Prakriti Resources Centre

Brot für die Welt

Ambitious Transport Decarbonization Targets: Policy Recommendations for Nepal's NDC 3.0

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Background: Transport and Climate

Transport accounts for 23% of global energy-related CO_2 emissions–the second largest source.[1] Transport emissions have increased faster than any other end-use sector, making it one of the key sectors to decarbonize to deliver the Paris Agreement's goals. Without intervention, CO_2 emissions from transport could grow up to 50% by 2050.[2]

The IPCC analysis suggests that transport needs to decarbonize faster than any other sector and achieve a 70-80% reduction below 2015 to meet the Paris Agreement commitments. While government and industry have taken action to decarbonize the sector, unfortunately, emissions from the transport sector are not set to fall fast enough to meet the Paris Agreement goals.[3]

In Nepal, transport is the second largest and the fastest-growing source of energy-related carbon emissions. In 2019, transport contributed 30% of the total energy-related carbon emissions.[4]

In 2022, transport (excluding aviation) emitted an estimated 4580 Gg of CO_2eq emission. Private vehicles, which constitute 87% of the total vehicle fleets (largely motorbikes)– the largest source of transport emissions–contributed 37% of the road transport emissions. Freight vehicles and public transport constitute only 7% and 6% of the total fleets but contributed 36% and 27% of the emissions, respectively.[5] Between 2011 and 2021, Nepal's transport GHG emissions grew by 124%.[6] Nepal is one of the top ten countries where transport emissions are projected to increase most from 2010 to 2050.[7]

1 International Energy Agency (IEA), 2019.

2 Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2022.

3 Transport in Nationally Determined Contributions, International Transport Forum (ITF), 2023.

4 Nepal's Long-term Strategy for Net-zero Emissions, Government of Nepal, October 2021.

5 Emission modelling of transport sector of Nepal: Ambitious transport decarbonization measures to inform NDC 3.0, Prakriti Resources Center, March 2025.

6 Climate Watch data.

7 Implications of 2DS and 1.5DS for Land Transport Carbon Emissions in 2050, Partnership on Sustainable Low-carbon Transport (SLoCaT), November 2016.

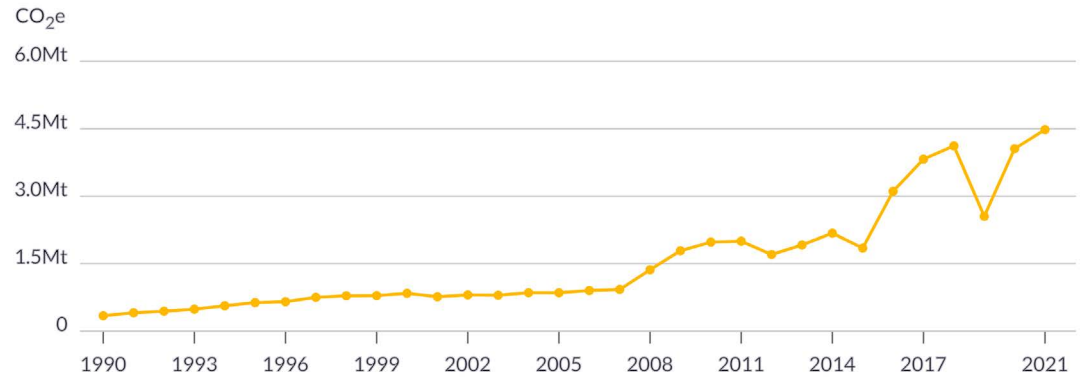


Figure 1: Historical Transport GHG emissions in Nepal (1990-2021)(Source: CLIMATEWATCH)

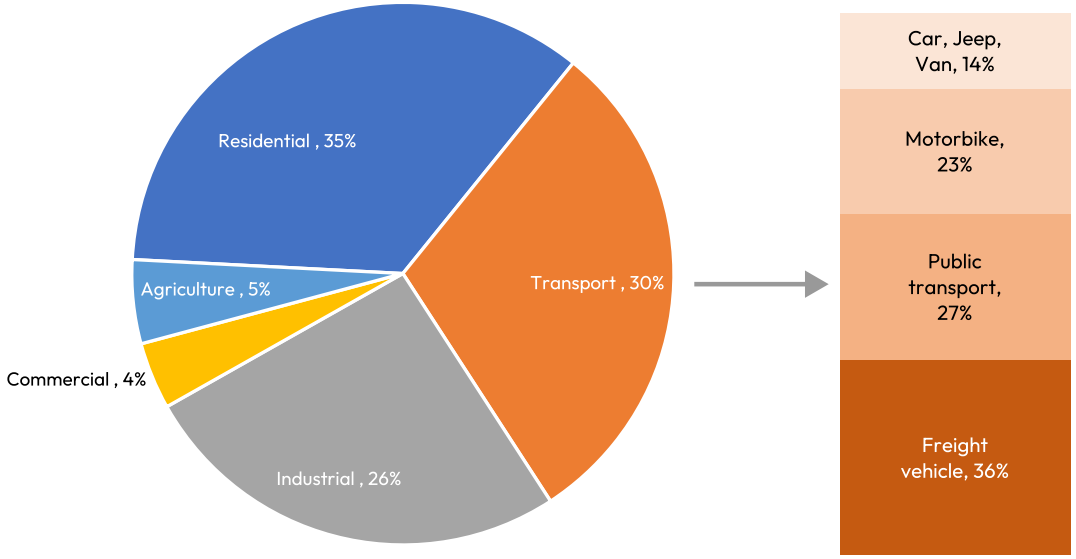


Figure 2: Share of energy-related GHG emissions in 2019 (LTS, 2019); Share of transport GHG emissions by vehicle categories (excluding aviation) in 2022 (PRC, 2025)

Nepal observed rapid motorization in the last two decades, growing transport emissions by several folds. The government data shows 5.2 million vehicles were registered in Nepal by FY 2022/23. Only around 3.2 million vehicles are estimated to be in operation.[8] In the last seven years (FY 2015/16–2022/23), the average annual motor vehicle growth rate was 12.5%.[9] With the increasing motorization and economic activity, fossil fuel consumption is increasing at a higher rate. Fossil fuel imports have increased at an average annual rate of 15% for diesel and 11% for petrol for the last 10 years (2011/12–2021/22). In FY 2022-23, petroleum oil (Petrol, Diesel, and LP Gas) had 17.3% of the total share in import[10]– the topmost imported commodities– contributing to the country's trade deficit.

Transport is one of the major contributors to urban air pollution. Air pollution is one of the biggest public health risks in Nepal. The State of Global Air estimates nearly 12,700 deaths in 2021 were attributed to ambient air pollution.[11] In the Kathmandu Valley, the daily fine particulate matter $PM_{2.5}$ level is 3–5 times higher than the National Ambient Air Quality Standards,[12] which is 13 times higher than the updated WHO guidelines. Diesel vehicles (trucks and public transport) are the major sources of fine particulate matter ($PM_{2.5}$) and black carbon (BC). On the other hand, private vehicles (largely petrol) emit significantly higher amounts of carbon monoxide (CO), methane (CH_4), and non-volatile organic compounds (NMVOCs).

[8] Estimating that the average life of vehicles is 20 years.
[9] Ministry of Physical Infrastructure and Transport, Nepal.
[10] Department of Customs, 2024.
[11] State of Global Air.
[12] Khem Bahadur Karki, Purushottam Dhakal, Srijan Lal Shrestha, Hari Datt Joshi, Krishna Kumar Aryal, Anil Poudyal, SajanPuri, et al. 'Situation Analysis of Ambient Air Pollution and Respiratory Health Effects in Kathmandu Valley, 2015'. Kathmandu, Nepal: Nepal Health Research Council, 2016.

