



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Nationally Determined Contribution (NDC)

09 March 2021

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1. INTRODUCTION

Lao People's Democratic Republic herewith presents its 2020 updated and enhanced Nationally Determined Contribution, in accordance with decision 1/CP.21 of the Conference of the Parties and following the country's Intended Nationally Determined Contribution (INDC) to the objectives of the Paris Agreement submitted to the UNFCCC on September 30th, 2015, and ratified by the Government on September 7th, 2016.

As per Paris Agreement Article 4, the 2020 NDC update builds upon the 2015 submission with a view to enhancing its ambition through the introduction of three national level greenhouse gas (GHG) emissions scenarios, namely a baseline emissions scenario, an unconditional mitigation scenario to 2030, as well as a more ambitious conditional mitigation scenario to 2030 towards achieving net zero GHG emissions by 2050. 2015 NDC targets have been updated and extended, including to new sectors, while new national level emission reductions targets have been formulated. The 2020 NDC also sets forth increased transparency and consistency between quantitative targets, new short-term objectives for climate change adaptation towards a strengthened measurement, reporting and verification system, as well as the country's expression of interest to pursue voluntary cooperation to allow for higher ambition, in accordance with the Paris Agreement.

With this new submission, the Government of Lao PDR intends to report on the progress of the country's contribution to the objectives of the Paris Agreement, and to bring forward enhanced action with the aim of strengthening Lao PDR's response to the threat of climate change while reflecting its common but differentiated responsibility and respective capability in a fair and ambitious manner, in light of the country's Least Developed Country (LDC) status and very limited contribution to global GHG emission levels. The long-term vision on how to address climate change will not be reiterated while only significant evolutions in the national circumstances will be elaborated upon.

All mitigation and adaptation measures in the 2020 NDC contribute to the Paris Agreement, including but not limited to "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels", as well as "increasing the ability to adapt to the adverse impacts of climate change". Proposed interventions will also serve the country's post COVID-19 economic recovery by increasing resilience and accelerating decarbonization. The 2020 NDC is aligned with the country's Sustainable Development Goals to be set out in the 9th five-year National Socio-Economic Development Plan (2021-2025), with a focus on combating climate change and its impacts.

This document has been subject to four formal rounds of consultation with stakeholders, including Government agencies, development partners, as well as public and private actors. At the end of 2019 an assessment of the progress for each target set out in the 2015 NDC was undertaken. This also provided an opportunity to get an update on the current situation and near-term future planning. The second and third rounds between April and August 2020 aimed to receive comprehensive feedback and comments from all relevant stakeholders on the draft NDC. The last round of consultation was conducted as part of the final validation workshop. Participation of the private sector will be instrumental in the implementation of the NDC and shall be facilitated through adequate policies for licensing and regulations for investment at sectoral level.

2. MITIGATION

2.1. National context

Complementing existing national level policy framework (2015 NDC), the Prime Minister's Office issued on September 19th, 2019, the Decree on Climate Change which defines principles, regulations, and measures on management, monitoring of climate matters. Simultaneously, the Decree states that climate change must be mainstreamed into the national socio-economic development plans, sectoral as well as local strategies and plans.

As per the Second National Communication to the UNFCCC in June 2013, total emissions of greenhouse gases in Lao PDR amounted to 50,742.91 ktCO₂e¹ in year 2000, with Land Use Change & Forestry (LUCF) and Agriculture responsible for over 95% of the total. Emission drivers such as economic and population growth increased by 7.17% and 1.6% per year respectively between 2000 and 2018. Besides, the total number of vehicles registered in the country grew drastically from 367,900 in year 2004 to 2,133,500 in year 2017 (+480%), while transport fuel consumption grew from 855 million liters in 2013 to 1,442 Million liters in 2016.

The following four sections provide the results of the scenario analysis undertaken for the 2020 NDC update as part of the country's enhanced ambition. Three scenarios are developed:

- A baseline scenario which is a reference case that illustrates future GHG emission levels most likely to occur in the absence of GHG mitigation activities.
- An unconditional mitigation scenario that reflects GHG emission reductions efforts that Lao PDR can commit to, considering own resources and existing levels of support from developed country Parties.
- A conditional mitigation scenario that represents additional GHG emission reductions efforts that Lao PDR could achieve, contingent upon increased levels of financial support from developed country Parties.

Section 2.2 is a graph summary of all scenarios. Section 2.3 provides background information about the baseline scenario. Section 2.4 estimates 2020 emissions level and discusses the country's progress against the mitigation targets set out in the 2015 NDC. Section 2.5 introduces the 2030 unconditional mitigation scenario and associated updated targets. Section 2.6 describes the 2030 conditional mitigation scenario and associated targets towards achieving net zero emissions by 2050.

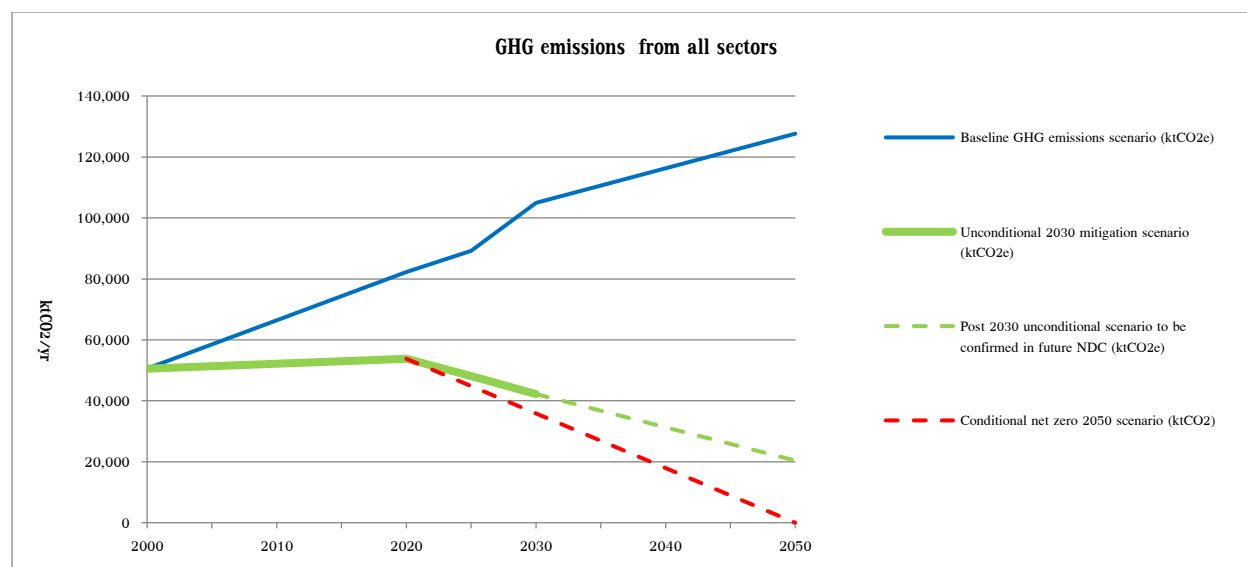
Sectors covered by the analysis include energy, industrial processes, agriculture, land-use change and forestry, and waste. Greenhouse gases comprise carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Emissions hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) are considered negligible in Lao PDR and excluded from the analysis. The boundaries of the analysis correspond to the national borders of the country. Year 2000 is selected as the base year for the calculations of all scenarios.

