



**NDC ASPECTS**

# Policy Brief

## **Decarbonising the Land Transport Sector: Options for Enhancing International Cooperation**

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## Key messages

- Transforming the land transport sector towards decarbonisation is crucial to achieving the long-term temperature goal of the Paris Agreement. While international cooperation has considerable potential to advance this transformation, this potential has remained underexploited.
- To drive the sector's transformation, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement can agree to: (1) develop a transport-specific decarbonisation roadmap accompanied by a global net-zero target; (2) integrate sectoral emissions budgets into their Nationally Determined Contributions that include transport targets (NDCs); and (3) create additional reporting requirements under the Paris Agreement that specifically focus on the implementation and achievement of NDCs in individual sectors, including for transport.
- To complement efforts pursued under the UNFCCC, groups of states can also develop a joint agreement to phase-out the sales of new fossil-fuelled vehicles by a specific date.
- Another option for enhancing international cooperation outside the UNFCCC can take the form of a climate club focused on electric vehicles. In addition to setting a phase-out target for the sales of new fossil-fuelled vehicles, such a club could also commit to harmonising market-share targets for zero-emission vehicles and zero-emission vehicle charging infrastructure.

Land transport is a major source of greenhouse gas emissions. In 2019, 23% of global energy-related carbon dioxide emissions were attributable to the transport sector alone (Jaramillo et al., 2022). Accordingly, transforming land transport towards sustainability and deep decarbonisation is crucial to realising the long-term goal of the Paris Agreement to keep global warming well below 2°C compared to pre-industrial levels, and pursue efforts to stay below 1.5°C.

While this transformation faces several barriers, international cooperation holds significant potential to drive the sector's transition to climate neutrality forward. However, this potential has so far remained underexploited. In this policy brief, we therefore identify several options for enhancing international cooperation both within the international climate regime and beyond.

## The potential of international cooperation to decarbonise the land transport sector

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### Transformation barriers and the potential of international cooperation

While mitigation options in the land transport sector have traditionally centred on technology solutions like electrification, research highlights that it could take as long as 20 years to replace the global fossil-fuel vehicle fleet (Keith et al., 2019). Additionally, the energy and resources needed to decarbonise prospective demand levels will be prohibitive, meaning that technology solutions alone will not be sufficient (Ash et al., 2020). Accordingly,



demand management solutions – such as more compact land-use planning and less car-dependent infrastructures – must be pursued in parallel (Jaramillo et al., 2022; Sims et al, 2014). However, as Table 1 highlights, the implementation of both mitigation strategies faces several barriers.

Table 1. Summary of transformation barriers

Type of barrier	Sectoral transformation barriers	
	Managing demand	Electrification
Political/institutional	<ul style="list-style-type: none"> <li>Traditional 'predict-and-provide' approach underpinning mobility and planning paradigms, resulting in continual infrastructure expansion to meet rising demand</li> <li>Reluctance to implement measures to curb car usage</li> </ul>	<ul style="list-style-type: none"> <li>Countries locked-in to gas and diesel technologies due to investments made in internal combustion engines</li> </ul>
Practical	<ul style="list-style-type: none"> <li>Significant reconstruction needed to modify transport infrastructures</li> <li>Limited capacity, especially in Global South</li> </ul>	<ul style="list-style-type: none"> <li>Mass roll-out of charging infrastructure</li> <li>Limited capacity, especially in Global South</li> </ul>
Economic	<ul style="list-style-type: none"> <li>High levels of investment and capital required to establish new infrastructure for sustainable transport</li> </ul>	<ul style="list-style-type: none"> <li>Higher purchasing costs for electric vehicles</li> <li>Investments required for charging and grid infrastructure</li> </ul>
Technological	<ul style="list-style-type: none"> <li>Slow adoption of digitised services for seamless travel chains and demand management such as Management as a Service (MaaS)</li> </ul>	<ul style="list-style-type: none"> <li>Power generation and transmission capacity</li> <li>Electric vehicle (EV) battery performance</li> <li>Unequal access to charging infrastructure</li> </ul>

Source: Hall and van Asselt (2022)

International cooperation holds considerable potential to overcome these barriers and transform land transport towards decarbonisation. Building on prior scholarship concerning the functions of global governance institutions (Oberthür, Hermwille and Rayner, 2021), Table 2 summarises the potential of international cooperation against six key functions that international institutions can perform.