The transport sector is vulnerable to climate change impacts. The unprecedented rainfall in September 2024 washed away several main roads and highways in eastern and central parts of Nepal, disrupting mobility for several days. It impacted twenty-three highways across the country, with an estimated loss of over NRs 2 billion due to roadblocks and damaged bridges.[13] The immediate repairs and comprehensive reconstruction of all affected highways are estimated to cost NPR 28 billion.[14] The rainfall-triggered landslides also buried four vehicles, resulting in the death of 35 people. Nepal is ranked 153rd out of 208 countries in the National Road Vulnerability Index Ranking (2023).[15] In Nepal. roads are often built along rivers and high-slope terrains without climate risk assessments, which makes them vulnerable to climate disasters such as flooding and landslides.

Second NDC: Transport Targets, Stocktake, Limitations and Gaps

Stocktake

Among the three quantified transport targets in the second Nationally Determined Contribution (NDC), Nepal has only met one 2025 target on electric public passenger vehicle sales.In FY 2022/23, 29% of public passenger vehicle sales[16] were electric vehicles (EVs), compared to the sales target of 20% by 2025. However, the country falls behind in meeting the target for private passenger vehicles – only around 10% of the total private passenger vehicle sales in FY 2022/23 are electric, compared to the 25% sales target by 2025. This is mainly because of the low penetration of EVs in the two-wheeler sector. The sales share of electric private passenger four-wheelers reached 58% for the fiscal year.

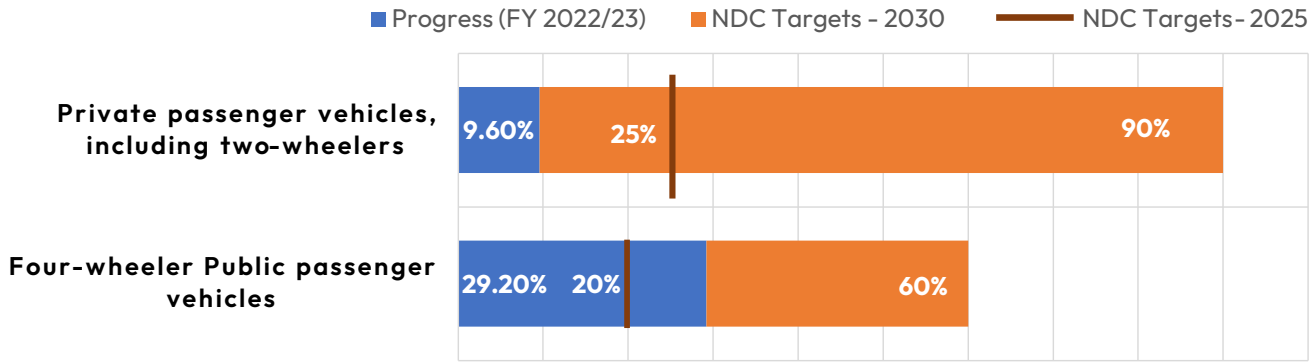


Figure 3: Second NDC Transport Targets Stocktake

[13] 2024 September Floods and Landslides: Situation Report #1, NDRRMA, 2024. https://bipad.gov.np/np/1314.
[14] A Preliminary Loss and Damage Assessment of Flood and Landslide September 2024, NDRRMA, 2024.
[15] Cited in: Nepal Climate Transport Profile, Asian Transport Observatory.
[16] As sales or vehicle registration data are not available, vehicle import data from the Department of Customs are considered as sales data.

Second NDC Transport Targets

Quantified Targets:

- Increase sales of electric vehicles to 25% of all private passenger vehicles sales, including two-wheelers, by 2025, and 90% by 2030.
- Increase sales of electric vehicles to cover 20% of all four-wheeler public passenger vehicle sales by 2025 and 60% of all four-wheeler public passenger vehicle sales by 2030 (the public passenger target does not take into account electric-rickshaws and electric-tempos).
- By 2030, develop 200 km of the electric rail network to support public commuting and mass transportation of goods.

Policy Targets:

- Promote public electric mobility through policy incentives, including subsidy policies and other financial mechanisms.
- By 2025, ensure at least three provinces operate electric public transport, three provinces establish vehicle fitness test centres to monitor and regulate vehicular emissions, and all metropolitan cities have roads paved with bicycle and pedestrian lanes.

The country is unlikely to meet the target of 200 km of electric railways by 2030. So far only 59 km of railway track bed for 945 km of electric East-West Railway Project has been completed. The 16th Periodic Plan has set a target of constructing 209 km of railway track bed by FY 2029/30. The plans for Kerung–Kathmandu railway and Kathmandu metro rail are still under plan.

Regarding policy targets, out of three provinces targeted to operate electric public transportation, Bagmati and Lumbini provinces operate electric buses but not on the required scale. So far, only two metropolitan cities (Lalitpur and Pokhara) out of the targeted six metropolitan cities have constructed cycle lanes. However, they are less than satisfactory in length and design to encourage cycling culture.

Gaps and Limitations

The second NDC targets, including Long-term Strategy for net-zero emissions, are primarily focused on the electrification of transport and have failed to consider a holistic approach to sustainable transportation. A holistic approach to transport planning is important to provide an inclusive and equitable transport system, support a just transition, and address transport-related issues such as road fatalities, traffic congestion, and a gender-friendly transport system. The targets also fail to address emissions from freight– one of the largest sources of transport emissions.

The transport emission analysis indicates that the NDC targets will reduce the transport emissions from the business-as-usual scenario but don't peak transport emissions and ensure emissions reductions from the current level, a much-required action to improve urban air quality.

NDC Targets	Public passenger vehicles	Private passenger vehicles	Freight	Railways	Active Mobility	Aviation	Transport Resiliency
Quantified Targets	√	√	×	√	×	×	×
Policy Targets	√	×	×	×	√	×	×

Figure 4: Coverage of the Second NDC by transport sub-categories

Here are the gaps and limitations of the second NDC that need to be addressed in the upcoming NDC 3.0.

- The NDC targets largely focus on the electrification of transport, and doesn't prioritize **a holistic approach to sustainable transportation**.
- Modal shift[17] is one of the key strategies to reduce transport emissions, however, there is no exclusive target to **increase the modal share of public transport and active mobility (walking and cycling)**.
- The targets don't address **'freight'–** one of the largest sources of transport GHG emissions.
- The targets won't lead to the **peaking of transport emissions** and reduce the current level of emissions, especially to address urban air pollution.
- Although politically challenging, **regulatory measures** are the most sustainable, cost-effective, and transformative (such as phasing out ICE vehicles by XXXX year). The second NDC doesn't include any regulatory measures.[18]
- No measures for **climate-resilient transport infrastructures**.

Nepal: Key Policies on Transport Decarbonization

Nepal has some supportive policies regarding sustainable transportation, but the **transport plans and investments, including the 16th Periodic Plan, largely focus on building roads and widening highways.** In FY 2024/25, more than 95% of the Ministry of Physical Infrastructure and Transport's annual budget is allocated for road projects.[19] Besides some budget for road safety, railway, and waterway development, the government failed to allocate a budget for public transport, and pedestrian and cycling infrastructures.