¹ Kilotons of CO₂ equivalent

2.2. Summary of the scenario analysis

Figure 1 below provides an overview of GHG emissions from all sectors from the base year 2000 according to the 3 scenarios described above. The 2020 value on the unconditional 2030 scenario represents estimated current level of emissions. Post 2030 unconditional scenario will be communicated in future NDC submissions.

Figure 1: GHG emissions scenarios from all sectors



2.3. Baseline scenario

The baseline scenario is a hypothetical or projected reference case that represents future GHG emission levels most likely to occur in the absence of GHG mitigation activities. This scenario is used to develop the unconditional and conditional mitigation goal scenarios and was computed through extrapolation of historical growth trends at sectoral scale (See also methodology section). Under the baseline scenario, total GHG emissions levels in Lao PDR would be expected to reach around 82,000 ktCO2e in 2020 and 104,000 ktCO2e in 2030. Detailed baseline projections to 2050 are presented in Figure 1 under section 2.2. Main sectors expected to contribute to baseline emissions are LUCF, agriculture and energy, including transport and power sector, through the potential addition of base load coal-fired power generation.

2.4. Estimated national GHG emissions in 2020 and NDC implementation progress

National GHG emissions in 2020 have been estimated around 53,000 ktCO2e through deducting the GHG mitigation measures implemented across all sectors since 2000 from the baseline scenario. Therefore, between 2000 and 2020 Lao PDR achieved to reduce emissions by 34% compared to the baseline scenario while GHG emissions growth rate during the period can be estimated around 0.3% on average annually. In the meantime, GDP per capita growth rate was 5.3% annually on average between 2000 and 2019 (World Bank), which indicates that emissions growth was decoupled from economic growth.

Major mitigation measures were implemented in the LUCF and power sectors. Table 1 below provides a summary of mitigation targets set out in 2015 NDC and the progress towards their achievement.

Table 1: Status of 2015 NDC Measures

#	2015 NDC Measure	Horizon	Progress
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M1	Increase forest cover to 70% land area	2020	Not achieved
M2	• 30% RE excluding large hydro	2025	Not on track
	• Share of biofuels to meet 10% of transport fuels	2025	Not on track
M3	90% households electrified	2020	Achieved
M4	Transport NAMA	2025	Not started
M5	• Expansion of large hydro to 5,500 MW (2020)	2020	Achieved
	• 20,000 MW (2030)	2030	On track
M6	Climate change action plans	Not available	On track

In year 2000, total LUCF emissions and removals were 44,805 ktCO₂e and 2,244 ktCO₂e respectively, or net emissions of 42,758 ktCO₂e², while average annual emissions and removals between 2005 and 2015 were 41,013 ktCO₂e and 7,533 ktCO₂e respectively, or net emissions of 33,479 ktCO₂e³ (See also section 2.8). Nevertheless, the 70% forest coverage of land area by 2020, **M1** target in the 2015 NDC, has not been achieved. According to the Lao PDR's Forest Reference Emission Level (FREL) submitted to UNFCCC in 2018, forest coverage in 2015 accounts for about 58% of total surface area in the country. The Lao People's Democratic Republic assumed its FREL to be valid for the next 11 years (i.e. 2015–2025).

Moreover, Lao PDR increased its hydropower resources to reach over 4,500 MW installed capacity in 2018 (EDL, 2018), in line with **M5** target set in the 2015 NDC. Applying 5,220 average operating hours per year (EDL, 2018) and 0.5595 tCO₂/MWh emission factor of the Lao grid (UNFCCC, 2019), about 13,000 ktCO₂e/y emission were abated in this sector through the displacement of electricity that would otherwise be supplied to the grid by more GHG-intensive means. The amount is equivalent to 26% of total national emissions in year 2000 (50,742 ktCO₂e).

Other achievements include implementation of the rural electrification programme which led to the electrification of 93.79% of the total population (EDL, 2018), beyond the 90% **M3** target which was set in the 2015 NDC. Financial constraints were identified as the main challenge towards **M1**, **M2** and **M4**. Data uncertainty, data inconsistency and transparency, access to data, lack of data as well as limited cross-sectoral coordination are other key hurdles in the implementation of **M1**.

Estimated national GHG emissions level in 2020 is presented in Figure 1 under section 2.2. It corresponds to the value for year 2020 in the '2030 unconditional mitigation scenario' data set.

2.5. 2030 Unconditional mitigation scenario and targets

The unconditional mitigation scenario and targets are the GHG emission reductions efforts that Lao PDR can commit to by 2030 considering own resources and existing levels of support from developed country Parties. Sectoral targets are presented in Table 2, national target in Table 3 below. Details are provided in Annex 1.

²Lao People's Democratic Republic, Technology Needs Assessments Report - Climate Change Mitigation, 2013, Department of Disaster Management and Climate Change, page 37.

³Lao People's Democratic Republic, Forest Reference Emission Level and Forest Reference Level for REDD+ Results Payment under the UNFCCC, 2018, Department of Forestry Ministry of Agriculture and Forestry, Lao PDR, page 27.

Table 2: Sectoral level 2030 unconditional mitigation targets

Sector	Mitigation target (2020-2030)	Average abatement between 2020 and 2030 (ktCO ₂ e/y)
Land Use Change and Forestry	Reduced emissions from deforestation and forest degradation, foster conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks.	1,100
Energy		
Hydropower	13GW total hydropower capacity (domestic and export use) in the country	2,500
Energy Efficiency	Introduction of 50,000 energy efficient cook stoves	50
Transport	<ul style="list-style-type: none"> • New Bus Rapid Transit system in Vientiane Capital and associated Non-Motorized Transport (NMT) component • Lao-China Railway 	25 300

In the LUCF sector, Lao PDR aims to accelerate the implementation of the national strategy to reduce emissions from deforestation and forest degradation, foster conservation, sustainable management of forests, buffer zones of protected areas and other preserves, and enhancement of forest carbon stocks. The target is to reduce LUCF emissions by 1,100ktCO₂e per year on average between 2020 and 2030, which is a threefold reduction objective compared to what was achieved between 2000 and 2015 (See also section 2.4). This can be achieved by ongoing projects including Green Climate Fund’s FP117: “Implementation of the Lao PDR Emission Reductions Programme through improved governance and sustainable forest landscape management”, as well as the World Bank’s “Lao Landscapes and Livelihoods Project (P170559)”. Forest management issues shall be addressed including through village-level land use planning as well as forest land data management and accessibility.

