

Synthesis Report

Transport in Nationally Determined Contributions (NDCs)

Lessons learnt from case studies of rapidly motorising countries

Synthesis Report

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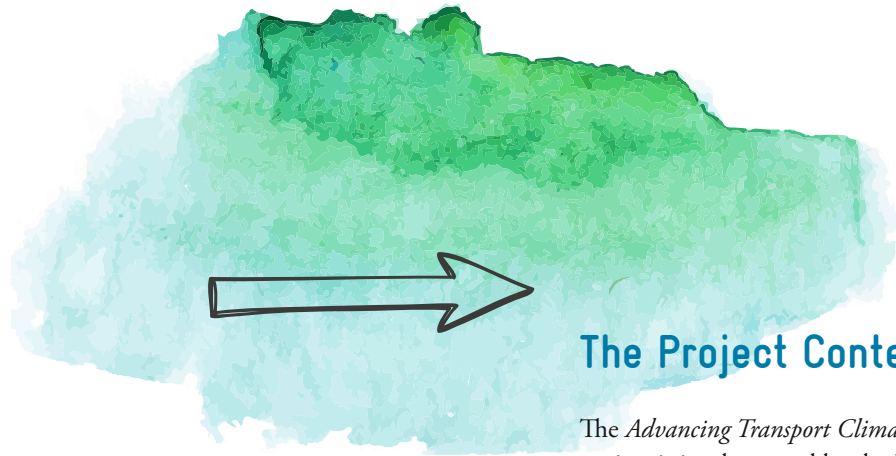


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The Project Context

The *Advancing Transport Climate Strategies (TraCS)* project is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and funded through the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

Its objective is to enable policy makers in partner countries (Vietnam and Kenya) to specify the contribution of the transport sector to their respective Nationally Determined Contributions (NDCs). In addition, detailed knowledge on mitigation potential can lead to raising the level of the two countries' ambitions.

The project follows a multi-level approach:

At the country level, TraCS supports (transport) ministries and other relevant authorities in systematically assessing GHG emissions in the transport sector and calculating emission reduction potential through the development of scenarios.

At the international level, TraCS organises active exchanges between implementing partners, technical experts, and donor organisations to enhance methodological coherence in emission quantification in the transport sector (South-South and South-North dialogue). The dialogue aims to increase international transparency regarding emissions mitigation potential and the harmonisation of methodological approaches in the transport sector.

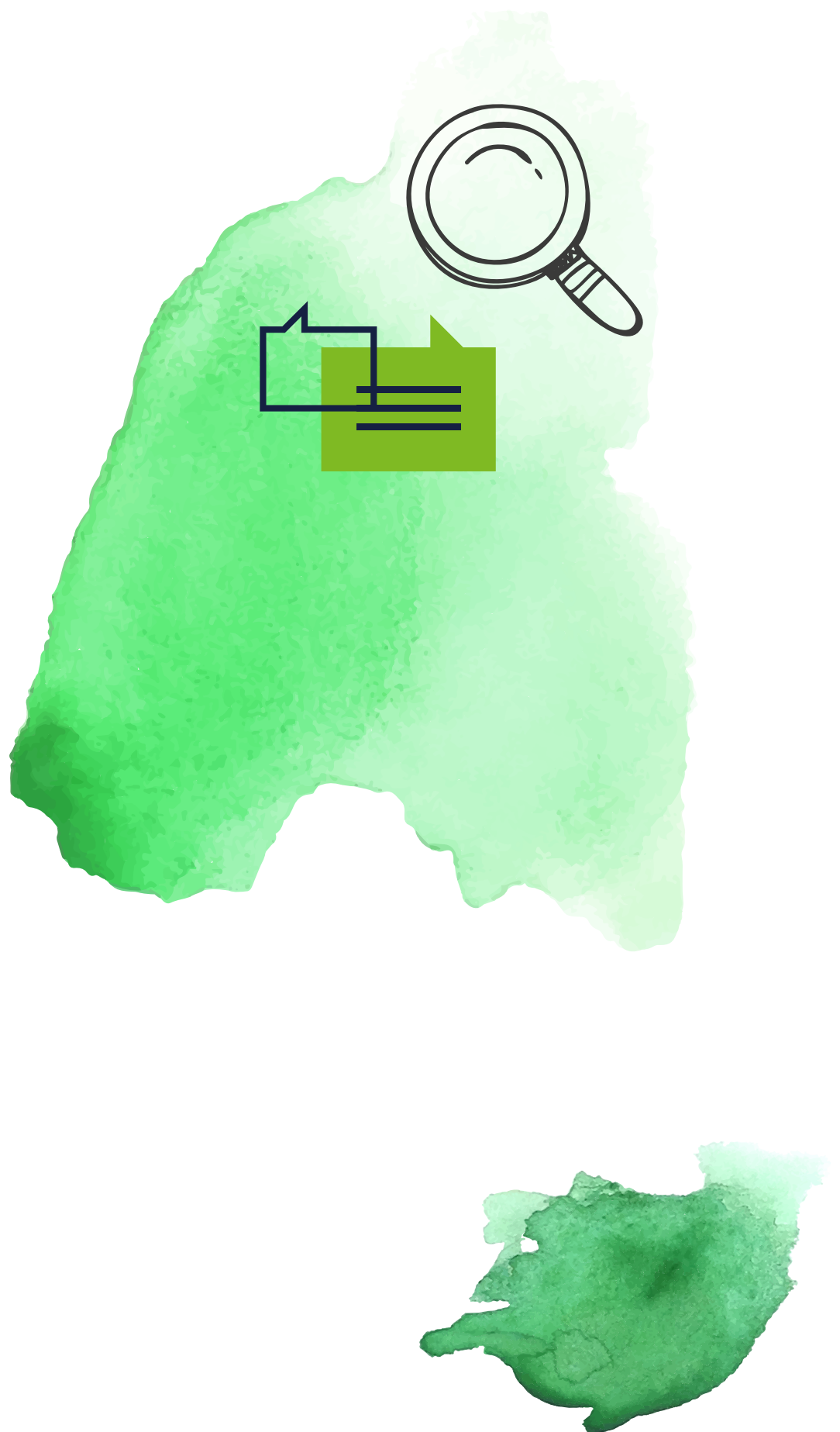


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Executive summary

In preparation for the COP21 Paris Climate Conference in December 2015, more than 160 countries submitted their Intended Nationally Determined Contributions (INDCs) to reduce greenhouse gas (GHG) emissions and increase resilience. A high level analysis of the NDC documents carried out by GIZ showed that transport has been recognized as a sector of key relevance for climate change. Due to the limited level of information provided in the official NDC documents, a more in-depth analysis at the country level is needed to be able to assess the role of transport in the NDC development and implementation process. To gain such insight for the transport sector in rapidly-motorising countries, seven case studies were carried out in the following countries: Bangladesh, Colombia, Georgia, Kenya, Nigeria, Peru and Vietnam. Data for the analysis was gathered through literature research and stakeholder interviews and complemented by experiences from GIZ's and Ricardo's day-to-day work in countries.

Whilst the situation for the first INDC development was unique, the analysis of the INDC development process helped identify lessons learnt that are relevant for the future steps in the NDC cycle. A particular focus of the analysis was the identification of factors limiting ambition in the first round of NDCs.

Four key lessons learnt are:

- Lack of transport data limits the sectoral ambition
- Buy-in from key transport actors is essential for ambitious sector targets
- NDC should be more closely linked with transport sector strategies
- Transport authorities need more climate change expertise

Based on the identified challenges and lessons learnt from the INDC development process, a range of recommendations were developed, aimed at different target groups. For all recommendations, the NDC timeline has to be considered and timings developed accordingly. More specifically, the NDC timeline can be broken down into three iterative process steps, which partly run in parallel: (1) Preparation of the NDC groundwork, (2) development and negotiation of the NDC, and (3) NDC implementation and integration in sectoral policies. The figure below illustrates this repeating cycle.

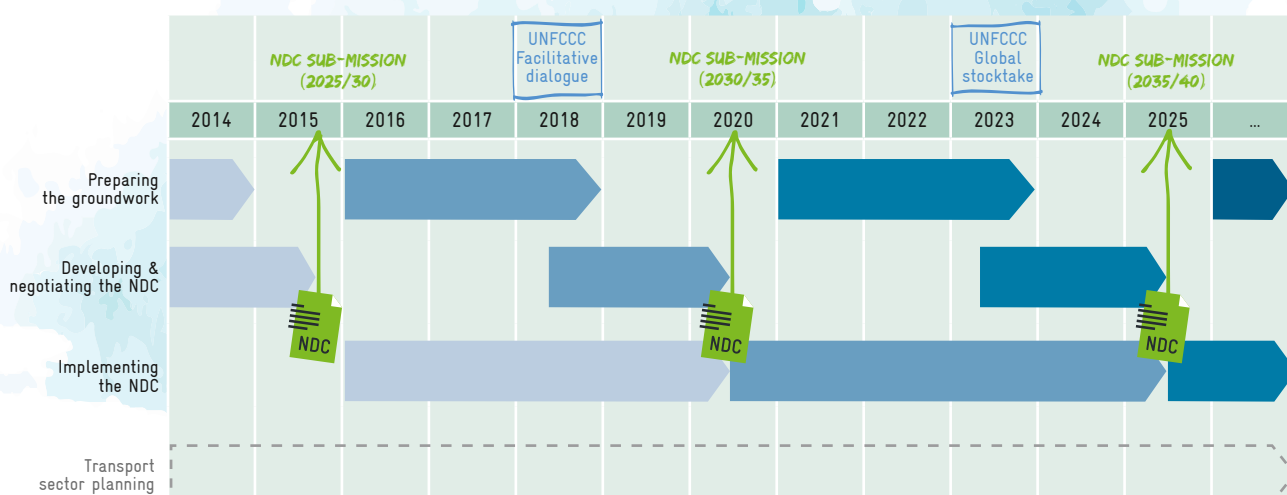


Figure 0: Timeline for the NDC cycle

Climate ministries are particularly relevant in steering the NDC development process and typically lead the development of the NDC. During phase 1 it is essential to build capacities on transport within climate ministries and allocate sufficient resources and time to support the assessment of measures. Ideally, gaps in the modelling of mitigation measures for the transport sector, e.g. sustainable development benefits, emission factors or abatement costs, are closed and data sharing agreements facilitated. In phase 2 climate ministries are in the lead. They need to consider transport sector plans in NDC development and suggest transport sector targets based on assessment of mitigation potentials. Climate ministries also need to actively engage transport stakeholders early in the process and coordinate with the energy sector in case renewable energy is needed for transport. Finally, in phase 3, institutional arrangements, (e.g. a transport working group) involving all relevant ministries (e.g. ministry of transport, energy, finance, etc.), to coordinate NDC implementation in transport could be set-up. However, still, climate ministries need to engage in detailed discussions of policy development to advocate for effective implementation and organization of review meetings and to request evaluation of measures.

Transport ministries are generally in charge of policy development and implementation of measures in the transport sector, as well as key activities for NDC implementation. They also have to collect and provide relevant transport data. During phase 1, transport ministries therefore need to develop dedicated climate change units within transport ministries (personnel / budget). These experts can then establish periodic and recurring data collection processes, of which timescales should be in line with the 5-year NDC cycle. During phase 2, the negotiation of the NDC, transport ministries primarily need to actively participate in NDC development stakeholder groups. Then in the implementation phase, they need to take the lead on NDC implementation plans for transport and mainstream NDC objectives into transport policies. This requires allocating budget resources to implement mitigation actions and getting hold of capacity development programmes for transport authorities, also for the local/regional level. Last but not least they need to ensure the support of the private sector and NGOs in integrated and cooperative stakeholder engagement processes.

Donor organisations can support government agencies with financial and technical assistance across all NDC steps. Essentially, donor and international cooperation support should enable countries to increase the level of ambition of their GHG mitigation (and climate adaptation) efforts and support implementation. The key is to ensure that the support provided is timely and linked to the NDC cycle. During phase 1 donors can provide access to expertise on transport and climate change (e.g. help-desk on transport data and mitigation actions) and support for data collection and modelling, as well as policy design. It is important to coordinate among donors working in transport in general, and not just those focused on climate and NDCs. During phase 2 donor support is limited. They could provide insights into best-practice stakeholder engagement processes and communicate the sustainable development benefits of transport mitigation actions (e.g. increasing energy security, reducing air pollution, etc.). During implementation (phase 3) donors can enable transport agencies to access climate finance or directly provide earmarked climate finance to transport. This includes supporting pipeline development for transport mitigation actions (e.g. pre-feasibility studies, stakeholder consultations) to increase the number of bankable projects. Last but not least, donors need to provide not only financial but technical assistance on climate action implementation (e.g. policy design).

Providing an outlook on how ambition in transport sections of NDCs can be raised further, the paper identifies the following:

- Use back-casting to align NDCs with long-term decarbonisation pathways
- Getting more renewable energy in the transport sector is essential
- Climate finance for decarbonising transport will need to trigger changes in national budgets
- Promotion of sustainable development benefits of transport mitigation actions will help ministries to priorities climate action

1. Introduction

In preparation for the COP21 Paris Climate Conference in December 2015, almost all countries submitted their Intended Nationally Determined Contributions (INDCs) to reduce greenhouse gas (GHG) emissions and increase resilience. To date¹ 171 out of 197 Parties to the Convention have ratified the Paris Agreement, transforming INDCs into Nationally Determined Contributions (NDCs)². The NDCs provide a confirmed framework for undertaking mitigation measures across identified sectors, with the requirement to submit updated and more ambitious NDCs every 5 years.

The countries are currently developing NDC implementation plans and transport climate actions (formerly also known as *Nationally Appropriate Mitigation Actions, NAMAs*³). The next NDC submission most likely looking at 2030/35 targets is planned for 2020. Against this backdrop, NDCs are very relevant for the transport sector, a sector that contributes 23% of global direct energy-related CO₂ emissions (IEA, 2017) and is key for meeting national emission reduction targets. Between 2010 and 2015 emissions increased by 2.5% annually (IEA 2017). Most of the future growth is forecasted in non-OECD countries.

NDCs and the 5-year cycle for revision will be important for guiding the sector on a decarbonisation pathway. The long-term goal of the *Paris Climate Agreement*, to limit global average temperature increase to well below 2°C, ultimately means to achieve economy-wide net-zero GHG emissions by 2050 or shortly thereafter. However, NDCs are political documents often providing little detail on the processes that led to their formulation. To allow for an assessment of the role of transport in NDC development, a review of all NDCs submitted to the UNFCCC was complemented with seven case studies on NDC development in rapidly-motorising countries.

