



RAIL NDC TEMPLATE

**A guide to unlocking rail potential
in Nationally Determined
Contributions 3.0**



INTERNATIONAL UNION
OF RAILWAYS

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1 INTRODUCTION

At COP28, the [First Global Stocktake](#), under the Paris Agreement, identified the transport sector as a key area for accelerated mitigative action and thereby highlighted the urgency of reducing its emissions, noting the need for "Accelerating the reduction of emissions from road transport on a range of pathways, including through the development of infrastructure and the rapid deployment of zero and low-emission vehicles."¹

In advance of COP30 in Brazil, an updated version of the NDCs (commonly referred to as NDCs 3.0) is due, where countries will have an opportunity to be more ambitious on the basis of the recommendations of the Global Stocktake, and outline plans for climate action that deliver on the Paris Agreement.

The transport sector is currently leading the growth in global CO₂ emissions, accounting for 22% of fossil CO₂ emissions worldwide in 2019. This follows off the back of an average annual increase of 1.7% since 1990, outpacing all other end-use sectors (with the exception of industry, which also experienced a similar growth rate)².

Despite this trend, the rail sector has showed a continued commitment to reducing emissions and is the only one to have done so successfully in the past decades. The sector is currently the least emissions-intensive mode of passenger transport, meaning that its expansion will help to reduce overall emissions.

Working collectively to promote all forms of fossil free transport by 2030 will be key to ensuring a Paris Agreement compliant future. The launch of the #FossilFreeTransport [Call to Action](#) in 2023 brings key stakeholders around the world together to work towards "Doubling the share of energy efficient and fossil-free forms of land transport for people and goods by 2030, by focusing on shifts to public transport, walking, cycling and rail freight, as well as electric vehicles and railways."³

The International Union of Railways (UIC) has developed the Rail NDC Template to provide countries with a framework to integrate rail transport and help set specific, measurable targets for rail development and its role in reducing transport emissions. The aim is to support countries in maximising their NDCs to showcase the potential to reduce emissions, ultimately accelerating the decarbonisation of the transport sector through increased rail utilisation.

¹ https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf

² <https://www.iea.org/energy-system/transport/rail>

³ <https://slocat.net/call-to-action-on-fossil-fuel-free-land-transport/>

2 HOW NDCs CAN UNLOCK POTENTIAL OF RAIL

This document was prepared to offer practical recommendations for countries to be more ambitious in their inclusion of rail in NDCs, ensuring that the strategies mentioned are both meaningful and impactful.

This Rail NDC Template builds on the “Rail in NDCs: analysis and recommendations” report, developed by UIC for COP28, and expands on the recommendations for including the rail sector more widely in the NDCs 3.0. There are six recommendations with three areas of activity (modal shift, network development, and electrification) that are explored in this document.

Countries without rail-specific NDCs can leverage the Rail NDC Template to incorporate comprehensive rail strategies into their climate action plans. This template offers a structured framework for national governments to assess their current rail plans, identify potential areas for expansion, and set concrete targets in line with the Paris Agreement.

For countries with existing but very general rail strategies in their NDCs, the template provides an opportunity to be both more ambitious and go into further detail. The template can be used to refine targets, setting clear, measurable, and time-bound objectives for the rail sector’s performance and reducing emissions. Additionally, countries with existing, ambitious rail targets can expand the scope and depth of their commitments by incorporating adaptation measures, financing mechanisms, and regional cooperation initiatives.



See also:

[Public Transport NDC Template](#) by UITP

[Active Travel NDC Template](#) by PATH Coalition

[Popular Transport NDC Template](#) by GNPT

[Guide for Including Transport in NDCs](#) by ITF-OECD

[NDC Library](#) by SLOCAT

3

RAIL NDC TEMPLATE



CLEARLY DEFINE OBJECTIVES

Specify quantifiable objectives related to the rail sector, which could include targets for rail network expansion, a modal shift, electrification, or reduced emissions.



FIND OPPORTUNITIES TO BE MORE AMBITIOUS

Find opportunities within rail to accelerate action and produce less emissions, while building future resilience so that targets can be increased from the previous cycle.



