



Nepal's Third Nationally Determined Contribution (NDC 3.0) Technical Report



Ministry of Forests and Environment
Government of Nepal

March 2026



**Government of Nepal
Ministry of Forests and Environment
Climate Change Management Division
Singha Durbar, Kathmandu, Nepal**

Phone: (+977-1) 4211567

Fax: (+977-1) 4211868

Website: www.mofe.gov.np

E-mail: info@mofe.gov.np

© Government of Nepal, Ministry of Forests and Environment (MoFE), March 2026.

Contributors:

Ministry of Forests and Environment: Dr. Maheshwar Dhakal, Naresh Sharma, Prakash S. Thapa, Shiva Khanal, Shila Gnyawali, Himal Siwakoti, Kiran Pokharel

Climate Analytics: Abhishek Yadav, Sneha Pandey, Manjeet Dhakal, Dr. Fahad Saeed, Isaac Rubayiza, Samita Sharma, Nandini Das, Mavis Mainu, Winnie Khaemba, Sisir Bhandari, Nazima Abidova, Dr. Jan Sindt, Sanjay Rajbhandari (consultant), Utsav Shree Rajbhandari (sub-consultant)

UNDP Nepal: Vijaya Singh, Deepak K.C., Rasse Manandhar, Dr. Shree Raj Shakya (consultant), Dr. Anita Prajapati (consultant)

Citation: MoFE. 2026. Nepal's Third Nationally Determined Contribution (NDC 3.0) Technical Report, Ministry of Forests and Environment (MoFE), Government of Nepal. Kathmandu.



Government of Nepal
Ministry of Forests and Environment



P.O. Box No. 3987
Singh Durbar, Kathmandu

Ref. No.

Message

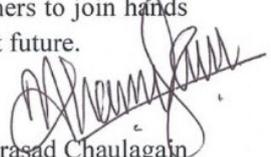
The third Nationally Determined Contribution (NDC 3.0) reflects our collective resolve to translate climate ambition into practical, results-oriented actions that protect our people and planet while advancing sustainable development. This technical report outlines the methodologies, references, and institutional processes that informed the enhancement of NDC 3.0, as well as the inclusive, transparent, and participatory approach adopted throughout its preparation.



The report illustrates a whole-of-society approach, encompassing consultations across all three tiers of government and engaging a wide range of non-government stakeholders, including civil society, private sector, media, academia, and development partners. It demonstrates that our climate commitments are firmly grounded in latest available science, aligned with national policies and priorities, and consistent with the objectives of the Paris Agreement. The report further provides a clear pathway toward a just energy transition, resilient livelihoods, sustainable ecosystems, and the promotion of green skills and employment opportunities.

In addition, it details the rigorous assessments undertaken to define mitigation pathways, identify adaptation priorities, and determine financial needs. The outcomes of the Global Stocktake (GST) were carefully integrated, and domestic financial contributions were assessed to ensure credibility and feasibility.

Together, NDC 3.0 and this technical report underscore Nepal's commitment to transparency and meaningful climate action. Achieving its targets will require enhanced international climate finance, technology transfer, and sustained capacity-building support. It is equally important to integrate NDC targets into national budget planning systems to ensure effective implementation. With strong collaboration and shared commitment, the successful implementation of NDC 3.0 will advance the Sustainable Development Goals and contribute to the global effort to limit warming to 1.5°C while strengthening resilience. I therefore invite all development partners to join hands with Nepal in advancing our shared vision for a sustainable and climate-resilient future.


Madhav Prasad Chaulagain
Minister

Secretary :- 4211567 Fax:- 4211868



Government of Nepal

Ministry of Forests and Environment

Ref.No.



P.O.Box No.3987
Singha Durbar, Kathmandu

Date :-

In NDC 3.0, Nepal has identified both quantified targets, as well as policies and measures. Quantified targets include targets in the following sectors: energy (energy generation and supply, cooking and heating, transport, industry), AFOLU, waste, and IPPU. Policies and measures include the following sectors: energy (energy generation and supply, cooking and heating, transport, industry, energy efficiency in buildings), AFOLU, LULUCF, waste, IPPU, Water, WASH, education, water resources, health, urban and rural settlements and tourism. Additionally, the NDC also includes sections on adaptation, loss and damage, means of implementation (climate finance, capacity building and technology transfer), and key considerations (co-impacts, just transition and human rights, GEDSI, and governance).



This Technical Report provides the analytical foundation for Nepal's NDC 3.0, documenting the processes, references, methods, and institutional arrangements that shaped the targets and commitments. NDC preparation was led by the Ministry of Forests and Environment in close collaboration with sectoral line Ministries, provincial and local governments, and a broad range of government and non-government stakeholders. The report reflects the coherence of national policies and plans with international obligations under the Paris Agreement and aims to enhance transparency, clarity and scientific basis of the NDC targets. The report details the application of IPCC methodologies, and the latest national GHG inventory. Mitigation pathways were systematically analyzed and aligned with national policies using scenario-based bottom-up modeling and adaptation priorities were determined ensuring alignment with the National Adaptation Plan (NAP). This report highlights how the NDC preparation process emphasized quality assurance and institutional ownership, with iterative reviews conducted through inter-ministerial coordination mechanisms and expert consultations.

The report sets out indicative financing needs, investment pathways, and enabling measures, while highlighting opportunities for leveraging domestic resources as well as mobilizing international finance and support. This report has been designed to serve both as a record of NDC preparation and as a guide for implementation. I extend my appreciation to all stakeholders across the government and non-government sectors whose technical expertise and commitment ensured the quality and credibility of the NDC and this technical report.

Govinda Prasad Sharma, PhD
Secretary

Secretary:- 4211567

Fax:- 4211868



Government of Nepal

Ministry of Forests and Environment



Ref.No.

P.O.Box No.3987
Singha Durbar, Kathmandu

Acknowledgement

Date :-

Nepal communicated its third Nationally Determined Contribution (NDC 3.0) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat on 19 May 2025. Although Nepal's contribution to global greenhouse gas (GHG) emissions is negligible, it faces significant climate change vulnerabilities. Yet, the nation is dedicated to climate-resilient and low-carbon development pathway, aligning with the Paris Agreement's goal of limiting warming to 1.5°C. Nepal also has set the long-term ambition to reach net-zero emissions by 2045.



The Government of Nepal commissioned this '*Nepal's NDC 3.0 Technical Report*' to inform the preparation and targets of Nepal's 2025 NDC. The targets were set through extensive stakeholder consultation at national and provincial levels, policy and GHG trend analysis and modeling. Stakeholders from government line ministries, planning commissions and other institutions, as well as non-government organizations, academia, private sector, and CSOs were consulted. This document also documents the basis for targets and priorities on adaptation and loss and damage, climate finance, just transition and GEDSI. This technical report serves as a repository of the technical work and NDC formulation process, which will also guide the implementation of the NDC targets and aid the development of the subsequent NDC implementation plan.

On behalf of the Ministry of Forests and Environment (MoFE), I thank various organizations and stakeholders involved in preparing this document as outlined in this report. Furthermore, I would like to offer my thanks to Ministry of Energy, Water Resources and Irrigation (MoEWRI), Ministry of Physical Infrastructure and Transport (MoPIT), Ministry of Home Affairs (MoHA), Ministry of Finance (MoF), Ministry of Foreign Affairs (MoFA), Ministry of Agriculture and Livestock Development (MoALD), Ministry of Health and Population (MoHP), Ministry of Urban Development (MoUD), Ministry of Water Supply (MoWS), Ministry of Industry, Commerce and Supplies (MoICS), Ministry of Education, Science and Technology (MoEST), and Ministry of Culture, Tourism and Civil Aviation (MoCTCA), Ministry of Land Management, Co-operatives and Poverty Alleviation (MoLCPA), provincial governments, and local government representatives who made valuable contributions through workshops and written feedback. More details on the institutions and experts involved has been included in the annex of this report.

Thank you once again, and congratulations to all involved parties and individuals.

Maheshwar Dhakal, PhD
Joint Secretary
(Chief, Climate Change Management Division)

Secretary:- 4211567

Fax:- 4211868

Contents

Message	i
Foreword	ii
Acknowledgment	iii
List of Acronyms	vii
1. Introduction	1
2. Background	1
2.1 International Context	1
2.2 National Circumstances	2
2.2.1 <i>Socio-economic condition</i>	2
2.2.2 <i>GHG emission profile of the country</i>	3
2.2.3 <i>Climate Vulnerability, Loss and Damage</i>	4
2.3 Stocktake of quantified targets in the Second NDC	4
2.4 Nepal's third NDC and its preparation process	6
3. Mitigation Assessment	6
3.1 GHG modeling framework and methodology for NDC 3.0	6
3.2 Reference values and the Business As Usual (BAU) scenario of the NDC 3.0	7
3.3 Key interventions and policy references of NDC 3.0's WEM and WAM scenarios	9
3.4 Assessment of GHG emissions and removals due to NDC 3.0's Quantified Mitigation Targets	11
3.5 Comparison of the WAM scenarios of NDC 3.0 with the LTS/ LT-LEDS	14
3.6 Comparison of the net GHG emissions in NDC 3.0's WEM and WAM Scenarios with the base year of 2011 and with the BAU scenario	15
3.7 Comparison of the targets and BAU scenarios of the Second and Third NDCs	16
3.8 Mitigation policies and measures and their references	16
3.9 Details on Information to facilitate clarity, transparency and understanding (ICTU) of NDC 3.0	21
4. Adaptation Assessment	28
4.1 Adaptation priorities and policy references	28
5. Loss and Damage Assessment	31
5.1 Climate Attribution Profile of Nepal	32
5.2 Loss and Damage measures in the NDC, policy references and rationales	32
6. Means of Implementation Assessment	34
6.1 Climate Finance	34
6.1.1 <i>Methodology and outcomes of NDC Costing</i>	34
6.1.2 <i>International and domestic climate finance and instruments</i>	35
7. Key considerations for NDC implementation	36
7.1 Co-impacts	36
7.2 Just Transition and Human Rights	38
7.3 Gender Equality, Disability and Social Inclusion (GEDSI)	39
8. Lessons Learnt and Conclusion	40
ANNEXES	44
Annex I: Stakeholder engagement	44
Annex II: Detailed methodology for GHG emissions and removals modeling	55
Annex III: Additional information on assessment of quantified mitigation targets	57
Annex IV: Detailed costing and assumptions of quantified targets	72
Bibliography	74

List of Figures

Figure 1: Nepal’s GHG emissions and removals estimated over the years 2011-2022 in GgCO ₂ eq as per the BTR1 (2025)	4
Figure 2: Emission modeling framework through scenario analysis using LEAP	7
Figure 3: Nepal’s total and net historical and projected GHG emissions and removals in the BAU scenario by IPCC-based sectors	9
Figure 4: Total and Net GHG emissions and removals under the BAU scenario	12
Figure 5: Total and Net GHG emissions and removals under the WEM scenario	12
Figure 6: Total and Net GHG emissions and removals under the WAM scenario	13
Figure 7: Historical and projected NDC 3.0 net GHG emissions under the BAU, WEM and WAM scenarios	14
Figure 8: Net CO ₂ emissions in WAM scenarios of NDC 3.0 and LTS including LULUCF	15
Figure 9: Net CO ₂ emissions in WAM scenarios of NDC 3.0 and LTS excluding LULUCF	15
Figure 10: Photos of consultation workshops	53
Figure 11: Total GHG emissions from the Energy sector in the BAU scenario	56
Figure 12: Total GHG emissions from Energy sector in the WEM scenario	56
Figure 13: Total GHG emissions from Energy sector in the WAM scenario	57
Figure 14: GHG emissions from thermal plants in the BAU scenario	57
Figure 15: GHG emissions from thermal plant in the WEM and WAM scenarios	58
Figure 16: Total installed capacity of electricity plants in the BAU scenario	58
Figure 17: Total installed capacity of electricity plants in the WEM scenario	59
Figure 18: Total installed capacity of electricity plants in the WAM scenario	59
Figure 19: Total electricity generation for domestic requirements in the BAU scenario	60
Figure 20: Total electricity generation for domestic requirements in the WEM scenario	60
Figure 21: Total electricity generation for domestic requirements in the WAM scenario	61
Figure 22: GHG emissions from the Residential sub-sector in the BAU scenario	61
Figure 23: GHG emissions from the Residential sub-sector in the WEM scenario	62
Figure 24: GHG emissions from the Residential sub-sector in the WAM scenario	62
Figure 25: GHG emissions from the Transport sub-sector in the BAU scenario	63
Figure 26: GHG emissions from the Transport sub-sector in the WAM scenario	63
Figure 27: GHG emissions from Industrial sub-sector in the BAU scenario	64
Figure 28: GHG emissions from Industrial sub-sector in the WEM scenario	64
Figure 29: GHG emissions from Industrial sub-sector in the WAM scenario	65
Figure 30: GHG emissions from the Agriculture sub-sector in the BAU scenario	65
Figure 31: GHG emissions from the Agriculture sub-sector in the WAM scenario	66
Figure 32: GHG emissions and removals from the LULUCF sub-sector in the BAU scenario	66
Figure 33: GHG emissions and removals from the LULUCF sub-sector in the WEM scenario	67
Figure 34: GHG emissions and removals from the LULUCF sub-sector in the WAM scenario	67

Figure 35: Total GHG emissions from the Waste sector in the BAU scenario	68
Figure 36: Total GHG emissions from the Waste sector in the WEM scenario	68
Figure 37: Total GHG emissions from the Waste sector in the WAM scenario	69
Figure 38: Total GHG emissions from the IPPU sector in the BAU scenario	69
Figure 39: Total GHG emissions from the IPPU sector in the WAM scenario	70

List of Tables

Table 1: Nepal's reported historical GHG emissions and removals in GgCO ₂ eq	3
Table 2: Stocktake of Second NDC's quantified targets	4
Table 3: Reference values and the BAU scenario for various sectors and sub-sectors in the NDC 3.0	7
Table 4: GHG emissions and removals (GgCO ₂ eq) in BAU Scenario from LEAP model	8
Table 5: Interventions and policy references of NDC 3.0's WEM and WAM scenarios	9
Table 6: Net GHG emissions in NDC 3.0's BAU, WEM and WAM scenarios for 2030 and 2035 in GgCO ₂ eq	12
Table 7: Comparison of net GHG emissions in NDC 3.0's WEM and WAM Scenarios to the base year 2011, year 2022, and BAU	16
Table 8: Mitigation policies and measures in NDC 3.0 and their policy references	17
Table 9: Alignment of Nepal's NDC 3.0 targets with the outcomes of the first GST (GST-1)	24
Table 10: Adaptation priorities and policy references	28
Table 11: L&D measures and expected benefits	33
Table 12: Cost estimate of NDC 3.0	35
Table 13: Lessons Learnt during the NDC 3.0 assessment, formulation and drafting process	41
Table 14: List and date of major stakeholder consultations and validations	43
Table 15: NDC 3.0 Stakeholder Workshop Thematic Groups and Group members	43
Table 16: Detailed costing and costing assumptions of quantified mitigation targets	71

List of Acronyms

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business-as-Usual
BEV	Battery Electric Vehicle
BTR	Biennial Transparency Report
BUR	Biennial Update Report
CBS	Central Bureau of Statistics
CETP	Common Effluent Treatment Plant
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CO ₂ eq	Carbon dioxide equivalent
COP	Conference of the Parties (to the UNFCCC)
CRM	Comprehensive Risk Management
DHM	Department of Hydrology and Meteorology
DLS	Department of Livestock Services
DOC	Department of Customs
DOED	Department of Electricity Development
DPR	Detailed Project Report
DRR	Disaster Risk Reduction
DWRI	Department of Water Resources and Irrigation
DWSSM	Department of Water and Sewerage Management
ESMAP	Energy Sector Management Assistance Program
ETF	Enhanced Transparency Framework
FAO	Food and Agriculture Organization
FBWC	Forests, Biodiversity & Watershed Conservation
FDF	Forest Development Fund
FPIC	Free Prior and Informed Consent
FRLD	Fund for responding to Loss and Damage
FRTC	Forest Research and Training Centre
FWG	Facilitative Working Group
FY	Fiscal Year
GAP	Gender Action Plan of the Enhanced LWPG
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEDSI	Gender Equality, Disability, and Social Inclusion
GEF	Global Environment Facility
GESI	Gender Equality and Social Inclusion

GgCO ₂ eq	Gigagram of Carbon dioxide equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
GLOF	Glacial Lake Outburst Flood
GoN	Government of Nepal
GST	Global Stocktake
GVA	Gross Value Added
GW	Gigawatt
GWh	Gigawatt-hour
GWP	Global Warming Potential
ICE	Internal Combustion Engine
ICS	Improved Cookstoves
ICTU	Information to facilitate Clarity, Transparency and Understanding
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
IRENA	International Renewable Energy Agency
LAPA	Local Adaptation Plans of Action
LCIPP	Local Communities and Indigenous Peoples Platform
LDC	Least Developed Country
LDCF	Last Developed Countries Fund
LEAP	Low Emissions Analysis Platform
LPG	Liquefied Petroleum Gas
LT-LEDS	Long-Term Low Emission Development Strategies
LTS	Long-Term Strategy for Net-Zero Emissions
LULUCF	Land Use, Land-Use Change and Forestry
LWPG	Lima Work Programme on Gender
MICS	Metallic Improved Cooking Stoves
MoALD	Ministry of Agriculture and Livestock Development
MoCTCA	Ministry of Culture, Tourism and Civil Aviation
MoEST	Ministry of Education, Science and Technology
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoF	Ministry of Finance
MoFA	Ministry of Foreign Affairs
MoFE	Ministry of Forests and Environment
MoHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
MoICS	Ministry of Industry, Commerce and Supplies
MoLCPA	Ministry of Land Management, Co-operatives and Poverty Alleviation
MoPIT	Ministry of Physical Infrastructure and Transport
MoUD	Ministry of Urban Development

MoWS	Ministry of Water Supply
MoWSEI	Ministry of Water Supply, Energy and Irrigation, Bagmati
MPI	Multidimensional Poverty Index
MRV	Monitoring, Reporting and Verification
MVA	Mega-volt-ampere
MW	Megawatts
MWth	MW-thermal
NAFHA	Nuts and Fruits in Hilly Areas Project
NARC	Nepal Agricultural Research Council
NAP	National Adaptation Plan
NCQG	New Collective Quantified Goal
NDC	Nationally Determined Contribution
NDC-IP	NDC-Implementation Plan
NDRRMA	National Disaster Risk Reduction and Management Authority
NEA	Nepal Electricity Authority
NNRFC	National Natural Resources and Fiscal Commission
NPC	National Planning Commission
NPR	Nepalese Rupee
NSO	National Statistics Office
NUGIP	Nepal Urban Governance and Infrastructure Project
PJ	Petajoule
PM	Particulate Matter
PMAMP	Prime Minister Agriculture Modernization Project
PV	Photovoltaic
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD-IC	REDD Implementation Centre
RDF	Refuse Driven Fuel
RHVAP	Resilient High-Value Agricultural Programme
SFM	Sustainable Forest Management
SDG	Sustainable Development Goal
SMEs	Small and Medium-Sized Enterprises
SOC	Soil Organic Content
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VAA	Vulnerability and Adaptation Assessments
WAM	With Additional Measures
WASH	Water, Sanitation and Hygiene
WECS	Water and Energy Commission Secretariat
WEM	With Existing Measures
WHO	World Health Organization

1. Introduction

This technical report is prepared to catalogue the assessment, policy references and stakeholder inputs that informed the preparation of Nepal's third Nationally Determined Contribution (NDC 3.0), particularly the quantified mitigation targets, mitigation policies and measures, adaptation priorities, and loss and damage measures. It also details the NDC 3.0 preparation and stakeholder engagement process. It aims to increase the understanding of Nepal's NDC 3.0 by providing the background details, assumptions and references. It is also meant to be utilized as a reference for tracking progress, preparing the corresponding NDC Implementation Plan and the next round of NDCs, and facilitating alignment with other relevant documents.

Furthermore, this report can support the prioritization, costing, and sequencing of actions under the NDC Implementation Plan, alignment with the Paris Agreement and GST outcomes, and strengthening of institutional coordination, climate finance readiness, and sectoral delivery across all levels of government. It also serves as a practical guide for effective NDC implementation and resource mobilization.

2. Background

2.1 International Context

The Paris Agreement, adopted in 2015 at COP21, is a legally binding international treaty on climate change adopted by 195 Parties to address climate change. As detailed in Article 2 of the Agreement and further emphasized during its implementation its primary goal is to limit global average temperature rise to 1.5°C above pre-industrial levels. Central to its implementation is the obligation under Article 4 for Parties to prepare, communicate, and maintain successive NDCs every 5 years that must reflect the highest possible ambition, to meet the temperature goals. Article 4.19 invites Parties to develop and submit Long-Term Low Emission Development Strategies (LT-LEDS) to complement NDCs and provide a low-emission development trajectory.

The Agreement also incorporates mechanisms for support and accountability. Article 6 of the Paris Agreement enables countries to voluntarily cooperate with each other to unlock financial support and achieve emission reduction targets set out in their NDCs. Article 8 recognizes the importance of averting, minimizing and addressing loss and damage associated with climate change and the need to enhance action and support. Article 9 emphasizes the role of developed countries in providing financial resources to assist developing nations with both mitigation and adaptation, with voluntary contributions encouraged from other Parties. Article 10 establishes a framework for technology development and transfer, aimed at fostering resilience and reducing greenhouse gas (GHG) emissions, and Article 11 highlights the necessity of capacity-building support to enable effective climate action in developing countries. Progress on each Party's NDC is tracked through the Enhanced Transparency Framework (ETF) outlined in Article 13, which requires detailed reporting of details on climate actions and support provided or received, as well as tracking of NDCs. This information is utilized by the Global Stocktake (GST) process, established under Article 14, which assesses collective progress towards the Agreement's goals and informs subsequent NDC cycles.

The ETF ensures clarity and trust among Parties and the effective implementation of the Paris Agreement. It mandates all countries to submit regular reports on greenhouse gas emissions, progress in implementing NDCs, and support provided or received on means of implementation such as climate finance, technology transfer and capacity building. The ETF includes a technical

expert review and a facilitative multilateral consideration of progress, fostering adherence to the Agreement's objectives. By standardizing reporting and review processes, the ETF enables a comprehensive assessment of global efforts, thereby promoting transparency, mutual confidence, and informed decision-making to enhance climate action.

As outlined in Article 14 of the Paris Agreement, the Global Stocktake is a key process under the Paris Agreement to assess collective progress towards achieving the Agreement's long-term goals. The first GST, concluded at COP28 in 2023, highlighted significant progress in climate action but emphasized the insufficiency of current efforts to meet the Paris Agreement's temperature objectives. Paragraph 28 of the GST decision emphasized the need for deep, rapid, and sustained reductions in greenhouse gas emissions, aligning with pathways to limit warming to 1.5°C. It also called for tripling global renewable energy capacity and doubling the rate of energy efficiency improvements by 2030, among other decisions aimed at accelerating the energy transition and enhancing global resilience. The GST synthesizes information from the ETF, scientific inputs, and other data sources, offering valuable recommendations for recalibrating strategies, increasing ambition, and fostering global collaboration.

Climate finance, as emphasized in Articles 9 and 2.1.(c) of the Paris Agreement, is fundamental to supporting developing countries in mitigating and adapting to climate change. Article 8 of the Paris Agreement also encourages Parties to enhance action and support in respect to loss and damage. Key entities of the UNFCCC financial mechanism, such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF), facilitate funding for mitigation, adaptation, and capacity-building. The Adaptation Fund and the Least Developed Countries Fund (LDCF) further address specific needs, ensuring equitable access to resources. The recently established Fund for responding to Loss and Damage (FRLD) provides financing to respond to and address loss and damage.

Developed nations committed to mobilizing financial resources, initially targeted USD 100 billion annually by 2020, with commitments to scale up subsequently. Further, the New Collective Quantified Goal (NCQG) was established at COP29 which expanded the finance commitments to USD 300 billion annually by 2035, with a broader aim to scale up public and private financing to USD 1.3 trillion per year.

2.2 National Circumstances

2.2.1 Socio-economic condition

Nepal is a landlocked country in South Asia that lies in the southern face of the Himalayan mountain range with a population of 29.16 million (2021). The country is located between 26° 22' and 30° 27' North latitude and 80° 04' and 88° 12' East longitude and covers an area of 147,516 square kilometers. It borders India to the south, east and west, and China to the north; whereas, Bangladesh and Bhutan are in close proximity. Physiographic regions within the country include High Himal, High Mountain, Middle Mountain, Siwalik, and the Tarai. Within these regions, elevations range from 59 meters to 8,848 meters. Nepal's climate is influenced by the Himalayan mountain range and the South Asian Monsoon. The climate has four distinct seasons: pre-monsoon (March-May), monsoon (June-September), post-monsoon (October- November) and winter (December-February).

Nepal is set to graduate from the Least Developed Country (LDC) status to developing country status in 2026. Nepal's economy has grown significantly over the years to around USD 41 billion, with contributions from key sectors such as agriculture (24.1%), industry (13.0%), and services (62.9%). The gross domestic product (GDP) per capita was USD 1,377 in 2023, and GDP growth rates were

1.95% in 2023, 5.63% in 2022, 4.84% in 2021, and a contraction of -2.37% in 2020 due to COVID-19 pandemic. The national debt has surged to USD 18.75 billion, reaching around 45.8% of its total GDP.

Life expectancy at birth has reached 70 years as of 2022, and primary school enrollment rates have improved, reflecting better access to education. The Multidimensional Poverty Index (MPI) value for Nepal was 0.074 in 2019, which was a substantial reduction from 0.301 in 2014. Nepal has made significant strides in maternal and child health, with the maternal mortality ratio decreasing to 174 per 100,000 live births as of 2020, and the under-five mortality rate dropping to 27 per 1,000 live births as of 2021. Nepal has also made notable progress in achieving the Sustainable Development Goals (SDGs), with improvements in energy access, poverty reduction, education, and health among others. Nonetheless, climate change poses significant risks to the economy and has resulted in significant loss and damage.

2.2.2 GHG emission profile of the country

In its Second NDC, Nepal estimated its net GHG emissions and removals for 2010/11 to be 31,998.91 GgCO₂eq (Gigagram of Carbon dioxide equivalent), drawing from the preliminary GHG Inventory in an early draft of its Third National Communication (TNC) (2021). In its final GHG Inventory in the Third National Communication (2021), Nepal reported net GHG emissions and removal of 28,166 GgCO₂eq for 2010/11. This revision was made due to improvements in data and analysis utilized during the finalization of the GHG Inventory report. As this was the latest information available during the submission of the third NDC, the base year emissions for the third NDC were set as per the TNC.

In its first Biennial Transparency Report (BTR1) published after the submission of third NDC, Nepal updated its GHG emissions and removals data, reflecting further refinement in methodology and data collection since its Third National Communication. In its BTR1, Nepal's net emissions and removals were estimated to be 28,823 GgCO₂eq in 2011 and 38,212 GgCO₂eq in 2022. The progression of Nepal's reported GHG emissions and removals are detailed in the Table 1 and the most updated values are illustrated in Figure 1.

Table 1: Nepal's reported historical GHG emissions and removals in GgCO₂eq

Sector and Sub-sector	GHG emissions and removals in the Second NDC (2020)	Yearly GHG emissions and removals in the TNC (2021)	Yearly GHG emissions and removals estimated in the BTR1 (2025)	
	2011	2010/11	2011	2022
Energy	14,713	14,752	15,357	25,014
Transport	-	1,740	1,797	4,762
Manufacturing Industries and Construction	-	2,256	1,432	7,140
Energy Industries	-	2.38	2.49	0.02
Others (Commercial, Institutional, Residential, Agricultural)	-	10,754	12,125	13,112
Industrial Processes and Product Use (IPPU)	80	368	355	4,812
Waste	94	925	1,302	4,814
Agriculture, Forestry and Other Land Use (AFOLU)	15,982	12,121	11,810	3,572
Livestock	-	17,664	17,197	18,724
Aggregate Sources and Non-CO ₂ Emissions Sources on Land	-	11,500	4,401	4,870
Land	-	-17,042	-9,788	-20,022
Total GHG emissions (excluding LULUCF)	-	45,208	38,611	58,234
Net GHG emissions and removals	31,999	28,166	28,823	38,212

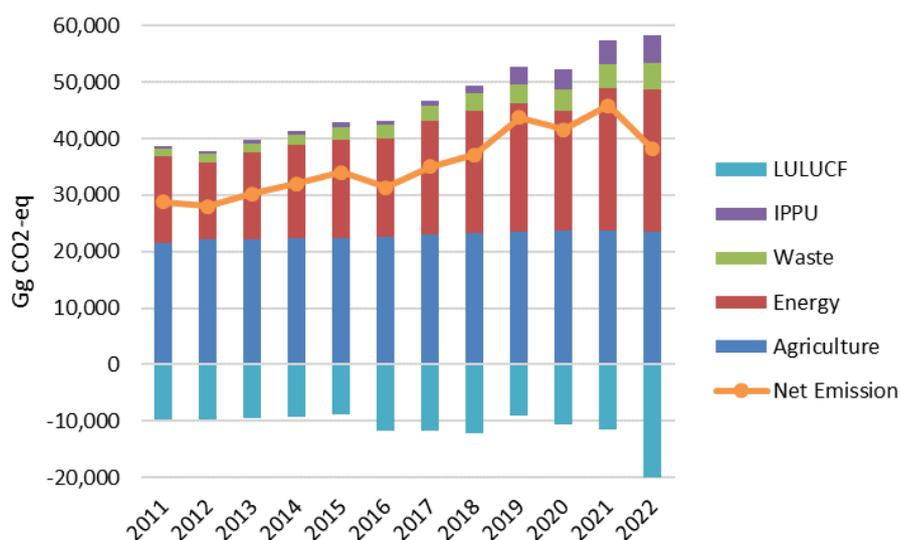


Figure 1: Nepal's GHG emissions and removals estimated over the years 2011-2022 in GgCO₂eq as per the BTR1 (2025)

2.2.3 Climate Vulnerability, Loss and Damage

The provision in the Paris Agreement to limit global average temperature rise to 1.5°C results in lower risks for Nepal when compared to 2°C or higher temperatures. Nepal's climate-sensitive geography, and vulnerable socio-economic conditions make the country highly susceptible to the impacts of climate change. Rising temperatures have intensified both slow-onset events (increasing temperature, glacier melting, loss of biodiversity) and extreme events (floods, drought, landslides, GLOFs, fires and heatwaves), severely affecting lives, livelihoods, and infrastructure. Nepal aspires to reduce future loss and damage through effective adaptation measures and resilience building, while also calling for urgent global collective action to reduce greenhouse gas emissions. However, it also recognizes that not all risks are avoidable and, in such cases, seeks to address loss and damage through international finance and technical assistance.

2.3 Stocktake of quantified targets in the Second NDC

Table 2 shows the progress in implementation of the quantified mitigation targets in Nepal's second NDC by sectors.

Table 2: Stocktake of Second NDC's quantified targets

Quantified Second NDC Mitigation Target	Progress (as of 2024)
Energy	
By 2030, expand clean energy generation from approximately 1,400 Megawatts (MW) to 15,000 MW, of which 5-10 % will be generated from mini and micro-hydro power, solar, wind and bioenergy. Of this, 5,000 MW is an unconditional target.	The renewable electricity generation capacity has reached around 3,500 MW, of which 5% is from mini and micro-hydro power, solar, wind and bioenergy (DOED, 2025).
By 2030, ensure 15% of the total energy demand is supplied from clean energy sources.	Out of the total energy demand of around 640 PJ (WECS, 2023), around 6.5% is supplied through clean and renewable electricity from NEA (NEA, 2023b), and 2.5% from other renewables (WECS, 2023). In total, 9% of total energy demand is generated through clean and renewable energy sources till 2023.