Table 2. Potential of international cooperation to address barriers

Governance function	Barrier	Potential of international cooperation to address barriers
Guidance & Signal	<ul style="list-style-type: none"> <li>Traditional predict-and-provide approach underpinning mobility and planning paradigms</li> <li>Reluctance to implement measures to curb car usage</li> </ul>	<ul style="list-style-type: none"> <li>Development of a sector-specific decarbonisation roadmap and international net-zero target, to guide policymakers and promulgate a new paradigm for transport built on sustainability</li> </ul>
Rules & Standards	<ul style="list-style-type: none"> <li>Traditional predict-and-provide approach underpinning mobility and planning paradigms</li> <li>Lock-ins to gas and diesel technologies</li> <li>High purchasing costs for electric vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Incorporation of international emissions budgets specific to transport into NDCs, to increase pressure on states to decarbonise their mobility systems and abandon carbon-intensive transport paradigms</li> <li>Creation of internationally coordinated phase-out dates for the sale of new fossil-fuelled vehicles to dismantle lock-ins to gas and diesel technologies</li> <li>International agreement on carbon pricing to render zero-emission technologies more economically attractive than high-emission technologies</li> </ul>
Transparency & Accountability	<ul style="list-style-type: none"> <li>Traditional predict-and-provide approach underpinning mobility and planning paradigms</li> <li>Reluctance to implement measures to curb car usage</li> </ul>	<ul style="list-style-type: none"> <li>Creation of additional international reporting requirements that specifically focus on the achievement of NDCs in the transport sector, to facilitate state-to-state accountability and emphasise the urgency to abandon traditional transport paradigms</li> </ul>
Means of Implementation	<ul style="list-style-type: none"> <li>High investment costs required for infrastructure</li> <li>Capacity limitations</li> <li>Unequal access to charging infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Provision of necessary financial resources and general capacity for countries to decarbonise their transport systems, especially where more pressing development demands often take priority (particularly in the Global South)</li> </ul>
Knowledge & Learning	<ul style="list-style-type: none"> <li>Slow adoption of digitised services</li> <li>EV battery performance</li> </ul>	<ul style="list-style-type: none"> <li>Creation of platforms to research and explore barriers and enablers to the adoption of digitised services</li> <li>Creation of platforms to facilitate research into EV advancements and diffuse technological solutions between states</li> </ul>
Orchestration & Coordination	<ul style="list-style-type: none"> <li>Traditional predict-and-provide approach underpinning mobility and planning paradigms</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of collaboration and creation of synergies across decarbonisation pathways, to help legitimise and normalise a new paradigm for transport centred on sustainability</li> </ul>

## Current governance landscape for the decarbonisation of land transport

Figure 1 shows that there are several international institutions pursuing sustainable mobility-related activities, ranging from United Nations bodies and intergovernmental institutions to various partnerships and city networks. Notwithstanding these efforts, the potential for international cooperation has so far been exploited only to a limited extent, particularly with respect to national government-led initiatives.

This has generated some important governance gaps in that there are: (1) no authoritative and centralised transport-specific decarbonisation roadmap, including the absence of a government-backed net-zero target; (2) no international requirements, such as emissions targets, for countries to decarbonise their transport systems; (3) no concrete, internationally coordinated phase-out dates for fossil-fuelled vehicles; and (4) no international reporting requirements that track sector-specific country progress towards achieving and implementing NDCs.

