk of harming people and the planet
- ▶ We have seen other stakeholders rise to the occasion and become the leaders, visionaries and change makers
- ▶ We have seen some cities adopting more sustainable models and prioritising access to transport and mobility services for all
- ▶ Governments can act overnight in redirecting policies and funding when they choose to, as seen during the pandemic and the ongoing energy crisis

**All stakeholders must revolutionise their level of ambition, action and accountability towards the structural transformation of transport systems**



### **Governments**

- Make climate strategies dramatically more ambitious and actionable
- Repurpose funds currently supporting fossil fuels
- Enable more sub-national action
- Ensure an equitable and just transition
- Send clearer signals and incentives to the market



### **Businesses**

- End counterproductive lobbying
- Implement credible climate transition plans
- Redirect investments from polluting endeavours, most notably fossil fuels and ever-larger vehicles



### **International finance and development institutions, including multilateral development banks**

- Scale up efforts towards sustainable transport systems, particularly in LMICs, in line with international climate and development goals



### **The global transport community and civil society**

- Conduct research, capacity building programmes, and outreach campaigns
- Increase the pressure on governments and businesses
- Countless other invaluable roles



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Transport Pathways to  
Reach Global Climate  
and Sustainability Goals



### Module 2

Regional Trends in Transport  
Demand and Emissions, and  
Policy Developments



### Module 3

Climate and Sustainability  
Responses in Transport  
Sub-Sectors and Modes



### Module 4

Transport and  
Energy



### Module 5

Enabling Climate and  
Sustainability Action  
in Transport: Finance,  
Capacity and  
Institutional Support



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## From Turbulence to Transformation: Navigating Challenges Towards Action on Transport, Climate and Sustainability

This document complements the SLOCAT Transport, Climate and Sustainability Global Status Report - 3rd edition, available at [tcc-gsr.com](http://tcc-gsr.com). It outlines a critical overview of key trends, challenges and opportunities in the intersection between transport, climate and sustainability. It aims to provide food for thought and action in support of decision makers interested in advancing the transformation towards sustainable, low carbon transport.



**SLOCAT** Partnership on Sustainable  
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Transport, Climate and Sustainability  
Global Status Report - 3rd edition

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