The **federal fiscal budget 2021/22** has adopted the policy to phase out light-duty fossil fuel vehicles and switch to electric ones by 2031. It also included plans to operate at least 100 electric buses in the Kathmandu Valley and provide financial support to develop electric public transportation in major cities.

The **First Periodic Plan for Bagmati Province** has also targeted to phase out fossil-fuel vehicles from its urban centers by mid-April 2028. The Bagmati Province also plans to introduce electric public transport will be introduced in public-private partnerships.

A **regulation by the Department of Transport Management** prohibits new ICE vehicles for taxis in the Kathmandu Valley and allows only electric vehicles for taxis. The government has also announced to ban vehicles more than 20 years old.

The **16th Periodic Plan (2024/25–2029/30)** states to prioritize electric public transportation to support a green economy, and promote affordable, reliable, and environment-friendly public transport. The Plan includes operating an integrated public transport system through public-private partnership, electric buses or alternative transport systems in the Kathmandu Valley and other large cities in coordination with Provincial and Local governments, and a modernized Hetauda–Kathmandu ropeway. It has set a target of constructing 209 km of railway track bed by FY 2029/30, out of which 140 km is of East-West Electric Railway Project and extending the existing 52 km railway to 86 km in five years. It also aims to establish a Transport Authority by managing existing transport-related offices and institutions.

The **Environment-Friendly Vehicle and Transport Policy (2013)** is a key policy document on promoting electric and environment-friendly transport systems promoting electric mobility. It included targets to increase the electric vehicle share to 20% by 2020. The policy includes conversion of fossil fuel vehicles to electric, tax exemption for encouraging the use of EVs, and construction of charging stations and cycle lanes.

Besides tax rebates (customs tariff and excise duty) on EVs, **the monetary policy of the Central Bank of Nepal** allowed banks and financial institutions to loan a maximum of up to 80% of the capital cost for EVs while only 20% for ICE vehicles. But, in 2025, the new monetary policy reduced the loan to 60% of the capital cost. It allows the tenure of auto loans for EVs up to 8 years, whereas limits to only 5 years for ICE vehicles.

[17] Modal shift in transportation planning is the practice of changing people's travel from one mode of transportation to another, for e.g., from cars and motorbikes to public transport.

[18] The regulatory measures should come with incentives especially for public transport system such as buses and taxis.

[19] Red book 2024/25, Ministry of Physical Infrastructure and Transport, 2024.

The **National Action Plan for Electric Mobility 2018** includes establishing a centralized regulatory entity for promoting e-mobility, the National Electric Financing Vehicle Fund to manage and disburse financial support, and a national program for electric mobility.

The **White paper on energy, water resources, and irrigation sector (2018)** states making the necessary policy and infrastructure arrangements for electric mobility with an aim that 50% of imported vehicles will be electric by 2023. The recent **Energy Development Roadmap (2025)** includes a plan to devise required regulations to replace ICE vehicles with EVs.

Global: Transport Decarbonization Targets

Several countries have targeted to ban new internal combustion engine (ICE) vehicle sales by 2030–2035, and Norway has an even more ambitious target to ban ICE vehicle sales by 2025.[20] [21] The EU adopted legislation to reduce 55% of CO_2 emissions from 2030 until 2034 and 100% of CO_2 emissions reductions from 2035 for new cars and vans. 31 national governments and 80 sub-national governments have signed the Zero Emission Vehicles Declaration to pledge that all new sales of cars and vans be zero-emission globally by 2040 and by no later than 2035 in leading markets.[22]

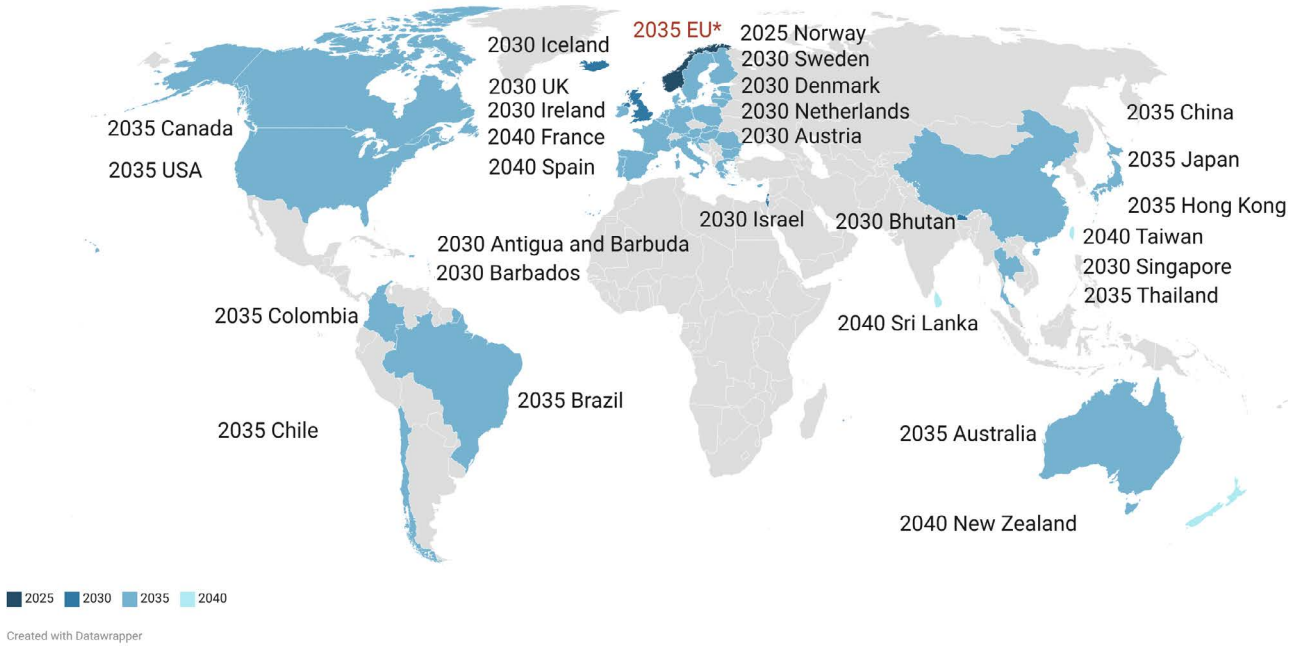


Figure 5: Countries with targets to phase-out new ICE vehicle sales

Developing countries with NDC Targets to phase-out ICE vehicle

Antigua and Barbuda: 100% all new vehicle sales to be electric vehicles by 2030; Ban import of ICE vehicles from 2030 (initial start in 2025); 100% of government vehicles will be electric by 2035.

Barbados: 100% electric or alternatively-fueled vehicles in the passenger fleet by 2030.

Monaco: Public transport will be zero-emission by 2030.

Bhutan: Import restriction on ICE cars from 2030.

[20] International Council on Clean Transportation.
[21] International Council on Clean Transportation.
[22] Accelerating to Zero.

Bhutan Transport Targets in NDC

- Mass transit though improvements in bus systems and the introduction of open-bus rapid transit (BRT) network (electric and diesel) and light rail transit.
- Promotion of electric passenger vehicles (taxi, two wheelers, light vehicles, buses).
- Low emission freight transport system for heavy and commercial trucks and freight trains
- Non-motorized transport system through public bicycle systems and improved sidewalks, crosswalks.
- Improve fuel-efficiency in internal combustion engines through stringent vehicle and emission standards.
- Private vehicle demand management through shared mobility, traffic system management carpooling, ride sharing and rental services, import restriction on internal combustion engine cars from 2030 and introducing annual import quota system.