In the energy sector, mainly three sub-sectors, hydropower, energy efficiency and transport, are mobilized to contribute to the mitigation efforts. Total target installed hydropower capacity in the country by 2030 is set at 13 GW, by applying an 80% probability ratio to the 2030 anticipated installed capacity in Ministry of Energy & Mines’ 2016-2030 Power Development Plan. 50,000 energy efficient cook stoves will reduce the use of non-renewable biomass for combustion, then a new target in the transport sector is introduced to replace **M4** target in the 2015 NDC, which has not been implemented, namely the construction and operation of a new bus rapid transit system in Vientiane Capital and associated Non-Motorized Transport (NMT) component, as well as the construction and operation of a Lao-China railway, which will displace the use of internal combustion engine private vehicles. The unconditional targets for energy efficiency and the transport sector have been defined considering that financing for the projects is already secured.

Ongoing mitigation efforts and the new 2030 sectoral targets established in Table 2 above will contribute to reach the 2030 unconditional national target presented in Table 3 below.

Table 3: National level 2030 unconditional mitigation target

National level 2030 unconditional target	60% GHG emission reductions compared to baseline scenario, or around 62,000 ktCO ₂ e in absolute terms.
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The 60% GHG emission reductions national level 2030 target demonstrates the enhanced contribution of the country to the Paris Agreement, considering the 34% GHG emission reductions compared to the baseline scenario achieved in 2020.

2.6. 2030 Conditional mitigation scenario and targets towards net zero emissions 2050

The conditional mitigation scenario and targets are the GHG emission reductions efforts that Lao PDR could achieve by 2030 contingent upon increased levels of financial support from developed country Parties. Sectoral targets, including additional sectors compared to 2015 NDC, are presented in Table 4. Details are provided in Annex 1.

Table 4: 2030 conditional mitigation targets

Sector	Mitigation measure (2020-2030)	Average target between 2020 and 2030 (ktCO₂e/y)
Land Use Change and Forestry	Increased forest cover to 70% of land area (i.e. to 16.58 million hectares) through reduced emissions from deforestation and forest degradation, foster conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks.	45,000
Energy		
Other renewables	SOLAR and WIND: 1 GW total installed capacity in the country	100
	BIOMASS: 300 MW total installed capacity in the country	84
Transport	30% Electric Vehicles penetration for 2-wheelers and passengers' cars in national vehicles mix	30
	Biofuels to meet 10% of transport fuels	29
Energy efficiency	10% reduction of final energy consumption compared to business-as-usual scenario	280
Agriculture	50,000 hectares adjusted water management practices in lowland rice cultivation	128
Waste	Implementation of 500 tons/day sustainable municipal solid waste management project	40

In the LUCF sector, Lao PDR would achieve to increase the forest cover to 70% of total land area, in line with the National Forestry Strategy.

In the energy sector, three sub-sectors would contribute to reach the conditional target. Renewable energy capacity would be increased to 1 GW solar and wind power and 300 MW biomass power capacity. The latter would also contribute to improve air quality through the utilization of agricultural residues and avoidance of slash and burn practices. This new renewable energy target updates **M2(1)** target in the 2015 NDC. Two conditional targets are brought forward in the transport sector, namely 30% Electric Vehicles penetration for 2-wheelers and passengers' cars in national vehicles mix, as well as to increase the share of biofuels to meet 10% of the transport fuels by 2030, in line with **M2(2)** from the 2015 NDC. Finally, a new target of 10% reduction of final energy consumption compared to business-as-usual (BAU) scenario is introduced in the energy efficiency sub-sector, to support the implementation of the 2016 National Policy on Energy Efficiency and Conservation which estimated total energy demand in Lao PDR as reaching 4,320 ktoe in 2030 (BAU scenario).

A new conditional target in the agriculture sector is the development of 50,000 hectares adjusted water management practices in lowland rice cultivation. The agriculture sector is the second most carbon intensive sector in the country and was not covered in the previous NDC submission.

Moreover, a new conditional target is introduced in the waste sector through the implementation of a 500 tons MSW/day sustainable municipal solid waste management capacity in Vientiane Capital. Although the sector only contributed to less than 1% of GHG emissions in the base year, emissions of methane associated with open burning of waste as well as disposing organic waste in a solid waste disposal site without landfill gas capture system are expected to keep growing steadily together with economic development. Moreover, the transition towards a circular economy is one of the priority areas in the upcoming 9th National Socio-Economic Development Plan. The target will contribute to the implementation of the Sustainable Solid Waste Management Strategy and Action plan for Vientiane 2020-2030 which also encompass organic waste separation and waste recycling initiatives. Lao PDR will also aim to further explore the mitigation potential of a circular economy including through material and product recirculation, circular business models, product resource efficiency, and prioritizing the use of regenerative material resources.

The extension of GHG emission reduction measures to energy efficiency, agriculture and waste further demonstrates the ambition of Lao PDR to step up action towards the objectives of the Paris Agreement. Ongoing mitigation efforts combined to the new 2030 unconditional and conditional targets established above would position the country on a net zero emissions by 2050 pathway, and earlier in case of the conditional target in the forest sector.

2.7. Country needs

Financing needs for implementation of mitigation measures towards the 2030 conditional targets have been estimated in table below and amount to USD 4,762 Million in total, using local data when available or default values (US\$/Unit) provided by UNEP DTU Partnership 's Greenhouse gas Abatement Cost Model.

Table 5: Estimated Financing needs - conditional measures

2030 Conditional mitigation measure	Financing needs
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	(Million USD)
Increased forest cover to 70% of land area	1,700
SOLAR and WIND: 1GW installed capacity	1,500
BIOMASS: 300MW installed capacity	720
30% EV penetration for 2-wheelers and passengers' cars	500
Biofuels to meet 10% of transport fuels	230
10% reduction of final stationary energy consumption / BAU	30
50,000 ha adjusted water management practices in rice cultivation	65
Implementation of 500 tons/day sustainable MSW treatment	17
Total financing needs – conditional measures	4,762

In addition, Lao PDR seeks support from developed country Parties in the design of innovative financial mechanisms that can blend public and private capital as a means of mitigating risks and unlocking private sector investment in climate projects.

