Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

National Strategy on Climate Change towards 2030

Vientiane, Lao PDR
January 5, 2023

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Preface

This National Strategy on Climate Change towards 2030 has been updated from a recent National Strategy on Climate Change Solution which was adopted by the Government of Lao PDR (GoL) in 2010. This improvement of the National Strategy on Climate Change has been made in order to respond to both domestic and international changes such as: updated version of the Environmental Protection Law (EPL), Strategy on Natural Resources and Environmental Sector (SNRES) towards 2030, the 2030 Agenda for Sustainable Development Goals (SDGs), the National Green Growth Strategy (NGGS), Climate Change Decree (CCD), Law on Disaster Management (LDM), the Paris Agreement (PA), etc. The main objective of this updated strategy is to continuously transform the climate change management strategy into action in order to reduce global warming and climate change's consequences and impacts on socio-economic development in order to improve people's quality of life, maintain personal properties, as well as to improve infrastructure and environmental conditions.

The implementation of the national strategy on climate change over the past 10 years has produced considerably positive impacts on various factors, for example greenhouse gases emissions were reduced by 30% in between 2000 and 2020, climate change impact has been projected from 1975 to 2099, maps of climate change risk and vulnerable areas have been completely developed for 148 districts throughout the country, and 350 million USD has been mobilized for the implementation of climate change associated projects in Lao PDR. Despite these outstanding achievements, there are still some obstacles and challenges to overcome in the phase of implementation, namely, climate change database needs to be systematically improved and managed, capacity of staff needed to be continuously strengthened, the limitations of access and transfer of technology need to be improved, budgets have not sufficiently allocated, and the monitoring and evaluation of the implementation of climate change adaptation and greenhouse gas mitigation have not yet been systematically and effectively conducted. All of these outstanding achievements and challenges mentioned above are invaluable lessons learnt and have become the basis for improving this strategy further for better implementation and fruitful outcomes.

This updated version of climate change strategy towards 2023 has been drafted in accordance with analysis of the results of the previous implementation of climate change associated tasks, results of research studies on characteristics, overall situations, opportunities, challenges, barriers, modernization trends (at the international, regional, and national levels), globalization, current and future collaboration at the international and regional levels, outcomes and comments of all of relevant national and local sectors, as well as with the development partners and international organizations.

This strategy defines the overall goals and anticipated targets, fundamental principles, priority programs and projects to enhance and strengthen the implementation of climate change adaptation and resilience and greenhouse gas mitigation, promotes the mainstreaming of climate change in development for all relevant sectors, and creates environmental conditions conducive to climate change management.

This strategy document is considered to have an important implications for policy and technical practices to develop solutions to climate change in Lao PDR, as well as to better enhance effective and efficient collaborations with regional and international organizations. Even though each program defined in this strategy has set a scope for projects and activities, it may be used as a reference with regards to defining or mainstreaming actions for both annual and 5-year plans for all ministries, agencies, and relevant sectors at both central and local levels and for further implementations in each particular area.

On behalf of the Ministry of Natural Resources and Environment, I would like to take this opportunity to express my appreciation to the steering committee, secretariat, national and

local agencies, development partners and international organizations for their considerable and invaluable technical and financial supports for the improvement of this strategy. I strongly encourage each of us to begin to turning this strategy into action once it has been adopted.

Vientiane, Lao PDR, dated 05 January 2023
Minister of Natural Resources and Environment
(Signed and Sealed.)

Executive Summary

Climate change is one of the world's most pressing issues causing adverse impacts on the national socio-economic development and well-being of people in many countries worldwide including in the Lao PDR, where most people rely primarily on natural means for their livelihoods. Since climate change threatens the national socio-economic development of the Lao PDR, the Government of Laos (GoL) did not hesitate to take an action in early stages in the negotiation process for the development of the United Nations Framework Convention on Climate Change (UNFCCC) in 1990, and eventually ratified the UNFCCC in 1995. Furthermore, the GoL ratified Kyoto Protocol and the Paris Agreement in 2003 and 2016, respectively.

In order to materialize the climate change management, the first national strategy on climate change was completely developed in 2010. However, the implementation of the first strategy on climate change did not prove effective or efficient enough due to the following reasons: some of the contents and priority plans defined in the strategy still remain incomplete and have yet to meet the needs of the climate change solutions (in particular, the contents of the strategy are not consistent with the post-2010 newly updated legal framework); programs, anticipated goals and time-frames have not been clearly specified in the strategy; monitoring and evaluation, and reporting systems are still lacking; financial mechanisms have not been sufficiently allocated; access to funds and fund mobilization are limited; and project activities defined in the strategy have not yet been implemented effectively or efficiently.

Moreover, internal factors, in particular frequent and severe climate change phenomena and unpredictable climate patterns (e.g. rapid increase in the earth's average surface temperature, fluctuations in precipitation, increasing frequency of storms, floods and droughts) on both global and regional levels, as well as in Laos, have become some of the decisive factors leading to the improvement of this strategy. In order to develop solutions to climate-related issues at the global level, the United Nations has adopted the 2030 agenda for sustainable development known as SDGs and ratified the Paris Agreement in an attempt to maintain the earth's average surface temperature increase to no more than 1.5 degree Celsius. Therefore, it is necessary to keep the strategy on climate change up-to-date in order to better address and solve the current situation and future trends of climate change.

The general goals of this updated strategy are to achieve the targets of Net Zero Emission by 2050 (NZE 2050) and to better enable adaption to climate change at a satisfactory level. The strategy consists of 03 main strategies and 09 priority programs as follows:

03 strategies include:

1. Strategy 1: the enhancement of prevention, resilience, adaptation, risk reduction, and rehabilitation of climate change associated impacts including: strengthening the data and information systems, reporting, early warning system, risk reduction and rehabilitation of climate change associated impacts and disasters, education and awareness raising, technology transfer, resilience and adaptive capacity of infrastructures, manufacturing systems, business operations, ecological system, and communities.
2. Strategy 2: enhancement of prevention methods for the control and mitigation of greenhouse gases including: the promotion of energy effectiveness and efficiency (including renewable and alternative energy sources with environmentally friendly and low-carbon-emission characteristics); the role of ecological systems in absorbing greenhouse gases and as cleaning mechanisms; standardization of waste management; improvement of urban planning, public works and transportation; enforcement of the existing legal framework and measures associated with climate change management.
3. Strategy 3: mainstreaming climate change management in sector plans and creating an environment conductive to climate change management including: the creation

of an environment conducive to enhancement and implementation of existing regulations, plans, financial mechanisms, coordination and collaboration at national and international levels, and monitoring and evaluation processes.

09 Priority programs include:

1) Development and management of climate change database and information to track and report the status of adverse events and climate change associated impacts;
2) Enhance the resilience and adaptive capacity to climate change impacts on various sectors such as: infrastructures, manufacturing systems, business operations, services, ecological systems and communities, as well as at-risk and affected sectors;
3) Strengthen the investigation, monitoring and evaluation process, and reporting on greenhouse gas emissions;
4) Strengthen different sectoral capacity for greenhouse gas control and mitigation;
5) Develop, utilize, and transfer technologies;
6) Promote education and awareness-raising, as well as encourage public involvement with climate change mitigation;
7) Strengthen the capacity of climate finance;
8) Mainstreaming climate change awareness and creation of environments conducive to climate change management;
9) Institutional strengthening and human resource development for climate change management.

Terminology

1) **Climate Change** refers to a rapid increase in the earth's average surface temperatures which are greater than normal ranges in the long-term, caused by direct and indirect human activities or natural phenomena, resulting in changes of atmospheric components.
2) **Climate Change Management** means a set of policies, strategies, human resource development, educational curriculum development, scientific research, awareness raising, data and information sharing and dissemination, finance, materials/equipment, facilities, as well as local wisdom and indigenous knowledge in order to better enable climate change management effectively and efficiently.
3) **Adaptation** refers to any adjustment process made by humans, animal and plant species, ecosystems, infrastructure, and urban developments to be capable of being resilient to climate change and to be able to minimize climate impacts by means of introducing proper measures to reduce potential vulnerability, risk and consequent damages.
4) **Vulnerability** means sensitivity and inability to deal with the impacts of climate change-associated impacts.
5) **Resilience** means the ability to respond to impacts and to restore the affected communities or society (including infrastructure and ecosystems) back to a normal status.
6) **Greenhouse Gases (GHGs)** refer to any harmful gases including Carbon Dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbans (PFCs), Sulphur Hexafluoride (SFs), and Nitrogen trifluoride (NF3), that are emitted from natural phenomena and/or human activities (such as burning of fossil fuels, forest and land use changes, waste generation and disposition) into the atmosphere resulting in the occurrence of global warming and climate change.
7) **GHG Emissions** mean the release of the 7 GHGs mentioned above into the atmosphere. GHG emission is caused by natural phenomena and/or human activities (such as burning of fossil fuels, forest and land use changes, waste generation and disposition).
8) **Mitigation** means the process of reducing greenhouse gas emissions and the enhancement of Carbon sinks.
9) **Absorption of GHGs** means the process of absorbing greenhouse gases from the atmosphere.
10) **Financial Mechanism** means the facilitation of climate finance. The convention has established a financial mechanism to allocate funds to the least developed and developing countries or parties.
11) **Impacts** means the adverse effects of natural disasters and climate change on natural systems and human anatomy.
12) **Droughts** means natural phenomena that exists when precipitation is significantly below normal levels recorded, causing serious hydrological imbalances leading to adverse impacts on land and production systems.
13) **Floods** mean the overflowing of the normal confines of a steam or other water bodies or the accumulation of water over areas that have not been experienced being submerged in the water before.