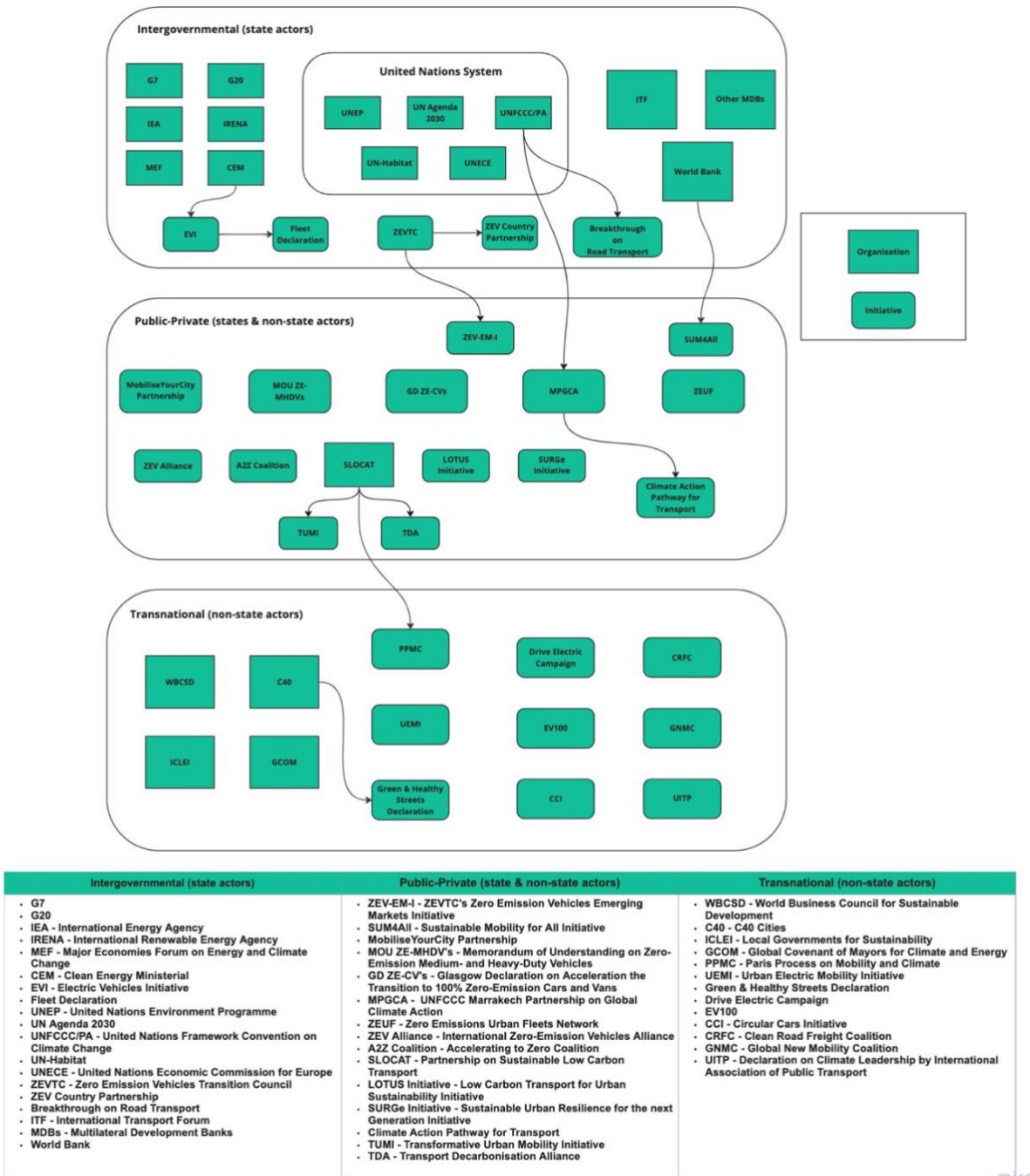


Figure 1. Overview of current governance landscape for the decarbonisation of land transport

## Recommendations for strengthening international cooperation

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To address these gaps, we present options for enhancing international cooperation between states both within and outside the UNFCCC to transform land transport towards decarbonisation.