Uganda Active Mobility Targets in NDC

The country has more holistic NDC transport targets, including adaptation on transport infrastructures. Among others, the transport targets in the second NDC include:

- Development of Nonmotorized Transport (NMT) infrastructure, along GKMA as well as in other urban areas across Uganda – potential to reduce the emissions by approximately 0.66 MtCO2e by 2030. It targets 100 km of complete streets or dedicated NMT corridors, constructed in greater Kampala area in 2030 leading to 10% shift in passenger-kilometer by mode from other passenger modes, and construction of 100 km of NMT facilities in secondary cities in 2030.
- Residential trip avoidance through town planning and transport orientated development.

Norway, Slovenia, Denmark, and the Netherlands achieved 100% of their new city bus sales being zero-emission in 2023. Eight European cities aim to achieve 100% ZE bus fleets in 2025, with a further 19 aiming for the same goal in 2030.[23] Indonesia targets to electrify 90% of urban mass public transport by 2030 and 100% by 2040 and to electrify all public transport, including microbus, by 2045.[24] India's Bharat Urban Megabus Mission plans to deploy 100,000 electric buses in cities with more than 1 million population by 2030. The Government of India is allocating INR 1.75 lakh crore for the mission, part of which will also fund the development of more than 5,000 km of walkways and cycling paths.[25]

Countries like Uganda and Sri Lanka have a more holistic approach to transport emission reduction in their NDCs. Beyond electrification, they have included targets on active mobility, modal shift, and integrated land-use and transport planning. Bhutan lacks quantified transport targets but includes more comprehensive strategies for reducing transport emissions, including an ambitious target to restrict the import of ICE cars from 2030 and introduce an annual car import quota system. The Copenhagen Climate Plan (2021-2025) includes cycling as a strategy to become carbon neutral by 2025. It targets to achieve 75% of all trips in Copenhagen on foot, by bike or public transport, and 50% of all trips to work or school are by bike.

The SLOCAT reports that only 41% of second-generation NDCs have transport targets, either GHG mitigation or non-GHG targets. The mitigation actions continue to lean towards system efficiency improvements over transformation. It also states that freight remains overlooked in NDC measures despite the sector's large contributions to GHG emissions. Only a few second-generation NDCs embrace a shift from road freight to rail and logistics improvements.[26] Only 52 countries have included active mobility in their NDCs to date.[27]

EV Targets by Vehicle Manufacturing Companies

Over 20 vehicle manufacturers, representing over 90% of car sales in 2023, have set targets for future EV deployment. Many companies have set targets to manufacture 50–100% of electric vehicles by 2030–

[23] Sustainable Bus.
[24] ITDP.
[25] The Economic Times.
[26] SLOCAT, (2022). Climate Strategies for Transport: An Analysis of Nationally Determined Contributions and Long-Term Strategies, October 2022.
[27] PATH.

2035.[28] In this scenario, the EV market will likely forward the electrification of the transport despite government efforts. However, for a rapid cut of transport emissions to realize the Paris Agreement and countries' NDC commitments, governments should take a proactive approach in phasing out fossil-fuel vehicles and push vehicle manufacturing companies towards EV production.

Vehicle Manufacturer	EVs Production Target
BYD, Tesla, Polestar	100% of vehicles produced are already EVs (and hybrid).
Tata Motors	30% EVs sales by 2030, 100% EVs catalogue by 2035. 100% of JLR fleet to be zero-emissions share by 2030.
Suzuki	80% EVs sales share in Europe in 2030; First EV production in India by 2025 and 15% BEV sales by 2030.
Mahindra	30% EVs sales by 2030.
Hyundai	100% EVs sales by 2040.
Nissan	100% EVs sales by 2030.
Toyota	3.5 million BEVs sales a year. Lexus 100% EVs by 2030 (western Europe, North America and China) and globally by 2035.
Volvo	90–100% cars sold to be fully EVs or plug-in hybrids by 2030.
Mitsubishi	50% of its sales will be EVs by 2030 and 100% by 2035.
Honda	100% of its new vehicle sales to be battery-electric and fuel cell electric vehicles by 2040.
Subaru	50% EVs sales in 2030.
BMW	50% EVs sales by 2030.
Volkswagen	80% EV sales in Europe and 55% in North America by 2030.
Daimler	100% CO_2-neutral fleet of new trucks and buses by 2039 in key regions.

Figure 6: EV production and sales targets of vehicle manufacturing companies

NDC 3.0: Setting the Transport Targets

As per the Paris Agreement, the countries are required to submit NDC by 2020 and every five years thereafter, regardless of their respective implementation time frames. Nepal is currently preparing the next round of the NDC to be submitted in 2025, also known as NDC 3.0, with an implementation timeframe of 2035. NDC 3.0 needs to be progressive and more ambitious than the current NDC, which is to be informed by the outcome of the first global stocktake.

The **First Global Stocktake Report**[29] suggests that "more ambitious mitigation targets in NDCs are needed to reduce emissions more rapidly and to align with each country's LT-LEDS towards just transitions to net zero emissions by or around 2050," It says that "phasing out internal combustion engines and using electric vehicles offer the greatest mitigation potential in the sector. In addition, demand-side interventions, such as shifting transport modes (e.g., to walking and using public transport), will be essential in the context of rethinking mobility."

The **Outcome of the First Global Stocktake (Decision 1/CMA.5)**[30] calls on parties to contribute to

[28] International Energy Agency (IEA), 2024.
[29] Synthesis report on the technical dialogue of the first global stocktake, UNFCCC.
[30] Decision -/CMA.5 - Outcome of the first global stocktake, UNFCCC, 2023.

the global efforts, in a nationally determined manner, taking into account the Paris Agreement, by "accelerating the reduction of emissions from road transport on a range of pathways, including through the development of infrastructure and rapid deployment of zero and low-emission vehicles."

The **IPCC**[31] also suggests that "transformative decarbonization of the global transport system requires, in addition to technological changes, a paradigm shift that ensures prioritization of high-accessibility transport solutions that minimize the amount of mobility required to meet people's needs, and favor transit and active transport modes."

The **International Transport Forum**[32] provides the following recommendations in the NDCs for the governments to deliver a Paris Agreement-aligned reduction of transport emissions:

- set targets to end sales of new internal combustion engine vehicles for both passenger and freight road fleets, roll out sustainable aviation fuels, and encourage the uptake of zero-emission fuels for shipping
- scale up investment in and deployment of infrastructure enabling the uptake of more sustainable transport modes
- implement mode-shift and demand-management policies to encourage more sustainable transport modes where they can be most effective
- mobilize finance to support emerging markets and developing economies with their transition.

Nepal needs ambitious, robust, and actionable targets for transport decarbonization such as phasing out of ICE vehicles. The transport decarbonization targets should aim to transform the country's transport system by phasing out internal combustion engine (ICE) vehicles, shifting to electric or zero-emission vehicles for both passenger and freight transport, and providing access to a safe, efficient, environment-friendly, and inclusive transport system. Phasing out of ICE vehicles is also in line with the policies of the federal government and Bagmati Province.

NDC 3.0 needs to align with the Long-term Strategy to achieve net-zero emissions by 2045 and targets to peak transport emissions by 2030. The second NDC targets will reduce the emission from the business-as-usual scenario but don't address the peaking of the transport emissions. The LTS emission modeling suggests that the emissions can be peaked by 2035 in the 'with additional measures' scenario. However, with more robust, ambitious, comprehensive, and inclusive targets, transport emissions can peak even earlier.