This paper provides a summary of the lessons learnt from this analysis. This includes first hand work experiences of GIZ and Ricardo in various partner countries. The paper is highlighting key challenges and needs, success stories and a set of general recommendations. The aim is to inform stakeholders involved in implementing transport-related elements of NDCs and revising NDCs before 2020. The analysis should also help GIZ and other organisations supporting NDC implementation in transport to optimise its advisory services. For example, the Advancing Transport Climate Strategies (TraCS) project supports Vietnam and Kenya in implementing their NDCs in the transport sector. This study is part of the global component of the project, funded through the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).



¹ On 18 September 2017

² Going forward, if NDCs are mentioned both INDCs and NDCs are referred to.

³ The term NAMA is not used in the Paris Agreement and is likely to disappear. Hence, we use the term climate actions.

2. Overview of the transport sector in NDCs

Shortly after COP21 Paris, the Partnership on Sustainable Low Carbon Transport (SLoCaT) conducted an analysis of the transport commitments captured in the submitted INDCs (SLoCaT, 2016). A similar, updated review of the 166 NDCs – including 30 INDCs of those countries that did not submit their final NDC – was carried out by GIZ in 2017 and it confirmed that many countries have specifically acknowledged the importance of the transport sector for achieving national emission reduction targets.

Figure 1 shows the extent to which the transport sector is covered by the 166 NDCs across the globe. 144 NDCs (87%) identify transport as an important source of GHG emissions and an area for action. While adaptation to climate change in transport is only be mentioned by 29 countries, 119 NDCs (72%) define mitigation actions. 14 NDCs even set a transport sector emission reduction target, e.g. Japan intends to reduce transport emissions 27% below 2013 levels by 2030 (target: 163 MT CO₂e). A similar number of NDCs list targets for the transport sector not expressed in emissions, e.g. China

aims to increase its share of public transport in motorised travel in big- and medium-sized cities to 30% by 2020. These numbers illustrate that transport has been recognized as a key sector for mitigation and the demand for climate change mitigation in the transport sector is high.

A review of the transport mitigation actions listed in NDCs from developing and emerging countries (see Annex 1&2 for details), showed that the distribution of mitigation actions has a strong focus on fuels and vehicles (80 non-annex 1 countries listed actions) and urban transport (67 countries listed actions). Infrastructure such as road and rail is another area that was highly recognised (44 non-annex 1 countries listed actions), whereas the freight logistics was only noted by 16 non-annex 1 countries (see Figure 2). It should be kept in mind though, that some measures might cut across different topics. E.g. infrastructure measures are a prerequisite for a shift to rail, and therefore relevant for freight transport. Furthermore, not all countries have mentioned (all) mitigation actions in their NDCs. As a result, the measures might be better balanced in reality.

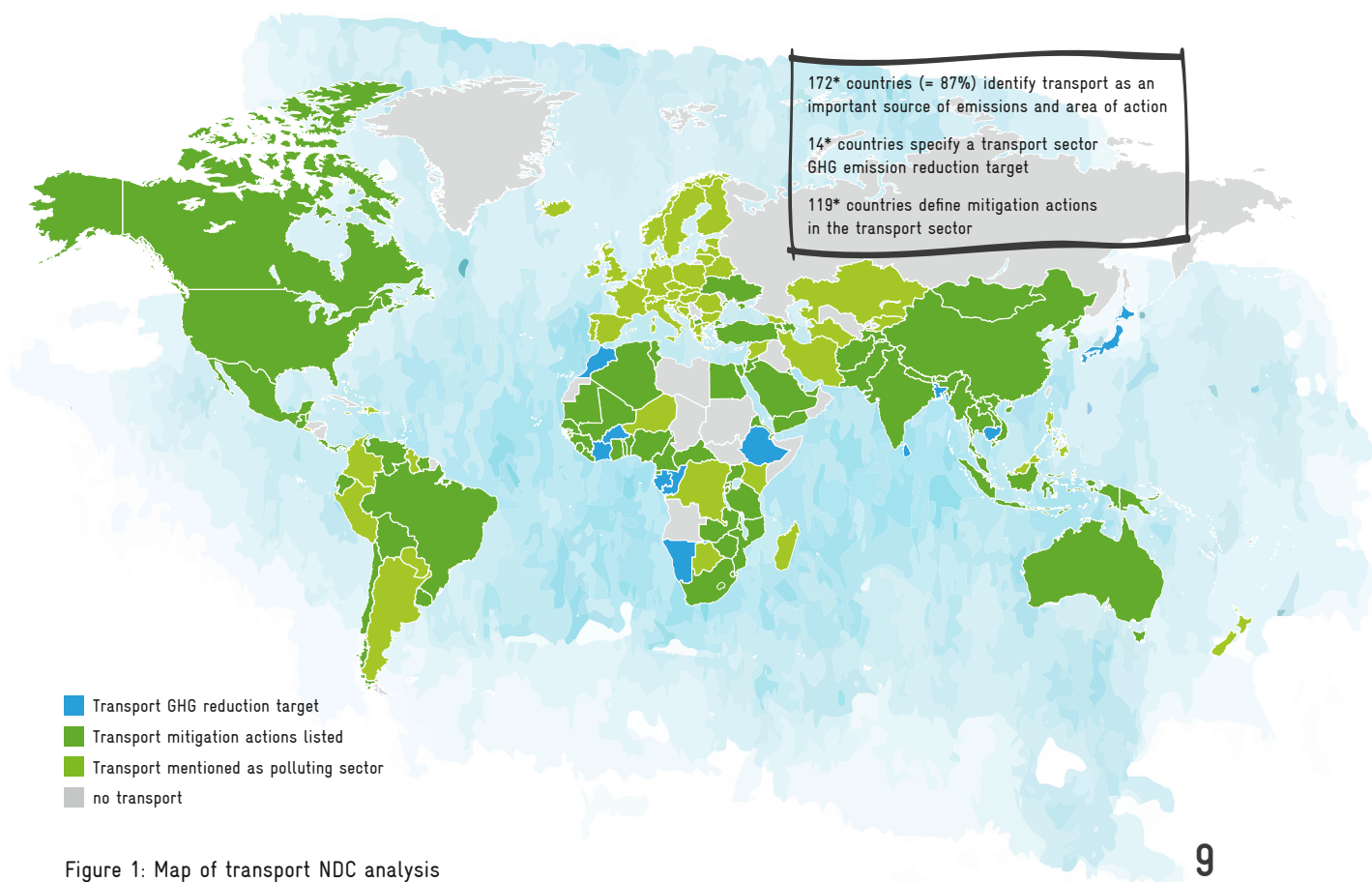


Figure 1: Map of transport NDC analysis

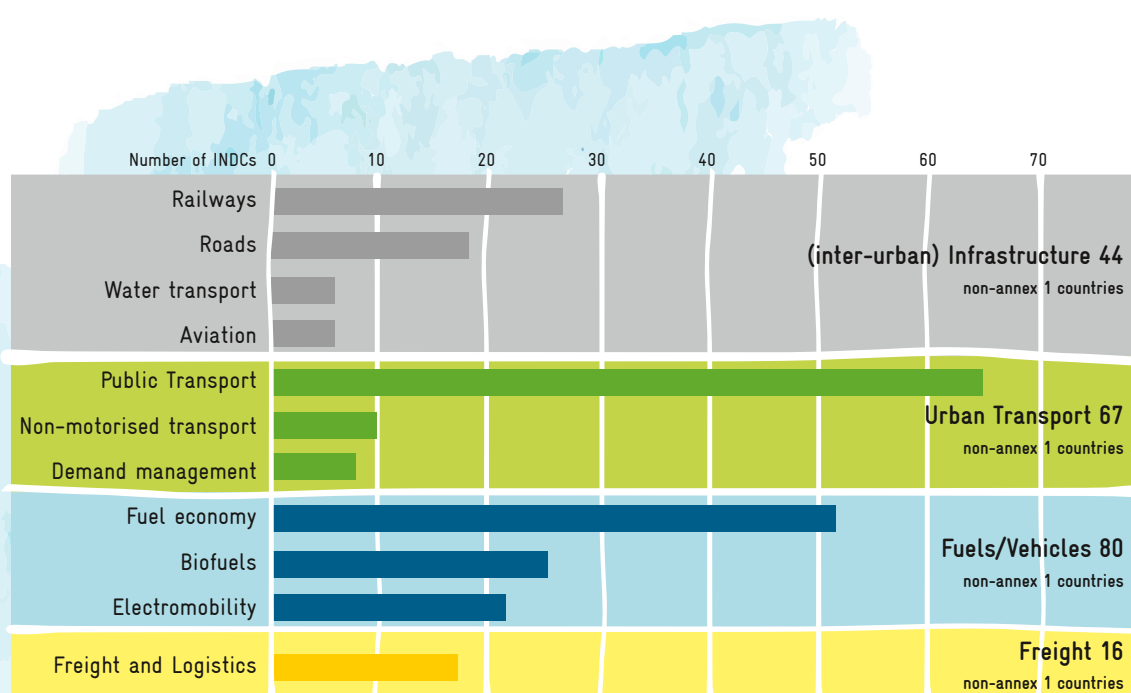


Figure 2: NDC Transport Mitigation Actions in 154 Non-Annex I countries

Transport has gained momentum in climate change discussions, but pathways and transformative measures how to decarbonise the sector are still not defined.

With respect to the analysis of mitigation actions it is important to note that guidelines on what NDCs should include does not exist. The main purpose of NDCs is to outline targets, and not necessarily pathways of how to achieve them. Usually, countries listed policies, programmes and projects to illustrate these targets and describe needs of the countries. However, the level of transport-related detail in official NDC documents varies significantly from one country to another. For instance, in Kenya's NDC it refers to its National Climate Change Action Plan, which includes a transport sector reduction target, but it does not specifically mention the target or actions in the NDC itself. Similarly, Peru and Colombia do not include a transport target or actions in its English language NDC submitted to the UNFCCC, but they do so in the extended Spanish language background report⁴ that is used internally. Many NDCs only mention mitigation actions in a single sentence, while others give more detail on key action. Viet Nam, for example, lists four mitigation actions (MONRE, 2015): public transport extension in large urban areas, shift of freight from road to rail and inland waterway, establish standards on fuel

consumption and encourage buses and taxis to use compressed natural gas and liquefied petroleum gas. Further examples are given in the table on the next page.

In general, the analysis of 166 NDCs showed that transport is important, but the submitted documents do not outline pathways to decarbonising transport. The actions listed in NDCs not only vary to a large extent, they often did not consider (or at least did not include) measures that could be cost-effective but that are not a high priority for transport authorities (e.g. fuel taxation, reform of land-use regulations). Furthermore, most NDCs also did not consider important interlinkages with other sectors e.g. how to ensure that electric vehicles are powered by renewable electricity or what effects electric vehicles have on the energy supply and network. Some countries even listed measures unlikely to have a major greenhouse gas reduction impact, e.g. the construction of highways. While these interventions could be nationally appropriate to improve access and hence serve sustainable development, no real mitigation impact can be expected.

⁴ <http://www.minam.gob.pe/wp-content/uploads/2015/12/Informe-T%C3%A9cnico-Final-CM--R-S-129-2015-PCM-Secretar%C3%ADa-T%C3%A9cnica-18-09-2015-vf.pdf>

3. Lessons learnt from case studies

In order to learn from experiences and go beyond general lessons learnt, this section presents a number of illustrative transport related examples from the case studies and highlights good practice during the NDC development process (and first months during subsequent NDC implementation). It concludes with transport specific lessons that could be beneficial for future NDC revision every five years. This ultimately relates to the question of how the countries could implement their NDCs efficiently and become more ambitious in transforming transport.

The case study countries included in the analysis were Bangladesh, Colombia, Georgia, Kenya, Nigeria, Peru and Vietnam. The pool of case study countries is quite diverse, ranging from a population of 4 million in Georgia to 182 million in Nigeria, and spanning four continents. However, the countries share a common concern: a rapid growth in motorisation rates that, without mitigation actions, are projected to result in significant increases in transport-related GHG emissions in future years. Table 1 gives an overview of the key characteristics of these countries, covering current and projected populations, motorisation rates, and GHG emissions, as well as a summary of their NDCs.

The assessment included several key aspects connected to the development of mitigation scenarios and targets for transport sections of NDCs, such as: stakeholder engagement, the level of ownership from transport ministries, the links to national climate change and development policies, and the data used in the analysis and modelling approaches. Each case study drew conclusions from the reflection on the overall process, and proposed future steps in the NDC implementation process. The full report on case studies contains confidential information and is not published.

Methodology

The case study analyses are based on literature reviews and stakeholder interviews. The literature reviews included in-depth reviews of:

- The INDC and NDC documents submitted to the UNFCCC
- Published documents relating to the NDC development process
- National climate change plans and strategies
- Sectoral policy documents and mitigation action plans

The findings were further supplemented with information gathered from interviews with key stakeholders involved in the NDC development process, including policy makers as well as NDC development team members (local and international experts). The analysis also considered current actions being taken to develop sectoral action plans and strategies.

Several common challenges relating to the NDC development process were due to the extraordinary situation before COP 21. It was the first time countries developed NDCs and the timeframes were very tight. For example, NDC modelling had to be carried out over the course of only a few months, and documents had to be developed rapidly. Countries had to prioritise and focus their efforts on the most dominant sectors. Time and resource constraints also limited the extent to which key stakeholders were involved. Many sectors were not yet familiar with the topic of climate change, and had to be brought up to speed on the relevant issues. The situation for future NDC revisions appears to be different, since the key sectoral actors are already familiar with the process and the timelines are more relaxed. Nevertheless, the lessons are relevant for upcoming NDC cycles. Data collection, modelling, coordination processes and building capacities are long term tasks that need to develop over time.