Chapter I: General Situation and Evaluation of the Implementation of the Climate Change Strategy 2010

1.1 Overview

Climate change is one of the most pressing challenges facing our global communities, including the Lao PDR. It has been observed that, in Lao PDR, climate change has resulted in increasing variable temperatures and fluctuations in precipitation, severe storms and torrential rains, frequent occurrence of severe and prolonged floods and droughts. These natural circumstances have brought adverse impacts on several sectors, particularly in agriculture, food security, forest and land use, water resources, energy, industries, public works and transportation, urban planning and development, and public health. These can be demonstrated by the following storms from the past decade, which are some of the most severe storms to ever occur in Laos. In 2009, Typhoon Ketsana caused a major impact on Lao economy with an estimated damage cost of 94.2 million USD and affected approximately 180,000 people from 30,000 households. In 2011, typhoon Nokten caused severe damage in 12 provinces with an approximately cost of 200 millions USD of economic loss and caused 41 fatalities. In 2018, Son-Tinh and Bebinca storms caused severe floods and negatively affected the infrastructure, disrupted production activities, service, transport, and other sectors in Laos with an economic loss of approximately 371.1 million USD, equivalent to 2.1% of the national gross domestic products (GDP). It is projected that climate change will cause more frequent and severe floods and droughts resulting in consequent adverse catastrophes in the future. This indicates that Lao PDR is extremely susceptible and vulnerable to climate change associated impacts. In 2018, Lao PDR was ranked the twenty-second most vulnerable country in the world to climate change.

The Lao PDR has recognized the importance of and did not hesitate to take actions on climate change solutions at the national level, as well as contribute in the global actions on climate change. Lao PDR ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995, Kyoto Protocol in 2003, and the Paris Agreement in 2016. Moreover, Lao PDR adopted the Strategy on Climate Change of the Lao PDR in 2010, followed by the Lao PDR's Climate Change Action Plan over the period of 2013 - 2020 in 2013. Lao PDR communicated its first Nationally Determined Contribution (NDC) in 2015 and submitted a second version to the Secretariat of the UNFCCC in 2021. In September 2019, Lao PDR approved the Decree on Climate Change.

This strategy has been improved based on the outcomes of the implementation of the recent strategy which was approved by the Government in 2010. It is considered as an important document for policy implementation and the development of solutions to combat climate change in Lao PDR, as well as effective and efficient collaborations at the regional and international levels. This strategy defines overall goals on climate change towards 2050, and strategies and programs towards 2030. The strategies specifically include strategic actions on risk prevention and reduction, resilience, adaption, recovery and rehabilitation from the climate change associated impacts, as well as mitigation of greenhouse gas (GHG) emissions which are the main cause of climate change. In addition, this strategy significantly contributes to national socio-economic development in the direction of green grown and sustainable development, institutional coordination and cooperation enhancement, multi-stakeholder engagement and ownership of climate change management at the national, regional, and international levels.

1.2 Climate Change Status, Impacts, and Responses at International and Regional Levels

1.2.1 Climate Change Status and Impacts at International and Regional Levels

Global climate, more specifically the earth's average surface temperature, is changing at a significant rate. From the pre-industrial era (the 1850s) to 2017, the Earth's average surface temperature has increased by 1 degree Celsius (ºC). The key factor contributing to the increasing temperature is human-induced emissions of GHGs into the atmosphere due to extraction and consumption of fossil fuels and other natural resources, changes in patterns of land use, forest degradation and destruction, agricultural and industrial production, application of chemicals, and waste generation and disposal. The Paris Agreement (PA), adopted by the United Nations in 2015, is an important legal basis for developing solutions to climate change at the global level. The agreement has set an ambitious target and measures to hold the increase in the global average temperature to well below 2°C above pre-industrial levels. This is to ensure a social safeguard and to reduce climate change associated impacts. In 2018, The results of the study by the Inter-governmental Panel on Climate Change (IPCC) revealed that there is a high potential that the global average temperature will reach 1.5ºC above pre-industrial levels sometime between 2023 and 2052 if current global GHG emissions persist without effective and efficient measures on the global mean temperature will likely reach 1.5ºC above pre-industrial temperatures between 2030 and 2052. It is believed that the significant increase in the global average temperature will bring adverse impacts on global climate patterns and the world's communities in the following areas:

1) **Extreme heatwaves:** it will hit the tropics at least once every 5 years. If global average temperatures increase by 2ºC, 1.7 billion or more people will experience severe heat waves, and 420 million additional people will suffer from extreme heatwaves. These heatwaves are a significant factor contributing to disease outbreaks, morbidity, and overall mortality.

2) Droughts and floods: climate change has caused approximately 350 million people to live with droughts at the global average temperature increase of 1.5ºC. If the global average temperature increase reaches 2ºC, it is projected that 410.7 million people will be suffering from unexpected droughts and floods. If the global average temperature increase can be limited to 1.5ºC, less than 50% of global population will be suffering from water stress, compared to those under a 2ºC increase scenario. Furthermore, over 70% of the global population will experience fluvial flooding under a 2ºC increase warming scenario.

3) Food production and natural habitats: With an increase in global average temperature at 1.5ºC warmer, 6%, 4%, and 8% of insects, vertebrates, and plant species, respectively will lose more than 50% of their natural habitats. In a case where the global average temperature increase reaches 2ºC, the aforementioned species will lose their habitats at a double the rate. Yields of rice, wheat, barley, and range livestock rangeland throughout the world will be reduced by approximately 7%–10%.

Climate change status and responses in ASEAN Member States (AMSs) are varied by locations, geographies, socio-economy, living conditions, proneness to natural catastrophes, and adaptive capacities. In general, AMSs are at-risk for sea level rises, as majority of their populations and socio-economic infrastructures are situated in the coastal areas. At the same time, climate change has been impacting agriculture, particularly food production. Recently, it was observed that the number of extreme events has been increasing, heavy torrential rains, increasing numbers of hot days, more severe floods, changing typhoon patterns, and variations in droughts. It is also observed that the available data of losses and damages are insufficiently in some AMSs, most relevantly with regards to flooding and rising sea levels. Like other AMS counties, Lao PDR experienced average temperature increases at a rate of 0.05 ºC per year over the last 40 years, and it is projected that the average temperature

will increase by between 1.4ºC and 4.3 ºC in 2100, which will result in more severe and prolonged floods and droughts.

The greenhouse gas emission rates of the Mekong riparian countries in comparison with their gross domestic products tend to have decreased dramatically since 1990, particularly for Cambodia, Lao PDR, and Myanmar. However, the total greenhouse gas emissions in the Mekong riparian countries still continues to rise by about 1.3% to 3.6% per annum due to population growth and economic development. It has been observed that average annual basin-wide temperatures and precipitation have increased over the levels of the historical records. However, it is very difficult to prove whether or not more frequent occurrences of torrential rains, storms, floods and droughts have been directly caused by climate change or other factors due to the variation in water levels in the basin in each year. It is projected that the average temperature for the Mekong river basin could increase by up to 3.3˚C by 2060 in comparison to rising global average temperatures trends.

1.2.2 Climate Change Responses at International and Regional Levels

Essentially, climate change responses at the international level are in accordance with the implementation of the United Nations Convention on Climate Change (UNFCCC) and Paris Agreement (PA). By 2020, parties to the PA were to have updated and submitted their Nationally Determined Contributions (NDCs), and to have developed their Long-Term Low Greenhouse Gas Emission Development Strategies (LT-LEDSs) to the UNFCCC.

Under the Paris Agreement, particularly the requirements for maximizing ambition, all parties are requested to contribute to the followings : (1) submit their updated NDCs in 2020 and 2025, and (2) collect global data and take-stock in 2023, in order to assess global progress on the agreed temperature goals. Furthermore, the Paris Agreement's Enhanced Transparency Framework (ETF) imposes reporting requirements on the government.

Furthermore, members of the International Civil Aviation Organization (ICAO) and the Kigali Amendment to the Montreal Protocol for the prevention of Ozone layer depletion have undertaken an important step for global warming reduction. In 2013, the ICAO adopted a global framework for market-based measures to achieve carbon neutrality within the aviation sector. In addition, the Kigali Amendment has set its goals to phase out hydrofluorocarbons (HFCs), which are most commonly used as refrigerants by the period of 2036 to 2047.

The Sustainable Development Goals (SDGs) were conceived as a "blueprint to achieve a better and more sustainable future for all." SDG 13 promotes climate action and sets targets to strengthen resilience and to the adaptive capacity to climate-related disasters. It also calls to mitigate greenhouse gases and integrate climate change measures into policies and planning and the implementation of the UNFCCC.

The Association of Southeast Asian Nations (ASEAN) has affirmed its support for the goals of the UNFCCC. On November 2, 2019, ASEAN declared a Joint Statement on Climate Change to the 25th Session of the Conference of The Parties to the United Nations Framework Convention on Climate Change. At present, ASEAN Member States (AMSs) are implementing key measures on climate change adaptation and disaster risk reduction. Many of them have undertaken risk and vulnerable assessments, capacity development, institutional strengthening, policy and legislative development associated with climate change. Also, AMSs have been multiplying their efforts with regard to climate change adaptation for the years ahead. Furthermore, the AMSs have set up prior countermeasures on readiness, Enhanced Transparency Framework (ETF), knowledge- and experience- exchanges of mitigation actions amongst themselves, especially with regard to capacity development on emissions projections

and GHG emission reduction in order to achieve the regional net zero emission goal in the future.