NDC 3.0 needs to consider a holistic approach to sustainable mobility and include active mobility as one of the strategies. Research suggests that better urban planning could reduce GHG emissions from urban transport by 25% in 2050, compared with a business-as-usual scenario.[33] Enabling more people to walk and cycle safely is a quick, affordable, and reliable way to help reduce transport emissions by as much as 50%.[34] A holistic approach to sustainable mobility calls for deaccelerating private vehicle growth rapidly, increasing mode shares of public transport and active mobility, and integrating transport and urban planning. Investing in and promoting active travel whilst 'demoting' private car ownership and use should be a cornerstone of strategies to meet 'net zero' carbon targets, particularly in urban areas, while also reducing inequalities and improving public health and quality of urban life in a post-COVID-19 world.[35]

Transport decarbonization targets should also ensure transport equity, gender-friendly transport system, and just transition. The current transport policies and plans don't consider pro-poor, gender-friendly, and equitable transport systems. Women are more likely to walk and take public transit compared to men. Women's travel patterns are more diverse spatially and temporally compared to men. A study by ILO shows that "limited access to safe transportation is the greatest challenge to participation that women face in developing countries, reducing their participation probability by 15.5 percentage points."[36] Not only proper transport planning provides mobility access to all, including vulnerable and marginalized communities, but it also helps in reducing poverty in cities. The NDC 3.0

[31] Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2022.

[32] Transport in Nationally Determined Contributions, International Transport Forum, 2023.

[33] Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2022.

[34] Sims et al., 2014.

[35] The climate change mitigation impacts of active travel: Evidence from a longitudinal panel study in seven European cities, Global Environmental Change, Volume 67, 2021.

[36] International Labor Organization.

should go beyond increasing EV sales; it needs to ensure that everyone –irrespective of gender, age, income, and physical ability– has access to a safe, efficient, affordable, environment-friendly, and resilient transport system. It must prioritize a transport system with higher social and equity benefits and ensure a just transition in the transport decarbonization process.

Nepal needs to decarbonize its transport system to address urban air pollution and the growing trade deficit. Given that Nepal's share of emissions is comparatively very low, transport decarbonization needs to be seen from the local lens of addressing air pollution and generating public health, economic, and social benefits rather than the global lens of carbon emission reduction. Decarbonizing transport will also help to address the country's trade deficit from petroleum and motor vehicle imports and transform its transport system.

Policy Recommendations: Ambitious Transport Decarbonization Targets for Nepal

The following targets are ambitious but achievable, and much needed to address air pollution and its public health concerns. These targets will also help to transform the country's transport system, and ensure safe, equitable, inclusive, gender-friendly and climate-resilient. The goal is to peak the transport emissions by 2030 and gradually reduce the emissions to nearly zero by 2045 aligning with the Long-term Strategy (LTS) for Net-zero Emissions.

Transport Categories	Proposed Transport Targets for NDC 3.0 (2025-2035)	Policy References
Public transport (road-based)	All new public passenger vehicles sales will be electric or zero-emission by 2030. 100% of urban public passenger vehicles will be electric or zero-emission by 2035. Convert ICE vehicles to electric or phase-out ICE vehicles,[37] which are more than 20 years old. Build 50 km of integrated climate-resilient electric Bus Rapid Transit (eBRT) system in the Kathmandu Valley by 2030, and at least 100 km of high-quality electric urban mass transit system (e-BRT, LRT, metro) by 2035. Develop integrated electric public transport system in all the metropolitan and sub-metropolitan cities by 2030. Improve the connectivity and service of intercity public transport with electric or zero-emission vehicles and required infrastructures. Develop 'National Electric Mobility Program' with dedicated funding to provide financial incentives and subsidy to cities and private public transport operators for rapid deployment of electric or zero-emissions public transport vehicles.	**Nepal** The federal fiscal budget 2021/22 had a policy to phase-out light duty fossil fuel vehicles and switch to electric ones by 2031. The First Periodic Plan for Bagmati Province targets to phase-out fossil-fuel vehicles from its urban centres by mid-April 2028. The Government of Nepal has phased-out new ICE taxis in the Kathmandu Valley. The Energy Development Roadmap 2025 also includes plan to devise required regulation to replace ICE vehicles with electric vehicles. The federal fiscal budget 2021/22 included plans to operate a minimum of 100 electric buses in the Kathmandu Valley, and provide financial support to develop electric public transportation in major cities. The Bagmati Province also plans to introduce electric public transport through public-private partnership. The 16th Periodic Plan states to prioritize electric public transportation to support green economy, and promote affordable, reliable and environment-friendly public transport. The Plan includes operate of electric bus or alternative transport system in the Kathmandu Valley and other large cities in coordination with Provincial and Local governments. The National Action Plan on Electric Mobility's priority action includes development of 'National Program for Electric Mobility' and 'National Financing Vehicle'. The Policy Roadmap for Nepal to transition to 100% RE by 2050 also calls for complete decarbonization of transport sector through electrification of transport system and phase-out of fossil fuels.[38] TDF has submitted the concept note to Green Climate Fund on developing eBRT system in the Kathmandu Valley.[39] ADB is also implementing electric mobility program in multi-countries including Nepal through GCF funding,[40] and GIZ through NAMA facility.[41]

[37] This requires development of standards and guidelines for converting fossil fuel vehicles to electric with enabling regulations and tax incentives.

[38] Policy Roadmap for Nepal to Transition to 100% RE by 2050, WWF Nepal, 2023.

[39] GCF.

[40] GCF.

[41] Mitigation Action Facility.

Transport Categories	Proposed Transport Targets for NDC 3.0 (2025-2035)	Policy References
Private and institutional vehicles	All new private (and institutional) passenger vehicle sales will be electric or zero-emission by 2030. 80% of private passenger vehicles will be electric or zero-emission by 2035.	**International** Several countries have targeted to phase out sales of new ICE vehicles by 2030–2035. Norway has even more ambitious plan by 2025. The EU adopted legislation on 100% CO2 emissions reductions from 2035 for new cars and vans. As a part of C40 Fossil Fuel Streets Declaration, C40 cities pledged to transition to Fossil-Fuel-Free Streets by: 1) procuring only zero-emission buses from 2025 and 2) ensuring a major area of our city is zero emission by 2030.[42] 31 national governments and 80 sub-national governments have signed Zero Emission Vehicles Declaration sign on to the pledge that all new sales of cars and vans be zero-emission globally by 2040, and by no later than 2035 in leading markets. More than 20 vehicle manufacturers, together representing over 90% of car sales in 2023, have set some sort of target for future EV deployment. Many companies have set targets of manufacturing 50-100% of electric vehicles by 2030–2035. Norway, Slovenia, Denmark, the Netherlands, have achieved 100% of their new city bus sales being zero-emission in 2023. Eight European cities aim to achieve 100% ZE bus fleets in 2025, with further 19 aiming for the same goal in 2030.[43] Shenzhen, China has the world's largest and first fully electric bus fleet.
Active mobility (walking and cycling)	All metropolitan and sub-metropolitan cities will develop a 'Sustainable Urban Mobility Plan' with aim to make cities pedestrian- and cycle-friendly by 2030.	**Nepal** The 16th Periodic Plans states to ensure pedestrian and cycling infrastructures to reduce air pollution. Nepal's Urban Road Standard states that urban roads should be planned and designed to provide safe, short and fast thoroughfare and access to all road users, being motor vehicles, cyclists and pedestrians. **International** As a part of C40 Fossil Fuel Streets Declaration, C40 cities pledged to transition to Fossil-Fuel-Free Streets by increasing the rates of walking, cycling and the use of public and shared transport that is accessible to all citizens, among other.
Railways	By 2035, operate at least 300 km[44] electric rail network to support public commuting and mass transportation of goods. Develop a national electric railway network plan with long-term vision on electric railway development and integrated with regional transport connectivity.	**Nepal** The 16th Periodic Plan has set a target of constructing 209 km of railway track bed and extending existing railway to 86 km by FY 2029/30. (Note: The second NDC targets includes 200 km of electric railway by 2030.) MoPIT has set a target to develop 348 km of railways and has preliminary plan to develop 77 km of metro rail in the Kathmandu Valley. The feasibility study of 141 km electric rail from Raxaul to Kathmandu completed, and of 73 km Kerung–Kathmandu railway is ongoing.