Case study country	Population 2015 / 2030	Current / projected motorisation rate	Current transport GHG emissions / share of total	Projected transport GHG emissions / share of total in 2030
Bangladesh	161 million / 186 million	5 cars per 1,000 people (in 2014) / n/a	17 MtCO ₂ e / 14% (in 2012)	37 MtCO ₂ e / 16%
Colombia	48 million / 53 million	100 cars per 1,000 people (in 2010) / 600 cars per 1,000 people (in 2040)	23 MtCO ₂ e / 10% (in 2010)	49 MtCO ₂ e / 15%
Georgia	4 million (in 2016) / 3.8 million (in 2030) --> declining	139 vehicles per 1,000 (in 2011) / n/a	4.9 MtCO ₂ e / 37% (in 2014)	n/a
Kenya	44.2 million / 63.9 million***	60 motor vehicles per 1,000 people (in 2015) / n/a	7 MtCO ₂ e / 10% (in 2010)	24.2 MtCO ₂ e / 17%
Nigeria	182 million / 263 million	29 cars per 1,000 people (in 2010) / 72 cars per 1,000 people (in 2035)	55 MtCO ₂ e / 13% (in 2015)	103 MtCO ₂ e / 11%
Peru	32 million* / 42 million**	73 cars per 1,000 people (in 2014) / 99 cars per 1,000 people (in 2025)	15 MtCO ₂ e / 9% (in 2010)	31 MtCO ₂ e / 10%
Vietnam	92 million / 105 million	n/a / 292 cars per 1,000 people (in 2050)	32 MtCO ₂ e / 13% (in 2010)	n/a

Table 1: Key country highlights and overview of NDCs by case study

Overall target (reduction in GHG emissions by 2030 compared to BAU levels)	Sectors covered	Transport sector targets (reduction in GHG emissions by 2030 compared to BAU levels)	Transport mitigation measures
5% (unconditional target) 15% (conditional target)	All sectors apart from Land Use, Land-Use Change and Forestry (LULUCF).	9% (unconditional target) 24% (conditional target)	<ul style="list-style-type: none"> • Modal shift from road to rail • Reduced congestion and improved running of traffic
20% (unconditional target) 30% (conditional target)	<ul style="list-style-type: none"> • Transport • Energy • Agriculture • Housing • Health • Trade, tourism and industry 	No transport sector target included.	No specific mitigation measures are stated in the official INDC.
15% (unconditional target) 25% (conditional target)	All sectors apart from LULUCF.	No transport sector target included.	Vertically Integrated NAMA (V-NAMA) for the Urban Transport Sector
30% (conditional target)	<ul style="list-style-type: none"> • Forestry • Electricity generation • Energy demand • Transport • Agriculture • Industrial processes • Waste 	No transport sector target included, but reference to 2nd National Communication, which puts max. mitigation potential at ca. 17% (conditional)	No specific mitigation measures are stated in the official NDC.
20% (unconditional target) 40% (conditional target)	<ul style="list-style-type: none"> • Electricity generation • Industry • Oil and gas • Transport • Agriculture, Forestry and Other Land Use (AFOLU) 	No transport sector target included.	<ul style="list-style-type: none"> • Modal shift from air to high speed rail • Moving road freight to rail • Upgrading roads • Urban transit • Toll roads/road pricing • Increasing use of CNG (compressed natural gas) • Reform of petrol/diesel subsidies
20% (unconditional target) 30% (conditional target)	All sectors. Two sets of emissions scenarios one with and one without LULUCF.	No transport sector target included in the English language NDC submitted to the UNFCCC, but in the Spanish language background report a mitigation target of 3.37 MT CO ₂ e in 2030 is included	No specific mitigation measures are stated in the official NDC, but 10 measures are included in the Spanish language background report.
8% (unconditional target) 25% (conditional target)	<ul style="list-style-type: none"> • Energy, including transport • Agriculture • LULUCF • Waste 	No sectoral targets included.	<ul style="list-style-type: none"> • Develop public passenger transport, especially fast modes for transit in large urban centres • Restructure Freight transport towards a reduction in the share of road transport • Increase in the share of rail and inland waterways for freight transport • Encourage buses and taxis to use LPG

* in 2016, ** in 2050, ***projections based on 2009 census

Sources: Official NDC documents available at (UNFCCC, 2017), INDC and supporting documents: (MoEF, 2015), (MinTransporte, 2013), (Gobierno de Colombia, 2015), (Universidad de los Andes, 2016), (Government of Georgia, 2015), (Ministry of Environment and Natural Resources Kenya, 2015), (Republic of Kenya, 2017), (Energy Commission of Nigeria, 2015), (República del Perú, 2015), (Government of Viet Nam, 2015) and additional sources (OICA, 2015), (United Nations, 2015), (Windrock International / Remissia, 2016), (UN Population Division, 2017), (Asian Development Bank, 2014)

Increasing ambition – what are we talking about?

The Paris Agreement requires all countries to increase the ambition of their NDCs with every revision cycle. Ultimately, global ambition has to be high enough to keep global temperature change well below 2 degrees Celsius. Breaking this down to required ambition levels for individual countries appears more problematic. Nonetheless, considering the overall emission reductions necessary to achieve the Paris Agreement, and taking into account that sectors such as agriculture will always produce residual emissions, the transport sector needs to become fully carbon neutral around the middle of the century (UNEP, 2016). In other words, the ambition level needed in the transport sector should converge with a low-carbon pathway that meets carbon-neutrality around 2050 or shortly after. Current targets or actions included in NDCs do not yet conform to a full decarbonisation of the sector.

Clearly, this is a huge challenge for many reasons. Figure 3 illustrates some of the aspects affecting the level of ambition countries are willing to commit to.

Ambition, measured against the alignment with decarbonisation of the transport sector, is influenced by a range of factors. Available financial resources together with access to technology and capacity and knowledge influence the ability to act. This ability to act, together with visionary political leadership and good data influence the level of ambition. Data is important to model long-term strategies and technology pathways to avoid actions, which may lead to unintended lock-in effects (e.g. the switch to CNG reduces emissions to a certain extent, but CNG-infrastructure stands in the way of full decarbonisation in the longer term). If such ambition meets well-functioning institutions, ambitious actions on carbon-neutral transport are more likely to be taken. At the same time, civil society and the media may also influence decision-makers to take more ambitious actions where political leadership is lacking.

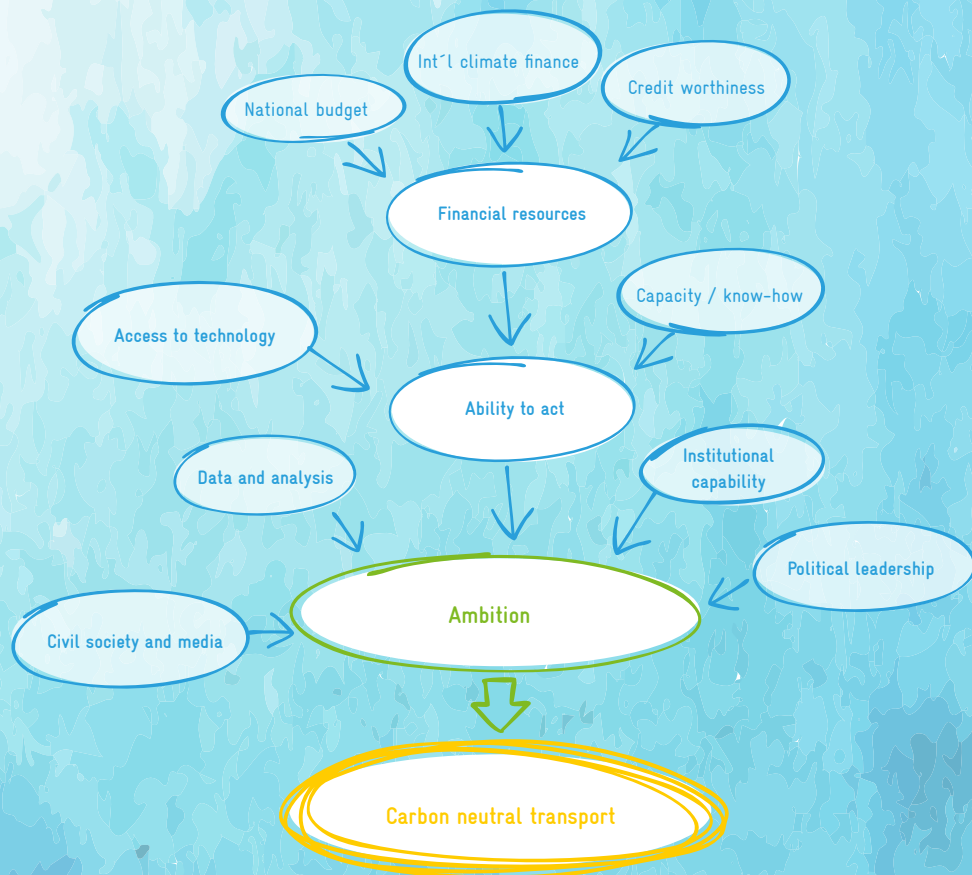


Figure 3: Factors influencing ambition in NDCs

3.1. Lack of transport data limits the sectoral ambition

The importance of good data for high level ambition targets should be highlighted. Analysis of the evidence suggests that estimates of mitigation potential are usually more conservative without adequate data and that the NDC development process was hindered by limited data availability. On the other hand, the analysis has also highlighted some examples where NDCs based on good data and a scientific modelling process have supported ambitious targets. In Colombia, for example, the NDC process further highlighted the relevance of the transport sector for the environment. The analyses performed have demonstrated, through a sound scientific process, that with predicted rates of motorisation it will not be possible to have liveable and sustainable cities in the future if no action is taken, and that ambitious targets were therefore necessary. Good data, however, does not necessarily lead to ambitious targets; evidence from the case studies suggests that in some cases ambition is limited by high-level political considerations, even when good quality data is available.

In terms of transport sub-sectors, the road transport sector was generally the one with the most detailed and robust data. Consequently, the modelling was more exhaustive for this sector than for rail, water and air transport. Also, road freight data was not covered exhaustively in a number of countries. Further data gaps included activity data (which limited the development of bottom-up models) as well as data on travel behaviour, number of in-use vehicles, modal split, fuel efficiency of the vehicle fleet, and occupancy rates. Several of the case study countries are amongst some of the most vulnerable to the effects of climate change, and a key gap was the lack of data required to assess synergies between adaptation and mitigation. A general issue across all case study countries was also the consistency of data across different data sources, and substantial resources were used up for collecting and verifying data. In some cases high uncertainties in the data lead to the exclusion of certain sub-sectors from the NDC.

Several case study countries have taken steps towards improving the quality of the data. In Nigeria there are plans to introduce a transport survey, intended to collect data on road-based transport through a ‘lighthouse project’ as part of the implementation effort. In both Bangladesh and Vietnam, transport-specific indicators for tracking implementation and effectiveness of both mitigation and adaptation actions will be part of the MRV system. In Vietnam, different government ministries and agencies, including the Ministry of Transport, were required by presidential decree to collect and contribute data. This is currently supported by GIZ and will result in a new statistical circular of the Ministry of Transport. Similarly, in Kenya, the Climate Change Act (2016) requires line ministries to report on their sectoral GHG emissions.

The limitations of modelling were mainly connected to gaps and uncertainties in the input data. In Bangladesh, Nigeria and Vietnam the LEAP⁵ model was used, which ensured a robust and scientific modelling approach. In Colombia, Peru and Kenya the modelling was carried out in MS Excel, in Georgia the MARKAL model was used.

The analysis, however, has highlighted some limitations in the modelling that were not driven by the lack or low quality of data. These are connected to the modelling capacity of the NDC teams which needs to be addressed for future NDC revisions. Specific areas of improvement that were identified were the modelling of sustainable development benefits, the development of marginal abatement cost curves, emission modelling and the assessment of mitigation-adaptation relationships. Furthermore, the importance of continuity in the modelling teams was highlighted.

In addition, the transparency of NDC modelling was limited. The assumptions made in the transport sector were not always clear. For example, the assumptions that fed into the development of the BAU, information on the policies considered for the BAU scenarios, and also details on how policies were dealt with that were introduced after the base year, were often missing.

For realistic assessments of emission reductions good databases and data management are needed for all modes of transport and all sub-sectors.

Key for future NDC revisions will be improved transparency around modelling assumptions.

⁵ Long-range Energy Alternatives Planning System

3.2. Buy-in from key transport actors is essential for ambitious sector targets

Highly ambitious emission reductions in the transport sector need political leadership.

High ambition at the sector level can only be achieved with the buy-in from key transport actors such as state agencies but also transport industry representatives (e.g. haulier or vehicle manufacturers' associations). The transport sector in developing countries plays an important role in providing the population with access to services and is closely linked to economic prosperity. It is particularly difficult to push an agenda that is not directly connected to growth in the sector. In countries where the NDC was clearly linked to the country's national development plans (e.g. Colombia or Kenya) it was generally easier to get support from key actors for the NDC i.e. the stakeholders were more interested in being involved in the NDC development process and showed clearer support for emission reductions targets in the sector. Stakeholders highlighted that a quantification of the potential sustainable development benefits of transport mitigation would have improved sector buy-in even further. Support from key actors is essential not only for setting ambitious targets, but also to ensure that NDC implementation in the future will be ambitious and successful.

Lack of institutionalised processes for NDC development limited engagement of transport ministries.

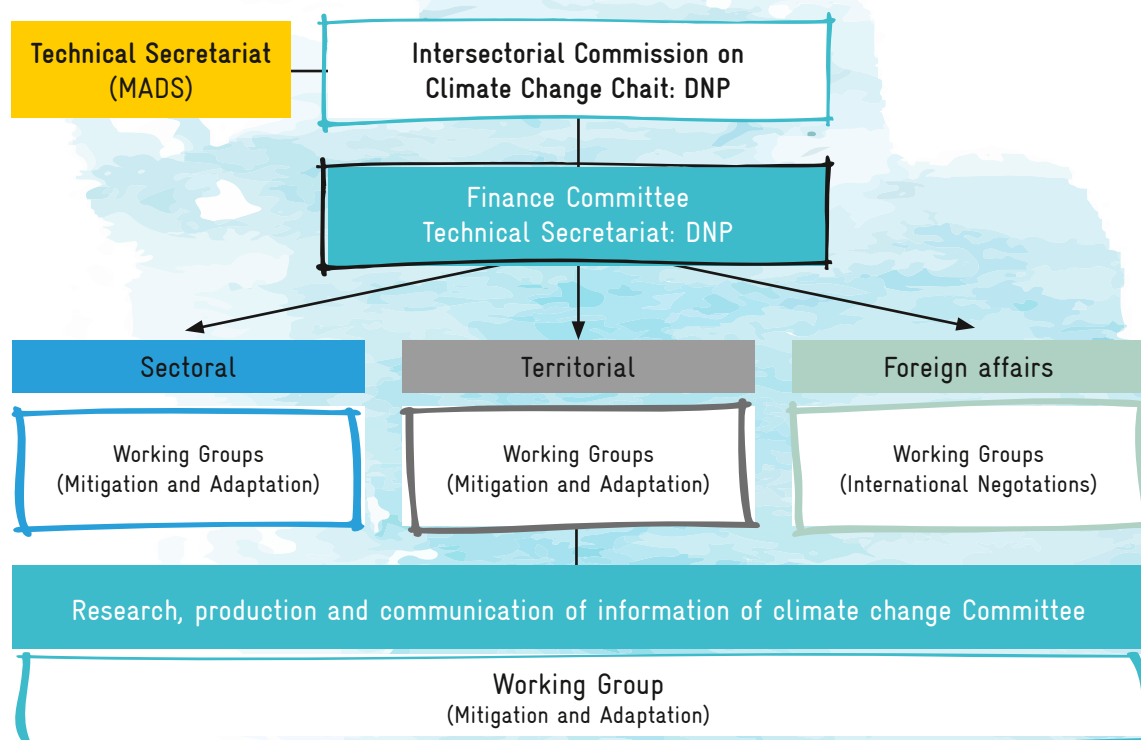
In Colombia, the scientific approach to emission scenario modelling as well as the high level of involvement of sector stakeholders ensured the sectors' support for the emission reduction target. Nigeria had the advantage of strong support for the overall NDC through the president. In Bangladesh, the alignment with national strategies that focus on the country's development priorities ensured increased ownership from the government. Also, in Vietnam, the alignment with national strategies (e.g. Climate Change, Green Growth and Sustainable Development) that had been developed since 2011 has helped gain the support of key stakeholders and led to the proactive promotion of a number of climate change response measures.