Generally, climate change in the Lower Mekong Basin (LMB) has provided negative impacts on natural resource and socio-economic development in the past, at present, and will continue to in the future. The Mekong Climate Change Adaptation Strategy and Action Plan (MASAP) 2017 provides policy-based and vulnerability-based adaptation measures for minimizing impacts and enhancing resilience to climate change in the LMB. The Long-term strategy in the Mekong Basin recognizes the importance of responses to unexpected extreme climate-related impacts, which could potentially result in agricultural yield reduction due to water scarcity and more severe flooding. Therefore, LMB countries should develop their long-term strategies and measures for water irrigation and storage, and for flood control schemes as appropriate.

1.3 Lao PDR in Overview

1.3.1 Geography and Climate

Lao PDR is situated in the middle of the mainland of the Southeast Asia, which is one of the world's most culturally and naturally diverse regions which is also experiencing rapid economic growth. The Lao PDR is a land-locked country, sharing borders with the People's Republic of China, the Socialist Republic of Vietnam, the Kingdom of Cambodia, the Republic of the Union of Myanmar and the Kingdom of Thailand, to the North, East, South, and West, respectively. It has a total area of 236,800 square kilometers, of which approximately 70% of the territory is the mountainous area surrounding the Annamite Mountain Range. The plain regions are mainly located in the Mekong River Basin, covering approximately 35% of Lao PDR's territory. Lao PDR has a tropical climate influenced by monsoon winds from the Southwest, which bring high precipitation and humidity. Lao PDR's weather comes according to its main seasons, namely the rainy season (May to September) and the dry season (October to April). The average annual rainfall is 1,900 millimeters, of which 80% of the rainfall rainfalls is recorded in the rainy season. The average temperatures are in between 31ºC and 27ºC.

1.3.2 Natural Resources and Environment

Land resources: According to the national master plan for land use and land use objectives, Lao PDR's land is divided into 8 categories: (1) agricultural land, (2) forestland, (3) water and wetland, (4) industrial land, (5) Land for communication, (6) cultural land, (7) defense and security land, and (8) construction land. Lao PDR has set a land survey target of 2023 for the reservation and protection of designated protected forest areas covering approximately 16.5 million hectares (or equivalent to 70% of the total country's land area). These are protected forest areas (20%), of buffer forest areas (35%), and production forests and some of the planting forest areas (13%), industrial tree plantation areas (2%). The remaining 30% of the land areas is allocated to development including agricultural land and settlements (19%), construction (11%), and other land uses (11%). As mentioned above, most of the country's land area is mountainous, and approximately 5.24% of these areas is susceptible to landslides and soil erosion. There is a limited amount of arable land, which covers only about 3.8 million hectares of the total area (or 16% of the total area of the country). Moreover, Lao PDR also has peatlands, which are important as carbon storage sources. Based on a primary study in 2022, approximately 1,449 hectares of peatland areas are located in three provinces (Champasack, Vientiane, and Xaysomboun) and in Vientiane Capital. Further nationwide surveying is still needed.

Forest resources: the statistics recorded in 1970 showed that forest coverage in Laos was 70% of a total area. However, forest areas have been gradually decreasing as a result of forest clearance, logging, and forest fires. The rate of forest loss has been projected at about 1.1% per year for the period of 2005 to 2015. According to the Forestry Strategy towards

2035, the national forestland dominated 58% and 62% in 2015 in 2019, respectively. The Government of Laos has been multiplying its efforts to continue to to reach preferred 70% of forest coverage. This will include: potential forest lands (26.7%), croplands (10.5%), other crop cultivation lands (1.7%), surface water and swamps (1.7%), other land uses (1.1%), and infrastructure land areas (0.4%). Forests are immensely important for the livelihood of Lao people. Statistics from 2005 showed about 80% of the population relies on forest resources for their daily lives.

Water resources: The total amount of annual surface water resources in Laos are estimated to be 377.3 cubic kilometers (Km3), equivalent to 55,000 cubic meters per citizen per year on average. About 95% of the national territory is situated in the Mekong River Basin and contributes 35% of its surface water flow to the Mekong river. Water withdrawal within Lao PDR is approximately 4,260 million Km3 per year, accounting for 1.3% of a total freshwater resources. Total water withdrawal and consumption by industrial sector, municipalities, and agriculture is 4%, 3.1%, and 93%, respectively.

Mineral resources: the results of the economic and technical feasibility study and mining-processing phases showed that Lao PDR has available cumulative mined resources as follows: 389,183,275 tons of gold and silver, 156,269,912 tons of copper, 608,075 tons of nigan, 21,153 tons of cobalt, 482,960 tons of antimony, 23.061.700 tons of lead, 2,087,953 tons of live and zinc, 100,907,894 tons of iron, 319,631,237 tons of rare earth minerals, 1,364,985,807 tons of cement, 11,080,986 tons of glue stone, 407,131,300 tons of bauxite, 12,320,015,470 tons of potassium chloride, 4,677,099,875 tons of coal, 92,876,690 tons of barite, 852,081 tons of quack, 1,115,905 tons of pakodai, 1,153,230,814 tons of gyppum, and 8,417,500 tons of clayey soil. Significant mineral resources that are currently being mined are: gold, copper, rare earth minerals, lead, live, zinc, antimony, iron, bauxite, coal, glue stone, potassium chloride, cement, pakodai, and some of the constructional and industrial gravels for construction and industrial use. Over the last decade, mining development promotion has been progressed in many ways, particularly with the construction of mining factories involving in the following mining areas: mine extraction, mine processing and transformation, mined goods selling in both domestic and international markets. These are considered as significant and potential income generating sources for the country in the long term.

Energy: National hydropower development potential is between 23,000 - 26,000 megawatts (MW). According to the modified data on electricity generation sources in 2022, there were 93 operating power plants with the installing capacity of over 1 MW, making the total installation capacity of 11,661.12 MW, generating 58,700.61 GWh/year. These include 81 hydropower plants with a total capacity of 9,615.14 MW and total power generation of 45,703.25 GWh/year. In addition to these were also coal thermal and renewable power sources.

Up to 2021, the nationwide electrification ratio reached the following: 1) 100% of all 148 districts, 2) 93.3% of all 8,450 villages, and 3) 95% of total households. These are important indicators contributing to the sustainable development and poverty eradication goals. According to Reports on the 8th Five-Year Energy and Mine Development Plan (2016-2020) and the 9th Five-Year Energy and Mine Development Plan (2021-2025), the electrical powerlines were a total of 63,563 km/cct combined length, throughout the country. These included high voltage powerlines of 500 kV: 626 km/cct; 230 kV: 2,637 km/cct; 115 kV:7,213 km/cct; medium voltage powerlines of 22 kV: 34,626 km/cct; and low voltage powerlines of 0.4 kV: 20,441 km/cct. There were 74 power stations throughout the country, including eleven 230/115/22 kV stations, sixty-two 115/22 kV stations, and one T-Off 230 kV station.

Despite the hydropower potential, climate change threatens the stability of dam storage and power generation. For instance, a drought situation in 2019 affected power production, reduced energy security, and minimized energy exports. Besides this, the price of

electricity will vary and is expected to reach a maximum by 2030, resulting in 77% drop in power generation by 2040.

Apart from hydropower, Lao PDR has a significant potential to generate energy from other renewable energy technologies, including biomass, solar, biogas, underground thermal, and wind which could potentially generate 2,068 MW of electricity and 889 kilotons (ktoe) of heat. Biomass has the potential to generate electricity of 938 MW and 227 ktoe of electricity. Solar power could potentially generate 511 MW of electricity and 218 ktoe of heat. Biogas might be able to generate 313 MW and 444 ktoe of heat. Solar power, thermal power, and wind farms have an electricity production potential of about 216 MW, 59 MW, and 40 MW, respectively. In 2015, the total energy production in Lao PDR was 4,765 ktoe. Of which, 3,122 ktoe was domestically consumed and the remainder was exported. Approximately 46% of energy was produced from biomass, especially fuelwood and charcoal. Fossil oils, coal, and electricity shared 29%, 13%, and 12%, respectively. Since 2015, Lao PDR has generated 14% of all electricity from lignite coal power plants, resulting in an increase in national carbon emissions. Electricity generation from coal will potentially reach 22% of the total energy mix by 2040, which will result in carbon dioxide emissions four times higher in comparison with the emission level in 2015, under a business-as-usual scenario, unless proper mitigation actions are implemented. In which, electricity would be mainly from renewable energy sources. The energy demand by 2025 is expected to be 4,930 ktoe, and Lao PDR has aimed to increase the share of renewable energy to 30% by 2025.

Biodiversity: Lao PDR is one of the countries that is richest in biodiversity. There are approximately 166 species of reptiles and amphibians, 700 species of birds, 90 species of bats, and 500 species of mammals. There are approximately 500 fish species in Mekong River and its tributaries. In addition, it is also estimated that there are about 8,000-11,000 species of flowering plants. Biodiversity is fundamental to human well-being for the Lao people. They depend on biodiversity for non-timber forest products (NTFPs), herbal plants, and agricultural plants which play an important role in economic development. Around 67% of the Lao population live in rural area and largely depends on forest resources for their living. About 40% of poorer families' incomes is derived from NTFPs. The trends of global average temperature increase will produce unavoidable impacts on the resilient adaptability of biodiversity and rural people's access to these natural resources in the future. Therefore proper and early stage measures are required.

