

## Rail and Modal Shift: A No-Regret Pathway for Accelerating the Transition Away from Fossil Fuels

The International Union of Railways (UIC) welcomes the opportunity to contribute to the development of the roadmap supporting the global transition away from fossil fuels. As the worldwide association of the rail sector, representing railways, infrastructure managers and mobility stakeholders across more than 95 countries, UIC works to advance sustainable mobility systems and supports governments in integrating rail and public transport solutions into climate strategies.

Transport plays a central role in the global energy transition. The sector accounted for roughly **27% of global final energy consumption in 2023**, making it one of the fastest-growing sources of energy demand, while **over 95% of transport energy still comes from fossil fuels**. This deep dependence on fossil fuels means that decarbonizing transport will be essential for achieving global climate goals and strengthening energy security. At the same time, the transition away from fossil fuels offers an opportunity to reshape transport systems so they are safer, more accessible and more equitable — reducing the human toll of road crashes, improving access to goods and services for underserved communities, and creating quality jobs in sustainable transport systems.

The outcomes of the first Global Stocktake underscore the urgency of accelerating action in the sector. In particular, paragraph 28(g) of the decision calls for “**accelerating the reduction of emissions from road transport through a range of pathways, including the development of infrastructure and the rapid deployment of zero- and low-emission vehicles**”. Achieving this objective will require not only technological improvements but also broader changes in how transport systems are organized and used. In this context, **enabling a shift toward more low-carbon, energy-efficient transport modes such as rail and public transport represents a critical and complementary pathway** for implementing the Global Stocktake outcomes and accelerating the reduction of fossil fuel use in transport systems.

Railways are already among the most energy-efficient transport modes and produce significantly lower emissions per passenger or tonne-kilometre than road or air transport. Railways are the most electrified mode of transport (electric rail, which accounts for over 85% of passenger rail activity and 55% of freight movements<sup>1</sup>) and at 15%, rail has the highest proportion of its energy from renewable sources than any other transport mode<sup>2</sup>. Expanding rail systems and enabling a shift from road and short-haul aviation to rail can therefore play a major role in reducing fossil fuel use across both passenger and freight transport.

### (a) Critical barriers preventing a transition away from fossil fuels

From the perspective of the transport sector, several structural barriers continue to slow the transition away from fossil fuels. A key challenge lies in long-standing infrastructure investment patterns that have historically prioritized the least energy efficient and fossil fuel dependent modes, namely road transport over rail and collective transport systems. As a result, rail networks and public transport systems often lack the capacity required to enable large-scale modal shift.

Economic and financial barriers also remain significant. Rail infrastructure requires substantial upfront investment and long-term planning horizons, which can be difficult to mobilize under existing financing frameworks. In many countries, access to affordable long-term capital remains a key constraint for expanding sustainable transport infrastructure.

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<sup>1</sup> [Rail - IEA](#)

<sup>2</sup> [Renewables in Transport](#)

External costs of road transport on the economy are felt by the whole society, by underpricing local air pollution, congestion and accidents as well as climate damage, road transport is artificially cheaper at the point of use. Road and aviation also receive significant explicit fossil fuel subsidies, which distort the market.

Institutional fragmentation further complicates the transition. Transport decarbonization strategies are often developed separately from energy, land-use and climate planning processes, while fiscal and regulatory frameworks often fail to create a level playing field that rewards the most sustainable transport choices. The role of rail and modal shift is not consistently reflected in national climate strategies, and consequently in Nationally Determined Contributions (NDCs), despite the important mitigation potential they offer.

### **(b) Potential levers to accelerate implementation of the transition**

Accelerating the transition away from fossil fuels will require a combination of technological, infrastructural and systemic approaches. In line with the Global Stocktake's call to reduce emissions from road transport, rapid deployment of zero- and low-emission vehicles will be essential. However, achieving deep emissions reductions will also require enabling a **shift toward more low-carbon, energy-efficient transport modes**.

Scaling up investment in rail infrastructure, urban public transport networks and freight rail corridors is therefore a critical lever. Investment in rail infrastructure and public transport systems represents a **no-regret pathway for transitioning away from fossil fuels**, delivering immediate emissions reductions while strengthening energy security, economic resilience and affordable access to mobility. Expanding high-capacity passenger rail networks can shift demand away from road transport, while strengthening freight rail and intermodal logistics systems can significantly reduce reliance on trucks for long-distance freight movements.