The case study analysis has shown that during the development of the NDC, the cooperation between the relevant authorities was not always satisfactory. In those cases the transport sector ministries had only minor involvement in the NDC development pro-

cess, this was viewed to have negatively impacted on ownership and ambition from the transport sector. In at least three of the case study countries the engagement with policy makers in the transport sector appeared to be weak, despite the various stakeholder engagement processes, such as meetings, workshops, and technical and advisory committees initiated as part of the NDC development process. The study also identified that transport sector ministries often did not work closely with the national INDC focal point leading the process, which in many cases was the ministry of environment (or equivalent). In one country, no Ministry of Transport existed at all.

Coordination is also important for modelling: For instance, in one case study, the lack of coordination between the institution in charge of providing access to emission data and the modelling team led to inefficiencies, such as having to repeat the modelling process several times in order to take into account new emission data. This lack of coordination limited the quality and efficiency of transport sector modelling compared to those countries with strong engagement from their transport sector policy makers.

Some countries have already initiated steps to improve the capacity and coordination of sectoral ministries. For example, in Kenya, capacity development activities are underway across various sectors, including the transport sector under the USAID/ UNDP Low Emission Capacity development project. In addition, the new Climate Change Act (from May 2016) has tasked each sectoral ministry to set up a climate change unit that will coordinate NDC implementation and reporting in the respective sectors. The institutionalisation of a climate change-focused role inside the Ministry of Transport, Infrastructure, Housing and Urban Development is yet to take place. Colombia has also taken steps to improve coordination between all entities involved in climate change by introducing the National Climate Change System (SISCLIMA), which brings together national and international actors, coordinating work on climate change that has, to date, been spread widely with few inter-linkages. Figure 4 gives an overview



MADS = Ministerio de Ambiente y Desarrollo Sostenible / Ministry of Environment and Sustainable Development
DNP = Departamento Nacional de Planeación / National Planning Department

Figure 4: SISCLIMA Organisational Structure (Source: (E3G, 2014))⁶

of the structure of SISCLIMA. The Institute of Hydrology, Meteorology and Environmental Studies (IDEAM), who develop Colombia's emission inventory, is responsible for the Information of Climate Change Committee. This committee is in charge of researching, producing and communicating key data on climate change. With the introduction of SISCLIMA, Colombia has taken an important step to institutionalise cooperation between key actors in the field of climate change.

The introduction of the technical information committee under SISCLIMA is also an important step in ensuring the completeness and consistency of climate-relevant data. In the future one entity will be in charge of managing the information for future

processes of updating the reports for the UNFCCC, the NDC, etc. In the transport sector there are further plans to oblige the authorities in bigger cities to report on the modal split and total number of trips every 3 years to improve the quality of activity data.

Across the other case study countries, plans for governance and coordination are being developed to various degrees of completion as part of the NDC implementation action plans. In Bangladesh for example the action plan for NDC implementation in the transport sector will include arrangements for governance and coordination including roles for the relevant ministries and guidance on how to engage with stakeholders and data providers effectively.

Transport and climate ministries need to shape institutions and procedures for sectoral integration.

⁶ MADS = Ministerio de Ambiente y Desarrollo Sostenible / Ministry of Environment and Sustainable Development, DNP = Departamento Nacional de Planeación / National Planning Department

3.3. NDC should be linked with transport sector strategies

Transport plans and policies are key guidelines for taking action.

Most countries have focused on the alignment of mitigation options and targets with existing, or upcoming, national level sectoral policies, climate strategies and communications submitted to the UN-FCCC. Given the time and budgetary constraints, having such policies and strategies in place provided a strong advantage for the NDC development teams in those countries. Concerns were raised in cases where the timelines of the transport sector policies and plans were not in line with the NDC targets. For instance, in some cases an existing transport sector climate action plan for 2020 had limited influence on the NDC with a 2030 time-horizon. This was due to the lack of clarity on how the two plans would fit together given their different timelines.

Colombia provides a good-practice example for alignment of the NDC with existing policy; the Universidad de los Andes conducted the modelling for the NDC and took into consideration transport

policy documents, such as the National Mitigation Action Plan for the transport sector (PAS), for the modelling. Furthermore, the Ministry of Transport reviewed all of the models, making sure that they were in line with what was developed in the sector previously. A good alignment with the national climate strategies was therefore ensured as the NDC was based on work carried out for the development of Colombia's Low-Carbon Development Strategy.

In Vietnam, climate change strategies are drivers for transport strategies and energy programmes with transport components. The NDC was aligned with the strategic sustainable transport policy framework, which focuses on different transport specific strategies. The active role of the Ministry of Transport and its Department of Environment was clearly advantageous for including transport in the NDC.



3.4. Transport authorities need climate change expertise

The analyses of case studies has shown that there is a need for capacity development in transport ministries. NDC development was generally coordinated by the climate ministries, and the modelling was often carried out by external experts. In many of the NDC processes analysed, the involvement of the transport ministries was minor. The reasons for this were in some cases due to different priorities and interests, but predominantly due to a lack of climate change expertise in the transport ministries as well as the lack of institutionalised processes to involve them. Across the case studies, international support was key for the development of the NDC but also for transferring international expertise to local consultancies. In Nigeria for example, the capacity building happened through full-time secondees into the NDC team, which was highlighted as a particularly efficient way of transferring knowledge. Also in Vietnam the NDC development process was considered to be a good example for international cooperation, as national and international experts worked successfully and effectively together. To improve the knowledge sharing even further, more face-to-face exchange over a longer period of time was considered to be beneficial. Similar suggestions were made in Colombia, where it was proposed that more international experts should stay for longer periods of time in the transport ministries to help develop technical knowledge and also increase awareness for climate change.

In many of the case study countries, the climate ministries have now transferred some of the NDC responsibility to different sectors. The current cooperation of transport ministries with climate change teams, however, still varies significantly – ranging from being virtually non-existent to very engaged. In Colombia, the Ministry of Transport has taken steps to take the NDC forward by creating a new division called GAADS (Group for Environmental Affairs and Sustainable Development), which is now in charge of modelling and reporting on mitigation measures in the transport sector. In Vietnam, the Department of Environment within the Ministry of Transport now organises capacity development on climate. The institutional setting also helps to mainstream key knowledge. For example, the Ministry of Transport has set up an internal working group for the preparation of a “GHG inventory in Transport”

which will report data to the Ministry of Environment and Natural Resources for the official Vietnamese inventory.

A common problem during the NDC development process, as well as in the ongoing NDC implementation process, is the lack of personnel in climate change teams of transport ministries – if they exist at all. Across all case study countries limited human resources were an issue and hampered the NDC process. Personnel with technical knowledge are needed as well as staff with strategic/policy level knowledge. To be able to take NDCs forward in an effective manner, resources need to be increased and accounted for in ministerial budgets for staff.

A key lesson learnt highlighted in some of the case studies was the importance of continuity in teams to build up expertise and knowledge. In one extreme example, the experts in the climate change team in the transport ministry are only contracted on a yearly basis, with no guaranteed overlap in team members from one year to the next. This practice has led to a constant loss of knowledge, which has slowed down the process of building climate change capacity within the ministry. Similar issues, albeit less extreme, were also identified in other case study countries. In Vietnam, the Transport Development and Strategies Institute (TDSI), a research centre owned by the government, helps to ensure key knowledge is maintained and built upon in this area.

Climate change capacity is not only needed on national level, because many decision on transport are taken by regional or local level authorities. Except for NDC development in Georgia, where the key stakeholders in the process were the cities, regional or local authorities, case study countries were often insufficiently engaged during the NDC development process. The analysis identified the particular importance of capacity development at the regional/local level for taking NDC implementation forward. Given that many of the identified mitigation actions are under the remit of municipalities and regional authorities, it is important that there is capacity and leadership at the regional/local level to help secure financing, implementation and monitoring. Across the case study countries, a current lack of such capacity was highlighted, along with the urgent need to address the issue.

Continuity in the climate change units of the transport ministries is needed to guarantee that capacity development is efficient and sustainable.

For successful NDC implementation in the transport sector, capacity needs to be developed in transport authorities at the national, regional and local level (e.g. urban transport).

4. Recommendations for sectoral integration

Since the first INDC submission in 2015, countries have worked on NDC implementation plans and some countries have further developed transport mitigation actions. In parallel, countries are improving their databases and developing capacity in preparation of NDC submission in 2020. NDC development is a periodic process, with NDC submissions due every five years. Throughout the process stakeholder dialogue will be important. As countries progress, more ambitious actions will have to be considered with each new NDC. Activities supporting NDC development follow these cycles.

More specifically, the NDC timeline can be broken down into three iterative process steps, which partly run in parallel:

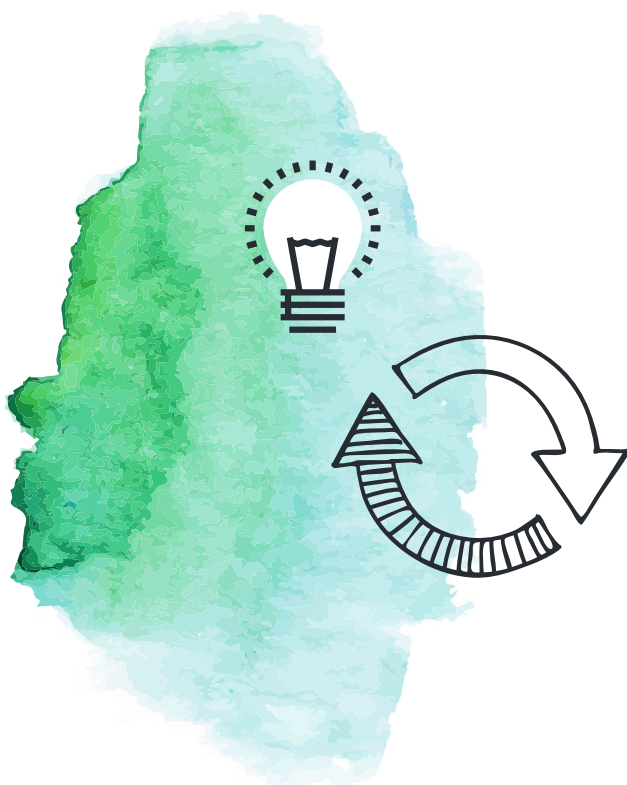
1. Preparation of the NDC groundwork (data collection, analysis and maintenance) and – for subsequent NDCs – monitoring
2. Development and negotiation of the NDC (pulling information together from different sectors, modelling and agreeing on NDC targets)
3. NDC implementation and integration in sectoral policies

Based on the assessment of the lessons learnt across the different case study countries, a number of recommendations were developed. All recommendations have to be considered in the light of the NDC timeline as shown in Figure 5 (see next page).

The recommendations developed as part of this study have been tailored for the transport sector, focusing on the following key actors in the NDC process:

- Climate ministries⁷, i.e. the ministries responsible for the NDC coordination, depending on the organisation of the national climate process these could be environment/climate or energy ministries
- Sector ministries (typically transport ministries but depending on the individual measures could also be energy ministries (e.g. for measures on electric vehicles) or industry ministries (e.g. for fuel efficiency measures))
- Donors/the international community

These are the stakeholder groups that were most prominently highlighted in the input from the case study stakeholders. The NDC process of course involves further types of stakeholders, such as finance ministries, industry, NGOs or academia, which are not discussed in detail in this study but are mentioned throughout the following chapter.



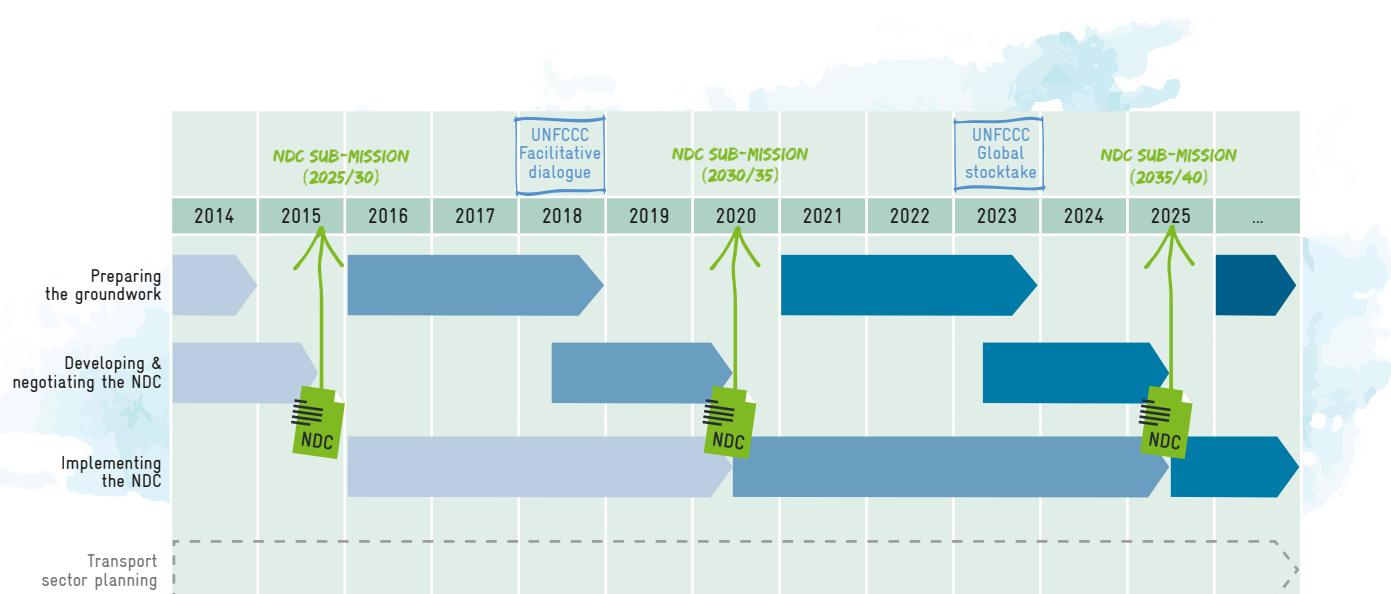


Figure 5: Timeline for the NDC cycle

4.1. Recommendations for climate ministries

Climate ministries are particularly relevant in steering the NDC development process and typically lead the development of the NDC: For the transport sector, they have to coordinate with transport ministries and consider transport data. Crucial aspects in NDC development which climate ministries have to consider are data collection processes and coordination formats between key actors.