1.3.3 Socio-Economy

Lao PDR has had a constant and substantial economic growth of around 6% over the last decade (2012-2021), primarily due to mining, hydropower, timber and timber product exports. In 2018, the National Gross Domestic Product (GDP) growth was 6.3%, equaling 152,414 billion LAK or 18.13 billion USD, with per GDP capita of 2,585 USD (a total population of 7,012,995 people). The agriculture sector grew at 6.9% totaling 41.60% of the national GDP. Industry sector grew at 7.8% totaling 31.10% of the national GDP. The service sector grew at 6.9% totaling 41.60% of the national GDP. The Duty and Production Tax sector grew at 6.2% totaling 11.10% of the national GDP.

Despite a recent economic growth, economic vulnerability is relatively high as the national economy relies much on natural resources. The economy of Lao PDR still has a weak manufacturing foundation, undiversified goods production, insufficient and vulnerable infrastructures. These are the key factors that hinder the capacity to overcome the economic and environmental vulnerability index and are obstacles to the country's shift from the Least Developed Country (LDC) status underpinned in the 8th National Socio-Economic Development Plan (2016-2020). According to the United Nations' standards and criteria for shifting from the LDC status, a given country is required to comply with the 3 following criteria: 1) Gross National Products (GNP) per Capita; 2) Human Asset Index (HAI); and 3) Economic Vulnerability Index. Assessment is undertaken in every three years or necessary

based on the world's socio-economic situation over the previous three year period. In Lao PDR, almost a quarter of its population still lives below the UN poverty line, and the country's economy is ranked the 3rd smallest in Southeast Asia. In 2020, Even though Lao PDR's economy was down by 3.3% due to climate change threat and the COVID-19 pandemic situation, it was still considered to be one of the countries having the highest economy in Southeast Asia. Climate change also threatens Lao PDR's capacity to achieve consistent economic growth and sustainable development. Floods and droughts over the years of 2018 and 2019 caused an economic loss of 750 million USD, as well as brought an adverse impact on agriculture, hydroelectric generation, and transportation. Nevertheless, Lao PDR will continue to play an active roles and make a dramatic efforts to graduate from the list of LDC status by 2026 and ensure its sustainable development. In conclusion, Lao PDR's future economic development remains dependent upon natural resources utilization (e.g. mining, hydropower, and timber), services, and industry. During 2020 - 2022, the agricultural and industrial sectors in Lao PDR were still constantly growing.

The population of Lao PDR is 7,012,995 people, of which most are in the younger age range (the median age of the population is 24.4 years). Around 65% of Lao people live in rural areas, and 70% of the total population practice agricultural production as their career, contributing to 17.7% of GDP. Almost 70% of those who work in the agricultural sector are women. Most of the farmers depend on natural resource exploitation as a major nutrition source and for wellbeing, including from forests, non-timber forest, and water resources for their well beings. These are believed to be a key factor essentially vulnerable to climate change.

The 9th Five-Year National Socio-economic Development Plans 2020-2025 (9th NSEDP 2020-2025) aims to shift Lao PDR from LDC status to become an upper-middle-income country. It also plans to achieve the SDGs, including the net zero poverty and climate change resilience goals, while ensuring a socio-economic development process in the direction of green growth and sustainability.

1.4 Assessment of a recent implementation of Strategy on Climate Change, Impacts, and Responses in Lao PDR

1.4.1 Geography and Climate

Climate Change means that the global average temperatures increase is greater than the normal ranges in the long-term, caused by direct and indirect human actions or natural phenomena, resulting in changes in atmospheric components.

In 2018, Lao PDR's average temperature in the norther region, where the weather is generally cooler than the other parts, was at 28.41ºC, while the average temperatures in other regions was at 31.38ºC. However, Lao PDR's temperatures has increased over the past 30 years (1976 - 2005), and there were intervals measured every 10 years. The annual average temperature tend to be consistently increasing at a rate of 0.022 °C per year. Of which, the minimum average temperature change recorded was by 0.017°C per year, while the maximum average temperature change was by 0.023°C per year.

The average annual rainfall ranged from 1,896 mm to 2,085 mm over the period of 1976 - 2005. It has increased by approximately 1.46 mm per year over a 3-decade period and varied in each decade. The average annual rainfall was +/-7% over normal rates. Some years, it was fluctuated by approximately 20%. In the near future, the RCP 4.5 projects that the average temperatures in Lao PDR will increase. During 2021 - 2050, the highest average temperatures are expected to increase by 1.03ºC - 1.29°C and the lowest average temperatures will also increase by 1.09ºC - 1.36°C compared with preindustrial temperatures. During 2070 - 2099, the highest average temperatures might rise up to 2.05ºC - 2.56°C compared with preindustrial temperature levels, while the lowest average temperatures are projected at between 2.04ºC - 2.47°C. The rainfalls are substantially different in the rainy and dry seasons.

Based on the projection by the RCP 4.5 and RCP 8.5 scenarios, the annual precipitation is usually to increase from February to April. By using the RCP 8.5 scenarios, it is projected that annual rainfall change to be -37% to -19%. From May to September, rainfall will be increasing and reaching 49% in July. By using the RCP 4.5, it is projected that rainfall will decrease by less than 10% in between June and September and increase by up to 3% to 46% in between July to December.

Despite that, Lao PDR has historically produced limited GHG emissions (approximately 50,000 GgCO2eq in 2000, and it was projected at 82,000 GgCO2eq and 104,000 GgCO2eq in 2020 and 2030, respectively), but it is highly vulnerable to climate change as mentioned above. Floods are believed to cause adverse impacts on the socio-economic development process, particularly for agriculture (damaged crop production), irrigation systems, and roads and bridges. These impacts threaten food security. In 2017, Lao PDR lost approximately 30,000 hectares (about 130,000 tons) of rice due to flooding, drought, and locust (grasshoppers) outbreaks. Disasters in 2018 from two tropical storms and a collapse of the Xe Pien - Xe Nam Noy Dam caused severe losses of lives, property, and caused the environment problems. The disaster displaced more than 100,000 hectares of rice fields (approximately 12% of the nation's total rice planation areas), leading to a 20% drop in rice production compared to the 2017 outputs, as well as brought direct negative impacts on approximately 750,000 people. Besides, these disasters also caused high rice prices and a high cost of living. Moreover, the disasters are an at-risk breading ground for disease outbreaks such as diarrhea, dengue fever, new and renewed epidemics, seasonal diseases and malaria, and resulting in severe poverty. The total losses and damages were 3,167 billion LAK (371 million USD) or equivalent to 2.1% of GDP. Fortunately, recently Lao PDR was able to mobilize 350 million USD from climate finance to undertake climate change associated activities in the country.

1.4.2 Recent Implementation of Strategy and Activities on Climate Change

Lao PDR has implemented and improved its capacity to respond to climate change in line with the objectives of the UNFCCC and decisions made by the Conferences of Parties (COPs), policies and socio-economic development plans at the national and local national levels. The key actions undertaken include improving response readiness, developing and updating policies, restructuring the organization, expanding networks and cooperation, developing human resources, promoting education and awareness, conducting research, establishing data and information system, and improving financial mechanisms. These actions are specified below:

1) Policies and Legislations

The Decree on Climate Change (2019) is considered to be an important legal and directive document necessary for mitigating emissions and building climate-resilience and adaptive capacity in Lao PDR. The decree mandates that the Ministry of Environment and Natural Resources (MONRE) is to play an important role in leadership and coordination with relevant ministries and parties to take actions against climate change. This decree focuses on: (1) developing a climate change data and information management system to support the national coordination regarding climate planning and actions, (2) conduct the vulnerability assessments and mapping processes to support adaptation actions at the national level, and (3) create a framework for enhancing carbon sinks and prepare a national strategy to low greenhouse gas emissions, and etc.

2) Strategic Plans

Recently, Lao PDR developed a series of strategic plans and programs for climate change mitigation and adaptation. They include: the National Adaptation Program of Action to Climate Change (NAPA) in 2009, the Climate Change Strategy in 2010, the Climate

Change Action Plan from 2013 to 2020, the Nationally Determined Contributions (NDCs) in 2015 and 2020, and the Technology Action Plan (TAP) for Climate Change Mitigation and Adaptation in Agriculture, Forestry and Water Resources Sectors in 2018.

The NAPA has defined objectives for climate change adaption, as well as identified priorities tasks for the agriculture, forestry, water resource, and health sectors. This NAPA also include many priorities such as early warning systems, enhancement of resilience of plant and animal species to climate change, as well as the promotion of the sustainable use of water resources.

The government has also been mainstreaming climate change management in the national and sectoral strategies and action plans, such as the 8th Five-Year National Socio-economic Development Plan (the 8th NSEDP), the national green growth strategy, the public health strategy, and the agriculture and forestry strategy.

3) Greenhouse Gases Inventory and Mitigation

Lao PDR submitted its first and second national communications (FNC and SNC) on climate change to the UNFCCC in 2000 and 2013, and its first biennial update report (BUR) in 2020. Over the period of 1990–2000, Lao PDR shifted from being a net carbon sink to becoming a net carbon emitter. In 1990, the net carbon sink of the country was of 104,570 gigagrams of CO2 equivalent (GgCO2eq), whereas net carbon emissions of the country were 41,764 GgCO2eq in 2000, followed by net carbon emissions of 24,099.98 GgCO2eq by 2014. The land use, land-use change, and forestry (LULUCF) sector contributed over 70% of the total emissions, with the rests from energy, waste and industrial sectors.