Quantified Second NDC Mitigation Target	Progress (as of 2024)
<p>Sales of electric vehicles (e-vehicles) in 2025 will be 25% of all private passenger vehicles sales, including two-wheelers, and 20% of all four-wheeler public passenger vehicle sales.</p> <p>By 2030, increase sales of e-vehicles to cover 90% of all private passenger vehicle sales, including two-wheelers and 60% of all four-wheeler public passenger vehicle sales</p> <p>Note: these private and public passenger targets do not take into account electric-rickshaws and electric-tempos.</p>	<p>Around 12.38% of all four-wheeler and two-wheeler private passenger vehicles imports were electric vehicles (DOC, 2023).</p> <p>4,232 (46%) out of a total of 9,205 four-wheelers imported in FY 2022/23 were electric vehicles (EVs). 11,184 (9.6%) out of a total of 115,364 two-wheelers imported in FY 2022/23 were EVs.</p> <p>281 (29%) out of a total of 963 four-wheelers public passenger vehicles imported were EVs in FY 2022/23 (DOC, 2023).</p>
<p>By 2030, develop 200 km of the electric rail network to support public commuting and mass transportation of goods.</p>	<p>A total of 112 km of railway trackbed has been laid (MoPIT, 2023). Most of the progress is under the East-West Railway project with a planned length of around 1000 km.</p> <p>52 km out of the planned 68 km Jainagar, India - Bardibas, Nepal rail network has been upgraded and is operational using diesel-electric multiple unit trains.</p> <p>Detailed Project Report (DPR) is prepared for the Kathmandu-Raxaul Electric Railway; as well as feasibility study completed for Kathmandu-Kerung electric railway; and DPR is prepared for Metrorail in Kathmandu.</p> <p>Electrification of the railway projects has been planned but so far only diesel-electric multiple unit trains are operational.</p>
<p>By 2030, ensure 25% of households use electric stoves as their primary mode of cooking.</p>	<p>Around 4.2% of households use electric stoves in addition to other stoves (NSO, 2024); however, data on use of electric stoves as primary mode of cooking is not available. Nepal imported 130,745 induction stoves, 73,648 infrared cookers, and 2,294 other electric stoves in the FY 2022/23 (DOC, 2023). It is estimated 400,000 households utilize electric stoves in 2025 (AEPC, 2025).</p>
<p>By 2025, install 500,000 improved cookstoves (ICS), specifically in rural areas.</p>	<p>It is estimated that 127,703 ICS and 18,068 metallic improved cookstoves (MICS) have been installed so far (AEPC, 2025).</p>
<p>By 2025, install an additional 200,000 household biogas plants and 500 large scale biogas plants (institutional/ industrial/ municipal/ community).</p>	<p>Nepal has installed a total of 450,770 domestic biogas plants and 357 large-scale biogas plants (AEPC, 2025).</p>
AFOLU	
<p>By 2030, maintain 45% of the total area of the country under forest cover (including other wooded land limited to less than 4%).</p>	<p>46% of the total area of the country is under forest cover including 2.7% other wooded land (FRTC, 2024a).</p>
<p>By 2030, manage 50% of Tarai and Inner Tarai forests and 25% of middle hills and mountain forests sustainably, including through the use of funding from REDD+ initiatives.</p>	<p>Progress data on sustainable forest management was not available. Community Based Forestry covers around 48.12% of total forest area (FRTC, 2024a).</p>
Waste	
<p>By 2025, 380 million litres/day of wastewater will be treated before being discharged, and 60,000 cubic meters/year of faecal sludge will be managed.</p>	<p>An estimated 61 million liters/day of wastewater is treated before being discharged, and 42,000 cubic meters/year of faecal sludge is managed (2025 MoWS inputs to NDC worksheet)</p>

In Nepal's Second NDC, in addition to the quantified targets, there are a total of 41 policies and measures in 7 sectors, namely Energy, AFOLU, Industry, Waste, Tourism, Urban Settlements,

and Gender Equality and Social Inclusion (GESI) sectors (GoN, 2020c). Aspirational targets that lack well defined reference values and/or other data to calculate GHG emission reduction, and thus could not be quantified, were included as policies and measures in Nepal's NDC.

2.4 Nepal's third NDC and its preparation process

Nepal's third NDC follows rules of transparency and understanding described in Decision 4/CMA.1. Nepal's Long-term strategy for net-zero emissions (LTS/LT-LEDS) has set a goal to reach net-zero by 2045 for carbon dioxide gas based on additional measures dependent on international support (GoN, 2021b). While Nepal's LTS only covers carbon dioxide (CO₂) the NDC 3.0 covers reductions for all locally relevant GHGs - namely CO₂, methane (CH₄), and nitrous oxide (N₂O). Nepal's NDC 3.0 is well aligned with strategies in the LTS, such as expansion of renewable power in all sectors including fuel switching, improvement of energy efficiency, adoption of clean, secure and connected mobility, increase of forest carbon sinks, encouragement of sustainable agriculture and land-use management, improvements to circular mobility and industrial sustainability, and enhancing international climate finance, support and cooperation. However, emission reductions targeted in the NDC 3.0 only take into account quantified targets with robust reference information (baseline) and other data that meet IPCC requirements. Additionally, the section on mitigation policies and measures included in the NDC 3.0 pursue additional mitigation actions, for which GHG information is not yet quantifiable due to lack of robust baseline, data, research and analysis.

To determine the target level, MoFE has led work across Federal Line Ministries and Provincial Governments to identify Nepal's highest possible ambition, taking into account outcomes of the Global Stocktake and alignment with fair share-based 1.5°C pathway, requirements and principles of the Paris Agreement, latest available science and analysis of decarbonization potential using GHG scenario modelling. The NDC preparation process was a country-driven process following the principle of Leave No One Behind with a focus on engagement with local communities and indigenous peoples, in a gender-responsive manner. It was based on an extensive and inclusive stakeholder consultation process involving the local governments, civil society organizations including youth, women, Persons with Disabilities, and Indigenous Peoples, private sector representatives, experts, academia, development partners, funders, media and members of parliament. The details of stakeholder engagement are given in **Annex I**.

3. Mitigation Assessment

3.1 GHG modeling framework and methodology for NDC 3.0

For the third NDC, GHG emissions and removals were estimated from 2011 to 2024 based on historical data and projected for years 2025 to 2035. For this purpose, a model with a GHG accounting framework was developed. The methodology follows historical trend analysis and future scenario-based analysis based on external parameters such as strategic and policy interventions that can influence activities and GHG outcomes. For emission projection, scenario analysis was conducted using LEAP (Low Emissions Analysis Platform) software, developed by the Stockholm Environment Institute. The framework for GHG emission projection through scenario analysis using LEAP is illustrated in Figure 2. The detailed methodology for GHG modelling is given in **Annex II**.

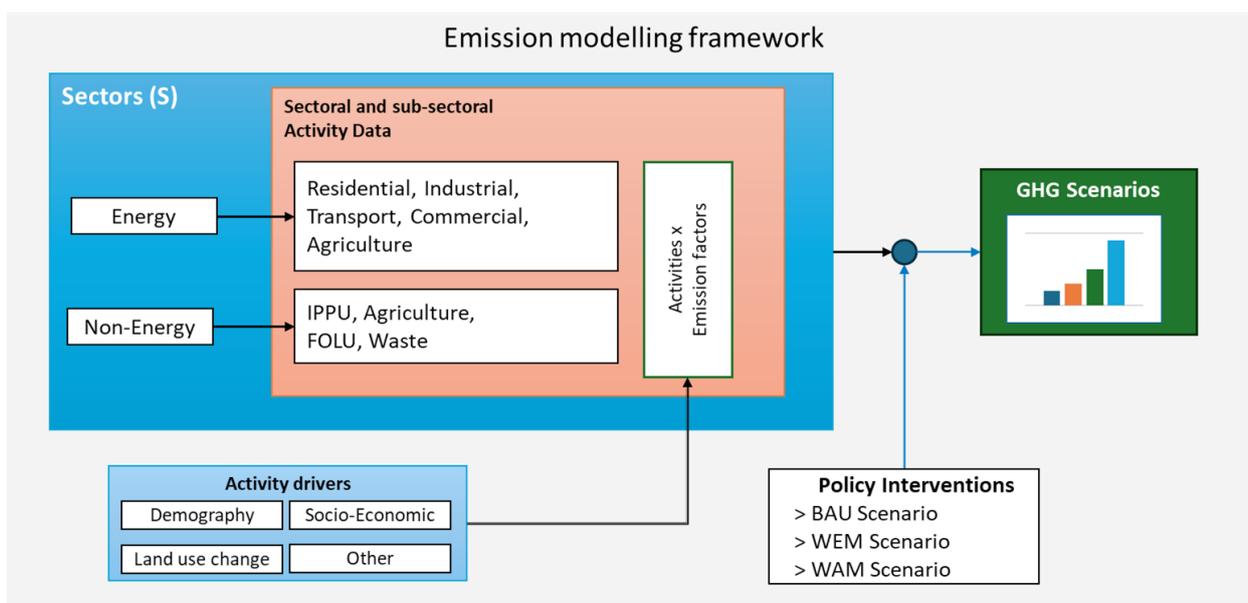


Figure 2: Emission modeling framework through scenario analysis using LEAP

Three scenarios – Business As Usual (BAU), With Existing Measures (WEM), and With Additional Measures (WAM) – were designed in LEAP to calculate and compare GHG emissions and removals.

3.2 Reference values and the Business As Usual (BAU) scenario of the NDC 3.0

The **Business As Usual (BAU) scenario** serves as the reference scenario in which the current conditions and trends continue without any significant interventions. The BAU scenario for each sector and sub-sector has been detailed in the Table 3. The estimated GHG emissions and removals in the BAU scenario are detailed in Table 4 and Figure 3.

Table 3: Reference values and the BAU scenario for various sectors and sub-sectors in the NDC 3.0

Sector and Sub-sector	Reference value (2024)	Business-As-Usual Scenario
1. Energy		
(i) Electricity generation and supply	3,500 MW of renewable electricity generation capacity. 5% of this is from variable renewable sources such as micro- and mini-hydropower, solar, wind-power and bioenergy. Fossil fuel electricity: 53.4 MW of thermal plants. Total system transmission and distribution losses of 12.73%.	Increase of renewable electricity to 3,762MW in 2030 and 4,415 MW in 2035 and limit fossil fuel electricity to 53.4 MW till 2035.
(ii) Cooking and Heating	Around 92% dependence on biomass (on open stoves, traditional stoves and improved stoves) and 5% on LPG respectively by fuel use for cooking and heating, and rest on biogas and electricity. ¹ Electric cookstoves: 400,000 units. Improved cookstoves: 127,703 units. Household-level biogas: 450,770 units. Large-scale biogas plants: 357 units. MICS for heating: 18,068 units	Decreasing but high dependence on fuelwood for cooking due to urbanization (84% and 82% by fuel use in 2030 and 2035), and increasing dependence on LPG (5.7% and 6.6% by fuel use in 2030 and 2035)

¹ Calculated from LEAP model based on data from Energy Synopsis Reports 2010, 2022b, 2023, 2024b and Provincial Energy Consumptions Reports (WECS, 2021a, 2021b, 2022a, 2024a)

Sector and Sub-sector	Reference value (2024)	Business-As-Usual Scenario
(iii) Transport	An estimated 2.57% of total vehicles are electric and the rest are fossil-fuel based (GoN 2023, GoN 2024). 12.38% of private passenger vehicle sales were BEVs (46% of four-wheelers and 9.6% of two-wheelers). 29% of four-wheeler public passenger vehicle sales were battery electric vehicles (BEVs) (DOC, 2023). No electric rail or light rail transit system.	High dependency on ICE (internal combustion engine) vehicles with more than 97.33% vehicles being ICE vehicles in 2030 and 97.27% in 2035.
(iv) Industry	Heavy dependence on fossil fuel use, which is estimated at 56% of industrial energy demand, 35% dependence on biomass and the rest on other energy sources. 20% of iron and steel industries have adopted electricity-based furnaces. None of the limestone-based cement industries use bioenergy. None of the industries with boilers use electricity-based boilers. 1,100 brick kilns are present, 95% of which is based on fixed chimney bull's trench kilns (FCBTK) and 5% are Hoffman/ tunnel/ clamp kilns. No electricity-based tunnel kilns are in operation.	High dependence on fossil fuel for energy - highest being on coal (~38%) and third being diesel (~11%) in 2030 and 2035. The use of biomass comes second (31% in 2030 and 23% in 2035) in total energy demand for the industrial sector. The demand for electricity gradually increases but remains around 15% in 2030 and 24% in 2035.
2. Agriculture, Forestry and Other Land Use (AFOLU)		
(i) Agriculture	20,376 improved cattle sheds. Methane emissions due to enteric fermentation and lack of manure management.	High dependence on traditional cattle sheds, most of which are for subsistence.
(ii) Forestry and other land use	46% forest cover including 2.7% other wooded land.	Forest cover is maintained at 46%.
3. Waste		
	61 million liters of wastewater treated per day before being discharged. 42,000 cubic meters of faecal sludge treated per year. 158 Healthcare Facilities (HCFs) using non-burn technologies. 1 combined effluent treatment plant in Hetauda Industrial District.	Waste management remains at nascent stage with waste collection only occurring in urban areas, most of which are not properly managed and are discharged to nearby unmanaged wetlands.
4. Industrial Processes and Product Use (IPPU)		
	The cement produced is assumed to be all Portland cement and a default value of 95% clinker fraction was used (Table 2.2, Volume 3, Chapter 2, 2006 IPCC Guidelines). There are 37 clinker-based and 20 limestone-based cement industries operating with a total 45,300 ton capacity, and 30-50% operating capacity.	Cement uses a high clinker fraction of 95%.

Table 4: GHG emissions and removals (GgCO₂eq) in BAU Scenario from LEAP model

Sector and sub-sector	2011	2022	2025	2030	2035
1. Energy	15,139	24,691	26,746	32,966	37,909
(i) Agriculture	310	383	423	514	641
(ii) Commercial	341	562	636	922	1,361
(iii) Grid Electricity	3	0.02	0.03	0.03	0.03
(iv) Industrial	1,415	6,693	7,574	12,336	15,744
(v) Residential	11,504	12,389	12,321	12,135	11,847
(vi) Transport	1,566	4,664	5,792	7,059	8,316
2. AFOLU	11,833	3,392	3,932	4,964	6,192
(i) Livestock	17,256	18,805	19,253	20,112	21,136
(ii) Crop	4,365	4,609	4,700	4,873	5,078
(iii) LULUCF	(9,788)	(20,022)	(20,022)	(20,022)	(20,022)
3. Waste	1,330	4,660	4,961	6,187	7,214
4. IPPU	355	4,812	5,398	7,664	10,742
Total emissions (excluding removals)	38,445	57,577	61,058	71,803	82,078
Net emissions and removals	28,657	37,555	41,036	51,781	62,056

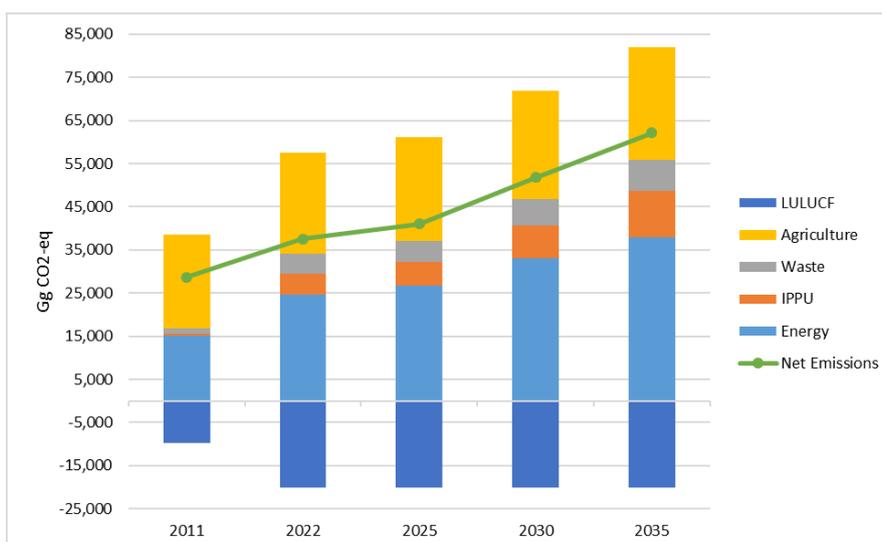


Figure 3: Nepal's total and net historical and projected GHG emissions and removals in the BAU scenario by IPCC-based sectors

3.3 Key interventions and policy references of NDC 3.0's WEM and WAM scenarios

Two distinct NDC 3.0 scenarios have been developed to explore the impacts of various strategic interventions on Nepal's sustainable development trajectory. While the BAU scenario explained earlier served as the reference scenario in which the current conditions and trend continue without any significant interventions, the **With Existing Measures (WEM) scenario** includes interventions based on the most recent policies and measures of the government that can be met with domestic efforts without additional international support or financing. **The WEM scenario forms the basis of unconditional NDC 3.0 targets.** Finally, the **With Additional Measures (WAM) scenario** includes ambitious interventions based on the most recent policies and measures of the government that will require highly scaled-up international support or financing to complement domestic efforts. **The WAM scenario forms the basis of conditional NDC 3.0 targets.** The WAM and WEM scenarios, and the respective policy references, for each sector and sub-sector of NDC 3.0 have been detailed in the Table 5.

Table 5: Interventions and policy references of NDC 3.0's WEM and WAM scenarios

Sectoral Scenario	With Additional Measures (WAM) - Conditional	With Existing Measures (WEM) - Unconditional	Policy References
1. Energy			
(i) Electricity generation and supply	Expand renewable electricity generation capacity to 14,031 MW by 2030 and 28,500 MW by 2035. This target includes 10% by 2030 and 15% by 2035 from mini and micro-hydro power, solar, wind power and bioenergy. Decrease the total system transmission and distribution losses to 11.50% and 10.50% by 2030 and 2035 while upgrading the transmission and distribution lines and substation capacity.	Expand renewable electricity generation capacity to 6,641 MW by 2030 and 10,000 MW by 2035. This target includes 10% from variable renewable sources. Unconditional target for transmission and distribution is 25% of the total target in WAM Scenario.	Energy Development Roadmap (2024a), 16th Periodic Plan; Transmission System Development Plan (2018); National Budget 2024-2025; NDC 2.0; MoEWRI and stakeholder inputs.

Sectoral Scenario	With Additional Measures (WAM) - Conditional	With Existing Measures (WEM) - Unconditional	Policy References
(ii) Cooking and Heating	<p>Expand the use of electric cookstoves to 2.1 million households and an additional 15,000 institutions and firms</p> <p>Expand the use of improved cookstoves (ICS) to 750,000 households by 2030 and 1 million by 2035 for cooking.</p> <p>Expand the use of MICS to 48,068 households by 2030 and 100,000 by 2035 in high-hill areas primarily for heating.</p> <p>Expand the use of household-level biogas for cooking to 500,000 households by 2030 and 652,770 households by 2035.</p> <p>Increase large-scale biogas plants to 550 units by 2030 and 750 units by 2035.</p>	<p>By 2035, expand the use of electric cookstoves to a total of 500,000 households and an additional 1,500 institutions.</p> <p>Use of ICS in total 227,703 households by 2030 and 277,703 households by 2035</p> <p>Use of MICS in a total 33,068 households by 2030 and 48,068 households by 2035</p> <p>455,770 households by 2030 and 472,770 households by 2035 s.</p> <p>Increase large-scale biogas plants to 415 units by 2030 and 475 units by 2035.</p>	16th Development Plan (2024); National Budget 2024-2025; NDC 2.0; AEPC and stakeholder inputs.
(iii) Transport	<p>In 2030 and 2035, increase sales of BEVs to 90% and 95% for all private passenger vehicles (including 2-wheelers), and to 70% and 90% for all public passenger vehicles respectively.</p> <p>Build and operate at least 50 km by 2030 and 100 km by 2035 of integrated electric bus, trolley and light rail transit system in Kathmandu Valley.</p> <p>Build and operate 200 km by 2030 and 300 km by 2035 of the electric rail network to support public commuting and mass transportation of goods (freight).</p>	None.	NDC 2.0; 16th Development Plan (2024); MoPIT and stakeholder inputs informed by technical assessment.
(iv) Industry	<p>Expand the use of electricity-based furnaces for adoption by all iron and steel industries.</p> <p>Use bioenergy (up to 35% of total fuel use) in two limestone-based cement industries instead of coal by 2035.</p> <p>Convert 30% of boilers by 2030 and 70% by 2035 to electricity-based in all industries with boilers.</p> <p>Phase out fixed chimney bull's trench kiln (FCBTK), and convert existing ones to hybrid Hoffman/ tunnel kilns for brick production by 2035.</p> <p>Pilot medium-sized electricity-based tunnel kiln for producing 100 million bricks per year by 2030.</p>	None.	MoICS and stakeholder inputs.

Sectoral Scenario	With Additional Measures (WAM) - Conditional	With Existing Measures (WEM) - Unconditional	Policy References
2. Agriculture, Forestry and Other Land Use (AFOLU)			
(i) Agriculture	Install a total of 500,000 improved cattle sheds for efficient manure management.	None.	NDC 2.0; National Budget 2024-2025; MoALD and stakeholder inputs.
(ii) Land Use, Land-use Change, and Forestry (LULUCF)	Maintain at least 46% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%) and (further) advance sustainable forest management.	By 2035, maintain at least 46.08% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%) and advance sustainable forest management.	National Land Cover Monitoring System of Nepal (2020-2022); National Budget (2024-2025) and MoFE and stakeholder inputs.
3. Waste	<p>Treat 510 million liters of wastewater per day before being discharged by 2035.</p> <p>Treat 370,000 cubic meters of faecal sludge per year by 2035.</p> <p>Manage healthcare waste using non-burn technologies in 1400 Healthcare Facilities (HCFs) by 2030 and 2800 HCFs by 2035.</p> <p>Install combined effluent treatment plants in 6 Industrial Estates by 2035.</p>	<p>Treat 140 million liters of wastewater per day before being discharged by 2035.</p> <p>Treat 110,000 cubic meters of faecal sludge per year by 2035.</p>	MoWS; MoHP; MoICS and stakeholder inputs.
4. Industrial Processes and Product Use (IPPU)	Decrease clinker factor to 75% for cement production by 2035.	None.	MoICS and stakeholder inputs.

3.4 Assessment of GHG emissions and removals due to NDC 3.0's Quantified Mitigation Targets

Table 6 details the NDC 3.0's projected net GHG emissions and removals in 2030 and 2035 under three scenarios: Business as Usual (BAU), With Existing Measures (WEM) and With Additional Measures (WAM), across four sectors: Energy, AFOLU, IPPU and Waste. The energy sector is the dominant contributor to net emissions in all scenarios, accounting for over 60% of total emissions, followed by the IPPU sector. The net GHG emissions and removals increases from 51,781 GgCO₂eq in 2030 to 62,056 GgCO₂eq in 2035 in the BAU scenario projects; whereas, the net GHG emissions and removals decreases slightly to 51,427 GgCO₂eq in 2030 and 61,538 GgCO₂eq in 2035 in the WEM scenario. The WAM scenario achieves the most significant reductions, as net GHG emissions and removals decreases significantly to 42,914 GgCO₂eq in 2030 and 45,429 GgCO₂eq in 2035, highlighting the critical role of conditional targets in meeting Nepal's climate goals. The greatest emission reductions occur in the Energy sector under the WAM scenario, with a decrease of about 8,546 GgCO₂eq in 2035 compared to the BAU scenario. Additional information on the assessment of the quantified mitigation targets of NDC 3.0 is given in **Annex III**.

Table 6: Net GHG emissions in NDC 3.0's BAU, WEM and WAM scenarios for 2030 and 2035 in GgCO₂eq

Sector	BAU		WEM		WAM	
	2030	2035	2030	2035	2030	2035
Energy	32,966	37,909	32,739	37,504	28,252	29,362
AFOLU	4,964	6,192	4,853	6,106	3,397	3,719
IPPU	7,664	10,742	7,664	10,742	6,674	8,485
Waste	6,187	7,214	6,172	7,186	4,592	3,862
Net GHG emissions	51,781	62,056	51,427	61,538	42,914	45,429

The net GHG emissions in the BAU scenario will reach 51,781 and 62,056 GgCO₂eq in 2030 and 2035 respectively as shown in Figure 4.

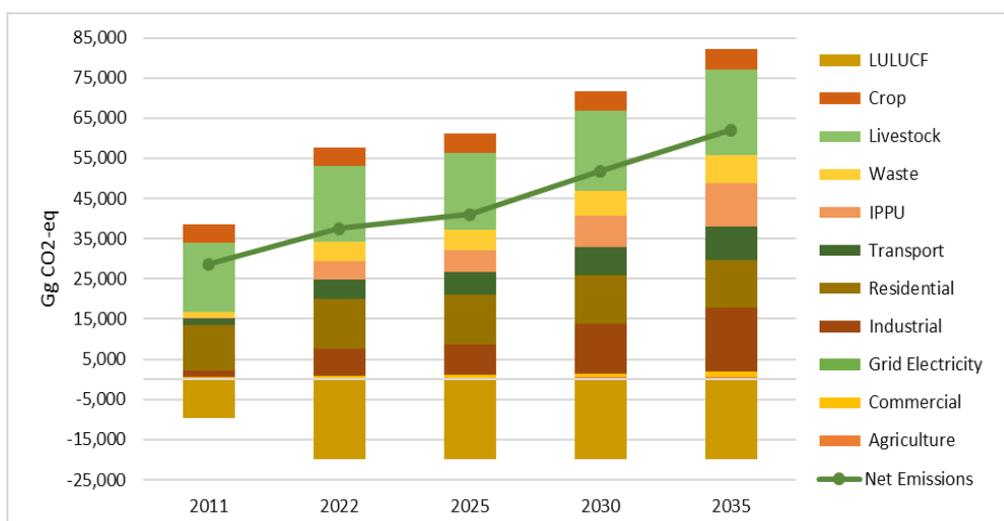


Figure 4: Total and Net GHG emissions and removals under the BAU scenario

In the WEM scenario, the net GHG emissions and removals will decrease by 353 and 518 GgCO₂eq compared to BAU scenario in 2030 and 2035 respectively as shown in Figure 5.

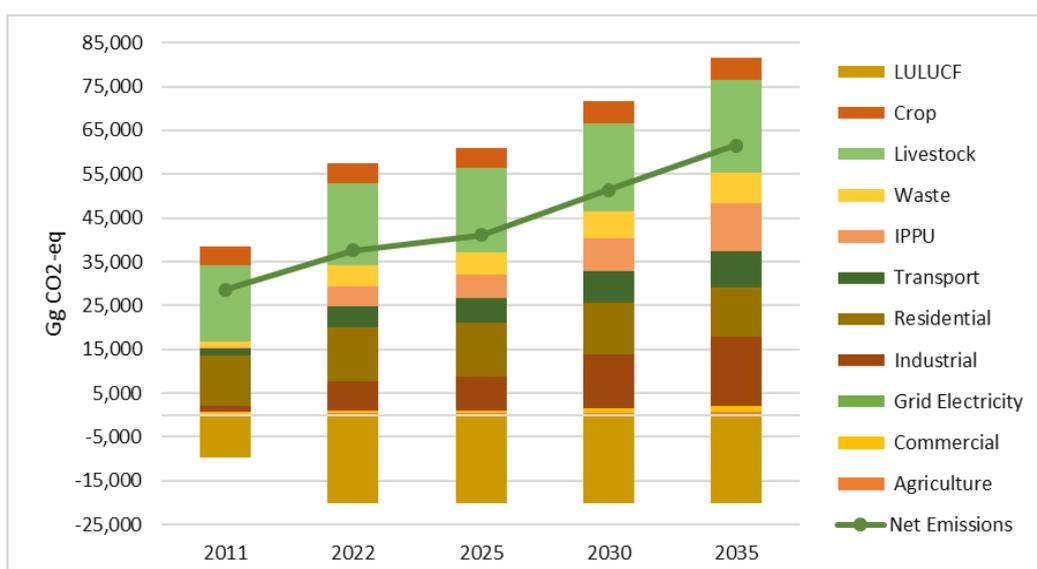


Figure 5: Total and Net GHG emissions and removals under the WEM scenario

In the WAM scenario, the net GHG emissions and removals will decrease by 8,867 and 16,628 GgCO₂eq compared to BAU scenario in 2030 and 2035 respectively as shown in Figure 6. Compared to the BAU scenario, the total GHG emissions reduction from the Energy sector will be 4,714 GgCO₂eq by 2030 and 8,546 GgCO₂eq by 2035, with reduction in cooking and heating sub-sector of 2,022 GgCO₂eq by 2030 and 3,004 GgCO₂eq by 2035, and reduction in transport sub-sector of 1,426 GgCO₂eq by 2030 and 2,732 GgCO₂eq by 2035. The total GHG emissions reduction from the Agriculture, Forestry and Other Land Use (AFOLU) sector will be 1,566 GgCO₂eq by 2030 and 2,473 GgCO₂eq by 2035. The total GHG emissions reduction from the Waste sector will be 1,596 GgCO₂eq by 2030 and 3,352 GgCO₂eq by 2035. The total GHG emissions reduction from the Industrial Processes and Product Use (IPPU) sector will be 990 GgCO₂eq by 2030 and 2,257 GgCO₂eq by 2035.

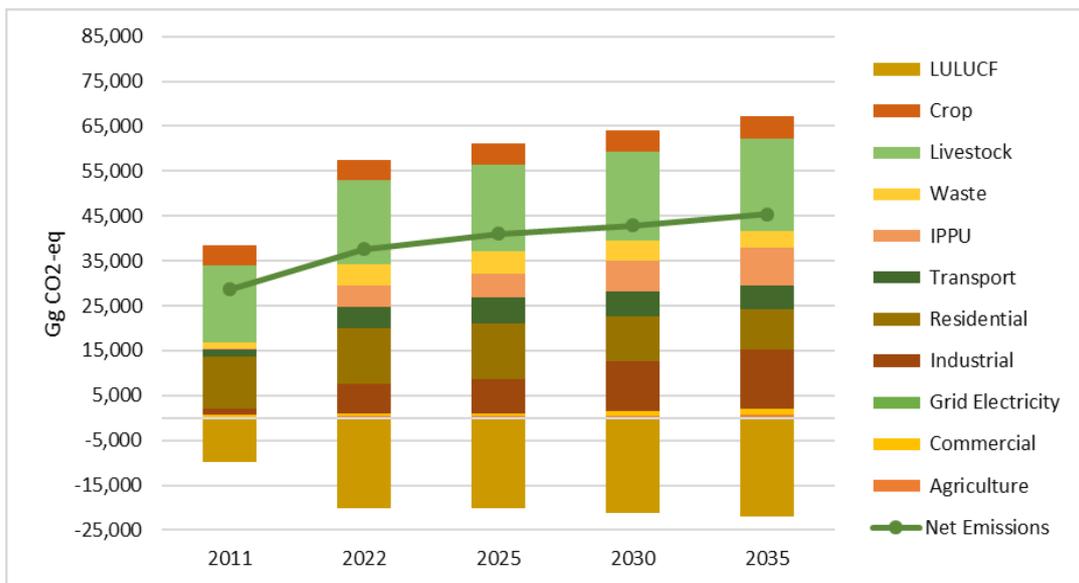


Figure 6: Total and Net GHG emissions and removals under the WAM scenario

Figure 7 illustrates the estimated historical net emissions (including removals) from 2011 to 2024. Values from 2025 to 2035 are projected values for BAU, WEM and WAM scenarios of NDC 3.0. By 2030, net GHG emissions in the BAU scenario reaches 51,781 GgCO₂eq; whereas, the net GHG emissions in the WEM and WAM scenarios are lower at 51,427 GgCO₂eq and 42,914 GgCO₂eq respectively. By 2035, the net GHG emissions in the BAU scenario reaches 62,056 GgCO₂eq; whereas, the net GHG emissions in the WEM scenario is lower at 61,538 GgCO₂eq and in the WAM scenario is significantly lower at 45,429 GgCO₂eq. Therefore, net GHG emissions in the WEM and WAM scenarios reflect a decrease compared to BAU scenario by 518 GgCO₂eq in the WEM scenario and by 16,628 GgCO₂eq in the WAM scenario in 2035.

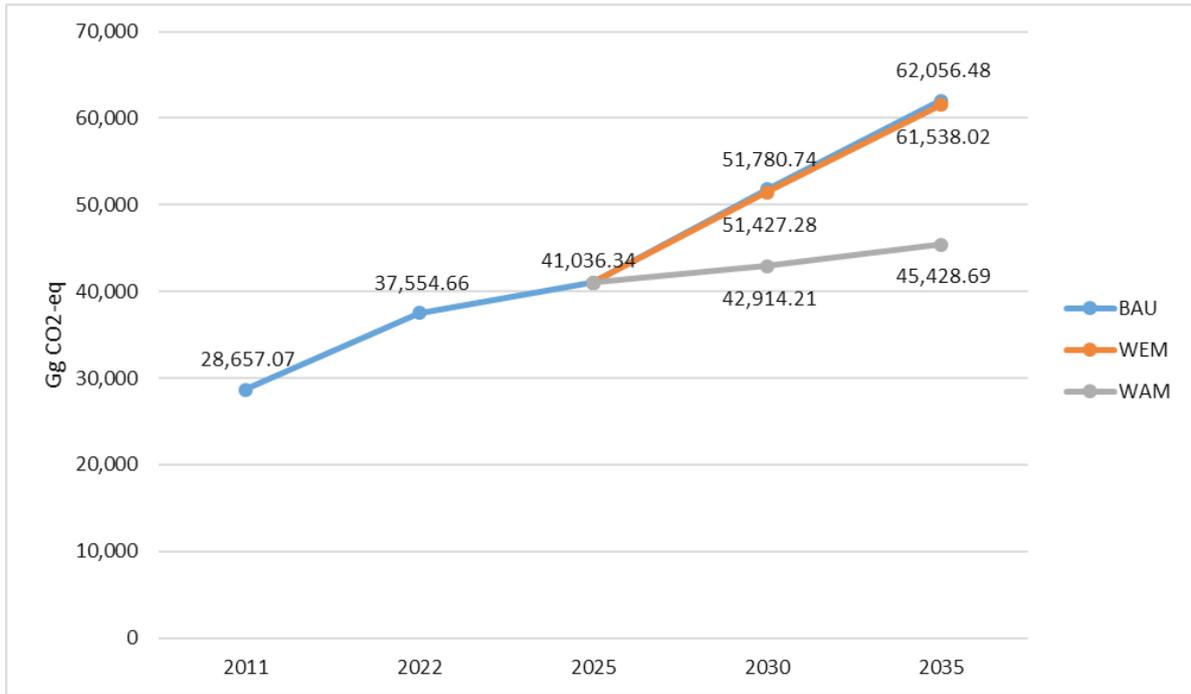


Figure 7: Historical and projected NDC 3.0 net GHG emissions under the BAU, WEM and WAM scenarios

3.5 Comparison of the WAM scenarios of NDC 3.0 with the LTS/ LT-LEDS

Figure 8 and Figure 9 show comparison of the net CO₂ emissions under the WAM scenarios of the NDC 3.0 and the LTS/LT-LEDS for the years 2030 and 2035, including and excluding LULUCF removals respectively. While Nepal’s LTS only covers reductions in CO₂, the NDC 3.0 covers reductions for all locally relevant GHGs - namely CO₂, CH₄, and N₂O. Additionally, the section on mitigation policies and measures included in the NDC 3.0 pursue additional mitigation actions, which is expected to result in further reductions; however, GHG emission reduction information for these policies and measures is not yet quantifiable due to lack of robust baseline, data, research and analysis. While NDC 3.0 reflects a bottom-up short to medium term climate action plan based on ground realities; the LTS reflects a top-down long-term strategy.