As important for transport authorities to build capacities on climate change, climate ministries need to develop knowledge on transport mitigation actions. This could be achieved through a dedicated transport unit or working group placed within the climate ministry. Such bodies could help setting up data sharing agreements and provide emission factors (in g CO₂/km) for assessing impacts of transport mitigation actions. Those bodies may also guide the assessment and modelling of emission reduction potential for mitigation actions. However, this task may also be given to transport ministries or even be carried out jointly.

Closing gaps in the capacity to model transport GHG mitigation measures is important for preparing the NDC groundwork and will ensure a more comprehensive modelling approach for the first and subsequent revisions to NDCs. Specific areas of improvement highlighted by interviewees were the modelling of sustainable development benefits, the development of marginal abatement cost (MAC) curves, emissions modelling and the assessment of relationships between GHG mitigation and climate adaptation. In the transport sector, sustainable development benefits of transport GHG mitigation measures that in particular should be included in the calculations are impacts of alleviated congestion, less energy imports and reduced air pollution.

In addition, the transparency of the modelling should be improved for future NDC revisions. Modelling teams should involve transport ministries in the process of developing assumptions for the scenarios. Climate ministries should make sure that processes/templates are in place to capture model-

ling details, such as the assumptions used for BAU scenarios. Furthermore, data needs to be available in a format that can be accessed and easily understood by other stakeholders involved in the NDC development process.

Climate ministries need to take charge and facilitate cooperation with transport ministries through the establishment of relevant institutions and procedures. This will help to formalise the cooperation needed for successfully taking NDCs forward, and also help ensure longer-term collaboration. As discussed above, the NDC development was particularly successful in cases where the NDCs were clearly linked with transport sector policies, plans and strategies. The same will be the case for future NDC developments (phase 2). Measures in line with transport sector plans will be more likely to receive support from key transport actors, and also be more likely to be quickly implemented.

Institutional arrangements, such as cross-ministerial working groups, also help to ensure resource needs within the transport sector and other sectors are met when accessing climate finance. Working groups or round tables could facilitate data sharing

agreements and bring together climate and transport experts to review implemented mitigation measures for the transport sector. Transport sector mitigation targets and commitments need to refer to real policy development and effective implementation. The institutional arrangements ideally include coordination between the energy and transport sector e.g. in order to communicate the transport sector's demand for renewable electricity. Such participative scenario development processes can strengthen the ownership and buy-in of relevant stakeholders, which become crucial for NDC implementation.

The climate ministries could promote the need for well-motivated transport climate action plans (in line with existing policies, e.g. national development plans, climate change strategies and transport sector mitigation and adaptation action plans). To ensure support from the transport sector, the sustainable development benefits of transport mitigation measures should be assessed by the NDC modelling teams and discussed in joint working groups, including the climate and transport ministries. Any sustainable development benefits identified could be used for United Nation's Sustainable Development Goals (SDGs) reporting as an added benefit.

Phase 1: Preparing the NDC groundwork (year 1-3)	<ul style="list-style-type: none"> • Building capacities on transport within climate ministries. • Allocating sufficient resources and time to support the assessment of measures. • Closing gaps in the modelling of mitigation measures for the transport sector, e.g. sustainable development benefits, emission factors or abatement costs. • Facilitating data sharing agreements.
Phase 2: Developing the NDC (year 3-5)	<ul style="list-style-type: none"> • Considering transport sector plans in NDC development and suggest transport sector targets based on assessment of mitigation potentials. • Actively engaging transport stakeholders early on in the process • Coordinating between the energy and transport sector e.g. in order to communicate the transport sector's demand for renewable electricity.
Phase 3: Implementing the NDC (year 6 onwards)	<ul style="list-style-type: none"> • Setting-up institutional arrangements, (e.g. a transport working group) to coordinate NDC implementation in transport, and involve all relevant ministries (e.g. ministry of transport, energy, finance, etc.) • Engaging in detailed discussions of policy development to advocate for effective implementation. • Organising review meetings and request evaluation of measures.

Table 2: Overview on recommendations for climate ministries

4.2. Recommendations for transport ministries⁸

Transport ministries are generally in charge of policy development and implementation of measures in the transport sector⁹ and key activities for NDC implementation¹⁰. They also have to collect and provide relevant transport data. The degree of involvement of transport ministries in the NDC development process depends on their technical capacity and resources.

In order to feed into phase 1 of the periodic NDC development (preparing the groundwork) it will be very important to introduce dedicated climate change experts within transport ministries, with the knowledge and capability to understand the links between the transport sector and climate change, and to take an active role in coordinating with various transport sector stakeholders. Vietnam is a good example where the Department for Environment in the Ministry of Transport is responsible for climate change in transport. It was not only consulted during NDC development but is also identified as coordinating body for NDC implementation.

Technical knowledge needs to be developed in transport ministries, in particular, around modelling, data collection and monitoring, reporting and verification. If the full capacity cannot be developed in-house, the transport ministries need at least enough understanding of the topic to be able to assess and judge the modelling outcomes. Further areas of capacity development could be policy design and implementation but also on identifying and accessing financing options. The transport ministries need to have enough funds and personnel available to develop climate knowledge. Ideally, these additional funds should be provided to sector ministries by treasuries/finance ministries from overall annual budgets. The ministries furthermore need to ensure that there is a level of continuity in the climate change teams to ensure that key knowledge is maintained and built upon over time.

A further step that is key for the first phase in the NDC process is the preparation of improved transport data collection. To ensure that data is consistent

Data gaps in transport

The analysis of NDC data collection in the case study countries concluded that activity data and vehicle fleet data for road transport (to enable bottom-up modelling) are common data gaps. None of the countries included country specific and detailed fuel-consumption rates and emission factors in models, but estimated values based on literature research. In addition, cost data to facilitate the development of marginal abatement cost curves is often missing. Here, the international community could help; for example, to develop regular transport surveys to collect key data.

Existing international initiatives like SuM4All¹¹ and support provided through the International Transport Forum (ITF) or the International Energy Agency (IEA) already help countries with some aspects of transport data collection. Nevertheless, further tailored support will be needed to address individual gaps. The GIZ project, Advancing Transport Climate Strategies, is currently supporting Kenya and Vietnam in data collection, data management, modelling and adoption of emission factors.

and covers all indicators and transport sub-sectors required for successful modelling, periodic and recurring data collection processes have to be established. Larger data collection exercises are needed, with processes to regularly and consistently archive and update the data. Transport ministries, in cooperation with the climate ministries, need to define indicators and data collection processes (e.g. mileage surveys) as well as identify suitable collection intervals and mechanisms for establishing consistency in data reported by different entities.

Given that many of the currently envisaged mitigation measures are focused on urban and passenger transport, municipalities and regional authorities play a crucial role in the implementation process (phase 3 in the NDC process). At the local/regional level, the approach to develop capacity might be

⁸ In countries where there is no dedicated transport ministry (e.g. Georgia), these recommendations are aimed at the relevant ministries that cover transport sector issues.

⁹ For some measures, other ministries are in charge e.g. industry ministries for fuel taxes or energy ministries for electric vehicles.

¹⁰ some responsibilities, e.g. for urban transport lie with the local authorities

¹¹ Sustainable Mobility for All (SuM4All) is a multi-stakeholder partnership that acts collectively to help transform the transport sector.

most effective if rolled out via a nation-wide capacity network. Transport ministries should take charge for building up a capacity development programme, if necessary with international support, which will then be made available to the individual local/regional authorities. For continued support and capacity development at a local level, it could be advantageous to build a market for consultancy work locally. For example, the use of a team containing both international and national consultants, as used for developing Nigeria's and Vietnam's NDCs, enabled the transfer of international experience to local consultancies. In order to motivate mitigation actions at the local level, national ministries can also make their administrators at different levels of hierarchy accountable to the achievement of mitigation targets or the implementation of mitigation measures. For instance, some countries are discussing whether to include climate change targets as part of performance contracts of government staff, e.g. in Kenya.

Transport ministries should take charge to ensure the support of key actors across public authorities (e.g. state agencies covering different sub-sectors, such as civil aviation authorities, road safety authorities, rail agencies, etc.) as well as industry representatives (e.g. association of hauliers, vehicle manufacturers, fuel distributors, etc.) and the wider public. The involve-

ment of transport ministries could, for example, be ensured through sector targets. Bangladesh indicates in its NDC that the transport sector target shall by 2030 reduce emissions by 9% (unconditional) to 24% (conditional to international support) compared to the baseline scenario. Peru (3.37 MT CO₂e in 2030 against BAU) and Kenya (2-3.5 Mt in 2030 against BAU) have also identified transport targets in climate action plans referred to in their NDCs. Such targets move responsibilities to transport ministries and help to mainstream actions in sectoral policies. However, transport ministries must be involved and actively participate in NDC development. Only receiving targets from the climate ministries will not lead to creating ownership and effective implementation.

Engagement activities here need to be tailored to the different stakeholder groups, including the private sector. A dialogue with stakeholders raises awareness across the sector about the importance of transport for climate change, and also highlights potential sustainable development benefits of transport sector mitigation actions. This creates more urgency for taking mitigation actions. Stakeholder activities could be steered by a dedicated working group or committee.

Phase 1: Preparing the NDC groundwork (year 1-3)	<ul style="list-style-type: none"> • Developing dedicated climate change experts/units within transport ministries (personnel / budget). • Establishing periodic and recurring data collection processes, of which timescales should be in line with 5-year NDC cycle.
Phase 2: Developing the NDC (year 3-5)	<ul style="list-style-type: none"> • Actively participating in NDC development stakeholder groups
Phase 3: Implementing the NDC (year 6 onwards)	<ul style="list-style-type: none"> • Developing NDC implementation plans for transport and mainstream NDC objectives into transport policies. • Allocating budget to implement mitigation actions. • Getting hold of capacity development programmes for transport authorities also for the local/regional level. • Ensuring the support of the private sector and NGOs (integrated and cooperative stakeholder engagement process).

Table 3: Overview on recommendations for transport ministries

4.3. Recommendations for international donors

Donor organisations (such as international aid agencies, development banks, philanthropies, the UN, etc.) can support government agencies with financial and technical assistance across all NDC steps. Essentially, donor and international cooperation support should enable countries to increase the level of ambition of their GHG mitigation (and climate adaptation) efforts and support implementation. This support is also crucial to align the support with NDC timelines, so that data and outputs are available when needed, e.g. development of updated emission scenarios does not start only a year before the next NDC submission. This means that timings of NDC development need to be considered when designing funding lines and support programmes.

In particular, scenario development will benefit from guidance on the timescales that need to be considered in order to allow enough time for robust data collection and modelling before NDC revisions are required. Whenever there are no near-term submission deadlines, priority should be put on improving databases and resource capabilities, so that ministries are well-prepared when the NDC development process kicks-off. Together with the national authorities, data collection timescales have to be developed that ensure relevant data is available for future steps in NDC development. A thorough gap analysis is needed and effective data collection procedures should be designed to close these gaps.

International organisations working on transport data such as the International Energy Agency, the International Transport Forum or the Global Tracking Framework of the Sustainable Mobility for All (SuM4All) Initiative may help with selection of indicators and can be used for capacity building. There could also be options for donors to jointly support improvements to data. This could be achieved through endorsing an open data policy and putting more effort into ensuring that technical background reports and databases, built up in their work, are handed over to public institutions as well as made

International initiatives on NDC implementation relevant for transport

- The NDC partnership¹²: a coalition of countries and institutions working together to mobilise support and achieve ambitious climate goals while enhancing sustainable development.
- The NDC cluster¹³: support to developing countries in a timely and comprehensive manner with the implementation of their nationally determined contributions (NDCs) through the International Climate Initiative (IKI)
- The Global NDC Implementation Partners (GNIplus)¹⁴: an initiative to accelerate developing country climate action.
- Capacity Building Initiative for Transparency (CBIT)¹⁵: The goal of the CBIT is to strengthen the institutional and technical capacities of developing countries to meet the enhanced transparency requirements of the Paris Agreement.
- The Partnership on Transparency in the Paris Agreement¹⁶: The Partnership promotes practical exchange and political dialogue between countries on enhanced climate transparency.
- Climate Finance Accelerator¹⁷: an initiative that brings countries and finance experts together to provide fast track practical advice to accelerate NDC finance planning and implementation.

publicly available and shared in the community. Finally, development and donor organisations should put effort into harmonising quantification approaches and the use of data.

Since more and more support is targeted towards implementation and revision of NDCs, early coordination of donor support becomes ever more important. The NDC Partnership launched in December 2016 can be instrumental in this task. A thematic

¹² <http://www.ndcpartnership.org/>

¹³ <https://www.ndc-cluster.net/>

¹⁴ <https://climatepolicyinitiative.org/press-release/cpi-partners-receive-funding-netherlands-launch-new-global-ndc-implementation-platform-will-accelerate-developing-country-climate-action-starting-kenya/>

¹⁵ <https://www.thegef.org/topics/capacity-building-initiative-transparency-cbit>

¹⁶ <https://www.transparency-partnership.net/>

¹⁷ <https://ec.ricardo.com/events/climate-finance-accelerator-london-2017>

working group on transport may be beneficial to support countries that ask for support in the transport sector. Such innovative programmes/platforms for knowledge sharing could provide trainings and enable peer-to-peer learning and help to channel more technical assistance on climate change into the transport sector.

International finance that is earmarked for NDC implementation in transport can also help in changing the agendas of transport ministries, and creating interest in capacity development and coordination. However, support could also be provided to transport sector ministries to help identify and access public and private financing options for NDC implementation projects. To use also traditional development aid, the international community could put more emphasis on quantifying sustainable development benefits and avoid costs of adaptation in the transport sector. This would also help to put climate change mitigation higher on the political agenda in the transport sector.

Providing more funding for pre-feasibility studies and preparation of mitigation actions could be another focus for donor organisations. A common issue for NDC implementation support regarding financing, is the lack of bankable projects. More funding lines may be needed that address that gap and provide grants for project development and capacity development. GIZ's TRANSfer¹⁸ project funded through the International Climate Initiative of the German Ministry for Environment represents a good case in point. Essentially a preparation facility for mitigation measures in the transport sector, TRANSfer has successfully facilitated the development of several transport NAMAs, four of which have won international climate finance (e.g. from the NAMA Facility) and are now being implemented. While some funding is already available, more of this type of support is needed to achieve the required transformative changes within the scale and short timelines necessary to achieve the Paris Agreement.