In attempt to reduce emissions and increase carbon sinks in Lao PDR, over 10 climate change mitigation associated projects have been implemented since 2009. Most of them are carried out in forestry sector (particularly through the Clean Development Mechanism [CDM], the emissions reduction in the forestry [REDD+], the Joint Development Mechanism [JCM]) and the implementation of the National Appropriate Mitigation Action (NAMA) in energy and transport sectors.

4) Enhancement of Resilience and Adaptation

Laos is one of the countries with the most high vulnerability to climate change. Therefore, enhancement of resilience and adaptation has become a national priority to prevent, limit, and reduce risks and impacts of climate change, as well as recover from climate change associated consequence.

Since 2009, the Lao PDR has implemented more than 30 projects related to climate change resilience and adaptation in different sectors. These projects have been implemented as a part of the implementation of climate change adaptation program, in parallel to the development and implementation of the NAPA. In 2021, the country finalized the climate change vulnerability maps for 148 districts throughout the country, and also began developing the National Adaptation Plan (NAP). Moreover, recently various sectors have been putting their efforts toward enhancing their adaptive capacity and resilience.

Agriculture and Forestry Sectors: Research and development programs are on crop varieties (including rice and vegetables) that are resilient to floods and drought. In addition, climate-smart agriculture techniques have been piloted, such as greenhouse crop cultivation, water harvesting techniques for water management, improvement of the agro-climate information services, enhancement of agri-business value chain, and improvement of the resilience of agricultural infrastructure, and the promotion of crop diversification, and commercialization.

Water Resources Sectors: Law on water and water resources was revised and adopted, along with the approval of the law on meteorology and hydrology, followed by the development and adoption of a series of legal frameworks such as the decree on river basins and reservoirs, a ministerial decision on groundwater management, and guidelines for water resources management, administration and utilization. Water resources profiling and assessments in relevant to climate change were also undertaken in the Nam Ou, Nam Ngeum and Nam Theun-Nam Kading basins. Climate risk and vulnerability assessments were conducted for two important wetland sites (Beung Khiad Ngong and Xe Champhone), together with the promotion of an increase of the resilience of vulnerable communities in and around the wetland sites. Furthermore, the Mekong Climate Change Adaption Strategy and Action Plan (MASAP) for Mekong Basin were also implemented.

Public Work, Transports and Urban Development Sectors: the Strategy on Housing and Urban Development towards 2030 has been implemented in order to achieve the 2035 Vision with mainstreaming of climate resilience. Guidelines on environmentally sustainable cities and guidelines on highway maintenance and renovation have also been created with consideration of climate influence as a key factor for maintenance techniques selection procedures. Currently, a series of investment projects are being carried out with the aim of reducing air pollution and greenhouse gases. They include: the Lao-China railways, the sustainable public bus transportation in Vientiane's urban areas, and the policy implications regarding the use of electrical vehicle (EV). Legal frameworks, technical criteria, and EVs' tag design have been developed that are consistent with the government's policy on the development and improvement of legislations for promoting environmentally friendly transportation. Construction and maintenance of waterway infrastructures to be done in compliance with specific standards, particularly with regard to urban riverbank protection and flood control systems, which must be resilient to climate-induced disasters through the mainstreaming of climate resilience via various technical procedures (including planning, design, construction, regular maintenance and renovation). Reduction of risk and damage from climate change (such as storm, flood, earthquake) and application of ecosystem-based urban resilience with an existing budget for maintenance are intended.

Public Health Sector: Key achievements in this sector include the development and endorsement of the Strategy on Climate Change and Health Adaptation (2018 - 2025) and Action Plan (2018 - 2020), training-of-trainer programs on climate change and its health impacts in 7 provinces, and the development and dissemination of information, education and communication outreach related to climate change and its health impacts on the public. Also, a cooperation project of climate change and air quality monitoring has been carried out under the support of the UNICEF cooperation program. The aim is to strengthen the coordination mechanism in the natural resources and environment sector, and the environment and climate change sub-sector; assessment of at-risk and vulnerable groups, particularly women, children, disables and elders; assessment of environmental impacts on at-risk and vulnerable groups by integration with the climate change adaptation enhancements, as well as to establish some of the air quality monitoring stations. In addition, rural water supply and sanitation projects were designed to support climate change adaption in the public health sector, while providing rural communities with clean water supply systems and sanitation.

Energy Sector: the energy sector has assessed its own vulnerability and developed an action plan on climate resilience, a manual on dam safety and an action plan on emergencies, which will strengthen their sectoral climate resilience and adaptation. In addition, effective reservoir management and multipurpose hydropower schemes are being promoted in order to benefit surrounding communities and other sectors by improving flood and drought mitigation measures.

Education and Awareness Raising Sectors: the National Strategy on Education and Awareness on the Environment and Climate Change (2018 - 2025) and Vision

towards 2030 was approved in 2018. The Environmental Science Faculty of the National University of Laos has included climate change and other climate change-related subjects in the teaching and learning curriculum. Furthermore, there have been campaigns, and public information dissemination on climate change through different channels and social media in order to raise public awareness and enhance public participation in climate change actions.

1.4.3 Barriers and Challenges

There are several barriers and challenges facing Lao PDR to fulfilling climate change adaptation and mitigation implementation. The some of the key barriers and challenges are: limited information and knowledge on climate change impacts on various sectors, ineffective mainstreaming of climate change into development plans, weak coordination across relevant sectors, limited and uncertain allocation of financial resources, lack of capable human resources, limited accessibility to appropriate technologies, lack of effective monitoring and evaluation system for adaptation and mitigation implementation. Moreover, the country has to conduct a critical benefit and loss balance of economic development and climate change management in order to pave a strong foundation to make the shift from the LDC status by 2026. This means to compliance with the UN criteria on GDP. Therefore, while there is a desire to shift from the country's current status to industrialized and modern status in order to increase the production to meet the needs of the rising consumption, it still remains challenging. Another challenge is that public knowledge, understanding, and awareness on climate change are not high enough and still recognize the climate change issues are still seen as low importance and unattainable. As a result, many people are still following their traditional lifestyles and behaviors, such as the burning of garbage in open areas, and production practices without regard to the studies on seasonal climate data and information.

1.5 The Rationale and Need for Updating the Strategy on Climate Change

The rationale and need for updating this strategy are based on the following internal and external factors:

Since Lao PDR adopted its 2010 Climate Change Strategy, the situations and circumstances have been considerably changed considerably. Lao PDR has approved a series of laws and legal frameworks such as the updated Environment Protection Law in 2012, the Strategy on Natural Resources and Environment towards 2030 in 2015, the Sustainable Development Goals (SDGs) and the Paris Agreement in 2016, the National Green Growth Strategy in 2018, the Strategy on Reducing Emissions from Deforestation and Forest Degradation (REDD+) in March 2021, the Decree on Climate Change in 2019, plans to graduate from a least developed country to a developing country status by 2024 and low-middle income country status by 2030, and the ambitious Net Zero Emission goal by 2050. In the meantime, other relevant laws have also been adopted. They included the Law on Meteorology and Hydrology in 2017, the Law on Water and Water Resources in 2017 and the Strategy towards 2030 in 2019, Forest Law in 2019, Land Law in 2019 and Master Plan on Land Use in 2018, and Law on Disaster Management in 2019.

The results of the review on the first strategy on climate change endorsed in 2010 showed that there are some gaps and constraint in the strategy such as (1) lack of a timeframe for the vision, goals, and programs; (2) lack of a monitoring, evaluation and reporting system, which created a barrier for monitoring and evaluating the progress and results; (3) only 7 climate change sectors have been included; (4) unclear mechanisms for climate financing, including financial access and resources mobilization; (5) ineffective and inefficient implementation. Many project activities were not implemented due to a lack of financial mechanisms, financial access and investment. Improper activities were included resulting in difficulties in implementation of those activities. For instance, (1) reduction methane (CH4) caused by the fermentation in paddy fields and livestock ranges and (2) application of methane

(CH4) from coal mines. In addition, the strategy does not support the post-2010 policies and legal documents such as policy and strategic plan for sustainable development, green growth, and the decree on climate change.

Climate change situations at global level, and in the Lao PDR have been dramatically changed. It is more complex than before and hard to make timely and accurately forecast of its changes and impacts. For instance, temperature and precipitation are rapidly changing. Vulnerable areas have been expanded. GHG emissions have been increased. Natural disasters like storms, floods, droughts, and other extreme natural phenomena frequently occur and are more severe than before. Simultaneously, the Paris Agreement 2015 obliges parties to upgrade their strategies, Nationally Determined Contributions (NDCs), and other measures to limit global warming below 1.5ºC above preindustrial temperatures, and strengthen climate resilience and adaptive capacity.

The year 2030 marks a critical milestone globally. The global community including Lao PDR will re-assess and update their localized SDGs. The Paris Agreement will be evaluated with regard to the first 10 years of its implementation progress and key achievements of that time period to see whether or not the world is on track to meet the accord's average temperature goal.

Based on the internal and external rationales and factors mentioned above, the Government of Laos recognizes the necessity to update this strategy on climate change to fit the current situations, policies, directions, and socio-economic development framework, together with mainstreaming the existing mechanisms in the regional and international framework in the direction of green growth and sustainable development.