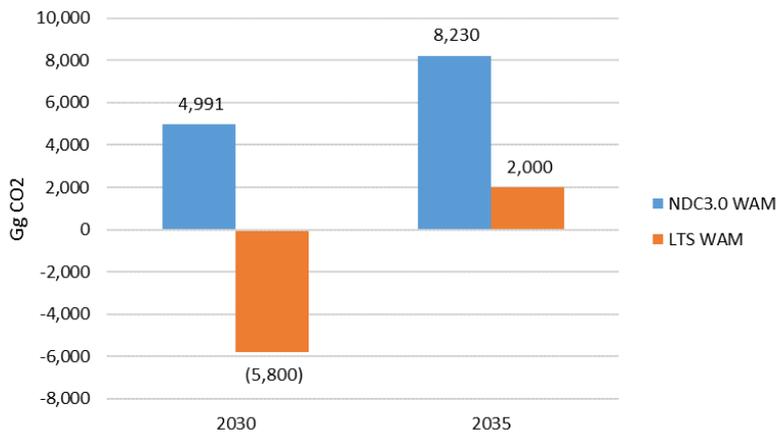


Figure 8: Net CO₂ emissions in WAM scenarios of NDC 3.0 and LTS including LULUCF

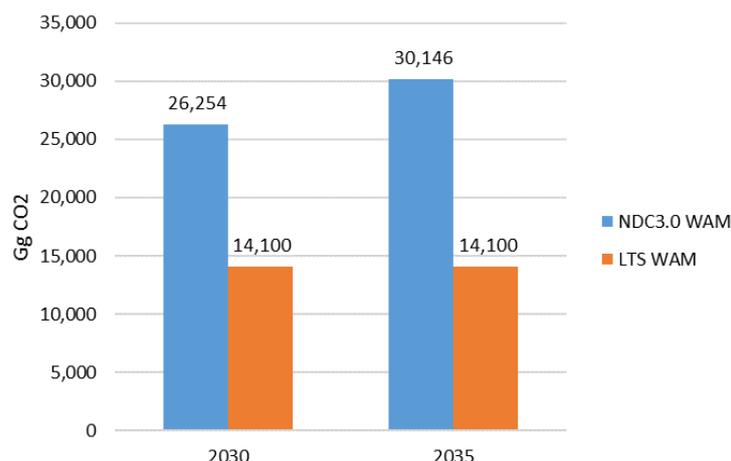


Figure 9: Net CO₂ emissions in WAM scenarios of NDC 3.0 and LTS excluding LULUCF

3.6 Comparison of the net GHG emissions in NDC 3.0's WEM and WAM Scenarios with the base year of 2011 and with the BAU scenario

Table 7 compares the net GHG emissions for NDC 3.0's BAU, WEM and WAM scenarios for 2030 and 2035, with the base year of 2011. Compared to base year of 2011, net GHG emissions in the BAU scenario is projected to increase by 81% in 2030 and 117% in 2035, while net GHG emissions in the WEM scenario shows only slightly lower increment of 79% and 115% respectively. The net GHG emissions in the WAM scenario significantly reduces the projected increment to 50% in 2030 and 59% in 2035 relative to 2011.

When compared to the 2022, net GHG emissions in the BAU scenario will increase by 38% in 2030 and 65% in 2035, while net GHG emissions in the WEM scenario will increase by 37% in 2030 and 64% in 2035. The net GHG emissions in the WAM scenario only increase by 14% in 2030 and 21% in 2035 relative to 2022.

Compared to the BAU scenario, the WAM scenario leads to net GHG emission reduction of 17% in 2030 and 27% decrease in 2035; whereas, the WEM scenario has reductions of around 1%.

Table 7: Comparison of net GHG emissions in NDC 3.0's WEM and WAM Scenarios to the base year 2011, year 2022, and BAU

Scenarios	GHG emissions (GgCO ₂ eq)		% GHG change compared to base year of 2011		% GHG change compared to 2022		% GHG change compared to BAU	
	2030	2035	2030	2035	2030	2035	2030	2035
BAU	51,781	62,056	+81%	+117%	+38%	+65%	-	-
WEM	51,427	61,538	+79%	+115%	+37%	+64%	-1%	-1%
WAM	42,914	45,429	+50%	+59%	+14%	+21%	-17%	-27%

3.7 Comparison of the targets and BAU scenarios of the Second and Third NDCs

Compared to the Second NDC, one of the ways Nepal has enhanced its NDC 3.0 is by adding GHG information on additional sectors. In the second NDC, Nepal only included quantified targets in the Energy, Forestry and Waste sectors; and only provided BAU and GHG emission reduction information in the Energy Sector's transport and cooking sub-sector, and only the GHG emission reduction information for the Waste Sector.

In NDC 3.0, Nepal has expanded the coverage to all IPCC sectors i.e. Energy, Agriculture, Forestry and Other Land Use (AFOLU), Waste, and Industrial Processes and Product Use (IPPU). In addition to the electricity generation, transport, and cooking sub-sectors featured under the Energy sector of the previous NDC, NDC 3.0 now covers additional sub-sectors under the Energy sector such as electricity supply, industry and heating.

The second NDC's projected BAU emissions for the transport sub-sector (for passenger transport only) was 2,988 GgCO₂eq in 2025 and 3,640 GgCO₂eq in 2030. In comparison, the NDC 3.0's BAU scenario estimated the overall transport sector emissions (inclusive of domestic transport, railway and aviation) at 5,792 GgCO₂eq and 7,059 GgCO₂eq, for 2025 and 2030 respectively.

The second NDC's projected BAU emissions for the residential sub-sector for cooking and heating was 1,999 GgCO₂eq in 2025 and 2,064 GgCO₂eq in 2030. In comparison, the third NDC's BAU scenario estimated the overall emissions from the residential sector (inclusive of all end use activities) at 12,321 GgCO₂eq and 12,135 GgCO₂eq, for 2025 and 2030 respectively.

The second NDC did not mention the BAU for the Waste sector but indicated a reduction target of 258 GgCO₂eq. The third NDC's projected BAU emissions for the Waste sector is 4,961 GgCO₂eq in 2025 and 6,187 GgCO₂eq in 2030.

3.8 Mitigation policies and measures and their references

Table 8 presents the Mitigation policies and measures included in NDC 3.0 and their policy references. NDC targets for which GHG information is not yet quantifiable due to lack of robust baseline, data, research and analysis, are also included in the mitigation policies and measures section.

Table 8: Mitigation policies and measures in NDC 3.0 and their policy references

Mitigation Policies and Measures	Policy References
1. Energy	
(i) Energy generation and supply	
<p>By 2030, national policies and acts on energy, renewable energy and energy efficiency will be formulated and the overall capacity will be strengthened to ensure adequate energy security and energy mix. By 2035, 400 local governments will formulate and start implementing the Municipal Energy Plans</p> <p>Smart metering infrastructure will be promoted to enable real-time monitoring, reduce losses and promote demand-side management. 20% generation reserve margin will be maintained. The Transmission System Development Plan of Nepal will be implemented, and a river corridor master plan will be prepared.</p>	<p>Energy Development Roadmap (2024a); NDC 2.0 MoEWRI; AEPC; WECS; DOED; MoUD; DWRI; MoEST; MoFA; MoFE; provincial and other stakeholder inputs.</p>
<p>Ring main distribution center for Kathmandu Valley will be established by 2035, capable of meeting growing demands up to 2050.</p>	
<p>Opportunities for green hydrogen consumption, production, transportation and storage, including carbon financing, will be determined.</p>	
<p>Land lease processes for all renewable energy projects including hydropower storage, solar and wind power will be streamlined.</p>	
<p>For small-scale energy generation projects below 10 MW, adequate policies including incentives and streamlined access to Power Purchase Agreements (PPAs) will be ensured. Distributed Renewable Energy (DRE) technologies, and clean cooking and heating will be promoted, including through carbon financing, and testing facilities will be strengthened.</p>	
<p>By 2030, develop Waste-to-energy guidelines. By 2035, install waste-to-energy plants in 2 Special Economic Zones (SEZs). Expand the Municipal level waste-to-energy plants in Metropolitan and Sub-metropolitan cities to 18 from the current 7.</p>	
<p>By 2035, Install and commission Institutional Solar Photovoltaic System (ISPS) to achieve a total 10 MW of solar PV systems in schools. By 2035, promote ISPS in 2,800 health care facilities (HCFs).</p>	
<p>Promote use of renewable electricity in sectors such as commercial, health, crematoriums, construction and industry</p>	
(ii) Cooking and Heating	
<p>100 local governments will approve and implement energy-efficient building bylaws and Standard Operating Practices (SoP).</p>	<p>Nepal Budget 2023/2024; 16th Periodic Plan; Nepal Green Building Guideline (2016); Green Building Codes (2024); Solar Thermal Roadmap and Implementation Plan for Nepal, 2025 (in draft phase). MoEWRI; AEPC and other stakeholder inputs.</p>
<p>Energy-efficient building codes to promote low carbon and thermally efficient buildings will be approved and implemented.</p>	
<p>By 2035, expand the use of solar thermal installations to 1,354 MW-thermal (MWth) in households for hot water and space heating from the current 389 MWth; and expand the use of solar thermal installations to 29 MWth in industries for hot water and space heating from the current 1.2 MWth.</p>	

Mitigation Policies and Measures	Policy References
(iii) Transport	
Increase sales of battery electric vehicles (BEVs) to an additional 10% and 20% for all freight and waste collection vehicles by 2030 and 2035	NDC 2.0 MoEWRI; AEPC; WECS; DOED; MoUD; DWRI; MoEST; MoFE; MoPIT; MoF; MoFA; MoLET (Bagmati Province); DoTM; DORW and other stakeholder inputs, including public feedback received on the draft NDC.
Sufficient charging stations and infrastructure will be developed to meet the quantified battery electric vehicle (BEV) targets by 2030 and 2035. Electric vehicle standard, technical human resources, and dedicated service centers will be established by 2030. The Government, education and health sectors will prioritize the use of battery electric vehicles. In addition to BEVs, feasibility of other types of zero-emission vehicles such as hydrogen fuel cell and renewable powered vehicles will be assessed and promoted accordingly	
Vehicle fitness test centers and a national research center for motor vehicles will be established by 2030, with infrastructure enhancement by 2035. Vehicle fitness standards and testing protocols will be implemented by 2035. Sustainable practices for battery recycling and skilled human resources will be developed including piloting by 2030.	
An effective public transport system in Kathmandu Valley and other metropolitan cities will be established by 2030 and in all other urban areas by 2035.	
A non-motorized transport and mobility policy will be formulated and implemented by 2030. By 2030, cycle lanes will be operational in all metropolitan and sub-metropolitan cities, and roads made friendly for cycling and walking by 2035. Bicycle-sharing will be implemented in at least 3 cities by 2030.	
Policy frameworks for cable-based transportation will be established by 2030. By 2030, at least 50 cable-based modes of transportation will be in operation, increasing to 150 by 2035.	
By 2030, measures will be included in policies to offset the carbon footprint of emissions resulting from tourism transport.	
(iv) Industry	
By 2035, install waste-to-heat electricity recovery systems in 16 limestone-based cement industries to generate 75 MVA of electricity from the current 24.7 MVA in 4 industries.	MoICS, MoEWRI, MoFE; provincial and other stakeholder inputs.
By 2035, all small and medium enterprises (SMEs) in Kathmandu Valley using small furnaces and boilers will be electricity-based	
By 2030, a performance certification system for fossil fuel-based industrial equipment will be installed and emission standards for brick, cement, and steel/iron industries will be established and energy-related emissions of other industries will be monitored and reported. By 2035, 500 technical personnel in the cement, brick, steel, and tiles industries will be trained on renewable energy technologies.	
Determine the feasibility of low-carbon brick production technologies by 2030 and promote accordingly.	
Determine the feasibility of using refuse driven fuel (RDF) by 2030 and promote accordingly.	
Certified and verified energy efficiency upgrades in industries will be incentivized. Energy audits will be promoted in energy intensive industries and a national benchmarking framework will be developed.	
(v) Energy Efficiency in Buildings	
By 2030, energy performance guidelines and energy audits will be conducted in 1,500 government buildings.	2nd NDC-IP MoUD; MoEST; AEPC; DWRI; other stakeholder inputs, including public feedback received on the draft NDC.
By 2030, 30% of new school and education infrastructure construction will adhere to the comprehensive school safety guidelines and use carbon-offset and energy-efficient systems, increasing to 70% by 2035	
Incentive structures for renovations and new constructions of energy-efficient and inclusive buildings will be developed by 2030. Building certification standard guidelines will be developed by 2030.	
Standardized labeling for household electrical appliances will be developed and implemented by 2030.	

Mitigation Policies and Measures	Policy References
2. AFOLU	
(i) Agriculture	
A total of 5000 ha and 10,000 ha of new Orchards will be established by 2030 and 2035 respectively.	MoALD (NAFHA, PMAMP, Fruit Decade, RHVAP); NDC 2.0; Agriculture Development Strategy (2015–2035). MoF; MoFE; DLS; NARC and other stakeholder inputs
By 2030, carbon sink potential from increasing Soil Organic Matter for various types of agricultural lands, crops and timeframes will be assessed, and efforts to increase Soil Organic Matter to at least 4% by 2035 will be pursued.	
Post-harvest losses will be reduced to 15% by 2035, and green enterprise-friendly programs targeting marginalized communities will be conducted.	
Promote climate friendly crop and livestock production system. A baseline study on crop residue burning in southern Nepal will be conducted by 2030 and crop residue burning will be reduced by 2035.	
(ii) Land Use, Land-use Change, and Forestry (LULUCF)	
By 2035, strengthen forest governance by aligning the regulation and operation procedure of community-based forest management groups with sustainable forest management (SFM)	Forest Act (2019); FDF Working Procedure (2024); FRTC Forest Inventory Reports; Nepal Land Cover Monitoring System (2020-2022); Annual Progress Report of MoFE (2079/80); REDD Benefit Sharing Plan (2020); National Parks and Wildlife Conservation Act (1973); National Urban Policy (2024). MoFE; NPC; NNRFC; NDRRMA; FRTC; REDD IC; DoFSC and other stakeholder inputs.
Ensure synergy of forestry sector targets, policies and measures with Convention on Biological Diversity (CBD).	
By 2030, Nepal will be self-sustainable in wood production through sustainable harvesting practices, and forest-based industries, businesses, skill development and jobs will be promoted.	
By 2035, update the data on national forest area and expand the coverage under carbon market through the REDD Implementation Centre (IC) while strengthening the capacity of REDD-IC and Forest Research and Training Centre (FRTC). Promote participation of family-owned and private forests in carbon markets	
By 2030, conduct assessments and strengthen data collection on sustainable forest management to determine the baseline SFM information by various types of forests and regions. Increase coverage of sustainable forest management to 50% of Tarai and Inner Tarai forests and 25% of middle hills and mountain forests, including through the use of funding from REDD+ initiatives and carbon financing	
By 2030, the carbon sink capacity of the land-use sector will be enhanced by operationalizing the Forest Development Fund (FDF) for compensation of plantations and forest restoration, increasing the national average Growing Stock to 168 m3/ha. By 2035, sustainable forest management will be expanded to degraded forest lands, including the Chure region.	
Promote agroforestry and reforestation, and strengthen the system for forest monitoring and transparency.	
By 2035, private sector engagement and adoption of innovative mechanized technology in sustainable forest management will be ensured through proper policy provision.	
By 2035, at least 60% of Nepal's forests will be under community-based management, ensuring 50% women representation and proportional representation of Dalits and Indigenous People in key posts. Fair and equitable benefits from sustainable forest management, watershed management, and biodiversity conservation will be ensured for Local Communities, women, and Indigenous People.	
By 2030, data will be collected and analyzed on trees outside forest, including in urban areas, and urban greenery will be promoted. Reduce forest fire incidents through sustainable management of dead wood and forest residue. Strengthen the capacity of Division Forest Offices and develop a common stakeholder coordination mechanism for regulating and controlling forest fires.	
Ensure land use changes are sustainable, and land ownership and rights are strengthened.	

Mitigation Policies and Measures	Policy References
3. Waste	
Material Recovery Facilities will be established adopting waste segregation and recycling, upcycling and downcycling in at least 100 municipalities by 2030 and all municipalities by 2035. Circular economy approaches will be strengthened.	Solid Waste Management Act (2011); Solid Waste Management Rules (2013); Solid Waste Management Technical Guideline (2008); 2nd NDC-IP; Tourism Policy (2008). MoUD; MoEST; AEPC; DWRI; MoICS; MoCTCA; MoFE; NDRRMA; NPC; NNRFC; AEPC; MoICS and other stakeholder inputs.
By 2030, organic waste management including composting and biogas production will be scaled up.	
By 2035, methane capture will be installed in all 10 industries with anaerobic wastewater treatment system.	
By 2030, the implementation of solid waste management act and regulation will be strengthened and a monitoring mechanism for waste management practices will be developed, wastewater and fecal sludge upcycling businesses will be supported and the effluent standards updated to promote reuse options.	
By 2030, sustainable management of mountaineering and trekking based waste will be ensured. Occupational health safety standards and guidelines for the waste sector will be developed. Effluent standards will be updated and treatment and reuse of wastewater will be promoted.	
4. IPPU	
By 2035, Continuous Emission Monitoring System (CEMS) will be installed in all cement industries.	MoICS; MoEWRI; MoFE and other stakeholder inputs.
By 2030, baseline emission information for SMEs and large industries will be developed, with periodic reporting for specific emission reductions.	
5. Other	
(i) Water, sanitation and hygiene (WASH)	
A GHG inventory system will be developed for water supply and sanitation services. Climate-resilient WASH guidelines, technical standards, and norms will be updated to reduce GHG emissions in service delivery and maintenance Green School Guidelines will be updated by 2030. By 2035, 100% of schools will formulate and implement action plans for green schools with quality WASH facilities.	NAP; School Education Sector Plan 2022–2032. MoWSEI; DWSSM; MoFE and other stakeholder inputs.
By 2030, 50% of the population, including women, children, and socially marginalized people, will benefit from safely managed and low-carbon water supply services.	
(ii) Education	
Green Jobs and Green Skills will be integrated into technical, vocational, and university level education as well as school education by 2030.	MoEST; provincial and other stakeholder inputs.
By 2035, climate change knowledge, including traditional, indigenous and local adaptation and mitigation knowledge, and cultural heritage aspects, will be fully integrated into the local-level curriculum.	
(iii) Water resources	
Groundwater cluster projects for irrigation will cover an additional 112,500 ha and 318,000 ha by 2030 and 2035 respectively using renewable energy. Lift irrigation projects will be developed to irrigate additional 111,500 ha using renewable energy by 2030.	MoWSEI, DWSSM, MoFE provincial and other stakeholder inputs
(iv) Health	
Upgrade 140 HCFs by 2030 and 280 HCFs by 2035 to be low-carbon and climate resilient, including use of solar PV back-ups	Baseline Assessment of GHG emissions of Nepal’s Health Sector (2024); Health NAP (2023b); 2nd NDC.
By 2030, action plan on low-carbon health system will be developed and implemented	
By 2035, 75% traditional anesthetic gases will be replaced with low GHG alternatives.	MoHP and other stakeholder inputs.

Mitigation Policies and Measures	Policy References
(v) Urban and rural settlements	
By 2030, Green Building Codes and Guidelines will be developed, awareness and capacity building will be provided to support 250 municipalities.	National Urban Policy(2024); 2nd NDC-IP. MOUD; MoEST; AEPC; DWRI and other stakeholder inputs.
By 2035, the central electronic building Permit System (EBPS) incorporating newly developed Building Construction Working Procedure (BCWP) will be developed and implemented in 125 municipalities.	
By 2030, low carbon, climate-resilient, and inclusive practices (cycling, plantation, maintenance of green belts and parks, use of electric vehicles) will be identified and promoted.	
(vi) Tourism	
By 2030, integrated (nature and culture-based) sustainable tourism plans will be formulated and implemented in at least seven main tourist destinations (one in each province), and at least five tourist destinations will be carbon neutral.	MoCTCA; MoUD; MoFE; NDRRMA; NPC; NNRFC and other stakeholder inputs.

3.9 Details on Information to facilitate clarity, transparency and understanding (ICTU) of NDC 3.0

Nepal’s NDC 3.0 is aligned with the transparency and understanding rules described in Decision 4/CMA.1, which is detailed herein.

Progression: Compared to the previous submission, Nepal's updated NDC shows clear advancement. This progression is evident in the expanded quantity of targets, improved quality of underlying data, and the heightened ambition embedded within the quantified mitigation commitments, collectively aiming for the highest possible GHG emission reductions.

Sectors covered: Nepal has increased the quantity of and the ambition in quantified mitigation targets. For policy and measures, Nepal will strive to increase the quality of GHG emissions and removals data to improve these targets as quantified mitigation targets in subsequent NDC cycles. Nepal strives to gradually move towards comprehensive economy-wide emission reduction or limitation targets. These include sectoral activity-based quantified targets aimed at reducing GHG emission reductions across key areas like Energy (electricity generation and supply, cooking and heating, transport, industry); AFOLU; LULUCF; Waste; and IPPU.

During the NDC preparation process, a detailed assessment concluded that comprehensive data needed for defining and rigorously evaluating the impact of policies and actions across all sectors was not fully available. While Nepal was unable to set an economy wide target, the country has extended the scope of the coverage of its quantified mitigation targets compared to its previous NDC.

Looking ahead, Nepal strives to update its GHG emission inventories, develop sector-specific emission factors (following 2006 IPCC guidelines), conduct modeling to cover all sectors for sector-specific scenarios and projections, and establish robust mechanisms to collect, store and maintain datasets and accounts. Nepal will strive to improve the quality and coherence of the GHG emissions and removals data across National Communications, GHG Inventories, NDCs, LT-LEDS and Biennial Update Report (BUR)/BTR. Ultimately, Nepal aims to transition towards an economy-wide emission reduction target, incorporating all major anthropogenic GHG emissions and removals. It will also aim to increase the quantification of the policy targets and measures, as more data and information becomes available.

Gases covered: Gases covered in this NDC are CO₂, CH₄, N₂O.

Target years: Nepal's NDC targets are set for 2030 and 2035. The targeted reductions in net GHG emissions and removals are calculated relative to the projected BAU emissions for those respective years.

Target types: Both unconditional and conditional targets are considered. Nepal will meet unconditional targets from its own resources; whereas, conditional targets are dependent on international climate finance and support, technology transfer and capacity building.

Baseline: For base year, estimated historical GHG emissions and removals of year 2011 are considered based on the GHG Inventory in the Third National Communication (TNC) (2021).

Methodology: For its quantified mitigation targets, Nepal calculated GHG emissions and removals using the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, and its 2019 Refinement. Nepal also incorporated guidance from the IPCC Good Practice Guidance and Uncertainty Management in National GHG Inventory (2000); the IPCC Good Practice Guideline for Land Use, Land-Use Change, and Forestry (2003); and the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands. The emissions are quantified using 100-year Global Warming Potentials (GWPs) from the IPCC Fifth Assessment Report (AR5), predominantly employing Tier 1 emission factors alongside Tier 2 factors in specific instances.

LEAP served as the primary modeling tool for quantifying mitigation targets within this NDC. It facilitated the calculation of GHG emission reductions by comparing projected emissions under a BAU scenario for both 2030 and 2035. Additionally, LEAP incorporated historical GHG emissions and removals from 2011 to 2024.

Adaptation and Loss and Damage: Nepal aspires to implement effective adaptation measures and improve resilience of its communities and ecosystems. But in the face of rising global temperatures and the soft and hard limits of adaptation, Nepal is committed to addressing the wide-ranging economic and non-economic loss and damage across sectors.

Long-term vision: Nepal aspires to achieve net-zero CO₂ emissions by 2045 as mentioned in its LTS/LT-LEDS (GoN, 2021b). This NDC is informed by this long-term goal.

Means of implementation: Nepal has strived to make domestic finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. Nepal's efforts to reduce national GHG emission levels will require international support on climate financing, technology transfer and capacity building. Furthermore, Nepal aspires to avoid the residual risks caused by Loss and Damage and to receive financial and any other support for the risks that may still materialize.

Alignment with global goals: The provision in the Paris Agreement to limit global average temperature rise to 1.5°C results in lower risks for Nepal when compared to 2°C or higher temperatures. The snow and glaciers in the high mountains are already experiencing severe impacts at the current level of warming, leading to extreme rainfall and longer droughts in the hills and plains. Therefore, achieving the Paris Agreement goal of limiting global temperature rise to 1.5°C is crucial for Nepal.

Nepal's NDC provides a fair and ambitious contribution to global action on climate change, aligning with economically efficient, cost-effective and fair share-based 1.5°C pathway estimates. In light of Nepal's insignificant contribution to past and current global GHG emissions, the targeted emission reductions are deemed a fair share of global efforts. These targets were set taking into account the temperature goal of the Paris Agreement, the outcomes of the Global Stocktake, and the principles of equity and common but differentiated responsibilities and respective capabilities, in light of different national circumstances. Furthermore, Nepal's NDC target is developed in accordance with best available science. Implementation of this NDC will contribute towards achievement of SDGs and eradication of poverty while ensuring a just transition.

Carbon market: Nepal will prioritize some climate actions for the carbon market under Article 6 of the Paris Agreement while ensuring there is no double counting, and that integrity is maintained. To engage effectively in the carbon trading under Articles 6.2 and Article 6.4, including for the implementation of Article 6.8 of the Paris Agreement, Nepal will establish robust institutional frameworks and develop necessary regulations to facilitate carbon trading. Some of these preparations are already reflected in the Environment Protection Act (2019) and Regulation (2020). Nepal will ensure corresponding adjustments and the establishment of a transparent monitoring, reporting, and verification systems and registries to track carbon emissions accurately and facilitate the issuance of carbon credits.

NDC preparation process: The NDC preparation process was a country-driven process following the principle of Leave No One Behind with a focus on engagement with local communities and indigenous peoples, in a gender-responsive manner. It was led by the Ministry of Forests and Environment (MoFE) - the UNFCCC focal institution for Nepal - in close collaboration with line Ministries and Provincial Governments following an extensive and inclusive stakeholder consultation process involving the local governments, civil society organizations including youth, women, Persons with Disabilities, and Indigenous Peoples, private sector representatives, experts, academia, development partners, funders, media and members of parliament. The proposed targets served as inputs to technical analysis conducted utilizing Low Emissions Analysis Platform (LEAP) to calculate GHG emission reductions for various scenarios. The proposed targets were further reviewed and verified by the NDC Technical Committee established by MoFE. Further, the NDC was discussed at the Inter-Ministerial Coordination Committee on Climate Change (IMCCCC), and shared with line Ministries for official inputs, shared on MoFE's website for public inputs, finalized by incorporating all relevant inputs, and submitted to the Cabinet (Office of the Prime Minister & Council of Ministers) for approval.

GST alignment: Nepal's NDC is informed by the outcome of the first GST (Decision 1/CMA.5), as detailed in Table 9.

Table 9: Alignment of Nepal’s NDC 3.0 targets with the outcomes of the first GST (GST-1)

GST-1 Outcomes	NDC 3.0 reference
Tripling renewable energy capacity by 2030	Nepal has set a quantified target to increase renewable energy installed capacity from 3500 MW in 2025 to 14,031 MW by 2030.
Doubling the average annual rate of energy efficiency improvements by 2030	<p>Nepal has set a quantified target to decrease the total system transmission and distribution losses to 11.50% while upgrading the transmission and distribution lines and sub-station capacity.</p> <p>Nepal also aspires to ensure that energy performance guidelines and energy audits will be conducted in 1,500 government buildings by 2030, 30% and 70% of new education infrastructure construction will use carbon-neutral and energy-efficient systems by 2030 and 2035, and incentive structures for renovations and new constructions of energy-efficient and inclusive buildings will be developed by 2030.</p>
Phase-down of coal power	Nepal has set a quantified target to use bioenergy (up to 35% of total fuel use) in two limestone-based cement industries by 2035, and convert 30% and 70% of boilers to electricity-based in all industries with boilers by 2030 and 2035 respectively. These efforts are targeted to replace and phase out coal.
Net-zero emission energy systems	Nepal has set a quantified target to scale up renewable electricity, expand and upgrade the transmission and distribution system, reduce system losses, as well as reduce emissions from the transport, cooking and heating, industry sub-sectors to gradually move towards net-zero emission energy systems.
Zero- and low-emission fuels and technologies	Nepal has set a quantified target to increase renewable energy from 3500 MW in 2025 to 14,031 MW by 2030 and reduce transmission and distribution loss through upgrading transmission and distribution lines and sub-station capacity. It has also aimed to set a quantified target on electric cookstoves, ICS, MICS, household-level and large-scale biogas plants. The NDC has also set targets for battery electric vehicles, electric bus, trolley, light rail transit, and electric rail network. Additionally, Nepal has set a quantified mitigation target to replace coal with bioenergy in cement industries, decrease clinker factor during cement production, electric furnaces in iron and steel industries, promote electric boilers in industries, promote hybrid Hoffman/tunnel kilns and electricity-based tunnel kiln for brick production. The country has set quantified targets to increase improved cattle sheds to reduce methane emissions, treat wastewater and faecal sludge before discharge, use non-burn technology in healthcare facilities, and promote combined effluent treatment plants in industrial estates. Nepal has set supporting policy targets to promote these low-emissions fuels and technologies.
Just transition away from fossil fuels in energy systems	To ensure just transition away from fossil fuels in energy systems, Nepal will undertake a Just Transition Impact Assessment for each relevant sector and establish a data repository to compile data for various ministries. A Just Transition Implementation Plan will be developed. These will encompass at-risk workers as well as impacted communities. Transition will prioritize the safeguarding of workers’ rights including implementation of health and safety standards, job security through capacity and skill development programs, with job placement support and social security provisions. Furthermore, targeting both at workers’ and impacted communities, proactive social dialogues and awareness campaigns to foster understanding and buy-in will be implemented. Adequate compensation and benefit-sharing provisions will be implemented where needed. Meaningful participation of at-risk workers and communities will be ensured. Community-led micro-grids (solar and hydro) will be promoted to enhance energy security and community ownership.
Low-carbon hydrogen production	Nepal has set a policy target to explore opportunities for green hydrogen consumption, production, transportation and storage.

GST-1 Outcomes	NDC 3.0 reference
Reduction of non-carbon-dioxide emissions especially methane emissions by 2030	Nepal has set a quantified target to reduce methane emissions by installing 500,000 improved cattle sheds by 2035 which prioritizes efficient manure management, and to improve feed efficiency leading to reduced enteric fermentation. Nepal has set targets for electric vehicles and other clean forms of transportation, which would reduce black carbon from ICS vehicles (see next row for detailed targets). Nepal has also set a target to implement vehicle fitness standards and testing protocols by 2035, which would help further reduce black carbon emissions. Nepal has set 2035 targets to treat 510 million liters wastewater per day and 370,000 cubic meters of faecal sludge per day, which would reduce methane and nitrous oxide emissions. By 2030, Nepal aims to reduce emissions from healthcare waste by using non-burn technologies in 1400 healthcare facilities by 2030 and 2800 healthcare facilities by 2035. In addition to carbon dioxide, this would also avoid emissions of nitrous oxide and black carbon. Nepal also aims to reduce crop residue burning by 2035 which is responsible for nitrous oxide, methane and black carbon emissions.
Reduction of emissions from road transport on a range of pathways, including zero-emission vehicles	Nepal has set quantified targets to increase the sales of battery electric vehicles to 90% and 95% for all private passenger vehicles (including two-wheelers), to 70% and 90% for all public passenger vehicle, and to 10% and 20% for all freight and waste collection vehicles by 2030 and 2035. Additionally, it aims to build and operate at least 50 km by 2030 and 100 km by 2035 of integrated electric bus, trolley and light rail transit system in Kathmandu Valley as well as build and operate 200 km by 2030 and 300 km by 2035 of the electric rail network to support public commuting and mass transportation of goods (freight).
Importance of global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change	Nepal aims to strengthen resilience, adaptive capacity and reduce vulnerability across different sectors. Nepal has set targets on resilient agricultural practices and food systems, resilient urban planning, resilient infrastructure guidelines and building codes, resilient transport infrastructure, resilient energy system, resilient local levels, resilient WASH system, resilient healthcare facilities and education systems. Innovative approaches such as Nature-based Solutions and Ecosystem-based Disaster Risk Reduction for sustainable resilience-building have been prioritized. Adaptation targets are overarching; related to agriculture and food security; forest, biodiversity and watershed conservation; water resources and energy; urban and rural settlements; industry, transport and physical infrastructure; tourism, natural and cultural heritage; health, drinking water and sanitation; disaster risk reduction and management; and awareness raising and capacity building. These priorities will be implemented while ensuring inclusiveness of women, children, PwD, youth and other marginalized groups and following GEDSI principles. Nepal aims to mobilize domestic and international resources, while prioritizing grants, to strengthen adaptive capacity and resilience.
National inventories of climate impacts	Nepal has set targets on observed and projected climate impacts. On observed climate impacts, Nepal will establish and implement a federally integrated framework for data to ensure comprehensive information collection, including on major extreme and slow onset events and their economic and non-economic losses and damages. The data will be disaggregated by gender, disability and other key dimensions. To understand and manage future climate impacts, Nepal will carry out sectoral vulnerability and risk assessment of Nepal in all administrative, physiographic and ecological regions by 2030. By 2030, one national and three provincial-level vulnerability and adaptation assessments (VAA) will be carried out, increasing to two national and seven provincial-level VAAs by 2035. An inventory of wetlands will be created and prioritized vulnerable wetlands will be sustainably managed by 2030. Glacial Lake Outburst Flood (GLOF) hazard mapping will be conducted and real-time monitoring of six glacial lakes will be implemented. A GEDSI and just transition impact assessments will also be conducted. Nepal will also continue to update and strengthen its national inventories. Such inventories will highlight high emitting sectors as well as also indicate sectors and regions that are vulnerable to climate change impacts, signaling where further impact assessments are needed.