FILL GAPS FOR A COMPREHENSIVE APPROACH

Incorporate comprehensive strategies, considering policies and push and pull measures to incentivise a modal shift. Include rail in both mitigation and adaptation plans and consider both freight and passenger transport.



CREATE POLICY COHESION

Ensure that rail sector goals, national and continental transport strategies, and broader national climate and sustainability objectives align and are cross-referenced. Action can be accelerated when national policies are cascaded and supported at a local level.



MAKE TARGETS MEASUREABLE

Include specific, measurable, and time-bound targets related to rail sector performance, reducing emissions, and modal shift percentages. These should be regularly monitored and reported, with clearly identified stakeholders responsible for tracking progress.



BE CLEAR ON FUNDING AND FINANCING

Indicate clearly how rail investment will be financed. Where applicable, differentiate between conditional and unconditional funding to open opportunities for international investment partnerships.

CLEARLY DEFINE OBJECTIVES

Vision

Encourage and enable people to have **safe, accessible, comfortable, enjoyable and connected** public transport, walking, and cycling experiences to mitigate climate change, reduce emissions, benefit public health and create **vibrant, resilient, and inclusive** societies.

Goal

Set targets that support railways as the backbone of sustainable mobility, in line with the four pillars of the [UIC Vision 2030](#):



Transforming cities and connecting communities



Energy, technology, and innovation



Intermodality and seamless connection



Customer experience



Specify quantifiable objectives related to the rail sector, such as targets for rail network expansion, a modal shift, electrification, or reduced emissions.



FIND OPPORTUNITIES TO BE MORE AMBITIOUS



Include existing national and local rail policies and projects that are not yet mentioned in NDCs

In **Asia**, 12 LMICs have included railways-related targets in transport policy documents, however, only two have mentioned railway-specific targets in their NDCs.



Include specific policies and measurable targets with clear indications of how they will be achieved

Burkina Faso's NDC (2022) has two rail projects (one conditional and one unconditional) with potential GgCO₂e savings by **2025, 2030 and 2050**.



Expand the scope of climate action by integrating mitigation, adaptation, and broader sustainability goals

Vietnam's NDC is one of the few to present **estimated economic losses due to the effects of climate change** in rail infrastructure.