Chapter II: Strategies and Programs towards 2023

2.1 General Goals and Targets

Lao PDR has set the target to reducing greenhouse gas emissions in order to become a net zero emission country by 2050, and to better enable the country to prevent, be resilient and adaptable to climate change, as well as reducing risks, responding, and recovering from the climate change impacts at a sufficient level. This is to secure life safety of lives, protect health and property of people, improve environmental conditions and infrastructure, together with promoting the mainstreaming of existing mechanisms outlined in the regional and international frameworks, and making contributions to green growth and sustainable development. The 2030 targets of the Lao PDR aim at: (1) strengthening all aspects of its capacity, including policies, institutions, human and financial resources, coordination, collaboration, research, data and information exchange, education and awareness, and better improvement of response capacity to climate change in all sectors, and (2) achieving the 2030 targets as follows:

1) Mainstream climate change management in policies, strategies, programs and projects of the relevant sectors such as: natural resources and environment, planning and investment, energy and mines, public works and transports, industry and commerce, agriculture and forestry, public health, education, labor and social welfare. Mainstreaming climate change management and measures in the socio-economic development plans of the vulnerable localities to ensure the effectiveness and efficiency of climate change actions. Development and investment projects must undertake the initial environmental examination (IEE) and/or social and environmental impact assessment (ESIA) together with the development of the climate change associated risk and impact assessment and management plan;

2) Enhance adaptive capacity and resilience at relatively medium to high levels for districts, rural areas, communities, infrastructures, production and service systems, and ecosystem, as well as increasing the capacity to reduce climate change vulnerability, risk and climate change induced disasters at a sufficient level according to the relatively low indices and medium-low index;

3) Reduce greenhouse gases emission (GHG) by 60% by 2030, compared to business as usual (BAU) level; and

4) Reduce economic or gross domestic product (GDP) loss and damage by less than 0.2% and the impacts of climate-induced disasters on population by less than 120,000 people, becoming a low emission country by reducing emissions to less than 1.2 tons/capita/year, increasing national forest cover up to 70% of the country's total area, and promotion of the increase of renewable energy by 30% comparing to total national energy consumption by 2030.

2.2 Fundamental Principles

This strategy document has been updated based on the following fundamental principles:

1) **Needs, relevance, and coverage:** Ensure the relevance and support for the national socio-economic progress in the direction of green growth and sustainable development, consistent with the national status and relevant to regional and international situations on climate change;

2) **Climate change mainstreaming:** Ensure the mainstreaming of climate change as a core element in all policies, strategies, programs, development and investment projects;

3) **Enabling environment:** Improve and develop policies, financial and technical readiness to promote and leverage climate change management;

4) **Cooperation, coordination, and partnership:** Expand and strengthen coordination and cooperation arrangements, partnership and networking with public organizations, business and private sectors, communities, development partners, and other local/overseas-based international organizations in an effective and efficient manner;

5) **Institutional and staff capacity:** strengthen institutional and build capacity for climate change initiatives in the public sector, educational and research institutions, business and private sectors and communities;

6) **Strategic solutions, participation and mutual benefits:** Enhance development and implementation of climate actions and solutions that are strategic, participatory, cost-effective and efficient, market-oriented, and maximize the benefits to various regions, sectors and communities;

7) **Proper financial instruments:** Promote and enhance capacity to access external financial resources and support, and budgetary allocation, as well as develop proper financial tools and mechanisms that enable climate change management;

8) **Public education, awareness, and participation:** Promote and strengthen public education, awareness, responsibility, participation, and involvement in the climate change management;

9) **Climate change management in accordance with** the principles of environmental protection, biodiversity conservation, sustainable development and others: Conducting climate change prevention as the first priority with solutions and mitigation as the secondary priority; ensuring the application of the best practices and technologies, transparency, and ethics; upholding the principles of polluter pays; putting sanctions against offenders, and rewarding the outstanding performers; and

10) **Responsibility and ownership:** The Ministry of Natural Resources and Environment (MONRE) plays an important role in overall coordination while relevant sectors take their ownership in the collaboration and implementation of the above principles, in accordance with their roles and responsibilities in an effective and efficient manner.

2.3 Strategies, Priority Programs, and Projects towards 2023

The Lao PDR is going to be implementing following three main strategies from now through 2030:

2.3.1 Strategy on Enhancement of Prevention, Resilience and Adaptation to Climate Change Impacts

1) Development and management of data and information, climate change reporting system, and the end-to-end early warning systems, including climate change monitoring, communication, response planning, as well as post-climate change induced disaster recovery;

2) Development, deployment and transfer of proper modern and proper technologies for early warning, prevention, risk and impact reduction, enhancement of resilience and adaptive capacity to climate change;

3) Intuitional strengthening and human resource development, including the knowledge and capacity needed to ensure the development and implementation of policies, plans and actions for climate change adaptation and resilience;

4) Promotion and enhancement of climate change education and awareness in order to increase knowledge, consciousness, preparedness of safety practices, and reduction of risky behaviors which will lead to climate change associated phenomena and disasters;

5) Creation of an enabling environment, promotion and enforcement of measures for prevention, risk reduction and rehabilitation from climate change impacts; and

6) Enhancement of resilience and adaptive capacity of infrastructures, production systems, business, services, ecosystem, and communities, as well as various sectors that are at-risk of consequence and impacts of climate change.

2.3.2 Strategy on Enhancement of Greenhouse Gases Prevention, Control and Mitigation

1) Promotion of increased capacity development for GHG inventory, management and control plans;
2) Promotion of energy and resource efficiency in an effective and efficient manner;
3) Expanded development and use of renewable and alternative energy sources which are environmentally friendly and produce relatively low emissions;
4) Expanded development and use of environmentally friendly energy and low carbon emission technologies, clean development mechanisms, GHG capture and storage technologies (in various sectors as necessary);
5) Protection and enhancement of carbon sequestration and sink via ecosystems, especially forests, wetlands, peatlands, and carbonated soils;
6) Promotion of standardized management of products, processing, business, services, waste management and disposal in accordance with the national and international standards of environmental management;
7) Promotion of low-emission urban development and renovation, public works and infrastructure, passenger and goods transportations, and the use of electrical vehicles (EVs) or other types of fossil fuel – free vehicles;
8) Promotion and expansion of low-emission waste management, including the reduce-reuse-recycle (3Rs) waste management and waste-to-energy transition; and
9) Strengthening and promoting the implementation and enforcement of mitigation policies and measures for the reduction of GHG emissions and increase carbon sinks.

2.3.3 Strategy on Mainstreaming Enhancement of and Enabling Environment for Climate Change Management

1) Mainstreaming of climate change goals and actions in all sectors;
2) Development and implementation of regulations, programs and financial mechanisms for climate change management;
3) Enhancement and expansion of national and international coordination and cooperation;
4) Development and implementation of climate change readiness plans and projects; and
5) Improvement and enhancement of climate change monitoring and evaluation and MRV system.

2.4 Priority Programs and Projects towards 20230

This strategy consists of 9 priority programs as defined in Table 1 below. Project activities have been summarized in the annex of this strategy.

Table 1 Priority Programs and Projects towards 2030

No.	Programs	Purposes
1	Development and management of data and	Program 1: Dissemination and Implementation of the Strategy 2.3.1. and 2.3.2.

	information system, reporting situations, events, and impacts of climate change	The main purpose of this program is to provide appropriate and sufficient data and information for effective, efficient, and timely decision-making and planning for climate change management.
2	Enhancement of resilience and adaptation capacity to climate change for at-risk and affected infrastructures, production system, business, services, ecosystem, community and sectors	Program 2: Dissemination and Implementation of Strategy 2.3.1. The overall purpose of the program is to enhance climate change resilience, improve adaptation capacity and reduce risk and impacts on socio-economic system, ecosystems and the environment.
3	Strengthening of GHG inventory, monitoring and evaluation, and reporting	Program 3: Dissemination and Implementation of Strategy 2.3.2. The main objective aims to improve the capacity of public, private, and business sectors to increase comprehensive, reliable and transparent levels of GHG emissions and absorption calibration, which is an important basis for mitigation planning.
4	Strengthening of GHG emission control and mitigation in all sectors	Program 4: Dissemination and Implementation of Strategy 2.3.2. The main purpose is to support the emission reduction targets and green growth, promote wisdom, appropriate, green and environmentally friendly technologies (as defined in Program 5).
5	Development, utilization and transfer of technology	Program 5: Dissemination and implementation of Strategy 2.3.1 regarding the Enhancement of Prevention, Resilience and Adaptation to Climate Change Impacts and Strategy 2.3.2 regarding Enhancement of Greenhouse Gases Prevention, Control and Mitigation.
6	Promotion of climate change education and awareness	Programs 6 to 9: Dissemination and Implementation of Strategy 2.3.3, which supports Strategy 2.3.1 and 2.3.2. The main purposes are to: - Improve accessibility to data and information, knowledge, awareness societal involvement, cooperation, and community in climate change management; - Create the environment, policies, conditions, and readiness for climate change management; - Strengthen institutions and administration systems, as well as ensure the sufficient human resources for climate change management.
7	Enhancement of climate finance	
8	Mainstreaming climate change and creating the environment capable for climate change management	
9	Institutional strengthening and human resource capacity building for climate change management	

Chapter III: Measures of Implementation, Monitoring, Evaluation and Reporting

3.1 Implementation

Ministry of Natural Resources and Environment (MONRE), especially the Department of Climate Change (DCC), serves as the national focal point for implementing this strategy in collaboration with relevant agencies. Key tasks are defined as follows:

1) Disseminate to and communicate this strategy with overall stakeholders and target groups;

2) Develop and elaborate programs, projects, and work plans including the financial mechanism for implementing this strategy. Development of programs and projects are to be designed by considering their consistency with and impacts on socio-economic and environmental factors, gender equality, and vulnerable groups;

3) Promote, support, and work in partnership with all ministries, and sectors and at all levels in order to prepare their climate action plans or to include the mainstreaming of climate change management into their strategies and action plans, including the institutional and personnel arrangement for implementation of their plans and for coordinating with relevant bodies with regard to the implementation of this strategy;

4) Budget for the implementation of this strategy is from the Climate Change Fund as part of the Environmental Protection Fund (EPF). In addition, the budget for the implementation of this strategy is mobilized from other funding sources, including the international climate finance sources, such as the Green Climate Fund (GCF), the Adaptation Fund (AF), the Least Developed Country Fund (LDCF), the Global Environment Facility (GEF), bilateral and multilateral cooperation programs and projects, international development partners, and other legal and financial sources, as defined in the Decree on Climate Change.