The country also requests continuous administrative, legal, technical and institutional capacity building, policy design and readiness support for the implementation of its NDC, including but not limited to measurement, reporting and verification, data collection, processing and management for GHG emissions inventories, GHG and climate modeling, carbon trading and enhanced mainstreaming of climate change into national and sub-national policies, including through climate action planning tools such as climate risk screening and climate budgeting.

Finally, Lao PDR would welcome legal and technical assistance in adjusting forestlands demarcation to match existing forest cover and avoid conversion to other land use of forested areas currently designated as outside forestland demarcation.

2.8. Methodology

Baseline and mitigation scenarios have been calculated using UNEP DTU Partnership's Greenhouse Abatement Cost Model (GACMO). Primary data source includes Lao PDR Second National Communication to the UNFCCC, Lao PDR Technology Needs Assessments Report - Climate Change Mitigation, Lao PDR Forest Reference Emission Level and Forest Reference Level (FREL/FRL) for REDD+ Results Payment under the UNFCCC, 2018 Electricité du Laos (EDL) Electricity Statistics Report, Lao PDR Energy Statistics 2018, Approved GCF funding proposal FP117. National electricity grid emissions factor was calculated using the UNFCCC Tool to calculate the emission factor for an electricity system. GHG inventory in Lao PDR's 2nd National Communication to UNFCCC followed the revised 1996 guidelines of the Intergovernmental Panel on Climate Change (IPCC). Background information on mitigation targets are provided in Annex 1.

To estimate emissions and removals from forest land, the NDC assumes emissions and removals consistent with those reported in the GHG inventory for 2000 included in the second National Communications [using the 1996 IPCC guidelines]. It is not comparable with the net sink reported for forest land in the first Biennial Update Report (BUR) [applying the 2006 IPCC guidelines] but is broadly consistent with the coverage of the net emissions reported in the annex on REDD+ Results-

Based Payments included in the same BUR. The main difference with the inventory included in the BUR is that the latter includes an estimate of biomass increase in forest remaining in the same strata based on a gain-loss method, which results in forestlands being reported as a large sink. In view of the lack of robust data to confirm it, the NDC assumes that forest remaining in the same strata are just carbon neutral. This reduces uncertainties.

Lao PDR acknowledges this discrepancy as an area for improvement and is committed to enhance the consistency between the FREL/FRL and future GHG inventories for the AFOLU sector to the extent possible, including through validating/adjusting the gain-loss estimates of forest remaining forest by a stock change approach.

3. ADAPTATION

3.1. National context

Due to its geographic and geophysical characteristics, high reliance on natural resources and agriculture, as well as limited adaptive capacity partly owed to its LDC status, Lao PDR remains highly vulnerable to climate change. Floods and droughts continue to be the most significant threats. The total damage and losses from 2018 flooding events that affected over 600,000 people across the country were estimated at USD 371 million or 2% of GDP⁴. In 2019, two central and four southern provinces experienced tropical storms and depression resulting in widespread flooding, affecting more than 764,000 people⁵ and leading to loss of lives, disruption to livelihoods and property damage. Risk of droughts is equally high with potential harmful effects on water resources, agricultural production and food security, hydroelectric power generation, human health etc.

In the future, significant warming is expected in the whole Mekong region and across seasons. Rainfall could increase or decrease with material variation in the magnitude of change and the location of impacts. Changes in temperatures and precipitation will trigger variations in hydrology and deteriorations of flood conditions, perturbations for biodiversity, ecosystems and ecosystems services. Rice and maize yields are anticipated to be negatively impacted, so is hydropower production, navigation, roads, water supply infrastructure and food security.⁶

The National Adaptation Program of Action (2009), the National Climate Change Strategy (2010), Climate Change Action Plan for Lao PDR for 2013 – 2020, and the previous INDC (2015) emphasize the need to build climate resilience in the most vulnerable sectors: agriculture, forestry and land use, water resources, transport and urban development, and public health. The National Green Growth Strategy to 2030 (2019) further places climate change adaptation as a cross-cutting focus area with the objective of reducing vulnerability of the country and of the population, especially disadvantaged groups, to natural disasters and global economic uncertainties which have become more serious and unpredictable. Adaptation measures also generate mitigation co-benefits and contribute to economic diversification. For instance, improved forest management within conservation forest areas increases mitigation potential as well resilience to climate-induced shocks such as floods and droughts. Next to this, the circular economy can also improve the resilience of Lao PDR to climate change. For example, by prioritizing the use of domestically available regenerative resources and closing nutrient cycles at a local level, communities can become less dependent on vulnerable international value chains.

⁴ Government of Lao PDR. Post-Disaster Needs Assessment. 2018 Floods, Lao PDR. 2018.

⁵https://reliefweb.int/sites/reliefweb.int/files/resources/AHA-Situation_Update-no6-LaoPDR_TS-PODUL-TD-KAJIKI.pdf

⁶ Mekong Climate Change Adaptation Strategy and Action Plan (2017), Mekong River Commission

Taking into consideration the 10-year National Socio-Economic Development Strategy 2015 – 2025 and the next 5-year National Socio-Economic Development Plan 2021 – 2025, priority adaptation objectives in key sectors set out in the 2015 NDC are updated to include measures that could reduce risks and provide long-term solution to enhance resilience especially in the Energy Sector. Adaptation objectives for key sectors are summarized in the Table 6 below. Moreover, the 2020 NDC as well as the upcoming National Adaptation Plan (NAP) will strive to facilitate their implementation as well as their measurement, reporting and verification. NAP will support the development and review of adaptation plans at the national and sub-national levels.

Table 6: Long-term adaptation objectives in key sectors

#	Sector	Objectives
1	Agriculture	<ul style="list-style-type: none"> Promote climate resilience in farming systems and agriculture Infrastructure Promote appropriate technologies for climate change adaptation, including nature-based and circular economy solutions
2	Forestry and Land Use Change	<ul style="list-style-type: none"> Promote climate resilience in forestry production and forest ecosystems, including in buffer zones of protected areas and other forested areas Promote technical capacity in the forestry sector for managing forest for climate change adaptation Promote integrated land use planning, natural resources and environment management
3	Water Resources	<ul style="list-style-type: none"> Strengthen water resource information systems for climate change adaption Manage surface water, groundwater and wetland for climate change resilience Increase water resource infrastructure resilience to climate change, including through nature-based solutions Strengthen early warning systems in a timely manner
4	Transport and Urban Development	<ul style="list-style-type: none"> Increase the resilience of urban development and infrastructure to climate change, including through the use of green infrastructure and nature-based solutions Promote ecosystem-based adaptation solutions
5	Public Health	<ul style="list-style-type: none"> Increase the resilience of public health infrastructure and water supply system to climate change Improve public health services for climate change adaptation and coping with climate change induced impacts.
6	Energy	<ul style="list-style-type: none"> Build resilience to climate change in hydropower sector through improved dam safety regulations and guidelines Strengthen technical capacity to use new and innovative technologies to enhance climate resilience and sound management in energy sector Promote multipurpose use of reservoirs to enhance resilience of surrounding communities and maximize benefits for other sectors

3.2. Current and near-term planning and actions

Climate change adaptation has been integrated into high-level policy frameworks, including the 8th National Socio-Economic Development Plan (2016 – 2020), National Green Growth Strategy to 2030, and sectoral strategies such as the Ten-Year Natural Resources and Environment Strategy 2016 – 2025, a draft Urban Development Strategy to 2030, Agriculture Development Strategy to 2025 and Vision to 2030, and Strategy on Climate Change and Health Adaptation 2018 – 2025 and action plan 2018 – 2020.