[42] C40 Cities.

[43] Sustainable Bus.

[44] This includes 209 km of railway track under-construction, including electric east-west railway project, and extension of current 52 km of Jaynagar-Janakpur-Bijalpura to 69 km and 17 km of cargo rail Bathanaha-Biratnagar planned under 16th Plan.

Transport Categories	Proposed Transport Targets for NDC 3.0 (2025-2035)	Policy References
Freight	All new freight vehicles (except heavy duty vehicles[45]) sales will be 100% electric or zero-emission by 2030, and all new heavy duty vehicles sales will be 100% electric or zero-emission by 2040. 80% of all the urban freight vehicles will be electric or zero-emissions by 2035. Convert ICE vehicles to electric or phase-out ICE vehicles, which are more than 20 years old. Develop and implement fuel-efficiency program for freight vehicles to increase their fuel-efficiency by 28%, as well as program to improve logistics supply chain. Build ropeways for goods transport in hilly and mountainous areas.	**Nepal** The 16th Plan includes operation of modernized Hetauda–Kathmandu ropeway, construction of 209 km of railway track bed, and extension of passenger and cargo rail to 86 km in five years. **International:** 18 countries address rail infrastructure expansion or improvement for freight in their NDCs.
Aviation (Domestic)	Promote use of Sustainable Aviation Fuel (SAF) mix and introduce domestic carbon offsetting scheme for the aviation industry.[46]	**Nepal** Yeti Airline offsets its emissions to achieve carbon neutrality. **International** Under the EU Emissions Trading System (ETS), all airlines operating in Europe, European and non-European alike, are required to monitor, report and verify their emissions, and to surrender allowances against those emissions.[47] In addition, legislation is in place to apply the Carbon Offsetting and Reduction Scheme for International Aviation of the International Civil Aviation Organization (CORSIA). The 41st International Civil Aviation Organization (ICAO) Assembly has adopted a goal of net-zero carbon emissions for international aviation by 2050.[48] The US government committed to net-zero GHG emissions from the US aviation sector by 2050, setting goal of scaling up the production and use of SAF. By 2050, SAF should account for 100% of domestic aviation fuel demand.[49]

[45] Heavy duty vehicles here refer to heavy commercial vehicles (HCVs), multi-axel vehicles (MAVs), tipper trucks with GVW of more than 7 tonnes and heavy equipment vehicles.

[46] Building an intercity electric railway network and improving intercity public transport network will also contribute in reducing air travel growth.

[47] European Union.

[48] International Civil Aviation Organization.

[49] Climate Action Tracker.

Transport Categories	Proposed Transport Targets for NDC 3.0 (2025-2035)	Policy References
Transport Infrastructure - Resiliency	Revise regulations, design standards, and guidelines to embed climate-resilient planning in the transport infrastructure projects. Assess and redesign transport infrastructures to make the climate-resilient, safe and inclusive of all road users. Develop early warning systems in major roads and highways to reduce the risk of disasters. Prioritize public transportation, active mobility and shared mobility in the country's transport planning that will support creating inclusive and resilient transport system.	**Nepal** The National Adaptation Plan includes following priority adaptation programmes on transport infrastructures: 32: Strengthening Institutions, Technologies, Policies and Resources (Databases), and Building Capacity and Awareness for Climate-Resilient Industry, Transport and Physical Infrastructure 33: Developing and Promoting Resilient, Clean Energy-based Transportation Systems 35: Up-Grading, Maintaining and Relocating Vulnerable Industries and Physical Infrastructures to Increase Resilience to Climate Risks. The National Urban Policy 2025 includes policy to develop sustainable and environment-friendly infrastructures by embedding disaster risk reduction and climate adaptation. **International** Some countries such as Uganda, Cambodia, Kenya, Liberia, Papua New Guinea include transport resiliency targets in their NDC.[50] For e.g., the Uganda's NDC targets include: Build climate-resilient roads, bridges, water, and Rail transport infrastructure systems. Revise design codes, regulations and guidelines to climate proof strategic transport infrastructure

Transport Emission Modeling: Pathways to Net-zero Emissions

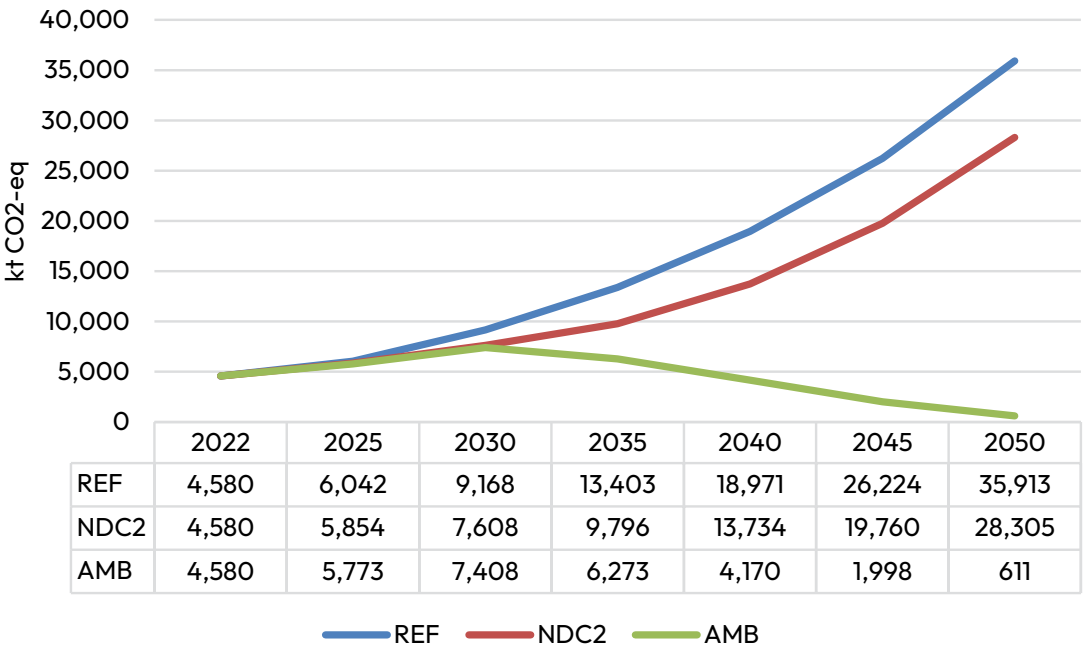
The transport emission modeling (2022–2050)[51] was done for three different scenarios: Reference scenario (REF), Second NDC scenario (NDC2), and Ambitious target scenario (AMB). The REF scenario follows the current trend–the business-as-usual scenario. The NDC2 scenario takes account of the targets set in the second NDC. The AMB scenario is based upon the more ambitious targets that are deemed to support the long-term strategy for NZE achievement by 2045 and intends to add to the achievements of the second NDC. The ambitious targets include phasing out new ICE vehicle sales, increasing electric and zero-emission vehicles for both passengers and freights, phasing out the 20-year-old vehicles, developing electric railways, improving fuel efficiency, and increasing the modal share of sustainable transport.