3.2 Monitoring and Evaluation

3.2.1 Measurement, Reporting and Verification System

It is necessary and essential for Lao PDR to monitor, assess, and report on the progress and results of the implementation of the national strategy, including the achievements of the annual climate change management targets. The measurement, reporting, and verification (MRV) system was created in 2022 in accordance with the UNFCCC and Paris Agreement (details are provided in the Annex). The requirements for measuring, reporting and verifying progress of the implementation of the strategy are needed for the following tasks:

- Implementation of the Nationally Determined Contributions (NDCs), the National Communications and Biennial Reports including the GHG inventory, progress and impacts of mitigation, adaptation, and resilience enhancement actions;
- Mainstreaming and reporting on the progress and accomplishments of the climate action goals as defined in the 9th National Socio-Economic Development Plan (9th NSEDP), the National Sustainable Development Goals (SDGs), the National Green Growth Strategy (NGGS), the National Strategy on Disaster Risk Reduction 2021-2030 (NSDRR 2021-2030), and sectorial strategies at the national and sub-national levels;
- The needs and acceptance of financial support, technology transfer, and capacity enhancement for climate change management.

3.2.2 Review of National Strategies and Programs on Climate Change

1) Annual and Mid-Term Reviews

Ministry of Natural Resources and Environment (MONRE) has begun reviewing and managing the annual progress reports, starting in December 2022. The mid-term review report will be managed in 2025.

2) Final Review

A final review of the implementation of this strategy will be undertaken by 2029. The final review will provide fundamental information needed for further improvement. During the review process, MONRE will work closely with the Ministry of Planning and Investment (MPI), national and sub-national sectorial agencies, development partners and international organizations. The final review will assess the efficiency and effectiveness, consistency and accomplishments of the implementation of this strategy. During the reviewing process, the following tasks will also be taken into consideration:

- Monitoring, Reporting and Verification (MRV) framework, and the results of the implementation of the sectorial climate action plans;
- National, regional and international cooperation;
- Fundamental substantive issues for the development of the next climate change associated strategies.

Annexes

The priority programs and project towards 2030 have been defined as follows:

Program 1: Development, management of data and information, reporting and early warning systems for climate change

Scope of projects or key actions	2021-2024	2025-2030
Development and management of data-information and statistics for climate change management	√	√
Monitoring, assessment, and development of maps for climate and disaster risky and vulnerable areas (e.g. flood, drought, heatwave, etc.)	√	√
Development of Early Warning System (EWS) including hazard monitoring, assessment, communication, reporting, early warning and emergency response to climate change.	√	√
Management of the State of the Climate Change Report	√	√

Program 2: Enhancement of resilience, adaptability capacity to climate change at-risk infrastructures, production system, business, services, ecosystem, communities, and sectors

Scope of projects or key actions	2021-2024	2025-2030
1. Agriculture Sector		
Review and assessment of climate change vulnerability, risk, impacts and adaptation plan-alternatives for agriculture and food security, including: - Key production system and value chain for food security, economy-commerce and employment - Other at-risk and affected production systems and value chains	√	√
Development and implementation of adaptation plans for the agricultural sector at both central and local levels	√	√
Enhancement and expansion of EWS development: - Expansion of agro-meteorology systems to regional and local levels, and key production systems and value chains to all at-risk provinces. - Research and development of monitoring and early warning plans for weeds, pests, insects, and animal diseases; - Implementation of monitoring and early warning plans for weeds, pests, insects, and animal diseases.	√	√
Expansion of technological and technical development and transfer for climate change adaptation and resilience for various impacts on the agricultural sector: - Review, identification/inventory and improvement of technological transfer program for climate change adaptation and resilience in agricultural sector; - Implementation of technological transfer programs for the agricultural sector, especially for climate resilience and advanced	√	√

Scope of projects or key actions	2021-2024	2025-2030
technologies; climate oriented agriculture, multiplied agriculture systems and varieties; environmental conservation and ecosystem basis.		
Enlargement of research and development, as well as the promotion of climate resilient agriculture systems, livestock, and varieties (focusing on nutrient-oriented agriculture production and food security, agribusiness, climate change adaptable species, and conservation of appropriate varieties).	√	√
Development and expansion of climate change resilient and adaptable infrastructures and facilities for agriculture production, processing and stock.	√	√
Development and implementation projects as well as strengthening of organization (including farmers' organizations for capable resilience and adaptation, emergency responses and rehabilitation in the agricultural sector)	√	√
Study and promotion of agriculture production, agri-business, value chain and alternatives in order to better farmers' livelihoods and provide them more resilience to climate change.	√	
Enhancement of policies, laws, decrees, other legal framework related to agricultural production and promotion via mainstreaming and promotion of climate change adaptation within agricultural sector.	√	√
2. Water and Water Resources Sectors		
Enlargement of the study and assessment of vulnerability in water and water resource sectors at the national level (e.g. wetlands, peatlands, aquatic-biodiversity, ecosystem, habitat, water quantity and quality, water supply and sanitation) for the affected and at-risk major river basins and sub-basins.	√	√
Development and implementation of climate change adaptation and resilience enhancement plans in water and water resources sectors via the management and protection of river basins, watersheds, water storages, swamps, reservoirs, wetlands, peatlands, aquatic biodiversity, ecosystem service, water quality, water supply and access security for all sectors and communities.	√	√
Development, improvement and expansion of forecasting, monitoring and early warning systems for water induced hazards under the collaboration with hydrology and meteorology, energy, agriculture and other sectors.	√	√
Enforcement of legislative compliance and undertaking of measures to settle illegal and destructive activities to infrastructures, facilities, and ecosystems, with regard to adaptation and conflict resettlement on water and water resources utilization.	√	√
3. Forestry and Land Uses Sectors		
Strengthening of education, development and implementation of adaptation plans in the forestry and land uses sectors.	√	

Scope of projects or key actions	2021-2024	2025-2030
Monitoring and assessment of climate change and hazard vulnerability, risk and impacts on forestry resources, including ecosystems and biodiversity.		
Expansion, development and utilization of technologies in the forestry and land use sectors, especially forestry ecosystems, forest lands, geographic features, sustainable forestry and non-timber forest product management. Conservation, rehabilitation and increase of forest cover and ecosystem services. Management of forestry business, agroforestry systems, administrative techniques and local wisdoms.	√	√
Institutional strengthening for local administrations and private sector parties in order to get them involved in climate change adaptation and resilience enhancement activities.	√	√
4. Public Works and Transport Sectors		
Study and assessment of climate change impacts on public works and transport infrastructures. Institutional strengthening and capacity building for the development and management of more adaptable and resilient infrastructure.	√	√
Development and implementation of regulations, standards, and plans on climate change adaptation and infrastructure investments.	√	
Expansion of research and transfer of technologies and techniques on climate change adaptation capacity and resilience enhancement.	√	√
Enhanced development of multi-transportation systems, infrastructures and urbanization designs that are resilient to climate change and natural disasters.	√	√
5. Energy and Mines Sectors		
Assessment and development of climate change and disaster risk plans for the energy and mining sectors, especially for the investment projects and activities related to hydropower, solar energy, wind power, mine extraction and processing.	√	
Development, implementation, monitoring, and reporting of regulations, standards and plans for the energy and mining sectors.	√	√
Institutional strengthening and human resource capacity building in the area of energy and mine development and management in ways that are more adaptable and resilient to climate change.	√	√
6. Information, Culture and Tourism Sectors		
Assessment and development of climate change and disaster risk and adaptation plans for the cultural and tourism sectors, especially with	√	

Scope of projects or key actions	2021-2024	2025-2030
regards conservation-oriented tourisms, including cultural-tourism, historical-site-tourism and eco-tourism.		
Development, implementation, monitoring and reporting on the climate change adaptation plans for the information, culture and tourism sectors.	√	√
7. Rural Development and Settlement Sectors		
Assessment of risks and impacts from climate change and natural disasters in rural development and settlement, including education, planning, and resettlement of relatively high risk and seriously affected communities to a better locations in an appropriate and sustainable manners.	√	
Strengthening, development, implementation, monitoring and reporting of climate change adaptation and resilience enhancement plans in the rural development and settlement sectors.	√	√
8. Public Health Sector		
Assessment of risks and impacts from climate change and natural disasters in the public health sector.	√	
Development, implementation, monitoring and reporting of systems and programs for the surveillance and solutions to disease outbreaks and illnesses that are likely related to climate change, such as malaria, dengue fever, diarrhea, pandemics and other sicknesses.	√	√
Expansion, development and consolidation of clean water supply system, hygiene, nutrition and public health services.	√	√
Improvement of capacity along with the development and implementation of climate change adaptation plans in the public health sector.	√	√
9. Education Sector		
Assessment of risks and impacts from climate change and natural disasters, and capacity needs for the implementation of climate actions in the education sector.	√	
Development, implementation, monitoring and reporting with regard to the climate change adaptation plan.	√	√
10. Cross-cutting Sector		
Assessment of risks and impacts from climate change and natural disasters to vulnerable groups, especially women, children, the disabled people, ethnic minorities, the elderly, and other groups.	√	
Development, implementation, monitoring and reporting with regard to climate change adaptation plans for vulnerable communities, especially women, children, the disabled, ethnic minorities, the elderly, and other groups.	√	√