Phase 1: Preparing the NDC groundwork (year 1-3)	<ul style="list-style-type: none"> • Ensuring that the support provided is timely and linked to NDC cycle. • Providing access to expertise on transport and climate change (e.g. helpdesk on transport data and mitigation actions). • Providing support for data collection and modelling, as well as policy design to transport ministries and their agencies. • Coordinating with donors working on transport (not just climate/NDC).
Phase 2: Developing the NDC (year 3-5)	<ul style="list-style-type: none"> • Providing insights into best-practice stakeholder engagement processes. • Communicating the sustainable development benefits of transport mitigation actions (e.g. increasing energy security, reducing air pollution, etc.).
Phase 3: Implementing the NDC (year 6 onwards)	<ul style="list-style-type: none"> • Enabling transport agencies to access climate finance • Providing earmarked climate finance to transport. • Supporting pipeline development for transport mitigation actions (e.g. pre-feasibility studies, stakeholder consultations) to increase the number of bankable projects. • Providing technical assistance on climate action implementation (e.g. policy design).

Table 4: Overview on recommendations for donors

5. Outlook on raising ambition of NDCs

NDCs are political documents that list a country's aims and are used in the context of international negotiations. While the INDCs submitted before COP21 in Paris have been developed under time constraints and there were neither examples nor common standards for NDCs at the time of development, the next generation of NDCs can be prepared in a better way and be more closely linked to long-term emission reduction strategies. To gain a more comprehensive picture of how transport can be considered in upcoming NDCs, the analysis at country level gave important insights into current barriers and opportunities for raising ambition. The assessment of the case studies has also shed light on how ambition regarding GHG emissions reductions in the transport sector can be improved beyond the universal need for political leadership.

To successfully increase ambition, there is a need to link mid-term NDC targets more closely with long-term decarbonisation strategies, something that is currently missing in most NDCs. If long-term targets up to 2050 are not considered, the NDC targets might not be ambitious enough to meet them. Ideally, modelling would include not only identification of mitigation potentials, but also back-casting on how to meet the long-term targets. Developing such pathways requires improving the transport sector database and transport demand forecasts step-by-step. Increased data quality will help to improve the accuracy of modelling, and consequently will give the modelling findings greater authority in political decision making.

In addition, the pool of measures considered needs to be widened. This includes intensification of avoid, shift and improve options, such as consideration of fuel economy standards or the upscaling of measures from one city to a nation-wide programme, as well as moving towards renewable fuels. To decarbonise, it will not be enough (but important) to improve the efficiency of existing systems; big and disruptive ideas are needed too.

Ultimately, decarbonisation of the transport sector will depend on the energy transition and cannot be handled by transport stakeholders alone. Instead it must be developed in a coordinated manner with other sectors, e.g. the energy sector for renewable fuels (Power-to-Gas or Power-to-Liquid) or the industry sector for provision of alternative vehicle technologies. Access to improved technology options is an important ingredient for higher ambition in developing and emerging countries. Additional research and development funds and projects, both international and national, private and public, may contribute to improve the ability to act of transport decision-makers.

Climate ministries, together with transport ministries, should aim at initiating a dialogue with other sectors to explore possible synergies. For future NDCs, this might help identify measures that have not been considered previously in an isolated analysis of the transport sector, e.g. electric vehicles integrated into smart grids for renewable energy or fuel pricing. Such cross-sector cooperation could be supported by the climate ministries through institutionalised processes of cooperation between sectors.

Use back-casting to align NDCs with long-term decarbonisation pathways

Getting more renewable energy in the transport sector is essential

Climate finance for decarbonising transport will need to trigger changes in national budgets

Another aspect influencing the ability to act of transport ministries is the availability of financial resources. Ultimately, climate finance for decarbonising transport will need to trigger changes in national budgets, channelling available funds towards sustainable transport, upgrading resources to build institutional capacity, and incentivising low carbon transport options. Currently, this is not yet addressed in NDCs. In addition, stimulating private capital is required at a larger scale, both for technology development and provision of low-carbon transport services. The international community urgently needs to develop new finance instruments that stimulate and allow the transport sector to act fast.

Promotion of sustainable development benefits of transport mitigation actions will help ministries to priorities climate action

For political leadership e.g. by transport ministries, the promotion of the sustainable development benefits of transport mitigation actions will be crucial. An improved understanding of such benefits may help to prioritise transport actions. Many mitigation measures contribute to better air quality, congestion reduction and increased public health, all of which spur prosperity and wellbeing, but may not be fully considered or recognised in the development of NDCs by government ministries.

Different ministries may focus on different benefits:

- Energy security is a topic for energy ministries and finance ministries and may lead to fuel economy policies or electrification;
- Air quality benefits may be an incentive for climate (environmental) ministries to build up transport capacity and partner with health ministries;
- Pricing measures may be interesting for finance ministries.

Making all sustainability benefits explicit will also help national policy makers better understand the contribution of transport GHG mitigation actions to achieving wider sustainable development goals. A sound scientific basis for emission scenarios and their development benefits may increase the buy-in of key actors in the sector, which is essential for the endorsement of high ambition emission reduction targets.

Finally, high ambition targets can also be driven by pressure from the private transport sector. A prerequisite for this, however, is that the sectoral stakeholders have a good understanding of the issues and the related consequences. Such an understanding can be developed through an integrated and cooperative stakeholder engagement process during the modelling and policy discussion. This ensures that key actors verify data and assumptions related to policies. Raising awareness across the sector on the importance of transport to tackle climate change and providing policy certainty may help create an improved urgency for taking actions.



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Annex 1: Transport in Developed/Industrialised Countries NDCs (Annex-I-Countries)

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Australia	92,49 Mt CO ₂ e	<ul style="list-style-type: none"> Investigate opportunities to improve the efficiency of light and heavy vehicles
Belarus	11,78 Mt CO ₂ e	No direct reference to the transport sector
Canada	176,39 Mt CO ₂ e	<ul style="list-style-type: none"> Transportation sector regulations establish progressively more stringent GHG emission standards for heavy-duty vehicles (model years 2014–2018). The federal government is currently developing additional regulatory measures that will establish more stringent standards in the transportation sector for heavy-duty vehicles of post-2018 model years ...and for passenger automobiles and light trucks (2011–2025) The federal government is also taking action to address transportation emissions from the rail, marine, and aviation subsectors
European Union	870,61 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Iceland	0,82 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Japan	208,45 Mt CO ₂ e	<p>Transport GHG emission target: 27% below 2013 levels in 2030 (not exceeding 163 Mt CO₂e)</p> <ul style="list-style-type: none"> Improvement of fuel efficiency, promotion of next-generation automobiles comprehensive measures for eco-friendly ship transport (accelerated promotion of energy saving ships) energy consumption efficiency improvement of aviation Reduction of land transport distance by selecting nearest port, and comprehensive low-carbonization at ports Promotion of Intelligent Transport Systems ITS (e.g. control of traffic signals) Promotion of automatic driving, eco-driving and car sharing other measures in transport sector (e.g. traffic flow improvement) Optimization of truck transport Making vehicle transport business more eco-friendly by eco-driving and promotion of collective shipments Energy consumption efficiency improvement of railways Promotion of public transport, modal shift to railway.
Liechtenstein	n/a	No direct reference to the transport sector
Monaco	n/a	<ul style="list-style-type: none"> Development of clean public transport, of "soft" transport options (pedestrian footpaths, cycling) Development of (...) electric vehicles (incentive policy will be continued and adapted over the coming years)
New Zealand	14,04 Mt CO ₂ e	<ul style="list-style-type: none"> Increase renewable energy generation to 90 percent by 2025 to further support transformation of the transport sector
Norway	14,04 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Russia	238,4 Mt CO ₂ e	No direct reference to the transport sector
Switzerland	16,92 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Turkey	60,91 Mt CO ₂ e	<ul style="list-style-type: none"> Promoting alternative fuels and clean vehicles Realizing high speed railway projects Increasing urban railway Systems Implementing sustainable transport approaches in urban areas Reducing fuel consumption and emissions of road transport with National Intelligent Transport Systems Strategy Document (2014–2023) Achieving fuel savings by tunnel projects Scraping of old vehicles from traffic Implementing green port and green airport projects to ensure energy efficiency Implementing special consumption tax exemptions for maritime transport
Ukraine	26,99 Mt CO ₂ e	No direct reference to the transport sector
United States of America	1728,75 Mt CO ₂ e	<ul style="list-style-type: none"> Introduce fuel economy standards for light-duty vehicles for model years 2012–2025 and for heavy-duty vehicles for model years 2014–2018

Table 5: Annex 1: Transport in Developed/Industrialised Countries NDCs (Annex-I-Countries)

Annex 2: Transport in Developing Countries's NDCs (Non-Annex-I-Countries)

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Afghanistan (LDC)	n/a	<ul style="list-style-type: none"> More efficient vehicles clean and alternative fuels
Albania	2,47 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Algeria	43,37 Mt CO ₂ e	Increased share of liquefied petroleum gas and natural gas in fuel consumption between 2021 and 2030
Andorra	n/a	Transport highlighted as sector covered by economy-wide (I)NDC target
Angola (LDC)	8,49 Mt CO ₂ e	No direct reference to the transport sector
Antigua and Barbuda	n/a	By 2020, establish efficiency standards for the importation of all vehicles and appliances
Argentina	46,5 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Armenia	1,45 Mt CO ₂ e	Development of electric transport
Azerbaijan	7,54 Mt CO ₂ e	<ul style="list-style-type: none"> Use of environmentally friendly forms of transport Enhancement of the use of electric vehicles at public transportation Electrification of railway lines, the transition to alternative current system in traction Improvement and expansion of scope of intellectual transport management system, elimination of traffic jams due to the construction of road junctions, underground and surface pedestrian crossings Development of metro transport and increase of a number of metro stations

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Bahamas	n/a	<ul style="list-style-type: none"> Discourage the importation of inefficient motor vehicles by linking tax regime to mileage per gallon and engine capacity, while lowering duties on hybrid and electric cars promote vehicle maintenance programmes Encourage development and implementation of energy related measures such as efficient traffic management, carpooling, park and ride, use of clean fuels to minimize pollution, flexi working hours and tele-commuting, efficient public / urban mass transit transport system, encourage non-motorized transport Promote road maintenance programmes Support legislation and infrastructure for use of biofuels
Bahrain	3,4 Mt CO ₂ e	<ul style="list-style-type: none"> GCC Railway Project Bahrain Light Rail Project Improvement of Transport Network (to reduce traffic time) The Motor Vehicles Standards and technical regulations are adopted to reduce the emissions from gasoline and diesel engine vehicles Emission Management Plan for Sustainable Aviation Growth includes an aviation efficiency program.
Bangladesh (LDC)	8,84 Mt CO ₂ e	<p>Transport GHG emission target: 9-24% below BAU in 2030</p> <ul style="list-style-type: none"> Modal shift from road to rail through i.e. underground metro systems and bus rapid transit systems in urban areas Building of expressways to relieve congestion and public transport measures Dhaka mass rapid transit system
Barbados	n/a	<ul style="list-style-type: none"> Investing in alternative vehicles and fuels such as compressed natural gas, liquid petroleum gas, ethanol, natural gas, hybrid and electric cars Encouraging use of above mentioned fuel / vehicles through tax incentives
Belize	n/a	<ul style="list-style-type: none"> Domestic transportation policy and implement the National Transportation Master Plan.
Benin (LDC)	3,88 Mt CO ₂ e	<ul style="list-style-type: none"> Conduct a survey at the national level to supplement the information available on the fleet of vehicles with data on fuel levels for categories and different uses of vehicles.
Bhutan (LDC)	n/a	<ul style="list-style-type: none"> Improving mass transit and demand side management of personal modes of transport Exploring alternative modes of transport to road transport such as rail, water and gravity ropeways Promoting use of appropriate intelligent transport systems Improving efficiency in freight transport Promoting non-fossil fuel powered transport such as electric and fuel cell vehicles Improving efficiency and emissions from existing vehicles through standards and capacity building
Bolivia	7,45 Mt CO ₂ e	No direct reference to the transport sector
Bosnia and Herzegovina	2,97 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Botswana	2,21 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Brazil	213,03 Mt CO ₂ e	<ul style="list-style-type: none"> Promote efficiency measures Improve infrastructure Improve public transportation in urban areas

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Brunei	1,35 Mt CO ₂ e	<ul style="list-style-type: none"> A transport fuel-economy regulation is currently under development in Brunei Darussalam to improve the emissions performances of vehicles on the road. The Government of Brunei Darussalam is considering setting fuel consumption targets for new vehicles that are similar to those in the EU, such as 17.2 kilometre/litre by 2020 (EU 2016 target equivalent) and at 21.3 kilometre/litre by 2025 (EU 2020 target equivalent) Technologies such as electric, hybrid and more fuel-efficient conventional engine vehicles are also being promoted Improve public transportation in urban areas (expand the bus fleet from 105 to 275 buses, creating a national school bus system, creating separate bus rapid transit (BRT) infrastructure) Integrated walking and cycling networks are planned for Bandar Seri Begawan and other areas An Urban Smart Travel Zone is proposed for the capital city parking policies and intelligent transport systems are also improved
Burkina Faso (LDC)	n/a	<p>Transport GHG emission target: 42% below BAU by 2030 (conditional)</p> <ul style="list-style-type: none"> 30% reduction in vehicle consumption by 2025 Bioethanol production units substitute 10% of consumption in 2030 and substitute 5% of diesel consumption in 2030 Modal transfer project in the city of Ouagadougou
Burundi (LDC)	n/a	<ul style="list-style-type: none"> Urban transit with low GHG emissions
Cambodia (LDC)	3,88 Mt CO ₂ e	<p>Transport GHG emission target: 3% below BAU by 2030 (0,4 Mt CO₂e)</p> <ul style="list-style-type: none"> Promoting mass public transport Improving operation and maintenance of vehicles through motor vehicle inspection and eco-driving Increased use of hybrid cars, electric vehicles and bicycles
Cameroon	3,25 Mt CO ₂ e	<ul style="list-style-type: none"> Development of low-carbon transport through a national transport infrastructure scheme Integrate climate in territorial planning documents to limit distances and propose efficient transport policies Support state and local authorities in the development of public transit and inter- and intra-city low carbon development plans (e.g. tramways in Yaounde and Douala) Encourage the purchase of low-emission vehicles and scrapping of high-emission vehicles through standards, incentives or obligations
Cape Verde	n/a	<ul style="list-style-type: none"> Increase energy efficiency of the transport sector, including domestic shipping and domestic air travel Increase energy efficiency (incl. collecting GHG emission profiles for light-duty vehicles as well as for freight and passenger transportation services) Consider options for boosting hybrid and electric fleet in the country, in particular, the feasibility of making government vehicles electrically powered by 2030
Central African Republic (LDC)	n/a	<ul style="list-style-type: none"> The Central African Republic will put in place an appropriate national measurement, notification and verification system for the Programme for the reduction of short-lived climate pollutants. The government will organise regular consultations with the national, regional and local stakeholders on the Programme for the reduction of short-lived climate pollutants
Chad (LDC)	n/a	No direct reference to the transport sector
Chile	23,56 Mt CO ₂ e	<ul style="list-style-type: none"> Implementation of atmospheric decontamination plans for fine particulate matter (esp. black carbon) Tax on the sale of lightweight vehicles