The total transport GHG emissions (excluding aviation) in the base year 2022 was estimated 4,580 Gg CO_2eq. In the reference scenario (REF), the transport emissions will increase at the rate of 7.6% annually. In the second NDC scenario (NDC2), the transport emission growth rate reduces only to 6.7%. This will reduce transport emissions by 17% in 2030, 27% in 2035, and 21% in 2050 compared to REF scenario, but it doesn't lead to continued emission reduction to reach net-zero emissions (NZE) targets.

In the ambitious target scenario (AMB) where the interventions are much more ambitious than the Second NDC scenario (NDC2), the transport emissions will peak by 2030 and decline continuously – a must for achieving NZE targets. With the implementation of ambitious targets AMB scenario, the transport emissions will reduce by 53% in 2035 and up to 98% in 2050 compared to the REF scenario.

[50] SLOCAT, (2022). Climate Strategies for Transport: An Analysis of Nationally Determined Contributions and Long-Term Strategies, October 2022.

[51] Emission modelling of transport sector of Nepal: Ambitious transport decarbonization measures to inform NDC 3.0, Prakriti Resources Center, March 2025.

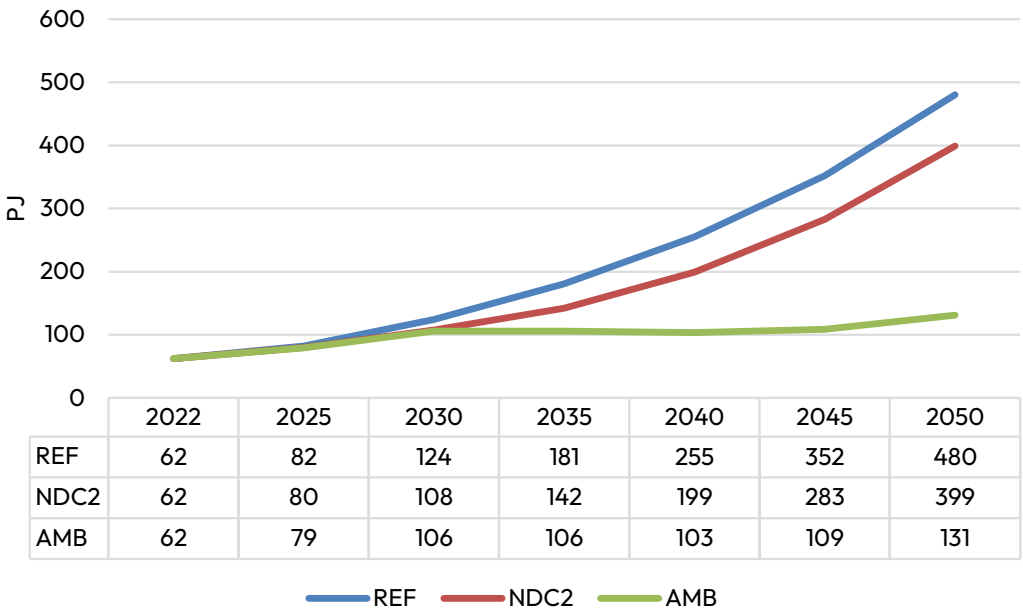


	2022	2025	2030	2035	2040	2045	2050
REF	4,580	6,042	9,168	13,403	18,971	26,224	35,913
NDC2	4,580	5,854	7,608	9,796	13,734	19,760	28,305
AMB	4,580	5,773	7,408	6,273	4,170	1,998	611

Figure 7: Transport GHG emissions (2022-2050) in different scenarios

In the AMB scenario, the transport energy demand will increase at a much lower rate of 2.7%, and most of it will come from electricity. The total energy demand will reduce by 15% in 2030, 41% in 2035, and 73% in 2050 compared to REF scenario. Thus, it is indicative that the targets to reduce transport emissions will also help to reduce the total energy demand. With the penetration of efficient vehicles, most of the transport energy demand will be fulfilled by domestically produced electricity replacing imported petroleum products.

In the REF scenario, the dominance of petroleum product power vehicles remains till 2050 with the increment of diesel consumption in the transport sector to 84% in 2050 from the level of 65% in 2022. In the NDC2 scenario, the demand for fossil fuel, especially for petrol, will lower, and the electricity demand will increase – taking a share of 5.6% in 2030, 8.9% in 2035, and 6.6% in 2050, which is only 1% in the REF scenario. In the AMB scenario, the result is quite different with electricity dominating the fuel mix in 2050, taking 94% of the total share.

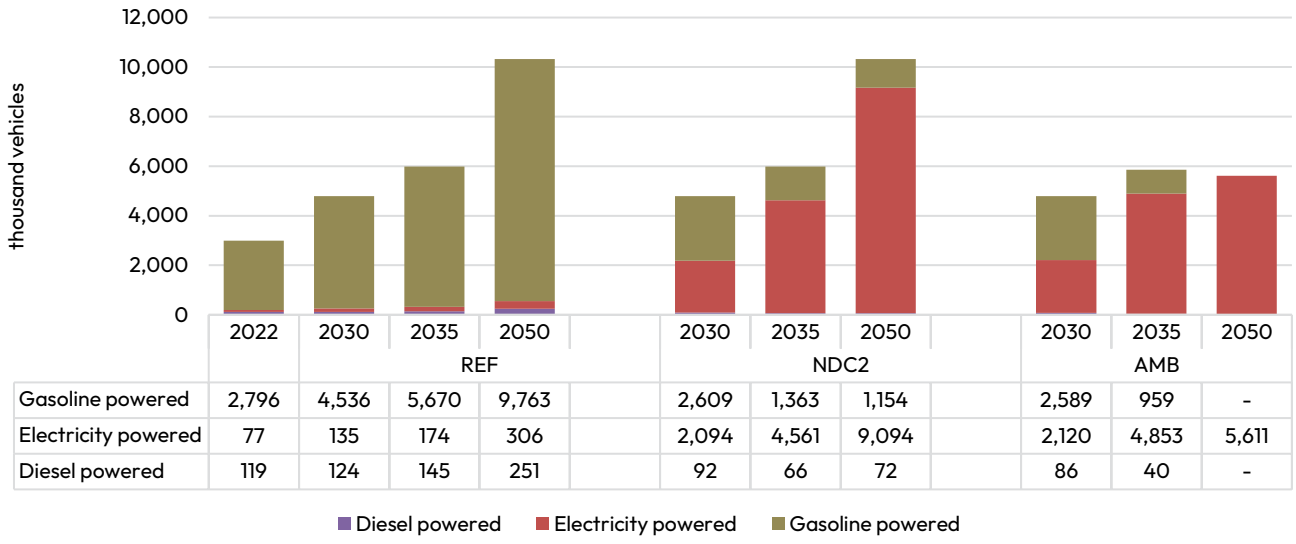


	2022	2025	2030	2035	2040	2045	2050
REF	62	82	124	181	255	352	480
NDC2	62	80	108	142	199	283	399
AMB	62	79	106	106	103	109	131