The Disaster Risk Management Law was adopted in 2019. The law strengthens the legislative framework for adaptation, highlights the need for risk reduction and represents a critical shift from a reactive to proactive approach by the Government of Lao PDR. The 2019 Decree on Climate Change set out principles, measures and regulations to prevent, protect and reduce potential impacts of climate change on lives, properties, environment, biodiversity and infrastructure.

The 2010 National Strategy on Climate Change is being revised and will put a stronger emphasis on gender responsive climate action and enhanced adaptation efforts of the vulnerable sectors. In addition, the NAP is in its preparation phase and expected to start in 2021. As part of the process, long term adaptation plans will be further elaborated and continue to evolve as more data is gathered and experience gained. Process will be established to ensure that the NAP is mainstreamed into government planning processes at the local level.

Between 2015 and 2020, progress has been made towards the adaptation objectives in the vulnerable sectors, as follows:

Agriculture

Research and development of crop varieties, including rice and vegetables, tolerant to flood or drought has been undertaken and introduced to farmers. Climate smart agriculture techniques have been piloted such as direct seeding using seed drillers, system of rice intensification, composting for soil improvement mainly for vegetables, use of greenhouse for vegetables production, water management practice using water harvesting techniques and groundwater, etc. In the livestock sub-sector, vaccination campaigns are regularly undertaken to protect animals from disease, and fish culture using plastic sheet has also been piloted. Agro-climate information service is being strengthened to provide a more reliable and accessible forecast for farm decision making. Ministry of Agriculture and Forestry (MAF) is currently enhancing agribusiness value chain by improving the resilience of agricultural infrastructure, enhancing crop productivity, promoting crop diversification and commercialization.

Forestry and Land Use Change

The National land allocation master plan was approved in 2018 with clear scope, categories and use of lands to manage, protect, develop and use lands in accordance with sustainable practices. Participatory land use zoning is being undertaken. Presently, MONRE is translating this master plan into plans at the sub-national level that will also cover an integrated management of natural resources and environment including climate change. Participatory sustainable forest management especially bringing rights and responsibilities closer to forest resources has seen some progress with village forest management plan formulated for selected villages. Fast-growing trees are being promoted to stabilize soil erosion in risk-prone areas. The revised forestry strategy will see enhanced efforts in promoting climate resilience and establishing a clear link between adaptation co-benefits and climate mitigation efforts.

Water Resources

The revised law on water and water resources was approved in 2017 and the national strategy for water and water resources management, governance and utilization until 2030, decree on watersheds and reservoir as well as the regulations on wetland and watershed are underway. In addition, subsidiary legislations related to water and water resources are being prepared including guidelines on water utilization, decision on water quality and wastewater discharge, and decision on water reservation areas and water resources management. The groundwater management regulation has been approved and the groundwater management plan is now being prepared for Savannakhet province. Water resources assessment and modelling, river basin profiles and basin management plans are also being drafted. A water information system is being developed to collect information from all sources related to water resources. In addition, Meteorology and Hydrology Law was approved in 2017 and aims to prevent and reduce the impacts of natural disasters on lives and properties, ensure timely and accurate data provision.

The network of meteorological and hydrology stations has been expanded and capacity for better forecasting enhanced. Climate risk and vulnerability assessment was conducted for two important wetland sites with interventions promoted to increase resilience of vulnerable communities in and around the wetland sites - Beung Kiat Ngong and Xe Champhone. Groundwater will be another key priority area for climate resilience in the water resources sector.

In accordance with the 1995 Mekong Agreement, Lao PDR is also working with other Mekong River Basin countries to implement the Mekong Climate Change Adaptation Strategy and Action Plan and the Basin Development Strategy 2021-2030 which has a strategic priority to strengthen resilience against climate risks, extreme floods and droughts. The strategy includes cooperation with other countries on mitigating and managing floods and droughts for increased regional benefits, environmental protection and gender sensitive livelihood development in transboundary areas, as well as more optimal and sustainable economic development in water-related sectors.

Transport and Urban Development

Guidelines for Environmentally Sustainable Cities of Lao PDR were developed to provide guidance and steps to city government on how to analyze urban issues and promote urban environmental management to encourage cities in Lao PDR to become clean, green and beautiful. Ministry of Public Works and Transport adopted a policy on mainstreaming climate resilience into this sector. The draft urban development strategy to 2030 explicitly calls for enhanced resilience in urban development. Ongoing investments include climate resilience road improvement for some critical sections for national and local road network, riverbank protection and drainage canal improvement in major cities to prevent both overflow river flooding and inundation. Improving urban resilience using ecosystem services approach also increasingly gained attention especially in relation to urban water management. Building resilience in key structures like roads, bridges, buildings both construction and maintenance is also a priority on the agenda. The climate resilience road asset management system, which includes vulnerability data such as landslides and flooding, is being finalized. The system will be used for road maintenance planning, prioritization and budgeting.

Public Health

Key achievement consists of the development and endorsement of the Strategy on Climate Change and Health Adaptation 2018 – 2025 and action plan 2018 – 2020, which defines strategic directions to build resilience in the sector. The strategy has 10 components including leadership and governance, organizational and staff capacity strengthening, vulnerability assessment, integration of risk monitoring and early warning systems, health and climate research, sustainability of technology and infrastructure, management of health environment determinants, climate informed health programs, emergency preparedness, climate and health financing. Indicators are provided in Annex 2.

Although the implementation of the action plan has experienced delays, master trainers on climate change and health impacts were trained to provide training on mitigating impact of climate change in the health sectors in 7 provinces. Information Education Communication materials related to climate change and health impacts were also developed and disseminated to public. In addition, the ‘Scaling-Up Water Supply, Sanitation and Hygiene’ project will contribute to public health climate adaptation through increasing access to improved water sources and sanitation services in rural areas, with specific targets ensuring gender equality. Related quantitative indicators and targets are provided in Annex 2.