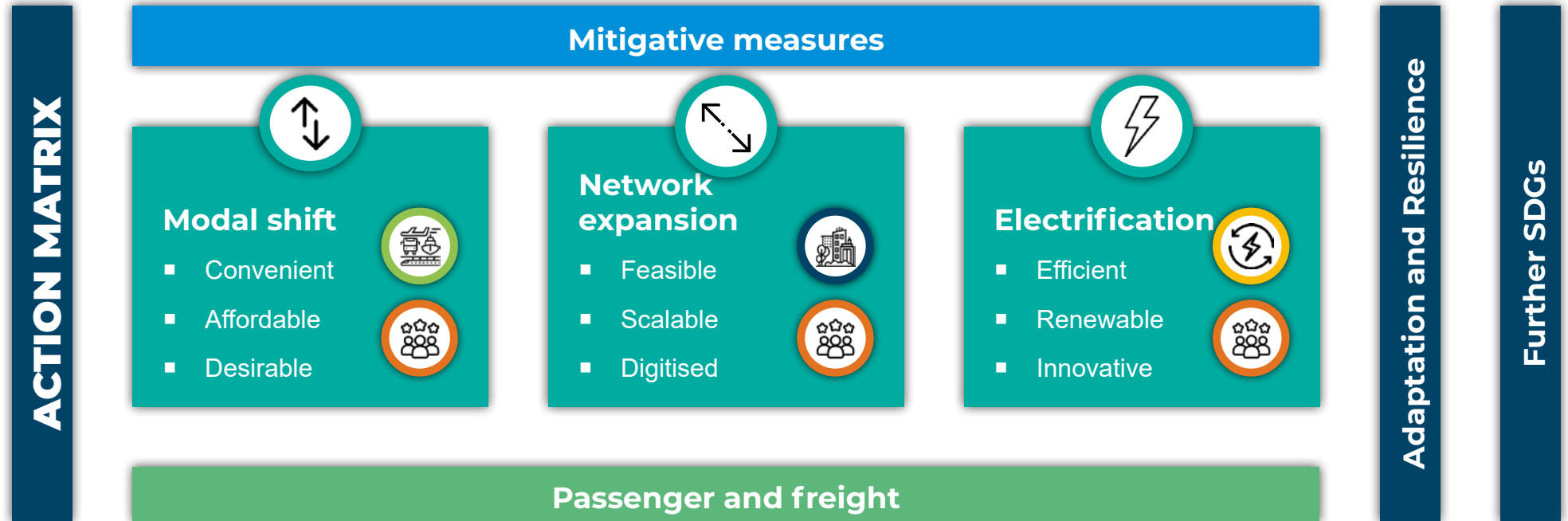


“

Set more ambitious goals in NDCs, addressing both the potential for mitigation and adaptation within a given national context.

”

A COMPREHENSIVE APPROACH



To maximise the potential of rail in NDCs, it is important to consider different aspects of rail operation management and rail infrastructure. First, both the potential to reduce and avoid (mitigate) emissions has to be taken into account, as well as the impact of climate change on rail infrastructure and any relevant future-proofing measures (adaptation and resilience), across both passenger and freight operations. For the rail sector, mitigation is mainly centred around three approaches: modal shift, network expansion, and electrification. The action matrix given above/below illustrates how these considerations relate to one another and provides an overview of the potential measures take into account when setting NDC targets for rail.



Encompass comprehensive strategies, considering policies and push and pull measures to incentivise a modal shift, while expanding the rail network and/or increasing energy efficiency, where appropriate.



A COMPREHENSIVE APPROACH - MODAL SHIFT

Make it

Convenient

Integrated transport and land-use planning: Develop comprehensive urban transport plans that prioritise rail and integrate it with other modes, while aligning land use to promote transit-oriented development (TOD) around rail stations, enhancing multimodal connections and last-mile connectivity for more convenient travel.

Technological innovation: Invest in technologies to improve the efficiency and appeal of rail, including adopting digital ticketing systems, real-time tracking, and other innovations that enhance the user experience.

Paraguay's NDC highlights the incorporation of passenger and freight rail transport strategies in regional planning through "Urban and Territorial Development Plans".



Affordable

Subsidies and incentives: Provide financial incentives such as subsidies, tax breaks, or grants for rail operators and users. This can lower ticket prices, making rail travel more competitive with other modes of transport.

Regulatory measures: Implement regulations that discourage the use of less sustainable modes of transport, such as congestion charges, low-emission zones, parking restrictions, and higher fuel taxes.

Moldova's NDC refers to the "new (2019) Railway Transport Code", which establishes guidelines for state support in developing railway infrastructure, to boost investment and international freight competitiveness.



Desirable

Public awareness campaigns: Run campaigns to raise awareness about the environmental and economic benefits of rail travel. Educate the public on how rail transport can contribute to reducing carbon footprints in order to shift public perception and preferences.

Costa Rica's NDC highlights the impact of several SDGs related to the new Tren Eléctrico de Pasajeros in the Gran Área Metropolitana, while also addressing black carbon reduction and a just transition.



A COMPREHENSIVE APPROACH - NETWORK EXPANSION

Make it

Feasible

Long-term planning: Develop a long-term rail plan, prioritising investment in higher traffic to support both business and financial cases for developing rail infrastructure.

Investment priorities: Prepare to set out financing mechanisms to support development and implementation of rail projects, taking advantage of climate and sustainability financing instruments.

Turkey's NDC projects a railway investment of \$29 billion (2019 prices) by 2030, highlighting the railway sector's importance in achieving sustainability targets.



Scalable

Building institutional capacity: In rail planning, procurement and operations can help ensure its successful implementation, and that technical capacity is built locally, ensuring better and more complex projects in the future.

International standardisation: Promote safety, efficiency, interoperability, and innovation, providing a common language and a set of best practices.