### Enhancing international cooperation within the UNFCCC

Strengthening international cooperation within the UNFCCC can be pursued in several ways. First, Parties could agree to the development of a **transport-specific decarbonisation roadmap that includes a global net-zero target**, in addition to interim emission reduction targets, for example for 2030 and 2040. There are two avenues that Parties could use to this end. First, Parties could develop a transport-specific roadmap in the framework of the new work programme for urgently scaling up mitigation ambition and implementation, agreed at the Sharm el-Sheikh Climate Summit in 2022. This could be based on existing sectoral roadmaps to decarbonisation, such as the Climate Action Pathway for Transport developed by the Marrakech Partnership on Global Climate Action (MPGCA). The Pathway sets out a sectoral vision to achieve the long-term temperature goal of the Paris Agreement through a transport-specific decarbonisation roadmap. In addition to a long-term target to fully decarbonise transport by 2050, the roadmap is also accompanied by a number of specific milestones for the land transport sector for 2025, 2030 and 2040, including market-share targets for EV deployment. An alternative option available is for the UNFCCC to request a more technical and sector-oriented institution – such as the International Transport Forum – to develop a roadmap, which Parties to the UNFCCC could later endorse.

In addition to the development of a transport-specific roadmap and global net-zero target, the Conference of the Parties serving as Meeting of the Parties to the Paris Agreement (CMA) could also request or encourage Parties to **include sectoral commitments in their NDCs**. This could take the form of sectoral emissions budgets that include transport targets. While reopening NDC guidance and requesting or encouraging parties to do this may prove politically difficult, the work programme for urgently scaling up mitigation ambition and implementation may offer an alternative way forward. While ‘imposing’ targets on Parties is not feasible under the work programme, Parties can initiate discussions on specific topics. Paragraph 12 allows Parties to submit ‘suggested topics in line with the scope of the work programme’ that can be discussed as part of the dialogues (Decision -/CMA.4, 2022). Accordingly, Parties could initiate discussions on the transport sector and propose the incorporation of sectoral emissions budgets into NDCs on a voluntary basis. Various countries have already implemented nationally binding sectoral emissions budgets domestically. For instance, the German Federal Climate Change Act (amended in 2021) stipulates annual emissions budgets for all sectoral systems until 2030, including transport.

Alongside advancing rule-setting, the CMA could also develop **additional reporting requirements** that specifically focus on the implementation and achievement of NDCs in individual sectors under the Paris Agreement’s Enhanced Transparency Framework, including for transport. By revising the reporting requirements to focus on individual emitting sectors, this would help highlight the particularly poor performance of the transport sector, in addition to facilitating state-to-state accountability. Although the first review and possible updates to the modalities,

procedures and guidelines is not expected until 2028, such revisions should be reconsidered earlier, particularly in light of the lack of ambition currently embodied in Parties' NDCs.

## Enhancing international cooperation beyond the UNFCCC

States should also consider strengthening sectoral international cooperation outside the international climate regime. To complement efforts pursued under the UNFCCC, states could develop a **joint agreement to phase-out the sales of new fossil-fuelled vehicles**. An increasing number of countries are establishing domestic time frames to phase-out conventional vehicles. Some examples of countries that have proposed bans or implemented targets for 100% sales of zero-emission vehicles include China, Canada, Germany, France, Italy, the United Kingdom and the Netherlands. The European Parliament has also approved a law that requires new cars and vans in the European Union to be zero emissions by 2035 (European Parliament, 2023). International coordination of the efforts of such countries could send an even stronger market signal. Such an agreement could therefore specify an internationally coordinated date to ban the sales of new fossil-fuelled vehicles. In addition to setting a phase-out date, the agreement could also include interim carbon emission reduction targets for new vehicles. For example, the agreement could require that average emissions of new vehicles are reduced by 50% by 2030.

Another option for enhancing international cooperation outside the UNFCCC could take the form of a **climate club focused on electric mobility**. The automobile industry is highly concentrated, with ten countries accounting for three-quarters of all car sales worldwide (Oberghassel, Lah and Rudolph, 2021). If a number of frontrunner and key-car producing countries were to harmonise their trajectories under an EV club, this could generate a significant influence on the automobile market and potentially drive a full electrification of the global fossil-fuel fleet. In addition to setting a specific date that bans the sale of all new fossil-fuelled vehicles (e.g. 2030 or 2035), club members could also commit to harmonising market-share targets for zero-emission vehicles and zero-emission vehicle charging infrastructure.