GST-1 Outcomes	NDC 3.0 reference
<p>Building accessible, user-driven climate services systems including early warning systems</p>	<p>Nepal has several targets that emphasize the need for accessible and user-driven climate service systems to support climate-informed decision making. One target aims to finalize and endorse a strategic action plan for a multi-hazard early warning system and establish and operationalize 30 additional multi-hazard early warning systems to cover all 7 provinces and major river basins ensuring that 80% of the population living in flood-prone areas will have access to flood early warning systems. Targets also aim to integrate early warning systems into hydropower plants, major highways, groundwater monitoring, and glacial lakes and monitor water quality of the Koshi, Gandaki, Karnali and Mahakali river basins.</p> <p>Nepal has also set a target to issue seasonal, monthly and weekly agrometeorological advisories in all 7 provinces by 2030. Nepal also aims to add information from the BIPAD portal and Department of Hydrology and Meteorology (DHM) website to local government websites, contributing to anticipatory actions for at-risk communities. Nepal aims to upgrade and expand the use of automatic meteorological and hydrological stations to 500 in the country.</p> <p>Nepal’s NDC emphasizes locally-led and inclusive adaptation efforts. Adaptation priorities will be synergized with the Local Adaptation Plans of Action (LAPA) framework of the country to integrate adaptation into local government level planning processes to address the urgent needs of the climate vulnerable people and communities.</p> <p>The country aims to ensure that all local governments prepare integrated gender-responsive LAPA in all 753 local governments. It also aims to integrate traditional, indigenous and local knowledge into the national planning process for disaster risk reduction as well as into local-level curriculums. Nepal also aims to strengthen the technical capacity of its climate- and disaster risk reduction- relevant government, non-government and private sector institutions to effectively utilize relevant new and emerging technologies.</p>
<p>Land-use management, sustainable agriculture, resilient food systems, nature-based solutions and ecosystem-based approaches, and protecting, conserving and restoring nature and ecosystems, including forests, mountains and other terrestrial ecosystems, which may offer improved resilience and well-being, and that adaptation can contribute to mitigating impacts and losses, as part of a country-driven gender-responsive and participatory approach, building on the best available science as well as Indigenous Peoples’ knowledge and local knowledge systems.</p> <p>Ecosystem-based approaches including adaptation and resilience measures in mountain regions, to reduce climate risks and provide co-benefits</p>	<p>Nepal’s forests and high mountains provide critical environment services for the region. Nepal has a number of targets in its NDC, that promote nature-based solutions and ecosystem-based approaches as well those that aim to promote conservation, sustainable management and restoration of ecosystems that would revive their natural functions. These targets include forests, mountains and other terrestrial ecosystems. Nepal aims to advance innovative approaches such as Nature-based Solutions (NbS) and Ecosystem-based Disaster Risk Reduction (Eco-DRR) for sustainable resilience-building.</p> <p>The country aims to maintain at least 46% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%) and advance sustainable forest management and community forestry. Additional targets to reduce forest fires and related biodiversity loss, protect and restore watershed health, protect and restore wetlands, monitor and improve water quality in major basins, protect water resources, conserve and restore springs, harvest rainwater and promote integrated water management have been set. Targets also include the establishment of climate-resilient farms and villages, automated groundwater monitoring, multi-hazard early warning systems. Targets have been set to integrate traditional and indigenous knowledge into the national planning process for disaster risk reduction (DRR), community-based forest management, sustainable forest-based livelihoods, production of high-value forest products, and increase in employment and job opportunities related to sustainable forest management.</p> <p>Nepal aims to promote adaptation and resilience measures in mountain regions. Targets include those that monitor and assess changes in glacier mass balance, targets to reduce GLOF risks through lowering of glacial lakes water levels, establishing of regulated flows of glacial lakes, establishment of early warning systems in glacial lakes and real-time monitoring and mapping of dangerous glacial lakes. Target has also been set to ensure that all local governments prepare integrated gender-responsive LAPA.</p>

GST-1 Outcomes	NDC 3.0 reference
<p>Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development</p>	<p>Nepal has strived to make domestic finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. Nepal also recognizes the insufficiency of its own resources to meet its conditional targets and highlights the critical role of substantial international climate finance and support.</p> <p>Nepal will strategically mobilize domestic and international resources, while prioritizing grants for adaptation, and loss and damage. It will leverage concessional loans, Foreign Direct Investment (FDI), and equity in productive sectors that do not increase debt burdens. Internal sources such as national budgets, private sector investments, public-private partnerships, venture capital, citizen investment funds, and carbon taxes will play a pivotal role</p> <p>Additional funds for climate targets will be determined according to availability of climate funds and facilities based on principles of fair-share, Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC), polluters' pay, and climate justice. Nepal will seek funding from global climate funds, multilateral development banks, bilateral funds, debt-for-climate swaps, and philanthropic contributions. Priority will be given to accessing predictable finance from climate-dedicated funds such as the GCF, GEF, Adaptation Fund, and LDCF. Nepal will also explore innovative financial tools such as carbon markets under Article 6 of the Paris Agreement, green energy bonds, blended finance models and multi-donor trust funds.</p>
<p>Role of the private sector</p>	<p>Nepal sees a key role for the private sector in mainstreaming climate action. Nepal's aim to de-risk private sector investments will be facilitated through credit guarantees, green credit lines, and climate risk insurance, which will also provide financial security to vulnerable communities.</p>
<p>The importance of particularly vulnerable countries, in responding to loss and damage associated with climate change impacts</p> <p>Coherence and complementarity in all aspects of action and support for averting, minimizing and addressing loss and damage associated with climate change impacts</p> <p>National efforts to respond to loss and damage, including in relation to CRM, anticipatory action and planning, recovery, rehabilitation and reconstructions, actions to address slow onset events policymaking and planning for displacement and planned relocation</p> <p>Coherence and synergies between efforts pertaining to disaster risk reduction, humanitarian assistance, rehabilitation, recovery and reconstruction, and displacement, planned relocation and migration</p> <p>Actions to address slow onset events, in order to make progress in averting, minimizing and addressing loss and damage</p>	<p>Nepal's NDC aims to avert, minimize and address loss and damage comprehensively through its mitigation, adaptation and loss and damage targets. In its adaptation section it sets several targets on anticipatory action and planning. Under this section, as part of comprehensive risk management, it also sets several targets on hazard mapping and analysis, vulnerability and risk assessments, and risk reduction and monitoring measures. Nepal aspires to reduce future loss and damage through effective adaptation measures and resilience building while also reducing its own emissions and calling on global collective action to reduce GHG emissions. However, when the hard and soft limits of adaptation and mitigation are reached, the country aims to respond to loss and damage through recovery, rehabilitation and reconstruction, in response to both extreme- and slow-onset events and associated economic and non-economic loss and damage.</p> <p>Nepal aims to strengthen its institutions, including their coordination and synergies, to strengthen response to both extreme events and slow onset events. It aims to establish and implement a federally integrated framework for data to ensure comprehensive information collection (including on major extreme and slow onset events and their economic and non-economic losses and damages), management, archiving, sharing (including transboundary sharing), access, and reporting of loss and damage data and information. The data will be disaggregated by gender, disability and other key dimensions. The country also aims to strengthen its research on extreme events and slow-onset events, and conduct research on existing and projected economic and non-economic losses and damages arising from climate change, including social, cultural, physical and psychological health, and livelihood impacts as well as ecosystem and biodiversity loss. Nepal aims to advance research on climate attribution and the projection of economic and non-economic loss and damage based on future climate scenarios. The country also aims to integrate and strengthen loss and damage reporting in its BTRs.</p>

GST-1 Outcomes	NDC 3.0 reference
<p>Methodologies and tools, including modeling tools, for assessing and analyzing the impacts of the implementation of response measures, with a view to minimizing the negative and maximizing the positive impacts of response measures, with a particular focus on the creation of decent work and quality jobs.</p>	<p>During NDC implementation, Nepal will ensure that co-benefits can be synergized and risks of negative impacts can be minimized. Co-impact analysis will be performed and synergies and trade-offs will also be identified to ensure that the potential implications can be accounted for when implementing interventions. By 2030, a framework for assessing co-impacts of Nepal’s NDC targets will be established.</p> <p>To ensure just transition away from fossil fuels in energy systems, Nepal will undertake a Just Transition Impact Assessment for each relevant sector and establish a data repository to compile data for various ministries. A Just Transition Implementation Plan will be developed. These will encompass at-risk workers as well as impacted communities.</p> <p>Transition will prioritize the safeguarding of workers’ rights including implementation of health and safety standards, job security through capacity and skill development programs, with job placement support and social security provisions. Furthermore, targeting both at workers’ and impacted communities, proactive social dialogues and awareness campaigns to foster understanding and buy-in will be implemented. Adequate compensation and benefit-sharing provisions will be implemented where needed. Meaningful participation of at-risk workers and communities will also be ensured.</p>

4. Adaptation Assessment

Adaptation priorities were selected based on review of national documents and stakeholder consultations, while ensuring alignment with the 8 thematic areas and 4 cross-cutting areas of the National Climate Change Policy and the National Adaptation Plan (NAP).

4.1 Adaptation priorities and policy references

Table 10 outlines adaptation priorities and their policy references.

Table 10: Adaptation priorities and policy references

Target Year	Adaptation Priorities	Policy References
Overarching		
2035	Ensure all 753 local governments prepare integrated gender responsive Local Adaptation Plan of Action (LAPA).	National Adaptation Plan (NAP) 2021–2050 (Section 7.9 GESI, Livelihood and Governance; Section 8.2 Policy, Legal and Regulatory Framework and Governance; Section 8 Enabling Actions); National Climate Change Policy 2019; Climate Change Gender and Social Inclusion Strategy and Action Plan 2020–2030; and stakeholder inputs.
2035	Adaptation priorities will be synergized with the LAPA framework for localizing adaptation and integrating adaptation into local government level planning processes to address the urgent needs of the climate vulnerable people and communities.	
2030	Carry out Sectoral Vulnerability and Risk Assessment of Nepal in all administrative, physiographic and ecological regions integrating differential vulnerability of climate vulnerable people and communities while taking into consideration the best available climate science.	

Target Year	Adaptation Priorities	Policy References
Agriculture and Food Security		
2030, 2035	A total of 200 Climate Resilient Farms will be established by 2030, and this number will cumulatively increase to 500 by 2035. 45,000 households of 90 municipalities will be transitioned towards a resilient agro-ecological based production system.	NAP 2021–2050 (Section 7.1 Agriculture and Food Security; Section 7.2 Forests, Biodiversity & Watershed Management); NDC 3.0; Sustainable Development Goals: Status and Road Map for Nepal (2016–2030); Vulnerability and Risk Assessment); MoFE and stakeholder inputs.
2035	Irrigation coverage will be expanded to 463,000 hectares to ensure food and nutrition security.	
2030	Seasonal, Monthly and Weekly Agrometeorological advisories will be issued in all 7 provinces by 2030.	
2030	Pilot at least two index-based insurance schemes to enhance protection from climate impacts for farmers.	
2030	20 automated groundwater monitoring stations for agriculture fields will be established in Terai districts.	
Forests, Biodiversity and Watershed Conservation		
2035	Establish agroforestry systems on at least 5000 ha per year.	NAP 2021–2050 (Section 7.2: Forests, Biodiversity & Watershed Conservation – FBWC); Vulnerability & Risk Assessment (2021); National Climate Change Policy 2019; National Wetland Policy 2012; National Irrigation Policy 2004; Second NDC 2020; and stakeholder inputs.
2035	Reduce forest fire incidents and biodiversity loss caused by fires, while restoring and managing degraded ecosystems.	
2035	Increase employment and job opportunities in Sustainable Forest Management.	
2030	Promote sustainable forest-based livelihoods increasing high-value forest products by 50% through sustainable harvesting, and launching the 'Forest for Food Grain' programme in 100 community-managed forests.	
2035	Increase water availability by 50% in sub-watersheds by 2035, conserve and restore 50% of wetlands, and reduce riverbank cutting and flood risks by 60% by complementing latest science, technology and locally led adaptation initiatives.	
2030	An inventory of wetlands will be created and prioritized vulnerable wetlands will be sustainably managed.	
2035	Climate resilient protected area management planning framework will be developed by 2030 and implemented by 2035.	
Water Resources and Energy		
2030	200 rainwater harvesting dams and 1,000 water source protection schemes will be implemented to promote multiple water use systems.	NAP 2021–2050 (Section 7.2: Forests, Biodiversity & Watershed Conservation – FBWC; Section 7.3: Water Resources and Energy – WRE); National Climate Change Policy 2019; Water Resource Policy 2020; National Wetland Policy 2012; Presidential Chure-Tarai Madhesh Conservation and Management Master Plan 2017 and stakeholder inputs.
2030	20 automated groundwater monitoring stations for agriculture fields will be established in Terai districts.	
2035	Technical training programs for 200 technical staff of water resources and irrigation sector including GEDSI aspects will be conducted.	
2035	Watershed health will be improved in 20 districts through integrated management of 164 river systems in Chure. Sustainable management and conservation plans for four river basins and ten independent basins will be prepared and implemented. River and sediment management plans will be developed for six rivers. Integrated water management will be applied to 60 river systems. 50 critical watersheds will be prioritized for integrated conservation, and river classification for all basins will establish jurisdictional responsibilities across three tiers of government.	
2030	20 sub-basins will have functional water accounting and auditing.	
2030	Assess change in glacier mass balance study of 20 glaciers using remote sensing and field-based methods and enhance hydrological and meteorological expertise in weather, climate, downscaling and hydrological scenario forecasting.	
2030, 2035	By 2030, water quality monitoring and evaluation will be conducted for the Koshi and Gandaki river basins. By 2035, the remaining Karnali and Mahakali river basins will also be monitored and evaluated.	
2035	Water supply will be improved through rainwater harvesting, resource protection, and spring conservation & restoration, and watershed health in 20 districts will be enhanced through integrated watershed management projects.	
2030	Automatic meteorological and hydrological stations will be upgraded and expanded to 500 (including 20% in areas above 3000 masl).	

Target Year	Adaptation Priorities	Policy References
Rural and Urban Settlements		
2030	Urban resilience and livability improvement aspects will be integrated into municipal infrastructures and governance in 7 municipalities.	NAP 2021–2050 (Section 7.4: Rural & Urban Settlements); Vulnerability & Risk Assessment 2021; National Urban Development Strategy 2017; National Climate Change Policy 2019; Land Use Policy 2015; Land Use Act 2019; and stakeholder inputs.
2030	Climate-resilient and inclusive urban environment management guidelines will be developed.	
2035	The urban infrastructure index of Nepal's urban areas will be increased to at least 50%.	
2030	Buildings and infrastructure guidelines and codes will be updated to ensure climate resilience.	
Industry, Transport and Physical Infrastructure		
2030	Climate-resilient planning in transport infrastructure projects will be embedded in revised regulations. Major highways will be equipped with early warning systems.	NAP 2021-2050 (Section 7.5: Industry, Transport and Physical Infrastructure); Environmentally Sustainable Transport Strategy 2014; National Climate Change Policy 2019; and stakeholder inputs.
Tourism, Natural and Cultural Heritage		
2035	Heritage (historical, cultural, religious) sites will be conserved with special focus on the World Heritage sites in Nepal.	NAP 2021-2050 (Section 7.6 Tourism, Natural and Cultural Heritage); Tourism Strategic Plan 2016-2025; and stakeholder inputs.
Health, Drinking Water and Sanitation		
2030	90% of the population benefit from safely managed water supply and sanitation services.	NAP 2021–2050 (Section 7.7: Health, Drinking Water and Sanitation – HDWS; Section 7.2: Forests, Biodiversity & Watershed Conservation – FBWC; Section 7.4: Rural and Urban Settlements – RUS); National Climate Change Policy 2019; National Health Policy 2019; Water Supply, Sanitation and Hygiene Sector Development Plan 2016–2030; Climate Resilient Sanitation Safety Planning; and stakeholder inputs.
2035	80% of the population will benefit from spring conservation, restoration, and management.	
2030, 2035	Climate-resilient WASH systems will be developed through various technologies explored in 3,000 vulnerable households, communities, and systems at the local level by 2030, and 5,000 by 2035. Climate-resilient WASH plans will be formulated at all local levels.	
2035	Rainwater harvesting will be implemented in 500,000 households. Real-time groundwater monitoring and early warning systems will be established in 50 locations. Managed Aquifer Recharge (MAR) will be implemented in 15 water-stressed areas.	
2035	Climate-resilient WASH service capacities and skill development training sessions will be conducted for stakeholders at local, provincial, and national levels.	
2030, 2035	By 2030, climate-sensitive disease surveillance will be strengthened in 134 sentinel sites, expanding to all municipalities by 2035. By 2030, 500 health professionals will be trained on climate change and health, increasing to 5,000 by 2035.	
2030, 2035	500 health professionals will be trained on climate change and health by 2030, increasing to 5,000 by 2035.	
2030, 2035	By 2030, a national and three provincial-level Vulnerability and Adaptation Assessments (VAA) will be carried out, increasing to two national and seven provincial-level VAAs by 2035. The Health National Adaptation Plan (H-NAP) will be updated by 2030.	
2030, 2035	The disease burden attributed to ambient and household air pollution will be reduced to 77/100,000 by 2030 and 60/100,000 by 2035.	

Target Year	Adaptation Priorities	Policy References
Disaster Risk Reduction and Management		
2030	Finalize and endorse a strategic action plan for a multi-hazard early warning system. Establish and operationalize 30 additional multi-hazard early warning systems to cover all 7 provinces and major river basins. 80% of the population living in flood-prone areas will have access to flood early warning systems.	NAP 2021–2050 (Section 7.3: Water Resources and Energy – WRE; Section 7.8: Disaster Risk Reduction and Management – DRRM); National Climate Change Policy 2019; Water Resource Policy 2020; National Disaster Risk Reduction and Management Act 2017; National Policy for Disaster Risk Reduction 2018; National Early Warning Strategic Action Plan 2013 and stakeholder inputs.
2030	Glacial Lake Outburst Flood (GLOF) risks will be reduced through regulated flows in 4 glacial lakes by 2030 and an additional 4 by 2035. Early Warning Systems will be established in 6 glacial lakes by 2030 and an additional 4 by 2035. GLOF hazard mapping will be conducted, and real-time monitoring of 6 glacial lakes will be implemented by 2030 and an additional 4 by 2035. GLOF risk reduction planning and action will be strengthened.	
2035	Advance innovative approaches such as Nature-based Solutions (NbS) and Ecosystem-based Disaster Risk Reduction (Eco-DRR) for sustainable resilience-building.	
2030	Traditional and Indigenous knowledge will be integrated into the national planning process for DRR.	
Awareness Raising and Capacity Building		
2030, 2035	By 2030, 2,000 Climate Change Adaptation resource persons will be mobilized locally to strengthen school-level climate change capacity, increasing to 4,000 by 2035. By 2035, 50% of schools will be climate-smart schools.	NAP 2021–2050 (Section 8.3: Awareness Raising and Capacity Building; Section 8: Enabling Actions; Section 7.8: Disaster Risk Reduction and Management – DRRM); National Climate Change Policy 2019; National Disaster Risk Reduction and Management Act 2017; National Urban Development Strategy 2017; and stakeholder inputs.
2030	By 2030, at least 7 (one in each Province) climate change-induced loss and damage research projects will be carried out and integrated into the education system.	
2030, 2035	By 2030, at least 25% of children will have uninterrupted education through a climate-resilient system that can withstand disasters and extreme events, rising to 75% by 2035.	
2035	At least 90% of children will have guaranteed education continuity through a climate-resilient education system that withstands climate-induced disasters and extreme events.	
2030	Access to data and tools on climate change impacts will be strengthened. Capacity building on extreme events and early warning systems will be carried out.	

5. Loss and Damage Assessment

Loss and Damage (L&D) refers to the negative impacts of climate change that occur when the limits of adaptation and mitigation are reached. It encompasses both permanent, irreversible loss – such as death, the disappearance of glaciers or loss of biodiversity – and damage, which includes impacts that can still be repaired, such as infrastructure destruction, flooded farmlands. L&D can be economic (e.g., loss of property, income, and infrastructure) or non-economic (e.g., loss of cultural heritage, displacement, psychological trauma, and ecosystem degradation). It also includes direct losses, such as destroyed homes, flooded farmlands, and damaged roads, as well as indirect losses, like supply chain disruptions, reduced agricultural productivity, loss of tourism revenue, and long-term health impacts.

Nepal is already experiencing significant climate-induced loss and damage (L&D) due to extreme events like floods, landslides, GLOFs, wildfires, and heatwaves, as well as slow-onset changes such as rising temperatures, glacier melt, and biodiversity loss. In recent years, Nepal has experienced many extreme events such as the July 2025 Rasuwagadhi floods, the July 2025 Upper Mustang GLOF, the May 2025 Humla GLOF, the September 2024 unseasonal rainfall

in Bagmati Province, the August 2024 Thame GLOF, July 2024 extreme rainfall in Kanchanpur, June 2024 flood and landslide in Taplejung, August 2023 Mustang Kagbeni Flood, post-monsoon rainfall in October 2022 and October 2021, and the June 2021 Melamchi landslides and floods. The frequency and severity of such climate extremes is increasing in the country.

5.1 Climate Attribution Profile of Nepal

In order to assess the influence of human-induced climate change on extreme heat and precipitation events across Nepal's diverse physiographic regions, including the Terai, Siwalik, Middle Mountain, High Mountain, and High Himalaya, a state-of-the-art probabilistic attribution methodology is applied (Climate Analytics, 2026).

The assessment compares the likelihood of climate extreme occurrences in the observed current climate to a world under climate scenarios without human-caused greenhouse gas emissions, called pre-industrial conditions. Heat extreme events are analyzed using an index based on the number of consecutive days exceeding a high percentile temperature threshold over a given baseline period. This enables the detection of unusual warm spells and an assessment of how global warming has shifted their probability. Results show that in all regions of Nepal, the return periods for such extreme heat events have significantly shortened in the current climate as compared to the pre-industrial times. This indicates that heat extremes are far more frequent and intense under current levels of global warming. In many cases, the observed events would have been virtually impossible without the influence of human-induced climate change.

A similar probabilistic approach is applied also to extreme precipitation events, considering the annual maximum five-day accumulated rainfall. Both under the current and counterfactual climate scenarios, assessment of the return periods for the most intense precipitation events in each region is carried out. The analysis reveals a consistent pattern: extreme rainfall events are substantially more likely under current warming levels, with shortened return periods across all physiographic zones. This relationship between climate extremes and rising global mean temperatures emphasize the role of anthropogenic emissions in amplifying the resultant hazards.

Overall, these findings demonstrate that global warming has already increased the frequency and intensity of high-impact climate extremes in Nepal, that in turn increased the risks to communities, infrastructure, and ecosystems. These insights provide a strong scientific basis for recognizing such events as being partly driven by global climate change and therefore relevant for international climate finance mechanisms, including those aimed at responding to loss and damage.

5.2 Loss and Damage measures in the NDC, policy references and rationales

The measures for loss and damage were discussed among government stakeholders - including the MoFE, MoHA, the National Disaster Risk Reduction and Management Authority (NDRRMA), the Department of Hydrology and Meteorology (DHM), and their provincial counterparts - as well as non-government actors. These targets were aspirational in nature, emerging from group discussions that considered current relevant policies, such as Nepal's Climate Change Policy NDRRMA's Disaster Risk Reduction Strategic Action Plan (2018–2030), the National Framework on Climate Change Induced Loss and Damage (2021), and the Procedure for the relocation and rehabilitation of hazard-prone settlements (2017). Discussions also reflected evolving ground realities, scientific advancements, and the shifting international governance landscape.

Recognizing that loss and damage is still an emerging area, stakeholders also reviewed the NDCs of other developing countries that have already integrated loss and damage into their NDCs. Stakeholders emphasized the importance of setting broad targets for loss and damage in the NDC to maintain flexibility during implementation, noting that overly detailed targets could become constrictive. These targets will be further elaborated as needed in the NDC Implementation Plan. Table 11 presents the L&D measures and the expected benefits and rationale.

Table 11: L&D measures and expected benefits

L&D Measures	Expected benefits and rationale
Nepal aims to strengthen capacity and institutional landscape, including coordination and synergy, in alignment with national and international mandates related to loss and damage.	This target seeks to enhance institutional coordination and synergy to ensure a coherent, timely, and effective response to loss and damage arising from both extreme weather events and slow onset processes. Strengthening the institutional landscape will help improve resource access and mobilization, and foster integrated data sharing, planning and implementation across relevant sectors and levels of governance.
Nepal aims to establish and implement a federally integrated framework for data to ensure comprehensive information collection (including on major extreme and slow onset events and their economic and non-economic losses and damages), management, archiving, sharing (including, where possible, transboundary sharing), accessing, and reporting of loss and damage data and information. The data will be disaggregated by gender, disability and other key dimensions.	Loss and damage encompasses a large number of sectors and institutions. Therefore, loss and damage response requires a collective and coordinated approach to data sharing, management and reporting.
Nepal aims to enhance its National Framework on Climate Change Induced Loss and Damage to ensure comprehensiveness (including non-economic as well as hazard specific losses and damages) and establish a robust implementation mechanism.	This target aims to enhance the current national loss and damage framework by ensuring comprehensiveness through inclusion of non-economic and hazard specific loss and damage.
Nepal aims to strengthen and update its relevant policies to ensure the inclusion of climate-induced displacement and risk-sensitive resettlement planning	This target aims to enhance the current procedure on relocation by ensuring that climate specific lens is applied.
Nepal aims to strengthen research on extreme events and slow-onset events, including on cascading and compounding hazards and risks. Nepal aims to strengthen capacity and conduct research and assessment on climate attribution and existing economic and non-economic loss and damage, as well as projected economic and non-economic loss and damage based on future climate scenarios, while also considering social, cultural, physical and psychological health, and livelihood impacts as well as ecosystem and biodiversity loss.	The impacts of climate change in Nepal are growing but require further study. This target aims to enhance research on loss and damage, including both economic and non-economic loss and damage.
Nepal aims to strengthen the technical capacity of climate- and disaster risk reduction- relevant government, non-government and private sector institutions to effectively utilize relevant new and emerging technologies.	This target reflects the need for climate-relevant government and non-government institutions to strengthen their capacity in utilizing emerging tools and technologies.
Nepal aims to integrate and strengthen its loss and damage reporting in its national communications, BTRs and other national reporting systems.	Effective reporting on climate impacts is essential to facilitate access to international climate finance.
Nepal aims to take measures to strengthen the fiduciary standards and enhance the environmental and social safeguards of designated direct access and implementing entities to fully benefit from the direct, rapid, and simplified access offered by the FRLD.	This target aims to enhance Nepal’s capacity to access international financing for loss and damage through the FRLD. To effectively access, mobilize and manage these resources, Nepal intends to leverage technical assistance and capacity-building support provided by the Santiago Network on Loss and Damage, as necessary.

6. Means of Implementation Assessment

6.1 Climate Finance

6.1.1 Methodology and outcomes of NDC Costing

The costs of Nepal's NDC 3.0 quantified mitigation targets were estimated using a sector-specific, activity-based costing approach, aligned with the two mitigation scenarios With Existing Measures (WEM) and With Additional Measures (WAM) and benchmarked against the Business-As-Usual (BAU) reference scenario. This methodology focused exclusively on quantified mitigation actions, excluding policy measures where emission reductions could not yet be robustly estimated.

Activity level costing approach was followed to assess the incremental investment expenditures required to implement each target. Unit costs were estimated for interventions such as renewable energy capacity additions (USD/MW), and electric rail deployment (USD/km). These values were sourced from national datasets, domestic feasibility studies, and stakeholder consultations, validated through expert and ministry consultations and were supplemented by international benchmarks from organizations such as the Asian Development Bank (ADB), World Bank, and GIZ.

Cost estimates were categorized by sector (Energy, AFOLU, Waste, and IPPU) and further disaggregated by sub-sector (e.g., renewable electricity, EVs, wastewater treatment). Each cost was classified as either:

- Unconditional: Costs expected to be met through domestic public and private resources.
- Conditional: Costs contingent on international climate finance, technology transfer, and/or capacity building.

To facilitate alignment with implementation and financing cycles, projections were segmented into two phases: 2025 to 2030 and 2030 to 2035. This phasing also supports prioritization of near-term investment needs and long-term planning for deeper decarbonization. All cost estimates were developed with the intent to reflect both ambition and realism, supporting resource mobilization from both domestic budgets and external funding mechanisms. Further details on underlying assumptions, cost parameters, data sources, and modeling architecture are detailed in **Annex IV**.

Adaptation priorities are aligned with the NAP thematic areas, and reflect Nepal's commitment to addressing the urgent needs of climate-vulnerable communities and ecosystems. This includes investments in key sectors such as agriculture and food security, forests, biodiversity and watershed conservation, water resources and energy, and other critical areas like disaster risk reduction and management and awareness raising and capacity building.

Loss and damage measures include targets to strengthen institutional capacity and landscape, policies, data management, research, reporting, and functional equivalency to access international financing. These costs associated with the adaptation and loss and damage targets are expected to be met through a combination of international climate finance, grants, and support, ensuring that Nepal can effectively build resilience and achieve its adaptation goals while addressing the disproportionate impacts of climate change on its vulnerable populations.

The total cost of the NDC’s quantified mitigation targets till 2035 is estimated to be USD 73.74 billion (14.68% unconditional and 85.32% conditional). The mitigation policies and measures have not been quantified, so these costs are not estimated. The total cost of NDC’s adaptation priorities till 2035 is estimated to be in the range of USD 18 to 20 billion dollars. The summary of costing of quantified mitigation targets by sector, sub-sector, and conditionality are given in Table 12.

Table 12: Cost estimate of NDC 3.0

Sector	Costs in Million USD (2025-2030)		Costs in Million USD (2030-2035)		Total Costs in Million USD (2025-2035)	
	Unconditional	Conditional	Unconditional	Conditional	Unconditional	Conditional
Energy	4,099	20,092	5,427	35,884	9,526	55,976
AFOLU	-	-	1,100	4,720	1,100	4,720
Waste	-	27	198	1,510	198	1,537
IPPU	-	-	-	683	-	683
Total	4,099	20,119	6,725	42,797	10,824	62,916

6.1.2 International and domestic climate finance and instruments

As per the climate change budget, in FY 2022/23, of the total government budget (MoF, 2022) of approximately USD 14 billion, 5.86% was highly climate change relevant (with more than 50% climate benefits), and 28.07% was climate change relevant (with 20 to 49% climate benefits). In FY 2022/23 out of the total government budget (MoF, 2022) of approx. USD 14 billion, the total financial support by international development partners was USD 2.32 billion as grant and USD 1.89 billion as loan. However, as specific information on mobilization of international climate finance provided in the form of grants, and concessional loans from various institutions, including market loans, offsets, in-kind support and technical support are difficult to navigate, it is important to track international as well as domestic climate finance for NDC and NAP - this is important as these documents include conditional targets that are based on adequate international support or unconditional based on domestic resources. The tracking process should try to include details on the main objective of the project, climate rationale, amounts as well as types of financing provided, co-financing, timelines, major stakeholders, regular progress reports and other details to make it feasible to accurately track international climate finance.

Nepal’s climate finance strategy in its NDC reflects its commitment to embedding climate action into national, sectoral, and sub-national budgets, ensuring integration at every level of decision-making. While pursuing a low-carbon and climate-resilient development pathway as outlined in its LT-LEDS, Nepal recognizes the insufficiency of its domestic resources to meet its conditional targets and underscores the critical role of substantial international climate finance and support. To address climate vulnerability, strengthen community resilience, and respond to loss and damage, Nepal will strategically mobilize both domestic and international resources, prioritizing grants for adaptation and loss and damage.