Tajikistan's NDC comprises goals to align all transport modes with international standards (including rail, road, air, and specialised services).



Digitised

Increased efficiency and capacity: Digitalisation allows for optimised traffic management and increased network capacity, as well as enhanced resource utilisation and improved integration between different rail systems and with other transport modes.

Seamless connectivity: Integrate rail and other modes of transport to enable door-to-door journeys for both passengers and for freight, creating a seamless experience.

Bangladesh's NDC sets goals for purchasing modern rolling stock and signalling systems for railway, which will improve the efficiency of rail services.



A COMPREHENSIVE APPROACH - ELECTRIFICATION

Make it

Efficient

Prioritise Rail Electrification: Electrify rail lines where traffic volume or emission reduction potential justifies the investment, reducing reliance on fossil fuels and significantly cutting emissions for a more efficient rail system.

Integrate advanced energy-efficient technologies: Encourage the adoption of technologies to significantly reduce energy consumption in rail operations, such as having regenerative braking systems, lightweight materials, and energy-efficient train design.

Azerbaijan's NDC includes plans for electrifying railway lines and transitioning to an alternating current (AC) traction system, as part of the measures to reduce the negative impact of transport on the environment.



Renewable

Prioritise renewable energy sources for powering rail: Encourage the expansion of rail electrification projects powered by renewable energy, using wind, solar, or hydroelectric power through procurement or by building power plants to feed the grid that supplies electricity to trains. Consider using renewables in stations and service/maintenance depots.

Myanmar's NDC proposes electric high-speed railway networks powered by renewable energy as a means to reduce GHG emissions, subject to future bilateral or multilateral agreements.



Innovative

Invest in alternative technologies: Encourage the adoption of hydrogen and battery-powered trains as key technologies for decarbonising rail, particularly in areas where electrification is not feasible.

Chile's NDC promotes shifting from private cars to bicycles or public transport and sets ambitious goals for using green hydrogen across various sectors, including transport.



POLICY COHENSION

Effective climate action in the rail sector requires both **vertical and horizontal alignment**. The former can be achieved by fostering collaboration between national and subnational governments, and the latter by ensuring coordination across different ministries (e.g. transport, environment, energy, finance, etc.) to align rail sector development with broader national climate and sustainability objectives. This multi-dimensional approach enhances the implementation of climate change initiatives and also connects them to the wider sustainability agenda and Sustainable Development Goals (SDGs), creating a comprehensive strategy that leverages the rail sector's potential to simultaneously contribute to climate mitigation, sustainable urban development, and economic growth.

Nigeria's NDC highlights the importance of working closely with states and local governments to coordinate action against climate change. For example, the Lagos 5-year Climate Action Plan envisages action in several areas, including spatial planning for TOD and a modal shift to rail within transport.



Ensure that rail sector goals and broader national climate and sustainability objectives align. Vertical alignment should be incorporated, with policies that enable cities and countries to work together to implement climate action for the rail sector.

MEASURABLE TARGETS

Clear

Use specific, quantifiable language with defined terms, a clear scope, context, and timeframes, while avoiding vague statements, providing concrete examples to illustrate goals, and concretely assigning responsibility to track progress for each target.

Malawi's NDC designates the Ministry of Transport and Public Works (MOTPW) and the Ministry of Local Government (MOLG) as having primary responsibility, with passenger associations, bus operator associations, city councils, and private transport companies being key stakeholders.



Measurable

Use quantitative metrics with clear baselines, specific units, defined measurement frequencies, identified data sources, and industry-standard indicators, incorporating both absolute and relative measurements for a comprehensive assessment.

Burkina Faso's NDC includes the Accra-Ouagadougou rail interconnection project, which will save an estimated 748 Gg of CO₂e by 2050.



Time-bound

Set specific end dates with interim milestones, match industry timelines, consider project lifecycles, have different timeframes for different goals, specify review periods, and account for technological progress, creating a clear and adaptable timeline which can be achieved.

Uganda: Uganda's NDC has timelines in certain cases, with short-term (2026), medium-term (2030), and long-term (2050) goals.