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
China	781,36 Mt CO ₂ e	<ul style="list-style-type: none"> Promote the share of public transport in motorized travel in big-and-medium sized cities Improve the quality of gasoline and to promote new types of alternative fuels and new energy vehicles and vessels Development of dedicated transport system for pedestrians and bicycles in cities and advocating of green travel Development of smart transport and green freight transport
Colombia	29,87 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Comoros (LDC)	n/a	No direct reference to the transport sector
Congo	2,02 Mt CO ₂ e	Transport GHG emission target: 30% below BAU in 2025 (conditional) <ul style="list-style-type: none"> Develop public transport services (particularly in Brazzaville and Pointe-Noire) to fight against congestion Or introduce changes in legislation (e.g. prohibit import of vehicles older than 5 years)
Cook Islands	n/a	<ul style="list-style-type: none"> Establishing noteworthy duty rates on the importation of motor vehicles embrace proven low carbon transport technologies and exploring the most effective incentives for promotion of transition towards clean energy transportation
Costa Rica	4,92 Mt CO ₂ e	<ul style="list-style-type: none"> Develop an integrated public transport system where routes are improved, train service strengthened, and availability of non-motorized transport enhanced (Costa Rica has made the intercity electric train a priority) Improve the freight sector through multi-modal options Fuel-switching schemes in end-use
Côte d'Ivoire	2,91 Mt CO ₂ e	Transport GHG emission target: 5,7% below BAU in 2030 <ul style="list-style-type: none"> Integrate climate in territorial planning documents in order to limit travel distances – Propose efficient transport policies Advance urban transport plan development (e.g. urban train in the district of Abidjan); Facilitate purchase of low-emission vehicles and scrapping of high-emission vehicles through standards, incentives or obligations.
Cuba	1,26 Mt CO ₂ e	mitigation is planned to be achieved in the agricultural and energy sectors
Democratic People's Republic of Korea	1,34 Mt CO ₂ e	<ul style="list-style-type: none"> Improve the fuel-economics of the vehicles Restrict excessive use of private transportation by permitting a system of car service by day of the week and a day's interval expand and encourage public transport facilities
Democratic Republic of the Congo (LDC)	4,51 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Djibouti (LDC)	n/a	<ul style="list-style-type: none"> Construction of a 752 km railway line between Djibouti City and Addis Ababa (scheduled to be put in service in October 2015) Elimination of the import of 10,000 old cars producing too much pollution
Dominica	n/a	Transport GHG emission target: 16,9% below BAU in 2030 <ul style="list-style-type: none"> All government vehicles, at their time of replacement, will be replaced by hybrid vehicles Introduce market based mechanisms to motivate the private sector to buy hybrid vehicles when replacing current vehicles
Dominican Republic	5,07 Mt CO ₂ e	No direct reference to the transport sector

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Ecuador	16,14 Mt CO ₂ e	<ul style="list-style-type: none"> Develop electric rail (Trans-Amazonian)
Egypt	39,07 Mt CO ₂ e	<ul style="list-style-type: none"> Passenger: Increase Share of Railways Pass. Transport Freight: Switch from road to rail transport Passenger: Increase Share of Buses Pass. Transport Increase Share of Microbuses Pass. Transport Improve road transport efficiency Passenger: Increase Share of River Pass. Transport Freight: Switch from road to river transport Cairo metro (Line 3 phase 3& 4 + Line 4)
El Salvador	2,83 Mt CO ₂ e	<ul style="list-style-type: none"> Promote clean mobility in the metropolitan area of San Salvador Regulations to improve the quality of diesel fuel served in the country, to be implemented from 2018 Promotion of a development strategy for cycle routes maintain sustained quality of the private vehicle fleet, public transport and freight, with defined goals for 2025 promote the use of renewable and efficient sources of energy in the transport sector
Equatorial Guinea (LDC)	n/a	<ul style="list-style-type: none"> Improvement of air, land and maritime traffic management, Continuation of the modernization of airport infrastructures and port infrastructures Improvement of (...) land traffic management, (...) road traffic (...) infrastructures Acquisition of aircraft equipped with high technology Promotion of collective urban and interurban transport for the reduction of Emissions due to the proliferation of individual transport
Eritrea (LDC)	0,17 Mt CO ₂ e	<ul style="list-style-type: none"> Biodiesel from MSW (airport?) Construction of 400 km rail transportation Restriction on import of used cars
Ethiopia (LDC)	4,28 Mt CO ₂ e	<p>Transport GHG emission target: 25% below BAU in 2030 (10 Mt CO₂e)</p> <ul style="list-style-type: none"> Investments in improved transportation systems (e.g. railway) that utilize clean and renewable energy Urban planning transition towards mixed use, compact and polycentric cities, resulting in shorter distances travelled
Fiji	n/a	<ul style="list-style-type: none"> Fuel switching (either biofuels or electricity) rather than mode changing for instance to improved public transport systems.
Gabon	0,83 Mt CO ₂ e	<p>Transport GHG emission target: 20% below BAU in 2025</p> <ul style="list-style-type: none"> Many infrastructure projects planned Development of public transport services (especially in Libreville, against congestion) Changes in legislation (e.g. prohibition of the import of vehicles more than 3 years old)
Gambia (LDC)	n/a	<ul style="list-style-type: none"> Increase energy efficiency in the transport sector (part of the National Energy Efficiency Action Plan (NEEAP))
Georgia	3,26 Mt CO ₂ e	<ul style="list-style-type: none"> These NAMA activities include [...] Vertically Integrated NAMA (V-NAMA) for the Urban Transport Sector
Ghana	7,26 Mt CO ₂ e	<ul style="list-style-type: none"> Expansion of inter (...) city mass transportation modes (Rail ... system) Building standards for strategic infrastructure in [...] transport [...] adopted in 10 urban administrative regions (conditional) Expansion of (...) intra city mass transportation modes (...) bus transit system) in 4 cities 13 (conditional)

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Grenada	n/a	<p>Transport GHG emission target: 20% reduction by 2025</p> <ul style="list-style-type: none"> • Implementation of(...) fuel efficiency standards for vehicles through incentives • Implementation of gasoline and diesel taxes (...) • Introduction of biofuel blends
Guatemala	6,45 Mt CO ₂ e	<ul style="list-style-type: none"> • Implementation and improvement of the Transmetro system currently in operation in Guatemala City • Legislation to establish a tax incentive program and subsidies focused on the use of clean energy for public and private transport, including regulation of GHG emissions in public transport
Guinea (LDC)	n/a	<ul style="list-style-type: none"> • Improving the quality of the transport fleet, promoting public transport
Guinea-Bissau (LDC)	n/a	Transport mentioned under adaptation only
Guyana	n/a	Transport mentioned under adaptation only
Haiti (LDC)	1,17 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Honduras	3,46 Mt CO ₂ e	No direct reference to the transport sector
India	231,83 Mt CO ₂ e	<ul style="list-style-type: none"> • Increase the share of railways in total land transport from 36% to 45% • Accelerate manufacturing and adoption of hybrid and electric vehicles • Develop national policy on biofuels • Set passenger vehicle fuel-efficiency standards • Construct 550 km (under construction) plus 600 km (under consideration) of metro lines • Approve construction of 39 urban transport and mass rapid transport projects • Construct two dedicated freight corridors: 1520 km Mumbai-Delhi (Western Dedicated Freight Corridor) and 1856 km Ludhiana-Dankuni (Eastern Dedicated Freight Corridor) • Promote growth of coastal shipping and inland water transport • Constructing about 5,000 km of road network all along the coastal areas
Indonesia	134,48 Mt CO ₂ e	<ul style="list-style-type: none"> • Implementation of biofuel in transportation sector (Annex 1)
Iran	138,63 Mt CO ₂ e	<ul style="list-style-type: none"> • Enforcement of national fuel consumption and emissions standards
Iraq	29,03 Mt CO ₂ e	<ul style="list-style-type: none"> • Standards for imported vehicles, Vehicle inspections (according to WB) • Cleaner fuels (according to WB) • Modal shift to mass transport (according to WB) • Aviation efficiency (according to WB)
Israel	16,88 Mt CO ₂ e	<ul style="list-style-type: none"> • Extension of the intercity rail system • Further development of public transport systems in major metropolitan areas, such as the construction of the Tel Aviv metropolitan light rail (...) and the Jerusalem light rail.
Jamaica	1,74 Mt CO ₂ e	<ul style="list-style-type: none"> • Expansion of energy efficiency initiatives in the (...) transportation sectors,

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Jordan	7,04 Mt CO ₂ e	<ul style="list-style-type: none"> • Reduce percentage of fuel consumption achieved through the implementation of the transport strategy • Adopt and implement policies related to fleet characteristics to enhance efficiency and reduce emissions; • Increase the total number of commuters using public transport • Reduce vehicle kilometers at national levels and in densely populated areas by type of vehicle (i.e. car, HGV, LGV) • Implement a national BRT system • Implement the railway system, which would be a cornerstone of the planned multimodal network and would play a major role in the transport of goods within the country and the surrounding region
Kazakhstan	13,66 Mt CO ₂ e	<ul style="list-style-type: none"> • Development of sustainable transport
Kenya	6,53 Mt CO ₂ e	<ul style="list-style-type: none"> • NDC refers to NCCAP for transport measures
Kiribati (LDC)	n/a	<ul style="list-style-type: none"> • Use of coconut oil as biodiesel for transport
Kuwait	13,14 Mt CO ₂ e	<ul style="list-style-type: none"> • Railway project that links ports of the State of Kuwait in order to achieve an integrated and sustainable development for transporting goods and passengers in Kuwait and abroad • Mass transit systems project (metro system)
Kyrgyzstan	2,32 Mt CO ₂ e	No direct reference to the transport sector
Laos (LDC)	n/a	<ul style="list-style-type: none"> • Increase the share of biofuels to meet 10% of the demand for transport fuels by 2025. • In one NAMA feasibility study, road network development is identified as a first objective, which will reduce the number of kilometers traveled. The second objective is to increase the use of public transport compared to business as usual (BAU)
Lebanon	5,46 Mt CO ₂ e	<ul style="list-style-type: none"> • Infrastructure initiatives aiming to revive the role of public transport • Achieve a relevant share of fuel efficient vehicles
Lesotho (LDC)	n/a	<ul style="list-style-type: none"> • Vehicle efficiency mitigation actions • Modal shift from private to public transport • Investments in fuel-efficient vehicles
Liberia (LDC)	n/a	<ul style="list-style-type: none"> • Develop technical and safety standards and the enforcement of policies including emission control • Develop emission reduction and tracking systems of pollutants from vehicles • Improve the quality and reliability of transport infrastructure and services • Blend up to 5% of palm oil biodiesel with both gasoline and diesel by 2030
Libya	18,83 Mt CO ₂ e	No direct reference to the transport sector
Macedonia	1,6 Mt CO ₂ e	<ul style="list-style-type: none"> • Transport Sector Strategy: Increased use of railway and extension to Bulgaria • Increased use of bicycles, walking and introduction of a parking policy • Renewal of the vehicle fleet • Electrification of transport;
Madagascar (LDC)	n/a	Transport mentioned under adaptation only
Malawi (LDC)	n/a	<ul style="list-style-type: none"> • Produce biodiesel/ethanol • increase passengers using mass transport
Malaysia	65,52 Mt CO ₂ e	No direct reference to the transport sector
Maldives	n/a	Transport highlighted as sector covered by economy-wide (I)NDC target

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Mali (LDC)	n/a	<ul style="list-style-type: none"> Replace more than one-third of fossil fuels (with renewables) for electricity and transport by 2030.
Marshall Islands	n/a	<p>Transport GHG emission target: 16% below BAU in 2025 (27% below BAU in 2030)</p> <ul style="list-style-type: none"> Introduction of electric vehicles Introduction of solar-charged electric lagoon transport Replanting and expansion of coconut oil production for use in electricity and transport sectors blended with diesel Emission standards for current vehicles, Vehicle inspections and maintenance
Mauritania (LDC)	n/a	<ul style="list-style-type: none"> Limit age of importation of cars at 8 years Create tax exemptions for bus factories.
Mauritius	1,01 Mt CO ₂ e	<ul style="list-style-type: none"> Sustainable transportation, including promotion of energy efficient mass transportation systems based on hybrid technologies and cleaner energy sources Acquisition of hybrid and electric means of mass transportation
Mexico	151,22 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Micronesia	n/a	Transport highlighted as sector covered by economy-wide (I)NDC target
Mongolia	2,02 Mt CO ₂ e	<ul style="list-style-type: none"> Development of a Bus Rapid Transit (BRT) system and improvement of the public transport system in Ulaanbaatar Improve Ulaanbaatar city road network (...) Improve enforcement mechanism of standards for road vehicles and non-road based transport Increase the share of private hybrid road vehicles Shift from liquid fuel to LPG for vehicles in Ulaanbaatar and Aimag (province) centres by improving taxation and environmental fee system Improve national paved road network: Upgrading/Paving 8000 km by 2016, 11000 km by 2021
Montenegro	0,52 Mt CO ₂ e	No direct reference to the transport sector
Morocco	15,32 Mt CO ₂ e	<ul style="list-style-type: none"> Substantially reducing public fossil fuel subsidies extension of the Rabat and the Casablanca tram Large taxi upgrade plan National Strategy on Logistics Development: Implementation of these actions: eco-driving training of truck drivers, (...) the improvement of maintenance and technical control of transport vehicles and a modal shift from road to rail Upgrade utility vehicles of 20 years and older to lower their fuel consumption, between 2025 and 2030
Mozambique (LDC)	2,2 Mt CO ₂ e	<ul style="list-style-type: none"> Project of urban mobility in the municipality of Maputo
Myanmar (LDC)	7,16 Mt CO ₂ e	<ul style="list-style-type: none"> Cities, like Yangon, are studying options for sustainable transport development
Namibia	1,99 Mt CO ₂ e	<p>Transport GHG emission target: 2.3 % below BAU in 2030</p> <ul style="list-style-type: none"> Commission of a mass transport system in City of Windhoek to reduce number of cars (taxis and private) by about 40% Implement a car pooling system to reduce fossil fuel consumption Improve freight transportation through bulking to reduce the number of light load vehicles by about 20%
Nauru	n/a	No direct reference to the transport sector
Nepal (LDC)	2,61 Mt CO ₂ e	<ul style="list-style-type: none"> Promote the transformation of regular vehicles to electric vehicles by providing a subsidy scheme for the promotion of electric and non-motorized vehicles Nepal will develop its electrical (hydro-powered) rail network by 2040 to support mass transportation of goods and public commuting Introduction of fuel tax used in Kathmandu Valley for air quality improvement