Financing strategies include leveraging concessional loans, Foreign Direct Investment (FDI), and equity in productive sectors that do not increase debt burdens, alongside internal sources such as national budgets, private sector investments, public-private partnerships, venture capital, citizen investment funds, and carbon taxes. Allocation of additional funds will be guided by the availability of climate funds and facilities, underpinned by principles of fair share, Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC), the polluter pays principle, and climate justice. Nepal seeks predictable finance from climate-dedicated funds such as the Green Climate

Fund (GCF), Global Environment Facility (GEF), Adaptation Fund (AF), Special Climate Change Fund (SCCF), and Least Developed Countries Fund (LDCF), as well as from multilateral development banks, bilateral funds, debt-for-climate swaps, readiness support, and philanthropic contributions. Nepal is also advancing innovative financing approaches, including carbon markets under Article 6 of the Paris Agreement, green energy bonds, blended finance models, and multi-funder trust funds. To attract private capital, the government will de-risk investments through credit guarantees, green credit lines, and climate risk insurance, which will also enhance financial security for vulnerable communities. Strengthening national systems, building institutional capacity, enhancing climate rationale, and improving project bankability will be central to increasing direct access to international climate finance.

A robust climate finance tracking and accountability framework will ensure transparency and efficiency in fund allocation. The strategy is rooted in inclusivity, with gender equality, disability, and social inclusion (GEDSI) considerations especially for marginalized communities embedded across policies. Systematic integration of climate policies into provincial and local development plans will align with Nepal's decentralized financial management structure under the constitution. Furthermore, the establishment of a carbon market framework and national carbon registry, supported by comprehensive carbon marketing guidelines, will enable effective tracking and management of carbon credits, generate revenue for climate projects, and promote low-carbon development.

7. Key considerations for NDC implementation

7.1 Co-impacts

Co-impacts refer to both positive and negative impacts that may arise as a result of deployment of adaptation and/or mitigation strategies (Cohen et al., 2021; IPCC, 2022b; United Nations, 2023). Synergies or co-benefits are the positive impacts. For example, forest restoration through afforestation and reforestation can contribute to ecosystem resilience in addition to sequestering carbon. Trade-offs, or negative impacts, can also result. For example, the loss of jobs due to transition or adoption of new technologies. Practices such as soil carbon management can lead to better yields thus enhanced adaptation as well as carbon sequestration (United Nations, 2023). Ideally co-benefits should result in poverty alleviation, equity, community well-being and resilience and environmental conservation and overall sustainable development (United Nations, 2023).

The IPCC Sixth Assessment's Working Group II report (IPCC, 2022a) notes that adaptation measures in sectors such as the water and agriculture sector, and mitigation measures in energy and forestry sectors have potential for generating multiple co-benefits. The report notes that 25% of assessed water sector adaptation measures have co-benefits thus these should be leveraged. The Paris Agreement (UNFCCC, 2015) provides for co-benefits arising from mitigation interventions and notes that actions should enhance resilience and adaptation. Nepal's second NDC emphasized that strategies should enhance the resilience of vulnerable populations and avoid residual risks of climate change. It also highlighted the importance of inclusivity and public participation. Nepal's LTS/LT-LEDS (GoN, 2021b) describes co-benefits as contributing to socio-economic prosperity and addresses pursuing co-benefits through sustainable agriculture, land-use, forestry and energy sectors.

Co-impact analysis will be included as part of the preparatory and feasibility phase for the implementation of strategies in the NDC. This shall ensure that co-benefits are fully harnessed and realized, and trade-offs are clearly understood to ensure that all implications including negative impacts are addressed from the outset. Monitoring, evaluation and learning will also ensure that strategies are adjusted to address any unintended consequences and optimize benefits especially those towards poverty alleviation, equity, community well-being and resilience and environmental conservation.

Co-impacts present some implications that have to be addressed especially for policy. Some of these include the greater need for integrated policymaking and implementation. The LAPA's are an avenue for this type of integration as they can be able to incorporate strategies that address co-impacts and ensure that any negative outcomes are anticipated and addressed beforehand. Local participation is also critical, and this can be incorporated in the process to ensure the maximization of synergies and addressing trade-offs in an inclusive and participatory manner. It is also critical that policies incorporate iterative approaches where there is room for modification and review at all stages including during implementation. Communication is also critical to ensure that there is sufficient awareness and information shared to different stakeholders including communities, researchers, civil society among others (IPCC, 2022b). This also necessitates just transition plans and strategies to ensure that the situation of those impacted most by climate change do not get worse. Below is an overview of some of the synergies and trade-offs that may arise with the implementation of Nepal's NDC 3.0.

In the energy sector, the expansion of renewable electricity generation will result in co-benefits. Generation and supply of this electricity can enable electric cooking (Practical Action, 2023) especially when 69% currently use biomass and open fire stoves for cooking (CCA, 2025). It may however also result in competition for land with the installation of wind and/or solar technologies, which may need to be addressed through combining renewable project development with agriculture and industrial applications. The planned expansion in the use of electric cookstoves will have synergies for health with reduced indoor air pollution that results from the use of inefficient biomass based cookstoves.

In the transport sector, increase in BEVs, electric vehicles and other mass transit options will have co-impacts of improved ambient air quality. According to the 2021 air quality status, PM 10 and PM 2.5 levels exceeded the World Health Organization (WHO) recommended levels (at 24-hour max concentration of 120 $\mu\text{g m}^{-3}$ and 40 $\mu\text{g m}^{-3}$ respectively) (Lamichhane et al., 2022; WHO, 2025).

In the industrial sector, the use of electric furnaces and bioenergy has co-impacts of reduced pollution and improved efficiency. Bioenergy generation though may have the effect of competition for land in terms of food crop farming and bioenergy production. There are synergies for enhanced food security in the AFOLU sector with the installation of improved cowsheds and manure management (FAO, 2021; United Nations, 2023). Increased forest and tree cover also results in livelihood support, mental health benefits, preservation of spiritual and sacred sites and general community wellbeing as well as ecosystem resilience. Integration of gender and social inclusion has co-impacts such as co-ownership of initiatives and inclusivity.

Targeted interventions lead to co-benefits for ecosystems, for e.g. better understanding of the vulnerability of mountain and forest ecosystems in the Himalayas and Terai and their communities can contribute to improved management. Climate resilient agriculture on the other hand also enhances carbon sequestration and reduces emissions from farming activities. Irrigation which is

critical for the enhancement of food security (FAO, 2021) may also have co-impacts with trade-offs around water resource competition for different uses (household, agricultural, industrial and recreational among others) (IPCC, 2022b).

Forest, biodiversity and watershed conservation has co-impacts of enhanced management of carbon sinks and enhanced carbon sequestration. Adaptation measures such as DRR, awareness raising and multi-hazard early warning and response have the co-impact of minimizing loss and damage. Addressing loss and damage through the principle of building back better, further improves services, strengthens infrastructures and improves resilience.

7.2 Just Transition and Human Rights

The Paris Agreement embeds the principle of Just Transition in its preamble, affirming the importance of “taking into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs.” The IPCC and successive Conference of the Parties (COP) decisions have reiterated this need, particularly in the GST outcomes at COP28, which call for integrated actions that simultaneously address mitigation, adaptation, equity, and development.

The inclusion of Just Transition in Nepal’s draft NDC 3.0 reflects a strategic and inclusive approach to climate action that aligns with both global principles and national priorities. Just Transition ensures that the shift toward a low-carbon and climate-resilient economy is fair, equitable, and inclusive, particularly for workers, communities, and sectors most affected by this transition. It provides a framework for safeguarding livelihoods, promoting green jobs, and enhancing social protection mechanisms, while also addressing structural inequalities. Nepal’s draft NDC 3.0 reflects a growing commitment to the principles of a just transition. By integrating Just Transition into the NDC process, Nepal underscores its commitment to leaving no one behind and promotes broader public support and stakeholder engagement in climate policies.

By explicitly referencing Just Transition, the NDC 3.0 acknowledges the need to support those affected by structural changes – such as brick kiln workers impacted by a transition to electric tunnel kilns, or rural households shifting from biomass to electric cooking. It also ensures that planned measures – like promoting EVs, improving cattle sheds, or enhancing forest management – are implemented in ways that protect livelihoods, ensure equity, and create new opportunities for green jobs. Just Transition framework serves as a guiding principle across both mitigation and adaptation actions, ensuring that the transition aligns with the principles of inclusion, gender-responsiveness, and proportional representation, already embedded in Nepal’s NDC formulation process.

Key elements from Nepal’s NDC 3.0 that will further advance just transition action include:

- Green job creation: Expanding electric mobility, renewable energy, and clean technologies will generate employment in transport, energy, and construction sectors.
- Health and social gains: Public health improvements via reduced indoor air pollution and cleaner transportation. Scaling up electric cookstoves, improved cookstoves, and biogas will reduce indoor air pollution, improving health, especially for women and children. Gender and social inclusion, particularly in household energy use and agriculture.
- Support for local economies: Just Transition planning followed by engaging women, Indigenous Peoples, and local communities. Community forestry and decentralized energy solutions enhance local ownership and equity.

- Resilient agriculture: Installing improved cattle sheds will cut methane emissions and improve rural livelihoods, supporting smallholder farmers and promoting sustainable livestock practices.
- Energy access and equity: Expanded clean electricity access, especially in rural and off-grid areas, will reduce energy poverty and enhance productivity.
- Institutional strengthening: Just Transition efforts are embedded in Nepal's federal structure, with clear roles for provincial and local governments, and aligned with national development plans and stakeholder-driven implementation.
- Inclusive stakeholder consultation process: This process included extensive and inclusive stakeholder consultation process involving the local governments, civil society organizations including youth, women, Persons with Disabilities, and Indigenous Peoples, private sector representatives, experts, academia, development partners, funders, media and members of parliament.
- Focus on equitable access to climate finance: Nepal will systematically integrate climate policies into provincial and local development plans in line with the constitution's decentralized financial management structure, ensuring that resources reach vulnerable communities and support a just transition at the local level.
- Prioritization of adaptation and resilience-building: Given Nepal's high vulnerability to climate change, the strong emphasis on strengthened adaptation and resilience-building, particularly for vulnerable populations, remains a key aspect of ensuring a fair transition. The prioritization of grants for adaptation and loss and damage, mobilized through both domestic and international resources, supports this goal.
- Addressing loss and damage: Addressing loss and damage is particularly important for vulnerable communities. The aim to strengthen research on economic and non-economic losses and damages arising from climate change, further highlights this concern for the broader societal impacts.
- Capacity building: The inclusion of capacity building as a key element, supports an intention to empower various stakeholders to participate in and benefit from the climate transition. Strengthening the technical capacity of relevant institutions is crucial for a just and effective implementation of climate actions.

7.3 Gender Equality, Disability and Social Inclusion (GEDSI)

The disproportionate impacts of climate change are widely acknowledged, with women, persons with disabilities, Indigenous Peoples (IPs), local communities, children, youths and other marginalized, socio-economically disadvantaged, underrepresented and minority groups experiencing significant greater vulnerability. This heightened vulnerability is driven by limited access to resources, information, social connections, education and opportunities to influence decision making. Climate change further entrenches and exacerbates existing inequalities.

While women, minorities, marginalized, and disadvantaged groups face such heightened impacts, it is also important to acknowledge the significant roles they play in climate response. Women, IPs, local communities and other vulnerable groups hold valuable knowledge, perspectives and practices that can be critical for effective and equitable climate solutions. It is therefore vital to integrate GEDSI principles when climate change decisions are made, when resources are accessed, and when benefits are shared. Furthermore, it is critical to ensure that climate actions operate under the guiding principle of Free Prior and Informed Consent (FPIC) and Do No Harm, with the appropriate social safeguards in place.

The Paris Agreement also recognizes the importance of GEDSI in climate action in its preamble, asking Parties to “respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity”. Article 7 of the Paris Agreement further acknowledges that adaptation efforts should be gender-responsive, participatory, fully transparent, and account for vulnerable groups, and communities. It emphasizes the need to be “guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems...”. Furthermore, Article 11 of the Paris Agreement further emphasizes the need for capacity building efforts to be country-driven and responsive, fostering ownership at national, subnational, and local levels. It emphasizes the need for capacity building efforts to be guided by lessons learned and be effective, iterative, participatory, and gender responsive.

The Lima Work Programme on Gender (LWPG) was first launched in 2014 to advance gender balance and integrate gender considerations into the work of the Parties during the implementation of the Paris Agreement. The LWPG has been subsequently reviewed and renamed as enhanced LWPG and its gender action plans (GAP) developed to guide Parties mainstream gender during climate action.

The Local Communities and Indigenous Peoples Platform (LCIPP) enables local communities and indigenous peoples to share knowledge, build capacity, and integrate indigenous and local knowledge into climate policies and actions. Its Facilitative Working Group (FWG) operationalizes these functions. The Baku Workplan of the LCIPP (2025-2027) was welcomed in Baku.

Recognizing the importance of GEDSI and guided by the enhanced LWPG and its GAP and the work of the FWG of the LCIPP, Nepal has integrated cross-cutting and dedicated, standalone GEDSI targets and considerations into its NDC. These targets are meant to be inclusive of women, persons with disabilities, Indigenous Peoples (IPs), local communities, children, youth, diverse genders, and other marginalized, socio-economically disadvantaged, underrepresented and minority groups. The NDC targets aims to be comprehensive and set targets on GEDSI specific institutional strengthening and policy integration; capacity building and participation; inclusive climate action planning and implementation; monitoring and evaluation; data management; awareness, education and empowerment; as well as sector specific inclusion, with benefit sharing and rights to just transition.

8. Lessons Learnt and Conclusion

Table 13 summarizes the lessons learnt during the NDC 3.0 assessment, formulation and drafting process. These lessons will be useful for NDC implementation, update of LT-LEDS, and development of future rounds of NDCs.

Table 13: Lessons Learnt during the NDC 3.0 assessment, formulation and drafting process

Topic	Lessons learnt
NDC Stocktake	<ul style="list-style-type: none"> NDCs should build on the ambition by setting achievable goals aligned with national capacity and supported by clear financing plans. Data systems should be improved, and a strong monitoring and evaluation frameworks should be developed to track progress more accurately. It is important to track international climate finance as well as domestic spending on NDC targets. Details such as project objectives, climate rationale, financing type and amount, co-financing, private sector spending, timelines, major stakeholders, supported by regular progress reports can enable accurate tracking.
Policy Measures	<ul style="list-style-type: none"> Reference value and other data on policy measures needs to be collected to quantify their impact on GHG emission reductions. For e.g. to quantify mitigation targets such as increasing soil organic content (SOC) in Nepal’s subsequent NDCs (this is currently only included as unquantified policy measure due to lack of data), the following key data, tools and institutional coordination will be needed: A robust baseline for setting and quantifying SOC targets. National and regional soil surveys which provide SOC data across different land types and depths. Historical SOC data from studies and long-term monitoring plots to help assess changes and trends over time. Land use and land cover (LULC) information from satellite imagery and GIS (Geographic Information System) mapping to link SOC levels with land categories such as cropland, forest, and degraded land. Combining of these datasets to support the identification of priority areas for SOC enhancement and realistic target-setting. IPCC Tier 2 or Tier 3 methodologies that enable more accurate estimation of SOC and potential carbon sequestration under improved land management practices.
Data gaps	<ul style="list-style-type: none"> It is necessary to establish centralized data repositories to systematically store and manage all activity data in a unified system. Standardizing data collection protocols and formats across all contributors ensures consistency and comparability. Annual or biennial data collection will keep information current, and better direct data methods can reduce interpolation and boost reliability. Regular public and private sector participation will improve data richness, and refining frameworks to break down data by sectors like transportation or forestry will offer detailed insights. Improved analysis and data generation on sustainable forest management (SFM) is needed to enable their inclusion as well-defined quantified targets in future NDC cycles. This would contribute to increasing the overall level of quantified GHG mitigation reductions.
ETF system	<ul style="list-style-type: none"> Regular and streamlined data generation on key NDC indicators would support the government to track progress of previous NDCs under the ETF, and inform future NDC cycles. Data on these indicators could also be included in annually published reports of concerned government institutions at 3-tiers of government.
GHG Inventory	<ul style="list-style-type: none"> GHG inventory, tools and methodologies need to be streamlined across various aspects of Nepal’s contributions towards the Paris Agreement, such as the NDC, NDC-IP, LT-LEDS, and BTR. This will help to improve the quality of GHG emissions reporting as well as reduction targets. Training agencies on the IPCC guidelines will ensure compliance with international standards, and adopting digital tools will enhance the precision and efficiency of data gathering processes, ultimately supporting more informed decision-making and tracking progress.
Loss and Damage	<ul style="list-style-type: none"> Loss and damage is a relatively new and evolving concept. There is a need to clearly differentiate between adaptation, disaster risk reduction and loss and damage. There are several knowledge gaps when it comes to loss and damage, including on slow onset events (such as glacier melting, temperature rise) and non-economic loss and damage (such as loss of culture). It is crucial to bridge such knowledge by developing robust methodologies to account for such economic and non-economic loss and damage. Nepal has established DRR institutions that have methodologies and processes in place to account for economic loss and damage from extreme events. Institutions must be established as needed and cross-institutional collaboration strengthened to improve data and information collection on loss and damage. Climate impacts disproportionately affect women, Indigenous Peoples, local communities and other vulnerable, disadvantaged and marginalized groups. Inclusive approaches that ensure meaningful participation, equitable sharing of benefits, do no harm and ensure appropriate safeguards are key.

Topic	Lessons learnt
Article 6	<ul style="list-style-type: none"> Avoiding double counting and maintaining environmental integrity is extremely important. Timely regulatory and institutional preparation, and capacity building at the country level is required.
Climate Finance	<ul style="list-style-type: none"> Tracking of climate finance support at the domestic and international level needs to be institutionalized. This would support accurate tracking and reporting on climate finance support, needs and gaps. Defining climate finance with a clear climate rationale is important. Due to the cross-cutting nature of climate action and finance, collaboration among multi-stakeholders and dedicated institutional arrangements would be necessary to scale up climate finance. Mobilizing private sector finance is critical but dependent on reducing risk and improving project viability through enabling conditions, including a well-informed and stable policy environment and strong institutional capacity.
Capacity building for NDC process	<ul style="list-style-type: none"> Government and implementing agencies will need to be equipped with technical skills for planning, implementation, and monitoring climate action. Coordination among ministries and stakeholders will need to be improved. Provincial and local governments need further capacity building on their roles in NDC implementation. Gaps in data availability will need to be addressed. Systems for data collection, reporting and verification aligned with the ETF will need to be built. Technical expertise in GHG accounting and modeling tools will need to be developed. Evidence-based policy and scenario development for mitigation planning will need to be strengthened. Tracking systems and registries to meet donor and carbon market requirements will need to be strengthened. Awareness and technical knowledge among communities and private stakeholders will need to be increased. Local academic and research institutions for climate-related research and development will need to be strengthened. International collaboration for technology testing and innovation will need to be encouraged. Knowledge and systems will need to be institutionalized for continuous improvement.
Compatibility with 1.5 °C pathways and GST outcomes	<ul style="list-style-type: none"> Nepal's NDC will need to gradually move towards an economy-wide target, and the conditional part of the NDC should be aligned with 1.5 °C pathways assessed by the IPCC dependent on means of implementation support through international climate finance, technology development and transfer, and capacity building. Aligning NDC 3.0 with the GST-1 outcome has enabled Nepal to significantly enhance its NDC; and it will be important to maintain and strengthen this alignment with GST in future NDC cycles. Future updates of LTS/LT-LEDS can include additional gases to CO₂, such as CH₄ and N₂O, to provide more guidance to future rounds of NDCs and better alignment to GST.
NDC Implementation	<ul style="list-style-type: none"> To strengthen NDC implementation and means of implementation, Nepal will need to develop a robust NDC implementation plan, mainstream it into national planning and budgeting processes, develop NDC financing strategy including pipeline development supported by project concept and information notes, align NDC 3.0's KPIs with the transparency system (ETF) to track progress on implementation and finance, and enabling regional collaboration for achieving transboundary synergies. NDC implementation should ensure fair and inclusive policies that benefit all, especially women, children, PwD, youth, IPs, and vulnerable and marginalized communities.

Overall, Nepal's NDC 3.0 significantly expands its climate action plan by covering all IPCC sectors, namely Energy, AFOLU, Waste, and IPPU compared to the limited sectoral scope of the previous NDC. It includes additional sub-sectors under Energy, provides GHG emission reduction information for all major sectors, and projects net emissions and removals to 2035 across BAU, Unconditional (WEM) and Conditional (WAM) scenarios using a bottom-up modelling approach.

Nepal has also increased its domestic contribution reflecting greater commitment to mobilize internal resources. Activity-wise costing of quantified mitigation targets with clear baseline is provided, and lump-sum costing of adaptation priorities, aligned with the NAP (2021), has been added to NDC 3.0. The NDC 3.0 is also aligned with the outcomes of the first GST. The scope is also broadened to include Just Transition, Loss and Damage, GEDSI, co-impacts, Article 6, and enhanced governance and transparency. It was developed as a whole-of-government plan, and engaged all relevant line Ministries, Provincial Governments, and a wide range of government and non-government stakeholders, increasing ownership and setting the stage for effective mainstreaming and implementation.

ANNEXES

Annex I: Stakeholder engagement

Table 14: List and date of major stakeholder consultations and validations

Major consultations and validations	Date
NDC 3.0 Federal level Consultation Workshop	22-24 Dec, 2024
Sectoral Consultations: Wash, Urban and Rural settlements, Waste to Energy, IPPU	23-24 Jan, 2025
Sectoral Consultations: Transport, Loss & Damage and Just Transition	26-27 Jan, 2025
Sectoral Consultations: GEDSI, Children, Youth, PwD and IPs	26-27 Jan, 2025
Sectoral Consultations: AFOLU; LULUCF (GHG emission reduction and sequestration)	27-28 Jan, 2025
Sectoral Consultation: Climate Finance	27-28 Jan, 2025
Sectoral Consultations: Adaptation, Carbon finance (Article 6), Governance, Human Rights, Health, Waste and Tourism	28-29 Jan, 2025
Federal Level Validation Workshop	24-25 Feb, 2025
Provincial Validation Workshop, Bagmati Province	20 March, 2025
Provincial Validation Workshop, Madhesh Province	21 March, 2025
Provincial Validation Workshop, Sudur Paschim	25 March, 2025
Provincial Validation Workshop, Karnali Province	27 March, 2025
Provincial Validation Workshop, Lumbini Province	30 March, 2025
Provincial Validation Workshop, Koshi Province	1 April, 2025
Provincial Validation Workshop, Gandaki Province	3 April, 2025
NDC 3.0 Validation Workshop	7-8 May, 2025
Sagarmatha Sambaad (Launch of NDC 3.0)	16 May, 2025

Table 15: NDC 3.0 Stakeholder Workshop Thematic Groups and Group members

Name	Organization
ENERGY	
Energy Generation and Supply	
Susheel Acharya	MoEWRI
Sanjeev Ray	MoEWRI
Shaligram Bhandari	MoEWRI
Megha Karn	MoEWRI
Richa Bhattra	MoFA
Mukti Bikram Chhetri	AEPC, MoEWRI
Pratima KC	AEPC
Maleena Shakya	DOED, MoEWRI
Anjuli Mulmi	ISSET Nepal
Nabin Paudel	Vidhyut Utpadan Company Limited (VUCL)
Shreeraj Shakya	CES
Jaya Ram Prajapati	WECS
Netra Bahadur Karki	NAIA
Auriane Meilland	UNDP
Anita Prajapati	UNDP
KP Awal	Brick Association
Guna Raj Dhakal	RECON
Tripti Prajapati	GIZ
Ugan Manandhar	FCDO

Abhishek Yadav	Climate Analytics
Rajan Thapa	WWF Nepal CBIT
Sandesh Belbase	Windpower
Utsav Shree Rajbhandari	National energy emissions expert
Sandeep Kayastha	RAIN
Manav KC	GIZ
Manoj Thapaliya	USAID Urja
Rassu Manandhar	UNDP
Cooking and Heating	
Rana Bahadur Thapa	AEPC, MoEWRI
Parbata Bhatta	AEPC
Shreejan Ram Shrestha	AEPC
Subir Karna	AEPC
Pradeep Bhattarai	WWF Nepal CBIT
Suyesh Prajapati	MinErgy
Anzoo Sharma	CRTN
Biraj Gautam	PEEDA
Neelam Sharma Rijal	Sustainable Ventures
Dharma Raj Uprety	Practical Action
Arati Khadgi	WWF Nepal
Umesh Basnet	YAE
Avishek Malla	ICIMOD
Pugazenthi Dhananjayan	ICIMOD
Basudev Upadhyay	Practical Action
Transport	
Shubha Shrestha	MoPIT
Archana Poudel	MoPIT
Babita Sharma	MoPIT
Shudarsan Poudel	MoPIT
Shubha Shrestha	MoPIT
Suraksha Pal	MoPIT
Shila Gyanwali	MoFE
Om Prakash Bhattarai	MoF
Bam Dev Panthi	MoF
Shreekanta Yadav	DoTM
Anuska Gautam	MoLET, Bagmati Province
Prabha Thapa	DoR
Saugat Pandey	Department of Railways
Purushottam Dhungel	MoFA
Kiran Kumar Pokharel	MoFE
Sneha Pandey	Climate Analytics
Dilasha Joshi	Institute for Integrated Development Studies (IIDS)
Prakash Lama	Clean Energy Nepal
Rajan Thapa	WWF Nepal CBIT
Guna Raj Dhakal	Ropeway Nepal
Samita Sharma	Climate Analytics
Baldev Tamang	NTUC
Prashant Khanal	PRC
Rojy Joshi	IIED
Bhushan Tuladhar	USAID Clean Air

Ashma Vaidya	UNDP
Krishna Nath Ojha	KRIP
Surendra Kumar Singh	KRIP
Ranjana Tiwari	Ropeway Nepal

Agriculture, Forestry and Other Land Use (AFOLU)

Matina Joshi Vaidya	MoALD
Sunita Pandey	MoALD
Khem Raj Joshi	MoALD
Sanjeeb Bimali	CAIDMP, MOALD
Dilip Jung Rana	MoALD
Chandra Dhakal	MoALD
Sagun Sharma Pandit	MoALD
Samikshaya Badal	MoALD
Surya Baral	MoALD
Lakshya B. Chaudhary	MoALD
Maheswar Dhakal	MoFE
Naresh Sharma	MoFE
Prakash Singh Thapa	MoFE
Kiran Pokharel	MoFE
Prakash Lamichhane	MoFE
Suman Subedi	MoFE
Shiva Khanal	MoFE
Prakash Pokharel	MoCTOC
Bipul Bhusal	NNRFC
Reena Chaudhary	NDRRMA
Sudip Chhatkuli	NDRRMA
Laxman Bahadur Basnet	NDRRMA
Janak Acharya	FRTC
Milan Dhungana	FRTC
Manju Ghimire	FRTC
Muna Nyaupane	FRTC
Govinda Shrestha	REDD IC
Siddhartha Aryal	DoFSC
Binita Bhattarai	NNRFC
Ashmita Baniya	NPC
Binod Prasad Parajuli	CRR LAB
Krishna Panta	FAO
Prayash Adhikari	Digo Bikas Institute
Shalu Adhikari	FAO
Deepa Devkota	NARC
Laxman Khatri	LI-BIRD
Shree Prasad Vista	NSSRC, NARC
Upama Acharya	NYCA
Susmita Bishankhae	PMAMP
Manisha Burlakoti	UNDP
Shyam Sundar Yadav	DLS
Krishna Timsina	NARC
Khem Raj Dahal	IAAS/ TU
Kyalima Khanal	FAO

Prakriti Koirala	Climate Adapt
Nanda K Maharjan	IIDS
Sindhu Sharma Kandel	NYCA
Regendra Khadka	DCA
Bimal Raj Regmi	OPM
Zaky Khan	IIDS
Raju Pandit Chettri	PRC
Rojy Joshi	IIED
Deepak KC	UNDP
Durga Regami	Mott MacDonald
Sama Shrestha	UNWOMEN
Umesh Balal	NWCF
Regan Sapkota	Clim Adapt
Simant Rimal	ICDPI
Amit Poudyal	IUCN
Sandeep Kumar Kayastha	NCCSP/MM Nepal
Abhishek Yadav	Climate Analytics
Sushma Giri	-
Namuna Ghimire	-
Naina Bahadur Tamang	-
Pramila Century	-
Nabin Bhattarai	-
Rita Chhetri	-
Gaurav Parmar	-
Nabin Chalise	-
Sunil B.K.	-

Waste, and Urban and Rural Settlements

Sudeep Acharya	MoUD
Sindhu Pathak	MoUD
Parikrama Singh	MoUD
Manoj Nakarmi	MoUD
Manoj Nakarmi	DWRI
Sushim Man Amatya	AEPC
Kushal Gurung	WindPower Nepal
Apar Paudyal	OPM
Prasesh Pote Shrestha	ICIMOD
Karuna Onta	CLIM ADAPT/UN Women
Bidhya Pokhrel	JICA Nepal
Rashika Pandit	ADAPT
Nabin Bikash Maharjan	Blue Waste to Value
Dikshya Subedi	YASEN
Sanot Adhikari	YAE

Industrial Processes and Product Use (IPPU)

Bhupendra Sharma	MoICS
Khagendra Basnet	Department of Industry, MoICS
Krishna Prasad Awal	FNBI
Bhupesh Adhikary	ICIMOD
Utsav Shree Rajbhandari	MinErgy/UNDP

Ritavraj Joshi	MinErgy/UNDP
Milabh Shrestha	FNCCI
Aastha Dhungel	Wind Power
Dikshya Baral	NYCA
Rassu Manandhar	UNDP
Prajwal Raut	-

Water, Sanitation and Hygiene (WASH)

Madhav P Adhikari	MoWS
Prabhat Shrestha	MoWS
Meena Shrestha	Water Supply and Sanitation Service Tariff Fixation Commission, MoWS
Madhu Timilsina	DWSSM, MoWS
Rajit Ojha	DWSSM
Santosh Nepal	IWMI
Raja Ram Pote Shrestha	WHO
Sushmita Dulal	WindPower Nepal
Arinita M Shrestha	UNICEF
Umesh Basnet	Youth Alliance for Environment
Phurba S Moktan	Plan International Nepal
Yogesh Rana Magar	WaterAid
Krishna GC	SNV
Tripti Kharel	KVWSMB
Hyeok Hwang	UNICEF
Anjil Adhikari	OXFAM
Rajan Thapa	WWF Nepal CBIT

Education

Chandra Prasad Sharma	MoEST
Suman Subedi	MoFE
Pallab Regmi	Save the Children

Water Resources

Prabhat Shrestha	MoWS
Santosh Kaini	DWRI, MoEWRI
Ezee G C	DWRI
Madhu Timilsina	DWSSM, MoWS
Rajit Ojha	DWSSM
Samir Kumar Adhikari	MoHP
Suresh Khanal	MoHP
Hema Raj Neupane	MoHP
Sudeep Acharya	MoUD
Sindhu Pathak	MoUD
Parikshya Singh	MoUD
Binod Parajuli	DHM
Raja Ram Pote Shrestha	WHO
Santosh Nepal	IWMI
Kushal Gurung	Windpower Nepal
Amita Thapa Magar	CEN
Sushmita Dulal	Windpower Nepal
Anjali Sai Chalise	Women of the South Speak Out-ARROW

Arinita M Shrestha	UNICEF
Apar Paudyal	OPM

Health

Bhim Prasad Sapkota	MoHP
Samir Kumar Adhikari	MoHP
Suresh Khanal	MoHP
Hema Raj Neupane	MoHP
Raja Ram Pote Shrestha	WHO
Upendra K.C.	WHO
Yadu Chandra Ghimire	EDCD, DoHS
Babu Ram Bhushal	NHTC
Meghnath Dhimal	NHRC
Bhupendra Das	NEEDS
Nawar Raj Bhattarai	IOE
Anjana Pokharel	MoHP
Khusbu Paudel	Ipas
Shuva Shrestha	-
Ashutosh Shrestha	-
Mandira Lamichanne	-

Tourism

Binita Bhattarai	NNRFC
Ashmita Baniya	NPC
Prakash Pokharel	MoCTOC
Bipul Bhusal	NNRFC
Reena Chaudhary	NDRRMA
Sudip Chhatkuli	NDRRMA
Laxman Bahadur Basnet	NDRRMA
Suman Subedi	MoFE
Shiva Khanal	MoFE
Sandeep Kumar Kayastha	NCCSP/MM Nepal
Umesh Basnet	Youth Alliance for Environment
Simant Rimal	ICDPI
Amit Poudyal	IUCN

Loss and Damage

Anupam Paudel	MoFA
Swati Acharya	NDRRMA
Muna Kunwar	NDRRMA
Govind Kumar Jha	DHM
Sauhardra Joshi	DHM
Sudarshan Humagain	DHM
Hari Prasad Sharma	MoFE
Himal Shiwakati	MoFE
Prakash Singh Thapa	MoFE
Kiran Kumar Pokharel	MoFE
Sudip Khadka	DoFSC
Sunil B.K	DoFSC
Sumana Devkota	DoFSC

Sneha Pandey	Climate Analytics
Dharam Uprety	Practical Action Nepal
Prayash Adhikari	DBI
Krity Shrestha	DCA
Binod Pd Parajuli	CRR Lab

Governance, Just Transition and Human Rights, and Article 6

Chandra Prasad Sharma	MoEST
Apekshya Adhikari	MoFAGA
Sudeep Acharya	MoUD
Pralhad K Karki	MoCTCA
Suman Subedi	MoFE
Umesh Basnet	Youth Alliance for Environment
Baldev Tamang	NTUC
Pankaj Kumar	UNICEF
Pallab Regmi	Save the Children
Sandeep Kumar Kayastha	NCCSP2/MM Nepal
Abhishek Yadav	Climate Analytics
Samita Sharma	Climate Analytics

Gender Equality, Disability, and Social Inclusion (GEDSI)

Keshav Pd Upadhyaya	MoWCSC
Deepa Oli	MoFE
Shila Gnyawali	MoFE
Nirmala Ghimire	MoFE
Komal Parajuli	MoEWRI
Roshani Karki	MoHP
Prakash Sapkota	MoEST
Pramila Kharel	MoYS
Barsha Jha	National Human Rights Commission
Sunita Kayastha	UNICEF
Kriti Thapa	UNICEF
Bal Krishna Jammakattel	UNICEF
Bhutila Sherpa	NEFIN
Sansila Sapkota	Inc
Khusbu Poudel	Ipas
Shovana Maharjan	ABF
Meena Kunwar	GESI Expert
Yamuna Ghale	IIDS
Mankesh Gupta	CIPRED
Anju Pokhrel	YAE
Anjana Shrestha	Save the Children
Anjita Devkota	BYAM
Dikshya Subedi	YASEN
Surya Rana	British Embassy
Dinesh Pd. Baral	CBM Global
Sanju Koirala	IWMI
Arati Sharma	World Vision International Nepal
Maya Kunwar	Election Commission
Doma T Sherpa	WWF Nepal

Karuna Onta	ClimAdapt
Kiran Shrestha	YFIN Nepal
Susmita Baidawar	Digo Bikas Institute
Priti Sakha	NWCF
Prakriti Koirala	ClimAdapt
Hari Karki	UNW
Hemanshu Kafle	YASEN
Kalpana Bhattachan	NIWFC Federation
Barsha Lekhi	UNESCO
Pradip K Shrestha	NIDA
Khadga Saru Magar	NIDA
Umesh Balal Magar	NWCF
Aakriti Dotel	NYCA
Dikchhya Baral	Nepalese Youth for Climate Action
Sangita Thapa	National Women Commission
Akhileshwar Karna	Madhesi Commission
Pratima Gurung	NIDWAN
Shriti Kumal	NEFIN
Anjali Sai Chalise	Women of the South Speak Out (WOSSO)
Palistha Tuladhar	Kathmandu University
Angel Lama	Blue Diamond Society
Prakriti Gurung	UNESCO
Rassu Manandhar	UNDP
Sagarika Bhatta	Power Shift Nepal
Sumana Lamichhane	Power Shift Nepal
Prajwal Danawar	YASEN
Julasa Sapkota	WDDN
Pema Wangmo Lama	WE-WIN
Dibya Gurung	GESI Expert
Anzoo Sharma	CRT/N
Sharu Joshi	Sath Sathai
Kamana Gurung	Embassy of Finland
Meeta Sainju Pradhan	SIAS
Ruby Karki	RRN

Finance

Om Prakash Bhattarai	MoF
Ambika Prasad Bhattarai	MoF
Ambika Prasad Phuyal	MoF
Bamdeb Panthi	MoF
Dipak Subedi	MoF
Naresh Sharma	MoFE
Raju Pandit Chhetri	PRC
Ineej Manandhar	UNDP Nepal
Kushal Gurung	Wind Power
Abhishek Yadav	Climate Analytics
Manjeet Dhakal	Climate Analytics

Note: The list presented above indicates the diverse set of government and non-government stakeholders engaged during the NDC 3.0 stakeholder consultation workshops and is not exhaustive







Figure 10: Photos of consultation workshops

Annex II: Detailed methodology for GHG emissions and removals modeling

LEAP (Low Emissions Analysis Platform) software, developed by Stockholm Environment Institute, is a robust tool designed for integrated energy planning and climate change mitigation analysis. It is used by organizations in over 200 countries, including governments, NGOs, consulting firms, and academic institutions. It has been instrumental in helping at least 60 countries prepare their NDCs under the Paris Agreement and is regarded as a standard for resource planning and greenhouse gas mitigation assessments, particularly in developing nations. With its transparent and user-friendly design, LEAP enables policymakers to assess future energy needs, explore low-carbon pathways, and develop evidence-based strategies to meet mitigation goals. LEAP has the capability to integrate both energy and non-energy sectors within a single toolkit (Heaps, 2024). LEAP is accessible free of charge to academic, governmental, and nonprofit organizations in low- and middle-income countries, as well as students worldwide. Training materials, documentation, and technical support are provided by Stockholm Environment Institute (SEI) alongside the platform to ensure that LEAP's potential is fully utilized by over 71,000 members globally.