Include clear, measurable, and time-bound targets related to rail sector performance, reduced emissions, and modal shift percentages. These should be regularly monitored and reported, with stakeholders responsible for tracking progress being clearly identified.

CLEAR ON FUNDING AND FINANCING

It is important to demonstrate financing mechanisms to support future rail transport development, quantifying investment needs. Strategies should address sources of finance and funding, while ensuring investments align with broader environmental and economic goals. Railways offer a low-carbon solution for connecting people to opportunities and transporting goods, but their development requires significant capital investment and faces a considerable funding gap. NDCs can include both unconditional measures (action taken with domestic resources) and conditional measures (ambitious targets dependent on external support). This framework allows countries, especially those with emerging economies, to set aspirational climate goals while acknowledging resource limitations. For rail development in LMICs, this measure can be particularly valuable, helping to **decouple economic growth from transport emissions** by enabling more ambitious rail projects with international support. It is important to demonstrate financing mechanisms to support future rail transport development, quantifying investment needs.

Conditional

vs.

Unconditional

Article 6 of the Paris Agreement establishes frameworks for voluntary international cooperation, including carbon markets, allowing countries to trade emission reductions, and work together and more cost-effectively to achieve their climate targets. Part of the mechanisms created include Internationally Transferred Mitigation Outcomes (ITMOs), which allow countries to trade emission reductions. **For a country to participate in ITMO markets, its NDC must set clear targets, as this defines the baseline against which emission reductions are measured and traded.** Without these specific targets, there is no clear way to verify or quantify the reductions available for trade, making it crucial for countries to establish transparent goals. This ensures accountability, prevents double counting, and helps achieve global climate objectives more efficiently.

“ Clearly indicate how rail projects are to be financed and, where applicable, differentiate between conditional and unconditional funding to demonstrate a commitment to rail as a solution to climate change. ”

Burkina Faso's NDC highlights three rail related projects: renewing the Ouaga–Kaya line, constructing the Kaya-Niger line, and establishing a heavy rail service on the existing Ouagadougou line as conditional projects that would lead to a 2,242 Gg CO₂e savings by 2050.



Bangladesh's NDC presents the purchasing of modern rolling stock and advanced signalling systems for the railway as part of their unconditional and conditional mitigations measures.



Myanmar's NDC seeks international technical and financial assistance in combination with grants and concessional loans to develop the railway sector.



4 IN A NUTSHELL

Objective

Set the vision and goals for rail in NDCs.

Ambitious

Take stock of existing policies and plans and incorporate them in a more ambitious manner into NDCs.

Comprehensive

Consider the template's action matrix (modal shift, network expansion, and electrification) for passenger and freight transport, while considering adaptation and resilience.

Cohesive

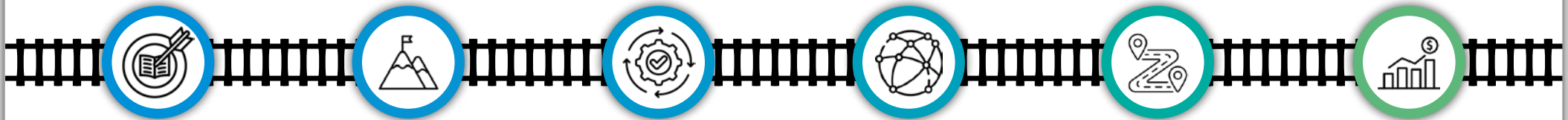
Set up processes to work on vertical and horizontal integration, bringing in key stakeholders that can help translate ambition into action.

Clear

Provide more information on how these plans will be implemented in the future and how they will be tracked.

Financed

Show how these plans will be financed and funded. Use the opportunity to demonstrate further ambition through conditional measures.



Passenger	Freight	Adaptation	
Modal shift	Convenient	Affordable	Desirable
Network development	Feasible	Scalable	Digitised
Electrification	Efficient	Renewable	Innovative



Target setting
Clear
Measurable
Time-bound



Financing
Conditional
VS.
Unconditional

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