Energy

While much of the attention on energy was related to mitigating greenhouse gas emissions through promotion of renewable energy and energy efficiency, domestic generation of electricity, mostly from hydropower, is in many ways vulnerable to extreme climate events. Lao power sector vulnerability assessment and resilience action plan including both climatic and non-climatic hazards was undertaken between 2018 and 2020 to provide a comprehensive look at energy sector and identify the most important hazards and risks and action plans to address the risks. With dam collapse in Attapeu in 2018 due to storms and heavy rains, which incurred huge losses and damages, improving hydropower infrastructure resilience is high on the agenda. In 2018, the Dam Safety Guidelines, Emergency Action Plan was developed to provide recommendations to hydropower companies to put in place and implement emergency action plans. In addition, hydropower reservoirs will be effectively managed and shared for multipurpose uses to enhance resilience of the surrounding communities and other sectors through improved flood and drought measures, improved productivity and water use for recreation and households.

Education and Awareness Raising

Climate change education and awareness program has seen some progress with awareness raising campaign conducted throughout the country to increase people understanding about climate change. In 2018, the National Strategy on Education and Awareness on the Environment and Climate Change (2018 – 2025) and Vision to 2030 was approved to provide overarching goals for “Lao people become more knowledgeable and aware, understand, care, participate and take ownership in natural resources management, environmental protection and adaptation to climate change, ensuring socio-economic development in line with green and sustainable manner”. The National University of Laos is also teaching climate change subject at the Faculty of Environmental Science and other subjects related to climate change at other faculties. Awareness raising on environmental and climate change as well as circular economy will be a key element in climate change projects to enhance understanding of stakeholders at different levels on the greenhouse gas emission contributing to climate change and impacts of climate change.

3.3. Gaps, barriers and needs

Similar to mitigation section, gaps and barriers remain for Lao PDR to achieve the adaptation vision and goals set out in the National Strategy on Climate Change as well as the sectoral objectives, including:

- Limited information and knowledge on impacts of climate change on vulnerable sectors including downscaled climate scenarios as well as limited technical knowledge and capacity of concerned sectors.
- Weak institutional capacity to mainstream climate change into development plans or translate them into action able measures at local level.
- Absence of sectoral strategies, action plans and indicators in most key sectors.
- Weak cross-sectoral coordination.
- Lack of diversified sources of long-term financing. It is hard to secure private sector financing in this area in particular, so public sector funding including ODA and other development assistance are a primary source.
- Technical and human resources constraints that limit capacity for meteorological and hydrological observations, forecasting, and early warning of associated hazards.
- Absence of monitoring and evaluation framework and systems including for climate finance monitoring.
- Lack of access to appropriate technologies to promote adaptation measures.

In addressing these adaptation gaps and barriers, the following needs will be critical for Lao PDR:

- Technical support for the downscaling of global and regional climate impact and vulnerability assessments to the national and local scale in a way that can support local and sector planning including the identification of practical adaptation measures;
- Investment in systems and tools to support monitoring, forecasting, analysis, early warning and preparedness to natural hazards, integrated within regional decision-support systems and platforms;
- Improved cross-sectoral governance and coordination structures, drawing on international best practice and lessons learned;
- Investment in education and technical skills development to support planning and management of adaptation measures within broader sectoral objectives and plans;
- Finance to support access to international and regional technologies and know-how;

The National Adaptation Plan (2021) will strengthen institutional and technical capacity of national and sub-national stakeholders to integrate adaptation into development planning, strengthen climate information system for prioritizing adaptation needs, develop a mechanism to measure the effectiveness of national policies, strategies and plans for adaptation to climate change at national and sub-national levels. The foreseeable funding support from GEF LDCF for NAP will support a vulnerability assessment and the formulation of adaptation plans at provincial and district levels.

At sectoral level, except for public health where the proposed target is aligned with the Strategy on Climate Change and Health Adaptation to 2025, the current lack of adaptation strategies and action plans including results-based frameworks does not allow for effective design, implementation and monitoring of NDC long term adaptation objectives. In this context, the 2020 NDC brings forward shorter-term 2025 targets which will be instrumental in guiding and monitoring adaptation efforts throughout the country and across sectors in the longer-term, as detailed in table below.

Table 7: 2025 shorter-term adaptation targets

#	Sector	Target 2025
1	Agriculture	Mainstream climate change adaptation in sectoral strategy and action plan, including through results-based management framework
2	Forestry and Land Use Change	Mainstream climate change adaptation in sectoral strategy and action plan including through results-based management framework
3	Water Resources	Mainstream climate change adaptation in sectoral strategy and action plan including through results-based management framework
4	Transport and Urban Development	Mainstream climate change adaptation in sectoral strategy and action plan including through results-based management framework
5	Health	Implement the Strategy on Climate Change and Health Adaptation to 2025
		Implementation of the ‘Scaling-Up Water Supply, Sanitation and Hygiene’ Project – Targets in Annex 2
6	Energy	Mainstream climate change adaptation in sectoral strategy and action plan including through results-based management framework

In the health sector, the overall objective is to “promote the capacity of the public health sector and community to protect and prevent the people health and ourselves from unstable and changing climatic conditions”. The different components, main activities, timeline, responsibilities and financing needs are detailed in Appendix 1 of the Strategy. Implementation arrangements will be in line with Part 5 of the Strategy.

For other sectors, climate change adaptation will be mainstreamed in each sectoral strategy and action plan to establish the direction and priority areas for action, based on emerging needs for resilience building, as well as a comprehensive results-based management framework including monitoring indicators, financial needs and potential sources to implement those priority measures. Nature-based solutions shall be prioritized as effective lower cost options to counter climate-induced disasters such as floods, landslides and droughts. More importantly, potentials for mitigation co-benefits will be strongly considered in sectoral adaptation strategies and action plans as well. Current sectoral delineations may be adjusted and streamlined to reflect institutional arrangements. Delivery of the shorter-term targets shall be coordinated by the Department of Climate Change of the Ministry of Natural Resources and the Environment and respective Ministries, in line with applicable sectoral policies and strategies.

4. IMPLEMENTATION

4.1. National Coordination Mechanism

A coordination mechanism shall be setup at national level to oversee the implementation of the NDC. The mechanism will feature representatives from Government agencies, development partners, as well as from the public and private sectors. The Decree on Climate Change issued on September 19th, 2019 by the Prime Minister’s Office assigns the Ministry of Natural Resources and Environment to take a direct responsibility and coordination with relevant ministries, organizations and local authorities. The climate change management and monitoring organizations include the Ministry of Natural Resources and Environment, the Provincial Department of Natural Resources and Environment and the District Office of Natural Resources and Environment. Local natural resources and environment sectors will report on climate change situation of their respective localities to their higher authorities, in coordination with relevant departments, offices and parties concerned.