LEAP was previously utilized by Nepal for preparation of Nepal's Second NDC preparation, LT-LEDS, and National Inventory Report alongside with BUR/BTR1. Choice of LEAP software has facilitated collaboration across these initiatives, enabling learning while ensuring consistency. Therefore, LEAP software was selected for GHG assessment of Nepal's NDC 3.0. Further, LEAP has the capability to analyze both energy and non-energy sectors with a single toolkit (Heaps, 2024). The framework for emission projection through scenario analysis using LEAP is illustrated below.

Energy: The emissions from the energy sector are related to emissions due to combustion for fuels only. The sources from the energy sector are categorized into 6 main sectors viz – residential sector, industrial sector, transport sector, commercial and service sector, agriculture sector and energy generation. These sectors were further subdivided into sub sectors and end use activities similar to categorization in LT-LEDS, and provincial energy reports (GoN, 2021b; WECS, 2024a, 2022a, 2021a, 2021b). The emissions from each sector are driven by usage of fuels which in turn depends upon the extent of activities. The process of developing scenarios depends on certain factors that drive these activities. The rate at which these activities occur is influenced by specific variables. In this model, activities are connected to economic and demographic factors. Agricultural, commercial, and industrial activities are assumed to depend on the gross value added (GVA) in each sector. For the residential sector, it is assumed to depend on the population and rate of urbanization. Meanwhile the transport sector is influenced by both economic and demographic factors for freight and passenger transportation. These assumptions are also based on those taken in LT-LEDS Nepal (GoN, 2021b) and provincial energy reports (WECS 2024a, WECS 2022a, WECS 2021a, WECS 2021b). A general assumption in projecting the energy in each sector is that the energy intensity remains constant over the period.

GDP growth rates are taken from the government document of 16th periodic plan (NPC, 2024) and LT-LEDS (GoN, 2021b). The population growth rate comes from census data (CBS, 2022) and the urban population growth rate is taken from NSO (2024). A key assumption in the model is that economic activities will follow GDP growth to meet the set targets, meaning that a growing sectoral GDP or GVA will require more activity, such as increased production in that sector. For the energy generation category, the electricity generated from thermal plants owned by Nepal Electricity Authority (NEA) has been considered. Although the decentralized thermal generators

are being used by industries and enterprises, there are no accurate records on their inventory and usage thus it is difficult to estimate the exact emissions. They are estimated within the industry and commercial sectors as inclusive in their total energy usage.

IPPU: Like the energy sector, industrial production is assumed to be dependent upon the national GDP and the industrial/ manufacturing GVA, therefore the driving factors in IPPU sectors are taken respectively. National GDP has been taken as a driving factor for cement production. Meanwhile for the rest of the productive sectors the manufacturing GDP has been taken as the driving factor.

Agriculture: In the agricultural sector, the activity data is not found to be directly correlated with economic outputs. Therefore, the trend of their growth based on the historical activity data has been estimated. The calculated growth rates have been used for livestock population, which are positive for some livestock while negative for others.

SOC has been retained as a policy target rather than a quantified target in Nepal's NDC 3.0 primarily due to gaps in comprehensive, nationally representative baseline data and methodological challenges. While some regional soil surveys and research studies exist, they are often fragmented or lack consistency across land use types and agroecological zones. Without a standardized baseline, it is difficult to accurately estimate current SOC levels or model potential gains from proposed interventions.

Additionally, implementing Tier 2 or Tier 3 methodologies recommended by the IPCC requires detailed site-specific data, long-term monitoring. Integrating SOC with land use and management practices also involves complex interactions that vary across Nepal's diverse landscapes. Given these limitations, SOC has been included as a policy target to highlight its importance while allowing time to build the necessary data systems, technical capacity, and institutional frameworks to support future quantification.

LULUCF: The case for land use, land use change and forestry is a bit different than other sub sectors. There is no specific growth rate for land use change. Therefore, in case of land use and land use change linear historical trend has been forecasted till 2035. The projection of land use change indicates that forest land will continue, accounting for approximately 46% of the total area. In contrast, cropland is expected to decrease by around 5% compared to 2022 levels. Other land use categories are projected to remain largely unchanged. In policy targets, in addition to the target of increasing the proportion of forest covered area, sustainable forest practices have been also included, that increase the capacity of carbon sequestration.

Waste: The activity data is primarily driven by economic activity and demographics, population and urbanization. The amount of waste produced by households is closely linked to population size and urbanization, which often corresponds with greater access to waste management facilities. Whereas for industrial waste, the production of waste has been correlated to industrial/ manufacturing GVA like in prior subsectors.

Annex III: Additional information on assessment of quantified mitigation targets

A) Energy

In the BAU Scenario, the total emissions from the Energy sector will reach 32,966 GgCO₂eq in 2030 and 37,909 GgCO₂eq in 2035.

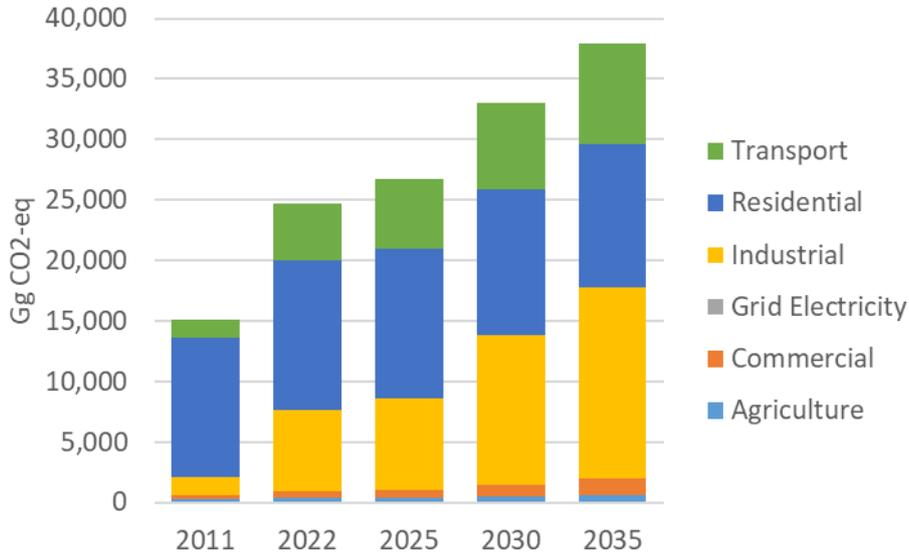


Figure 11: Total GHG emissions from the Energy sector in the BAU scenario

In the WEM scenario, there will be a reduction of 227 GgCO₂eq in 2030 and 405 GgCO₂eq in 2035 compared to the BAU scenario.

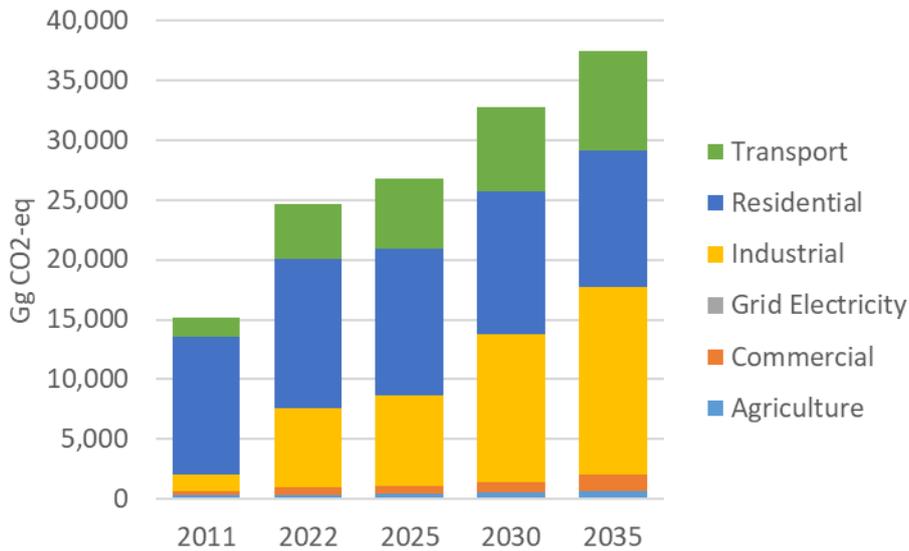


Figure 12: Total GHG emissions from Energy sector in the WEM scenario

In the WAM scenario, there will be a reduction of 4,714 GgCO₂eq in 2030 and 8,546 GgCO₂eq in 2035 compared to the BAU scenario.

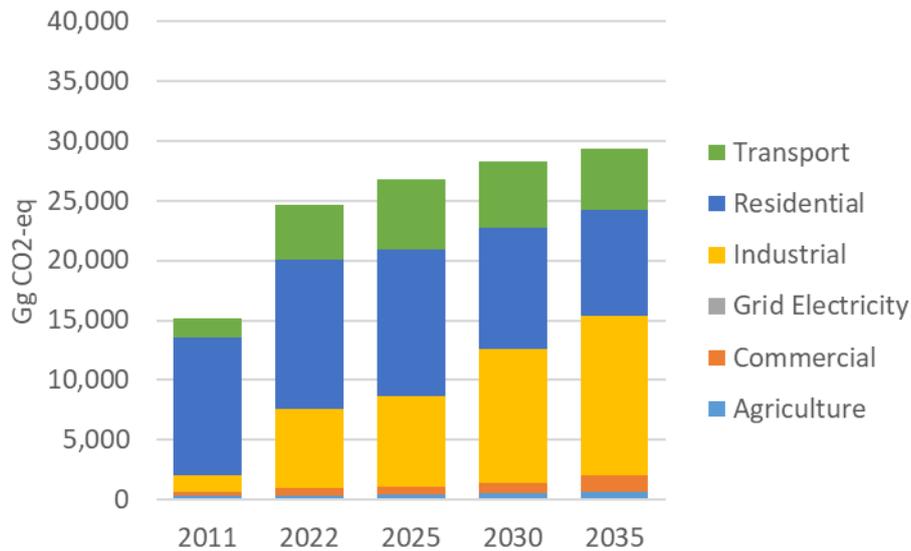


Figure 13: Total GHG emissions from Energy sector in the WAM scenario

(i) Electricity generation and supply

In the BAU scenario, the GHG emissions will be 30 ton CO₂eq in 2030 and 32 ton CO₂eq in 2035, due to the very small installed capacity of existing thermal plants and continuation of the trend.

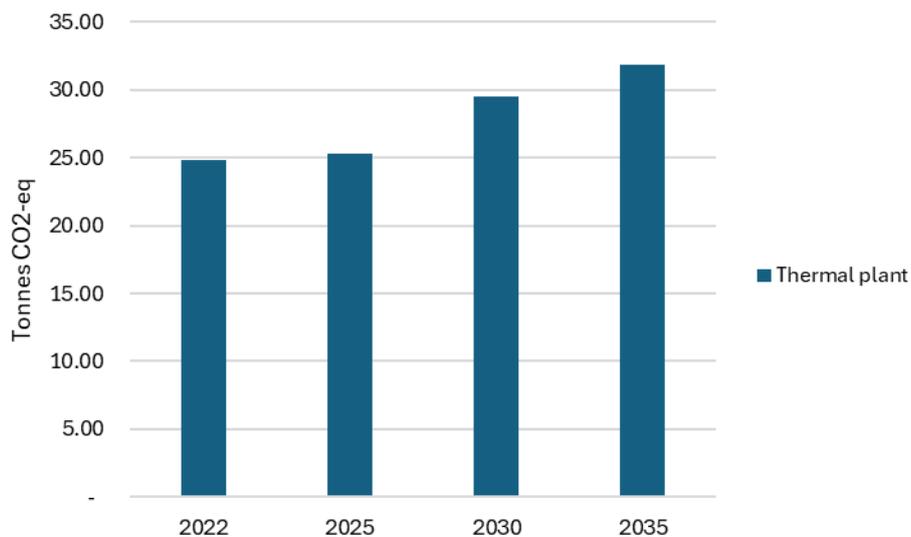


Figure 14: GHG emissions from thermal plants in the BAU scenario

In the WEM and WAM scenarios, thermal plants are phased out. Thus, the emissions will decrease by 30 ton CO₂eq emissions in 2030 and 32 ton CO₂eq emissions in 2035 in comparison to the BAU scenario due to absence of thermal plants and promotion of renewable electricity plants.

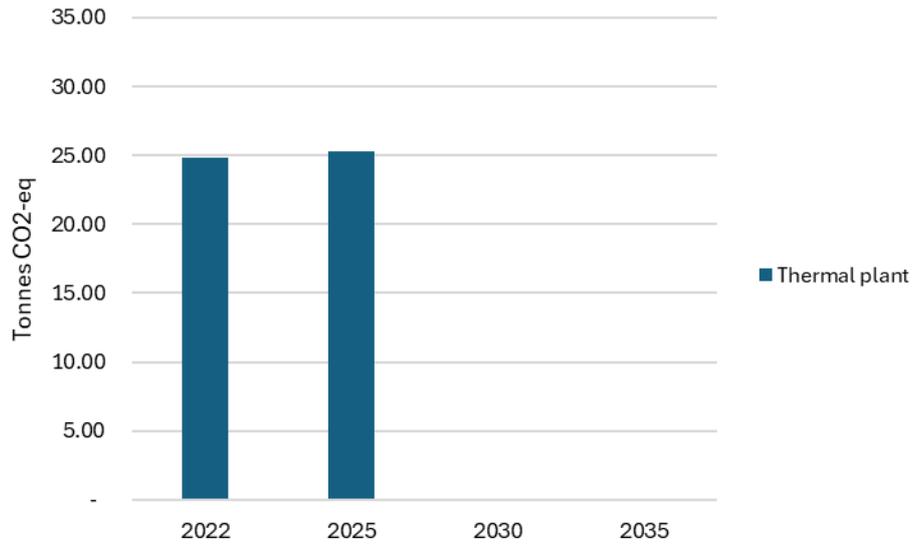


Figure 15: GHG emissions from thermal plant in the WEM and WAM scenarios

In the BAU scenario, the total installed capacity will be 3,900 MW in 2030 and 4,500 MW in 2035.

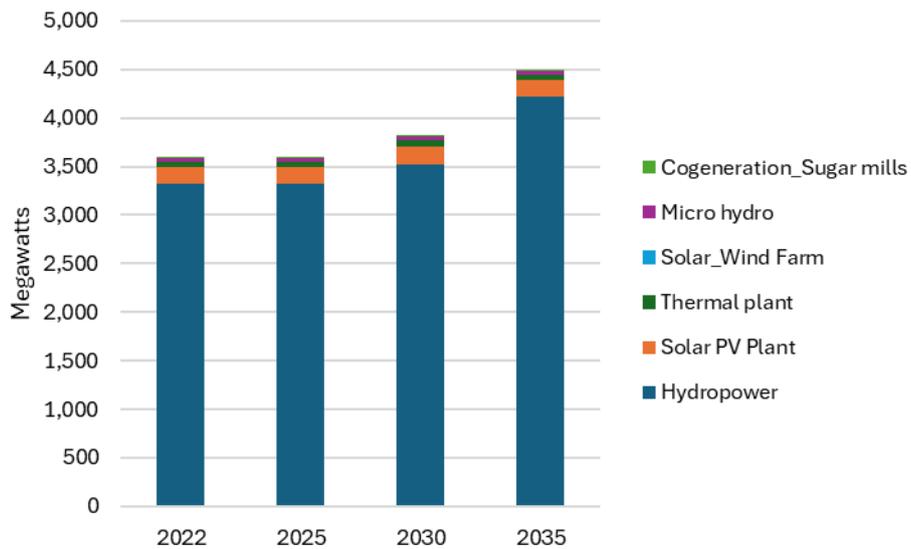


Figure 16: Total installed capacity of electricity plants in the BAU scenario

In the WEM scenario, the total installed capacity will be 6,641 MW in 2030 and 10,000 MW in 2035.

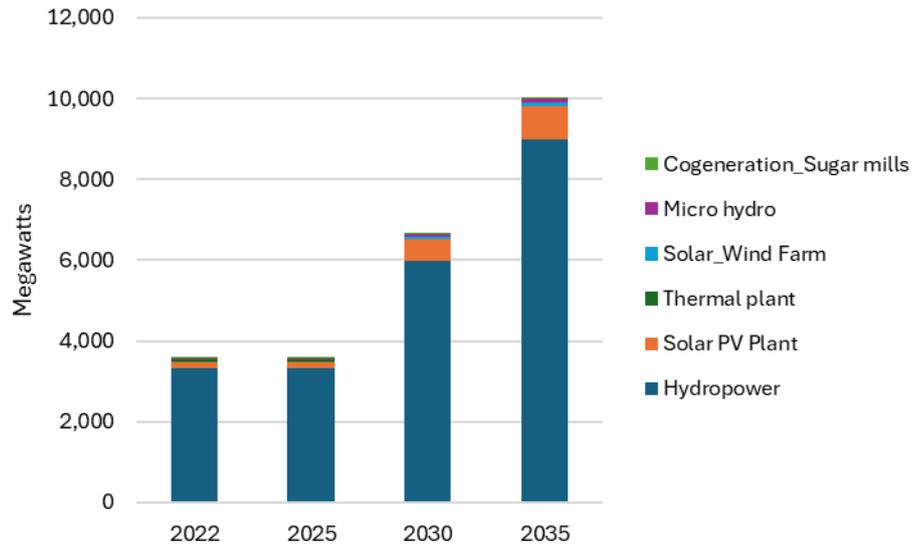


Figure 17: Total installed capacity of electricity plants in the WEM scenario

In the WAM scenario, the total installed capacity will be 14,031 MW in 2030 and 28,500 MW in 2035.

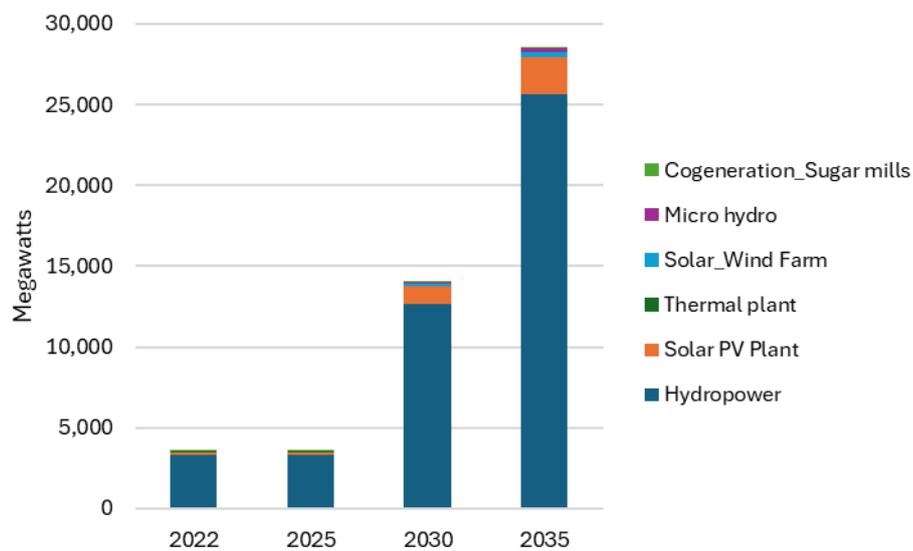


Figure 18: Total installed capacity of electricity plants in the WAM scenario

These power plants will generate 13,000 gigawatt-hours (GWh) of electricity in 2030 and 16,000 GWh in 2035 in the BAU scenario.

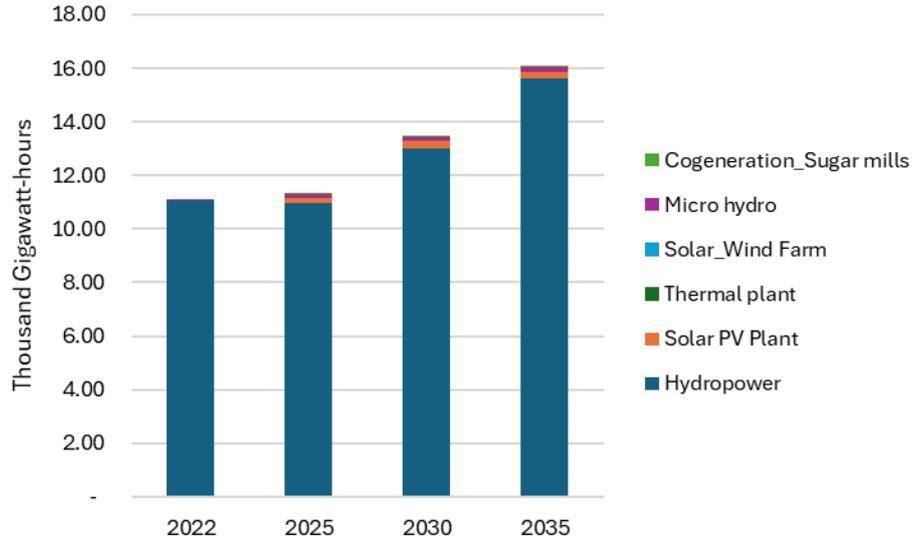


Figure 19: Total electricity generation for domestic requirements in the BAU scenario

In the WEM scenario, the total generation will be 16,000 GWh in 2030 and 19,000 GWh in 2035. Decreasing transmission and distribution losses will save 53 GWh in 2030 and 115 GWh in 2035.

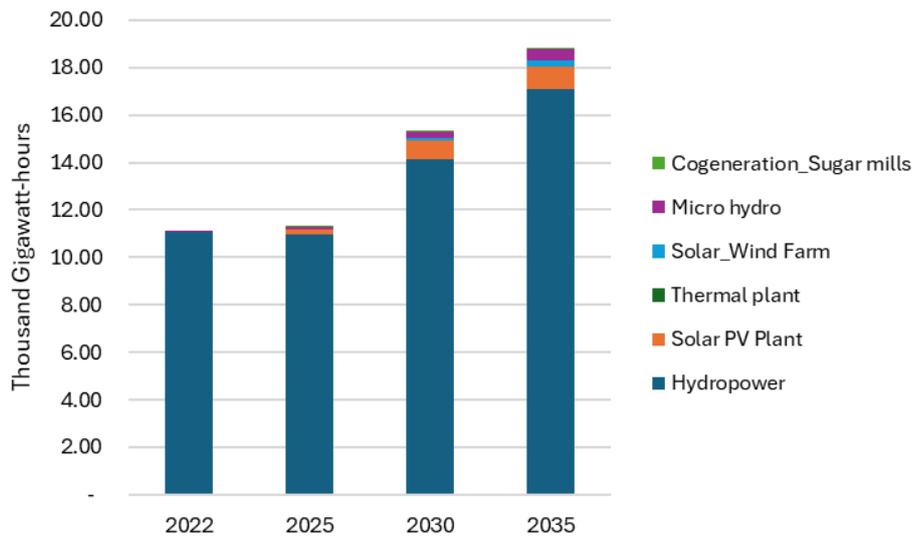


Figure 20: Total electricity generation for domestic requirements in the WEM scenario

In the WAM scenario, the total generation from the power plants for domestic consumption will be 29,000 GWh in 2030 and 45,000 GWh in 2035. Decreasing transmission and distribution losses to 11.5% and 10.5% in 2030 and 2035 will save 396 GWh in 2030 and 1,110 GWh in 2035.

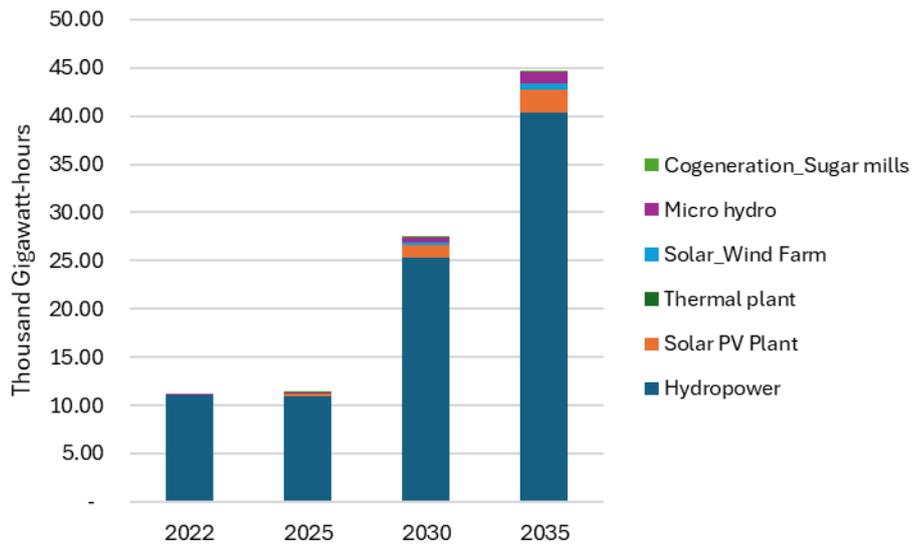


Figure 21: Total electricity generation for domestic requirements in the WAM scenario

(ii) Residential

In the BAU scenario, the total GHG emissions from the residential sector will be around 12,000 GgCO₂eq in 2030 and 11,850 GgCO₂eq in 2035.

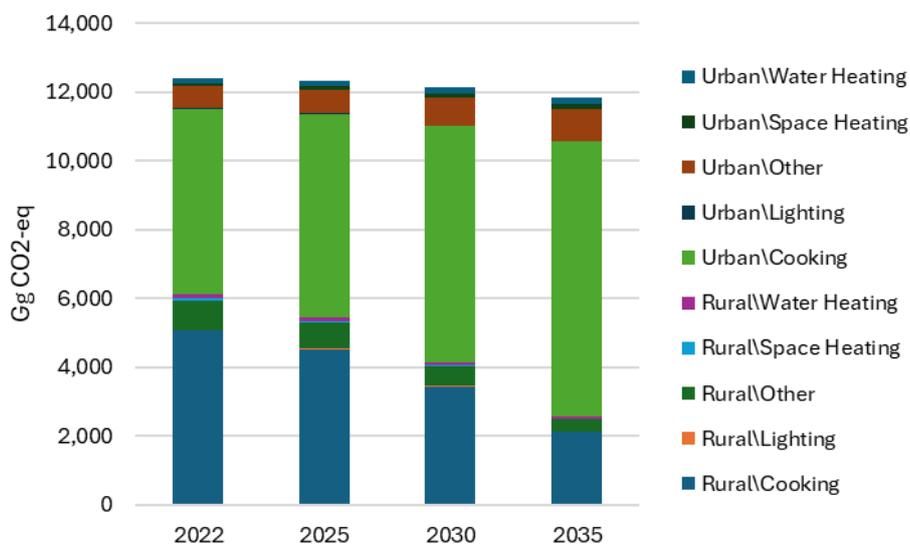


Figure 22: GHG emissions from the Residential sub-sector in the BAU scenario

In the WEM scenario, there will be GHG reduction of 227 GgCO₂eq in 2030 and 405 GgCO₂eq in 2035 compared to the BAU scenario. These reductions are due to the following NDC targets:

- By 2035, expand the use of electric cookstoves to 500,000 households.
- By 2030, expand the use of improved cookstoves (ICS) to 227,703 households for cooking and to 277,703 households by 2035.
- By 2030, expand the use of household-level biogas for cooking to 455,770 units and to 472,770 by 2035.
- Increase large-scale biogas plants to 415 units by 2030 and 457 units by 2035.

