

CRITICAL EVALUATION OF TRANSPORT SECTOR NDCS FOR A LOW-CARBON FUTURE

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The Nationally Determined Contributions (NDCs) of the transport sector have been recognised as one of the most effective measures to reduce greenhouse gas (GHG) emissions. This study aims to conduct a comprehensive and critical evaluation of the NDCs of the transportation sector in Sri Lanka to assess their effectiveness in achieving a low-carbon future. The first set of NDCs was implemented by the Mahaweli Development and Environment Ministry in 2016 and was subsequently submitted to the United Nations Framework Convention on Climate Change. In July 2021, Sri Lanka updated its NDCs, reflecting its ongoing commitment to combating climate change. This research aims to identify the gaps and limitations of current policy and to plan strategies and recommend effective strategies to support the sector's transition to a sustainable future. Through evaluation of the effectiveness of current NDCs, we can provide information on the country's progress toward achieving its climate goals. This research can provide valuable recommendations to policymakers and stakeholders to overcome these challenges and promote sustainable development in the transport sector. To prioritise NDCs, a set of criteria was developed based on research objectives and the specific needs of the transportation sector. These criteria served as a framework for subsequent analysis. A questionnaire survey was administered to gather information from transportation industry professionals and the general public regarding NDCs. The collected data was analysed using suitable statistical approaches, using the Statistical Package for the Social Sciences (SPSS) software as a tool. A list of essential NDCs for the transport sector was established using the prioritised criteria and the feedback obtained from the questionnaire survey. This list served as the basis for the subsequent evaluation and analysis of the identified NDCs. Finally, conclusions were drawn based on the evaluation and analysis regarding the significance and impact of the prioritised NDCs in the transportation sector. This study's results have helped increase awareness of the complexity of emission assessments in the transportation industry and have provided helpful information for planning and policy-making related to sustainable transportation. This research can provide valuable recommendations to policymakers and stakeholders to overcome these challenges and promote sustainable development in the Sri Lankan transport sector. In conclusion, implementing the proposed enhancements for the selected NDCs is crucial to effectively align Sri Lanka with the goals of the Paris Agreement within the designated time frame. Sri Lanka is particularly vulnerable to the impacts of climate change, underscoring the urgency and importance of taking decisive action. It is imperative to prioritise and address the identified issues to mitigate risks, enhance resilience, and contribute to global efforts in combating climate change. By proactively addressing these challenges, Sri Lanka can create a sustainable and climate-resilient future.

Keywords: Nationally Determined Contributions (NDCs), Transportation sector, Greenhouse Gas emission, Low – Carbon future, Evaluation of NDCs

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Transportation sectors Nationally Determined Contributions :

Table 1 : Recently updated Nationally Determined Contributions of transport sector

NDC #	NDC Action	Timeline
NDC 1	Transport sector system improvement	2021 - 2030
NDC 2	Promote public passenger transport	2021 - 2030
NDC 3	Shift freight to efficient modes	2021 - 2030
NDC 4	Rapid transport for passenger transport	2021 - 2030
NDC 5	Promote non-motorized transport modes	2021 - 2030
NDC 6	Introduce taxes and other instruments to promote public transport	2021 - 2030
NDC 7	Introduce inland water transport modes	2021 - 2030
NDC 8	Modernizing and upgrading of suburban railway	2021 - 2030
NDC 9	Promote electric mobility and hybrid vehicles	2021 - 2030
NDC 10	Improve vehicle fleet efficiency	2021 - 2030
NDC 11	Road infrastructure development	2021 - 2030
NDC 12	Reduce GHG emissions from the marine sector	2021 - 2030
NDC 13	Generic enabling activities	2021 - 2030

- The research evaluates NDCs related to passenger transport in the road and rail sectors in Sri Lanka
- The analysis deliberately excludes the freight and marine transportation sectors.
- NDC 01, which covers the entire transportation system, was excluded from the prioritization process.
- From this point onwards, the evaluation will continue for the following nine NDCs.
- Table one shows the selected NDCs for evaluation. Red text indicates eliminated NDCs.

Multi-Criteria Analysis of Transportation Sector NDCs

Table 2 : Selected criteria and weightages for Multi Criteria Analysis

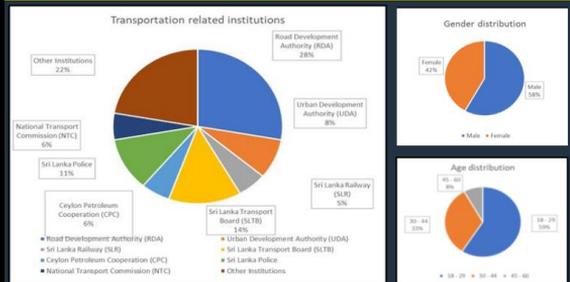
Criteria	Measuring Attribute	Weightage
Desirability Criteria	User Population	10%
	Passenger Kilometres	15%
Feasibility Criteria	Cost-effectiveness	12.5%
	Implementation time	12.5%
Co - Benefit Criteria	Environmental Benefits	20%
	Social Benefits	30%
	Total	100%

Table 3 : Significance Level Scores

Significance	Score
High	4
Moderate	3
Low	2
None	1

- The multi-Criteria Analysis method was used to prioritize the selected NDCs in line with best practices in this investigation.
- These weightages assigned as a demonstration method. Weightages can be change and check the sensitivity as well.

Questionnaire Survey on NDCs in the transport sector



- Survey included individuals working in the transportation industry as well as the general public.
- Total of 98 responses were collected, with 57 responses from male and 41 from female. Among the respondents, 36 were professionals in the transportation.

Evaluation of transport sector NDCs

- The Multi-Criteria Analysis (MCA) scoring process involved referencing the available data, and ranking was established.
- The questionnaire survey was analyzed in two cases: Case 01, which included all responses, and Case 02, which focused on responses from transport sector professionals.
- Conducted statistical analysis using SPSS software. Utilized Friedman tests for determining mean rankings
- Table 5 will display the ranking of criteria for each NDC, indicating their relative importance based on the responses within the context of the NDC.
- There are three selected NDCs were evaluated and proposed suitable enhancements.

Table 4 : Prioritization of NDCs in MCA and Questionnaire surveys

NDC Number	MCA rank	QS rank (Case 1)	QS rank (Case 1)
NDC 02	05	04	05
NDC 04	07	05	07
NDC 05	09	03	02
NDC 06	06	08	03
NDC 08	08	02	06
NDC 09	01	01	01
NDC 10	02	07	04
NDC 11	03	06	09
NDC 13	03	09	08

Conclusions

- In conclusion, implementing the proposed enhancements for the selected NDCs is crucial to effectively align Sri Lanka with the goals of the Paris Agreement.
- Discrepancies attributed to the need for a well-defined framework in designing NDCs
- Absence of established baseline scenarios for some NDC action
- Sri Lanka requires assistance in improving emission data availability and implementing a robust monitoring system.
- Inadequate coordination among transport sector institutions.
- Low public awareness of NDCs in Sri Lanka highlights the need for targeted awareness programs.