In line with the Decree on Climate Change, The Ministry of Natural Resources and Environment shall be responsible for developing and maintaining data and information systems on climate change for collection, compilation, management, provision and service in a reliable, accurate and timely manner, using national disaster data and national statistics, in coordination with other relevant ministries and local authorities. Ministries shall also provide information related to climate change from their sectors to Ministry of Natural Resources and Environment.

Ministry of Agriculture and Forestry, Ministry of Industry and Commerce, Ministry of Energy and Mines, Ministry of Public Works and Transport, Ministry of Labor and Social Welfare, Ministry of Science and Technology, Ministry of Information, Culture and Tourism, Ministry of Education and Sports, and Ministry of Public Health shall ensure mainstreaming of climate change into their activities, including through conducting studies, research and promoting the use of environmentally friendly technologies that mitigate greenhouse gas emission and/or increase resilience to climate change.

Implementation arrangements of all measures shall be in line with applicable sectoral policies and strategies, and as per approved funding agreements or further defined as part of the financing mobilization process, which is to be coordinated by the Department of Climate Change of the Ministry of Natural Resources and the Environment.

4.2. Monitoring and Evaluation

Mitigation

Monitoring procedures for every mitigation measure are introduced in Annex 1. The Department of Climate Change from the Ministry of Natural Resources and Environment (MONRE) is responsible for the overall measurement, reporting and verification of the mitigation objectives. Capacity development plan will be extended throughout the next 5-year period with a focus on greenhouse gas accounting and monitoring. For enhanced transparency and consistency, in this new submission all quantitative targets have been formulated using a single unit, average ktCO₂e/y between 2020 and 2030.

Adaptation

National level metrics will be defined to document progress, effectiveness and gaps as part of the ‘reporting, monitoring and review’ element of the National Adaptation Plan. The NAP should also foster cross-sectoral coordination on data reporting and data sharing, capacity building for adaptation monitoring and evaluation, and climate finance monitoring for improved tracking of adaptation projects in the country.

Quantitative indicators for measurement, reporting and verification of the progress on increasing the resilience of public health infrastructure and water supply system to climate change are defined in Table 1 of Appendix 2 of the Strategy on Climate Change and Health Adaptation 2018-2025, and summarized in Annex 2 of the 2020 NDC. Quantitative indicators for measurement, reporting and verification of the progress on the long-term adaptation objectives in the agriculture, forestry and land use change, energy, water resources, and transport and urban development, will be defined in the sectoral adaptation strategies and actions plans then communicated in the 2025 NDC. Means of verification for 2025 adaptation targets set out above are the endorsement of sectoral adaptation strategies and/or mainstreaming of climate change adaptation measures by relevant Ministries.

4.3. Voluntary International cooperation

The Government of Lao PDR herewith expresses interest in cooperating with other nation states to meet the objectives of the Paris Agreement, including but not limited to the use of internationally transferred mitigation outcomes as well as for the supply of clean, renewable energy from hydropower resources to neighboring countries.

ANNEX 1: Mitigation Measures

Unconditional measures

Measure	Reduced emissions from deforestation and forest degradation, foster conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks
Sector	Land Use Change and Forestry
GHG mitigation target	1,100 ktCO ₂ e/y average abatement between 2020 and 2030
Monitoring procedures	In line with monitoring plans of projects mentioned below
Comments	<ul style="list-style-type: none"> - Emissions reductions will mainly be achieved through existing mitigation projects including the Green Climate Fund's FP117: "Implementation of the Lao PDR Emission Reductions Programme through improved governance and sustainable forest landscape management", as well as the World Bank's "Lao Landscapes and Livelihoods Project (P170559)". - Mitigation target is equivalent to increasing forest stocks by about 8,300 hectares per year, based on 37.2 tC/ha average carbon stocks in plantation forest class, as per Lao PDR's Forest Reference Emission Level (UNFCCC, 2018)

Measure	13 GW total installed hydropower capacity (domestic and export use) in the country by 2030
Sector	Energy
GHG mitigation target	2,500 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Newly added hydropower capacity will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data from the Ministry of Energy and Mines
Comments	<ul style="list-style-type: none"> - Installed capacity as of 2018 is around 4.5 GW (EDL, 2018) - Target installed hydropower capacity by 2030 has been calculated conservatively by applying an 80% probability ratio to the 2030 anticipated installed capacity in Ministry of Energy & Mines' 2016-2030 Power Development Plan. - GHG mitigation target is estimated based on expected 8.5 GW added capacity between 2019 and 2030.

Measure	Introduction of 50,000 energy efficient cook stoves
Sector	Energy
GHG mitigation target	50 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	As per World Bank's Lao PDR Clean Cook Stove Initiative

Comments	Implementation across three provinces: Vientiane Capital, Savannakhet, and Champasack.
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Measure	New Bus Rapid Transit system in Vientiane Capital and associated Non-Motorized Transport component
Sector	Transport
GHG mitigation target	25 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Number of passengers transported in the project and total consumption of fuel/electricity in the project will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data provided by the BRT operator.
Comments	Ex-ante estimate is based on 13km new segregated lanes, where only buses are allowed to operate

Measure	Lao-China railway
Sector	Transport
GHG mitigation target	300 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Number of passengers and tons of freight transported by Lao-China railway will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data provided by the Ministry of Public Works and Transport.
Comments	Ex-ante estimate is based on 3.4 million passenger-kilometers and 1 million ton-kilometers freight per day.

Conditional measures

Measure	Increased forest cover to 70% of land area (i.e. to 16.58 million hectares) through reduced emissions from deforestation and forest degradation, foster conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks.
Sector	Land Use Change and Forestry
GHG mitigation target	45,000 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	As per latest available national forest inventory
Comments	The target is in line with National Forestry Strategy which aims to return forests cover to 70 percent of total land area in the country

Measure	1 GW total installed solar and wind power capacity in the country by 2030
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Sector	Energy
GHG mitigation target	100 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Newly added power capacity will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data from the Ministry of Energy and Mines
Comments	<ul style="list-style-type: none"> - Installed solar capacity as of 2018 is around 32 MW (EDL, 2018) - No installed wind power capacity as of 2020 - Target installed capacity by 2030 has been estimated conservatively by applying 50% probability ratio to the 2030 anticipated installed capacity by Ministry of Energy & Mines.