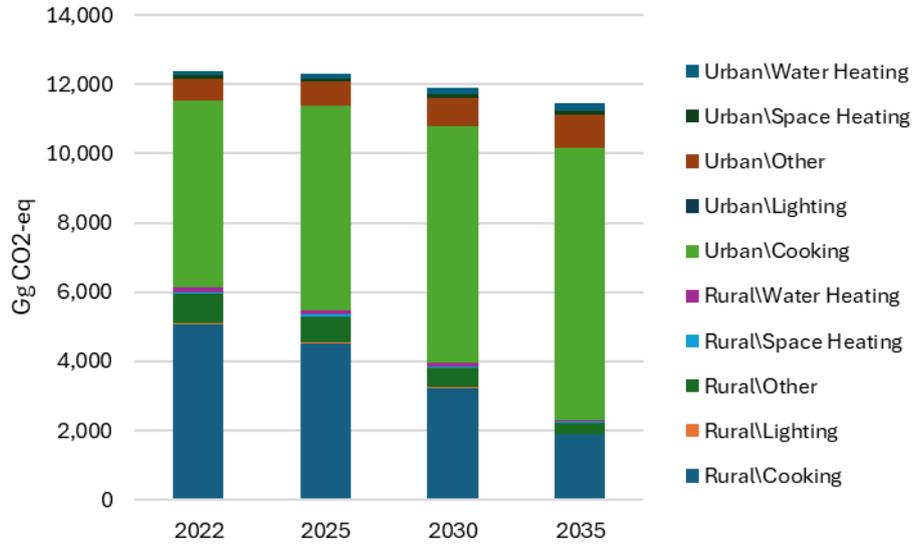


Figure 23: GHG emissions from the Residential sub-sector in the WEM scenario

In the WAM scenario, there will be a reduction of 2,022 GgCO₂eq in 2030 and 3,004 GgCO₂eq in 2035 compared to the BAU scenario. These reductions are due to the following NDC targets:

- By 2035, expand the use of electric cookstoves to 2.1 million households.
- By 2030, expand the use of ICS to 750,000 households for cooking and 1,000,000 by 2035.
- By 2030, expand the use of MICS to 48,068 units and to 100,000 units by 2035 in high-hill areas primarily for heating.
- By 2030, expand the use of household-level biogas for cooking to 500,000 units and 652,770 units by 2035.
- Increase large-scale biogas plants to 550 units by 2030 and 750 units by 2035

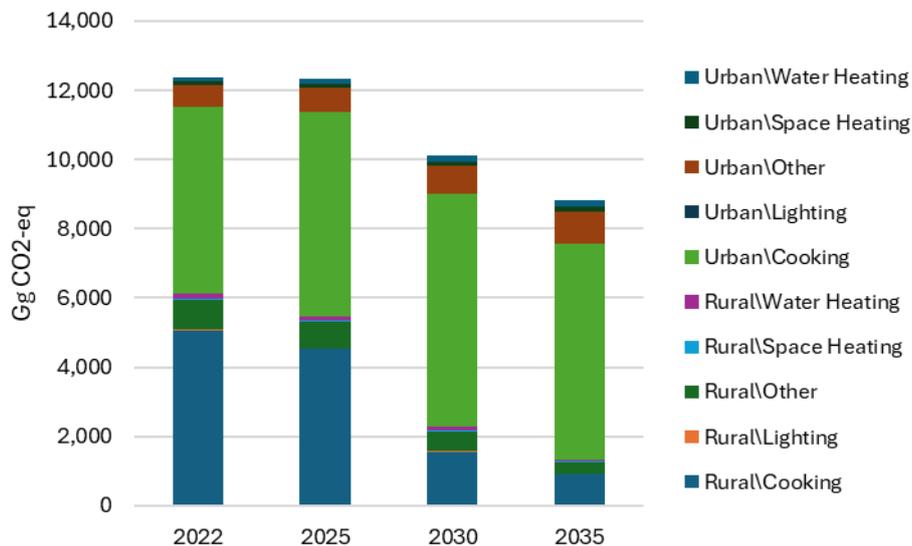


Figure 24: GHG emissions from the Residential sub-sector in the WAM scenario

(iii) Transport

In the transport sector, the emissions will be around 7,100 GgCO₂eq in 2030, and it will increase to 8,300 GgCO₂eq in 2035 in the BAU scenario.

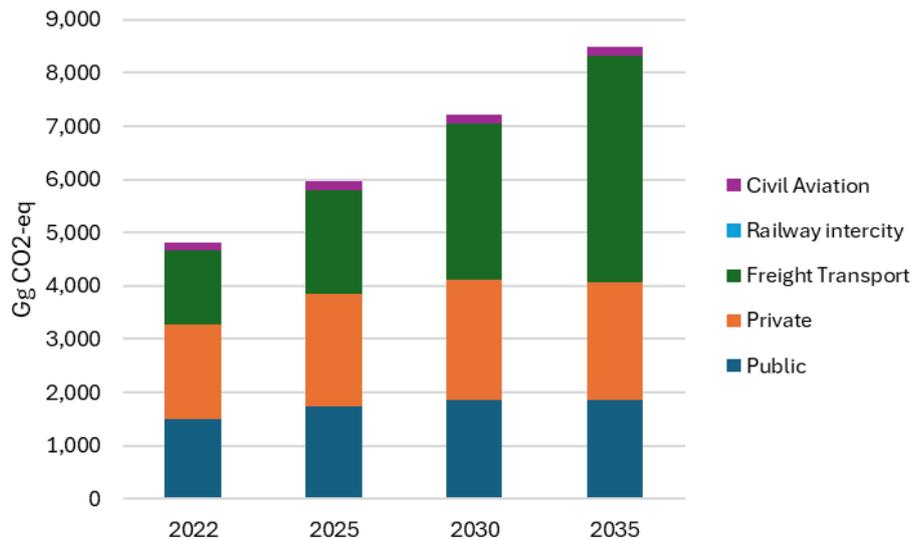


Figure 25: GHG emissions from the Transport sub-sector in the BAU scenario

In the WEM Scenario, since there are no additional interventions compared to the BAU scenario, there will be no reduction in emissions from the transport sector and the GHG emissions profile will look the same as BAU scenario.

In the WAM scenario, with interventions in the transport sector will result in reduction of around 1,426 GgCO₂eq in 2030 and 2,732 GgCO₂eq in 2035 in comparison to the BAU scenario. These reductions are due to the following NDC targets:

- Increase sales of battery electric vehicles (BEVs) to 90% and 95% for all private passenger vehicles (including 2-wheelers), to 70% and 90% for all four-wheeler public passenger vehicles by 2030 and 2035.
- Build and operate at least 50 km by 2030 and 100 km by 2035 of integrated electric bus, trolley and light rail transit system in Kathmandu Valley.
- Build and operate 200 km by 2030 and 300 km by 2035 of the electric rail network to support public commuting and mass transportation of goods (freight).

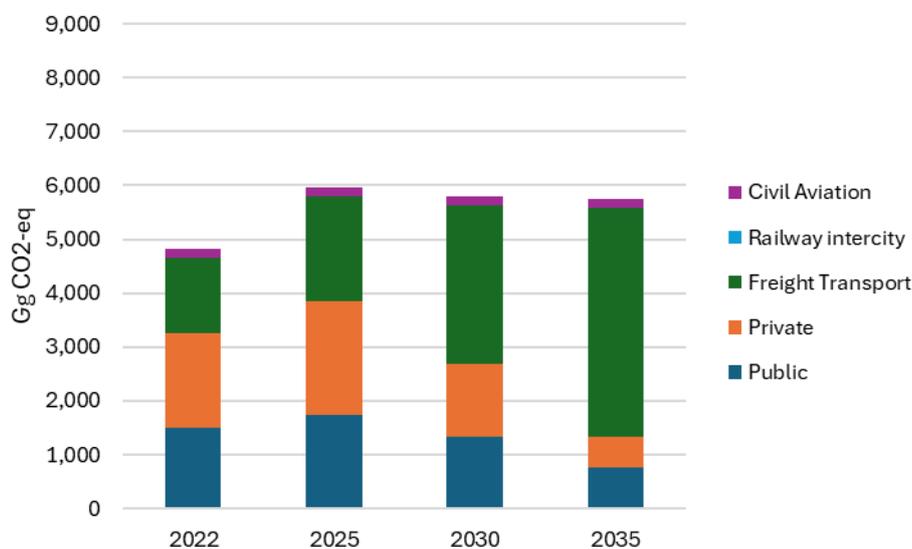


Figure 26: GHG emissions from the Transport sub-sector in the WAM scenario

(iv) Industry

The emissions from the industrial sector in the BAU scenario will reach around 12,300 GgCO₂,eq in 2030 and 15,750 GgCO₂,eq in 2035.

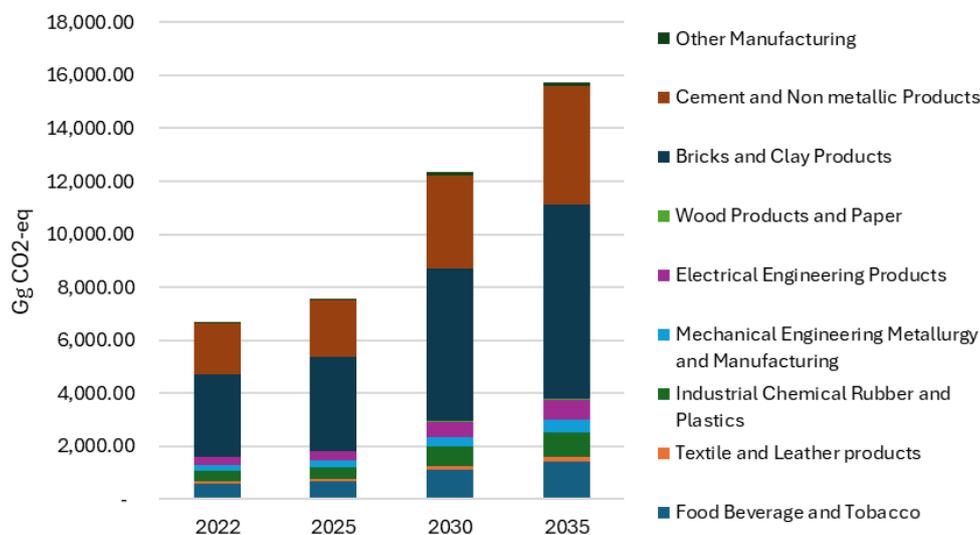


Figure 27: GHG emissions from Industrial sub-sector in the BAU scenario

As there are no additional interventions in the WEM scenario compared to the BAU scenario, there will be no emission reduction compared to the BAU scenario.

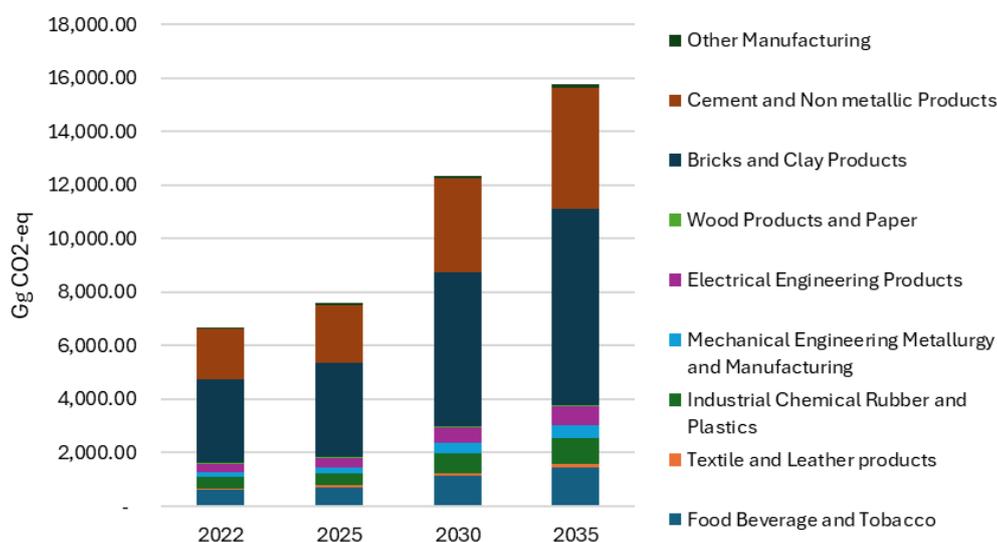


Figure 28: GHG emissions from Industrial sub-sector in the WEM scenario

In the WAM scenario, there will be a reduction of 1,150 GgCO₂,eq emissions in 2030 and 2,400 GgCO₂,eq emissions in 2035. These reductions are due to the following NDC targets:

- All iron and steel industries will adopt electricity-based furnaces by 2035.
- Use bioenergy (up to 35% of total fuel use) in two limestone-based cement industries instead of coal by 2035.
- Convert 30% of boilers by 2030 and 70% by 2035 to electricity-based in all industries with boilers.
- Phase out fixed chimney bull's trench kilns (FCBTK), and convert existing ones to hybrid hoffman/ tunnel kilns for brick production by 2035.

- Pilot medium-sized electricity-based tunnel kiln for producing 100 million bricks per year by 2030.

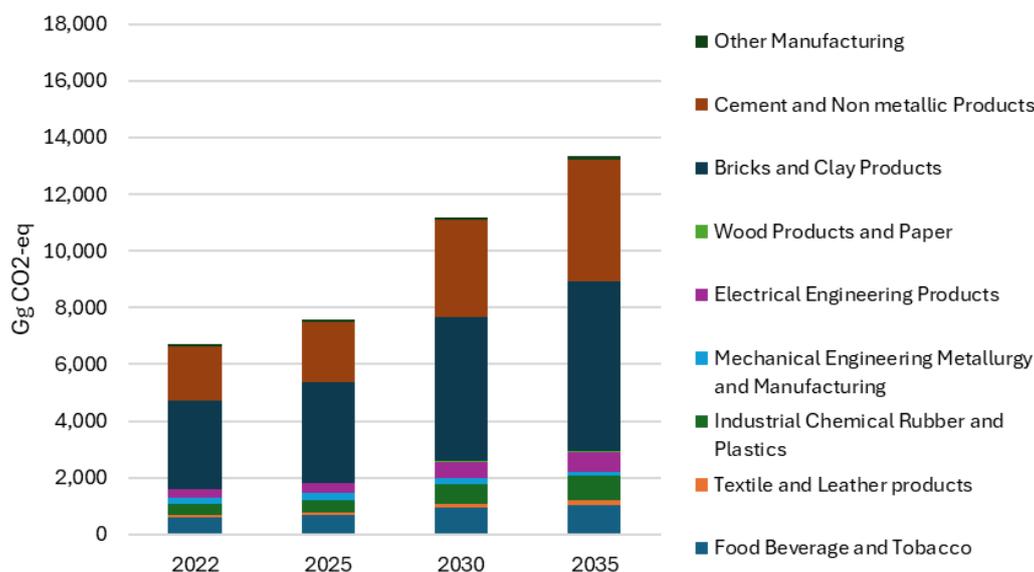


Figure 29: GHG emissions from Industrial sub-sector in the WAM scenario

B) Agriculture, Forestry and Other Land Use (AFOLU)

(i) Agriculture

The emissions from the agriculture sector in the BAU scenario will reach 24,985 and 26,214 GgCO₂eq in 2030 and 2035 respectively.

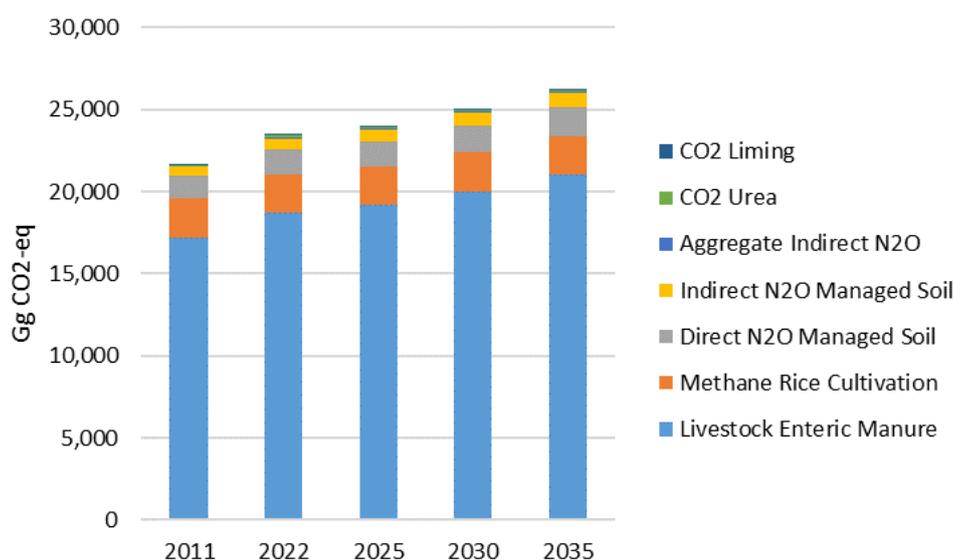


Figure 30: GHG emissions from the Agriculture sub-sector in the BAU scenario

In the WEM Scenario, since there are no additional interventions there will be no reduction in emissions the GHG emissions profile will look the same as BAU.

The WAM scenario in the agriculture sector decreases emissions by 326 and 579 GgCO₂eq compared to BAU in 2030 and 2035 respectively. These reductions are due to the following NDC target:

- Install 500,000 improved cattle sheds for efficient manure management by 2035

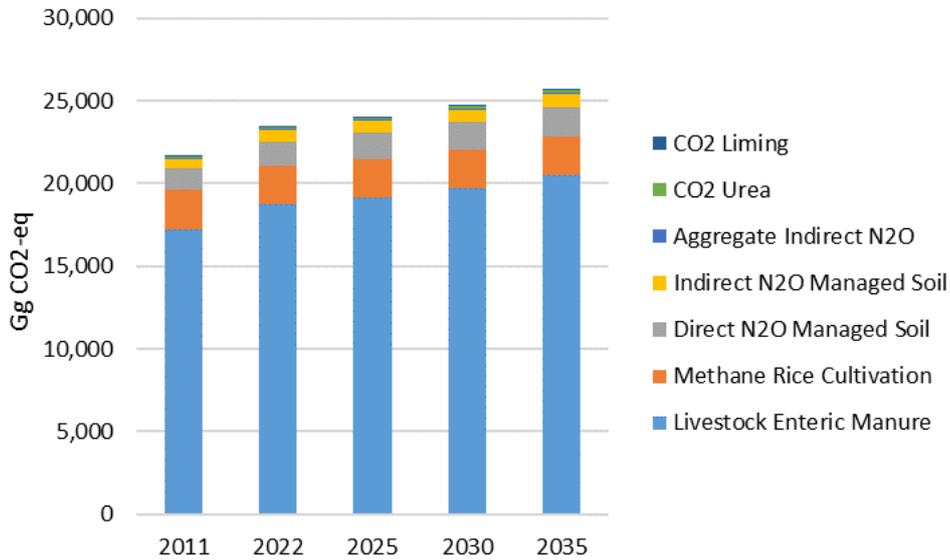


Figure 31: GHG emissions from the Agriculture sub-sector in the WAM scenario

(ii) Land Use, Land Use Change and Forestry (LULUCF)

The removals from the LULUCF sector in the BAU scenario will reach 20,022 GgCO₂eq in 2030 and 2035.

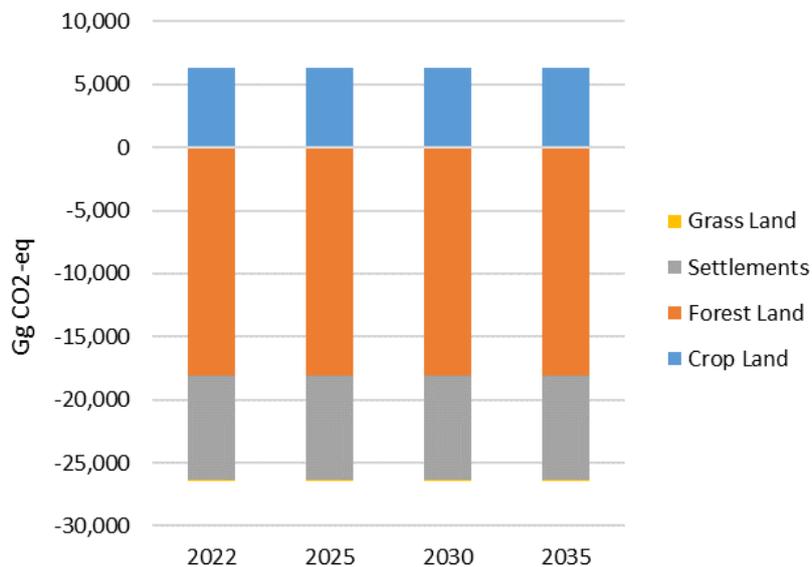


Figure 32: GHG emissions and removals from the LULUCF sub-sector in the BAU scenario

The WEM scenario in LULUCF increases removals by 111 and 86 GgCO₂eq compared to BAU in 2030 and 2035 respectively. These removals are due to some advancement in the sustainable forest management (SFM) aspect of the following NDC target:

- Maintain at least 46% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%) and advance sustainable forest management

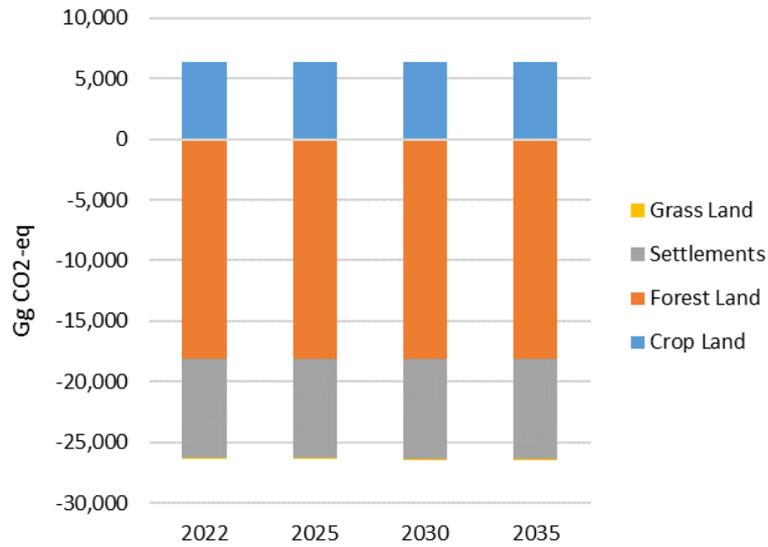


Figure 33: GHG emissions and removals from the LULUCF sub-sector in the WEM scenario

In the WAM scenario, LULUCF emission removals increases by 1,241 and 1,894 GgCO₂eq compared to BAU in 2030 and 2035 respectively. These removals are due to further ambitious advancement of the SFM aspect of the following NDC target:

- Maintain at least 46% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%) and further advance sustainable forest management

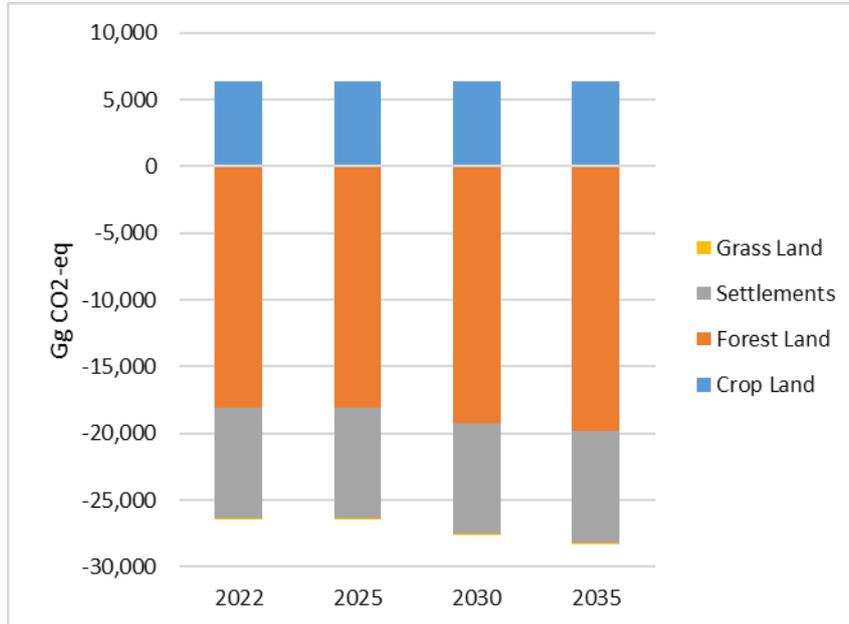


Figure 34: GHG emissions and removals from the LULUCF sub-sector in the WAM scenario

C) Waste

The total GHG emissions from the Waste sector in the BAU scenario will reach 6,187 and 7,214 GgCO₂eq in 2030 and 2035 respectively.

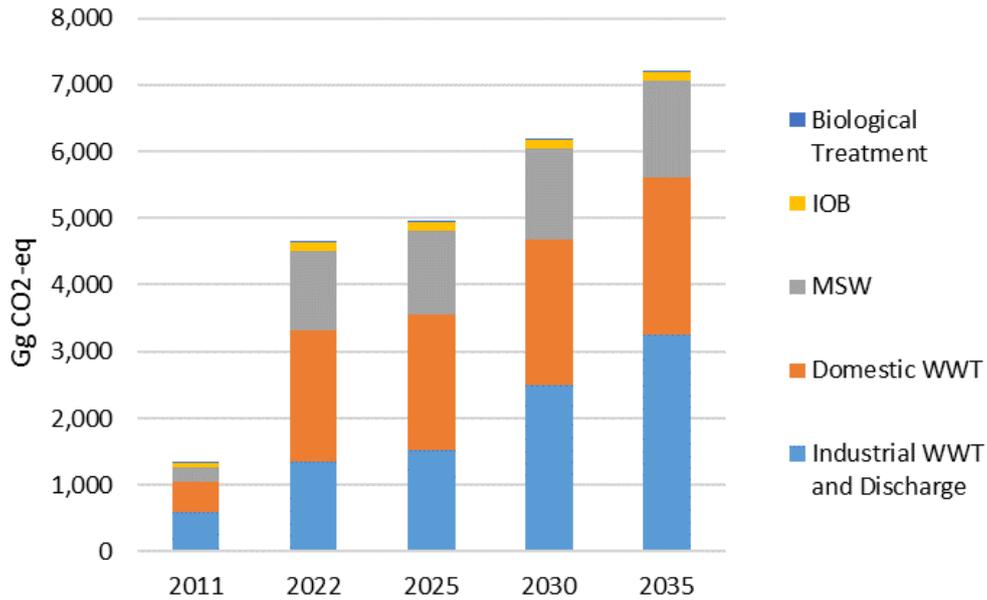


Figure 35: Total GHG emissions from the Waste sector in the BAU scenario

In the WEM scenario, the emissions in the Waste sector decreases by 15 and 27 GgCO₂eq compared to BAU in 2030 and 2035 respectively. These reductions are due to the following NDC targets:

- Treat 140 million liters of wastewater per day before being discharged by 2035.
- Treat 110,000 cubic meters of faecal sludge per year by 2035.

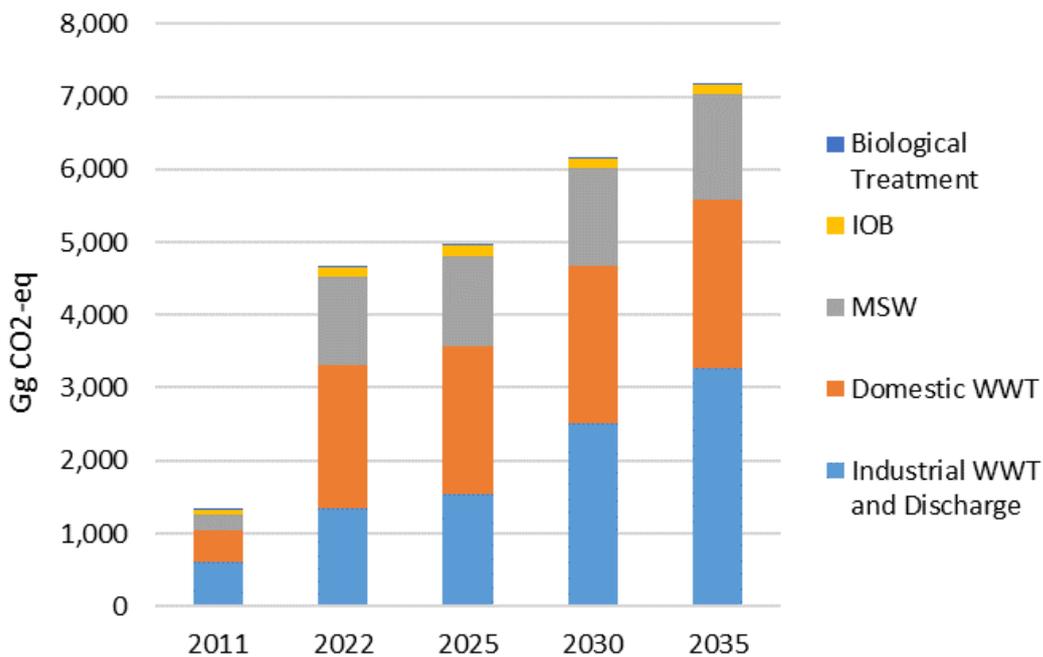


Figure 36: Total GHG emissions from the Waste sector in the WEM scenario

In the WAM scenario, the emissions in the Waste sector decreases by 1,596 and 3,352 GgCO₂eq compared to BAU scenario in 2030 and 2035 respectively. These reductions are due to the following NDC targets:

- Treat 510 million liters of wastewater per day before being discharged by 2035.
- Treat 370,000 cubic meters of faecal sludge per year by 2035.
- Manage healthcare waste using non-burn technologies in 1400 Healthcare Facilities (HCFs) by 2030 and 2800 HCFs by 2035.
- Install combined effluent treatment plants in 6 Industrial Estates by 2035.

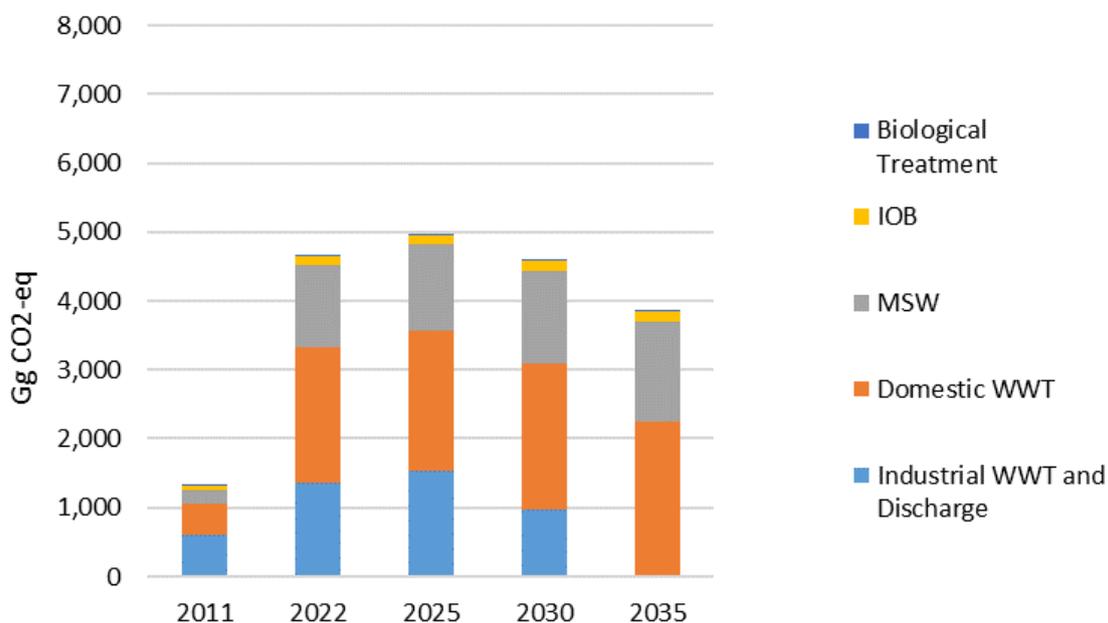


Figure 37: Total GHG emissions from the Waste sector in the WAM scenario

D) Industrial Processes and Product Use (IPPU)

The emissions from the IPPU sector in the BAU scenario will reach 7,664 and 10,742 GgCO₂eq in 2030 and 2035 respectively.

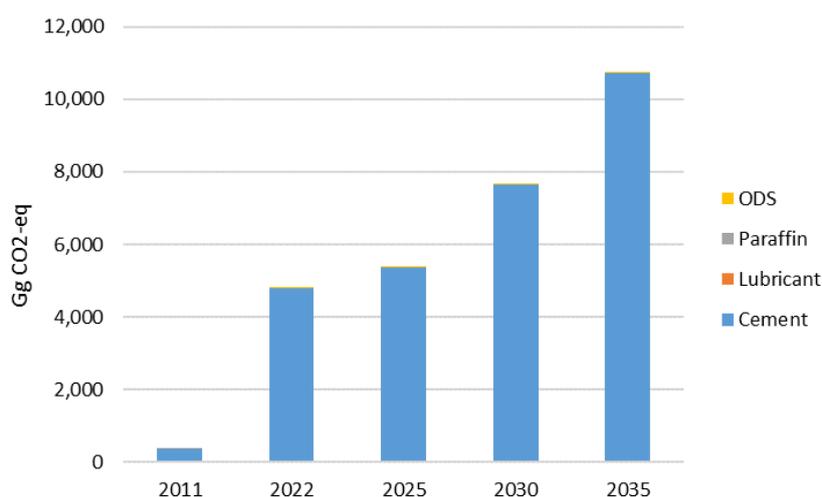


Figure 38: Total GHG emissions from the IPPU sector in the BAU scenario

In the WEM Scenario, since there are no additional interventions, there will be no reduction in emissions from the IPPU sector and the GHG emissions profile will look the same as BAU.