Program 3: Development of Capacity for GHG Inventory and MRV

Scope of projects or key actions	2021-2024	2025-2030
Development of data and data-information systems for GHG inventory at the national and city levels in key sectors, such as agriculture, forestry and land use, industry, waste, energy and transports.	√	√
Promotion of research and development of emissions factors in key sectors, such as land uses, forestry, energy, agriculture, industry, transports, urban planning and housing, and waste disposal.	√	√
Capacity building and promotion of implementation of measures on GHG inventory, monitoring, reporting and verification (MRV) at the city level.	√	√
Development of monitoring, reporting and verification (MRV) system for GHG emission at the national level. Promotion of the MRV implementation at the sectorial and project levels.	√	√

Program 4: Development of Capacity for GHG Emission Control and Mitigation in Different Sectors

Scope of projects or key actions	2021-2024	2025-2030
Area 1: Capacity development, promotion of energy and resource conservation, efficiency and savings		
Promotion of the development and expansion of energy-efficient cooking stoves.	√	√
Promotion of energy-saving building designs and household appliances.	√	√
Improvement and development of infrastructures, such as road and bridge networks, goods and passengers transportation, and logistics systems to reduce traffic congestion.	√	√
Promotion and expansion of electrical vehicles (EVs) development.	√	√
Expansion of the smart city development in secondary towns and other locations.	√	√
Promotion and enhancement of resource efficiency in wood and non-timber forest product processing and usage.	√	√
Promotion and enhancement of energy and resource efficiency via the application of digital technology in the telecommunication sector.	√	√
Strengthening of the electrical leak monitoring and control system.	√	√
Strengthening of the Sulphur hexafluoride (SF_6) leak monitoring and control system.		√
Rising awareness, development and application of environmentally friendly green labels, and rewarding to people who implement energy and resource efficiency policies.	√	√

Scope of projects or key actions	2021-2024	2025-2030
Study of, improvement, and implementation of the pilot project for energy resources pricing mechanisms, such as electricity, fuels, water, forest resource and mine pricing mechanisms.	√	√
Area 2: Study, pilot and creation of models to promote clean, environmentally friendly and low-emission technologies		
Promotion of research and planning for the expansion of clean, environmentally friendly and low-emission technologies.	√	
Implementation of plans for the expansion of clean, environmentally friendly and low-emission technologies in energy, public works and transports, industry, agricultural and forestry, and waste sectors.	√	√
Area 3: Pilot and creation of renewable and alternative energy development and utilization		
Promotion and expansion of energy development and utilization for solar power, wind power, biofuel and biomass energy development and utilization.	√	√
Promotion and implementation of the solid waste to energy pilot project.		√
Area 4: Promotion of development and recruitment of GHG capture and storage technologies in key sectors		
Study, research, registration and detailing of appropriate GHG capture and storage technologies.	√	
Promotion of GHG capture and storage technologies in the electrical generation, coal and cement industries.		√
Area 5: Protection and enhancement of Carbon sequestration for ecosystem, especially forests, wetlands and green areas		
Combatting deforestation and forest degradation.	√	√
Enhancement of forest restoration and rehabilitation.	√	√
Promotion of sustainable management of production and community forests.	√	√
Promotion and enhancement of sustainable reforestation.	√	√
Promotion and enhancement of sustainable non-timber forest product management.	√	√
Prevention and reduction of wetland, carbon soil and peatland destruction, in conjunction with local livelihood improvement.	√	√
Promotion of effective and sustainable forest product utilization.	√	√
Promotion of city green area protection and enhancement.	√	√
Area 6: Promotion and enhancement of the standardized management of products, processing and disposal		

Scope of projects or key actions	2021-2024	2025-2030
Enhancement of research, experiments and enforcement of international environmental standards in coal thermal power plants, aviation, cement processing and iron melting industries, and city waste disposal landfills.	√	√
Promotion of education and research for the creation guidelines for climate resilient urban areas and infrastructure development, such as guidelines for planning, maintenance and construction of drainage cannels and landfills.	√	√
Promotion and research for the modification of the City Resilience Index.	√	√
Development of the multi-access database for housing and urban planning sectors.	√	√
Promotion and enforcement of the international environmental standards in major energy generation plants and cement processing factories.		√
Area 7: Enhancement of low emission waste management, including the promotion of the Reduce-Reuse-Recycle (3Rs) and waste-to-energy practices		
Enhanced development and improvement of solid waste management and services, including waste treatment facilities in cities, secondary and tertiary towns.	√	√
Enhanced development and improvement of wastewater management, services and treatment, including wastewater treatment facilities in cities, 2nd and 3rd tier towns.	√	√
Project for environmental improvement in Luang Prabang City.	√	√

Program 5: Development, Utilization and Transfer of Technologies

Scope of projects or key actions	2021-2024	2025-2030
Review, assessment of needs and development of programs for climate change adaption and mitigation technologies	√	
Coordination and collaboration with development partners and the private sector on the implementation of programs for technologies, including experiment, promotion and dissemination of appropriately climate change adaptation, resilience and mitigation technologies.	√	√
Promotion, support and development of local wisdom for climate change adaptation and mitigation.	√	

Program 6: Promotion of Public Education, Awareness and Participation on Climate Change

Scope of projects or key actions	2021-2024	2025-2030
Assessment of capacity needs for the implementation of climate change management in the education sector.	√	√

Scope of projects or key actions	2021-2024	2025-2030
Review and improvement of public educational curriculum, training programs and participation in climate change mitigation for both formal and non-formal education at all levels.	√	√
Development and implementation of capacity building programs for teachers in teaching the climate change curriculum.	√	√
Standardization of public curriculum, guidelines, theories and methodologies for media, disclosure, awareness and participation.	√	√
Training on climate change management, especially with regard to scientific knowledge of climate change, adaptation, technology and effective application.	√	√
Organization of public campaigns, in collaboration with relevant sectors, to disseminate climate change data and information, create opportunities for knowledge sharing, develop pilot projects, model communities and products, and other events.	√	√

Program 7: Enhancement of Climate Finance

Scope of projects and key actions	2021-2024	2025-2030
Study and development of regulations or notices, mechanisms and guidelines for climate finance implementation.	√	
Assessment of financial sources and needs for climate change management.	√	
Development and implementation of strategies and mechanisms for financial access, mobilization, and resources for climate change management.	√	√
Development and implementation of financial monitoring and reporting system.	√	√

Program 8: Mainstreaming, enabling environment and promotion of readiness

Scope of projects or key actions	2021-2024	2025-2030
Mainstreaming of climate change awareness in national, sub-national, and sectoral policies, strategies and programs.	√	
Consultation and development of climate change mainstreaming programs.	√	
Implementation and monitoring of climate change mainstreaming programs.	√	√
Creation and conducting of a consultation platforms, bilateral and multilateral forums on climate change management and other matters.	√	

Program 9: Capacity Enhancement on Climate Change Management

Scope of projects or key actions	2021-2024	2025-2030
Development and consolidation of policies and planning	√	
Development and implementation of institutional strengthening and administration plans at both the national and provincial levels in order to assess gaps and needs regarding the implementation of legislations, regulations, NDCs, conventions and other relevant international agreements.	√	√
Assessment of capacity needs and implementation of human resource development programs for GHG inventory, mitigation planning, modelling and projection, risk and vulnerable assessment, adaptation planning, climate financing, monitoring and evaluation (M&E), monitoring, reporting and verification (MRV), and others.	√	√
Consolidate cooperation and coordination of climate change management.	√	√
Promotion of research and development related to climate change.	√	√

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2) Law on Environment Protection (Amended), no. 041/NA, dated 18 December 2012;
3) Law on Meteorology and Hydrology, no. 36/NA, dated 13 November 2017;
4) Law on Land (Amended), no. 14/NA, dated 21 June 2019;
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6) Law on Forestry, no. 64/NA, dated 13 June 2019;
7) Law on Disaster Management, no. 15/NA, dated 24 June 2019.

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2) United Nations Convention on Biological Diversity (UNCBD) (1992);
3) United Nations Convention to Combat Desertification (UNCCD) (1992);
4) Kyoto Protocol (KP) (2003);
5) Paris Agreement (PA) (2015);
6) Sustainable Development Goals (SDGs) (2015);
7) Montreal Protocol on Substances that Deplete the Ozone Layer (1989) or / and Kigali Amendment to the Montreal Protocol to gradually reduce the consumption and production of hydrofluorocarbons (HFCs) (2016);
8) Decisions A38-18 and A40-18 of the International Civil Aviation Organization (ICAO) on Environment and Climate Change (2013);
9) ASEAN Joint Statement on Climate Change (2019).

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5) Action Plan on Climate Change 2013-2020 (2013);
6) Strategy on Forestry to the year 2020 (2005);
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6) Government of the Lao PDR. Ministry of Agriculture and Forestry, 2018. Forest Reference Emission Level and Forest Reference Level (FREL/FRL) of the Lao PDR for the expenditure in REDD+ under the UNFCCC. Vientiane Capital. https://redd.unfccc.int/files/2018_frel_submission_laopdr.pdf
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