Figure 8: Energy consumption by transport sector in different scenarios

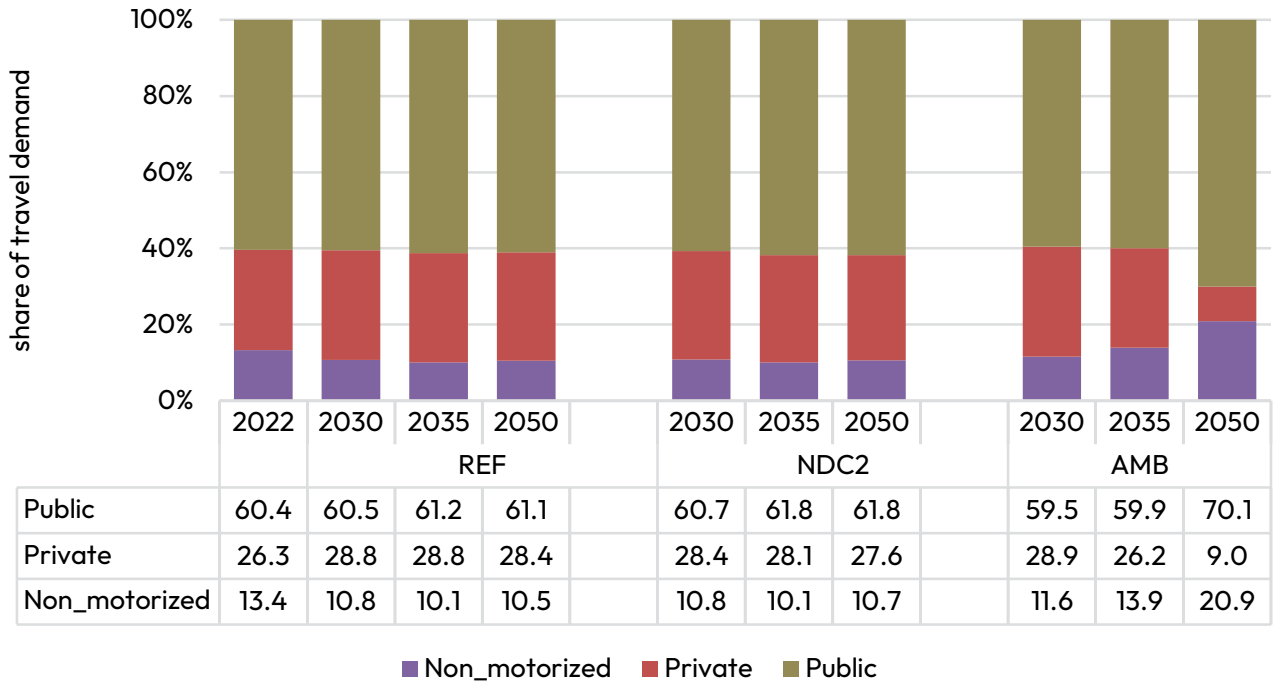
In the AMB scenario, 80% of the total passenger vehicles will be electric by 2035 and 100% by 2050. With 100% sales of electric freight vehicles by 2040, the freight vehicle fleet is assumed to be electrified by 2060, making transport a zero emissive sector.

With the strategic actions in place, the travel demand for public transport and non-motorized transportation will increase in the AMB scenario. While in REF and NDC2 scenarios, the travel demand share for 2035 and 2050 will remain at nearly the level of base year 2022. In the AMB scenario, 70% of the travel demand share will be fulfilled from public transport, 20% from non-motorized mode, and a very low share will be fulfilled by private vehicles in the year 2050.



	2022	REF 2030	REF 2035	REF 2050	NDC2 2030	NDC2 2035	NDC2 2050	AMB 2030	AMB 2035	AMB 2050
Gasoline powered	2,796	4,536	5,670	9,763	2,609	1,363	1,154	2,589	959	-
Electricity powered	77	135	174	306	2,094	4,561	9,094	2,120	4,853	5,611
Diesel powered	119	124	145	251	92	66	72	86	40	-

Figure 9: Passenger vehicle stock by fuel used in different scenarios



	2022	REF 2030	REF 2035	REF 2050	NDC2 2030	NDC2 2035	NDC2 2050	AMB 2030	AMB 2035	AMB 2050
Public	60.4	60.5	61.2	61.1	60.7	61.8	61.8	59.5	59.9	70.1
Private	26.3	28.8	28.8	28.4	28.4	28.1	27.6	28.9	26.2	9.0
Non_motorized	13.4	10.8	10.1	10.5	10.8	10.1	10.7	11.6	13.9	20.9

Figure 10: Travel demand share by mode in different scenarios

Reforming the Transport Governance

Transforming the transport system and implementing transport decarbonization will require reforming the transport governance. Nepal needs to reform the institutional structure of the existing institutions, decentralize the transport planning, update transport policies and regulations, enhance institutional coordination, and increase transport financing to a sustainable transport system. Here is the list of key tasks for reforming the transport governance:

Institutional	1. Set-up a dedicated department in the Ministry of Physical Infrastructure and Transport to oversee and coordinate public transport regulation, planning, and financing. 2. Reform Department of Roads and Department of Transport Managment as 'Department of Transport' with a mandate to develop sustainable, affordable, accessible, and climate-resilient transport system, beyond road construction. 3. Strengthen and operationalize Valley Public Transport Authority ensuring decision-making of the provincial and city governments, and establish a special unit to develop an electric Bus Rapid Transit system. 4. Support city governments, primarily metropolitan and sub-metropolitan cities, on transport planning. Facilitate the setting up dedicated department/unit led by an urban transport planner under city government. 5. Set up special purpose vehicles in all metropolitan and sub-metropolitan cities under the city governments to regulate or operate public transport systems. 6. Strengthen the Department of Railways with skilled human resources on railway planning and development and adequate budget
Policy and Regulatory	7. Develop a national roadmap with clear targets for developing electric public transport infrastructures and services. 8. Update the Motor Vehicle and Transport Management Act addressing regulatory issues of transport management, prioritizing sustainable transport systems, clarifying the roles and jurisdictions of all three governments, addressing new technological development and approaches to transport development, and facilitate conversion of ICE vehicles to electric. 9. Decentralize the transport governance by transferring jurisdiction of urban roads (except national highways) and urban transport management to local governments. 10. Mandate the Ministry of Physical Infrastructure and Transport to develop a comprehensive transport data collection system and publish transport statistics on vehicle registration by fuel type, passenger and freight mobility, energy use, emissions road crash fatalities and injuries, mode share, travel demand, condition and performance of the physical transportation infrastructure, transport impact on economy,... 11. Develop standards, certification and licensing for converting fossil fuel vehicles to electric with enabling regulations and tax incentives.
Finance	12. Ensure 50% of the federal transport budget goes towards a sustainable transport system with a regulatory mandate. 13. Ensure consistent fiscal measures and incentives to accelerate the adoption of electric vehicles, prioritizing electric public transportation. 14. Set up a National Financing Program with a dedicated budget to support the development of electric or zero-emission public transport systems and active mobility ensuring access to the funds by provincial and local governments, and incentivizing private sectors. 15. Develop regulation and modality to mobilize 'green tax' on emission reduction programs/ projects.

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