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Nicaragua	1,89 Mt CO ₂ e	No direct reference to the transport sector
Niger (LDC)	1,16 Mt CO ₂ e	<ul style="list-style-type: none"> Improving energy efficiency in [...] transport
Nigeria	21,29 Mt CO ₂ e	<ul style="list-style-type: none"> Transport shift from car to bus (key measure) Modal shift from air to high speed rail Moving freight to rail Upgrading roads Urban transit Toll roads/ road pricing Increasing use of CNG Reform petrol/ diesel subsidies Blending 10% by volume of Fuel-Ethanol with Gasoline (E10) and 20% by volume of Biodiesel with Petroleum Diesel (B20) for Transportation Fuels
Niue	n/a	<ul style="list-style-type: none"> Customs regulations were amended to encourage the import of fuel-efficient vehicles and targets have been set under the Niue Strategic Energy Road Map (NiSERM) to deploy more fuel efficient vehicles The Government welcomes international assistance in the development of opportunities for deep emissions cuts in the transport sector (incl. electric vehicles) 2015-2020: Implement energy efficiency through (...) fuel substitution for transport (...);
Oman	12,45 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Pakistan	39,76 Mt CO ₂ e	<ul style="list-style-type: none"> Awareness raising and incentives for efficient vehicle operations Upgrading and modernization of rail services Training of government officials at the national, regional and city levels on monitoring and evaluating mitigation programs Training of technical staff to operate modern rail systems Upgrading and development of efficient public transport systems Improvement of urban public transport systems, especially Bus Rapid Transport at Lahore, Rawalpindi-Islamabad and Multan, and urban rail transport (Orange Line) at Lahore
Palau	n/a	<ul style="list-style-type: none"> Currently there is a pending national legislation that would mandate the use and commercial sale of four-stroke outboard motor engines to reduce emissions Palau is investigating a project to convert waste cooking oil to biofuel for diesel vehicles, beginning with public school buses and a potential public bus route
Panama	3,86 Mt CO ₂ e	<ul style="list-style-type: none"> Electrification of public transport expand current subway system in Panama City
Papua New Guinea	n/a	<ul style="list-style-type: none"> Improve public transport by introducing energy efficient busses in the main urban centres Future introduction of infrastructure for more sophisticated modes of public transport, such as trains and trams
Paraguay	4,83 Mt CO ₂ e	<ul style="list-style-type: none"> Establish multimodal transport
Peru	19,26 Mt CO ₂ e	Transport mentioned in adaptation section, further transport mentioned in long version of NDC not submitted to UNFCCC and in Spanish only
Philippines	26,64 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Qatar	14,16 Mt CO ₂ e	<ul style="list-style-type: none"> Continuation of improvement of emission standards for new motor vehicles, in accordance with regional and global emission standards Qatar introduced public transportation to reduce the demand on private vehicles public transportation (...) programs that enhance the traffic flow expressway programs that enhance the traffic flow and divert it outside the cities

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Republic of Korea	92,43 Mt CO ₂ e	<ul style="list-style-type: none"> Strengthen the average emission standard from 140g/km in 2015 to 97g/km in 2020 Introduce low-carbon standards for fuel efficiency and emissions produced from automobiles Create incentives, including tax reductions, for electric and hybrid vehicles Expand infrastructure for environmentally friendly public transport
Republic of Moldova	1,79 Mt CO ₂ e	<p>Transport GHG emission target: 15% below BAU in 2020</p> <ul style="list-style-type: none"> Reforms and adoption of new technical and normative standards in transport
Rwanda (LDC)	n/a	<ul style="list-style-type: none"> Set vehicles' emission standards and regulations Promotion of Public Transport, 17 km BRT main corridor construction and 6 modern interchanges Improvement of transport infrastructure, Integrated national transportation planning
Saint Kitts and Nevis	n/a	<ul style="list-style-type: none"> Incentives for more efficient vehicles tax on vehicles with high fuel consumption retrofitting inefficient vehicles More efficient public transport, parking and transit regulation
Saint Lucia	n/a	<ul style="list-style-type: none"> Efficient Vehicles Reduction of excise tax and duty for importers of fuel efficient vehicles and alternative energy vehicles: Escalating taxes on higher engine capacity vehicles Introduced a new levy to control importation of used vehicles Improved and Expanded Public Transit
Samoa	n/a	<ul style="list-style-type: none"> Regulation in place to restrict emissions from vehicles to a certain level. However, enforcement has not been possible due to a lack of technical capacity, technological capacity and financial resources. Enforcement of this regulation will have significant impact on reducing emissions from this sector.
San Marino	n/a	No direct reference to the transport sector
Sao Tome and Principe (LDC)	n/a	No direct reference to the transport sector
Saudi Arabia	131,3 Mt CO ₂ e	<ul style="list-style-type: none"> Introduction of efficiency standards in the transportation sectors Encourage actions that promote the development and use of mass transport systems in urban areas: take necessary actions to expedite the development of the metro system in Riyadh, support and expedite the planning and development of metro systems in Jeddah and Dammam
Senegal (LDC)	2,44 Mt CO ₂ e	<ul style="list-style-type: none"> Implement Bus Rapid Transit (BRT) pilot in Dakar/Guédiawaye
Serbia	5,9 Mt CO ₂ e	No direct reference to the transport sector
Seychelles	n/a	<ul style="list-style-type: none"> Keeping a high penetration of public transport targeting fuel efficiency in import regulation, targeting biofuels in import regulation moving towards electric vehicles and two wheelers
Sierra Leone (LDC)	n/a	<ul style="list-style-type: none"> Development and enforcement of regulations on regular maintenance of vehicles (vehicle emission testing): formulation of transport plans Improving and promoting use of public transport (...) to reduce traffic congestion and GHG's emissions Diversify economic growth through strengthened transport sub-sector (particularly infrastructure) to reduce regional and global emissions and build a stable economy

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Singapore	6,88 Mt CO ₂ e	No direct reference to the transport sector
Solomon Islands (LDC)	n/a	Transport highlighted as sector covered by economy-wide (I)NDC target
Somalia (LDC)	n/a	No direct reference to the transport sector
South Africa	52,7 Mt CO ₂ e	<ul style="list-style-type: none"> Integrate electric and hybrid vehicles
South Sudan (LDC)	n/a	<ul style="list-style-type: none"> Establish emissions standards for vehicles establish exhaust testing centres and cars that fail the tests by emitting fumes above allowable emissions levels will be subjected to mandatory repairs or scrapped Consider measures to restrict importation of vehicles that do not adhere to allowable emissions levels
Sri Lanka	7,99 Mt CO ₂ e	<p>Transport GHG emission target: 3% below BAU in 2030 (7% conditional)</p> <p>Launching of electric buses as a pilot project</p> <ul style="list-style-type: none"> Introduction of BRT system to encourage public transport Introduction of ITS (Intelligent Transport System) based bus management system Introduce Park & Ride system Electrification of three - wheelers to reduce emissions Development of Urban Transport Master Plans (UTMP) Introduce the BRT system for Galle Road Corridor Upgrading of Fuel Quality Standards in order to reduce GHG emission. Following activities are continuously carried out to minimize emissions from vehicles that emit excessive smoke on the road: Heavy smoke vehicles spotter programme Road side vehicle emission testing programme Inspection and monitoring of Vehicle Emission Testing Centers Rehabilitation of Kalani valley Railway line Electrify railway from Weyangoda to Panadura Purchase new rolling stock for Sri Lanka Railway Introduce electrified boat service using inland water canal for public transportation to reduce the congestion in roads as well as GHG emission Implement international laws and regulations on Maritime Safety and Security in collaboration with Merchant Shipping Secretariat Maintain international standards in maritime transportation Encourage and introduce low emission vehicles such as Electric and Hybrid into the system
St Vincent and the Grenadines	n/a	<ul style="list-style-type: none"> New policies to reduce the import duty paid on low emission vehicles are in the process of being introduced to encourage their use Significant potential for greater reductions (e.g. improved public transport) is achievable if international finance can be made available,
State of Palestine	n/a	No direct reference to the transport sector
Sudan (LDC)	7,9 Mt CO ₂ e	No direct reference to the transport sector
Suriname	0,67 Mt CO ₂ e	<ul style="list-style-type: none"> Biofuel project that could realize the introduction of ethanol in gasoline with 60% of vehicles utilizing the blend
Swaziland	n/a	<ul style="list-style-type: none"> Swaziland's contribution is to introduce the commercial use of a ethanol blend in petrol
Syria	6,61 Mt CO ₂ e	No direct reference to the transport sector
Tajikistan	1,56 Mt CO ₂ e	<ul style="list-style-type: none"> Develop green infrastructure in the transport sector
Tanzania (LDC)	5,97 Mt CO ₂ e	<ul style="list-style-type: none"> Rapid transport and mass marine transport systems are being improved Investments in air, rail, marine and road infrastructures

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Thailand	60,19 Mt CO ₂ e	<ul style="list-style-type: none"> Promote road-to-rail modal shift for both freight and passenger transport (extensions of mass rapid transit lines, construction of double-track railways, improvement of bus transit in the Bangkok Metro areas) Promote road-to-rail modal shift for (...) passenger transport (extensions of mass rapid transit lines, improvement of bus transit in the Bangkok Metro areas) Vehicle tax scheme based on CO₂ emission
Timor-Leste (LDC)	n/a	<ul style="list-style-type: none"> Continue to promote and implement the current Decree Law (No.30/2011) on used vehicles which are imported into Timor-Leste to be less than 5 years of factory production Promote use of public transport by enabling convenient routes (routes to all areas) and reliable access to bus or micro-bus, constructing appropriate facilities such as proper bus stops, terminals, and establish necessary regulations to control the transportation system
Togo (LDC)	1,33 Mt CO ₂ e	<ul style="list-style-type: none"> Improvement of the road network (in the main urban centres) Quality standard for the imported used vehicles: Limit age of imported vehicles to 5-7 years Promotion of public transport Promote active transport (bicycles, walking, bike path development)
Tonga	n/a	<ul style="list-style-type: none"> Diesel Engines Fuel Efficiency Services Training Solar Vehicle Public Awareness Tour Project Developing transport sector measures to include in the Tonga Energy Road Map (TERM) strategies undertaking training and public awareness actions on vehicle maintenance, public transport and bicycle usage Interested in developing biofuels for both transport and electricity generation Participating in regional transport sector mitigation efforts being developed by the Secretariat of the Pacific Community Welcoming international assistance in the development of mitigation opportunities to reduce Tonga's oil dependence and GHG emissions in this sector
Trinidad and Tobago	3,2 Mt CO ₂ e	<ul style="list-style-type: none"> Public transportation
Tunisia	6,33 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Turkmenistan	11,76 Mt CO ₂ e	Transport highlighted as sector covered by economy-wide (I)NDC target
Tuvalu (LDC)	n/a	<ul style="list-style-type: none"> Planning to address growing emissions in the transport sector, as evidenced from the increased numbers of vehicles on land and vessels for sea transport, through technological innovations.
Uganda (LDC)	n/a	<ul style="list-style-type: none"> Fuel Efficiency Initiative NAMA: Policies and regulations to promote cleaner fuels, and more fuel efficient vehicle technology Update transport codes and regulations and implement measures to ensure compliance with them
United Arab Emirates	36,91 Mt CO ₂ e	<ul style="list-style-type: none"> Introduction of a new fuel pricing policy, which will put the UAE in line with global prices. This reform aims to support the national economy, lower fuel consumption, and protect the environment A federal freight rail network crossing the country and eventually integrated into the GCC network The Emirate of Dubai has invested in a multi-billion dollar light-rail and metro system, which will continue to add new lines Improvement of emission standards for new motor vehicles Comprehensive regulations for electric vehicles, so as to facilitate their uptake domestically The Emirate of Abu Dhabi has also set targets to shift 25% of government vehicle fleets to compressed natural gas

Country	Transport Emissions (2014)*	Transport Sector in NDC (mentioned as sector covered, GHG emission target, mitigation actions)
Uruguay	3,47 Mt CO ₂ e	<ul style="list-style-type: none"> • Implement BRT corridors for metropolitan public transport • Introduce electric and hybrid private and public vehicles • Increase the percentage of biofuels in gasoline and diesel oil blends • Introduce public and private vehicles that support a higher percentage of biofuel blends • Enhancement of the vehicle fleet through higher power efficiency standards and lower emissions • Improve cargo transport, through the incorporation of new multimodal systems, and increased use of railroad and inland waterway transport
Uzbekistan	6,7 Mt CO ₂ e	No direct reference to the transport sector
Vanuatu (LDC)	n/a	Transport highlighted as sector covered by economy-wide (I)NDC target
Venezuela	50,12 Mt CO ₂ e	<ul style="list-style-type: none"> • Fleet Renewal financed by central bank • A road construction, rebuilding and maintenance plan has been developed throughout the national territory (traffic decongestion and considerable time reductions), reducing the environmental impact of the vehicular park of the country • Further Mass Transportation Systems will be built with the consequent decrease in the use of vehicles
Viet Nam	31,93 Mt CO ₂ e	<ul style="list-style-type: none"> • Develop public passenger transport, especially rapid transit in large urban centres • Restructure freight to reduce share of road transport and increase share of transport via rail and inland waterways • Encourage buses and taxis to use compressed natural gas and liquefied petroleum gas • Implement management solutions for fuel quality, emissions standards, and vehicle maintenance
Yemen (LDC)	7,39 Mt CO ₂ e	<ul style="list-style-type: none"> • Improving energy use efficiency in transportation sector
Zambia (LDC)	1,12 Mt CO ₂ e	<ul style="list-style-type: none"> • Promote fuel switching (e.g. diesel to biodiesel)
Zimbabwe	2,56 Mt CO ₂ e	<ul style="list-style-type: none"> • Refurbish and electrify the rail system

Table 6: Annex 2: Transport in Developing Countries's NDCs (Non-Annex-I-Countries)

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Project

Advancing Transport Climate Strategies in Rapidly Motorising Countries

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