In the WAM scenario, IPPU sector emissions decrease by 990 and 2,257 GgCO₂eq compared to BAU in 2030 and 2035 respectively. These reductions are due to the following NDC target:

- Decrease clinker factor to 75% for cement production by 2035

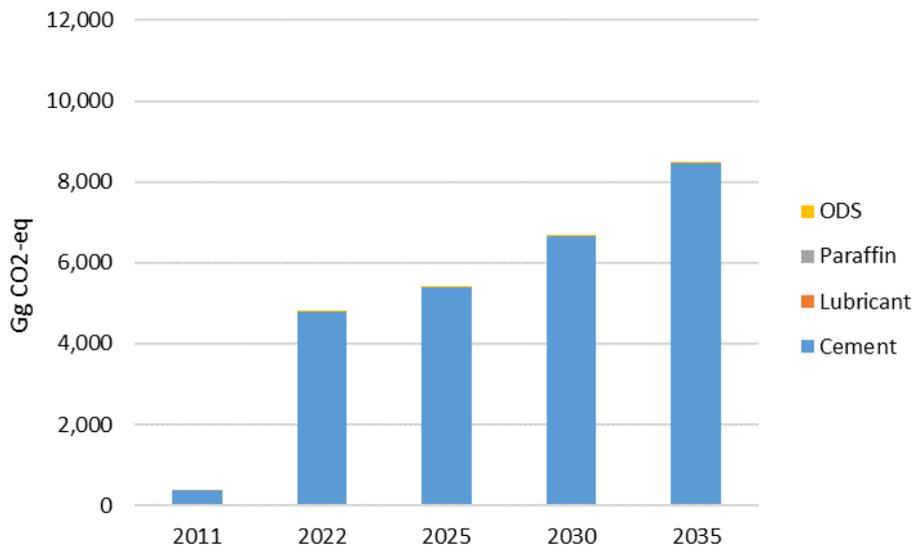


Figure 39: Total GHG emissions from the IPPU sector in the WAM scenario

Annex IV: Detailed costing and assumptions of quantified targets

Table 16: Detailed costing and costing assumptions of quantified mitigation targets

Quantified Target	Cost in USD	Costing reference and details
Energy		
(i) Electricity generation and supply		
Expand renewable electricity generation capacity to 14,031 MW by 2030 and 28,500 MW by 2035. This target includes 10% by 2030 and 15% by 2035 from mini and micro-hydro power, solar, wind power and bio-energy (Distributed Renewable Energy and Utility Scale)	32.5 billion	Unit cost: USD 1.3 million per MW, based on IRENA's (2022b) reported installation cost range of USD 1–3 million per MW for renewable energy projects in developing economies (IRENA, 2022b).
Decrease the total system transmission and distribution losses to 11.50% and 10.50% by 2030 and 2035 while upgrading the transmission and distribution lines and substation capacity.	4.75 billion	Cost estimates derived from Nepal Electricity Authority's (NEA) annual report with investment plans (NEA, 2023), benchmarked against regional loss reduction costs from the World Bank (2022d) and IEA (2021). Additional validation from Ministry of Energy, Water Resources and Irrigation strategy documents and stakeholder consultations during Nepal's NDC process.
(ii) Cooking and Heating		
Expand the use of electric cookstoves to 2.1 million households and an additional 15,000 institutions and firms.	134.44 million	Unit cost: USD 100 per household stove, USD 850 per institutional stove, based on retail pricing data from the Climate and Clean Air Coalition (CCAC, 2023) and Adhikari et al. (2021), cross-verified through NDC stakeholder consultations.
Expand the use of improved cookstoves (ICS) to 750,000 households by 2030 and 1 million by 2035 for cooking.	42.94 million	Unit cost: USD 50 per unit, within the USD 10–50 range reported by Aryal et al. (2021), assuming higher-end models for durability and efficiency.
Expand the use of MICS to 48,068 units by 2030 and 100,000 by 2035 in high-hill areas primarily for heating.	7.46 million	Unit cost: USD 91 per unit, based on 2002 ESMAP data for high-altitude designs (USD 90–100/unit), with assumption of 30,000 additional units beyond initial target.
Expand the use of household-level biogas for cooking to 500,000 units by 2030 and 652,770 units by 2035.	137.76 million	Unit cost: USD 682 per unit, within the USD 400–800 range cited by the Alternative Energy Promotion Centre (AEPCC, n.d.) under the Biogas Support Program.
Increase large-scale biogas plants to 550 units by 2030 and 750 units by 2035.	44.65 million	Unit cost: USD 113,600 per plant, within IRENA's (2021) reported range of USD 110,000–120,000 for industrial-scale biogas systems.
(iii) Transport		
Increase sales of battery electric vehicles (BEVs) to 90% by 2030 and 95% by 2035 for all private passenger vehicles (including 2-wheelers), and to 70% by 2030 and 90% by 2035 for all four-wheeler public passenger vehicles (operated by the private sector).	9.2 billion	Incremental cost: USD 4,000 per two-wheeler BEV, USD 15,000 per four-wheeler BEV, reflecting 30–50% premium over ICE vehicles (World Bank, 2023). Charging infrastructure: 1 station per 50 BEVs at USD 50,000–80,000 per fast-charging station. Government subsidy assumed at USD 2,000 per vehicle, consistent with current Nepali policy and NDC stakeholder consultations. Vehicle sales projections based on Department of Transport trends (DoT, 2023).
Build and operate at least 50 km by 2030 and 100 km by 2035 of integrated electric bus, trolley and light rail transit system in Kathmandu Valley.	12.75 billion	Unit cost: USD 150–200 million/km for light rail, USD 10–15 million/km for trolley systems, USD 1–2 million/km for electric bus lanes, based on World Bank (2023) urban transport infrastructure benchmarks. Project phasing based on Detailed Project Reports (DPRs) for three proposed lines (Saddobato–Pulchowk, Kirtipur–TIA, Koteshwor–Swayambhu).

Quantified Target	Cost in USD	Costing reference and details
Build and operate 200 km by 2030 and 300 km by 2035 of the electric rail network to support public commuting and mass transportation of goods (freight).	5.55 billion	Unit cost: USD 22.3 million per km, within ADB's (2022a) reported range of USD 20–25 million/km for electrified rail development in South Asia.
(iv) Industry		
All iron and steel industries will adopt electricity-based furnaces.	100 million	Unit cost: USD 5 million per plant, based on IEA (2022b) and World Steel Association (2021a, 2021b) data on electrification of industrial processes.
Use bioenergy and RDF as fuel (up to 35% of total fuel use) in two limestone-based cement industries instead of coal.	10 million	Unit cost: USD 5 million per plant, within UNIDO's (2022) retrofitting cost range of USD 4–5 million. Supported by IEA (2021), WBCSD (2022), and Nepal's Ministry of Industry (2023).
Convert 30% of boilers by 2030 and 70% by 2035 to electricity-based in all industries with boilers.	104 million	Unit cost: USD 200,000 per boiler, including electric boiler procurement, grid upgrades, and installation. Based on IEA (2022b) industrial electrification studies and NEA grid reinforcement plans (NEA, 2023), with additional inputs from World Bank (2022a) on SME energy efficiency.
Phase out fixed chimney bull's trench kilns (FCBTK) and convert existing ones to hybrid hoffman/ tunnel kilns for brick production.	171 million	Unit cost: USD 155,000 per kiln, within the USD 150,000–170,000 range reported by the Climate and Clean Air Coalition (CCAC, 2022) for ~1,100 brick kilns.
Pilot medium-sized electricity-based tunnel kiln for producing 100 million bricks per year.	1.52 million	Capital cost: USD 1.52 million, based on UNIDO (2021) and World Bank (2022c) reports on sustainable brick production. Supported by Practical Action (2022) and CCAC (2022) on cleaner kiln technologies.
2. Agriculture, Forestry and Other Land Use (AFOLU)		
(i) Agriculture		
Install 500,000 improved cattle sheds to reduce methane emissions through efficient manure management, and to improve feed efficiency leading to reduced enteric fermentation.	720 million	Unit cost: USD 1,500 per unit, within USD 1,000–2,500 range for upgraded livestock infrastructure (Practical Action, 2019; World Bank, 2020). Reflects mid-range investment for durable, climate-resilient designs.
(ii) Forestry and other land use		
Maintain at least 46.08% of the total area of the country under forest cover (including other wooded land limited to less than 2.7%).	5.1 billion	Total area: 67,975 km ² (6.8 million hectares). Unit cost: USD 75 per hectare per year, within FAO's (2020) reported range of USD 50–100 for monitoring, enforcement, and sustainable forest management.
3. Waste		
Treat 510 million liters of wastewater per day before being discharged.	1.53 billion	Unit cost: USD 3–3.5 per liter per day of treatment capacity, based on the World Bank (2022e) water infrastructure database and validated through NDC stakeholder consultations.
Treat 370,000 cubic meters of faecal sludge per year.	73.94 million	Unit cost: USD 160–180 per m ³ per year, based on WHO (2022) sanitation cost database and NDC stakeholder consultations.
Manage healthcare waste using non-burn technologies in 1400 Healthcare Facilities (HCFs) by 2030 and 2800 HCFs by 2035.	58.2 million	Assumed average facility-level cost based on WHO (2014) guidelines on non-incineration technologies (e.g., autoclaving, microwaving) and Health Care Without Harm (HCWH, 2020) assessments.
Install combined effluent treatment plants in 6 Industrial Estates	72 million	Unit cost: USD 12 million per CETP (Common Effluent Treatment Plant), assuming 3–5 MLD capacity. Based on ADB (2022b), World Bank (2021), and Nepal Ministry of Industry, Commerce and Supplies (2023) cost data for industrial wastewater treatment.
4. Industrial Processes and Product Use (IPPU)		
Decrease clinker factor to 75% for cement production.	683 million	Cost derived from process optimization, alternative raw materials, and grinding efficiency improvements. Sources: World Bank (2022a), IFC (2021), and ADB (2023) on low-carbon cement pathways in developing countries.

Bibliography

- Adhikari, S.R. et al. (2021) 'Clean cooking transition in Nepal: challenges and opportunities', *Development in Practice*, 31(4), pp. 487–501. doi:10.1080/09614524.2021.1893659.
- Alternative Energy Promotion Centre (AEPC) (2023) *Annual Progress Report FY 2022/23*. Kathmandu: AEPC.
- Alternative Energy Promotion Centre (AEPC) (2025) *Solar Thermal Roadmap and Implementation Plan for Nepal (Draft)*. Kathmandu: AEPC.
- Alternative Energy Promotion Centre (AEPC) (n.d.) *Biogas Support Program (BSP) in Nepal*. Kathmandu: AEPC. Available at: <https://www.iese.edu/media/research/pdfs/OP-0301-E> (Accessed: 07 August 2025).
- Aryal, K.R. et al. (2021) 'Household energy use and clean cooking access in rural Nepal', *Journal of Advances in Engineering and Management*, 6(1), pp. 45–58.
- Asian Development Bank (ADB) (2022a) *Railway Sector Investment Program: South Asia*. Manila: ADB.
- Asian Development Bank (ADB) (2022b) *Industrial Wastewater Treatment in South Asia: Costs & Implementation*. Manila: ADB.
- Asian Development Bank (ADB) (2023) *Asian Development Outlook 2023 Thematic Report: Asia in the Global Transition to Net Zero*. Manila: ADB.
- Central Bureau of Statistics (CBS) (2022) *National Population and Housing Census 2021*. Kathmandu: CBS.
- Clean Cooking Alliance (CCA) (2024). *Unit Economics Framework and Analysis for the Clean Cooking Sector*. Washington DC: CCA.
- Clean Cooking Alliance (CCA) (2025) *Nepal Project | Clean Cooking Alliance*. Available at: <https://cleancooking.org/industry-development/nepal-project/> (Accessed: 07 August 2025).
- Climate Analytics (2026) *Hazard Attribution Modeling of Nepal and Implications for Access to Fund for responding to Loss and Damage (draft)*. Berlin: Climate Analytics.
- Climate and Clean Air Coalition (CCAC) (2022) *Brick Kiln Initiative: Reducing Black Carbon Emissions*. Available at: <https://ccacoalition.org/en/initiatives/brick-kilns> (Accessed: 07 August 2025).
- Climate and Clean Air Coalition (CCAC) (2023). *Measurement Tools to Accelerate Clean Cooking Potential in Nepal*. Available at: <https://www.ccacoalition.org/news/measurement-tools-accelerate-clean-cooking-potential-nepal> (Accessed: 07 August 2025).
- Cohen, B. et al. (2021) 'Co-benefits and trade-offs of climate change mitigation actions and the Sustainable Development Goals', *Sustainable Production and Consumption*, 26, pp. 805–813.
- Darlami, H.B., Ale, B.B. and Pokharel, G.R. (2022) 'Socioeconomic Analysis of two pot raised mud improved cookstove in the context of Nepal', *Journal of Advances in Civil Engineering and Management*, 5(1), pp. 1-11.
- Department of Customs (DOC) (2023) *Foreign Trade Statistics FY 2022/23*. Kathmandu: DOC. Available at: <https://www.customs.gov.np> (Accessed: 07 August 2025).
- Department of Electricity Development (DOED) (2025) *Electricity License Dashboard*. Kathmandu: DoED. Available at: <http://www.doed.gov.np> (Accessed: 07 August 2025).
- Department of Transport (DoT) (2023) *Vehicle Registration and Sales Trends*. Kathmandu: DoT.
- Department of Urban Development and Building Construction (DUDBC) (2016) *Green Building Guidelines*. Kathmandu: Government of Nepal.

- Department of Water Supply and Sewerage Management (DWSSM) (2023) *Annual Progress Report FY 2022/23*. Kathmandu: DWSSM.
- Department of Urban Development and Building Construction (DUDBC) (2024) *Nepal National Building Code*. Kathmandu: DUDBC.
- EDGAR (2024) *GHG Emissions of All World Countries*. Available at: <https://doi.org/10.2760/0115360>.
- ESMAP (2022) *Clean Cooking Solutions: Costs and Performance*. Washington, DC: World Bank Group.
- FAO (2020) *Global Forest Resources Assessment 2020 – Main Report*. Rome: FAO.
- FAO (2021) *Synergies and trade-offs in climate-smart agriculture*. Rome: FAO.
- Forest Research and Training Centre (FRTC) (2022a) *Churia Forests of Nepal*. Kathmandu: FRTC.
- Forest Research and Training Centre (FRTC) (2022b) *High Mountains and High Himal Forests of Nepal*. Kathmandu: FRTC.
- Forest Research and Training Centre (FRTC) (2022c) *Middle Mountains Forests of Nepal*. Kathmandu: FRTC.
- Forest Research and Training Centre (FRTC) (2024a) *National Land Cover Monitoring System of Nepal (2020-2022)*.
- Forest Research and Training Centre (FRTC) (2024b) *Terai Forests of Nepal*. Kathmandu: FRTC.
- Giordano, P., Pelizan, L. and Rahnema Alavi, A. (2018). *Nepal Biogas Support Program (BSP): Cooking With Clean and Affordable Energy in Rural Areas*. IESE Business School. Available at: <https://www.iese.edu/media/research/pdfs/OP-0301-E.pdf> (Accessed: 07 August 2025).
- Government of Nepal (GoN) (1973) *National Parks and Wildlife Conservation Act 1973*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2004) *National Irrigation Policy 2004*. Kathmandu: Ministry of Water Resources.
- Government of Nepal (GoN) (2008) *Solid Waste Management Technical Guideline For Municipalities Of Nepal*. Available at: <https://unhabitat.org/solid-waste-management-technical-guideline-for-municipalities-of-nepal> (Accessed: 07 August 2025).
- Government of Nepal (GoN) (2011a) *National Framework on Local Adaptation Plans for Action*. Kathmandu: Ministry of Environment.
- Government of Nepal (GoN) (2011b) *Solid Waste Management Act, 2068*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2012) *National Wetland Policy 2012*. Kathmandu: Ministry of Forests and Soil Conservation.
- Government of Nepal (GoN) (2013a) *National Early Warning Strategic Action Plan 2013*. Kathmandu: Ministry of Home Affairs.
- Government of Nepal (GoN) (2013b) *Solid Waste Management Rules, 2070*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2014) *Environmentally Sustainable Transport Strategy 2014*. Kathmandu: Ministry of Physical Infrastructure and Transport.
- Government of Nepal (GoN) (2015a) *Land Use Policy 2015*. Kathmandu: Ministry of Land Reform and Management.
- Government of Nepal (GoN) (2015b) *National Energy Crisis Reduction and Electricity Development Decade 2015*. Kathmandu: Ministry of Energy.
- Government of Nepal (GoN) (2016a) *Forest Sector Strategy 2016–2025*. Kathmandu: Ministry of Forests and Soil Conservation.

- Government of Nepal (GoN) (2016b) *Tourism Strategic Plan 2016–2025*. Kathmandu: Ministry of Culture, Tourism and Civil Aviation.
- Government of Nepal (2017a) *National Urban Development Strategy*. Kathmandu: GoN.
- Government of Nepal (GoN) (2017b) *Local Government Operation Act 2017*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2017c) *Nepal Health Infrastructure Development Standards 2017*. Kathmandu: Ministry of Health.
- Government of Nepal (GoN) (2017d) *National Urban Development Strategy 2017*. Kathmandu: MoUD. Available at: https://www.moud.gov.np/storage/listies/July2019/NUDS_PART_A.pdf (Accessed: 07 August 2025).
- Government of Nepal (GoN) (2017e) *Presidential Chure-Tarai Madhesh Conservation and Management Master Plan 2017*. Kathmandu: MoFSC. .
- Government of Nepal (GoN) (2018a) *National Policy for Disaster Risk Reduction 2018*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2018b) *National Ramsar Strategy and Action Plan 2018–2024*. Kathmandu: MoFE.
- Government of Nepal (GoN) (2018c) *Water and Energy Sector White Paper 2018*. Kathmandu: MoEWRI.
- Government of Nepal (GoN) (2019a) *Detailed Study of Cement Manufacturing Industry in Nepal*. Available at: <https://doind.gov.np/uploads/downloads/Downloads-2021060113420392.pdf> (Accessed: 07 August 2025).
- Government of Nepal (GoN) (2019b) *Land Use Act 2019*. Kathmandu: Law Book Management Committee.
- Government of Nepal (GoN) (2019c) *National Climate Change Policy 2019*. Kathmandu: MoFE.
- Government of Nepal (GoN) (2019d) *National Forest Policy 2019*. Kathmandu: MoFE.
- Government of Nepal (GoN) (2019e) *National Health Policy 2019*. Kathmandu: MoHP.
- Government of Nepal (GoN) (2019f) *The Environment Protection Act, 2019 (2076)*. Kathmandu, GoN.
- Government of Nepal (GoN) (2020a) *Climate Change Gender and Social Inclusion Strategy and Action Plan 2020–2030*. Kathmandu: GoN.
- Government of Nepal (GoN) (2020b) *Environment Protection Regulations, 2077 (2020)*. Kathmandu: GoN.
- Government of Nepal (GoN) (2020c) *Second Nationally Determined Contribution (NDC)*. Kathmandu: GoN. Government of Nepal (GoN) (2020d) *Water Resource Policy 2020*. Kathmandu: GoN.
- Government of Nepal (GoN) (2021a) *National Adaptation Plan (NAP) 2021–2050*. Kathmandu: GoN.
- Government of Nepal (GoN) (2021b) *Nepal’s Long-term Strategy for Net-zero Emissions*. Kathmandu: GoN.
- Government of Nepal (GoN) (2021c) *Vulnerability and Risk Assessment and Identifying Adaptation Options: Summary for Policy Makers*. Kathmandu: GoN.
- Government of Nepal (GoN) (2023a) *Nepal Health Fact Sheet*. Kathmandu: GoN.
- Government of Nepal (2023b) *Nationally Determined Contribution (NDC) Implementation Plan (2080-2086)*. Kathmandu: GoN.
- Government of Nepal (GoN) (2023c) *Project Implementation Manual – NUGIP 2023*. Kathmandu: Ministry of Urban Development.

- Government of Nepal (GoN) (2023d) Prime Minister Agriculture Modernization Project, *Annual Program and Progress Report (FY 2080/81)*. Kathmandu: GoN. Available at: <https://pmamp.gov.np/en> (Accessed: 07 August 2025).
- Government of Nepal (GoN) (2023e) *Vehicle Registration Data*. Kathmandu: GoN.
- Government of Nepal (GoN) (2024) *Economic Survey 2080/81*. Kathmandu: GoN.
- Government of Nepal (GoN) (2025) *Nationally Determined Contribution (NDC) 3.0*. Kathmandu: GoN.
- Government of Nepal (GoN) (n.d.) *Climate Resilient Sanitation Safety Planning*. Kathmandu: Ministry of Water Supply and Sanitation.
- Government of Nepal (GoN) (n.d.) *Climate Resilience Water Safety Plan*. Kathmandu: Ministry of Water Supply and Sanitation.
- Health Care Without Harm (HCWH) (2020) *Non-Incineration Technologies for Medical Waste Treatment*. Available at: <https://noharm.org> (Accessed: 07 August 2025).
- Heaps, C. (2024) *Leap - Low Emission Analysis Platform*. Available at: <https://www.sei.org/tools/leap-low-emissions-analysis-platform/> (Accessed: 07 August 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2000) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at: <https://www.ipcc-nggip.iges.or.jp/public/gp/english/> (Accessed: 4 September 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2003) *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at: https://www.ipcc-nggip.iges.or.jp/public/gp/lulucf/gp/lulucf_contents.html (Accessed: 4 September 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2006) *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Hayama, Japan: Institute for Global Environmental Strategies (IGES). Available at: <https://www.ipcc-nggip.iges.or.jp/public/2006gl/> (Accessed: 07 August 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2013a) *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. Available at: <https://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html> (Accessed: 4 September 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2013b) *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, A., Nauels, Y., Xia, V., Bex, V. and Midgley, P.M. (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Intergovernmental Panel on Climate Change (IPCC) (2019) *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at: <https://www.ipcc-nggip.iges.or.jp/public/2019rf/> (Accessed: 4 September 2025).
- Intergovernmental Panel on Climate Change (IPCC) (2021) *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. doi:10.1017/9781009157896.
- Intergovernmental Panel on Climate Change (IPCC) (2022a) *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Pörtner, H.-O., D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S.

- Löschke, V. Möller, A. Okem, and B. Rama (eds.]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. doi:10.1017/9781009325844.
- Intergovernmental Panel on Climate Change (IPCC) (2022b) *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Shukla, P.R., J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, and J. Malley (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. doi:10.1017/9781009157926.
- International Energy Agency (IEA) (2014) *Electricity Transmission and Distribution Losses in Developing Countries*. Paris: IEA.
- International Energy Agency (IEA) (2018) *Technology Roadmap: Low-Carbon Transition in the Cement Industry*. Paris: IEA.
- International Energy Agency (IEA) (2020a) *Iron and Steel Technology Roadmap*. Paris: IEA.
- International Energy Agency (IEA) (2020b) *Iron and Steel Technology Roadmap: Towards more sustainable steelmaking*. Paris: IEA.
- International Energy Agency (IEA) (2021) *Alternative Fuels in Cement Production*. Paris: IEA.
- International Energy Agency (IEA) (2022a) *Energy Efficiency 2022*. Paris: IEA.
- International Energy Agency (IEA) (2022b) *Industrial Electrification Studies*. Paris: IEA.
- International Energy Agency (IEA) (2022c) *Electrification of Industrial Processes: Iron and Steel*. Paris: IEA.
- International Finance Corporation (IFC) (2021) *Strengthening Sustainability in the Cement Industry*. Washington DC: IFC.
- International Renewable Energy Agency (IRENA) (2021) *Bioenergy Cost Analysis: Industrial and Utility-Scale Applications*. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA) (2022a). *Renewable Power Generation Costs in 2021*. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA) (2022b) *Renewable Cost Database*. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA) (2023). *Renewable Power Generation Costs in 2022*. Abu Dhabi: IRENA.
- Lamichhane, G.P. et al. (2022) *Status of Air Quality in Nepal Annual Report 2021*. Kathmandu. Available at: https://doenv.gov.np/progressfiles/Status-of-Air-Quality-in-Nepal-Annual-Report_2021-1676438644.pdf (Accessed: 07 August 2025).
- Ministry of Agricultural Development (MoAD) (2015) *Agriculture Development Strategy 2015-2035*. Kathmandu: MoAD.
- Ministry of Agriculture and Livestock Development (MoALD) (2022) *Nuts and Fruits in Hilly Areas Project (NAFHA) Project Document*. Kathmandu: MoALD.
- Ministry of Culture, Tourism and Civil Aviation (MoCTCA) (2008) *Tourism Policy 2065*. Kathmandu: MoCTCA.
- Ministry of Education (2016) *School Sector Development Plan (2016–2023)*. Kathmandu: Ministry of Education.
- Ministry of Education, Science and Technology (MoEST) (2022) *School Education Sector Plan 2022–2032*. Kathmandu: MoEST.
- Ministry of Energy, Water Resources and Irrigation (MoEWRI) (2024a) *Energy Development Roadmap*. Available at: <https://moewri.gov.np/content/61/energy-route-picture/> (Accessed: 07 August 2025).
- Ministry of Energy, Water Resources and Irrigation (MoEWRI) (2024b). *National Energy Crisis Resolution Action Plan*. Kathmandu: MoEWRI.
- Ministry of Finance (MoF) (2022) *Budget Statement for Fiscal Year 2022/23*. Kathmandu: MoF.

Ministry of Finance (MoF) (2024) *Budget Statement for Fiscal Year 2024/25*. Available at: <https://mof.gov.np/content/389/budget-speech--english--2024-25/> (Accessed: 07 August 2025).

Ministry of Forests and Environment (MoFE) (2020) *Nepal REDD Emission Reductions Program for Thirteen Terai Arc Landscape Districts Project: Benefit Sharing Plan*. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/757781592998659529/benefit-sharing-plan> (Accessed: 07 August 2025).

Ministry of Forests and Environment (MoFE) (2021) *Nepal's Third National Communication to the United Nations Framework Convention on Climate Change*. Kathmandu: GoN.

Ministry of Forests and Environment (MoFE) (2022) *Forest Act*. Kathmandu: MoFE.

Ministry of Forests and Environment (MoFE) (2023) *Annual Progress Report 2079/80 (2022/23)*. Kathmandu: Government of Nepal.

Ministry of Forests and Environment (MoFE) (2024a) *Annual Progress Report FY 2079/80*. Kathmandu: MoFE.

Ministry of Forests and Environment (MoFE) (2024b) *Forest Development Fund Working Procedure, 2024*. Kathmandu: MoFE.

Ministry of Health and Population (MoHP) (2023a) *National Health Adaptation Plan: Climate Change Health Adaptation Strategy and Action Plan (2080 - 2087 BS)*. Kathmandu: Ministry of Health and Population.

Ministry of Health and Population (MoHP) (2023b) *Health National Adaptation Plan: Climate Change Health Adaptation Strategy and Action Plan (2023–2030)*. Kathmandu: MoHP.

Ministry of Health and Population (MoHP) (2024) *Baseline Assessment of GHG Emissions of Nepal's Health Sector*. Kathmandu: MoHP.

Ministry of Home Affairs (MoHA) (2017) *Procedure for the relocation and rehabilitation of hazard-prone settlements*. Kathmandu: MoHA.

Ministry of Home Affairs (MoHA) (2018) *National Disaster Risk Reduction Strategic Action Plan (2018-2030)*. Kathmandu: MoHA.

Ministry of Industry, Commerce and Supplies (MoICS) (2023) *Policies on Alternative Fuels and Energy Transition; Industrial Wastewater Management and CETPs in Nepal*. Kathmandu: MoICS.

Ministry of Physical Infrastructure and Transport (MoPIT) (2023) *Annual Progress Report FY 2022/23*. Available at: <https://www.mopit.gov.np> (Accessed: 07 August 2025).

Ministry of Urban Development (MoUD) (2024) *National Urban Policy 2081*. Kathmandu: MoUD.

Ministry of Water Supply and Sanitation (MoWSS) (2016) *Nepal Water Supply, Sanitation and Hygiene Sector Development Plan (2016-2030)*. Kathmandu: GoN.

National Disaster Risk Reduction and Management Authority (NDRRMA) (2025) *Building Information Platform Against Disaster (BIPAD) Portal*. Available at: <http://bipadportal.gov.np/> (Accessed: 07 August 2025).

National Planning Commission (NPC) (2017) *Sustainable Development Goals: Status and Road Map for Nepal (2016–2030)*. Kathmandu: NPC.

National Planning Commission (NPC) (2019) *The Fifteenth Periodic Plan (Fiscal Year 2019/20 – 2023/24)*. Kathmandu: NPC,

National Planning Commission (NPC) (2024) *The Sixteenth Periodic Plan (Fiscal Year 2024/25–2028/29)*. Kathmandu: NPC.

Nepal Electricity Authority (NEA) (2018) *Transmission System Development Plan*. Kathmandu: NEA.

Nepal Electricity Authority (NEA) (2020) *Province No. 2 Electrification Project*. Kathmandu: NEA.

Nepal Electricity Authority (NEA) (2023) *Annual Report 2022–2023*. Kathmandu: NEA.

National Statistics Office (NSO) (2024) *National Climate Change Survey 2022*. Available at: <https://nsonepal.gov.np> (Accessed: 07 August 2025). Practical Action (2019) *Sustainable Livestock Farming in Nepal*. Kathmandu: Practical Action.

Practical Action (2020) *Annual Report 2019–20 Nepal*. Kathmandu: Practical Action.

Practical Action (2022) *Cleaner Brick Kiln Technologies in Nepal*. Kathmandu: Practical Action Nepal.

Practical Action (2023) *An innovative recipe for cleaner air*. Available at: <https://practicalaction.org/our-work/projects/e-cooking-nepal/> (Accessed: 07 August 2025).

Robinson, B.L., Jewitt, S., Clifford, M.J. and Hewitt, J. (2021) 'Understanding the current market enablers for Nepal's biomass cookstove industry', *Development in Practice*, 32(1), pp. 52-68.

UNFCCC (2015) *Paris Agreement*. Bonn: UNFCCC. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed: 07 August 2025).

UNFCCC (2018) *Online guide on loss and damage*. Bonn: UNFCCC. Available at: https://unfccc.int/sites/default/files/resource/Online_guide_on_loss_and_damage-May_2018.pdf

UNFCCC (2024) *Outcome of the first global stocktake*. Decision 1/CMA.5. Bonn: UNFCCC. Available at: https://unfccc.int/sites/default/files/resource/cma2023_16a01_adv_.pdf (Accessed: 07 August 2025).

United Nations (2023) *Synergy Solutions for a World in Crisis: Tackling Climate and SDG Action Together*. Available at: <https://sdgs.un.org/sites/default/files/2023-09/UN%20Climate%20SDG%20Synergies%20Report-091223B.pdf> (Accessed: 07 August 2025).

United Nations Department of Economic and Social Affairs (2023) *COP28 Global Stocktaking Calls for Urgent Action, Integrating Climate and Development Pathways*. Available at: <https://sdgs.un.org/news/cop28-global-stocktaking-calls-urgent-action-integrating-climate-and-development-pathways> (Accessed: 07 August 2025).

United Nations Industrial Development Organization (UNIDO) (2021) *Sustainable Brick Production Report*. Vienna: UNIDO.

United Nations Industrial Development Organization (UNIDO) (2022) *Industrial Energy Efficiency: Alternative Fuels in Cement*. Vienna: UNIDO.

UN-Water (2021) *Progress on Wastewater Treatment – 2021 Update*. Geneva: UN-Water.

Water and Energy Commission Secretariat (WECS) (2010) *Energy Synopsis Report 2010*. Kathmandu, Nepal. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2021a) *Energy Consumption and Supply Situation in Federal System of Nepal - Province 1 (Koshi Pradesh)*. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2021b) *Energy Consumption and Supply Situation in Federal System of Nepal - Province 2 (Madhesh Pradesh)*. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2022a) *Energy Consumption and Supply Situation in Federal System of Nepal - Bagmati Province*. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2022b) *Energy Synopsis Report 2021/2022*. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2023) *Energy Synopsis Report 2022/2023*. Kathmandu: WECS.

Water and Energy Commission Secretariat (WECS) (2024a) *Energy Consumption and Supply Situation in Federal System of Nepal - Gandaki, Lumbini, Karnali and Sudurpaschim Provinces* (Unpublished).

- Water and Energy Commission Secretariat (WECS) (2024b) *Energy Synopsis Report 2023/2024*. Kathmandu: WECS.
- Weiss, W., Moschik, R., Malla, A., Dhananjayan, P., Gautam, K. and Ghimire, L.P. (2025) *Solar Thermal Roadmap and Implementation Plan for Nepal*. Kathmandu: ICIMOD and AEPC.
- WHO (2014) *Safe management of wastes from health-care activities, 2nd ed.* Geneva: WHO.
- WHO (2022) *Global Water, Sanitation and Hygiene: Annual Report 2022*. Geneva: WHO.
- WHO (2022) *Sanitation Cost Database*. Geneva: WHO.
- WHO (2025) *What are the WHO air quality guidelines?* Available at: <https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines> (Accessed: 07 August 2025).
- World Bank (2009) *Reducing Technical and Non-Technical Losses in the Power Sector*. Washington DC: World Bank.
- World Bank (2020) *Climate-Smart Agriculture Investment Plan (CSAIP) Nepal*. Washington DC: World Bank.
- World Bank (2021) *Effluent Treatment Infrastructure for Industrial Zones*. Washington DC: World Bank.
- World Bank (2022a) *Low-Carbon Cement Production in Developing Countries*. Washington DC: World Bank.
- World Bank (2022b) *Livestock Infrastructure Development in South Asia*. Washington DC: World Bank.
- World Bank (2022c) *Nepal Country Climate and Development Report*. Washington DC: World Bank Group.
- World Bank (2022d) *Urban Mobility and EV Infrastructure Costs in South Asia*. Washington DC: World Bank.
- World Bank (2022e) *Water Treatment Infrastructure Database*. Washington DC: World Bank.
- World Bank (2023) *Urban Transport Infrastructure Costs*. Washington, DC: World Bank.
- World Bank (2025) *World Development Indicator*. Available at: <https://databank.worldbank.org/source/world-development-indicators> (Accessed: 07 August 2025).
- World Business Council for Sustainable Development (WBCSD) (2022) *Low-Carbon Cement Roadmap*. Geneva: WBCSD.
- World Steel Association (2021) *Energy Efficiency and Decarbonization in Steel Production*. Brussels: WSA.
- World Steel Association (2021) *Fact Sheet: Energy Use in the Steel Industry*. Brussels: WSA.