Strengthening the integration of transport within climate policy frameworks is another important step. Countries can accelerate progress by incorporating rail development and modal shift objectives within their national decarbonization strategies and NDCs, while improving coordination between transport, energy and land-use planning.

Mobilizing adequate finance will also be essential. In this context, climate finance can play an important catalytic role in accelerating investment in sustainable transport systems. Rail infrastructure and public transport projects often deliver long-term emissions reductions while also generating significant co-benefits for economic development, energy security and social inclusion. Strengthening the recognition of rail and modal shift measures within climate finance frameworks — including through multilateral development banks, climate funds and blended finance mechanisms — can help close the investment gap and enable countries to scale up low-carbon mobility systems.

Carbon markets may offer additional opportunities to mobilize investment. Under Article 6 of the Paris Agreement, carbon market mechanisms could support investments in sustainable transport by recognizing the mitigation potential of modal shift. Crediting emissions from shifts from road or air transport to rail could help unlock new sources of finance for rail infrastructure and public transport systems, particularly in developing countries.

### **(c) Experiences, best practices and lessons learned**

Experiences from several regions demonstrate the potential impact of sustained investment in rail systems. Countries that have invested consistently in rail expansion, high-capacity passenger rail networks and integrated freight logistics systems have achieved significant reductions in transport emissions.

Successful approaches often involve integrating rail development with broader planning frameworks, including urban development strategies, land-use planning, energy and industrial planning and logistics systems. These integrated approaches help maximize the climate and economic benefits of rail investments while enabling sustained modal shift.

#### **(d) Reflecting diverse national circumstances and supporting a just transition**

Ensuring that the transition away from fossil fuels is just, orderly and equitable requires recognizing the diverse circumstances of countries at different stages of development. For many developing economies, expanding rail and public transport systems provides an opportunity to simultaneously advance climate mitigation, economic development and social inclusion.

Rail investments can strengthen regional connectivity, improve access to affordable mobility and reduce dependence on imported fossil fuels. However, realizing this potential will require increased access to climate finance, technical expertise and capacity-building support to help countries integrate sustainable transport solutions into their development strategies.

#### **Contribution from UIC**

UIC and its members stand ready to support these efforts. The association has developed a range of analytical work and practical tools to assist governments in advancing sustainable transport solutions.

This includes the [UIC Rail NDC Template](#), which supports countries in integrating rail and modal shift strategies into their Nationally Determined Contributions, as well as analyses on the climate mitigation potential of rail in both passenger and freight transport. UIC has conducted a global assessment of how rail is currently reflected in national climate plans, analysing nearly all submitted NDCs to understand the extent to which rail is integrated into transport decarbonization strategies. The analysis shows that while rail accounts for only around **1% of global transport emissions, it remains significantly underrepresented in these climate commitments**. Approximately **one quarter of NDCs mention rail at all, and only around 10% include specific targets or quantified actions related to rail development or modal shift**.

In addition, UIC has undertaken analytical work on the role of **rail investment in low- and middle-income countries (LMICs)** in supporting climate mitigation and sustainable development. The study *“Bridging the Rail Finance Gap”*, developed with partners including the University of Birmingham and Roland Berger, highlights the significant opportunity to expand rail infrastructure in developing economies while avoiding future transport emissions growth. The analysis finds that expanding rail infrastructure in LICs and LMICs could enable rail’s modal share to increase significantly and **avoid up to 1.8 gigatonnes of CO<sub>2</sub> emissions by 2050**, while also improving connectivity, economic development and access to mobility. The study also identifies the need for stronger climate finance mechanisms and international cooperation to help close the rail investment gap in these regions.

UIC has also explored innovative financing approaches through its **Carbon Credits White Paper**, which examines how carbon markets could support the expansion of sustainable transport. The paper analyzes how emissions reductions and avoided emissions resulting from increased rail use — for example through shifts from road or air transport to rail — could potentially generate carbon credits under existing and emerging carbon market frameworks. By recognizing the climate mitigation value of modal shift, such mechanisms could help mobilize additional finance for rail infrastructure and public transport projects, particularly in developing countries.

Together, these initiatives aim to support governments, financial institutions and international organizations in identifying practical pathways to scale up sustainable transport investment and unlock the full climate mitigation potential of rail systems.

Through its global network and technical expertise, UIC remains committed to supporting governments, international organizations and financial institutions in advancing sustainable transport systems as part of the global transition away from fossil fuels.

We look forward to continued engagement with the COP30 Presidency and Parties as the roadmap is further developed.