While membership should ideally involve key car-producing countries to be effective, the club should also be carefully designed to address any potential equity concerns. For example, buyer countries would have to heavily invest in charging infrastructure and continuing maintenance, as well as potentially invest in adaptations to their electricity grids. Accordingly, this speaks for broader participation. However, it would be possible to create an EV climate club that initially starts with a smaller membership, but is designed to be open and enable expansion over time. As well as state governments, the membership of such a club could also extend to important non-governmental actors, such as major car-manufacturing companies.

Any potential club must also be perceived as legitimate to the Global South and emerging economies, with the capacity to provide support to these countries to decarbonise their transport systems. Allowing for broader membership would not only help accelerate the transition to zero-emission transport, but also ensure that the EV club is deemed inclusive. However, several countries may lack the resources required to make a full transition to electric mobility. The provision of means of implementation would be crucial here to ensure that developing countries are able to overcome potential technological, infrastructural and financial barriers to EV deployment.

## References

- Ash, N., Davies, A., & Newton, C. (2020). *Renewable electricity requirements to decarbonise transport in Europe with electric vehicles, hydrogen and electrofuels: Investigating supply-side constraints to decarbonising the transport sector in the European Union to 2050*. Transport & Environment. [https://www.transportenvironment.org/wp-content/uploads/2021/07/2020\\_Report\\_RES\\_to\\_decarbonise\\_transport\\_in\\_EU.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/2020_Report_RES_to_decarbonise_transport_in_EU.pdf)
- European Parliament. (2023). *Fit for 55: zero CO2 emissions for new cars and vans in 2035*. European Parliament News. <https://www.europarl.europa.eu/news/en/press-room/20230210IPR74715/fit-for-55-zero-co2-emissions-for-new-cars-and-vans-in-2035>
- Hall, C., & van Asselt, H. (2022). *On the Road to Somewhere? Assessing Climate Governance Gaps and Options for the Land Transport Sector*. NDC Aspects. [https://ndc-aspects.eu/sites/default/files/2022-11/D6.1d%20Assessing%20Climate%20Governance%20Gaps%20and%20Options%20for%20the%20Land%20Transport%20Sector\\_2.pdf](https://ndc-aspects.eu/sites/default/files/2022-11/D6.1d%20Assessing%20Climate%20Governance%20Gaps%20and%20Options%20for%20the%20Land%20Transport%20Sector_2.pdf)
- Jaramillo, P., Ribeiro, S., Newman, P., Dhar, S., Diemuodeke, O., Kajino, T., Lee, D., Nugroho, S., Ou, X., Strømman, H., & Whitehead, J. (2022). *Transport*. In: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. [https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC\\_AR6\\_WGIII\\_Chapter10.pdf](https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter10.pdf)
- Keith, D., Houston, S., & Naumov, S. (2019). Vehicle fleet turnover and the future of fuel economy. *Environmental Research Letters* 14, 021001.
- Obergassel, W., Lah, O., Rudolph, F. (2021). Driving towards transformation? To what extent does global climate governance promote decarbonisation of land transport? *Earth System Governance* 8, 100098.
- Oberthür, S., Hermwille, L., & Rayner, T. (2021). A sectoral perspective on global climate governance: Analytical foundation. *Earth System Governance* 8, 100104.
- Sims, R., Schaeffer, R., Creutzig, F., Cruz-Núñez, X., D'Agosto, M., Dimitriu, D., Meza, M., Fulton, L., Kobayashi, S., Lah, O., McKinnon, A., Newman, P., Ouyang, M., Schauer, J., Spreling, D., & Tiwari, G. (2014). *Transport*. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. [https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_chapter8.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf)
- UNFCCC. (2022). Decision -/CMA.4, Matters relating to the work programme for urgently scaling up mitigation ambition and implementation referred to in paragraph 27 of decision 1/CMA.3, Advance unedited version, 19 November 2022. [https://unfccc.int/sites/default/files/resource/cma4\\_auv\\_4\\_scaling\\_up\\_mitigation.pdf](https://unfccc.int/sites/default/files/resource/cma4_auv_4_scaling_up_mitigation.pdf)







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## POLICY BRIEF

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