Measure	300 MW total installed biomass power capacity in the country by 2030
Sector	Energy
GHG mitigation target	84 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Newly added biomass capacity will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data from the Ministry of Energy and Mines
Comments	- Installed capacity as of 2019 is around 40MW

Measure	30% Electric Vehicles penetration for 2-wheelers and passengers' cars in national vehicles mix
Sector	Transport
GHG mitigation target	30 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Share of Electric Vehicles in national vehicle mix will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data from the Ministry of Public Works and Transport.
Comments	The measure is in line with the Ministry of Energy and Mines' "Clean energy promotion policy in transportation, development plan 2025, Strategy 2030 and vision 2050"

Measure	Biofuels to meet 10% of transport fuels
Sector	Transport / Energy
GHG mitigation target	29 ktCO ₂ e on average per year between 2020 and 2030

Monitoring procedures	Share of biofuels in transport fuels will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data from the Ministry of Energy and Mines.
Comments	<ul style="list-style-type: none"> - Target is in line with Prime Minister's Decree on the Bio-fuel Promotion and Development in Lao PDR (No. 410/GO, 10 November 2016) - Actions, Responsible Agencies, and Implementation are described in the Lao Renewable Energy Strategy - Agricultural products and residues, including crops such as palm oil, soybean, and jatropha, offer high potential for biofuel production - Share of biofuel in transport fuels as of 2019 is estimated between 0.5% and 1%.

Measure	10% reduction of final energy consumption compared to business-as-usual scenario
Sector	Energy
GHG mitigation target	280 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Energy savings should be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data provided by the Ministry of Energy and Mines
Comments	<ul style="list-style-type: none"> - The measure is in line with the 2016 National Policy on Energy Efficiency and Conservation. - Business-as-usual total energy demand was estimated to reach 4,320 ktoe by 2030. - Organizational arrangements, implementation roadmap and energy efficiency measures are described in the 2016 National Policy on Energy Efficiency and Conservation.

Measure	50,000 hectares adjusted water management practices in lowland rice cultivation
Sector	Agriculture
GHG mitigation target	128 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Total surface area under adjusted water management practices will be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data provided by the Ministry of Agriculture and Forestry
Comments	The measure involves reducing anaerobic decomposition of organic matter in rice cropping soils. Emphasis should be on strengthening both software and hardware aspects of water management practices. Software would include but is not limited to (1) capacity building at

	all levels including communities; and (2) incentives for behavior change, while hardware aspects would include the renovation of irrigation systems to support the practices, which takes into account the small scale and fragmented nature of Laos' irrigation, and low adoption rate.
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Measure	Implementation of 500 tons/day sustainable municipal solid waste management project
Sector	Waste
GHG mitigation target	40 ktCO ₂ e on average per year between 2020 and 2030
Monitoring procedures	Total amount of waste and waste type deposited at the project should be monitored on an annual basis by the Department of Climate Change of the Ministry of Natural Resources and Environment using data provided by the Vientiane City Office for Management and Services.
Comments	The measure is aligned with the Sustainable Solid Waste Management Strategy and Action plan for Vientiane 2020-2030

ANNEX 2: Adaptation Measures

Health Adaptation Strategy – Summary of components and indicators

Component	Key indicators
Component 1: Leadership Status and Governance	<ul style="list-style-type: none"> • The Committee and the Adaptation Team of the Public Health Sector will be established • Completion of the coordinated co-operation mechanism • At least 03 workshops/seminars conducted • At least 02 projects/year developed Health Impact Assessment Reports • At least 03 MoUs signed with the relevant stakeholders
Component 2: Organizational and Staff Capacities Strengthening	<ul style="list-style-type: none"> • 100 people/year had attended the workshop (50% of women) • At least 8 hours teaching on climate change and health at the National University and the University of Medical Science. • At least 5 recommendations regarding the diagnosis, investigation, control, prevention and treatment, injuries and foodborne diseases have been improved or created. • Workshop conducted At least 03 times/year • At least 10,000 posters/brochures produced and distributed to communities • At least 2 times of TV/radio advertisement per month • Communication strategy related to climate change and health • Implementation plans on gender roles related to the climate change and health
Component 3: Vulnerability, Capacity and Adaptation Assessment	<ul style="list-style-type: none"> • The 100 most disadvantaged communities to the weather fluctuation condition and climate change have been identified. • At least 3 meetings/year have been conducted on integrating health impact assessments into all development projects. • At least 4 projects and adaptation plan have been established • There is a list of health sensitive areas • At least 100 sensitive communities have built adaptive measures activity • There is a disadvantageous community map that adapts to the climate change
Component 4: Integration of Risk Monitoring and Warning Systems	<ul style="list-style-type: none"> • 1 time/month information analysis on climate change and diseases • 1 time/month reporting on climate change sensitive disease • 1 time/week monitoring report and control activities/insecticide report • 1 time/quarterly report on early warning system
Component 5: Health and Climate Research	<ul style="list-style-type: none"> • At least 3 meeting sessions held in the National Research Agenda • At least 2 topics/ year that conducted research • At least 2 recommendations/year of research carried out
Component 6: Resilience to the Climate and the Sustainability of Technology and Infrastructure	<ul style="list-style-type: none"> • 10 district hospital and 50 healthcare center installed or renovated to ensure there are clean water, electricity, communication, equipment and medicines. • 10 district hospital and 50 healthcare center that use new technology such as eHealth or satellite image on the effectiveness improvement of public health systems. • 10 new healthcare centers in areas not at risk from climate change • 3 proposals for green hospital development in central and provincial levels.

Component 7: Environmental Determinants Health Management	<ul style="list-style-type: none"> • At least 5 meetings with ministry departments related to the review and revision of regulations on air quality, water quality, food quality, safety shelter, waste disposal and urban development. • Health Impact Assessment Report for 2 projects/year
Component 8: Climate Informed Health Programs	<ul style="list-style-type: none"> • Monitoring at least 04 times/year • 20 sensitive communities informed on water, sanitation, hygiene, dengue control, nutrition, women health, reproductive and children health • 10 sensitive communities informed on noncommunicable disease • 10 sensitive communities informed on mental illness
Component 9: Emergencies Preparation and Management	<ul style="list-style-type: none"> • There are plans and steps to be prepared for response to emergencies • At least 50 officers participate during climate related disaster • Disaster management team deployed after severe weather event including to assess loss
Component 10: Health Financing and Climate Change	<ul style="list-style-type: none"> • Number of proposals on public health adaptation from climate change submitted to international organizations

Indicators and targets for the ‘Water Supply, Sanitation and Hygiene’ project

Indicator	Baseline	Target 2024
People provided with access to improved water sources	0	192,000
People provided with access to improved water sources - Female	0	96,000
People provided with access to improved water sources - rural	0	192,000
People provided with access to improved sanitation services	0	96,000
People provided with access to improved sanitation services - Female	0	48,000
People provided with access to improved sanitation services - rural	0	96,000

Source: World Bank